International Council for the Study of Virus and Virus-like Diseases of Grapevine (ICVG)

Bibliography on grapevine virus and virus-like diseases 1985-1997

Compiled by R.Bovey, Secretary of ICVG, Chemin de Trembley 27, CH 1197 Prangins (Switzerland).

I. Introduction

This bibliographic report is the fifth of a series which was initiated in 1965 within the framework of the International Council for the Study of Virus and Virus-like Diseases of Grapevine (ICVG). The four preceding reports were:

Caudwell,A., 1965: Bibliographie des viroses de la vigne des origines à 1965. Office International de la Vigne et du Vin, Paris, 76 pp. (out of print).
Caudwell,A., W.B.Hewitt and **R.Bovey,** 1972: Les viroses de la vigne. Bibliographie de 1965-1970. Vitis **11**, 303-324.
Hewitt,W.B. and **R.Bovey,** 1979: The viroses and virus-like diseases of the grapevine. A bibliographic report 1971-1978. Vitis **18**, 316-376.
Bovey,R. and **G.P.Martelli,** 1986. The viroses and virus-like diseases of the grapevine. A bibliographic report, 1979-1984. Vitis **25**, 227-275.

The papers presented at the 8th Meeting of ICVG held at Bari in September 1984, which were included in the last report although they were published in 1985 (Phytopathologia Mediterranea **24**) have not been mentioned again in the present document. As in previous bibliographic reports, references on Pierce's disease were entered although this disease is now known to be caused by a bacterium. Its inclusion in future bibliographies, however, will be discontinued. No attempt was made to discriminate between research papers, advisory publications intended for wine growers or popular accounts of the diseases caused by viruses or virus-like agents. Most of the references were checked in the original and great care was taken to avoid misquotations.

In the four previous bibliographic reports mentioned above, the references were numbered in a continuous way, from number 1 (Akdogan, 1956) to 2799 (Zinka *et al.*, 1979). For the present report, all references were entered in a computer, and it was not possible to continue with the same numbering system. The references are therefore numbered from 1 to 1670. The alphabetic order of the references was organized by the computer bibliographic software Refman (Reference Manager, Research Information Systems, Inc., Carlsbad, CA 92009, USA). Some corrections had to be made in order to respect as much as possible the bibliographic rules in this respect.

The bibliography which we are presently pleased to offer on Internet to all colleagues interested is also available in a printed version, without summaries, in the *Options Méditerranéennes* ser. B, No 29, published by the Mediterranean Agronomic Institute of Valenzano, Bari (CIHEAM / IAMB)

II. Subject index

Etiology

Euscelidius variegatus, Euscelis incisus (see leafhopper vectors or suspected vectors of grapevine phytoplasmas)

3. References

The numbers before the first author's name correspond to the Subject index numbers

1. **Abou-Ghanem, N., S. Sabanadzovic, A. Minafra, P. Saldarelli, M.A. Castellano, and G.P. Martelli.** 1997. Physico-chemical and molecular characterization of grapevine leafroll-associated virus 2, p. 15-16. In O. A. Sequeira,de, J. C. Sequeira, and M. T. Santos (ed.), Extended abstracts 12th Meeting ICVG, Lisbon, Portugal, 29 September-2 October 1997. Dept.Plant Pathology, Estação Agronomica Nacional, Oeiras, Portugal.
Keywords :grapevine; leafroll; GLRaV-2; closterovirus; genome; molecular analysis; properties; Italy; meeting; ICVG;
Notes : Grapevine leafroll-associated virus 2 (GLRaV-2) is the only closterovirus-like virus infecting grapevine that is transmissible by mechanical inoculation. *Nicotiana benthamiana* is the only infectible herbaceous host, it is used for purification of the virus. The mol. weight of the viral RNA is about 6×10^6 daltons. The coat protein is a single polypeptide of mol. weight 21.5 kDa. Viral particles were observed in electron microscope sections and were immunolabelled with colloidal gold. They were localized in the nuclei and cytoplasm of sieve tubes and companion cells. The genomic organization of viral RNA was studied. Eight open reading frames (ORFs) were identified in the 3' end region of the viral genome and were sequenced. The structural organization of GLRaV-2 is very similar to that of beet yellows virus. GLRaV-2 is therefore certainly a true closterovirus.

2. **Abou-Ghanem, N., P. Saldarelli, A. Minafra, N. Buzkan, M.A. Castellano, and G.P. Martelli.** 1997. Properties of grapevine virus D, a novel putative trichovirus. Journal of Plant Pathology **79**:15-25.
Keywords :grapevine; vitivirus; GVD; *in vitro;* corky rugose wood; new virus; occurrence; properties; immunoassay; nucleic acid assay; Italy;
Notes : The name of grapevine virus D is proposed for a trichovirus very similar to GVA, GVB or GVC, found in Apulia in a vine cv. Primus with symptoms described as "corky rugose wood" (Bonavia et al., 1996, ref.169). The virus was transmitted from *in vitro* grown explants from this vine to *Nicotiana occidentalis*. The virus has particles of 825 x 12 nm in size, with distinct cross-banding. Coat protein subunits have an estimated Mr of ca 20.5 kDa, and the genome is a single-stranded RNA with ca 7600 nt in size. GVD is serologically unrelated with GVA, GVB, GVC, Heracleum latent trichovirus (HLV), grapevine berry inner necrosis (Terai et al., 1993, ref. 1530) and GLRaV-1 to -7. The cytopathology of GVD-infected *Nicotiana occidentalis* is very similar to that caused by GVA or GVB. A cloned probe 420 bp in size hybridized with purified GVD-RNA and with total nucleic acids from infected *N.occidentalis*, but not with comparable preparations with GVA and GVB. The genome structure of GVD is very similar to that of GVA or GVB. These data strongly support the idea that GVD is a member of the Trichovirus genus. A study of 307 vines from diverse varieties and geographical origins showed that GVD occurred in 4% of 218 accessions with rugose wood symptoms, but in none of 89 disease-free vines.

3. **Abracheva, P.** 1992. Les maladies à virus et les maladies de type viral de la vigne en Bulgarie. (Virus and virus-like diseases of grapevine in Bulgaria). Progr. Agric. Vitic. **109**:434-436.
Keywords :grapevine; virus diseases; virus-like diseases; Bulgaria;

4. **Abracheva, P. and N. Atanassova.** 1991. Influence of climatic factors on symptoms expression of grapevine fanleaf in Bulgaria, p. 493-496. In I. C. Rumbos, R. Bovey, D. Gonsalves, W. B. Hewitt, and G. P. Martelli (ed.), Proceedings of the 10th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG). Plant Protection Institute, P.O. Box 303, 38001 Volos, Greece.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; symptoms; Bulgaria; meeting; ICVG;
Notes : Study on the influence of temperature, rainfall and hydrothermic coefficient on symptom expression of fanleaf in grapevines cv. Bolgar in Bulgaria.

5. **Abracheva, P., L. Rozenova, and M. Todorova.** 1994. L'influence de grapevine fanleaf virus et de stem pitting sur la cultivation de la vigne *in vitro* (Influence of grapevine fanleaf virus and stem pitting on *in vitro* culture of grapevine). Vitis **33**:181-182.
Keywords :grapevine; i*n vitro*; micropropagation; nepovirus; grapevine fanleaf virus; stem pitting; rugose wood; growth; Bulgaria;
Notes : Growth of Rupestris du Lot was depressed by virus infection. The influence of virus was maximum on explants from the apical part of shoots.

6. **Agran, M.K., B. Di Terlizzi, D. Boscia, A. Minafra, V. Savino, G.P. Martelli, and F. Askri.** 1990. Occurrence of grapevine virus A (GVA) and other closteroviruses in Tunisian grapevines affected by leafroll disease. Vitis **29**:43-48.
Keywords :grapevine; leafroll; mealybug; *Planococcus citri;* vitivirus; GVA; closterovirus; GLRaV-1; GLRaV-2; GLRaV-3; Tunisia; Italy;
Notes : All grapevines with leafroll symptoms showed the presence of closterovirus particles in ISEM/IEM: GLRaV-1, 2, 3, GVA. GLRaV-3 + GVA occur in about 50% of specimens. Transmission of GVA isolate by *Planococcus citri* to herbaceous hosts. Serological reactions of GVA identical with those of Italian isolates. Occurrence: GLRaV-1: 17%; GLRaV-2: 27%; GLRaV-3: 77%; GVA: 50%.

7. **Agulhon, R. and J. C. Laurent.** 1987. Informations sur l'évolution de la cicadelle *Scaphoideus titanus* (Information on the evolution of the leafhopper *Scaphoideus titanus*). Progr. Agric. Vitic. **104**:340-341.
Keywords :grapevine; phytoplasma disease; leafhopper; flavescence dorée; *Scaphoideus titanus;* France;
Notes : In French. Evolution of the populations of this insect in Aude, Hérault, Gard, Ardèche, Drome, Vaucluse and Bouches du Rhône.

8. **Ahrens, U. and E. Seemüller.** 1992. Detection of DNA of plant pathogenic mycoplasmalike organisms by a polymerase chain reaction that amplifies a sequence of the 16S rRNA gene. Phytopathology **82**:828-832.
Keywords :grapevine; phytoplasma disease; flavescence dorée; phytoplasma; PCR; nucleic acid assay; method; detection; Germany;
Notes : The authors describe a method for the amplification of the DNA that codes for 16S rRNA of mycoplasma-like organisms (MLO) by polymerase chain reaction (PCR). 24 cycles are suitable. The method provides a great sensitivity, positive results were obtained with as little as 18 pg with MLOs from periwinkle. With 40 amplification cycles, contaminations appear. Flavescence dorée MLO has been used among many other yellows disease MLOs.The sensitivity of this method is considered as 1000 times that of dot blot hybridization of DNA extracts from periwinkle.

9. **Akbas, B. and G. Erdiller.** 1993. Researches on grapevine virus diseases and determination of their incidence in Ankara,Türkiye. Journal of Turkish Phytopathology **22***(2-3):*55-61.
Keywords :grapevine; survey; virus; alfalfa mosaic virus; arabis mosaic virus; strawberry latent ringspot virus; tomato black ring virus; leafroll; indexing; immunoassay; serology; ELISA; Turkey;
Notes :A survey made in vineyards of the districts of Ankara, based on symptomatology, indexing, and serological reactions including DAS-ELISA showed that following viruses were present in the region: alfalfa mosaic virus, arabis mosaic virus, grapevine fanleaf virus, strawberry latent virus, tomato black ring virus, and grapevine leafroll virus.

10. **Al Kowni, R., M. Digiaro, and V. Savino.** 1997. A survey of grapevine viruses in Palestine, p. 111-112. In O. A. Sequeira,de, J. C. Sequeira, and M. T. Santos (ed.), Extended abstracts 12th Meeting ICVG, Lisbon, Portugal, 29 September-2 October 1997. Dept.Plant Pathology, Estação Agronomica Nacional, Oeiras, Portugal.
Keywords :grapevine; virus diseases; survey; occurrence; vitivirus; GVA; GVB; nepovirus; grapevine fanleaf virus; closterovirus; leafroll; GLRaV-1; GLRaV-2; GLRaV-3; GLRaV-7; Italy; meeting; ICVG;
Notes : A survey was made in Palestinian vineyards in 1996-1997 for the presence of viruses. 566 *Vitis vinifera* and 69 rootstocks were examined and material sampled for virus determination made in Bari (indexing by mechanical inoculation or green grafting, ELISA). Following viruses were detected (mentioned

in decreasing order of incidence): GVA, GLRaV-1, GLRaV-3, GFkV, GLRaV-2, GVB, GFLV, GLRaV-7. GLRaV-1, GVB and GLRaV-7 were not found in rootstocks. The infection level of rootstocks was lower than that of European grapevines, except for GFLV. The high percentage of infection by GLRaV-1 (45.6%) is astonishing in relation to the absence of contamination in the rootstocks. This suggests the possibility of a vector, so far unknown.

11. **Albanese, G., V. D'Urso, G. Granata, and S. Collodoro.** 1997. Individuazione di un fitoplasma in esemplari di *Psammotettix striatus* catturati in vigneti (Detection of a phytoplasma in *Psammotettix striatus* captured in vineyards). Inform. Fitopatol. **47***(7/8)*:57-60.
Keywords :grapevine; phytoplasma disease; phytoplasma; Sicily; vector; survey; Italy;
Notes : In Italian, Eng.sum. A study was made on Homoptera collected in Sicilian vineyards. Several insects known as vectors of phytoplasmas were identified. *P. striatus* was found to be a possible vector of a phytoplasma, which was detected in extracts of these insects collected in vineyards. However, the molecular identification of the detected phytoplasma showed that it was genetically different from phytoplasmas of grapevine present in Sicily.

12. **Albanese, G., R.E. Davis, G. Granata, E. L. Dally, T. Santuccio, and M. Tessitori.** 1996. DNA-based analyses to detect and identify phytoplasmas in yellows-diseased grapevines in Sicily. Petria **6**:65-75.
Keywords :grapevine; phytoplasma disease; detection; diagnosis; PCR; method; Sicily; Italy;
Notes :PCR amplification of a sequence of the phytoplasma 16S rRNA gene in extracts from leaves of cvs. Inzolia and Chardonnay showing symptoms of yellows in Sicily. The technique was suitable for detecting phytoplasmas in only a few of symptomatic vines. To increase the sensitivity of the analysis, PCR amplification products were hybridized with a specific probe of the amplified DNA (758/1232) or were submitted to a secondary amplification (nested-PCR) through the use of other nested universal primers 758F/1232R. With this improved method, phytoplasmas were detected in most of symptomatic vines analysed.

13. **Albanese, G., G. Granata, S. Collodoro, E. Egger, P. Baioletti, and M. D'Arcangelo.** 1997. Individuazione e caratterizzazione molecolare di fitoplasmi in piante di vite con sintomi di giallume in Umbria (Detection and molecular characterization of phytoplasmas in grapevine plants with symptoms of yellows in Umbria). Riv. Vitic. Enol. **50***(4):*3-9.
Keywords :grapevine; phytoplasma; phytoplasma disease; detection; PCR; RFLP; Italy; aster yellows;
Notes : In Italian, Eng. sum. Symptoms of the yellows type were observed on grapevines in Umbria, Italy. In a vineyard planted with three white varieties, Grechetto, Chardonnay and Italian Riesling and one black variety, Merlot, the authors recorded in 1995 from 2 to 20 % of yellows-diseased vines, depending on the variety. Using the techniques of molecular analysis (nested polymerase chain reaction and restriction fragment length polymorphism analysis of the DNA coding for the 16S ribosomal RNA of the pathogen) they were able to show that the phytoplasmas detected belonged to the 16SrI phylogenic group of aster yellows, subgroup 16SrI-G. Some of the vines with symptoms of yellows gave negative reactions in the tests. The authors suggest that this may be due to an irregular distribution of the phytoplasmas in the vines or to a degradation of nucleic acid during the collection and manipulation of the samples. Phytoplasmas of this subgroup have been already detected in grapevines with yellows symptoms in Piedmont, Veneto, Emilia-Romagna, Liguria, Tuscany and Sicily.

14. **Allen, W.R.** 1986. Effectiveness of Ontario populations of *Longidorus diadecturus* and *L. breviannulatus* as vectors of peach rosette mosaic and tomato blackring viruses. Can. J. Pl. Pathol. **8**:49-53.
Keywords :peach rosette mosaic virus; tomato black ring virus; nepovirus; transmission; nematode; vector; *Longidorus*; Longidoridae; Ontario; Canada;
Notes : Peach rosette mosaic virus from peach and tomato blackring virus from grapevines imported in Ontario from France were found to be closely related serologically to strain G (potato bouquet virus). Transmission to *Chenopodium quinoa* and *Petunia hybrida*. Does not concern directly grapevine.

15. **Allen, W.R. and B.A. Ebsary.** 1988. Transmission of raspberry ringspot, tomato black ring, and peach rosette mosaic viruses by an Ontario population of *Longidorus elongatus*. Can. J. Pl. Pathol. **10**:1-5.

Keywords :raspberry ringspot virus; tomato black ring virus; peach rosette mosaic virus; *Longidorus*; Longidoridae; nepovirus; transmission; vector; nematode; Ontario; Canada;
Notes : Transmission data showed that with respect to transmission of the three viruses considered, the Ontario population of this nematode is similar to European (UK) populations. No direct implication is considered for grapevine.

16. **Allen, W.R., L. W. Stobbs, J.G. Van Schagen, and B.A. Ebsary.** 1988. Association of *Xiphinema* species with soil types and grapevines infected with tomato ringspot virus in Ontario, Canada. Plant Disease **72**:861-863.
Keywords :grapevine; nepovirus; tomato ringspot virus; *Xiphinema rivesi; Xiphinema americanum;* Longidoridae; nematode; vector; Ontario; Canada;
Notes :*Xiphinema rivesi* is the main vector for tomato ringspot in grapevine in the Niagara Peninsula. This species was found in all samples containig nematodes. *X. americanum* was found in only 1 sample.

17. **Alleweldt, G. and M. Harst-Langenbucher.** 1987. Der Einfluss von Wachstumsinhibitoren auf die Langzeitlagerung von *in-vitro*-Kulturen der Rebe (Influence of growth inhibitors on long term storage of *in vitro* cultures of grapevine). Vitis **26**:57-64.
Keywords :grapevine; *in vitro*; micropropagation; storage; growth inhibitor; Germany;
Notes :CCC at 750 ppm in the medium for *in vitro* culture makes it possible to store grape plantlets for 10 months at 3^{o} C without loss in vitality, whereas untreated plants died. The CCC is included in the medium after sterilization using a sterile filter. This method is useful in relation with storage of virus-free material.

18. **Alma, A., A. Arzone, and D. Bosco.** 1993. Grapevine MLO transmission by insects, p. 84-85. In P. Gugerli (ed.), Extended abstracts 11th Meeting ICVG, Montreux, Switzerland, 6-9 September 1993. Federal Agricultural Research Station of Changins, CH-1260 Nyon, Switzerland.
Keywords :grapevine; phytoplasma; phytoplasma disease; transmission; leafhopper; *Scaphoideus titanus; Euscelidius variegatus;* etiology; Italy; meeting; ICVG;
Notes : Transmission experiments from grapevines to grapevines and to herbaceous hosts with *Scaphoideus titanus* and other leafhopper species showed that yellows disease present in northeastern Italy differs from flavescence dorée as it occurs in France.

19. **Alma, A., D. Bosco, A. Danielli, A. Bertaccini, M. Vibio, and A. Arzone.** 1997. Identification of phytoplasmas in eggs, nymphs and adults of *Scaphoideus titanus* Ball reared on healthy plants. Insect Mol. Biol. **6**:115-121.
Keywords :grapevine; phytoplasma disease; phytoplasma; *Scaphoideus titanus;* leafhopper; aster yellows; detection; PCR; RFLP; nested PCR; vector; transovarial transmission; Italy;
Notes :A survey for the presence of aster yellows-related phytoplasmas in the different stages of *Scaphoideus titanus* was carried out by means of PCR and nested-PCR. Using a phytoplasma 16Srl group-specific primer pair followed by RFLP analysis of amplified products, the authors were able to detect and identify phytoplasmas from eggs, newly hatched nymphs, fourth and fifth instar nymphs and adults reared on ten phytoplasma-free *Vicia faba* seedlings. Two of them became infected, whereas PCR failed to detect phytoplasmas in the same ten plants before leafhopper rearing. These results suggest the possibility of transovarial transmission of aster yellows-related phytoplasmas in *S. titanus.*

20. **Alma, A., R.E. Davis, M. Vibio, A. Danielli, D. Bosco, A. Arzone, and A. Bertaccini.** 1996. Mixed infection of grapevines in northern Italy by phytoplasmas including 16S rRNA RFLP subgroup 16SrI-B strains previously unreported in this host. Plant Disease **80**:418-421.
Keywords :grapevine; phytoplasma; molecular detection; classification; symptoms; RFLP; PCR; elm yellows; aster yellows; IPVR; Italy; USA;
Notes : Chardonnay vines with symptoms similar to those of flavescence dorée in vineyards in Piedmont (Italy) were shown to contain phytoplasmas genetically related to two phylogenetically different 16S rRNA RFLP groups. They belong to group 16SrI (aster yellows and related phytoplasmas) and 16SrV (elm yellows and related phytoplasmas). Of the 16 tested vines, 13 contained phytoplasmas of the 16SrI group mentioned above: 12 of them contained strains of the subgroup 16SrI-G subgroup (Italian perivinkle virescence IPVR

and related phytoplasmas), and one contained a strain of subgroup 16SrI-B (Maryland aster yellows and related phytoplasmas). Doubly infected vines were also found: 16SrI-G + 16SrV, and 16rI-G + 16SrI-B.

21. **Altmayer, B.** 1987. Die *in vitro* Vermehrung von Reben (*In vitro* multiplication of grapevines). Gesunde Pflanzen **39**:318-325.
Keywords :grapevine; meristem tip culture; virus elimination; *in vitro;* grapevine fanleaf virus; arabis mosaic virus; raspberry ringspot virus; tomato black ring virus; nepovirus; strawberry latent ringspot virus; leafroll; Germany;
Notes :*In vitro* culture of grapevine shoot tips including the meristem and 1-3 leaf primordia. Good results for eliminating GFLV, ArMV, RRV, ToBRV, SLRV and leafroll, without chemotherapy or thermotherapy.

22. **Altmayer, B.** 1987. Viruskrankheiten der Rebe (Virus diseases of grapevine). Weinwirtschaft Anbau **123***(7):*24-27.
Keywords :grapevine; virus diseases; virus-like diseases; Germany;
Notes : In German. This is a popular account on grapevine virus diseases intented for wine growers in Germany.

23. **Altmayer, B.** 1989. Elimination of different nepoviruses and grapevine leafroll by *in vitro* apical culture of grapevines, p. 155-158. In E. Tanne (ed.), Proceedings of the 9th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG), Kiryat Anavim, Israel, September 1987. The Volcani Center, P.O. Box 6, Bet Dagan, Israel.
Keywords :grapevine; grapevine fanleaf virus; raspberry ringspot virus; arabis mosaic virus; strawberry latent ringspot virus; tomato black ring virus; nepovirus; leafroll; *in vitro;* meristem tip culture; virus elimination; Germany; meeting; ICVG;
Notes : Grapevine fanleaf virus, raspberry ringspot virus, arabis mosaic virus, strawberry latent virus, tomato black ring virus and grapevine leafroll were eliminated by shoot tip metistem culture without additional heat- or chemotherapy. The explants should be 0.2 -0.5 mm in size, including the apical dome and 1-3-leaf primordia.

24. **Altmayer, B.** 1989. Investigations on the elimination of nepoviruses and grapevine leafroll by shoot tip meristem culture of grapevines. Phytoparasitica **17**:72-73.
Keywords :grapevine; grapevine fanleaf virus; arabis mosaic virus; raspberry ringspot virus; tomato black ring virus; strawberry latent ringspot virus; leafroll; virus elimination; *in vitro;* meristem tip culture; Germany; nepovirus; meeting; ICVG;
Notes : Abstract. This paper appears in full in the Proceedings of the 9th meeting of ICVG, Kiryat Anavim, Israel, 1987, 155-158 (1989).

25. **Altmayer, B. and A. Becker.** 1987. Kernerkrankheit -- Abhilfe in Sicht ? (Kerner disease -- prospects of help ?). Weinwirtschaft Anbau **123** *(6):*20-23.
Keywords :grapevine; nepovirus; etiology; Kerner disease; occurrence; arabis mosaic virus; rootstock; incompatibility; enquiry; Germany;
Notes : In German. An enquiry was made among growers of 127 vineyards with Kerner grapes. Arabis mosaic virus (ArMV) was found in 90% of 101 vines with symptoms, whereas 89 % of 43 vines without symptoms had no ArMV. The virus was found in rootstocks, but never in scions. The disease seems to be due to a defence reaction of the variety Kerner to ArMV infection from the rootstock, causing an obstruction of the vessels. As protection measures, the authors recommend to use virus-free scionwood and rootstocks, and to avoid planting the variety Kerner in soils infested by the vectors of ArMV.

26. **Andrade, E.R.,De and E.L. Peruzzo.** 1993. Viroses da videira: caracterização e obtenção de matrizes libres dos principais virus (Virus diseases of grapevine: characterization and obtention of plant material free from the main viruses). Agropecuaria Catarinense **6***(3):*10-13.

Keywords :grapevine; leafroll; GLRaV; closterovirus; nepovirus; grapevine fanleaf virus; corky bark; stem pitting; rugose wood; *Xiphinema index; Xiphinema italiae;* virus-free material; virus elimination; indexing; Brazil;
Notes : In Portuguese. Symptoms caused by grapevine leafroll-associated closteroviruses, GFLV, corky bark virus, dissemination by vectors. Production of virus-free grapevine material at the Experimental Station of Videira, C.P. 21, Videira, SC, Brazil. (Rev. of Pl.Pathol. 1994, ref.1768; also Rev.Agr.Entomol.1994, ref.8316).

27. **Anonymous,** 1985. La flavescence dorée dans l'Aude en 1985. (Flavescence dorée in Aude in 1985). Progr. Agric. Vitic. **102**:569-573.
Keywords :grapevine; phytoplasma disease; flavescence dorée; occurrence; symptoms; Aude; France;
Notes : In French. Report by the Chambre d'Agriculture de l'Aude on the situation concerning flavescence dorée in Aude, southern France, for the year 1985. Occurrence of the disease and its vector *Scaphoideus littoralis/titanus*, control measures, economic importance.

28. **Anonymous,** 1986. Compte-rendu du IVe Symposium international sur la sélection clonale de la vigne. Nyon-Changins (Suisse), 1er-4 septembre 1986. (Report on the 4th International symposium on clonal selection of grapevine, Nyon-Changins, Switzerland). Progr. Agric. Vitic. **103**:439-445.
Keywords :grapevine; clonal selection; virus diseases; heat therapy; chemotherapy; virus elimination; performance; meeting; Switzerland;
Notes : In French.

29. **Anonymous,** 1987. La flavescence dorée dans l'Aude en 1987. (Flavescence dorée in Aude in 1987). Progr. Agric. Vitic. **104**:207-215.
Keywords :grapevine; phytoplasma disease; flavescence dorée; symptoms; occurrence; leafhopper; *Scaphoideus titanus;* control; insecticide; Aude; France;
Notes : In French. Report by the Chambre d'Agriculture of Aude, France, on the importance of flavescence dorée attacks in Aude, evolution of the disease, damage, transmission, control with winter and summer insecticide sprays, which are compulsory in infected vineyards.

30. **Anonymous,** 1987. L'évolution de la flavescence dorée dans le vignoble français au cours de 1987. (Evolution of flavescence dorée in the French vineyards in 1987). Progr. Agric. Vitic. **104**:399-400.
Keywords :grapevine; phytoplasma disease; flavescence dorée; survey; France;

31. **Anonymous,** 1987. Expérimentation d'insecticides sur la cicadelle de la flavescence dorée *(Scaphoideus titanus)*. (Experiments with insecticides against the leafhopper vector of flavescence dorée, *Scaphoideus titanus*). CIVAM de la région Corse, Lupino, F-20600 Bastia (Corse), France.
Keywords :grapevine; phytoplasma disease; flavescence dorée; leafhopper; vector; *Scaphoideus titanus*; insecticide; control; France; Corsica;
Notes : Publication No 18 of the "Centre d'Information et de Vulgarisation pour l'Agriculture et le Milieu Rural de la région Corse (CIVAM)". Summary of previous research, experiments made in 1987, results, bibliography.

32. **Anonymous,** 1988. Flavescence dorée de la vigne en Corse, expérimentation 1988 (Flavescence dorée in Corsica, experiments made in 1988). CIVAM de la région corse, Lupino, F-20600 Bastia (Corse), France.
Keywords :grapevine; phytoplasma disease; flavescence dorée; *Scaphoideus titanus;* leafhopper; vector; control; insecticide; Corsica; France;
Notes : Publication No 29 du "Centre d'Information et de Vulgarisation pour l'Agriculture et le Milieu Rural de la Région Corse (CIVAM)". Field trials with insecticides against *Scaphoideus titanus* in 1988. Situation concerning the flavescence dorée in Corsica.

33. **Anonymous,** 1988. Mise au point d'une méthode de lutte contre les cochenilles de la vigne (Development of a method for the control of grapevine mealybugs). Progr. Agric. Vitic. **105**:346-350.
Keywords :grapevine; mealybug; control; *Planococcus ficus;* France;

Notes : In French. Experiments made by the CIVAM of the Corsican region for the control of the most important mealybugs of grapevine in the region, *Planococcus ficus* and *Eulecanium corni*. Very good results with one winter spray (Dinitrocresol-DNOC + oil) and 3 summer sprays with methidathion.

34. **Anonymous,** 1988. Résolution No 1, Rome 1987, Commission I: Viticulture. Bull. OIV **61**:94-95.
Keywords :grapevine; ICVG; resolution; OIV; meeting; Israel; Italy;
Notes : Text of the resolution adopted by ICVG at the 9th meeting at Kiryat Anavim and sent to OIV. This text was adopted by OIV at the meeting of 1987 in Rome.

35. **Anonymous,** 1989. La flavescence dorée. Bilan 1988. Progr. Agric. Vitic. **106**:88-90.
Keywords :grapevine; phytoplasma disease; flavescence dorée; economic importance; symptoms; control; France;
Notes : Information on FD by the SITEVI. Damage, control measures in southern France.

36. **Anonymous,** 1989. Round table on grapevine red leaf and rugose wood syndrome, p. 227-228. In E. Tanne (ed.), Proceedings of the 9th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG), Kiryat Anavim, Israel, September 1987. The Volcani Center, P.O.Box 6 , Bet Dagan, Israel.
Keywords :grapevine; corky bark; rugose wood; stem pitting; leafroll; stem grooving; indexing; closterovirus; meeting; Israel; ICVG;
Notes : Summary of a round table discussion held during the 9th ICVG meeting at Kiryat Anavim, Israel. The main problems discussed were rugose wood, corky bark and leafroll, indexing, and the nomenclature of leafroll associated viruses.

37. **Anonymous,** 1989. Etude de l'efficacité de divers insecticides sur la cicadelle *Scaphoideus titanus* vectrice de la Flavescence dorée. (Study on the effectiveness of various insecticides on the leafhopper *Scaphoideus titanus* vector of flavescence dorée). Progr. Agric. Vitic. **106**:163-169.
Keywords :grapevine; phytoplasma disease; *Scaphoideus titanus;* leafhopper; flavescence dorée; vector; insecticide; control; France;
Notes : In French. Experiments with oleoparathion, sodium arsenite, pyrethrinoids, etc. for controlling the leafhopper *Scaphoideus titanus*, vector of flavescence dorée. They are reported by the Chambre d'Agriculture of Aude, in southern France.

38. **Anonymous,** 1989. Flavescence dorée de la vigne, travaux 1989 (Grapevine flavescence dorée, work of 1989). CIVAM de la région corse, Lupino, 20600 Bastia (Corse) France.
Keywords :grapevine; phytoplasma disease; flavescence dorée; leafhopper; vector; *Scaphoideus titanus;* control; insecticide; Corsica; France;
Notes : Publication No 32 of the" Centre d'Information et de Vulgarisation pour l'Agriculture et le Milieu Rural de la Région Corse (CIVAM)". Summary of field trials 1987-1988, list of insecticides available and authorized against *Scaphoideus titanus*, vector of FD, experiments with insecticides in 1989. Research of host plants for *S.titanus* other than grapevine and of other possible vectors of FD.

39. **Anonymous,** 1990. Flavescence dorée de la vigne. Travaux 1989 (Grapevine flavescence dorée. Work in 1989). Progr. Agric. Vitic. **107**:218.
Keywords :grapevine; phytoplasma disease; flavescence dorée; *Scaphoideus titanus;* leafhopper; vector; control; insecticide; biology; Corsica; France;
Notes : In French. Summary of the work done in 1989 by the CIVAM and the SRPV (regional service of plant protection) of Corsica on the chemical control of *Scaphoideus titanus*, vector of flavescence dorée. Also research work on possible alternative hosts in summer. *S.titanus* appears to be able to complete its summer cycle (from L1 to adult) on *Rumex* and clover. On plantago and Alep sorghum, only aged larvae and adults were found.

40. **Anonymous,** 1991. Quarantine procedure. Méthode de quarantaine. Tomato ringspot nepovirus in fruit tree and grapevine / Tomato ringspot nepovirus sur arbres fruitiers et vigne. Bulletin OEPP/EPPO Bulletin **21**:245-250.
Keywords :grapevine; nepovirus; quarantine; general; ELISA; tomato ringspot virus;
Notes : Recommendations, in English and French, concerning quarantine procedures for inspection and test methods. This papers concerns mainly fruit trees. For grapevine, the recommended test is ELISA.

41. **Anonymous,** 1991. Flavescence dorée de la vigne, travaux 1990 (Flavescence dorée of grapevine, work of 1990). CIVAM de la région corse, Lupino, F-20600 Bastia (Corse), France.
Keywords :grapevine; phytoplasma disease; flavescence dorée; leafhopper; vector; *Scaphoideus titanus;* biology; control; insecticide; survey; Corsica; France;
Notes : Publication No 42 of the "Centre d'Information et de vulgarisation pour l'Agriculture et le Milieu Rural de la Région Corse (CIVAM). Contribution to the knowledge of the biology and ethology of *Scaphoideus titanus*, survey of populations of the vector in regions affected with FD, experiments with insecticides, evolution of the disease.

42. **Anonymous,** 1992. Proposed scheme for grapevine certification in the European Economic Community, p. 101-130. In G. P. Martelli (ed.), Grapevine Viruses and Certification In EEC Countries: State of the Art. Quaderno No 3, Istituto Agronomico Mediterraneo (I.A.M.), Bari, Italia.
Keywords :grapevine; certification; sanitary selection; EEC; meeting; legislation;
Notes : Concluding chapter of the Panel discussion and Seminar held at the I.A.M., Valenzano/Bari, Italy, 22-23-March 1991. After a discussion on major discrepancies between certification systems of individual EEC countries, a scheme is proposed as a basis for a novel EEC legislative initiative on grapevine certification. It includes the successive steps in selection and multiplication of selected material, sanitary requirements, testing for disease freedom, sanitation procedures, certification and labelling. In English, Italian and French. Book chapter.

43. **Anonymous,** 1992. La lutte contre la flavescence dorée de la vigne dans le cadre de l'agriculture biologique (The control of flavescence dorée in biological agriculture). Progr. Agric. Vitic. **109**:523-526.
Keywords :grapevine; phytoplasma disease; flavescence dorée; *Scaphoideus titanus;* leafhopper; control; insecticide; France;
Notes : The use of neem oil as an insecticide against *Scaphoideus titanus,* leafhopper vector of flavescence dorée (FD) was experimented as a possible substitute to classical insecticides in biological cultivation of grapevine in regions affected by flavescence dorée. The results were disappointing. No insecticide among those allowed in "biological cultivation" is sufficiently effective to control this insect and stop FD epidemics. The only possible measures compatible with biological agriculture, beside these inefficient or little efficient insecticides are: 1. Winter spray with white oil against eggs of *S.titanus.* 2. Removal and burning of pruned wood. 3. removal of unnecessary buds.

44. **Anonymous,** 1994. Certification scheme/Schéma de certification: Pathogen-tested material of grapevine varieties and rootstocks/Certification sanitaire des variétés et porte-greffe de la vigne. Bulletin OEPP/EPPO Bulletin **24**:347-367.
Keywords :grapevine; certification; virus; virus-like diseases; indexing; immunoassay; ELISA; sampling; detection; identification; Europe;
Notes : Guidelines No 8 for sampling, indexing and/or various procedures of laboratory tests for detecting pathogens of grapevine. The scheme includes selection for pomological and health quality, maintenance of candidate material, production of nuclear stock plants, distribution of propagation stock and production of certified stock, checking the use and status of certified material, certification and labelling. The methods for testing on *Vitis* indicators, on herbaceous hosts, and with ELISA are outlined. Detection methods for the main viruses and virus-like diseases are described as well as sanitation procedures.

45. **Anonymous,** 1995. Le matériel végétal "vigne" de notre époque. Sa sélection sanitaire et génétique. Les résultats obtenus (The grapevine propagation material of our epoch. Its sanitary and genetic selection. Results obtained). Progr. Agric. Vitic. **112**:511-515.

Keywords :grapevine; sanitary selection; clonal selection; certification; performance; virus-free material; virus elimination; France;
Notes : In French. The author is indicated with the initial "N." This is a report on a meeting held at the ENTAV (Etablissement National pour l'Amélioration de la Viticulture), Domaine de l'Espiguette, Le Grau-du-Roi, France, 8.11.95.

46. **Arias, M., A. Bello, and J. Fresno.** 1994. Nematodos vectores de virus de la vid en España (Nematode vectors of grapevine viruses in Spain). Investigacion agraria *(2)*:187-199.
Keywords :grapevine; nematode; vector; *Xiphinema index; Xiphinema italiae; Xiphinema rivesi; Longidorus attenuatus; Longidorus elongatus;* Longidoridae; survey; Spain;
Notes : In Spanish, En. sum. Study of nematodes that transmit nepoviruses in Spanish vineyards, including Baleares Islands. The most frequent vector nematode is *Xiphinema index*, followed by *X.italiae*. *X.diversicaudatum, Longidorus attenuatus, L.elongatus and Xiphinema rivesi* are also present.

47. **Arias, M. and J. Fresno.** 1994. Agroecological characterization of *Xiphinema index* in Spain. Bulletin OEPP/EPPO Bulletin **24**:403-411.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; *Xiphinema index;* Longidoridae; nematode; vector; occurrence; distribution; Spain;
Notes : Occurrence and distribution of *Xiphinema index* in Spain. This species is widespread in viticultural areas. It prefers sandy-loam or sandy-clay soils, and the degree of moisture is important. Grapevine and fig are the main hosts. The reproduction cycle is about 6-8 weeks. *X.index* was found in 14% of all vineyards sampled and in 50% of vineyards with GFLV. ELISA can detect GFLV in batches of 5 nematodes.

48. **Arias, M., J. Fresno, and A. Bello.** 1993. Grapevine fanleaf virus in Canary Islands as a model for Mediterranean region, p. 108-109. In P. Gugerli (ed.), Extended abstracts 11th Meeting ICVG, Montreux, Switzerland, 6-9 September 1993. Federal Agricultural Research Station of Changins, CH-1260 Nyon, Switzerland.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; nematode; *Xiphinema index; Xiphinema italiae;* Longidoridae; occurrence; Canary Islands; Spain; meeting; ICVG;
Notes : Grapevine fanleaf virus (GFLV) is widespread in all Canary Islands except Lanzarote and La Gomera. The infection appears to have spread mainly through diseased nursery material. *Xiphinema index* is present in the whole archipelago, with highest populations in orchards of fig trees, especially in places with high moisture content. *X.italiae* was also found in some of the islands.

49. **Arias, M., J. Fresno, A. Lopez Pérez, M. Escuer, S. C. Arcos, and A. Bello.** 1997. Nematodos, virosis y manejo del viñedo en Castilla-La Mancha (Nematodes, viroses and vineyard management in Castile and La Mancha). Centro de Ciencias Medioambientales - Junta de Comunidades de Castilla-La Mancha, Serrano, 115 dpdo-28006 Madrid, Spain.
Keywords :grapevine; nematode; vector; survey; nepovirus; grapevine fanleaf virus; *Xiphinema index; Xiphinema italiae; Xiphinema pachtaicum; Xiphinema rivesi; Xiphinema vuittenezi; Xiphinema diversicaudatum;* Longidoridae; Spain;
Notes : In Spanish, Eng. sum., 212 ref. Several species of nematodes were found associated with grapevine in Spain. Among the *Longidoridae*, which include several vectors of grapevine viruses, *Xiphinema index*, vector of grapevine fanleaf virus (GFLV), was found in 30 locations. *X.italiae*, a suspected but doubtful vector of GFLV was recorded in 45 locations. *X.diversicaudatum*, vector of arabis mosaic virus and other nepoviruses, was found in only two locations. *X.rivesi*, vector of tomato ringspot virus in the Niagara Peninsula, Canada, was found in three locations, *X.vuittenezi* and *X. coxi* only in one. The only *Longidorus* found was *L.belloi*, which is not considered as a vector of any of the grapevine viruses. GFLV is present in many locations, but usually in localized patches in association with *X.index* which maintain the infection in the soil, but spread is slow, and *X.index* population remain low, except when irrigation favours the development and dispersal of the nematode.

50. **Arias, M., J. Fresno, and J.A. Lopez.** 1997. Influence of agronomic techniques on the epidemiology of GFLV, p. 125-126. In O. A. Sequeira,de, J. C. Sequeira, and M. T. Santos (ed.), Extended abstracts 12th Meeting ICVG, Lisbon, Portugal, 29 September-2 October 1997. Dept.Plant Pathology, Estação Agronomica Nacional, Oeiras, Portugal.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; epidemiology; *Xiphinema index;* nematode; Longidoridae; Spain; meeting; ICVG;
Notes : About 1000 soil samples were collected in vineyards cultivated under dry farming system in La Mancha region of Spain, in order to analyse the nematode populations. Grapevine tissue samples were also collected for detecting grapevine fanleaf virus. 100 soil samples and grapevine tissue samples were also collected in irrigated vineyards. *Xiphinema index* populations and foci of fanleaf disease remain of low importance in the traditional dry farming conditions, whereas *X.index* populations and incidence of fanleaf symptoms strongly increase when vineyards are irrigated in order to increase yield.

51. **Arnò, C., A. Alma, D. Bosco, and A. Arzone.** 1993. Investigations on spatial distribution and symptom fluctuation of Flavescence dorée in 'Chardonnay'vineyards. Petria **3**:81-91.
Keywords :grapevine; phytoplasma disease; flavescence dorée; *Scaphoideus titanus;* leafhopper; survey; symptoms; distribution; Italy;
Notes :A survey of several Chardonnay vineyards was made in Piedmont from 1988 to 1990 in order to determine the distribution and evolution of symptoms of flavescence dorée (FD). In one of the vineyards surveyed, 191 vines out of 539 showed symptoms of FD. 86 vines showed symptoms for the three successive years (45%), 24 for two consecutive years (12.6%), 12.6 for the first and third year (10.5%) and 61 for only one year (31.9%). Pollarding (severe pruning) resulted in symptom remission in about 80% of severe cases. The disease appeared to spread mostly along the rows, probably through a vector with a low efficiency. No correlation was observed between the rate of spread and the importance of the *Scaphoideus titanus* population in the vineyards.

52. **Arzone, A., A. Alma, C. Arnò, and D. Bosco.** 1992. Ricerca su flavescence dorée e auchenorrinchi probabili vettori del suo agente patogeno (Research on flavescence dorée and on the probable Auchenorrhyncha vectors of its pathogenic agent). Quaderni Piemonte Agricoltura **16** *(3,suppl.):*90-93.
Keywords :grapevine; phytoplasma disease; flavescence dorée; epidemiology; survey; vector; leafhopper; Italy;
Notes : In Italian. Results of the work done from 1987 to 1990 on flavescence dorée and its possible vectors in the Piedmont region in northern Italy. The disease affects mainly the cv. Chardonnay. The dissemination of the disease appears to be due not only to *Scaphoideus titanus* or other Auchenorrhyncha but also to contamination in nurseries. A large survey of leafhoppers present in 4 vineyards of the Piedmont region is reported. Observations were made 5 times a year from May to October. Biological material was sampled in 23 localities. Grafts were made in the field and in the greenhouse. Potted Chardonnay and Erbaluce vines were exposed to contamination in infected vineyards. 4000 potted plants of *Catharanthus roseus* and *Vicia faba* were also exposed to infection for 2 weeks and renewed every fortnight in infected vineyards. Chardonnay vines were isolated in screen boxes with 3-15 adults of *S.titanus* infected in the field. The same was made with *Vicia faba* and *Trifolium repens*. All Auchenorrhynchids found in the vineyards were determined. *S. titanus* was largely present in the area, but not in all vineyards with yellows disease. Chardonnay is the most sensitive variety. Only 1% of vines caged with *S.titanus* developed symptoms of yellows. (Supplement to No 3 "Ricerca e sperimentazione in Piemonte).

53. **Arzone, A., A. Alma, D. Bosco, and A. Patetta.** 1995. MLO-infected weeds in the vineyards of north-western Italy. J. Phytopathol. **143**:257-260.
Keywords :grapevine; phytoplasma disease; phytoplasma; detection; electron microscopy; host range; epidemiology; weeds; Italy;
Notes : Ten species of herbaceous plants and shrubs with symptoms of MLO-disease were collected in both grapevine yellows (GY)-infected and uninfected vineyards in north-western Italy. The presence of MLOs was detected in thin section of leaf stalk veins and flower peduncles by electron microscopy. MLOs were detectedd for the first time in *Picris echioides* L., and also in nine other plant species. The possible role of MLO-infected weeds in the spread of GY disease is discussed.

54. **Arzone, A., A. Alma, A. Patetta, and D. Bosco.** 1991. Grapevine golden flavescence MLOs in plant and vector, p. 184-192. In I. C. Rumbos, R. Bovey, D. Gonsalves, W. B. Hewitt, and G. P. Martelli (ed.), Proceedings of the 10th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG). Plant Protection Institute, P.O. Box 303, 38001 Volos, Greece.
Keywords :grapevine; phytoplasma disease; flavescence dorée; phytoplasma; electron microscopy; ultrastructure; cytopathology; Italy; meeting; ICVG;
Notes : Bodies similar to MLOs were observed by transmission electron microscopy in sieve elements of petioles of Chardonnay and Perera grapevines with flavescence dorée (FD) symptoms, and also in sieve elements of *Trifolium repens* infected experimentally with FD and in salivary glands of *Scaphoideus titanus* reared on Chardonnay with FD.

55. **Arzone, A., A. Bertaccini, R.E. Davis, A. Alma, D. Bosco, M. Vibio, and J.P. Prince.** 1993. Molecular detection of MLOs associated with grapevine yellows disease in Piemonte, Italy, p. 86-87. In P. Gugerli (ed.), Extended abstracts 11th Meeting ICVG, Montreux, Switzerland, 6-9 September 1993. Federal Agricultural Research Station of Changins, CH-1260 Nyon, Switzerland.
Keywords :grapevine; phytoplasma; phytoplasma disease; etiology; aster yellows; flavescence dorée; *Scaphoideus titanus; Macrosteles quadripunctulatus;* vector; leafhopper; transmission; dot blot hybridization; PCR; RFLP; DNA probe; detection; nucleic acid assay; Italy; meeting; ICVG;
Notes : In dot hybridization experiments with extracts of *Scaphoideus titanus* fed on grapevines showing or having previously shown symptoms of yellows, using biotinylated cloned DNA probes prepared in previous work for detecting plant pathogenic MLOs (pAY18, pG3, pG30 and pG39), positive signals were obtained with 11 of 15 groups of this leafhopper species, clearly indicating the presence of MLOs in these insects after feeding on yellows- affected vines. All control tests were negative. Similar batches of *S.titanus* transmitted MLOs to clover. One strain (GY-T) was transmitted from clover to periwinkle using *Macrosteles quadripunctulatus* (Kirschb.) as vector. This strain was used as a source for polymerase chain reaction (PCR) and restriction fragment length polymorphism (RFLP) experiments aimed at characterizing this MLO strain, which appear to be similar to type II subcluster in the Aster yellows cluster. Several MLOs, all differing from FD MLO seem to be associated with grapevine yellows in Piemonte. It is not yet clear which of these MLOs or which combination of them is pathogenic in grapevine.

56. **Arzone, A., P. Cravedi, and F. Pavan.** 1993. Epidemiologia della malattia (Epidemiology of the disease), p. 39-47. In E. Refatti (ed.), Extended Abstracts, Convegno "La flavescenza dorata ed altri giallumi della vite. Stato attuale delle conoscenze e problemi di lotta". Eurovite'93, Gorizia, Italy.
Keywords :grapevine; phytoplasma disease; flavescence dorée; epidemiology; survey; transmission; *Scaphoideus titanus;* leafhopper; Auchenorrhyncha; weeds; Italy;
Notes : In Italian. Extended abstracts of papers presented at a meeting on flavescence dorée (FD) and other grapevine yellows at Gorizia, Italy, in December 1993. Summary of present knowledge on the epidemiology of the yellows diseases occurring in Italy. There are clearly different types of yellows, some of which closely resemble FD as it is known in France, and others differ. The importance of the cultivar, of the type of cultivation and of the insecticide spray schedules are discussed. Several studies have been made on the distribution of yellows in the vineyards and on the possibility of other plants than grapevine being sources of disease contamination. Studies on Auchenorrynchid populations in vineyards shows that in many cases, the spread of grapevine yellows is not correlated with the presence or relative abundance of *Scaphoideus titanus*. This points to the possible role of another vector. The role of contamination in nursery is also discussed. 34 references.

57. **Auger, J. and E. Aballay.** 1991. Effect of fanleaf virus on the growth and productivity of Thompson Seedless grapevine plants in Chile, p. 409. In I. C. Rumbos, R. Bovey, D. Gonsalves, W. B. Hewitt, and G. P. Martelli (ed.), Proceedings of the 10th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG). Plant Protection Institute, P.O. Box 303, 38001 Volos, Greece.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; performance; yield; Chile; meeting; ICVG;
Notes :GFLV causes a yield loss of about 12%.

58. **Auger, J., E. Aballay, E.M. Pinto, and C. Pastenes.** 1992. Efecto del virus de la hoja en abanico (VHA) en el desarollo y productividad de plantas de vid cv. Thompson seedless (Effect of grapevine fanleaf virus on the growth and productivity of grapevine plants cv. Thompson seedless). Fitopatologia **27***(2):*85-89.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; fanleaf; growth; yield; performance; nematode; *Xiphinema index;* Longidoridae; Chile;
Notes : In Spanish, Eng. sum. Research carried out in 1988-89 in the central region of Chile in an eleven-year old Thompson seedless vineyard growing in a soil with heavy *Xiphinema index* populations. ELISA tests reveal 50% of vines with GFLV. Considerable effect on performance.

59. **Auger, J. and R. Arancibia.** 1991. Selective elimination by heat treatment and meristem culture of closteroviruses associated with leafroll in grapevine *(Vitis vinifera L.)* cv. Black Seedless, p. 325-335. In I. C. Rumbos, R. Bovey, D. Gonsalves, W. B. Hewitt, and G. P. Martelli (ed.), Proceedings of the 10th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG). Plant Protection Institute, P.O. Box 303, 38001 Volos, Greece.
Keywords :grapevine; heat therapy; *in vitro*; meristem tip culture; leafroll; GVA; vitivirus; GLRaV-1; GLRaV-2; GLRaV-3; closterovirus; virus elimination; Chile; meeting; ICVG;
Notes : Heat therapy was applied to six Black Seedless grapevines grafted onto St George rootstock and which indexed positive by ELISA for one or more of the grapevine leafroll associated viruses (GVA, GLRaV- I,- II,- III). The heat treatment was made according to the classical Davis method, and during the treatment (100, 120 or 150 days), leaves were removed from various parts of the plants and tested by ELISA. At the end of the treatment, shoots were fragmented into segments with one node, which were sterilized and rooted *in vitro*. Meristem tip culture, alone or combined with heat therapy, was also experimented. GLRaV-I, II and III closteroviruses were less easily eliminated by heat therapy when GVA was also present in the grapevine plants. GVA itself was more resistant to heat therapy than the GLRaV I, II and III. Virus-free plants were obtained with the three methods (heat therapy alone, meristem tip culture and combination of both). Combining heat therapy and shoot tip culture did not increase the percentage of cured plants.

60. **Auger, J., R. Arancibia, and P. Gugerli.** 1989. Isolation and identification of virus particles in leafroll infected grapevines in Chile, p. 95. In E. Tanne (ed.), Proceedings of the 9th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG), Kiryat Anavim, Israel, September 1987. The Volcani Center, P.O. Box 6, Bet Dagan, Israel.
Keywords :grapevine; leafroll; closterovirus; identification; ELISA; Chile; Switzerland; meeting; ICVG;
Notes : The same abstract appears in Phytoparasitica **17,** 67, 1989.

61. **Auger, J., R. Arancibia, and P. Gugerli.** 1989. Isolation and identification of virus particles in leafroll-infected grapevines in Chile. Phytoparasitica **17**:67
Keywords :grapevine; immunoassay; leafroll; closterovirus; ELISA; identification; virus; detection; Chile; meeting; ICVG;
Notes : The same abstract appears in the Proceedings of the 9th meeting of ICVG, Kiryat Anavim, Israel, 1987, 95 (1989).

62. **Avgelis, A., L. Catalano, and N. Vovlas.** 1993. Occurrence of virus vector nematodes and their associated nepovirus in vineyards of the Greek island of Rhodes. Nematol. medit. **21**:93-95.
Keywords :grapevine; nematode; survey; *Xiphinema pachtaicum; Xiphinema index;* grapevine fanleaf virus; occurrence; Rhode Island;
Notes :*Xiphinema pachtaicum*, which is not a vector of grape viruses, was found in 37% of samples, *X.index* in 10%, and grapevine fanleaf virus in only five vineyards among the 40 vineyards inspected.

63. **Avgelis, A., I. Rumbos, N. Katis, A. Rumbou, N. Nikolaou, and D. Dimou.** 1997. Association of closteroviruses GLRaV 1 and GLRaV 3 with leafroll symptoms in Greek vineyards, p. 117-118. In O. A. Sequeira,de, J. C. Sequeira, and M. T. Santos (ed.), Extended abstracts 12th Meeting ICVG, Lisbon, Portugal, 29 September-2 October 1997. Dept.Plant Pathology, Estação Agronomica Nacional, Oeiras, Portugal.

Keywords :grapevine; leafroll; survey; occurrence; closterovirus; GLRaV-1; GLRaV-3; Greece; meeting; ICVG;
Notes : During the years 1994-1996, a survey of leafroll disease of grapevine was made in the main viticultural areas of Greece. 494 grapevines exhibiting symptoms of leafroll were tested by ELISA for the presence of GLRaV-1 and -3. The average contamination was 42.4% for GLRaV-1 , 47.8 for GLRaV-3 and 9.8% for GLRaV-1 + GLRaV-3.

64. **Avgelis, A. and I.C. Rumbos.** 1991. Carnation mottle virus isolated from vines affected with "Roditis leaf discoloration", p. 437-443. In I. C. Rumbos, R. Bovey, D. Gonsalves, W. B. Hewitt, and G. P. Martelli (ed.), Proceedings of the 10th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG). Plant Protection Institute, P.O. Box 303, 38001 Volos, Greece.
Keywords :grapevine; roditis leaf discoloration; nepovirus; grapevine fanleaf virus; carnation mottle virus; Greece; meeting; ICVG;
Notes : Two isometric viruses were consistently isolated by mechanical inoculation to herbaceous hosts from Roditis grapevines showing symptoms of Roditis leaf discoloration. They were identified as isolates of grapevine fanleaf virus and carnation mottle virus.

65. **Avgelis, A.D. and E.A. Tzortzakakis.** 1997. Occurrence and distribution of *Xiphinema* species and grape fanleaf nepovirus in vineyards of the Greek island of Samos. Nematol. medit. **25**:177-182.
Keywords :grapevine; grapevine fanleaf virus; nepovirus; vector; *Xiphinema;* Longidoridae; nematode; occurrence; *Xiphinema index; Xiphinema italiae; Xiphinema pachtaicum;* Greece;

66. **Ayuso, P.** 1985. Le microgreffage appliqué à la régénération sanitaire de la vigne (Micrografting applied to sanitary selection of grapevine), p. 191-192. Colloque Amélioration de la Vigne et Culture in Vitro 1985. Moët-Hennessy, Paris.
Keywords :grapevine; *in vitro;* micrografting; indexing; sanitary selection; Spain;
Notes : In French and English. Meeting on the improvement of grapevine and *in vitro* culture, organized by Moët-Hennessy.

67. **Azeri, T.** 1990. Detection of grapevine leafroll virus in different varieties by indexing. Journal of Turkish Phytopathology **19**:103-109.
Keywords :grapevine; leafroll; detection; indexing; occurrence; Turkey;
Notes : Leafroll was detected by indexing on Pinot noir, Mission, Baco 22 A. 45-85% of vines were affected and gave positive reactions.

68. **Azzam, O.I. and D. Gonsalves.** 1988. Survey of grapevine stem pitting in New York and isolation of dsRNA from a grapevine selection infected with stem pitting (Abstract 443). Phytopathology **78**:1568.
Keywords :grapevine; rugose wood; rupestris stem pitting; dsRNA; detection; etiology; New York; USA;
Notes :dsRNA was recovered from grapevines that indexed positive for rupestris stem pitting but negative for leafroll, corky bark and 3 nepoviruses. It was not recovered from healthy controls. dsRNA from rupestris stem pitting affected grapevines differs from dsRNA associated with corky bark and GLRaVs.

69. **Azzam, O.I., D. Gonsalves, and C. Collmer.** 1991. Investigations on the grapevine rupestris stem pitting disease etiology (Abstract), p. 225. In I. C. Rumbos, R. Bovey, D. Gonsalves, W. B. Hewitt, and G. P. Martelli (ed.), Proceedings of the 10th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG). Plant Protection Institute, P.O. Box 303, 38001 Volos, Greece.
Keywords :grapevine; rugose wood; rupestris stem pitting; etiology; dsRNA; USA; meeting; ICVG;
Notes : Abstract.Two distinct dsRNAs were detected in stem samples of rupestris stem pitting-positive vines of *V. rupestris* St-George, with molecular weights of 5.3 and $4.4x10^6$ respectively, and appear to be consistently associated with this disease in samples from New York, Canada and California. This paper appears in full in Plant Disease 75 (9),960-964 (next reference).

70. **Azzam, O.I., D. Gonsalves, and D.A. Golino.** 1991. Detection of dsRNA in grapevines showing symptoms of rupestris stem pitting disease and the variabilities encountered. Plant Disease **75**:960-964.

Keywords :grapevine; detection; dsRNA; cDNA; nucleic acid assay; rugose wood; rupestris stem pitting; stem pitting; USA;
Notes : Two high MW dsRNA species (B and C) were detected in polyacrylamide gel electrophoresis in phloem cane tissue of grapevines from California and Canada, affected with rupestris stem pitting (rSP). No similar dsRNAs were found in cane extracts from healthy control vines, nor in leaf extracts. dsRNAs of the same MW (B and C) were also found in phloem extracts of vines with rSP from New York, but the association with rSP was less consistent. Several other dsRNAs of various MW were also found in leaf extracts from both rSP-diseased and healthy vines. They appear to originate from the grape powdery mildew fungus. The possibility of using cDNA probes for detecting rSP is discussed.

71. **Badour, C., D. Moncomble, and G. Rouas.** 1985. Les "rougissements" de la vigne en Champagne. (Leaf reddening of grapevine in Champagne). Le Vigneron Champenois **106***(9)*:441-460.
Keywords :grapevine; leaf reddening; leafroll; deficiency; rougeau; brenner; esca; symptoms; France;
Notes : In French. This is a review of the various causes of reddening of grapevine leaves in Champagne: Mg and Mn deficiency, rougeau (physiological or accidental), leafroll, parasites (mostly mites), rougeot parasitaire or brenner, esca.

72. **Bagard, A.** 1987. La flavescence dorée dans le vignoble corse. (Flavescence dorée in Corsican vineyards), p. 69-90. In S. Ruini (ed.), Atti del Convegno sulla Flavescenza Dorata della Vite, Vicenza-Verona, Maggio 1987. Fondazione Sergio Bolla, Verona.
Keywords :grapevine; phytoplasma disease; flavescence dorée; *Scaphoideus littoralis; Scaphoideus titanus;* vector; biology; symptoms; economic importance; control; leafhopper; Corsica; France; meeting;
Notes : In French, It. Eng. sum. Flavescenza dorata, Vicenza-Verona meeting.

73. **Bagard, M. and G. Felici.** 1986. La flavescence dorée, une menace permanente pour le vignoble corse. (Flavescence dorée, a persistent threat to Corsican vineyards). Phytoma - La Défense des Végétaux *(379):*25-27.
Keywords :grapevine; flavescence dorée; phytoplasma disease; Corsica; leafhopper; vector; *Scaphoideus titanus;* control; economic importance; occurrence; symptoms; France;
Notes : Biology of *Scaphoideus titanus*, vector of flavescence dorée, symptoms of the disease, control measures.

74. **Balthazard, J.** 1993. Valeur culturale du Gewurztraminer clone No 913 guéri du virus de l'enroulement par thermothérapie (Cultural value of cv. Gewurztraminer clone No 913 cured from leafroll by heat therapy). Progr. Agric. Vitic. **110**:382-385.
Keywords :grapevine; leafroll; vein necrosis; vein mosaic; rugose wood; rupestris stem pitting; virus elimination; heat therapy; *in vitro*; micrografting; performance; comparison; quality; France;
Notes : Several clones of cv. Gewurztraminer were heat treated at 36-38^{o}C, and shoot apices were grafted *in vitro* onto grape seedlings. Heat treated clone 913 was compared with the original non heat treated clone for agronomic performance. The initial material was infected with mild leafroll, vein mosaic, vein necrosis and rupestris stem pitting. The virological status after heat treatment is not indicated, except that leafroll had been eliminated. Results of measurements of 1990 to 1992 showed an increase of 27% in yield of heat treated clone in comparison with the original untreated clone. The sugar content was reduced by 8.8%, corresponding to 0.5 degree in probable acohol. There was no morphological modification.

75. **Baptista, C.R., H. Kuniyuki, G.W. Muller, and J.A. Betti.** 1993. Obtenção de clones livres de virus de sete variedades de videira através da cultura de meristema em São Paulo (Seven grapevine varieties freed from viruses by meristem tip culture in São Paulo). Summa Phytopathologica **19**:96-98.
Keywords :grapevine; virus elimination; leafroll; fleck; corky bark; meristem tip culture; *in vitro;* Brazil;
Notes : In Portuguese, Eng. sum. Meristem tips including three leaf primordia (0.2-0.3 mm) were cultured on agar-based medium (according to Gamborg *et al.*1976) with 1 mg/l benzylaminopurine, 0.5 mg/l kinetin, 4 mg/l adenine, pH adjusted at 5.5. The meristems were taken from grapevines that were infected in single or in mixed infections with leafroll, fleck and corky bark. 28 out of 34 plants were freed of the viruses present in the original plants.

76. **Barba, M., A. Cupidi, and L. Casorri.** 1993. Influence of virus and virus-like diseases of grapevine in shoot cultures, p. 43-44. In P. Gugerli (ed.), Extended abstracts 11th Meeting ICVG, Montreux, Switzerland, 6-9 September 1993. Federal Agricultural Research Station of Changins, CH-1260 Nyon, Switzerland.
Keywords :grapevine; virus; leafroll; fanleaf; performance; growth; *in vitro*; micropropagation; symptoms; Italy; meeting; ICVG;
Notes : Leafroll reduced the survival of *in vitro*-grown explants to less than 50 %. GFLV had less influence on survival, but reduced the number of internodes.

77. **Barba, M., A. Cupidi, and F. Faggioli.** 1989. *In vitro* culture of grapevine infected by closterovirus type III. J. Phytopathol. **126**:225-230.
Keywords :grapevine; *in vitro;* micropropagation; GLRaV-3; closterovirus; Italy;
Notes : Growth was reduced by 50 % in comparison with healthy controls. There was no leaf symptoms, but 30 times more virus particles in *in vitro*-grown plants than in infected field plants.

78. **Barba, M., A. Cupidi, and L. Martino.** 1991. Comparison of different methods to obtain virus-free grape propagative material, p. 399-406. In I. C. Rumbos, R. Bovey, D. Gonsalves, W. B. Hewitt, and G. P. Martelli (ed.), Proceedings of the 10th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG). Plant Protection Institute, P.O. Box 303, 38001 Volos, Greece.
Keywords :grapevine; grapevine fanleaf virus; nepovirus; leafroll; GLRaV-1; GLRaV-3; closterovirus; heat therapy; *in vitro;* chemotherapy; ribavirin; meristem tip culture; method; virus elimination; comparison; Italy; meeting; ICVG;
Notes : Comparison of 3 methods for obtaining virus-free grape planting material by elimination of GFLV, GLRaV-I and GLRaV-III: 1) *in vitro* thermotherapy, 2) *in vitro* chemotherapy and 3) *in vitro* tip culture. Complete elimination of the 3 viruses concerned was obtained by using *in vitro* thermotherapy. Ribavirin did not increase the percentage of cured plants, but was helpful in allowing the use of larger apices in meristem tip culture.

79. **Barba, M. and P. Del Serrone.** 1993. Preliminary results on the characterization of an Italian FD-like disease MLO. Phytopath. medit. **32**:70-71.
Keywords :grapevine; phytoplasma disease; flavescence dorée; phytoplasma; transmission; dodder; Italy;
Notes : Abstract of a paper presented at a Workshop on Fruit and Grapevine Mycoplasma Diseases, Bologna, Italy, September 1992.

80. **Barba, M., P. Del Serrone, C. Minucci, G. Boccardo, and M. Conti.** 1995. Diagnosi molecolare di fitoplasmi della vite (Molecular diagnosis of grapevine phytoplasmas). Petria **5**:299-300.
Keywords :grapevine; phytoplasma; phytoplasma disease; diagnosis; detection; nucleic acid assay; dot blot hybridization; flavescence dorée; aster yellows; Italy;
Notes : In Italian. Summary of the techniques of molecular diagnosis of phytoplasmas causing grapevine yellows in Italy.

81. **Barba, M., F. Faggioli, A. Cupidi, and A. Quacquarelli.** 1989. Closteroviruses associated with leafroll of grapevine. Phytoparasitica **17**:69-70.
Keywords :grapevine; leafroll; closterovirus; ISEM; Italy; meeting; ICVG; closteroviruses; associated; GVA; GLRaV;
Notes : Filamentous particles were observed in EM. They had no serological ralationships with GVA, GLRaV I or II. This paper appears in full in the Proceedings of the 9th meeting of ICVG, Kiryat Anavim, Israel, 1987, 125-130, 1989.

82. **Barba, M., F. Faggioli, A. Cupidi, and A. Quacquarelli.** 1989. Closteroviruses associated with leafroll of grapevine, p. 125-130. In E. Tanne (ed.), Proceedings of the 9th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG), Kiryat Anavim, Israel, September 1987. The Volcani Center, P.O. Box 6, Bet Dagan , Israel.
Keywords :grapevine; leafroll; closterovirus; electron microscopy; ISEM; Italy; meeting; ICVG;

Notes : Closterovirus-like particles observed in the electron microscope showed no serological relationships with GVA, GLRaV-I or GLRaV-II when tested by decoration in immuno-electron microscopy.

83. **Barba, M., L. Martino, and A. Cupidi.** 1992. Il risanamento della vite: tre tecniche a confronto (grapevine sanitation: three methods compared). Vignevini **19***(3):*33-36.
Keywords :grapevine; virus; sanitary selection; *in vitro;* meristem tip culture; chemotherapy; heat therapy; comparison; method; virus elimination; grapevine fanleaf virus; nepovirus; GLRaV-1; GLRaV-3; closterovirus; Italy;
Notes : Comparison of apex culture *in vitro*, chemotherapy *in vitro*, heat therapy *in vitro*. GFLV, GLRaV-1 and 3 were eliminated.

84. **Barbercheck, M. and J. Heyns.** 1986. Occurrence of *Xiphinema* in South African plant improvement vineyards. Phytophylactica **18**:59-61.
Keywords :grapevine; nematode; *Xiphinema;* Longidoridae; occurrence; selection; South Africa;
Notes : Following nematode species of *Xiphinema* were found in a survey of South African vineyards: *Xiphinema americanum, X. index* (only in one sample), *X. brevicolle, X.pachtaicum*.

85. **Barbercheck, M., P.C. Smith, and J. Heyns.** 1985. Occurrence and distribution of *Xiphinema* in vineyards of the Bree River valley. Phytophylactica **17**:27-30.
Keywords :grapevine; nematode; *Xiphinema;* Longidoridae; occurrence; distribution; South Africa;
Notes :*Xiphinema elongatum, X.brevicolle, X.index, X.americanum* were found in vineyards of the Bree Valley, South Africa.

86. **Barbier, P., G. Demangeat, M. Perrin, P. Cobanov, C. Jacquet, and B. Walter.** 1997. Grapevine genetically transformed with the coat protein gene of grapevine fanleaf virus: an analysis of transformants, p. 131. In O. A. Sequeira,de, J. C. Sequeira, and M. T. Santos (ed.), Extended abstracts 12th Meeting ICVG, Lisbon, Portugal, 29 September-2 October 1997. Dept.Plant Pathology, Estação Agronomica Nacional, Oeiras, Portugal.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; transgenic; coat protein gene; resistance; France; meeting; ICVG;
Notes : The coat protein (CP) gene of grapevine fanleaf virus was transferred to several grapevine rootstock varieties. The integration of the CP gene was checked. None of the transformed rootstocks showed a total immunity towards grapevine fanleaf, although differences in the systemic spread of infection or in symptom expression were observed. The challenge infection was made by graft or by *Xiphinema index.*

87. **Bardonnet, N., F. Hans, M.A. Serghini, and L. Pinck.** 1994. Protection against virus infection in tobacco plants expressing the coat protein of grapevine fanleaf nepovirus. Plant Cell Reports **13**:357-360.
Keywords :grapevine; grapevine fanleaf virus; nepovirus; transgenic; resistance; *Nicotiana;* France;
Notes : Grapevine fanleaf virus (GFLV) is one of the nepoviruses that causes court-noué or Reisigkrankheit (France, Germany) and the agent of fanleaf all over the world. Its genome is made up of two single-stranded RNA molecules (RNA1 and RNA2) which direct the synthesis of polyprotein P1 and P2 respectively. A chimaeric coat protein gene derived from the C-terminal part of protein P2 of GFLV was constructed and introduced into a binary transformation vector. Transgenic *Nicotiana benthamiana* plants expressing the coat protein of GFLV were obtained by *Agrobacterium tumefaciens*-mediated transformation. A significant delay of systemic invasion was observed in transgenic plants when inoculated with GFLV or its RNA. No such delay was observed after inoculation with arabis mosaic virus.

88. **Barillère, J.M., A. Collas, C. Bougerey, and C. Palgé.** 1995. Clonal selection in Champagne, p. 33-39. In J. M. Rantz (ed.), Proceedings of the International Symposium on Clonal Selection, Portland, Oregon, USA, June 1995. The American Society of Enology and Viticulture, Portland, Oregon, USA.
Keywords :grapevine; clonal selection; sanitary selection; performance; green grafting; France;
Notes : Clonal slection resulted in an increase of yield up to 30% above the local average without losing wine quality. The authors insist on the necessity of preserving old types of grapevines from extinction, as many of them were abandoned because of virus accumulation. They can be regenerated now and often have

an interesting potential of quality characteristics. With the INRA/Champagne Mumm green grafting technique, 10000 vines can be produced within 14 months beginning from one single bud.

89. **Barlass, M.** 1987. Elimination of stem pitting and corky bark diseases from grapevine by fragmented shoot apex culture. Ann. Appl. Biol. **110**:653-656.
Keywords :grapevine; fragmented shoot apex culture; meristem tip culture; rugose wood; stem pitting; corky bark; *in vitro;* virus elimination; Australia; diseases;
Notes : A 100 % success was obtained in eliminating stem pitting and corky bark. 66 plants of 3 cvs. were cured.

90. **Barlass, M. and K.G.M. Skene.** 1986. Tissue culture and disease control, p. 191-193. In T. H. Lee (ed.), Proceedings 6th Australian Wine Industry Technical Conference, July 1986, Adelaide, Australia. Australian Industrial Publishers, Adelaide.
Keywords :grapevine; tissue culture; meristem tip culture; fragmented shoot apex culture; *in vitro;* stem pitting; rugose wood; corky bark; virus elimination; review; Australia; meeting;
Notes : Virus-free grapevines were obtained by fragmented shoot apex culture and other tissue culture techniques. Elimination of stem pitting and corky bark. Book chapter.

91. **Basile, M., F. Lamberti, and V.A. Melillo.** 1986. Attività nematocida e distribuzione verticale di un prodotto contenente il 92% di dicloropropene in un terreno destinato a reimpianto di vigneto (Nematocidal activity and vertical distribution of a product containing 92% of dichloropropene in a soil prepared for replanting grapevine), p. 405-414. In Atti Giornate Fitopatologiche 1986, Riva del Garda, 24-27 marzo 1986, Vol.1. Cooperativa Libraria Universitaria Editrice Bologna (CLUEB), Bologna, Italy.
Keywords :grapevine; nepovirus; nematode; vector; control; *Xiphinema index; Xiphinema;* Longidoridae; nematicide; soil fumigation; Italy;
Notes : In Italian, Eng.sum. Experiments were made in southern Italy in order to determine the nematicidal effect and the vertical distribution of a chemical containing 92% of 1,3-dichloropropene applied either in the irrigation water at relatively low doses or with an injector gun. The control of *Xiphinema* species and the distribution of fumigant in treated soil were better when the chemical was applied by injector gun. *X.index* was eradicated in this case to 60 cm of depth with 60, 90 and 120 l/ha, and to 100 cm with 180 and 240 l/ha. Atti, CLUEB.

92. **Basile, M., F. Lamberti, V.A. Melillo, and A.C. Basile.** 1986. Influenza del metodo di somministrazione e della qualità della copertura sull'efficacia del bromuro di metile nei confronti di nematodi "Longidoridae" e sulle concentrazioni di bromuro inorganico nel terreno (Influence of application method and of the quality of covering on the efficiency of control of nematodes by methyl bromide and on concentration of inorganic bromine in soil). Riv. Ortoflorofrutt. Ital. **70**:193-203.
Keywords :grapevine; soil fumigation; *Xiphinema index; Xiphinema pachtaicum;* control; vector; nepovirus; grapevine fanleaf virus; nematode; Longidoridae; nematicide; Italy;

93. **Basile, M., F. Lamberti, and G. Russo.** 1990. Efficacia e tossicità dell'1,3 dichloropropene nella lotta nematocida nel vigneto (Efficiency and toxicity of 1,3 dichloropropene in the control of nematodes in vineyards). Vignevini **17***(11):*53-56.
Keywords :grapevine; nematode; control; nematicide; 1,3-dichloropropene; *Xiphinema index; Xiphinema pachtaicum;* Longidoridae; Italy;
Notes : In Italian, Eng.sum. The final distribution of the nematicide is mostly restricted in the 30 upper cm of soil. Nematode control at 30 cm was good four days after treatment when the product was applied at 50 and 100 l/ha, and at 60 cm only with treatments at 150 l/ha in the irrigation water. The efficiency of the treatment was nil after one year.

94. **Bass, P., E. Clog, and B. Walter.** 1988. Improvements in apex culture in *Vitis* species. Acta Horticulturae *(227):*485-488.
Keywords :grapevine; *in vitro;* meristem tip culture; heat therapy; micrografting; method; virus elimination; France;

Notes : The meristem tip culture (0.1 mm, 1-2 leaf primordia) method for eliminating viruses from grapevines was improved by adding rabbit serum 1/100 in liquid and gelified media used for this technique. This method was used not only for eliminating viruses, but also for micrografting after heat treatment of potted plants, and for micropropagation of clones. Paper presented at the International Symposium on Vegetative Propagation of Woody Species, Pisa (Italy) September 1987.

95. **Bass, P., A. Dumont, C. Greif, and B. Walter.** 1993. Détection des cannelures du tronc de la vigne par indexage en vert (greffe-bouture herbacée) (Detection of grapevine stem pitting/grooving by green graft-indexing). Agronomie **13**:519-526.
Keywords :grapevine; rugose wood; Kober stem grooving; rupestris stem pitting; detection; indexing; green grafting; France;
Notes : In French, Eng. sum. Indexing by green grafting using Kober 5BB and 161-49 C as indicators provides quicker results than using Rupestris du Lot for rupestris stem pitting (RSP) or Kober stem grooving (KSG) detection. Symptoms were observed by light microscopy on tranverse section of the indicator stem just below the graft. After 6 to 8 months, KGS symptoms on 5BB were sufficiently obvious for diagnosis, whereas RSP diagnosis required more than a year. The hybrid rootstock 161-49C used as RSP indicator by green grafting indexing of RSP also gave quicker response that Rupestris du Lot, usually after 8 months. The presence of a *Vitis vinifera* in the graft combination is necessary for the expression of the KGS and RSP symptoms on the indicators.

96. **Bass, P., R. Legin, and C. Greif.** 1993. Association of corky bark with a peculiar form of vein mosaic, yellow blotch mosaic, detected by indexing on *Vitis riparia* Gloire, p. 65. In P. Gugerli (ed.), Extended abstracts 11th Meeting ICVG, Montreux, Switzerland, 6-9 September 1993. Federal Agricultural Research Station of Changins, CH-1260 Nyon, Switzerland.
Keywords :grapevine; rugose wood; corky bark; yellow blotch mosaic; detection; indexing; symptoms; France; meeting; ICVG;
Notes : Yellow blotch mosaic develops symptoms that can be confused with those of vein mosaic on *Vitis riparia* Gloire, or with those of fleck on *V. rupestris* "du Lot". They are probably associated with corky bark, and can be a source of confusion in sorting out indexing results. The authors emphasize the importance of using immunological or biochemical diagnosis assays as a complement to graft indexing whenever possible.

97. **Batlle, A., J. Larrue, D. Clair, X. Daire, E. Boudon-Padieu, and A. Laviña.** 1995. Identificacion del fitoplasma asociado al Bois noir de la Viña en España (Identification of the phytoplasma associated with Bois noir of grapevine in Spain). Phytoma España *(68):*40-44.
Keywords :grapevine; bois noir; phytoplasma disease; occurrence; Spain; France;
Notes : In Spanish.

98. **Batlle, A. and A. Laviña.** 1997. Identification of grapevine yellows phytoplasmas in the northern Spain, p. 69-70. In O. A. Sequeira,de, J. C. Sequeira, and M. T. Santos (ed.), Extended abstracts 12th Meeting ICVG, Lisbon, Portugal, 29 September-2 October 1997. Dept.Plant Pathology, Estação Agronomica Nacional, Oeiras, Portugal.
Keywords :grapevine; bois noir; phytoplasma disease; *Scaphoideus titanus;* vector; occurrence; Spain; meeting; ICVG;
Notes : A survey was made from 1994 to 1996 in Aragon, Navarra and Catalonia (Spain) in order to detect and identify yellows diseases of grapevine occurring in these regions. The presence of the leafhopper *Scaphoideus titanus* was also recorded. The phytoplasmas were identified by ELISA and PCR. *S.titanus* was present in all vineyards examined, often in high numbers (5-7 individuals per leaf). Bois noir was detected in several vineyards in Catalonia (5 plots out of 15) and Navarra (2/10). The extent of the infection increased from 3.4% to 14% from 1994 to 1996. The disease appeared to spread mostly along the rows. Flavescence dorée was also identified in several vineyards in the northeastern part of Catalonia, near the French border.

99. **Batlle, A., A. Laviña, C. Kuszala, D. Clair, J. Larrue, and E. Boudon-Padieu.** 1997. Detection of flavescence dorée phytoplasma in grapevine in northern Spain. Vitis **36**:211-212.
Keywords :grapevine; flavescence dorée; phytoplasma; phytoplasma disease; occurrence; detection; ELISA; PCR; RFLP; Spain;
Notes : In the fall of 1996, several vineyards of the Alt Empordà viticultural region of Catalonia (Spain) near the French border had a considerable number of vines affected with yellows. In 7 out of 9 samples from diseased vines, an elm yellows group phytoplasma was detected by nested PCR followed by RFLP. Positive results were also obtained with the same samples using the FD9f/r primers specific for flavescence dorée. ELISA confirmed the presence of a flavescence dorée infection similar to that occurring in France.

100. **Baumgartnerova, H. and V. Subikova.** 1993. Identification of tomato ringspot virus in leafroll-diseased grapevine, p. 31-34. In A. Blahutiak (ed.), Works of the Institute of Experimental Phytopathology and Entomology (Vol.4). Institute of Experimental Phytopathology and Entomology, Ivanka pri Dunaji, Slovakia.
Keywords :grapevine; leafroll; tomato ringspot virus; immunoassay; immuno electron microscopy; detection; nepovirus; Slovakia;
Notes : An isometric virus transmitted by mechanical inoculation to herbaceous plants from Cabernet Sauvignon vines with symptoms of leafroll was shown by immunoelectron microscopy and agar gel immunodiffusion to be an isolate of tomato ringspot virus.

101. **Bavaresco, L. and M.A. Walker.** 1994. Techniques for successfully establishing *Xiphinema index* in dual culture with grape. Amer. J. Enol. Vitic. **45**:273-277.
Keywords :grapevine; nematode; Longidoridae; *Xiphinema index; in vitro;* California; USA;
Notes :*In vitro* cultures of *Xiphinema index* and roots of *Vitis rupestris* were successfully used for the study of the biology of *X.index* during long periods. Observations were made on feeding, root damage and reproduction.

102. **Bays, D.C. and S.A. Tolin.** 1989. Variation in tomato ringspot virus isolated from grape (Abstract 630). Phytopathology **79**:1214.
Keywords :grapevine; nepovirus; tomato ringspot virus; strain; symptoms; USA;
Notes : A comparison was made between 3 isolates of tomato ringspot virus from: 1. Vidal 256 in Virginia (WR5) 2. SO4 rootstock (TS1) from outside Virginia 3. 5BB Kober (TkB1) from outside Virginia. The host range was identicl for the three isolates, but differences were observed in the severity of symptoms on Cucumber. WR5 was identical with typical TomRSV of north- eastern USA. The two other strains were serologically different, although related.

103. **Bays, D.C. and S.A. Tolin.** 1989. Incidence of tomato ringspot virus in grape in Virginia (Abstract 491). Phytopathology **79**:1196.
Keywords :grapevine; nepovirus; tomato ringspot virus; occurrence; dandelion; epidemiology; strain; Virginia; USA;
Notes : Sampling was made in commercial vineyards with 10 cvs. and 2 rootstocks, SO4 and Kober 5BB. Samples were tested with ELISA for tomato ringspot virus. Several weed species were also tested in the vicinity of vineyards, for instance dandelion, plantain, white clover. The virus was found mostly in Vidal 256, also in SO4 and 5BB rootstocks. The virus occurred also in dandelion, but the type is different from that of grapevine. No other weed species was found infected. It is suggested that dandelion does not play a role in the epidemiology of grape TomRSV in Virginia.

104. **Bazzi, C.** 1994. Studies of *Xylella fastidiosa* (1989-1994). Phytoparasitica **22**:176.
Keywords :grapevine; Pierce's disease; *Xylella fastidiosa;* detection; method; quarantine; immunoassay; immunofluorescence; SDS-PAGE; nucleic acid assay; PCR; ELISA; Italy;
Notes : Summary of research on methods of detection of *Xylella fastidiosa* in imported plant material. Cooperation Italy, France, Germany. Following detection methods were compared: ELISA or IFAS (immunofluorescence) with polyclonal antisera, SDS-PAGE of total soluble proteins of cell envelope, PCR analysis.

105. **Bazzi, C., E. Stefani, F. Padovan, and U. Mazzucchi.** 1990. *Xylella fastidiosa* Wells *et al.* is not associated with "mal dell' esca" of Grapevine in the Emilia-Romagna Region. Phytopath. medit. **29**:56-58.
Keywords :*Xylella fastidiosa;* Pierce's disease; esca; grapevine; ELISA; bacterium; Emilia-Romagna; Italy;
Notes : Examination of 37 samples of trunks and canes of vines affected with "mal dell'esca" by ELISA for the possible presence of *Xylella fastidiosa*, agent of Perce's disease, gave negative results and colonies of bacteria grown from these samples were also negative in ELISA tests with PD antisera. It is concluded that *X. fastidiosa* is not associated with the "mal dell'esca" in Emilia- Romagna.

106. **Bazzi, C., E. Stefani, and M. Zaccardelli.** 1994. SDS-PAGE: a tool to discriminate *Xylella fastidiosa* from other endophytic grapevine bacteria. Bulletin OEPP/EPPO Bulletin **24**:121-127.
Keywords :grapevine; Pierce's disease; detection; SDS-PAGE; *Xylella fastidiosa;* Italy;

107. **Bazzi, C., M. Zaccardelli, and F. Niepold.** 1994. Monospecific antiserum is suitable for the selective detection of *Xylella fastidiosa*. Microbiological Research **149**:337-341.
Keywords :grapevine; *Xylella fastidiosa;* Pierce's disease; detection; ELISA; Italy;
Notes : Monospecific antibodies obtained in rabbits, and directed against 20.7 kD and 19.8 kD protein bands were successfully used in ELISA for detecting *Xylella fastidiosa* in grapevine.

108. **Becker, A.** 1988. Untersuchungen über Ursache, Verbreitung und Bekämpfungsmöglichkeiten einer Absterbeerscheinung bei der Rebsorte Kerner (Dissertation). (Research on cause, occurrence and control of a dieback disease of the grape variety Kerner) (PhD. thesis). Univ. Kaiserslautern, Fachbereich Biologie, Kaiserslautern, BRD, 113 p.
Keywords :grapevine; Kerner disease; occurrence; etiology; arabis mosaic virus; nepovirus; *Xiphinema diversicaudatum;* Longidoridae; thesis; nematode; Germany;
Notes : Symptoms of Kerner disease are described. There is a close correlation with the presence of arabis mosaic virus. No control method is available. The hypothesis of a graft-incompatibility in presence of ArMV in the rootstock is put forward.

109. **Becker, A., J. Jäger, and B. Altmayer.** 1989. Association of arabis mosaic virus-infected rootstocks with the dieback of the *Vitis vinifera* cv. "Kerner" in Germany, p. 57-61. In E. Tanne (ed.), Proceedings of the 9th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG), Kiryat Anavim, Israel, September 1987. The Volcani Center, P.O. Box 6, Bet Dagan , Israel.
Keywords :grapevine; Kerner disease; etiology; arabis mosaic virus; nepovirus; rootstock; incompatibility; histology; scanning electron microscopy; symptoms; Germany; meeting; ICVG;
Notes : The dieback of the cv. Kerner in Germany (Kernerkrankheit) was found to be associated with arabis mosaic virus (ArMV)-infection of the rootstocks. 90% of the diseased Kerner vines were shown to be infected with ArMV in the rootstock but never in the scion. The strong incompatibility of the Kerner/rootstock combination towards ArMV infection from the roots is the cause of the disease. Vines with infected rootstocks die off within a few years.

110. **Belin, C., G. Demangeat, B. Walter, and L. Pinck.** 1997. Recombinant RNA of GFLV and ArMV: an approach to study transmission specificity of nepoviruses by nematodes, p. 27-28. In O. A. Sequeira,de, J. C. Sequeira, and M. T. Santos (ed.), Extended abstracts 12th Meeting ICVG, Lisbon, Portugal, 29 September-2 October 1997. Dept.Plant Pathology, Estação Agronomica Nacional, Oeiras, Portugal.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; arabis mosaic virus; transmission; nematode; *Xiphinema index; Xiphinema diversicaudatum;* molecular analysis; genome; France; meeting; ICVG;
Notes : Assuming that the ability of GFLV and ArMV to be transmitted by specific nematodes is determined by proteins coded by RNA2, as it seems to be the case for RRV, several recombinants of both viruses were constructed. Their properties and their ability to replicate in *Chenopodium quinoa,* and to encapsidate the genomic RNAs were investigated. They will be used for studying the specificity of transmission by *Xiphinema* vectors

111. **Belli, G.** 1987. Ulteriori informazioni sulla flavescenza dorata della vite, con particolare riferimento alla provincia di Brescia. (Further informations on flavescence dorée of grapevine, with special reference to the province of Brescia). Rassegna di Viticoltura **2***(1):*4-5.
Keywords :grapevine; phytoplasma disease; flavescence dorée; symptoms; occurrence; Italy;

112. **Belli, G.** 1987. Considerazioni conclusive, p. 257-260. In S. Ruini (ed.), Atti del Convegno sulla Flavescenza Dorata della Vite, Vicenza-Verona, Maggio 1987. Fondazione Sergio Bolla, Verona.
Keywords :grapevine; phytoplasma disease; control; epidemiology; etiology; flavescence dorée; meeting; Italy;
Notes : In Italian, Fr. sum. Flavescenza dorata, Vicenza-Verona meeting. Concluding remarks on symptoms, etiology, epidemiology and control of grapevine flavescence dorée (which still includes other types of yellows now known to be distinct from FD).

113. **Belli, G.** 1991. Recent progress in research on virus-like diseases of the grapevine, p. 147-154. In I. C. Rumbos, R. Bovey, D. Gonsalves, W. B. Hewitt, and G. P. Martelli (ed.), Proceedings of the 10th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG). Plant Protection Institute, P.O. Box 303, 38001 Volos, Greece.
Keywords :grapevine; virus diseases; virus; prokaryote; virus-like diseases; phytoplasma; phytoplasma disease; flavescence dorée; bois noir; review; Italy; meeting; ICVG;
Notes : Review on recent research on virus-like diseases of grapevine, including both the disorders which are similar to virus diseases but are caused by prokaryotes and those which are supposed to be virus diseases but whose agents are not yet known. This was the introductory lecture to session 2 of the 10th ICVG meeting at Volos, 1990.

114. **Belli, G.** 1995. La flavescenza dorata della vite: storia, diffusione, sintomi, danni e prevenzione (Golden flavescence of grapevine. History, diffusion, damage and control). L'Enotecnico **31***(9):*55-59.
Keywords :grapevine; flavescence dorée; phytoplasma disease; economic importance; control; review; Italy;
Notes : In Italian. Description of symptoms of flavescence dorée, historical account of the disease, occurrence and extent in Italy and in the world, economic importance and possible control measures.

115. **Belli, G.** 1996. Accartocciamento fogliare della vite (Leafroll of grapevine), p. 27-40. In G. P. Martelli, V. Savino, and M. Digiaro (ed.), Virus floematici e malattie della vite.
Keywords :grapevine; leafroll; symptoms; etiology; epidemiology; review; Italy;
Notes : In Italian, Eng.sum. Results of research on leafroll within the frame of the RAISA project (Relationships between phloem-limited viruses and leafroll and rugose wood of grapevine) in Italy.

116. **Belli, G.** 1997. La flavescenza dorada de la vid: historia, difusion, sintomas, daños a prevencion (Flavescence dorée of grapevine: history, diffusion, symptoms, damage and prevention). La Semana Vitivinicola **52***(2630):*13-17.
Keywords :grapevine; phytoplasma disease; flavescence dorée; symptoms; etiology; epidemiology; control; economic importance; Italy;
Notes : In Spanish. Historical account of flavescence dorée in France and northern Italy. Symptoms and damage caused by the infection, etiology and epidemiology, possibilities of control and economic importance. This account is based mainly on the Italian experience.

117. **Belli, G., P.A. Bianco, S. Cinquanta, and A. Fortusini.** 1987. Diagnosi rapida dell'accartocciamento fogliare su foglie di vite prelevate in campo. (Rapid detection of the leafroll agent in grapevine leaves sampled in the field). Schw. landw. Forschung/La Recherche agronomique en Suisse **26**:310-312.
Keywords :grapevine; nepovirus; leafroll; detection; immunoassay; ELISA; electron microscopy; Italy;
Notes : ELISA can be used for checking the absence of nepoviruses. For leafroll, the grape sap is concentrated by ultracentrifugation and examination in the electron microscope. Closteroviruses are recognized by their typical length over 1000 nm.

118. **Belli, G., P.A. Bianco, and A. Fortusini.** 1989. Cross protection phenomena in herbaceous hosts between two different strains of grapevine fanleaf virus, p. 17. In E. Tanne (ed.), Proceedings of the 9th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG), Kiryat Anavim (Israel), September 1987. The Volcani Center, P.O. Box 6, Bet Dagan, Israel .
Keywords :grapevine; nepovirus; grapevine fanleaf virus; cross-protection; herbaceous hosts; strain; Italy; meeting; ICVG;
Notes : Abstract. The same abstract appears in Phytoparasitica **17,** 58-59, 1989.

119. **Belli, G., P.A. Bianco, and A. Fortusini.** 1989. Cross protection phenomena in herbaceous hosts between two different strains of grapevine fanleaf virus. Phytoparasitica **17**:58-59.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; cross-protection; strain; herbaceous hosts; meeting; ICVG; Italy;
Notes : The same abstract appears in the Proceedings of the 9th meeting of ICVG, Kiryat Anavim, Israel, 1987, 17, 1989.

120. **Belli, G., P.A. Bianco, and A. Fortusini.** 1993. Osservazioni e richerche sulla flavescenza dorata della vite in Lombardia e zone limitrofe (Observations and research on grapevine flavescence dorée in Lombardia and bordering zones), p. 55-57. In E. Refatti (ed.), Extended Abstracts, Convegno "La flavescenza dorata ed altri giallumi della vite, stato attuale delle conoscenze e problemi di lotta". Eurovite'93, Gorizia, Italy.
Keywords :grapevine; phytoplasma disease; flavescence dorée; symptoms; diagnosis; epidemiology; control; Italy;
Notes : In Italian. Extended abstracts of papers presented at a meeting on flavescence dorée (FD) and other grapevine yellows at Gorizia, Italy, December 1993. Symptoms, diagnosis, epidemiology and control.

121. **Belli, G., R. Credi, and E. Refatti.** 1994. Recenti sviluppi nelle conoscenze sulla flavescenza dorata ed altri giallumi della vite (Recent progress in knowledge on flavescence dorée and other grapevine yellows), p. 295-306. In Atti Giornate Fitopatologiche 1994, Montesilvano Lido (Pescara), 9-12 maggio 1994, Vol.2. Cooperativa Libraria Universitaria Editrice Bologna (CLUEB), Bologna, Italy.
Keywords :grapevine; phytoplasma; flavescence dorée; phytoplasma disease; symptoms; epidemiology; immunoassay; detection; diagnosis; control; Italy; meeting;
Notes : In Italian, Eng. sum. Review on symptomatology and epidemiology of flavescence dorée and of other yellows diseases of grapevine. Recent results obtained using serology and molecular biology are outlined. Suggestions are made for disease control. Book chapter. Meeting at Montesilvano Lido, Italy, May 1994. Atti, CLUEB.

122. **Belli, G. and A. Fortusini.** 1990. Conoscenze attuali sulla flavescenza dorata della vite (Present knowledge on grapevine flavescence dorée). Atti Accad. Ital. Vite Vino **42**:195-199.
Keywords :grapevine; flavescence dorée; phytoplasma disease; symptoms; etiology; epidemiology; control; Italy;
Notes :A description is given of the history, symptoms, etiology and epidemiology of flavescence dorée as it appears in northern Italy, where it was first detected in 1973. The vector is *Scaphoideus titanus* and the disease is also transmitted with infected grafting or rootstock material. The importance of using healthy propagation material is stressed.

123. **Belli, G., A. Fortusini, P. A. Bianco, G. Torresin, S. Carraro, and L. Pizzoli.** 1997. Flavescenza dorata e altri giallumi della vite (Flavescence dorée and other yellows diseases of grapes). L'Informatore Agrario **53***(19):*69-73.
Keywords :grapevine; phytoplasma disease; flavescence dorée; occurrence; control; Italy;
Notes : Fifteen years after its first appearance in Veneto, Italy, flavescence dorée of grapevine now affects most of the viticultural areas of that region. The main features of the disease, caused by phytoplasmas, are described. The strategies for control are discussed, especially the importance of controlling the vector *Scaphoideus titanus* Ball.

124. **Belli, G., A. Fortusini, P. Casati, L. Belli, P. A. Bianco, and S. Prati.** 1994. Transmission of a grapevine leafroll associated closterovirus by the scale insect *Pulvinaria vitis* L. Riv. Pat. Veg., S.V, **4**:105-108.
Keywords :grapevine; leafroll; GLRaV-3; closterovirus; scale insects; coccid; transmission; vector; *Pulvinaria vitis;* Italy;
Notes : In a vineyard of northern Italy where natural spread of leafroll was found to occur, the authors were unable to record the presence of mealybugs (family *Pseudococcidae*), but found scale insects (family *Coccidae*) of the species *Parthenolecanium corni* and *Pulvinaria vitis.* Transmission experiments carried out in insect proof chambers with young nymphs of the two insect species gave positive results in two out of five vines inoculated with *P.vitis* previously fed for five days on leafroll infected vines carrying the GLRaV-III closterovirus. The first symptoms appeared as a light reddening and rolling of some leaves about four months after inoculation feeding. ELISA tests carried out with sap of inoculated vines and polyclonal anti-GLRaV-III antibodies gave negative results, but nucleic acids extracted from the inoculated vines that had shown symptoms hybridized with the probe specific for GLRaV-III detection. In PCR tests, a virus specific band of about 340 base pairs was obtained with extracts from the two inoculated vines showing symptoms. This is the first report of a virus transmission by scale insects.

125. **Belli, G., A. Fortusini, P. Casati, S. Cinquanta, P. A. Bianco, and G. Scattini.** 1995. Evidence that the closteroviruses GLRV-1 and GLRV-3 are causal agents of grapevine leafroll disease. Riv. Pat. Veg., S.V, **5**:95-98.
Keywords :grapevine; leafroll; closterovirus; GLRaV-1; GLRaV-3; etiology; nomenclature; Italy;
Notes : By green graft-inoculating young grapevine plants of the cvs. Barbera, Pinot noir and the hybrid LN-33 with grape sources containing only GLRaV-1 or GLRaV-3, the authors were able to reproduce leafroll disease of grapevine. They conclude that GLRaV-1 and -3 should be renamed grapevine leafroll virus 1 and grapevine leafroll virus 3.

126. **Belli, G., A. Fortusini, and S. Prati.** 1993. Natural spread of grapevine leafroll disease in a vineyard of northern Italy, p. 110. In P. Gugerli (ed.), Extended abstracts 11th Meeting ICVG, Montreux, Switzerland, 6-9 September 1993. Federal Agricultural Research Station of Changins, CH-1260 Nyon, Switzerland.
Keywords :grapevine; leafroll; GLRaV-3; closterovirus; vector; spread; epidemiology; coccid; Italy; meeting; ICVG;
Notes : In a vineyard planted with virus-free material in 1976 and subsequently checked for virus infection by visual inspection and biological tests, no infection was recorded during more than 10 years. From 1989 to 1992, nine vines showed leafroll symptoms, and serological tests showed they were due to GLRaV-III. Mealybugs (Pseudococcidae) were never found. Coccidae of the genus *Eulecanium* and *Pulvinaria* were observed in 1991 and 1992. Their possible role as vectors is being investigated.

127. **Belli, G., D. Rui, A. Fortusini, G. Torresin, L. Pizzoli, P. A. Bianco, and S. Carraro.** 1985. La flavescenza dorata della vite e le sue manifestazioni nel Veneto. (Flavescence dorée of grapevine, its occurrence and symptoms in Veneto), p. 13-25. In Atti del Convegno "Problemi Attuali di Patologia Viticola". Camera di Commercio I.A.A., Vicenza.
Keywords :grapevine; phytoplasma disease; flavescence dorée; occurrence; symptoms; Veneto; Italy;
Notes : In Italian. Proceedings of a meeting held in Vicenza on May 24th 1985. Book chapter.

128. **Ben Abdallah, F., A. Fnayou, and A. Ghorbel.** 1997. La sauvegarde des variétés autochtones de vigne tunisiennes par l'utilisation des vitrométhodes (Recovery of autochtonous Tunisian grapevine varieties by *in vitro* methods). Progr. Agric. Vitic. **114**:343-347.
Keywords :grapevine; virus elimination; *in vitro;* meristem tip culture; Tunisia;
Notes : In French, Eng. sum. Meristem tip culture allowed to regenerate local varieties of grapevine that were heavily infected with virus and virus-like diseases. The best conditions for obtaining vigourous and healthy plants are described.

129. **Ben Abdallah, F., A. Fnayou, S. Grenan, and A. Ghorbel.** 1996. Contribution à l'amélioration du microgreffage de la vigne (Contribution to the improvement of grapevine micrografting). Bull. OIV **69**:601-616.
Keywords :grapevine; *in vitro;* micrografting; method; Tunisia;
Notes : Improvement of mirografting by pretreating scion plants with iron sequestrene and shoot apices with Murashige-Skoog medium enriched with BAP and ANA before micrografting. The percentage of successful micrograft rose from 15% to 60%.

130. **Ben Abdallah, F., D. Hmouni, H. Zemni, N. Chabbouh, F. Askri, and A. Ghorbel.** 1996. Risanamento e propagazione *in vitro* di varietà di vite autoctone della Tunisia (*In vitro* cleansing and regeneration of autochtonous Tunisian grapevine varieties). Vignevini **23***(4 suppl.):*15-17.
Keywords :grapevine; virus elimination; meristem tip culture; *in vitro;* nepovirus; grapevine fanleaf virus; closterovirus; GLRaV-3; Tunisia;
Notes : In Italian, Eng. sum. The *in vitro* meristem tip culture was efficient in eliminating GFLV and GLRaV-3 present in four Tunisian grapevine varieties.

131. **Berisha, B., Y.D. Chen, B.Y. Xu, and T.A. Chen.** 1996. Isolation of Pierce's disease bacteria from grapevines in Europe. Phytopathology **86***(Suppl.):*S119.
Keywords :grapevine; Pierce's disease; *Xylella fastidiosa;* occurrence; Yugoslavia; ELISA; immunoassay; nucleic acid assay; USA;
Notes :*Xylella fastidiosa*, the agent of Pierce's disease of grapevine, was isolated from grapevines in Kosovo, Yugoslavia. The bacterium showed a typical rippled cell wall in electron microscope. It was shown to be serologically identical with the US strains using respective antisera in ELISA. The diagnosis was also confirmed by nucleic acid assay. The Kosovo isolate was inoculated into young healthy grapevines through the roots with negative pressure applied to the shoots, resulting in typical scald and scorch symptoms on the leaves 40-80 days after inoculation. The same bacteria were reisolated from these inoculated diseased plants and used to reinoculate young grapevines which produced again Pierce's disease symptoms, fulfilling Koch's postulate. This the first confirmation that Pierce's disease occurs in Europe.

132. **Bernard, R.** 1996. Plaidoyer pour une démystification de la sélection clonale en Bourgogne (Plea against a few myths on clonal selection in Burgundy). Progr. Agric. Vitic. **113**:357-360.
Keywords :grapevine; clonal selection; performance; economic importance; quality; yield; France;
Notes : In French. Discussion on the respective advantages of mass- and clonal selection, and on the critics made on grapevine clonal selection, most of which are unjustified in view of the results of a careful experimentation.

133. **Berres, R.E.** 1988. Einfluss von Virosen auf das Nährstoffaneignungsvermögen verschiedener Pfropfunterlagen (Influence of virus diseases on the nutrient assimilation capacity of some rootstocks). Mitt. Biol. Bundesanstalt. f. Land- u. Forstwirtschaft Berlin-Dahlem *(245):*481.
Keywords :grapevine; virus diseases; leafroll; closterovirus; arabis mosaic virus; raspberry ringspot virus; grapevine fanleaf virus; nepovirus; nutrition; physiology; Germany;
Notes :in German. This study aimed at determining the influence of various viruses (leafroll, arabis mosaic virus, raspberry ringspot virus, grapevine fanleaf virus) on the assimilation capacity of soil nutrients by rootstocks. 26G and 5C had a reduced assimilation when infected, especially with GFLV. With SO4, there was almost no reduction. With 5BB there was a reduction for all parameters measured.

134. **Berres, R.E.** 1989. Effect of virus and virus-like infections on the mineral content of grapevine. Phytoparasitica **17**:66.
Keywords :grapevine; nepovirus; arabis mosaic virus; grapevine fanleaf virus; rugose wood; rupestris stem pitting; mineral; virus; virus-like diseases; infection; Germany; meeting; ICVG;
Notes : Abstract. This paper appears in full in the Proceedings of the 9th meeting of ICVG, Kiryat Anavim, Israel, 1987, 87-90 (1989).

135. **Berres, R.E.** 1989. Effects of virus and virus-like infections on the mineral content of grapevine petioles, p. 87-90. In E. Tanne (ed.), Proceedings of the 9th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG), Kiryat Anavim, Israel, September 1987. The Volcani Center, P.O. Box 6, Bet Dagan, Israel.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; arabis mosaic virus; rugose wood; rupestris stem pitting; mineral; physiology; Germany; meeting; ICVG;
Notes : Rooted cuttings of rootstocks *Vitis Berlandieri x V.riparia* SO4 infected with arabis mosaic virus (ArMV), Trollinger x *V.riparia* 26G infected with (ArMV) or grapevine fanleaf virus (GFLV) as well as Pinot noir from California infected with rupestris stem pitting were analysed for the mineral content of their petioles, in comparison with healthy material. Dry weight from infected plants was lower than that of healthy plants. The root volume of infected SO4 and 26G was smaller that that of healthy controls. The petioles of infected vines had a lower potassium content than controls and more trace elements.

136. **Berres, R.E.** 1989. Untersuchungen über die Vitalität und das Nährstoffaneignungsvermögen von Pfropfreben nach Infektion mit Virosen und virusähnlichen Krankheiten im Hinblick auf die Verminderung der Düngungsintensität (Dissertation) (Investigations on nutrient assimilation of grafted vines after infection with virus and virus-like diseases in relation with the lowering of manuring intensity). Universität Göttingen, Fachbereich Agrarwissenschaften, Göttingen, Germany.
Keywords :grapevine; physiology; virus diseases; virus-like diseases; nutrition; fertilization; yield; growth; Germany;
Notes : PhD Thesis University of Göttingen, Germany.

137. **Berres, R.E.** 1991. Influence of virus and virus-like diseases on the vitality and the mineral content of grapevine rootstocks, p. 374-385. In I. C. Rumbos, R. Bovey, D. Gonsalves, W. B. Hewitt, and G. P. Martelli (ed.), Proceedings of the 10th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG). Plant Protection Institute, P.O. Box 303, 38001 Volos, Greece.
Keywords :grapevine; grapevine fanleaf virus; arabis mosaic virus; raspberry ringspot virus; GLRaV-1; nepovirus; closterovirus; performance; mineral nutrition; growth; physiology; fertilization; Germany; meeting; ICVG;
Notes : Study on the influence of virus and virus-like diseases on the development of vines and on the uptake of mineral nutrients present in the soil.

138. **Berres, R.E. and G. Stellmach.** 1986. Untersuchungen über die Mineralstoffaufnahme virukranker Reben. (Research on the mineral uptake of virus-infected grapevines). Mitt. Biol. Bundesanstalt. f. Land- u. Forstwirtschaft Berlin-Dahlem *(232):*203-204.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; arabis mosaic virus; leafroll; mineral; physiology; Germany;
Notes :A heavy intensity of manuring of the vineyards tends to mask the symptoms of some virus diseases. With arabis mosaic virus and SO4 as a rootstock, the assimilation is significanty lower than with healthy rootstocks.

139. **Berres, R.E. and G. Stellmach.** 1990. Neue Beobachtungen und Feststellungen zur Reaktion virusinfizierter Pfropfreben auf normale und eingeschränkte Nährstoffangebote (New observations and conclusions on the reaction of virus-infected grafted vines to normal and restricted nutrient supply). Mitt. Klosterneuburg **40**:219-222.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; arabis mosaic virus; raspberry ringspot virus; leafroll; rugose wood; rupestris stem pitting; rootstock; scion; mineral nutrition; growth; Germany;

140. **Bertaccini, A., A. Arzone, A. Alma, D. Bosco, and M. Vibio.** 1993. Detection of mycoplasmalike organisms in *Scaphoideus titanus* Ball reared on flavescence dorée infected grapevine by dot hybridizations using DNA probes. Phytopath. medit. **32**:20-24.
Keywords :grapevine; flavescence dorée; phytoplasma disease; *Scaphoideus titanus;* leafhopper; transmission; phytoplasma; detection; periwinkle; IPVR; nucleic acid assay; dot blot hybridization; Italy;

Notes : Four probes were made from naturally infected periwinkle collected in the field in Beltsville Md, USA and northern Italy (Italian periwinkle virescence). Positive hybridization signals were obtained with DNA extracts from batches of 6 or more *Scaphoideus titanus* fed on FD-infected grapevines. No signal was obtained with healthy *S.titanus*.

141. **Bertaccini, A., D. Boscia, F. Faoro, and A. Minafra.** 1994. Metodi di diagnosi delle malattie da virus, viroidi e micoplasmi della vite (Methods for the diagnosis of grapevine virus, viroid and phytoplasma diseases), p. 281-294. In Atti Giornate Fitopatologiche 1994, Montesilvano Lido (Pescara), 9-12 maggio 1994, Vol.2. Cooperativa Libraria Universitaria Editrice Bologna (CLUEB), Bologna, Italy.
Keywords :grapevine; virus diseases; virus-like diseases; phytoplasma disease; viroid; diagnosis; method; Italy;
Notes : In Italian, Eng. sum. Book chapter. Meeting at Montesilvano Lido, Italy, May 1994. Atti, CLUEB.

142. **Bertaccini, A., R.E. Davis, M. Vibio, J.P. Prince, and R. Credi.** 1993. Detection and characterization of mycoplasmalike organism (MLO) DNA in naturally infected grapevine cultivars in Emilia-Romagna, Italy: polymerase chain reaction and restriction analyses, p. 88-89. In P. Gugerli (ed.), Extended abstracts 11th Meeting ICVG, Montreux, Switzerland, 6-9 September 1993. Federal Agricultural Research Station of Changins, CH-1260 Nyon, Switzerland.
Keywords :grapevine; phytoplasma disease; phytoplasma; etiology; aster yellows; relationship; detection; nucleic acid assay; PCR; RFLP; Italy; meeting; ICVG;
Notes : Evidence is presented of an association of MLOs with grapevine yellows in Emilia Romagna. The MLO strains found in grapevine are mutually similar and related with aster yellows MLOs, but are different from known aster yellows MLO cluster strains.

143. **Bertaccini, A., E. Murari, M. Vibio, A. Danielli, R.E. Davis, M. Borgo, R. Consolaro, and G.P. Sancassani.** 1996. Identificazione molecolare dei fitoplasmi (Molecular identification of phytoplasmas). L'Informatore Agrario **52***(20):*55-59.
Keywords :grapevine; phytoplasma disease; etiology; aster yellows; elm yellows; bois noir; flavescence dorée; apple proliferation; detection; nucleic acid assay; identification; phytoplasma; molecular analysis; PCR; RFLP; Veneto; Italy;
Notes : In Italian. Summary of the main properties of phytoplasmas and of the diseases they cause in grapevine. Description of molecular methods for detecting pyhtoplasmas: nucleic acid extraction, PCR, RFLP. Results show that three types of phytopasmas are predominant in the area: Aster yellows subgroup B, Aster yellows subgroup G (bois noir) and Elm yellows (FD). Besides, Aster yellows subgroup C and apple proliferation phytoplasma were found, but only in one case. The practical consequences of these results are discussed. The bibliography is published in the reprints.

144. **Bertaccini, A., M. Vibio, I.M. Lee, and R.E. Davis.** 1994. Molecular characterization of mycoplasmalike organisms (MLOs) infecting fruit and grapevine in Italy, p. 63-65. In Proceedings 9th Congress of the Mediterranean Phytopathological Union, September 1994, Kusadasi-Aydin, Turkey.
Keywords :grapevine; phytoplasma disease; phytoplasma; classification; PCR; nucleic acid assay; RFLP; meeting; Italy;
Notes : Book chapter. Mediterranean Phytopathological Union.

145. **Bertaccini, A., M. Vibio, D.A. Schaff, E. Murari, M. Martini, and A. Danielli.** 1997. Geographical distribution of elm yellows-related phytoplasmas in grapevine flavescence dorée outbreaks in Veneto (Italy), p. 57-58. In O. A. Sequeira,de, J. C. Sequeira, and M. T. Santos (ed.), Extended abstracts 12th Meeting ICVG, Lisbon, Portugal, 29 September-2 October 1997. Dept.Plant Pathology, Estação Agronomica Nacional, Oeiras, Portugal.
Keywords :grapevine; phytoplasma disease; phytoplasma; identification; detection; elm yellows; flavescence dorée; aster yellows; PCR; RFLP; Italy; meeting; ICVG;
Notes : The results of a survey on the spread of flavescence dorée (FD) in Veneto (northern Italy), carried out in 1995 and 1996, are reported together with further molecular characterization of some elm-yellows related phytoplasmas strains detected in grapevines and in *Scaphoideus titanus*. The molecular tests

(PCR/RFLP) confirmed that phytoplasmas are widespread in the Veneto vineyards. FD and aster yellows type phytoplasmas are often detected in mixed infections. Two types of 16SrV phytoplasmas were detected in grapevine, as it was the case in other regions of Italy, one similar to rubus stunt, the other to elm yellows.

146. **Bertaccini, A., M. Vibio, and E. Stefani.** 1995. Detection and molecular characterization of phytoplasmas infecting grapevine in Liguria (Italy). Phytopath. medit. **34**:137-141.
Keywords :grapevine; phytoplasma disease; phytoplasma; detection; nucleic acid assay; relationship; elm yellows; aster yellows; IPVR; stolbur; PCR; RFLP; Italy;
Notes : In order to determine the genetic relationships of phytoplasmas causing a severe yellows disease of grapevine in Eastern Liguria with other yellows agents, nucleic acid samples from symptomatic grapevines in this area were prepared from leaf midribs and nested-polymerase chain reaction (PCR) assays were carried out using two universal and four phytoplasma group-specific primer pairs. PCR products were analyzed by electrophoresis through agarose gel. Restriction fragment length polymorphism (RFLP) analysis was also used to compare 16S rDNA sequences amplified by PCR. The results of these studies confirm the presence of phytoplasmas in yellows-diseased grapevines in Liguria. A double infection with phytoplasmas related to the Elm Yellows group (EY, USA) and phytoplasmas related to the Italian Periwinkle Virescence group (IPVR) was recorded in all symptomatic grapevines tested in the Bisogno Valley. The IPVR strain used in this study for comparison is phylogenetically related to stolbur, which is itself in the same subgroup as the Vergilbungskrankheit observed in Germany.

147. **Bertioli, D.J., R.D. Harris, M.L. Edwards, J.I. Cooper, and W.S. Hawes.** 1991. Transgenic plants and insect cells expressing the coat protein of arabis mosaic virus produce empty virus-like particles. J. Gen. Virol. **72**:1801-1809.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; arabis mosaic virus; coat protein; amino acid sequence; comparison; United Kingdom;
Notes : The 3' end of the RNA-2 of ArMV was cloned and sequenced, and modified in order to facilitate the cloning of the coat protein gene, which was introduced and expressed in transgenic plants, recombined baculovirus-infected insect cells and bacteria. Both insect cells and plant (tobacco) expressing the modified coat protein gene contained empty virus shells typical of ArMV infections. *Escherischia coli* did not express the coat protein. Analysis of the primary amino acid sequence in the ArMV coat protein revealed extensive regions of identity with that of GFLV.

148. **Bianco, P.A., A. Alma, P. Casati, G. Scattini, A. Arzone, and G. Belli.** 1997. Experimental transmission of 16SrV phytoplasmas by *Scaphoideus titanus* Ball, p. 59-60. In O. A. Sequeira,de, J. C. Sequeira, and M. T. Santos (ed.), Extended abstracts 12th Meeting ICVG, Lisbon, Portugal, 29 September-2 October 1997. Dept.Plant Pathology, Estação Agronomica Nacional, Oeiras, Portugal.
Keywords :grapevine; phytoplasma disease; phytoplasma; transmission; leafhopper; *Scaphoideus titanus;* PCR; detection; RFLP; Italy; meeting; ICVG;
Notes : Flavescence dorée (FD) and its vector *Scaphoideus titanus* are widespread in the Vicenza province (northern Italy). Leaf samples collected on FD affected vines were assayed by PCR and nested PCR for phytoplasma identification. Adult *S.titanus* feeding on affected vines were collected, some were used for transmission experiments to grapevine and broadbean while others were used for phytoplasma detection and identification. Almost all the leaf samples collected from grapevines showing symptoms were found to be infected with phytoplasmas of the 16SrV group (elm yellows group), while few of them contained phytoplasmas related to the 16SrI (aster yellows group). Only 16SrV group phytoplamas were detected in grapevines and broadbean inoculated by *S.titanus* previously fed on yellows-diseased vines. Phytoplasmas belonging to the 16SrI group were occasionally found in *S.titanus*, but they were not transmitted by this leafhopper.

149. **Bianco, P.A., I. Bruno, A. Fortusini, and G. Belli.** 1988. Saggi di premunità con il virus dell' arricciamento della vite (GFLV) su piante test erbacee (Cross protection tests on herbaceous hosts with grapevine fanleaf virus, GFLV). Riv. Pat. Veg., S. IV, **24**:81-88.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; cross-protection; herbaceous hosts; Italy;

Notes : Two isolates were chosen, P1, mild (protectant) and 19C, severe (challenge). The best results were obtained on *Gomphrena globosa*. There was a high degree of cross protection when challenge inoculation was made 20 days after initial inoculation.

150. **Bianco, P.A., P. Casati, and G. Belli.** 1997. Detection and identification by PCR-based techniques of diverse phytoplasmas infecting grapevine, p. 179-182. In H. W. Dehne, G. Adam, M. Diekmann, J. Frahm, A. Mauler-Machnik, and P. van Halteren (ed.), Diagnosis and identification of plant pathogens. Proceedings 4th International Symosium of the European Foundation for Plant Pathology, Bonn, Germany, 9-12 September 1996. Kluwer Academic Publishers, Dordrecht, The Netherlands.
Keywords :grapevine; phytoplasma; phytoplasma disease; occurrence; survey; identification; PCR; RFLP; flavescence dorée; aster yellows; elm yellows; 16SrDNA; Italy;
Notes :A survey was made in northern Italy for the presence and distribution of phytoplasmas in grapevines affected with yellows diseases, using PCR and RFLP analysis of amplified 16SrDNA. Two phytoplasmas were detected, one of the 16SrV phytoplasma group responsible for flavescence dorée, the other belonging to the 16SrI-G phytoplasma subgroup considered as responsible for other yellows in Europe (Bois noir, Vergilbungskrankheit). A mixed infection was observed in one sample from the Siena province.

151. **Bianco, P.A., P. Casati, R.E. Davis, and G. Scattini.** 1996. Two different phytoplasmas belonging to group 16SrV may occur in grapevines affected by Flavescence dorée disease. IOM Letters **4**:192-193.
Keywords :grapevine; phytoplasma; phytoplasma disease; flavescence dorée; classification; Italy;
Notes : Samples from naturally diseased grapevines showing symptoms of FD and from symptomless grapevines were collected in the provinces of Vicenza (northern Italy) where *Scaphoideus titanus* is present, and Arezzo (central Italy), where this vector of FD is not present. Phytoplasmas belonging to the group 16SrV were largely present in samples from the Vicenza province, and also in one sample from the Arezzo province. Stolbur phytoplasmas were present in all the symptomatic grapevine samples collected in the Arezzo province. No phytoplasmas were detected in healthy grapevines from these two regions. The results of RFLP analyses support the hypothesis that the phytoplasma identified in grapevines in the Vicenza province is similar to the FD phytoplasma in France and that a different group 16SrV phytoplasma also occurs in grapevine plants.

152. **Bianco, P.A., R.E. Davis, P. Casati, and A. Fortusini.** 1996. Prevalence of aster yellows (AY) and elm yellows (EY) group phytoplasmas in symptomatic grapevines in three areas of northern Italy. Vitis **35**:195-199.
Keywords :grapevine; phytoplasma disease; phytoplasma; flavescence dorée; nucleic acid assay; etiology; aster yellows; elm yellows; RFLP; PCR; Italy;
Notes : An extended survey was made in northern Italy in order to determine the relationships of the phytoplasmas causing yellows diseases of grapevine in these areas with the main groups of phytoplasmas, using direct PCR assays with group-specific primers. The results showed that phytoplasmas belonging to the group 16SrI (aster yellows and related phytoplasmas) subgroup G were present in the three provinces of Vicenza, Brescia and Pavia, whereas phytoplasmas belonging to the group 16SrV (elm yellows and related phytoplasmas) were detected only in the Vicenza province.

153. **Bianco, P.A., R.E. Davis, J.P. Prince, and A. Fortusini.** 1993. Diagnosi di infezioni da MLOs (Mycoplasma-like organisms) in piante di vite mediante PCR (Diagnosis of MLO infections in grapevines by means of PCR), p. 7. In Convegno nazionale "Marcatori Molecolari: stato dell'arte ed applicazioni a problematiche dell' agricoltura italiana". Como, Aprile 1993 (Riassunti). Università degli Studi, Milano.
Keywords :grapevine; phytoplasma disease; phytoplasma; detection; diagnosis; nucleic acid assay; identification; PCR; meeting; Italy;
Notes : In Italian. Summary of a poster.

154. **Bianco, P.A., R.E. Davis, J.P. Prince, A. Fortusini, P. Casati, and G. Belli.** 1994. Elm yellows and aster yellows MLOs associated with a grapevine disease very similar to Flavescence dorée in northern Italy. IOM Letters **3**:251-252.

Keywords :grapevine; flavescence dorée; phytoplasma disease; elm yellows; aster yellows; phytoplasma; etiology; comparison; nucleic acid assay; Italy;

155. **Bianco, P.A., R.E. Davis, J.P. Prince, I.M. Lee, D.E. Gundersen, A. Fortusini, and G. Belli.** 1993. Double and single infections by aster yellows and elm yellows MLOs in grapevines with symptoms characteristic of Flavescence dorée. Riv. Pat. Veg., S.V, **3**:69-82.
Keywords :grapevine; phytoplasma disease; infection; flavescence dorée; symptoms; phytoplasma; aster yellows; elm yellows; Italy;
Notes : Using PCR and RFLP analysis of DNA extracted from yellows-diseased grapevine with flavescence dorée symptoms in Lombardia, the authors showed that this isolate was indistinguishable from two aster yellows-related MLO strains isolated from diseased grapevines in Emilia-Romagna, but was distinct from a FD- associated MLO from Friuli-Venezia Giulia. In further experiments carried out in 1993, the presence of aster yellows MLO in grapevine in northern Italy was confirmed, and double infections with aster yellows and elm yellows were found in some cases.

156. **Bianco, P.A., R.E. Davis, J.P. Prince, I.M. Lee, B.D. Mogen, and G. Belli.** 1993. PCR detection of a mycoplasma-like organism (MLO) in Flavescence dorée diseased grapevines from Lombardia, Italy, p. 90-91. In P. Gugerli (ed.), Extended abstracts 11th Meeting ICVG, Montreux, Switzerland, 6-9 September 1993. Federal Agricultural Research Station of Changins, CH-1260 Nyon, Switzerland.
Keywords :grapevine; phytoplasma; phytoplasma disease; detection; nucleic acid assay; dot blot hybridization; PCR; Italy; meeting; ICVG;
Notes : MLOs were detected in tissue extracts of grapevines exhibiting typical symptoms of FD in Italy by means of the polymerase chain reaction and dot hybridization. The probe strain was an aster yellows phytoplasma strain AY1 from Beltsville, MD, USA.

157. **Bird, G.W. and D.C. Ramsdell.** 1985. Population trends and vertical distribution of plant parasitic nematodes associated with *Vitis labrusca* L. in Michigan. Journal of Nematology **17**:100-106.
Keywords :grapevine; nepovirus; nematode; vector; *Xiphinema americanum;* Longidoridae; control; soil fumigation; 1,3-dichloropropene; USA;
Notes : This is report on soil fumigation experiments with 1,3 dichloropropene in vineyards of soutwestern Michigan, from 1976 to 1983. A double application of 281 l/ha at shallow level (20 cm) and of 658 (or 1322) l/ha at deep level (90 cm) gave an excellent control of *X. americanum* for 8 years. Cv. Concord.

158. **Bitterlin, M.W. and D. Gonsalves.** 1987. Spatial distribution of *Xiphinema rivesi* and persistance of tomato ringspot virus and its vector in soil. Plant Disease **71**:408-411.
Keywords :grapevine; nepovirus; tomato ringspot virus; *Xiphinema rivesi;* Longidoridae; vector; persistance; survival; infectivity; nematode; USA; New York;
Notes : *Xiphinema rivesi* can survive for long periods in the soil. After storage at 1-3^{o} C., the infectivity is still present after 2 years, not after 3 years.

159. **Blaich, R.** 1985. Recherches sur les cultures de méristèmes et d'organes de vigne *in vitro* en vue de la sélection et de la conservation de génotypes (Research on *in vitro* culture of grapevine meristems and organs for selection and genotype conservation). Bull. OIV **58**:391-395.
Keywords :grapevine; meristem tip culture; *in vitro;* heat therapy; collection; virus elimination; review; Germany;
Notes : In French, Eng. sum. The author summarizes the advantage of tissue culture for the selection and conservation of grapevine clones and genotypes. The *in vitro* culture protects the material from contamination. In some cases it leads to the elimination of viruses, and can be combined with heat therapy. The material can be stored for several months in a small volume.

160. **Bleyer, G.** 1993. Virusübertragende Nematoden in Württemberg. Ergebnisse von Bodenuntersuchungen (Virus-transmitting nematodes in Württemberg. Results of soil sampling). Rebe und Wein,Weinsberg **46**:196-198.

Keywords :grapevine; nepovirus; grapevine fanleaf virus; nematode; vector; *Xiphinema index; Xiphinema diversicaudatum; Longidorus macrosoma; Paralongidorus maximus;* Germany;
Notes : In German. In Württemberg (Germany) 21% of tested vineyards were found to be infested with nematode vectors, mainly *Xiphinema index*. This species was found especially in vineyards of long-term grape culture, and was associated with grapevine fanleaf virus (GFLV). *Longidorus macrosoma* was also widespread, but was not associated with virus infection. *X.diversicaudatum* was also detected frequently, especially in slightly acid soils and in former horticultural areas. It was sometimes associated with nepovirus other than GFLV in grapevine. *Paralongidorus maximus* was found only once.

161. **Bleyer, G. and H.H. Kassemeyer.** 1992. Untersuchungen über das Vorkommen der Nematodengattungen *Xiphimema, Longidorus* und *Paralongidorus* in Weinbergen von Baden-Württemberg. (Occurrence of the nematode genera *Xiphinema, Longidorus* and *Paralongidorus* in vineyards of Baden-Württemberg). Wein-Wiss. **47**:96-102.
Keywords :grapevine; nematode; nepovirus; *Xiphinema; Xiphinema index; Xiphinema diversicaudatum; Xiphinema vuittenezi; Longidorus; Paralongidorus;* Longidoridae; occurrence; Germany;
Notes :*Xiphinema index* (vector of GFLV), *Xiphinema diversicaudatum* (vector of ArMV), and *Xiphinema vuittenezi* were found in large numbers in vineyards of Baden-Württember, Germany.

162. **Bleyer, G. and H.H. Kassemeyer.** 1993. Investigations on the occurrence of the nematode genera *Xiphinema, Longidorus* and *Paralongidorus* in vineyards of Baden-Württemberg (Germany), p. 118. In P. Gugerli (ed.), Extended abstracts 11th Meeting ICVG, Montreux, Switzerland, 6-9 September 1993. Federal Agricultural Research Station of Changins, CH-1260 Nyon, Switzerland.
Keywords :grapevine; nematode; *Xiphinema; Xiphinema diversicaudatum; Xiphinema index; Xiphinema pachtaicum; Xiphinema vuittenezi; Xiphinema rivesi; Longidorus; Paralongidorus;* Longidoridae; occurrence; Germany; meeting; ICVG;
Notes : In 49 % of the sites prospected in vineyards of Baden-Württemberg, six species of *Xiphinema* were found: *index* (6%), *diversicaudatum* (6%), *vuittenezi* (30%), *pachtaicum* (8%), *coxi* (only once), *rivesi* (only once). Nematodes of the genus *Longidorus* were found in 18% of prospected sites, with six species: *macrosoma, profundorum, caespiticola, elongatus, attenuatus* and *vineacola*. Only one species of *Paralongidorus* was found: *P. maximus.*

163. **Boehm, J. and E. Martins.** 1991. O virus do enrolamento da videira (Grapevine leafroll virus). Vida Rural **40***(8):*44-48.
Keywords :grapevine; leafroll; symptoms; occurrence; Portugal;

164. **Boehm, J. and E. Martins.** 1992. A nova técnica de enxertia em verde na produção de bacelos enxertados e detecção de viroses da videira (A new green grafting technique for producing grafted vines and detect grapevine virus diseases). Vida Rural **41***(15):*5-7.
Keywords :grapevine; green grafting; propagation; indexing; Portugal;
Notes : Green grafting using a machine developed by Mumm in Champagne. The method can be used for producing large quantities of grafted plants of excellent quality and for indexing grapevine clones with *Vitis* indicators.

165. **Boidron, R.** 1995. La protezione dalle virosi (The protection from virus diseases). Vignevini **22***(1/2):*45-49.
Keywords :grapevine; sanitary selection; clonal selection; virus; virus-like diseases; control; heat therapy; micrografting; virus elimination; ELISA; indexing; France;
Notes : Description of the French system of grapevine virus control, and especially of ENTAV (Etablissement National pour l'Amélioration de la Viticulture), review of the methods for obtaining and distributing virus-tested material, heat therapy, micrografting, ELISA, indexing.

166. **Boidron, R.** 1995. Clonal selection in France. Methods, organization, and use, p. 1-7. In J. M. Rantz (ed.), Proceeding of the International Symposium on Clonal Selection, Portland, Oregon, USA, June 1995. The American Society for Enology and Viticulture, Portland, Oregon, USA.

Keywords :grapevine; clonal selection; sanitary selection; France;
Notes : Book chapter. A description is given of the methods of clonal selection in France. It includes sanitary selection, indexing and sanitation methods, a list of important virus and virus-like diseases, a discussion on the effects of selection on yield and quality, and methods for maintaining sanitary conditions. The principles of genetic selection are also described as well as the organization of distribution, control and certification of selected material.

167. **Boidron, R. and S. Grenan.** 1992. Appareil à eau chaude pour le traitement des bois contre la flavescence dorée. (Hot water apparatus for control of flavescence dorée in dormant canes of grapevine). Progr. Agric. Vitic. **109**:271-273.
Keywords :grapevine; phytoplasma disease; flavescence dorée; hot water treatment; control; Pierce's disease; *Xylella fastidiosa;* nematode; *Agrobacterium;* phylloxera; France;
Notes : A hot water treatment of 35-60 minutes at 50^{o} C. is recommended as a control method against the propagation of flavescence dorée phytoplasmas with rootstocks or graftwood. It is also efficient against *Agrobacterium tumefaciens, Xylella fastidiosa,* phylloxera and root nematodes.

168. **Boidron, R. and C. Valat.** 1993. Sanitary clonal selection. Laboratories for clone approval in the world - Sélection clonale sanitaire. Les laboratoires pour l'agrément des clones dans le monde. Bull. OIV **66**:520-531.
Keywords :grapevine; clonal selection; sanitary selection; detection; virus; viroid; phytoplasma; phytoplasma disease; survey; France; World;
Notes : In English and French. Data are given on laboratories for clonal selection, detection of viruses, viroids and other pathogens of grapevine which are considered for clonal selection, in different parts of the world.

169. **Bonavia, M., M. Digiaro, D. Boscia, A. Boari, G. Bottalico, V. Savino, and G.P. Martelli.** 1996. Studies on "corky rugose wood" of grapevine and on the diagnosis of grapevine virus B. Vitis **35**:53-58.
Keywords :grapevine; corky rugose wood; rugose wood; vitivirus; GVB; etiology; detection; ELISA; diagnosis; immunoassay; closterovirus; Italy;
Notes : Corky rugose wood (CRW) designates a grapevine syndrome characterized by a pronounced development of cork just above the graft union, in addition to the rugose aspect of the wood cylinder. In Italy, CRW is especially frequent in cv. Italia. Vines with CRW often coexist in the same vineyard with vines showing rugose wood without excessive cork production. A search for viruses associated with this disease was made in five vineyards of Apulia (Southern Italy), using DAS- and TAS-ELISA and immune electron microscopy (IEM). The viruses found were: GLRaV-1, -2, -3, GVA, GVB, GFkV. However, the same viruses, except GVB, were found in vines with rugose wood but without excessive CRW symptoms. The authors suggest that GVB may have a determining role in the etiology of CRW. A triple antibody sandwich ELISA was used for detecting GVB in cortical scrapings' extracts from mature canes collected in autumn, with polyclonal antibodies for plate coating (trapping) and a monoclonal antibody for antigen detection.

170. **Bondarchuk, V.V., L.A. Litvak, and I.S. Konstantinova.** 1991. Closterovirus-like particles associated with leafroll of grapevine in Moldavia, p. 408. In I. C. Rumbos, R. Bovey, D. Gonsalves, W. B. Hewitt, and G. P. Martelli (ed.), Proceedings of the 10th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG). Plant Protection Institute, P.O. Box 303, 38001 Volos, Greece.
Keywords :grapevine; leafroll; closterovirus; Moldavia; meeting; ICVG;
Notes : Thread-like virus particles 700-2300 nm long and about 17 nm wide were found by electron microscopy in crude extracts of leafroll-affected grapevines. Purification was carried out from veins and petioles of infected leaves. An antiserum made with purified virus was used in IEM and ELISA. At least two types of particles can be observed in infected grapevines and can be considered as pathogens.

171. **Bonfiglioli, R., J. Lherminier, X. Daire, and E. Boudon-Padieu.** 1997. The use of *in situ* hybridization with oligonucleotide probes to specifically localize phytoplasmas in plant tissues in electron

microscopy, p. 81-82. In O. A. Sequeira,de, J. C. Sequeira, and M. T. Santos (ed.), Extended abstracts 12th Meeting ICVG, Lisbon, Portugal, 29 September-2 October 1997. Dept.Plant Pathology, Estação Agronomica Nacional, Oeiras, Portugal.
Keywords :grapevine; phytoplasma disease; phytoplasma; flavescence dorée; stolbur; nucleic acid assay; immunogold labelling; electron microscopy; ultrastructure; France; meeting; ICVG;
Notes : A method was developed for labelling phytoplasmas in thin sections of plant tissue after embedding and sectioning. The phytoplasma nucleic acid was denatured by heat and hybridized with specific oligonucleotide probes end-labelled at the 3' end with digoxigenin-11-dUTP. The sections were then incubated with gold labelled monoclonal anti-digoxigenin antibodies, stained with uranyl acetate and examined in the electron microscope. A satisfactory labelling was obtained with stolbur. Using biotin instead of digoxigenin for flavescence dorée gave disppointing results. This is the first report on the use of oligonucleotides as probes for post embedding *in situ* hybridization.

172. **Bonfiglioli, R.G., C.T. Carey, L.F. Schliefert, A.J. Kinnear, and R.H. Symons.** 1997. Description and progression of symptoms associated with grapevine yellows disease in young Chardonnay vines in the Sunraysia region. The Australian Grapegrower and Winemaker **34***(400):*11-15.
Keywords :grapevine; yellows disease; symptoms; occurrence; epidemiology; Australia;
Notes : A study of the evolution of a yellows disease of cv. Chardonnay in a vineyard of the Sunraysia region of Australia showed that the disease was spreading to adjacent vines. There was some recovery, as is the case for flavescence dorée. A description of symptoms is given. So far the vector is not known.

173. **Bonfiglioli, R.G., C.T. Carey, L.F. Schliefert, A.J. Kinnear, and R.H. Symons.** 1997. Preliminary studies on the appearance and spread of symptoms of grapevine yellows in an Australian vineyard, p. 109. In O. A. Sequeira,de, J. C. Sequeira, and M. T. Santos (ed.), Extended abstracts 12th Meeting ICVG, Lisbon, Portugal, 29 September-2 October 1997. Dept.Plant Pathology, Estação Agronomica Nacional, Oeiras, Portugal.
Keywords :grapevine; phytoplasma disease; symptoms; spread; epidemiology; Australia; meeting; ICVG;
Notes :A study of grapevine yellows (GY) during 2 years in a vineyard of the Sunraysia region of Australia showed that beside the usual known symptoms of yellows due to phytoplasmas, additional symptoms occurred at different times of the year: late season leaf curl in autumn (LSLC), unusual out of season growth in winter, abnormal bud burst in spring and pale discoloration of whole vines in summer. PCR analysis detected phytoplasmas in only 50% of vines showing symptoms of GY. There was a clear evidence of spread of the disease to adjacent vines, whereas previously affected vines were often symptomless next year. The increase was as high as 10 fold from the first year to the next.

174. **Bonfiglioli, R.G., N. Habili, L.F. Schliefert, and R.H. Symons.** 1997. Serious problems with top-working old vines: a warning to grapegrowers about grapevine leafroll viruses. The Australian Grapegrower and Winemaker **34***(402):*16-18.
Keywords :grapevine; leafroll; graft; graft transmission; Australia;
Notes : This note intended for growers is a warning on the risks of topgrafting a healthy vine with graftwood that is infected with leafroll and may infect the whole plant, and also of using healthy but leafroll-susceptible graftwood for topworking a vine that is carrying leafroll in a latent form.

175. **Bonfiglioli, R.G., P.A. Magarey, and R.H. Symons.** 1995. PCR analysis confirms an expanded symptomatology for Australian grapevine yellows. Austral. J. Grape and Wine Res. **1**:71-75.
Keywords :grapevine; phytoplasma disease; Australian grapevine yellows; symptoms; detection; nucleic acid assay; PCR; Australia;
Notes :PCR analysis confirmed the presence of Australian grapevine yellows (AGY) phytoplasmas in vines with yellows symptoms in late summer and autumn. Early-season symptoms (late spring-early summer) were confined to isolated shoots and less frequent. PCR was also positive for these shoots in most cases (72%). These vines showed in several cases typical AGY autumn symptoms later in the season (Summary in Bull. OIV 69 (785-786), 693).

176. **Bonfiglioli, R.G., L.F. Schliefert, R.J. Gibson, P.A. Magarey, M.F. Wachtel, K.S. Gibb, and R.H. Symons.** 1995. Preliminary survey of the distribution of phytoplasma associated with Australian grapevine yellows. The Australian Grapegrower and Winemaker **32***(378a):*98.
Keywords :grapevine; Australian grapevine yellows; phytoplasma disease; phytoplasma; detection; distribution; survey; nucleic acid assay; PCR; occurrence; Australia;

177. **Bonfiglioli, R.G., L.F. Schliefert, R.J. Gibson, P.A. Magarey, M.F. Wachtel, K.S. Gibb, and R.H. Symons.** 1996. Preliminary survey of the distribution of phytoplasma associated with Australian Grapevine Yellows (Abstract of poster), p. 194. In C. S. Stockley, A. N. Sas, R. S. Johnstone, and T. H. Lee (ed.), Proceedings Ninth Australian Wine Industry Technical Conference, Adelaide S.A.,16-19 July 1995. Australian Wine Research Institute, Urrbrae, South Australia.
Keywords :grapevine; Australian grapevine yellows; phytoplasma disease; phytoplasma; detection; nucleic acid assay; PCR; survey; distribution; occurrence; Australia;
Notes : Vineyards in South Australia, New South Wales and Victoria were examined for the presence of Australian grapevine yellows (AGY) using PCR. Phytoplasma DNA was detected in vines showing symptoms of AGY. The extent of the disease appears to be more widespread than previously thought.

178. **Bonnet, A., S. Grenan, and R. Boidron.** 1993. Indexing by green-grafting technique, p. 153. In P. Gugerli (ed.), Extended abstracts 11th Meeting ICVG, Montreux, Switzerland, 6-9 September 1993. Federal Agricultural Research Station of Changins, CH-1260 Nyon, Switzerland.
Keywords :grapevine; virus; virus-like diseases; rugose wood; corky bark; detection; indexing; green grafting; France; meeting; ICVG;
Notes : Advantages of green grafting technique for detection of grapevine virus infections, especially corky bark.

179. **Borgo, M.** 1987. Evoluzione della malattia "flavescenza dorata" rilevata su alcuni vitigni sensibili nel Veneto orientale. (Evolution of flavescence dorée on some sensitive grapevine varieties in the eastern Veneto), p. 103-119. In S. Ruini (ed.), Atti del Convegno sulla Flavescenza Dorata della Vite, Vicenza-Verona, Maggio 1987. Fondazione Sergio Bolla, Verona.
Keywords :grapevine; phytoplasma disease; flavescence dorée; symptoms; Veneto; Italy; meeting;
Notes : In Italian, Fr. Eng. sum. Flavescenza dorata, Vicenza-Verona meeting.

180. **Borgo, M.** 1987. Primi risultati di saggi biologici e di ricerca di varietà tolleranti alla malattia "flavescenza dorata" della vite mediante prove di sovrinnesto (First results of biological tests and search for varieties tolerating the disease "flavescence dorée", by means of double-grafting), p. 121-139. In S. Ruini (ed.), Atti del Convegno sulla Flavescenza Dorata della Vite, Vicenza-Verona, Maggio 1987. Fondazione Sergio Bolla, Verona.
Keywords :grapevine; phytoplasma disease; flavescence dorée; varietal sensitivity; tolerance; symptoms; Italy; meeting;
Notes : In Italian, Fr. Eng. sum. Flavescenza dorata, Vicenza-Verona meeting.

181. **Borgo, M.** 1988. Problemi connessi alla presenza della "Flavescenza dorata" della vite in provincia di Treviso (Problems in relation with the presence of flavescence dorée of grapevine in the province of Treviso). Riv. Vitic. Enol. **41**:250-259.
Keywords :grapevine; phytoplasma disease; flavescence dorée; *Scaphoideus titanus;* symptoms; leafhopper; vector; Italy;
Notes : In Italian, Eng. Fr. sum. There is no correlation between the level of outbreak of "flavescence dorée" and the importnce of *Scaphoideus titanus* populations in the viticultural regions of Padua and Treviso (Veneto, northern Italy). The most affected varieties are Chardonnay and Perera.

182. **Borgo, M.** 1989. Présence de dépérissements du type "flavescence dorée" sur la vigne en Italie (Presence of dieback of the type "flavescence dorée" in Italy), p. 285-294. In R. Cavalloro (ed.), Influence of Environmental Factors on the Control of Grape Pests, Diseases and Weeds. Proceedings of the Meeting of EC Experts' Group, Thessaloniki, October 1987. A.A. Bakema, Rotterdam, Netherlands.

Keywords :grapevine; phytoplasma disease; flavescence dorée; occurrence; symptoms; *Scaphoideus littoralis;* leafhopper; Italy; meeting;
Notes : In French. General information on flavescence dorée in northern Italy. Symptoms of the disease. *Scaphoideus littoralis* is not always present. Book chapter. EC meeting.

183. **Borgo, M.** 1990. Determinazione sierologica dei virus dell' arricciamento e dell' accartocciamento fogliare mediante test ELISA su organi legnosi della vite (Serological detection of fanleaf and leafroll viruses with ELISA in woody organs of grapevine). Riv. Vitic. Enol. **43**:3-13.
Keywords :grapevine; immunoassay; nepovirus; grapevine fanleaf virus; leafroll; GLRaV-1; GLRaV-3; closterovirus; arabis mosaic virus; detection; ELISA; wood shavings; Italy;
Notes : In Italian. Use of kits from Bioreba and Sanofi. Wood shavings gave better results than leaf extracts for GFLV and ArMV. For GLRV, the best sample material were the basal leaves in autumn, or preferably wood shavings in autumn and winter. Prep. of antigens: leaves homogeneized in plastic bags (Tris-HCl buffer + PVP + PEG pH 8.2 + Tween 20) 0.5 g leaf/5 ml buffer. Centrifug. 1500 tpm 8-10 min. Wood samples: shawing with knife after discarding bark, maceration Tris-HCl pH 8.2 + Tween + 1% BSA (bovine serum albumine) 4-5 h at 5°C, centrifug. 1500 tpm 8-10 min. Good results were obtained with leaves or wood shavings for GFLV or ArMV, with basal leaves for GLaV-I or III in summer or autumn, and with wood shavings for the same viruses in autumn or winter. Biorbea kits gave the best results. Wood shavings were better sources of virus than sawdust.

184. **Borgo, M.** 1990. Aspetti fitosanitari delle virosi della vite in referimento alla selezione clonale di vitigni in Sardegna (Phytosanitary aspects of grapevine virus diseases in relation with clonal selection of grapevine in Sardinia). Annali dell'Istituto Sperimentale per la Viticoltura Conegliano Veneto **47**:(Publ.No 1).
Keywords :grapevine; selection; leafroll; fanleaf; rugose wood; indexing; symptoms; Italy;
Notes : In Italian. 16 pages not numbered. In Sardinian viticulture the presence of virus and virus-like diseases is particularly noxious because of the negative effects on production. A good knowledge of symptoms of these diseases is important for diagnosis. Biological indexing reveals a high incidence of leafroll and rugose wood whereas fleck and fanleaf is less prevalent. The sanitary state of rootstocks is better.

185. **Borgo, M.** 1991. Influenza della virosi dell'accartocciamento fogliare della vite su alcuni parametri della produzione (Influence of grapevine leafroll of on some production parameters). Riv. Vitic. Enol. **44***(2):*21-30.
Keywords :grapevine; leafroll; closterovirus; GLRaV-3; economic importance; performance; yield; quality; Italy;
Notes : This paper reports on the influence of leafroll disease on the performances of cvs. Merlot, Cabernet franc and Cabernet Sauvignon in northern Italy. Production of Merlot: Healthy 12.85 kg/vine // infected 9.77 kg/vine. Cabernet franc: 6.8 kg // 5.6 kg. Reduction in sugar content due to virus infection: Merlot 30%, Cabernet franc 18%, Cabernet Sauvignon 8%.

186. **Borgo, M.** 1996. Fitoplasmosi della vite in provincia di Treviso. Diffusione di legno nero e flavescenza dorata (Phytoplasma diseases of grapevine in the province of Treviso. Diffusion of blackwood and flavescence dorée). L'Informatore Agrario **52***(20):*72-75.
Keywords :grapevine; phytoplasma disease; flavescence dorée; bois noir; aster yellows; elm yellows; phytoplasma; *Scaphoideus titanus;* epidemiology; leafhopper; Italy;
Notes : In Italian. The phytoplasma associated with flavescence dorée (FD) is very common in vineyards of the Treviso province, especially in the region of Valdobbiadene where the first cases were found at the beginning of the eighties. From there the epidemics spread rapidly. It is now extending eastwards. FD often occurs in mixed infection with blackwood (bois noir) or other phytoplasmas of the aster yellows group. The bibliography is published in the reprints.

187. **Borgo, M. and A. Bonotto.** 1993. Rugose wood complex of grapevine in northeastern Italy: occurrence of rupestris stem pitting and Kober stem grooving, p. 61-62. In P. Gugerli (ed.), Extended

abstracts 11th Meeting ICVG, Montreux, Switzerland, 6-9 September 1993. Federal Agricultural Research Station of Changins, CH-1260 Nyon, Switzerland.
Keywords :grapevine; rugose wood; indexing; rupestris stem pitting; Kober stem grooving; LN 33 stem grooving; occurrence; Italy; meeting; ICVG;
Notes :239 cultivars of rootstocks and European grapes were indexed with *Vitis rupestris*, Kober 5BB and LN 33 in order to detect the various components of rugose wood in northern Italian vineyards. 6.7% of tested rootstocks carried rupestris stem pitting (RSP). Kober stem grooving (KSG) and LN 33 stem grooving (LNSG) were not present in rootstocks. *V.vinifera* cvs. were more heavily affected: 52.2% had RSP, 0.9 % had KSG and LNSG was not detected.

188. **Borgo, M., A. Calò, and A. Bonotto.** 1992. Ricerca sui rapporti fra affezioni virali e caratteristiche della produzione: risultati preliminari su risanamento da accartocciamento fogliare e da fleck (Study on the relationship between virus diseases and productive features: preliminary results concerning the elimination of leafroll and fleck). Riv. Vitic. Enol. **45***(1):*3-10.
Keywords :grapevine; leafroll; fleck; virus elimination; *in vitro;* meristem tip culture; heat therapy; Italy;
Notes :*In vitro* sanitation of Sauvignon bianco (White Sauvignon) and Torbato bianco. GLRaV-I and III were present in most leafroll-affected vines. GLRaV-III was eliminated more easily than GLRaV-I. Fleck was easily eliminated by heat therapy.

189. **Borgo, M. and S. Cancellier.** 1992. Relazione tra aspetti sanitari e sintomi di malformazione infettive su tralci in piante di uva "Garganega" (Relation between sanitary aspects and symptoms of infectious malformations on canes of Garganega grapevines). L'Informatore Agrario **48***(13):*123-125.
Keywords :grapevine; court-noué; grapevine fanleaf virus; arabis mosaic virus; nepovirus; symptoms; selection; Italy;
Notes : The presence of malformations on mature canes (double nodes, short internodes, fasciations, etc) is often considered as an expression of an infection with fanleaf or arabis mosaic virus. Although these symptoms are useful for selection, they cannot be considered as sufficiently reliable for diagnosis.

190. **Borgo, M., T. Cosmi, F. Anaclerio, and E. Sartori.** 1994. Innesto in verde: un metodo rapido per la selezione sanitaria della vite (Green grafting: a quick method for sanitary selection of grapevine). Vignevini **21***(6):*23-25.
Keywords :grapevine; sanitary selection; indexing; green grafting; leafroll; closterovirus; GLRaV-3; nepovirus; grapevine fanleaf virus; fleck; grapevine fleck virus; vein mosaic; rugose wood; corky bark; rupestris stem pitting; Italy;
Notes : Green grafting provides much quicker results of indexing for GFLV, GLRaV-3, GFkV, vein mosaic, corky bark, rupestris stem pitting than the usual graft indexing.

191. **Borgo, M. and E. Egger.** 1987. Selezione clonale sanitaria della cv. Prosecco (Sanitary selection of cv. Prosecco). Riv. Vitic. Enol. **40**:310-319.
Keywords :grapevine; clonal selection; virus elimination; sanitary selection; Italy;
Notes : In Italian.

192. **Borgo, M., E. Egger, and L. Corino.** 1987. Presenza e diffusione in Italia della "flavescenza dorata", malattia responsabile di gravi deperimenti su vitigni europei (Occurrence and diffusion in Italy of flavescence dorée, a disease causing a severe dieback in European vineyards), p. 209-236. In S. Ruini (ed.), Atti del Convegno sulla Flavescenza Dorata della Vite, Vicenza-Verona, Maggio 1987. Fondazione Sergio Bolla, Verona.
Keywords :grapevine; flavescence dorée; phytoplasma disease; survey; occurrence; Italy; meeting;
Notes : In Italian, Fr., Eng. sum. Flavescenza dorata, Vicenza-Verona meeting. The authors describe the situation regarding yellows diseases of grapevine in the various viticultural region where this type of disease has been recorded. The presence or absence of *Scaphoideus titanus*, vector of FD, is mentioned for each case. Whereas in northern Italy, the disease is very similar to FD, with the presence of *S.titanus*, great sensitivity of Chardonnay and typical recovery phenomena, the yellows in other regions of Italy follow a somwhat different pattern and may be due to other pathogens.

193. **Borgo, M. and C. Michielini.** 1993. Detection of grapevine closteroviruses associated with leafroll by ELISA test in *Vitis* rootstocks, p. 131-132. In P. Gugerli (ed.), Extended abstracts 11th Meeting ICVG, Montreux, Switzerland, 6-9 September 1993. Federal Agricultural Research Station of Changins, CH-1260 Nyon, Switzerland.
Keywords :grapevine; leafroll; closterovirus; GLRaV-1; GLRaV-2; GLRaV-3; GLRaV-5; nepovirus; grapevine fanleaf virus; arabis mosaic virus; rootstock; ELISA; immunoassay; indexing; comparison; detection; method; Italy; meeting; ICVG;
Notes : Comparison of ELISA and biological indexing for the detection of grapevine nepoviruses and closteroviruses in rootstocks. ELISA proved to be quite reliable for detecting nepoviruses, even better than indexing on St.George. For detecting closteroviruses associated with leafroll in rootstocks, ELISA is a less reliable method, but the authors consider it as sufficiently valid, especially as a preliminary screening.

194. **Borgo, M. and C. Michielini.** 1997. Relationship between rugose wood complex symptoms and grapevine virus A, p. 37-38. In O. A. Sequeira,de, J. C. Sequeira, and M. T. Santos (ed.), Extended abstracts 12th Meeting ICVG, Lisbon, Portugal, 29 September-2 October 1997. Dept.Plant Pathology, Estação Agronomica Nacional, Oeiras, Portugal.
Keywords :grapevine; rugose wood; Kober stem grooving; rupestris stem pitting; corky bark; LN 33 stem grooving; GVA; vitivirus; etiology; Italy; meeting; ICVG;
Notes : A trial was started in 1993 at the Istituto Sperimentale per la Viticoltura (Conegliano) in order to establish the relationship between rugose wood and grapevine virus A (GVA). 259 vines showing symptoms of rugose wood were indexed on rupestris du Lot, Kober 5BB and LN33. GVA was detected with two ELISA kits :Bioreba CH), Agritest (Bari,I) and with antibodies from the Applied Virology Institute of Turin (I). The result showed that there was no close correlation between GVA infection and rupestris stem pitting. Similarly GVA was not always detected in vines indexing positive for Kober stem grooving. Corky bark and LN33 stem grooving don't appear to be linked with GVA. The etiology of rugose wood appears to be far from being clarified.

195. **Boscia, D.** 1993. Isolation and analysis of double-stranded RNAs, p. 217-218. In G. P. Martelli (ed.), Graft-transmissible diseases of grapevines. Handbook for detection and diagnosis. FAO, Rome.
Keywords :grapevine; dsRNA; analysis; method; Italy;

196. **Boscia, D.** 1996. La maculatura infettiva della vite (Fleck of grapevine), p. 63-71. In G. P. Martelli, V. Savino, and M. Digiaro (ed.), Virus floematici e malattie della vite.
Keywords :grapevine; fleck; grapevine fleck virus; research; review; Italy;
Notes : In Italian, Eng. sum. Review of the work done on fleck within the framework of the RAISA research project in Italy.

197. **Boscia, D., N. Abou-Ghanem, P. Saldarelli, A. Minafra, M. A. Castellano, R. Garau, V. Savino, and G. P. Martelli.** 1993. A comparison of grapevine virus B isolates, p. 25-26. In P. Gugerli (ed.), Extended abstracts 11th Meeting ICVG, Montreux, Switzerland, 6-9 September 1993. Federal Agricultural Research Station of Changins, CH-1260 Nyon, Switzerland.
Keywords :grapevine; rugose wood; corky bark; vitivirus; GVA; GVB; comparison; isolate; immunoassay; ISEM; dsRNA; coat protein; electrophoresis; cytopathology; Italy; meeting; ICVG;
Notes : Comparison of nine isolates of grapevine virus B (GVB) from Italy, USA and Canada. Possible association with corky bark. Transmission to *Nicotiana* species by mechanical inoculation. No serological cross reaction in ISEM decoration between GVA and GVB. On the basis of serology, coat protein properties, electrophoretic dsRNA patterns, cytopathology and nucleic acid hybridization studies, the authors conclude that GVA and GVB, although probably belonging to the same genus, are serologically and molecularly distinct viruses. (This paper appears in full in the Rivista di Patologia vegetale, ser. V, vol. 4, 11-34).

198. **Boscia, D., N. Abou-Ghanem, P. Saldarelli, A. Minafra, M.A. Castellano, R. Garau, V. Savino, and G.P. Martelli.** 1994. A comparative study of grapevine virus B isolates. Riv. Pat. Veg. ,S. V **4**:11-24.

Keywords :grapevine; vitivirus; rugose wood; corky bark; GVA; GVB; comparison; isolate; immunoassay; ISEM; electron microscopy; electrophoresis; dsRNA; coat protein; cytopathology; Italy;
Notes : Nine isolates of grapevine virus B (GVB) from Italy, USA and Canada were compared with one another and with an isolate of grapevine virus A (GVA), on the basis of host range, dsRNA analysis, serology, electron microscopy, cytopathology, and molecular hybridization. GVB was transmitted to *Nicotiana occidentalis, N. cavicola, N. rotundifolia* and *N. benthamiana*. Two biological variants were identified by their symptoms on *N. occidentalis* and *N. cavicola*, one with vein clearing and chlorosis, the other with necrotic local lesions followed by an extensive necrosis of upper leaves. All GVB isolates had particles with rather similar properties, and differences in cytopathology between strains were minor. In all serological tests (ELISA, western blot and IEM), the GVB isolates proved to be related with one another, but distinct from GVA. Molecular hybridization gave similar results. This study stengthens the hypothesis of an association of GVB with corky bark.

199. **Boscia, D., E. Aslouj, V. Elicio, V. Savino, M.A. Castellano, and G.P. Martelli.** 1992. Production, characterization and use of monoclonal antibodies to grapevine virus A. Arch. Virol. **127**:185-194.
Keywords :grapevine; vitivirus; GVA; *in vitro;* detection; immunoassay; monoclonal antibodies; ELISA; Italy;
Notes : Four monoclonal antibodies to grapevine virus A (GVA) were obtained. All of them reacted with GVA in leaf extracts from infected *Nicotiana benthamiana*, glasshouse-, field-, or *in vitro*-grown infected grapevines, or with cortical shavings from mature grape canes. In immuno-electron microscopy tests, only one of the MAbs decorated virus particles on the whole surface. This MAb was probably induced by a surface antigenic determinant, whereas the other three MAbs were determined by cryptotypes. A good detection of GVA was obtained by using polyclonal antibodies for coating protein A-sensitized plates and monoclonal antibody conjugates for antigen detection.

200. **Boscia, D., A. Boari, M.A. Castellano, V. Savino, and G.P. Martelli.** 1994. Production of monoclonal antibodies to grapevine trichovirus B, p. 19-20. In Proceedings 9th Congress of the Mediterranean Phytopathological Union, September 1994, Kusadasi-Aydin, Turkey.
Keywords :grapevine; vitivirus; GVB; monoclonal antibodies; meeting; Italy;
Notes : Book chapter. Mediterranean Phytopathological Union.

201. **Boscia, D., M. Digiaro, J. Fresno, C. Greif, S. Grenan, H.H. Kassemeyer, V.A. Prota, and O.A. Sequeira,de.** 1997. ELISA for the detection and identification of grapevine viruses, p. 129-155. In B. Walter (ed.), Sanitary selection of the grapevine. Protocols for detection of viruses and virus-like diseases. (Les Colloques no 86). INRA Editions, Paris, France.
Keywords :grapevine; virus; detection; identification; immunoassay; ELISA; method; review; France; Germany; Italy;

202. **Boscia, D., V. Elicio, V. Savino, and G.P. Martelli.** 1993. Monoclonal antibodies to grapevine fleck virus, p. 133. In P. Gugerli (ed.), Extended abstracts 11th Meeting ICVG, Montreux, Switzerland, 6-9 September 1993. Federal Agricultural Research Station of Changins, CH-1260 Nyon, Switzerland.
Keywords :grapevine; grapevine fleck virus; detection; immunoassay; ELISA; monoclonal antibodies; Italy; meeting; ICVG;
Notes : High-titre monoclonal antibodies against grapevine fleck virus are now available and can be used for ELISA. Bark scrapings were found to be the best antigen source.

203. **Boscia, D., V. Elicio, V. Savino, and G.P. Martelli.** 1995. Production of monoclonal antibodies to grapevine fleck virus. Plant Pathology **44**:160-163.
Keywords :grapevine; grapevine fleck virus; monoclonal antibodies; ELISA; Italy;
Notes : Two hybridoma cell lines producing monoclonal antibodies (mAbs) to grapevine fleck virus were obtained (Fk. 89 and Fk.117). Both mAbs belong to the IgG1 isotype. They give positive ELISA reactions but do not decorate the corresponding particles. Good results were obtained with ELISA using cortical scrapings, leaf or root tissue extracts of *Vitis* as virus source. Indirect ELISA gave quick and strong reactions, but a colour background developed also in control wells after less than two hours. Direct ELISA

gave cleaner and highly reproducible results. The mAbs could be used for plate coating (trapping) or as second antibody. However the best results were obtined using antibodies of a polyclonal antiserum for coating and mAb Fk.117 as a second antibody. Precoating the plates with protein A was not found to be advantageous.

204. **Boscia, D., C. Greif, P. Gugerli, G.P. Martelli, B. Walter, and D. Gonsalves.** 1995. Nomenclature of grapevine leafroll-associated putative closteroviruses. Vitis **34**:171-175.
Keywords :grapevine; closterovirus; leafroll; nomenclature; rugose wood; corky bark; immunoassay; immuno-blot; immuno electron microscopy; GLRaV-6; GCBaV; GLRaV-2; GLRaV-IIa; GLRaV-IIb; monoclonal antibodies; ELISA; Italy; France; Switzerland; USA;
Notes : Several filamentous viruses of the closterovirus type have been found to be associated with leafroll in different parts of the world, and have been named grapevine leafroll-associated virus I to V (GLRaV-I to -V, now to be designated by GLRaV-1 to -5). In order to clarify the relationships of these viruses between them and with another closterovirus reported to be associated with corky bark (GCBaV), comparative studies were made using ELISA, immunoelectron microscopy (IEM) and immunoblotting, with antisera of different origins. These studies show that *a)*: both GCBaV isolates NY and BA are serologically very closely related, if not identical, and very closely related or identical with GLRaV-2. *b)*: GLRaV-IIb from Chasselas (Changins) is similar to GLRaV-2 from France, whereas GLRaV-IIa from Chasselas is a distinct type, and is provisionally given the name of grapevine leafroll-associated virus 6 (GLRaV-6). *c)*: GLRaV-1 and GLRaV-3 are most widespread and are definitely associated with leafroll. *d)*: GLRaV-2 is less common, and differs from types 1 and 3 by its particle structure and coat protein characteristics. *e)*: GLRaV-4 and -5 are much less common, and their association with leafroll has little substance. *f)*: GLRaV-6 is the least known among clostero-like grapevine viruses. *g)*: None of the viruses included in this study appears to be clearly associated with corky bark.

205. **Boscia, D., J. S. Hu, D. Golino, and D. Gonsalves.** 1990. Characterization of grape leafroll associated closterovirus (GLRaV) serotype II and comparison with GLRaV serotype III. Phytopathology **80**:117 (Abstract).
Keywords :grapevine; leafroll; closterovirus; immunoassay; GLRaV-2; GLRaV-3; ELISA; ISEM; USA;
Notes : Type II=CA-5 California. Type III= NY-1 New York. Serologically distincts in both ISEM and ELISA. Coat protein of CA-5: 36 kD (Western blot). Same results with four other isolates of type II.

206. **Boscia, D. and G.P. Martelli.** 1993. Western blot, p. 219-223. In G. P. Martelli (ed.), Graft-transmissible diseases of grapevines. Handbook for detection and diagnosis. FAO, Rome.
Keywords :grapevine; virus; detection; diagnosis; immunoassay; western blot; method; Italy;

207. **Boscia, D., G.P. Martelli, V. Savino, and M.A. Castellano.** 1991. Identification of the agent of grapevine fleck disease. Vitis **30**:97-105.
Keywords :grapevine; GPLIV; fleck; grapevine fleck virus; ELISA; Italy;
Notes : Grapevine phloem-limited isometric virus (GPLIV) is the virus agent of fleck, and should be renamed grapevine fleck virus (GFkV).

208. **Boscia, D., K.M. Masannat, A.R. Abu-Zurayk, and G.P. Martelli.** 1995. Rugose wood of the grapevine in Jordan. Phytopath. medit. **34**:126-128.
Keywords :grapevine; rugose wood; leafroll; symptoms; occurrence; vitivirus; GVA; nepovirus; grapevine fleck virus; grapevine fanleaf virus; GLRaV; closterovirus; Jordan;
Notes :GVA, GFkV, GFLV, GLRaV, rugose wood are reported from grape in Jordan.

209. **Boscia, D., K.M. Masannat, A.R. Abu-Zurayk, and G.P. Martelli.** 1995. Disease and pest outbreaks. Jordan. Rugose wood of the grapevine in Jordan. Arab and Near East Plant Protection Newsletter *(21):*32.
Keywords :grapevine; rugose wood; symptoms; occurrence; fanleaf; grapevine fanleaf virus; nepovirus; GVA; vitivirus; leafroll; GLRaV-1; GLRaV-2; fleck; grapevine fleck virus; Jordan; Italy;

Notes : Serological analysis revealed the presence of following viruses in grapevines in Jordan: grapevine fanleaf virus, grapevine virus A, grapevine leafroll-associated viruses 1 and 3, grapevine fleck virus and an unidentified virus. GVA was the most prevalent of the viruses detected.

210. **Boscia, D., A. Minafra, and G.P. Martelli.** 1997. Filamentous viruses of the grapevine: Putative trichoviruses and capilloviruses, p. 19-28. In P. L. Monette (ed.), Filamentous viruses of woody plants. Research Signpost, Trivandrum, India.
Keywords :grapevine; trichovirus; capillovirus; classification; review; Italy;

211. **Boscia, D., A. Minafra, V. Savino, and G.P. Martelli.** 1991. Polyclonal and monoclonal antibodies and molecular probes for detection of phloem-limited grapevine viruses. Phytoparasitica **19**:264.
Keywords :grapevine; GVA; GPLIV; grapevine fleck virus; rugose wood; leafroll; closterovirus; vitivirus; detection; immunoassay; ELISA; Italy;

212. **Boscia, D., S. Sabanadzovic, V. Savino, P.E. Kyriakopoulou, G.P. Martelli, and R. Lafortezza.** 1993. Association of a non mechanically transmissible isometric virus with asteroid mosaic of grapevine, p. 27. In P. Gugerli (ed.), Extended abstracts 11th Meeting ICVG, Montreux, Switzerland, 6-9 September 1993. Federal Agricultural Research Station of Changins, CH-1260 Nyon, Switzerland.
Keywords :grapevine; asteroid mosaic; isometric; virus; associated; Italy; Greece; meeting; ICVG;
Notes : The disease was first described in California, and was later found in Europe and South Africa. It was recently reported from Greece and transmitted by graft. In grapevine material from Greece, studied in Bari, isometric, non mechanically transmissible particles of 30 nm in diameter were found by electron microscopy. No serological relationship with the agents of fleck or ajinashika disease.

213. **Boscia, D., S. Sabanadzovic, V. Savino, P.E. Kyriakopoulou, G.P. Martelli, and R. Lafortezza.** 1994. A non-mechanically transmissible isometric virus associated with asteroid mosaic of the grapevine. Vitis **33**:101-102.
Keywords :grapevine; asteroid mosaic; isometric; virus; Italy; Greece;
Notes : Isometric particles 30 nm in diameter were recovered directly from grapevine tissue (roots, scrapings of cortical tissue) of vines with symptoms of asteroid mosaic (California source). There was no transmission by mechanical inoculation to herbaceous hosts. No particles could be observed in the electron microscope in extracts from whole leaves or separated main veins or petioles. Good results, however, were obtained with young roots or cortical scrapings, after treatment with liquid nitrogen. Two types of particles were observed: intact virions and empty shells. They are similar to the particles of GFkV, but there is no serological reaction with an anti-GFkV antiserum in ELISA.

214. **Boscia, D., V. Savino, M.A. Castellano, and G.P. Martelli.** 1991. Portinnesti della vite e closterovirus (Grapevine rootstocks and closterovirus), p. 35-42. In Atti del III Convegno sui portinnesti della vite, novembre 1988, Potenza, Italia.
Keywords :grapevine; closterovirus; rootstock; symptoms; occurrence; performance; meeting; Italy;
Notes : Book chapter. Meeting on grapevine rootstocks, Potenza 1988.

215. **Boscia, D., V. Savino, V. Elicio, S.D. Jebahi, and G.P. Martelli.** 1991. Detection of closteroviruses in grapevine tissues, p. 52-57. In I. C. Rumbos, R. Bovey, D. Gonsalves, W. B. Hewitt, and G. P. Martelli (ed.), Proceedings of the 10th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG). Plant Protection Institute, P.O.Box 303, 38001 Volos, Greece.
Keywords :grapevine; immunoassay; leafroll; closterovirus; GLRaV-3; purification; detection; electron microscopy; ELISA; Italy; meeting; ICVG;
Notes : Micropurification does not allow detection of GLRaV-III in American roootstocks and ELISA is not suitable for detecting this virus in leaves of *Vitisrupestris* and its hybrids, and probably also in Kober 5 BB. ELISA can be used safely with leaves of *V.vinifera* and its hybrids, of *V.riparia*, and with bark scrapings of mature canes of most *Vitis* species commercially grown. It is suggested that GLRaV-III is not equally invasive in all *Vitis* species.

216. **Boscia, D., V. Savino, G.P. Martelli, and M.A. Castellano.** 1991. Association of a phloem-limited non mechanically transmissible isometric virus with grapevine fleck disease, p. 173-174. In I. C. Rumbos, R. Bovey, D. Gonsalves, W. B. Hewitt, and G. P. Martelli (ed.), Proceedings of the 10th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine. Plant Protection Institute, P.O.Box 303, 38001 Volos, Greece.
Keywords :grapevine; fleck; virus; grapevine phloem-limited isometric virus; GPLIV; grapevine fleck virus; etiology; properties; Italy; meeting; ICVG;
Notes : An isometric virus with particles ca. 30 nm in diameter, called grapevine phloem-limited isometric virus (GPLIV), is shown to be closely associated with fleck disease of grape. Properties of the virus, distribution in the plant, occurrence in different grapevine sources.

217. **Boscia, D., V. Savino, A. Minafra, S. Namba, V. Elicio, M.A. Castellano, D. Gonsalves, and G.P. Martelli.** 1993. Properties of a filamentous virus isolated from grapevines affected by corky bark. Arch. Virol. **130**:109-120.
Keywords :grapevine; rugose wood; corky bark; closterovirus-like particles; properties; GVB; vitivirus; mealybug; *Planococcus ficus;* Italy; Japan;
Notes :A virus was transmitted to *Nicotiana occidentalis* by mechanical inoculation of sap from grapevines affected with corky bark . Flexuous filamentous particles of about 800 nm in length with transverse striations were observed in the electron microscope. The virus, called grapevine virus B (GVB), has a single-strand RNA of ca. 7600 nucleotides with a mw. of ca. $2.5x10^6$ daltons. Coat protein subunits have a mw. of about 23 000 daltons. The herbaceous host range is restricted to *N.occidentalis*, *N.cavicola* and *N.rotundifolia*. Two isolates were studied initially, one from New York (GVB-NY) the other from Canada (GVB-CAN). Italian isolates were also studied later. The virus was transmitted experimentally by the mealybug *Planococcus ficus*. Although GVB shares some physicochemical properties with GVA, it is not serologically related with this virus.

218. **Bosco, D., A. Alma, and A. Arzone.** 1997. Studies on population dynamics and spatial distribution of leafhoppers in vineyards (Homoptera: Cicadellidae). Ann. Appl. Biol. **130**:1-11.
Keywords :grapevine; phytoplasma; phytoplasma disease; vector; leafhopper; survey; Italy; *Scaphoideus titanus; Euscelidius variegatus; Anoplotettix fuscovenosus;*
Notes :A survey of populations of leafhoppers was made in two vineyards in Piedmont, northern Italy. Yellow sticky traps were hung vertically in each vineyard 1.50 m above ground at a rate of 5 or 6.6 per 1000 m2. They were replaced weekly during all the growing season. 32 species were recorded 10 of which are confirmed vectors of phytoplasmas. Three of these species are known as vectors of grapevine phytoplasmas: *Scaphoideus titanus*, vector of Flavescence dorée (FD), *Euscelidius variegatus*, also vector of FD under laboratory conditions, and *Anoplotettix fuscovenosus*, shown to transmit from clover to clover an undefined phytoplasma originating from grapevine and transmitted to clover by *S.titanus*. The possible role of six species, including the three above-mentioned ones, as vectors of grapevine yellows in the region is being investigated.

219. **Bottalico, G., V. Savino, and A. Campanale.** 1997. Improvements in the *in vitro* culture of meristem shoot tips for sanitation and establishment of rooted explants, p. 163-164. In O. A. Sequeira,de, J. C. Sequeira, and M. T. Santos (ed.), Extended abstracts 12th Meeting ICVG, Lisbon, Portugal, 29 September-2 October 1997. Dept.Plant Pathology, Estação Agronomico Nacional, Oeiras, Portugal.
Keywords :grapevine; virus elimination; *in vitro;* meristem tip culture; method; Italy; meeting; ICVG;
Notes : 211 grapevine accessions from 89 different cultivars were used for experimenting *in vitro* culture of meristem shoot tips with different growth media. Two of them, denoted 1A and ML proved to be the best for explant stabilization. The methods of adaptation of grape explants to *in vitro* subculture every 15-21days and the final steps of rooting and transplanting the plantlets were also improved. Some cultivars proved more difficult to grow *in vitro* than the average. These improvements managed to shorten by 50% the time needed to go from the meristem tip explant to the rooted greenhouse-grown plant.

220. **Boubals, D.** 1986. La Flavescence dorée dans l'Aude, c'est très sérieux. (Flavescence dorée in Aude, a very serious problem). Progr. Agric. Vitic. **103**:389-390.

Keywords :grapevine; phytoplasma disease; flavescence dorée; economic importance; Aude; France;
Notes : Popular paper, in French.

221. **Boubals, D.** 1987. Reflets négatifs de la Flavescence dorée sur la viticulture européenne. (Negative consequences of flavescence dorée on European viticulture), p. 249-256. In S. Ruini (ed.), Atti del Convegno sulla Flavescenza Dorata della Vite, Vicenza-Verona, Maggio 1987. Fondazione Sergio Bolla, Verona.
Keywords :grapevine; phytoplasma disease; flavescence dorée; economic importance; control; Europe; France; meeting;
Notes : In French, It. Eng. sum. Flavescenza dorata, Vicenza-Verona meeting.

222. **Boubals, D.** 1987. Le Chardonnay, malade de la flavescence dorée, partout où on l'établit nouvellement en Europe du Sud. (Chardonnay is affected by flavescence dorée wherever it is newly planted in southern Europe). Progr. Agric. Vitic. **104**:277-278.
Keywords :grapevine; phytoplasma disease; flavescence dorée; Chardonnay; review; meeting; control; Italy; France;
Notes : In French. This a report on the meeting held in 1987 on grapevine yellows diseases in Vicenza and Verona, Italy. It deals with the control of this dangerous disease.

223. **Boubals, D.** 1989. La maladie de Pierce arrive dans les vignobles d'Europe. (Pierce's disease in European vineyards). Bull. OIV **62**:309-314.
Keywords :grapevine; Pierce's disease; occurrence; *Xylella fastidiosa;* ELISA; France;
Notes : Report that the bacterium *Xylella fastidiosa* was detected by ELISA in grapevines imported from California. There is no evidence that the disease occurs in European vineyards. The author points out to the necessity of paying attention to this danger (reprinted from Progrès agricole et viticole 106 (4) 85-87, see next reference).

224. **Boubals, D.** 1989. Attention! La maladie de Pierce arrive dans les vignobles d'Europe. Il faut réagir rapidement (Attention! Pierce's disease is on its way to European vineyards. It is necessary to react qickly). Progr. Agric. Vitic. **106**:85-87.
Keywords :grapevine; Pierce's disease; *Philaenus spumarius; Xylella fastidiosa;* vector; control; France;
Notes : In French. Report that Pierce's disease agent, *Xylella fastidiosa*, has been detected by ELISA in grapevine dormant canes originating from California by Dr B.Walter at INRA, Colmar. Remarks on the danger of this disease for European viticulture, as one of its vector (although not the most efficient) is present in Europe: *Philaenus spumarius.*

225. **Boubals, D.** 1990. ELISA, cauchemar des pépiniéristes viticulteurs du monde entier (ELISA, the nightmare of grapevine nurserymen worldwide). Progr. Agric. Vitic. **107**:113-116.
Keywords :grapevine; virus diseases; detection; immunoassay; ELISA; virus-free material; France;
Notes : The author describes the ELISA method of detecting viruses and other pathogens in grapevine. For nurserymen, the detection of viruses in their planting material is a constant menace. It is possible to avoid its consequences: planting healthy material, in a healthy soil.

226. **Boubals, D.** 1990. La sélection clonale de la vigne (Clonal selection of grapevine). Progr. Agric. Vitic. **107**:333-335.
Keywords :grapevine; clonal selection; results; performance; incompatibility; France;
Notes : In French. This papers summarizes the different steps of clonal selection of grapevine in France and its practical results, most of them favourable. There are some problems, due to frauds on the origin of graftwood, and also to incompatibility of certain clones of rootstocks and of cultivars. The importance of testing the susceptibility of new rootstock or scion varieties to viruses before releasing them is stressed. For example the rootstock Bourboulenc, recently introduced, appears to be much too sensitive to GFLV.

227. **Boubals, D.** 1993. Une grave épidémie de jaunisse de la vigne sur le Golan (Israël) (A serious epidemic of grapevine yellows on the Golan, Israel). Progr. Agric. Vitic. **110**:361-364.

Keywords :grapevine; phytoplasma disease; occurrence; symptoms; Israel;
Notes : Typical yellows were observed on Pinot noir, White Sauvignon, Chardonnay, Cabernet Sauvignon, Colombard. Merlot was not affected. There was no spontaneous recovery as it is the case for flavescence dorée. *Scaphoideus titanus* was not present.

228. **Boubals, D.** 1993. Situation actuelle des maladies à mycoplasmes (Flavescence dorée et autres jaunisses de la vigne) dans le vignoble français (Present situation of mycoplasma-like diseases [Flavescence dorée and other yellows diseases of grapevine] in the French vineyards). Progr. Agric. Vitic. **110**:540-543.
Keywords :grapevine; phytoplasma disease; flavescence dorée; bois noir; occurrence; *Scaphoideus titanus;* leafhopper; economic importance; control; review; research; detection; immunoassay; ELISA; meeting; France;
Notes : This is a report on a meeting of the working group on flavescence dorée held at Carcassonne on 28th October 1993. The evolution of the disease and of its vector in the various viticultural regions of France are described, as well as the results of research on detection methods (ELISA, genomic tests). The flavescence dorée is distinct from bois noir. A third type of MLO was detected in some vineyards.

229. **Boubals, D.** 1993. Nouvelle panique en Californie... Après le phylloxéra, la virose de l'enroulement (New panics in California...After phylloxera, leafroll disease). Progr. Agric. Vitic. **110**:101-103.
Keywords :grapevine; leafroll; certification; control; virus-free material; France;
Notes : In French. This short polemical chronicle reports on an article published in *The Economist* stating that the new test ELISA applied to grapevine clones of the Davis collection revealed the presence of leafroll in part of the basic grapevine material of the University of California. The author suggests that French certified material could offer a safer alternative to California wine growers.

230. **Boubals, D.** 1996. Le problème actuel de la sélection clonale, sanitaire et génétique de la vigne (The present problem of clonal, sanitary and genetic selection of grapevine). Progr. Agric. Vitic. **113**:163-164.
Keywords :grapevine; sanitary selection; clonal selection; France;
Notes : In French. Importance of continuing sanitary and genetic selection.

231. **Boudon-Padieu, E.** 1996. Le Bois noir. Des inconnues sont levées, mais d'autres demeurent (Bois noir. Some new facts are known, but mysteries remain). Phytoma - La Défense des Végétaux *(488):*10-13.
Keywords :grapevine; phytoplasma disease; bois noir; etiology; Vergilbungskrankheit; epidemiology; stolbur; leafhopper; *Hyalesthes obsoletus;* vector; detection; identification; review; France;
Notes : In French, Eng. sum. Historical account on Bois noir (Blackwood) in France, symptoms, differences with flavescence dorée, varietal sensitivity, identification of the disease, caused by a phytoplasma identical with or related to stolbur. Geographical distribution. Transmission by the leafhopper *Hyalesthes obsoletus*, which is an occasional feeder on grapevine. Biology of this insect which, unlike *Scaphoideus titanus* vector of flavescence dorée, does not hibernate as eggs but as larvae feeding on roots of their weed hosts, mainly *Convolvulus*. The disease can be also transmitted by graft. Graftwood can be disinfected by hot water treatment (45 min. at 50^{o} C). The questions that remain to be solved are the reservoir of infection (probably mainly weeds), the possible role of other vectors, and their biology in relation with transmission.

232. **Boudon-Padieu, E.** 1996. Jaunisses à mycoplasmes de la vigne. Diagnostic, épidémiologie, et développement des recherches (Grapevine yellows induced by phytoplasmas. Diagnosis, epidemiology and research). C. R. Acad. Agric. **82**:5-20.
Keywords :grapevine; phytoplasma disease; symptoms; epidemiology; bois noir; flavescence dorée; *Scaphoideus titanus;* leafhopper; vector; control; heat therapy; diagnosis; detection; immunoassay; ELISA; nucleic acid assay; PCR; review; France;
Notes : In French, Eng. sum. This paper is a good review of the problem of grapevine yellows diseases. These diseases, caused by phytoplasmas (formerly called mycoplasma-like organisms, MLO) are more and more important in most viticultural countries of the world. Flavescence dorée, which occurs in south-western France and north-eastern Italy, is a highly epidemic and damaging disease transmitted by a leafhopper, *Scaphoideus titanus* Ball. After a period of crisis, the symptoms often disappear spontaneously.

The same vine may be infected again later by the leafhopper vector. Control of the vector population is therefore essential. Bois noir and the "Vergilbungskrankheit", which occur respectively in north-eastern France and Germany, are less epidemic, and the symptoms usually recur every year. Similar diseases have been described in central and southern Italy, Israel, Spain, Switzerland. Yellows diseases caused by phytoplasmas have also been found in Australia and North America. In this review on the present knowledge on grapevine phytoplasma diseases, the author describes the biology of the disease agents and the symptoms produced, the ways of contamination through leafhopper vectors or through rootstocks and graftwood, the means of detection and diagnosis, the control measures available and the present state of research.

233. **Boudon-Padieu, E., X. Daire, D. Clair, A. Laviña, A. Batlle, W. Reinert, and M. Maixner.** 1997. Differentiation of grapevine phytoplasmas in the elm yellows and the stolbur group with the use of RFLP of non-ribosomal DNA, p. 55-56. In O. A. Sequeira,de, J. C. Sequeira, and M. T. Santos (ed.), Extended abstracts 12th Meeting ICVG, Lisbon, Portugal, 29 September-2 October 1997. Dept.Plant Pathology, Estação Agronomica Nacional, Oeiras, Portugal.
Keywords :grapevine; phytoplasma disease; phytoplasma; identification; elm yellows; stolbur; PCR; RFLP; France; Spain; Germany; meeting; ICVG;
Notes : Surveys in vineyards conducted from 1992 to 1996 included sampling and analysis of leaf tissues from several hundred grapevine yellows-diseased grapevines in 21 viticultural regions in Western Europe and Israel. The phytoplasmas were identified by PCR-RFLP. The stolbur phytoplasma was detected in all regions investigated. The primer pairs STOL4f/r and STOL11f2/r1 proved to be specific for the stolbur group. The DNA fragments amplified using these primers did not show much RFLP diversity. Apparently the stolbur goup has a rather low genetic variability, in contrast with the Elm yellows group. Elm yellows-type phytoplasmas were detected in samples from southern France, northern Italy, northern Spain where the vector of flavescence dorée (FD) is present, and in the German Palatinate where *Scaphoideus titanus* has not been recorded. The present study confirmed the occurrence of different types of phytoplasmas within the same viticultural area.

234. **Boudon-Padieu, E. and J. Larrue.** 1986. Diagnostic rapide de la flavescence dorée de la vigne par test ELISA sur la cicadelle vectrice. Application à des populations naturelles de *Scaphoideus littoralis* Ball. Confirmation de la présence de la flavescence dorée dans les Bouches-du-Rhône. (Quick diagnosis of flavescence dorée of grapevine by ELISA on vector leafhoppers. Application to natural populations of *Scaphoideus littoralis* Ball and confirmation of the presence of flavescence dorée in the Bouches-du-Rhône region). Progr. Agric. Vitic. **103**:524-526.
Keywords :grapevine; immunoassay; phytoplasma disease; flavescence dorée; diagnosis; detection; ELISA; leafhopper; vector; *Scaphoideus littoralis;* France;
Notes : In French. Summary on detection methods for flavescence dorée in the leafhopper vector: 1.transmission test, by allowing leafhoppers to feed on broadbean plants and testing the plants for infection. 2. Injection test, by injecting extracts of leafhopper to be tested into healthy leafhoppers, and then applying the transmission test. 3. Serological test by ELISA, much quicker than 1 and 2.

235. **Boudon-Padieu, E., J. Larrue, and A. Caudwell.** 1989. ELISA and dot-blot detection of flavescence dorée-MLO in individual leafhopper vectors during latency and inoculative state. Curr. Microbiol. **19**:357-364.
Keywords :grapevine; phytoplasma disease; flavescence dorée; ELISA; detection; immunoassay; phytoplasma; leafhopper; *Scaphoideus titanus; Euscelidius variegatus;* vector; immuno-blot; France;
Notes : Transmission in the field by *Scaphoideus littoralis (= titanus)*, in the laboratory from *Vicia faba* to *V.faba* by *Euscelidius variegatus*. ELISA works well on leafhopper extracts, also during latency. The test is rapid and accurate. The MLOs multiply more rapidly in males than in females. Possibility of use for surveys of disease spread.

236. **Boudon-Padieu, E., J. Larrue, and A. Caudwell.** 1990. Serological detection and characterization of grapevine flavescence dorée MLO and of other plant MLOs. IOM Letters **1**:217-218.
Keywords :grapevine; flavescence dorée; detection; immunoassay; phytoplasma; France;

Notes :8th International Congress IOM, Istanbul 8-12 July, 1990.

237. **Boudon-Padieu, E., R. Meignoz, X. Daire, and J. Larrue.** 1993. Characterization of grapevine yellows diseases using serology and genomic tools. Phytopath. medit. **32**:85.
Keywords :grapevine; phytoplasma; phytoplasma disease; detection; identification; immunoassay; nucleic acid assay; PCR; France;
Notes : Abstract of a paper presented at a Workshop on Fruit and Grapevine Mycoplasma Diseases, Bologna, Italy, September 1992.

238. **Boudon-Padieu, E., Y. Schwartz, J. Larrue, and A. Caudwell.** 1987. ELISA and immunoblotting detection of grapevine flavescence dorée MLO-induced antigens in individual vector leafhoppers. Bulletin OEPP/EPPO Bulletin **17**:305.
Keywords :grapevine; phytoplasma disease; flavescence dorée; phytoplasma; detection; antigen; immunoassay; leafhopper; vector; ELISA; immuno-blot; *Euscelidius variegatus; Scaphoideus littoralis;* broadbean; France;
Notes :31st Meeting of the French Phytopathological Society, Versailles, 13-14 November 1986.

239. **Boudon-Padieu, E., Y. Schwartz, R. Meignoz, J. Lherminier, J. Larrue, and A. Caudwell.** 1989. Immunoenzymatic detection of the MLO pathogen agent of grapevine flavescence dorée and correlation with its visualization. Phytoparasitica **17**:74-75.
Keywords :grapevine; immunoassay; phytoplasma disease; flavescence dorée; ISEM; phytoplasma; ELISA; leafhopper; *Scaphoideus littoralis;* control; detection; France; meeting; ICVG;
Notes : Abstract. This paper appears in full in the Proceedings of the 9th meeting of ICVG, Kiryat Anavim, Israel, 1987, 185-195 (1989).

240. **Boudon-Padieu, E., Y. Schwartz, R. Meignoz, J. Lherminier, J. Larrue, and A. Caudwell.** 1989. Immunoenzymatic detection of the MLO pathogen agent of grapevine flavescence dorée. Correlation with its visualization, p. 185-195. In E. Tanne (ed.), Proceedings of the 9th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG), Kiryat Anavim, Israel, September 1987. The Volcani Center, P.O. Box 6, Bet Dagan , Israel.
Keywords :phytoplasma disease; grapevine; flavescence dorée; phytoplasma; leafhopper; *Scaphoideus littoralis;* detection; ELISA; electron microscopy; immunoassay; France; meeting; ICVG;
Notes : More and more specific antibodies against flavescence dorée (FD) were obtained at the INRA Station on phytoplasma and arbovirus of plants. This allowed ELISA detection of FD phytoplasma in leafhopper vectors and in infected *Vicia faba*, using polyclonal and monoclonal antibodies. Immunofluorescence and immunogold labelling were performed on salivary glands of infected leafhoppers. ELISA was used in order to determine the infectivity of populations of the leafhopper *Scaphoideus littoralis (=titanus).*

241. **Boudon-Padieu, E., R. Sforza, X. Daire, D. Clair, and J. Larrue.** 1997. La bois noir de la vigne (Blackwood of grapevine). INRA, B.V. 1540, F-21034 DIJON Cedex, France.
Keywords :grapevine; bois noir; phytoplasma disease; *Hyalesthes obsoletus;* vector; control; hot water treatment; France;
Notes : In French. This is a summary of the present knowledge on blackwood of grapevine or "bois noir" intended for growers, with advice for control, as well as photographs showing symptoms on grapevine and the vector *Hyalesthes obsoletus.*

242. **Boudon-Padieu, E., T. Terwisscha Van Scheltinga, J. Lherminier, and A. Caudwell.** 1987. Elisa and immunofluorescence (IF) detection of the MLO agent of grapevine flavescence dorée on individual leafhopper vectors. Israel J. Medical Science **23**:506.
Keywords :grapevine; immunoassay; phytoplasma disease; flavescence dorée; phytoplasma; detection; leafhopper; vector; ELISA; immunofluorescence; France;
Notes : Abstracts 6th International Congress of the International Organization for Mycoplasmology. Birmingham, USA, 26-31-August 1986.

243. **Boulay, M., A. Perl, M.C. Mauro, and P. Coutos-Thévenot.** 1997. Les vignes transgéniques. Amélioration par voie moléculaire de la tolérance aux maladies des porte-grefes, des cépages et des variétés à raisin de table (Transgenic grapevines. Improvement by molecular way of tolerance to diseases of rootstocks, wine and table varieties). Phytoma - La Défense des Végétaux *(499):*18-23.
Keywords :grapevine; virus; selection; transgenic; review; France;
Notes : In French, Eng. sum. Review of the progress in the research on grapevine improvement by gene transfer. Discussion on the problems raised and prospects.

244. **Boulila, M., D. Boscia, B. Di Terlizzi, M.A. Castellano, A. Minafra, V. Savino, and G.P. Martelli.** 1989. Détection du virus parasphérique (GPLIV) associé à la maladie de l'enroulement foliaire de la vigne en Tunisie (Detection of the paraspherical virus (GPLIV) associated with grapevine leafroll disease in Tunisia). Ann. Inst. Nat. Rech. Agron. Tunisie **62***(15):*1-12.
Keywords :grapevine; GPLIV; fleck; leafroll; isometric; associated; purification; detection; immunoassay; ISEM; Tunisia;
Notes : In French. Detection of a new virus. It is now recognized as the agent of fleck, and has been renamed grapevine fleck virus (GFkV). Description of the method used for electron microscopy observation of the virus and for its purification.

245. **Boulila, M., D. Boscia, B. Di Terlizzi, M.A. Castellano, A. Minafra, V. Savino, and G.P. Martelli.** 1990. Some properties of a phloem-limited non mechanically- transmissible grapevine virus. J. Phytopathol. **129**:151-158.
Keywords :leafroll; isometric; new virus; properties; Italy; grapevine;
Notes : A new virus of grapevine, named grapevine phloem-limited isometric virus (GPLIV), was isolated from leafroll-affected grapevines. It has apparently no clear-cut relation with leafroll. Isometric particles were isolated from roots. They measured 30 nm in diameter, and formed 2 bands in sucrose and CsCl gradients consisting of empty and intact particles. The particles contained 35% of single stranded RNA, with 74 kb of apparent size. The coat protein had a MW of 28000 daltons. The virus could not be transmitted by mechanical inoculation to herbaceous hosts.

246. **Boulila, M., N. Chabbouh, C. Cherif, and G.P. Martelli.** 1991. Current knowledge on viruses and virus diseases of grapevines in Tunisia, p. 104-110. In I. C. Rumbos, R. Bovey, D. Gonsalves, W. B. Hewitt, and G. P. Martelli (ed.), Proceedings of the 10th Meeting of the international Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG). Plant Protection Institute, P.O. Box 303, 38001 Volos, Greece.
Keywords :grapevine; closterovirus; vitivirus; nepovirus; grapevine fanleaf virus; leafroll; GLRaV-1; GLRaV-2; GLRaV-3; GVA; rugose wood; fleck; grapevine Tunisian ringspot virus; yellow speckle; viroid; GYSVd-1; HSVd-g; Tunisia; meeting; ICVG;
Notes : Fanleaf, leafroll, rugose wood, fleck, and a new nepovirus named grapevine Tunisian ringspot virus (GTRV) were found in Tunisian vineyards. An isometric virus was found to be associated with fleck and is considered as the cause of this disease. Two viroids, yellow speckle viroid and hop stunt viroid were also detected.

247. **Bouquet, A.** 1989. Culture *in vitro* de la vigne. Attention aux mauvaises surprises! (*In vitro* culture of grapevine. Beware of bad surprises!). Progr. Agric. Vitic. **106**:303-305.
Keywords :grapevine; *in vitro;* multiplication; France;
Notes : In French. The author reviews the results of *in vitro* culture of grapevine. He reports on a recent result with a clone of the rootstock Fercal, obtained from *in vitro* culture of anther, which is very sensitive to root Phylloxera. The author insists on the potential risk of clonal muliplication *in vitro.*

248. **Bouquet, A.** 1993. Vignes transgéniques et résistance aux virus : les laboratoires de recherche français sont en pointe... mais le court-noué serait- il devenu un domaine réservé ? (Transgenic and virus-resistant grapevines: French laboratories are in the forefront of research... but has court-noué become a reserved field ?). Progr. Agric. Vitic. **110**:327-330.

Keywords :grapevine; nepovirus; grapevine chrome mosaic virus; grapevine fanleaf virus; transgenic; resistance; France;
Notes : Three years after the first obtention of a transgenic grapevine at the University of Davis, California, the author reports on a similar genetic transformation obtained in France by introducing the gene of the capsid protein of grapevine chrome mosaic virus (GCMV) in the rootstock 110 R. This work was done at the *Station de recherches de viticulture INRA* of Montpellier with the collaboration of the *Station de Pathologie végétale INRA* at Bordeaux and of the Viticulture Department of the *Ecole Nationale Supérieure d'Agronomie* of Montpellier. The idea is to protect the rootstocks from virus infection by interference with the virus capsid protein present in the plant. While the work done with GCMV is mostly interesting in the scientific point of view, the final aim is to obtain resistance against the most damaging nepovirus, grapevine fanleaf virus (GFLV). A similar work was done in Champagne on the rootstock 41B in the research laboratory of an important wine industry, *Moët et Chandon*, with the introduction of resistance to GFLV. The author discusses some financial and administrative problems, mainly due to the lack of funds in the public research sector and the impossibility to have access to a bacterial strain carrying the GFLV capsid protein gene, obtained in Champagne by the private laboratory.

249. **Bovey, R.** 1987. Viruses, virus and virus-like diseases of grapevine. Schw. landw. Forschung/La Recherche agronomique en Suisse **26**:402-404.
Keywords :grapevine; virus diseases; virus; virus-like diseases; review; Switzerland;
Notes : List of known grapevine viruses classified according to their mode of transmission, and of virus-like diseases. Geographic distribution, economic importance, type of particle, vector, methods of detection.

250. **Bovey, R.** 1987. Progrès récents dans l'étude des viroses de la vigne et l'amélioration de la sélection sanitaire (Recent progress in the study of grapevine virus and virus-like diseases and improvement of sanitary selection). Schw. landw. Forschung/La Recherche agronomique en Suisse **26**:303-306.
Keywords :grapevine; sanitary selection; virus diseases; virus-like diseases; review; Switzerland;
Notes : Review on progress in research and development on grapevine virus and virus-like diseases and on sanitary selection, for the period 1981-1986.

251. **Bovey, R.** 1989. Control of virus and virus-like diseases of grapevine: production of virus-free propagating material and its performance, p. 143-151. In E. Tanne (ed.), Proceedings of the 9th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG), Kiryat Anavim, Israel, September 1987. The Volcani Center, P.O. Box 6, Bet Dagan , Israel.
Keywords :grapevine; virus diseases; virus-like diseases; control; performance; virus-free material; review; Switzerland; meeting; ICVG;
Notes : Review of papers on production of virus-free material, on its performance and on control of virus and virus-like diseases of grapevine for the period 1980-1987.

252. **Bovey, R.** 1991. Round-Table Discussion (Report meeting ICVG Volos 1990), p. 14-19. In I. C. Rumbos, R. Bovey, D. Gonsalves, W. B. Hewitt, and G. P. Martelli (ed.), Proceedings of the 10th Meeting of the International Council for the Study of Viruses and Virus diseases of the Grapevine (ICVG). Plant Protection Institute, P.O. Box 303, 3801 Volos, Greece.
Keywords :grapevine; closterovirus; viroid; phytoplasma; phytoplasma disease; rugose wood; nomenclature; classification; meeting; ICVG;
Notes : Discussion on standardization of grapevine virus isolates, nomenclature of closteroviruses, viroids, yellows diseases affecting grapevine, and red-leaf rugose wood syndrome.

253. **Bovey, R.** 1992. Le rôle des porte-greffe dans la dissémination des maladies à virus et affections similaires de la vigne (The importance of rootstocks in the spread of virus and virus-like diseases of the grapevine). Rev. suisse vitic. arboric. hortic. **24**:321-324.
Keywords :grapevine; phytoplasma disease; rootstock; virus; virus-like diseases; spread; incompatibility; leafroll; rugose wood; corky bark; flavescence dorée; bois noir; control; Switzerland;

Notes : The rootstocks play an important role in the dissemination of several virus and virus-like diseases, often as symptomless carriers, sometimes as the part of the plant mostly affected. Incompatibility phenomena are particularly insidious, as symptoms may occur only after several years.

254. **Bovey, R. and G.P. Martelli.** 1986. The viroses and virus-like diseases of grapevine. A bibliographic report, 1979-1984. Vitis **25**:227-275.
Keywords :grapevine; virus diseases; virus-like diseases; bibliography; ICVG;
Notes : This bibliographical list contains 636 references on grapevine virus and virus-like diseases, their agents and vectors, control measures, effects on grapevine production. It is the fourth list prepared for ICVG members. The references are included in the REFMAN database BIBICV03, together with those of the previous list, published in Vitis 18,316-376, 1979.

255. **Bovey, R. and G.P. Martelli.** 1992. Directory of Major Virus and Virus-like Diseases of Grapevines. Mediterranean Fruit Crop Improvement Council, Tunis (Tunisia). 111 p.
Keywords :grapevine; virus diseases; virus-like diseases; symptoms; transmission; control; bibliography; review; Switzerland; Italy;
Notes : This review of the main publications on virus and virus-like diseases of grapevine was done at the request of the Mediterranean Fruit Crop Improvement Council (MFCIC), with the collaboration of ICVG. It includes a short description of each disease, data on its agent(s), the mode of transmission, the varietal susceptibility and sensitivity when known, control measures, a historical review and a list of references. Book.

256. **Brandt, S. and G. Himmler.** 1993. Detection of grapevine fanleaf virus (GFLV) from woody material by using immunocapture polymerase chain reaction, p. 150. In P. Gugerli (ed.), Extended abstracts 11th Meeting ICVG, Montreux, Switzerland, 6-9 September 1993. Federal Agricultural Research Station of Changins, CH-1260 Nyon, Switzerland.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; detection; ELISA; immunocapture; nucleic acid assay; cDNA; PCR; method; comparison; Austria; meeting; ICVG;
Notes :GFLV was found to infect about 10 % of 840 vines tested in Austria. Immunocapture and polymerase chain reaction (PCR) were tried as a possibly more sensitive detection method than ELISA. Wood shavings homogenized in Tris-HCl buffer containing PVP, PEG and Tween 20 were incubated in polypropylen microcentrifuge test tubes coated with anti-GFLV antigen. After denaturation of virus protein, the RNA was transcribed into cDNA by reverse transcriptase in the same tubes. cDNA was then amplified by PCR. Amplification products were analysed by electrophoresis in 1% agarose gel and staining with ethidium bromide. Whereas the limit of DAS-ELISA was reached at a 1/320 to 1/1280 dilution, viral DNA was detected at a dilution up to 1/20480.

257. **Brandt, S. and G. Himmler.** 1995. Detection of nepoviruses in ligneous grapevine material by using IC/PCR. Vitis **34**:127-128.
Keywords :grapevine; nepovirus; detection; diagnosis; dormant tissues; nucleic acid assay; immunocapture PCR; arabis mosaic virus; grapevine fanleaf virus; grapevine chrome mosaic virus; comparison; immunoassay; ELISA; Austria;
Notes :IC/PCR proved reproducible and useful for detecting nepoviruses in naturally infected dormant wood of grapevine. This method is at least 5 times more sensitive than DAS-ELISA.

258. **Brandt, S., G. Himmler, and H. Katinger.** 1993. Anwendung der Immunocapture Polymerase Chain Reaction (IC/PCR) für den Nachweis von Rebenviren aus holzigem Material (Use of immunocapture polymerase chain reaction (IC/PCR) for detection of grapevine viruses in woody material). Mitt. Klosterneuburg **43**:143-147.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; detection; wood shavings; immunocapture; nucleic acid assay; cDNA; PCR; Austria;
Notes : The IC/PCR method was adapted to the detection of GFLV in woody shoots. Plant samples were taken from mature canes as wood shavings, suspended in Tris-HCl/PVP/PEG/Tween20 extraction buffer and clarified by centrifugation. Supernatant was put in polypropylene tubes previously coated with

polyclonal anti-GFLV antiserum and incubated overnight at 4^{o} C. After denaturing proteins with 1% Triton X-100, and reverse transcription of viral RNA, cDNA was amplified by PCR to yield an amplification product of 700 base pairs, which was analyzed by agarose gel electrophoresis. The limit of sensitivity of the method is about 20 times lower than that of ELISA (dilution 1:20480 versus 1:1000).

259. **Brandt, S., M. Ibl, and G. Himmler.** 1995. Coat protein gene sequence of an Austrian isolate of grapevine fanleaf virus. Arch. Virol. **140**:157-164.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; coat protein; gene; immunocapture PCR; sequence analysis; Austria;
Notes : The cistron coding for the coat protein of an Austrian isolate of grapevine fanleaf virus (GFLV-FC) obtained directly from wood scrapings of an infected *V. vinifera* vine was sequenced. The viral RNA was amplified by an immunocapture-PCR without passage through an herbaceous host. The nucleotide sequence determined for this isolate shows small differences with the sequences already published for grapevine fanleaf virus strains, at the level of the RNA and of the coat protein structure. These differences may be due to natural variation, or to the subculture of the virus in an herbaceous host (for the cases studied and published so far), whereas the isolated studied by the authors was cultivated only in *Vitis*.

260. **Brault, V., T. Candresse, R. Delbos, M. Lanneau, L. Hibrand, O. Le Gall, and J. Dunez.** 1990. Expression of grapevine chrome mosaic nepovirus (GCMV) coat protein in transgenic plants, p. 122. In Abstracts 8th International Congress of Virology, Berlin 1990.
Keywords :grapevine; grapevine chrome mosaic virus; nepovirus; coat protein; France; meeting;

261. **Brault, V., T. Candresse, O. Le Gall, R.P. Delbos, M. Lanneau, and J. Dunez.** 1993. Genetically engineered resistance against grapevine chrome mosaic nepovirus. Pl. Mol. Biol. **21**:89-97.
Keywords :grapevine; nepovirus; grapevine chrome mosaic virus; transgenic; resistance; *Nicotiana;* France;
Notes :A hybrid gene expressing the coat protein of GCMV has been constructed and transferred into tobacco plants. When compared with non transformed plants, fewer inoculated plants became infected and those that became infected accumulated lower levels of viral RNAs. The protection effect also worked when tobaco plants were inoculated with purified viral RNA.

262. **Brault, V., L. Hibrand, T. Candresse, O. Le Gall, and J. Dunez.** 1989. Nucleotide sequence and genetic organization of Hungarian grapevine chrome mosaic nepovirus RNA2. Nucleic Acids Research **17**:7809-7819.
Keywords :grapevine; grapevine chrome mosaic virus; nucleotide sequence; RNA; nepovirus; France;
Notes : Complete nucleotide sequence of GCMV RNA2. 4441 nucleotides, excluding the poly (A) tail. Homologies with TBRV.

263. **Brendel, G.** 1988. Einsatz der *in vitro*-Kultur bei *Vitis* zur Erzeugung von virusfreiem Pflanzgut (Dissertation) (Use of *in vitro* culture of *Vitis* for obtaining virus-free planting material). PhD thesis, University of Hohenheim, Faculty of Agricultural Science, D-7000 Stuttgart 70, BRD.
Keywords :grapevine; *in vitro;* virus elimination; meristem tip culture; heat therapy; chemotherapy; performance; Germany; thesis;
Notes : Methods for grapevine *in vitro* culture. Preparation of virus- free plants by meristem culture, heat therapy, chemotherapy. Performance of regenerated material. During 1984-1987, more than 60 varieties were regenerated.

264. **Brendel, G., P. Steinmann, and K. Steinmann.** 1991. Der Einsatz der *in-vitro*-Kultur in der Praxis (Use of *in vitro* culture in practice). Der Deutsche Weinbau **46**:58-64.
Keywords :grapevine; clonal selection; *in vitro;* multiplication; virus-free material; Germany;
Notes :K. Steinmann, Rebschule Steinmann, Sommerhausen, BRD. *In vitro* culture has many advantages, especially the fact that soil problems with nematodes are avoided. The disadvantage lies in the risk of multiplying viruses or other defects of the clone that escape attention at the green tissue stage, for instance incompatibility factors, or *Agrobacterium tumefaciens.*

265. **Bretout, C., T. Candresse, O. Le Gall, V. Brault, M. Ravelonandro, and J. Dunez.** 1988. Virus and RNA-specific molecular hybridization probes for two nepoviruses. Acta Horticulturae *(235):*231-238.
Keywords :grapevine; nepovirus; tomato black ring virus; grapevine chrome mosaic virus; nucleic acid assay; dot blot hybridization; detection; cDNA; France;
Notes : Four probes 700 to 1500 bp long derived from the 3' region of TBRV and GCMV RNAs can be used for the detection and identifiction of these two related viruses. Detection was possible with as little as 3 pg of viral RNA in a simple dot blot hybridization assay. Paper presented at the 14th International Symposium on Fruit Tree Virus Diseases, Thessaloniki, Greece, June 1988.

266. **Brown, D.J.F.** 1989. Viruses transmitted by nematodes. Bulletin OEPP/EPPO Bulletin **19**:453-461.
Keywords :grapevine; nepovirus; vector; Longidoridae; nematode; relationship; control; review; England;
Notes : Review of the relations between nepoviruses and their longidorid vectors. Specificity of the virus-vector association is largely determined by the coat protein of the virus and by the inherited ability of the nematode to retain virus particles at specific sites within the oesophagus. Prospects of control involve new methods, and probably the use of transgenic resistant plant cultivars.

267. **Brown, D.J.F. and M.I. Coiro.** 1985. The reproductive capacity and longevity of *Xiphinema index* (Nematoda: Dorylaimida) from three populations on selected host plants. Revue de Nématologie **8**:171-173.
Keywords :grapevine; nematode; *Xiphinema index;* Longidoridae; multiplication; host range; Scotland; Italy;
Notes : On *Ficus carica* the mean longevity is 64 weeks, producing 150 descendants, 1 egg per degree-day above 10^{o} C. On tomato, the survival is period is 40 weeks. The reproduction rate on tomato is only 20% of that on fig. Fig is a better host than grape.

268. **Brown, D.J.F., W.M. Robertson, and D.L. Trudgill.** 1995. Transmission of viruses by plant nematodes. Annu. Rev. Phytopathol. **33**:223-249.
Keywords :virus; transmission; nematode; vector; nepovirus; review; England;
Notes : This review includes 177 references.

269. **Brown, D.J.F. and C.E. Taylor.** 1987. Comments on the occurrence and geographical distribution of longidorid nematodes in Europe and the Mediterranean region. Nematol. medit. **15**:333-373.
Keywords :grapevine; nematode; occurrence; Longidoridae; *Xiphinema; Longidorus; Paralongidorus;* Europe;
Notes : The species of *Xiphinema, Longidorus* and *Paralongidorus* which occur in Europe and the Mediterranean region are listed, with comments on those aspects of the biology of the species that relate to their geographical distribution. Maps of occurrence and distribution are provided for *X.diversicaudatum, X index, X.italiae, L.attenuatus, L.elongatus, L.fasciatus, L.macrosoma* and *P.maximus.*

270. **Brown, D.J.F. and D.L. Trudgill.** 1989. The occurrence and distribution of nepoviruses and their associated vector *Longidorus* and *Xiphinema* nematodes in Europe and the Mediterranean basin. Bulletin OEPP/EPPO Bulletin **19**:479-489.
Keywords :grapevine; grapevine fanleaf virus; arabis mosaic virus; strawberry latent ringspot virus; tomato black ring virus; nematode; nepovirus; vector; *Longidorus; Xiphinema;* Longidoridae; occurrence; distribution; Europe; Mediterranean area; England;
Notes : Concerning the transmission of grapevine nepoviruses, the authors discuss the following points: TBRV *(Longidorus attenuatus)*; ArMV *(Xiphinema diversicaudatum)*; SRLV (idem); GFLV *(X.index, X.italiae, X. vuittenezi)*. The authors don't exclude the possibility that some strains of GFLV could be transmitted by *X.italiae* whereas other are not transmissible by this species, as it is known that different strains of nepoviruses may be transmitted by different species of longidorid nematodes (Brown, 1989, Bull.OEPP/EPPO 19, 453-461, réf. 266). Good review on this subject.

271. **Buciumeanu, E., C. Grecu, and C. Bejan.** 1995. Polyphenolic compounds of virus-infected grapevine, p. 387-388. In R. Brouillard, M. Jay, and A. J. Scalbert (ed.), Polyphenols 94: 17th International

conference, Palma de Mallorce, Spain, 23-27 May 1994. Institut National de la Recherche Agronomique (INRA), Paris.
Keywords :grapevine; virus; vein mosaic; virus-like diseases; physiology; polyphenols; Rumania;
Notes : All virus-infected vines were richer in polyphenols than healthy ones. The greatest differences were obtained with non-flavonoids and tannins for vein mosaic virus.

272. **Burger, J.G.** 1989. Electrotherapy: a possible method to eliminate grapevine fanleaf virus from grapevines. Phytoparasitica **17**:72.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; electrotherapy; control; South Africa; meeting; ICVG;
Notes : Abstract. This paper also appears in the Proceedings of the 9th meeting of ICVG, Kiryat Anavim, Israel, 1987, 153 (1989).

273. **Burger, J.G.** 1989. Electrotherapy: a possible method to eliminate grapevine fanleaf virus from grapevines, p. 153. In E. Tanne (ed.), Proceedings of the 9th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG), Kiryat Anavim, September 1987. The Volcani Center, P.O. Box 6, Bet Dagan , Israel.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; electrotherapy; control; South Africa; meeting; ICVG;

274. **Burger, J.G. and J.P. Schumann.** 1991. Effect of different combinations/concentrations of growth stimulants on the proliferation of *Vitis* cultivars *in vitro,* p. 366. In I. C. Rumbos, R. Bovey, D. Gonsalves, W. B. Hewitt, and G. P. Martelli (ed.), Proceedings of the 10th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG). Plant Protection Institute, P.O. Box 303, 38001 Volos, Greece.
Keywords :grapevine; virus elimination; *in vitro;* meristem tip culture; South Africa; meeting; ICVG;
Notes : Different combinations and concentrations of growth stimulants were incorporated in the basal Murashige-Skoog medium (MS) supplemented with 0.01 mg/l naphtaleneacetic to support apical meristem cultures *in vitro*. The medium that performed best was the MS supplemented with 10 mg/l zeatin riboside, 1 mg/l kinetin and 60 mg/l adenine sulphate.

275. **Burger, J.G. and N.A. Spreeth.** 1993. Occurrence of Shiraz disease in South Africa, p. 56. In P. Gugerli (ed.), Extended abstracts 11th Meeting ICVG, Montreux, Switzerland, 6-9 September 1993. Federal Agricultural Research Station of Changins, CH-1260 Nyon, Switzerland.
Keywords :grapevine; Shiraz disease; leafroll; GLRaV-1; GLRaV-2; GLRaV-3; rugose wood; closterovirus; GVA; vitivirus; corky bark; etiology; South Africa; meeting; ICVG;
Notes :A new disease resembling corky bark is highly destructive on cvs. Shiraz, Malbec and Merlot. Symptoms are leafroll-like, but there are also similarities with corky bark. There is not yet clear evidence as to the real cause of the disease.

276. **Burger, J.G. and J.Thatcher.** 1987. The detection of grapevine fanleaf virus in dormant cuttings of vines by enzyme-linked immunosorbent assay. Phytophylactica **19**:247-248.
Keywords :grapevine; grapevine fanleaf virus; nepovirus; detection; immunoassay; ELISA; South Africa;
Notes : The detection of GFLV was made by DAS-ELISA on sawdust obtained by sawing a bunch of about 100 grape canes. The detection threshold is about 1 infected vine in 10. As the bunch of 100 shoots originates from 3-4 vines, one single infected plant can be detected.

277. **Burrows, G. and K. Ashton.** 1993. Meristem tip culture of grapevines for virus and viroid elimination. The Australian Grapegrower and Winemaker **30***(Nov.):*60-62.
Keywords :grapevine; virus; viroid; meristem tip culture; virus elimination; Australia;

278. **Bussière, F., D. Lafontaine, and J.P. Perreault.** 1996. Compilation and analysis of viroid and viroid-like RNA sequences. Nucleic Acids Research **24**:1793-1798.
Keywords :grapevine; viroid; structure; general; comparison; Canada;

Notes : The authors present a catalogue of all viroid and viroid-like RNA sequences available up to October 1995, including some of the grapevine viroids. The catalogue is available on the world wide web (http:/www.callisto.si.usherb.ca/-jpperra) on computer disk and in printed form, requests should be addressed to the third author.

279. **Cabaleiro, C.** 1995. El enrolado de la vid (GLRaV): Incidencia, epidemiologia y daños en *Vitis vinifera* L.cv. Albariño en la denominacion de origen "Rias Baixas" (Grapevine leafroll: Incidence, epidemiology and damage on *Vitis vinifera* L. cv. Albariño). Departamento de Biotecnologia, Universidad Politécnica, Madrid, Spain, 169 p.
Keywords :grapevine; leafroll; closterovirus; GLRaV-1; GLRaV-3; occurrence; epidemiology; symptoms; economic importance; thesis; Spain;
Notes : PhD thesis. In Spanish. Two detection methods for grapevine leafroll were compared: the green grafting indexing and ELISA. ELISA was found to be faster and more reliable when specific sera were available for the different leafroll-associated viruses, but indexing is compulsory as other non characterized viruses may be present. Green grafting represents an important improvement in reducing both space and time for indexing. Leafroll detection by ELISA in some rootstocks is not reliable, especially with *Vitis rupestris* and its hybrids. In Galicia, leafroll occurrence is about 40%, with GLRaV-3 predominant as in most Mediterranean countries. GLRaV-1 is also detected (less than 4%). *Planococcus citri* was confirmed as vector of GLRaV-3 in pot experiments. In a vineyard where this insect was present, leafroll (GLRaV-3) infection increased from 33 to more than 83% in five years. Detection of GLRaV-3 in mealybugs showed that about 20% of individuals fed on infected grapevines acquired the virus, which seems to be of the semi-persistent type. Decrease in yield of up to 30% and a lowering in sugar content of the berries were observed in vines affected by leafroll caused by GLRaV-3.

280. **Cabaleiro, C., A. Piñeiro, and A. Segura.** 1997. Photosynthesis in grapevines infected with leafroll virus (GLRaV-3), p. 153-154. In O. A. Sequeira,de, J. C. Sequeira, and M. T. Santos (ed.), Extended abstracts 12th Meeting ICVG, Lisbon, Portugal, 29 September-2 October 1997. Dept.Plant Pathology, Estação Agronomica Nacional, Oeiras, Portugal.
Keywords :grapevine; leafroll; closterovirus; GLRaV-3; physiology; photosynthesis; Spain; meeting; ICVG;
Notes : In the northwest of Spain, leafroll is present in about 40% of vines. A study was undertaken to determine the rate of photosynthesis of leafroll-affected vines (GLRaV-3) and to compare it with that of healthy vines. The variety was cv. Albariño grown in two vineyards in Beluso and Meaño. Three healthy and three leafroll-affected vines were investigated in each vineyard. Measurements were made on four leaves of each of the healthy controls, on four leaves with symptoms of leafroll as well as four symptomless leaves of each of the leafroll-infected vines. In addition, measurements were made several times in July and August on leaves of healthy and leafroll-affected potted vines. No significant difference in photosynthesis rate was recorded between healthy and leafroll-infected potted vines. The leaves of infected vines, although infected with GLRaV-3, were symptomless. In the field grown vines, with leaves showing symptoms of rolling and reddening, significant differences appeared in net photosynthesis in all cases examined, in comparison with healthy controls, and in transpiration rate and stomatal conductance in some cases. Symptomless leaves of GLRaV-3 infected vines showed a lower photosynthesis rate than healthy controls, but the difference was significant only in one case.

281. **Cabaleiro, C. and A. Segura.** 1997. Field transmission of grapevine leafroll associated virus 3 (GLRaV-3) by the mealybug *Planococcus citri* . Plant Disease **81**:283-287.
Keywords :grapevine; closterovirus; leafroll; transmission; mealybug; *Planococcus citri;* spread; Spain;
Notes : The spatial distribution of leafroll-infected vines in nine vineyards in the Galician vine growing area of Rias Baixas suggests transmission by a non-flying vector. From 1991 to 1995, the vines from two vineyards were tested for the presence of GLRaV-3 by ELISA. They had been planted virus-free. In the first vineyard, the virus was detected 3 years after planting. In the second, the incidence of infection increased from 33 to 83 % between 1991 and 1995. *Planococcus citri* was present in the vineyard and was shown to transmit GLRaV-3 in controlled transmission experiments.

282. **Cabaleiro, C. and A. Segura.** 1997. Some characteristics of the transmission of grapevine leafroll associated virus 3 by *Planococcus citri* Risso. Eur. J. Plant Pathology **103**:373-378.
Keywords :grapevine; leafroll; closterovirus; GLRaV-3; mealybug; transmission; vector; *Planococcus citri;* Spain;
Notes : The transmission of GLRaV-3 by *Planococcus citri* was studied by using ELISA and insect transmission experiments. Preliminary assays showed that batches of five insect vectors were the minimum necessary for safe transmission. After a feeding period of a least 3 days on GLRaV-3 infected vines, only 10% of the groups of mealybugs transferred to test plants transmitted the virus, although more than 80% of them were expected to contain viruliferous insects. After transfer onto potato plants, the insects retained the virus for up to 24 hours, but they lost the capacity to transmit it after one hour. In grapevines infected by means of *P.citri*, the virus was dectectable only after 13 months by ELISA.

283. **Calò, A.** 1988. Réaction physiologique de la vigne en présence de virus (Physiological reaction of grapevine in the presence of viruses). Riv. Vitic. Enol. **41**:317-323.
Keywords :grapevine; virus diseases; virus-like diseases; physiology; review; Italy;
Notes : In French. Text of a lecture given in Paris at the session of the OIV experts' group "Physiology of grapevine", January 1988.

284. **Calò, A. and M. Borgo.** 1990. Controlli sanitari per la diagnosi della malatti "Pierce's disease" su materiale viticolo d'importazione (Sanitary inspection for the diagnosis of Pierce's disease in imported grapevine material). Vignevini **17***(1/2):*9-10.
Keywords :grapevine; immunoassay; Pierce's disease; *Xylella fastidiosa;* detection; ELISA; negative; Italy;
Notes : Samples form 31 grapevine varieties of American origin, imported mostly from California, were tested with ELISA for detecting the presence of *Xylella fastidiosa*, agent of Pierce's disease. All tests gave negative results.

285. **Calò, A., A. Costacurta, S. Cancellier, and M. Giust.** 1987. Variabilità di alcune caratteristiche produttive in vitigni del Veneto (Variability of some productivity characteristics in vineyards of Veneto). Schw. landw. Forschung/La Recherche agronomique en Suisse **26**:345-350.
Keywords :grapevine; clonal selection; performance; comparison; Italy;
Notes : This paper, presented at the IVth International Symposium on grapevine clonal selection held in 1986 at Changins/Nyon (Switzerland), compared the total phenotypical and genotypical variability of cv. Durella, in vines made with indexed planting material considered as "virus-free" on one hand, and material indexing positive for one or several of following virus or virus-like diseases: fanleaf, leafroll, fleck, legno riccio (rugose wood). The analysis of results showed that in the healthy population there was still a considerable amount of genotypical variability, which showed the interest of clonal selection even in virus-tested and healthy varieties.

286. **Calò, A., E. Egger, M. Borgo, A. Costacurta, S. Cancellier, and M. Niero.** 1987. Considerazioni su alcune relazioni esistenti tra aspetti sanitari e caratteristiche produttive in alcuni vitigni del Veneto (Considerations on some relationships between sanitary state and productivity features in some grapevine cultivars of Veneto). Schw. landw. Forschung/La Recherche agronomique en Suisse **26**:341-344.
Keywords :grapevine; leafroll; legno riccio; rugose wood; fanleaf; fleck; indexing; yield; quality; performance; economic importance; Italy;
Notes : The presence of one or several viruses in a clone does not necessarily imply a lower performance in yield and quality. In field trials made in two localities of Vicenza and Veneto region with the cvs. Corvina, Durella, Garganega, Molinara, Rondinella and Vespaiola planted in 1970, indexing was made from 1976 to 1985 in order to detect fanleaf, leafroll, fleck and legno riccio (rugose wood) and production was checked during 3 years (sugar %, yield kg/vine, mean weight of grapes). The vines were classified in 5 groups according to the severity of indexing reaction (1= no reaction in any indexing test; 5= strong reaction in several tests). A significant difference was found only with cv. Durella (yield reduction 20%). No significant differences were found concerning sugar content of grapes.

287. **Cameron, H.R. and M.H. Walter.** 1985. Double-stranded RNA in grapevines affected with leafroll disease. Phytopathology **75**:1323.
Keywords :grapevine; leafroll; dsRNA; diagnosis; detection; USA;
Notes : Extracts from dormant cane phloem. Only the dsRNA bands with the highest molecular weight gave patterns differing from those of healthy controls. Possible use for diagnosis of leafroll.

288. **Campbell, W.P.** 1995. Directives pour les mesures de quarantaine concernant la vigne (Guidelines for grapevine quarantine). Progr. Agric. Vitic. **112**:68-70.
Keywords :grapevine; quarantine; legislation; Canada;
Notes : Translation in French of a text published in English in the Newsletter Nr 12 of the International Council for the Study of Viruses and Virus Diseases of Grapevine (ICVG), July 1994, p. 8-11.

289. **Candresse, T. and G.P. Martelli.** 1995. Genus *Closterovirus*, p. 461-464. In F. A. Murphy, C. M. Fauquet, D. H. L. Bishop, S. A. Ghabrial, A. W. Jarvis, G. P. Martelli, M. A. Mayo, and M. D. Summers (ed.), Virus taxonomy. The classification and nomenclature of viruses. Sixth Report of the International Committee on Taxonomy of Viruses. Springer Verlag, Wien, New York.
Keywords :closterovirus; classification; nomenclature; France; Italy;

290. **Caobelli, R. and G. Carcereri.** 1995. Lotta biologica alla cicalina della vite (Biological control of grapevine leafhopper). L'Informatore Agrario **51***(33):*75-77.
Keywords :grapevine; flavescence dorée; vector; control; *Scaphoideus titanus;* leafhopper; insecticide; biological agriculture; Italy;
Notes : Experiments on the possibility of controlling *Scaphoideus titanus*, vector of flavescence dorée, with insecticides permitted by EEC regulation for biological agriculture were made in a vineyard of cv. Garganega in Veneto, Italy. Derris (6.5% rotenone) alone or with paraffin oil, as well as neem seed oil extracts were ineffective. Natural pyrethrin (Kenyatox verde, i.e. 4% pyrethrin + 12.8% piperonyl butoxide) at 1.0 or 1.5 l./ha, plus paraffin oil in late June or early July gave good control of the insect.

291. **Carraro, L., N. Loi, C. Kuszala, D. Clair, E. Boudon-Padieu, and E. Refatti.** 1994. On the ability-inability of *Scaphoideus titanus* Ball to transmit different grapevine yellows agents. Vitis **33**:231-234.
Keywords :grapevine; phytoplasma disease; flavescence dorée; *Scaphoideus titanus;* leafhopper; vector; transmission; Italy;
Notes : Results of a six-years transmission trial of different types of yellows with *Scaphoideus titanus* are presented. Positive results were obtained with transmissions from vines of the Veneto region with typical flavescence dorée (FD) symptoms to cvs. Perera and Chardonnay. No transmissions were obtained from sources of grapevine yellows of the Friuli-Venezia Giulia region, although *S.titanus* was present in the vineyards. ELISA and PCR analyses confirmed the fact that transmission by *S.titanus* were positive only when the FD *sensu stricto* type of yellows was present. The vector of the other type of yellows (Friuli-Venezie Giulia) is probably another insect.

292. **Carraro, L., R. Osler, N. Loi, E. Refatti, and V. Girolami.** 1986. Diffusione nella regione Friuli-Venezia Giulia di una grave malattia della vite assimilabile alla Flavescenza dorata (Diffusion in the Friuli-Venezia Giulia region of a severe grapevine disease similar to flavescence dorée). Un vigneto chiamato Friuli **4***(5):*4-9.
Keywords :grapevine; phytoplasma disease; flavescence dorée; distribution; spread; Italy;

293. **Carraro, L. and F. Pavan.** 1988. La flavescenza dorata della vite in Friuli. I primi risultati delle ricerche nel 1987 (Grapevine flavescence dorée in Friuli. First results of research in 1987). Un vigneto chiamato Friuli **6***(4):*6-10.
Keywords :grapevine; flavescence dorée; phytoplasma disease; occurrence; Italy;
Notes : In Italian.

294. **Carstens, R.** 1997. Double stranded RNA studies on Shiraz disease in South Africa, p. 44. In O. A. Sequeira,de, J. C. Sequeira, and M. T. Santos (ed.), Extended abstracts 12th Meeting ICVG, Lisbon,

Portugal, 29 September-2 October 1997. Dept.Plant Protection, Estação Agronomica Nacional, Oeiras, Portugal.
Keywords :grapevine; Shiraz disease; etiology; detection; dsRNA; closterovirus; GLRaV-1; GLRaV-2; GLRaV-3; South Africa; meeting; ICVG;
Notes : Grapevine Shiraz disease is a local virus-like disease of cvs. Shiraz, Gamay, Merlot and Malbec in South Africa. It is graft transmissible and evidence of field spread has been reported. Budburst is delayed, canes do not mature properly and appear droopy with a rubbery texture. Infected vines have fewer bunches than normal vines, and a bad fruit set. GLRaV-1, -2, -3, and GVA were found in diseased vines, but they were probably not the cause of the disease. Attempt to detect the causative agent of Shiraz disease by the dsRNA technique failed to give results.

295. **Carvalho, M. and A.M. Pereira.** 1997. Serological detection of double-stranded RNA from grapevine viruses, p. 99-100. In O. A. Sequeira,de, J. C. Sequeira, and M. T. Santos (ed.), Extended abstracts 12th Meeting ICVG, Lisbon, Portugal, 29 September-2 October 1997. Dept.Plant Pathology, Estação Agronomica Nacional, Oeiras, Portugal.
Keywords :grapevine; closterovirus; GLRaV-3; grapevine fleck virus; nepovirus; arabis mosaic virus; detection; immunoassay; dsRNA; method; Portugal; meeting; ICVG;
Notes : The authors attempted to detect dsRNA by serology, and present the results of different procedures experimented with grapevine leafroll associated virus 3 (GLRaV-3), grapevine fleck (GFkV) and arabis mosaic virus (ArMV). In tested conditions, it was impossible to make a clear and consistent differentiation between infected and healthy samples either in aqueous or phenol-chloform extraction. However, polyclonal antibodies detected dsRNA after purification of samples by CF-11 cellulose chromatography and ethanol/sodium acetate precipitation. The relative failure of the method appears to be due to the low concentration of these nucleic acids and the influence of polyphenolic and polysaccharide compounds.

296. **Castellano, M.A., N. Abou-Ghanem, G.P. Martelli, D. Boscia, and V. Savino.** 1995. Cytopathology of two filamentous grapevine viruses and their intracellular identification by gold immunolabelling. Z. Pfl. Krankh. Pfl. Schutz **102**:23-33.
Keywords :grapevine; rugose wood; corky bark; GCBaV; trichovirus; GVC; closterovirus-like particles; ultrastructure; cytopathology; immunogold labelling; immunoassay; Italy;
Notes : Two filamentous viruses, grapevine corky bark-associated virus (GCBaV) and grapevine virus C (GVC) were transmitted by mechanical inoculation from *in vitro* grown explants of cv. Sémillon shoot tips to *Nicotiana benthamiana*. The cytopathology of cells of this doubly infected herbaceous host was studied by electron microscopy of thin sectioned leaf tissues. Mesophyll cells were apparently little affected, whereas severe symptoms were observed in vascular bundles, involving phloem parenchyma, companion cells, differentiating sieve tubes and xylem elements. They were characterized by necrosis of cells, deposit of callose-like substance on cell walls, presence of vesicles up to 150 nm in diameter in the cytoplasm, disruption of mitochondria. Virus particles appeared as more or less compact aggregates of thin filaments in the cytoplasm or occasionally in the nucleus. They were identified by gold immunolabelling. Double immunolabelling with 5 nm (GCBaV) and 15 nm gold (GCV) showed that particles of GCBaV were more abundant than those of GVC. Both were usually present in mixed aggregates.

297. **Castro, R., A. Martins, and L. Carneiro.** 1987. Etude d'une symptomatologie de type rougissement automnal des feuilles de vigne et de ses effets sur les paramètres du rendement et de la qualité (Studies on autumnal leaf reddening of grapevine and on its effects on yield and quality). Schw. landw. Forschung/La Recherche agronomique en Suisse **26**:400-401.
Keywords :grapevine; leafroll; symptoms; yield; quality; performance; Portugal;
Notes : In French. Symptoms of autumnal leaf reddening, starting in June on a few leaves, first on the edges of leaves, later on the whole leaf, including veins were observed in most Portuguese viticultural regions, especially in the Vinho Verde region. The cause is so far unknown, but it is probably partly leafroll. Yield is decreased by 4.8 - 36.8 %, sugar content of grapes by 12.6 %.

298. **Castrovilli, S. and D. Gallitelli.** 1985. A comparison of two isolates of Grapevine virus A. Phytopath. medit. **24**:219-220.
Keywords :grapevine; vitivirus; GVA; isolate; comparison; symptoms; immunoassay; ELISA; Italy;
Notes :GVA isolates from Torino and Palermo are very similar.

299. **Catalano, L.** 1992. I nematodi vettori di virus (Nematodes vectors of viruses). Vignevini **19***(5):*39-44.
Keywords :grapevine; virus; vector; nematode; nepovirus; *Xiphinema; Longidorus;* Longidoridae; Italy;
Notes : The paper has no bibliography. It is announced that references will be given in the reprint.

300. **Catalano, L. and F. Lamberti.** 1992. La diagnosi virologica sui nematodi vettori di virus (Virus detection in nematode vectors), p. 231-238. In IV Congresso della Societa Italiana di nematologia, Pordenone, giugno 1992.
Keywords :grapevine; virus; Longidoridae; nematode; vector; detection; method; electron microscopy; ISEM; ELISA; PCR; review; Italy;
Notes : Review of different methods available for detecting viruses in their nematode vectors. Several references to grapevine viruses. Book chapter.

301. **Catalano, L., F. Roca, and M. Castellano.** 1989. Efficiency of transmission of an isolate of grapevine fanleaf virus (GFV) by three populations of *Xiphinema index* (Nematoda: Dorylaimida). Nematol. medit. **17**:13-15.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; transmission; nematode; *Xiphinema index;* Longidoridae; Italy; comparison; California; Israel;
Notes : The transmission efficiencies of 3 populations of *Xiphinema index* from Italy, California and Israel were compared, with a source of GFLV from Italy. The population from Italy gave the highest rate of transmission on Mission.

302. **Catalano, L., V. Savino, and F. Lamberti.** 1991. ELISA for the detection of grapevine fanleaf nepovirus in *Xiphinema index*, p. 243-246. In I. C. Rumbos, R. Bovey, D. Gonsalves, W. B. Hewitt, and G. P. Martelli (ed.), Proceedings of the 10th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG). Plant Protection Institute, P.O. Box 303, 38001 Volos, Greece.
Keywords :grapevine; grapevine fanleaf virus; nepovirus; nematode; vector; *Xiphinema index;* Longidoridae; detection; ELISA; immunoassay; Italy; meeting; ICVG;
Notes : Fanleaf virus can be detected by DAS-ELISA in homogenates of 20- 50 *Xiphinema index* reared in pots with GFLV-infected vines or collected in diseased vineyards.

303. **Catalano, L., V. Savino, and F. Lamberti.** 1992. ELISA for detecting GFLV-carrying Longidoridae. Journal of Nematology **23**:523.
Keywords :grapevine; nepovirus; detection; Longidoridae; *Xiphinema index;* nematode; vector; ELISA; immunoassay; Italy;

304. **Catalano, L., V. Savino, and F. Lamberti.** 1992. Presence of grapevine fanleaf nepovirus in populations of longidorid nematodes and their vectoring capacity. Nematol. medit. **20**:67-70.
Keywords :grapevine; grapevine fanleaf virus; nepovirus; nematode; Longidoridae; *Xiphinema index; Xiphinema italiae;* transmission; vector; Italy;
Notes : Longidorid nematodes collected in soil of vineyards with fanleaf in southern Italy were tested for the presence of GFLV in their body and their capacity to transmit GFLV. This virus was always associated with *Xiphinema index* only. It was never detected in, nor transmitted by, *X.italiae.*

305. **Catalano, L., V. Savino, F. Lamberti, and G.P. Martelli.** 1991. Transmission of three isolates of grapevine fanleaf nepovirus to grapevine species and rootstock hybrids by two populations of *Xiphinema index*. Nematol. medit. **19**:349-351.
Keywords :grapevine; grapevine fanleaf virus; nepovirus; *Xiphinema index;* Longidoridae; nematode; transmission; vector; Italy;

Notes : This was a test for resistance to grapevine fanleaf virus. All *Vitis vinfera x Muscadinia rotundifolia* hybrids, all grapevine species and rootstocks could be infected with the three GFLV isolates, transmitted by the two populations of *Xiphinema index.*

306. **Caudwell, A.** 1988. Grapevine yellows diseases, p. 45-47. In R. C. Pearson and A. C. Goheen (ed.), Compendium of Grape Diseases. APS Press, The American Phytopathological Society, St.Paul, Minnesota 55121, USA.
Keywords :grapevine; phytoplasma disease; flavescence dorée; bois noir; Vergilbungskrankheit; handbook; France; USA;
Notes : Flavescence dorée, bois noir, Vergilbungskrankheit and other yellows diseases of grapevine are described and illustrated by colour photographs. Book chapter.

307. **Caudwell, A.** 1988. La Flavescence dorée et la multiplication du matériel végétal (diagnostic) (Flavescence dorée and the propagation of planting matérial. Diagnosis). Le pépiniériste **64**:9-13.
Keywords :grapevine; phytoplasma disease; flavescence dorée; diagnosis; nursery; multiplication; France;
Notes : Lecture given to the Scientific and Technical Committee of ENTAV (Etablissement National pour l'Amélioration de la Viticulture), May 1988.

308. **Caudwell, A.** 1989. Recent development and progress in epidemiology and characterization of grapevine yellows disease, p. 173-184. In E. Tanne (ed.), Proceedings of the 9th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG), Kiryat Anavim, Israel, September 1987. The Volcani Center, P.O. Box 6, Bet Dagan , Israel.
Keywords :grapevine; flavescence dorée; bois noir; Vergilbungskrankheit; phytoplasma disease; epidemiology; symptoms; review; France; meeting; ICVG;
Notes : This well documented survey of the literature on grapevine yellows diseases includes two parts:
1. Epidemiology of grapevine yellows and occurrence of the various types of yellows in the world.
2. Characterization methods of grapevine yellows: transmission to differential hosts, light and electron microscope studies, chemotherapy, serology. There are 61 references.

309. **Caudwell, A.** 1989. Les maladies bactériennes et à mycoplasmes de la vigne. La flavescence dorée et les jaunisses de la vigne en Europe (Bacterial and mycoplasma diseases of grapevine. Flavescence dorée and yellows of grapevine Europe), p. 451-457. In R. Cavalloro (ed.), Plant-Protection Problems and Prospects of Integrated Control in Viticulture. Proceedings of the CEC/IOBC International Symposium, Lisboa-Vila Real, Portugal, June 1988. Commission of the European Communities, L-2920 Luxembourg.
Keywords :grapevine; phytoplasma disease; flavescence dorée; review; France;
Notes : In French, Eng. sum. Book chapter.

310. **Caudwell, A.** 1990. Epidemiology and characterization of *Flavescence dorée* (FD) and other grapevine yellows. Agronomie **10**:655-663.
Keywords :grapevine; phytoplasma disease; epidemiology; flavescence dorée; bois noir; Vergilbungskrankheit; Australian grapevine yellows; symptoms; control; immunoassay; ISEM; ELISA; transmission; leafhopper; *Scaphoideus littoralis; Scaphoideus titanus;* electron microscopy; review; France;
Notes : Review on the present situation concerning the flavescence dorée (FD) and other yellows diseases recorded in the world (65 references). FD *sensu stricto* concerns the disease present in France, including Corsica, and in northern Italy. Mediterranean grapevine yellows is not associated with *Scaphoideus littoralis* and the vector is not known. Bois noir and Vergilbungskrankheit are probably due to MLOs transmitted from wild plants. The situation of Australian and north American grapevine yellows is not yet clear. The author describes the methods for characterizing grapevine yellows: transmission to differential hosts, serology, electron microscopy, and discusses on the possibilities of control.

311. **Caudwell, A.** 1993. Advances in grapevine yellows research since 1990, p. 79-83. In P. Gugerli (ed.), Extended abstracts 11th Meeting ICVG, Montreux, Switzerland, 6-9 September 1993. Federal Agricultural Research Station of Changins, CH-1260 Nyon, Switzerland.
Keywords :grapevine; phytoplasma disease; review; France; meeting; ICVG;

Notes : Review on recent progress in grapevine yellows research. Introductory lecture.

312. **Caudwell, A., E. Boudon-Padieu, C. Kuszala, and J. Larrue.** 1987. Biologie et étiologie de la Flavescence dorée. Recherches sur son diagnostic et sur les méthodes de lutte. (Biology and etiology of flavescence dorée. Research on diagnosis and control methods), p. 175-208. In S. Ruini (ed.), Atti del Convegno sulla Flavescenza Dorata della Vite, Vicenza-Verona, Maggio 1987. Fondazione Sergio Bolla, Verona.
Keywords :grapevine; phytoplasma; phytoplasma disease; flavescence dorée; biology; etiology; diagnosis; review; France; meeting;
Notes : In French, It. Eng. sum. Flavescenza dorata, Vicenza-Verona meeting.

313. **Caudwell, A., E. Boudon-Padieu, C. Kuszala, R. Meignoz, X. Daire, and J. Larrue.** 1992. Detection of grapevine MLOs with antibodies and DNA probes. IOM Letters **2**:26.
Keywords :grapevine; flavescence dorée; phytoplasma; detection; immunoassay; nucleic acid assay; DNA probe; France;
Notes :9th International Congress IOM, August 2-7, Ames, Iowa.

314. **Caudwell, A., E. Boudon-Padieu, J. Lherminier, Y. Schwartz, and R. Meignoz.** 1990. Current spread of the grapevine yellows and characterization methods for the MLO pathogen, p. 916-918. In G. Stanek, G. H. Cassel, J. G. Tully, and R. F. Whitcomb (ed.), Recent Advances in Mycoplasmology. Proceedings of the 7th Congress of the International Organization for Mycoplasmology, Baden near Vienna 1988. Zentralblatt für Bakteriologie, Supplement 20. Gustav Fischer Verlag, Stuttgart, Germany.
Keywords :grapevine; phytoplasma disease; flavescence dorée; phytoplasma; identification; immunoassay; ELISA; spread; leafhopper; vector; *Scaphoideus littoralis; Scaphoideus titanus;* France;
Notes :ELISA can be used to detect MLOs of FD in the leafhoper vector *Scaphoideus littoralis (= titanus).* It was also effective for detecting FD in cuttings collected in winter from infected vines and grown in glasshouse. It gave positive response in cuttings following controlled feeding by the leafhopper. It was not effective in identifying FD in field samples of infected vines collected during symptom development in summer.

315. **Caudwell, A. and C. Kuszala.** 1986. Mise au point par l'épreuve d'infectivité d'un milieu d'extraction et d'un milieu de survie, d'une méthode de purification et de conservation au froid de l'agent pathogène (MLO) de la flavescence dorée. (Development of an extraction medium and a survival medium, of a method of purification and conservation at low temperature of the agent (MLO) of flavescence dorée, using the infectivity test). Agronomie **6**:885-892.
Keywords :grapevine; phytoplasma disease; flavescence dorée; phytoplasma; purification; infectivity; cold storage; France;
Notes : In French, Eng. sum.

316. **Caudwell, A. and C. Kuszala.** 1992. Mise au point d'un test ELISA sur les tissus de vignes atteintes de flavescence dorée (Development of an ELISA test with tissues of flavescence dorée-infected grapevines). Research in Microbiology **143**:791-806.
Keywords :grapevine; phytoplasma; phytoplasma disease; flavescence dorée; detection; immunoassay; ELISA; France;

317. **Caudwell, A. and C. Kuszala.** 1993. ELISA detection of MLO antigens in flavescence dorée affected grapevine leaves. Phytopath. medit. **32**:74-76.
Keywords :grapevine; phytoplasma disease; flavescence dorée; phytoplasma; detection; immunoassay; ELISA; France;
Notes : Abstract of a paper presented at a Workshop on Fruit and Grapevine Mycoplasma Diseases, Bologna, Italy, September 1992.

318. **Caudwell, A., C. Kuszala, and A. Fleury.** 1987. Preparation from plant tissues of the antigens of grapevine flavescence dorée MLO. Bulletin OEPP/EPPO Bulletin **17**:304.

Keywords :grapevine; phytoplasma disease; flavescence dorée; phytoplasma; antigen; purification; extracts; broadbean; method; leafhopper; vector; France;
Notes :31st Meeting of the French Phatopathological Society, Versailles, 13-14 November 1986.

319. **Caudwell, A., C. Kuszala, and A. Fleury.** 1988. Préparation des antigènes des mycoplasmes (MLO) pathogènes de la flavescence dorée, à partir de tissus végétaux (Antigen preparation of pathogenic mycoplasms (MLO) causing flavescence dorée, from plant host tissues). J. Phytopathol. **123**:124-132.
Keywords :grapevine; phytoplasma disease; flavescence dorée; phytoplasma; antigen; immunoassay; France;
Notes : In French, Eng. and Germ. sum.

320. **Caudwell, A. and J. Larrue.** 1986. La flavescence dorée dans le midi de la France et dans le Bas-Rhône. (Flavescence dorée in the South of France and the Lower Rhône). Progr. Agric. Vitic. **103**:517-523.
Keywords :grapevine; phytoplasma disease; flavescence dorée; occurrence; symptoms; France;
Notes : In French. Review on the situation in southern France. History of flavescence dorée, control measures.

321. **Caudwell, A. and J. Larrue.** 1987. Schéma de l'évolution de la flavescence dorée chez la vigne et du développement de la cicadelle vectrice: les périodes critiques (Schematic description of the evolution of flavescence dorée in grapevine and of the development of the leafhopper vector: the critical periods). Progr. Agric. Vitic. **104**:216-217.
Keywords :grapevine; phytoplasma disease; flavescence dorée; control; leafhopper; vector; *Scaphoideus titanus;* France;
Notes : In French. Evolution of the disease, control measures.

322. **Caudwell, A., J. Larrue, E. Boudon-Padieu, and G.D. McLean.** 1997. Flavescence dorée elimination from dormant wood of grapevines by hot-water treatment. Austral. J. Grape and Wine Res. **3**:21-25.
Keywords :grapevine; flavescence dorée; phytoplasma disease; control; hot water treatment; France;
Notes : Effective treatments with hot water against flavescence dorée (FD) and its vector *Scaphoideus titanus* ranged from 10 hours at 40^{o} C to 10 minutes at 55^{o} C. The eggs of *S.titanus* were also killed by immersion at 50^{o} C for 45 minutes.

323. **Caudwell, A., J. Larrue, R. Meignoz, D. Moncomble, and C. Palgé.** 1997. Current state of the research on the vein yellowing leafroll in the Champagne region, p. 45-46. In O. A. Sequeira,de, J. C. Sequeira, and M. T. Santos (ed.), Extended abstracts 12th Meeting ICVG, Lisbon, Portugal, 29 September-2 October 1997. Dept.Plant Pathology, Estação Agronomica Nacional, Oeiras, Portugal.
Keywords :grapevine; vein yellowing leafroll; leafroll; etiology; survey; France; meeting; ICVG;
Notes : Vein yellowing leafroll (VYLR) was first described in 1983 in the Champagne region. Its etiology is stil unclear. Re-examination of the distribution of diseased vines during several consecutive years in the vineyards where VYLR was first considered to be spreading rapidly showed that this apparent spread was probably an illusion due to a contamination in the rootstock, perhaps of the leafroll type, that produced symptoms after different incubation periods. VYLR cannot be longer considered as a fast spreading type of leafroll.

324. **Caudwell, A., J. Larrue, G. Riffiod, M.C. Simon, R. Boidron, S. Grenan, L. Mayoux, V. Tassart, R. Planas, M. Leguay, J.C. Laurent, and C. Vernet.** 1993. La Flavescence dorée de la vigne (Grapevine flavescence dorée). ENTAV (Etablissement National pour l'Amélioration de la Viticulture), Domaine de l'Espiguette, F-30240 Le-Grau-du-Roi (France). 16 pages.
Keywords :grapevine; phytoplasma; phytoplasma disease; economic importance; symptoms; vector; *Scaphoideus titanus;* geographical distribution; diagnosis; control; quarantine; France;
Notes : In French. This very nicely presented and illustrated booklet was prepared by a working group on Flavescence dorée set up in 1986 with the collaboration of INRA (French National Agricultural Research Institute), the Chambers of Agriculture, ONIVINS (National Wine Institute) and ITV (Technical Institute of

Viticulture). It summs up the present knowledge on the disease, its vector *Scaphoideus titanus* Ball, its geographical distribution in France, the methods of detection and diagnosis, and the control measures.

325. **Caudwell, A., J. Larrue, V. Tassart, R. Boidron, S. Grenan, M. Leguay, and P. Bernard.** 1994. Caractère "porteur de la flavescence dorée" chez les vignes porte-greffes, en particulier le 3309 Couderc et le Fercal (Ability of grapevine rootstocks to be symptomless carriers of flavescence dorée, with special reference to 3309 Couderc and Fercal). Agronomie **14**:83-94.
Keywords :grapevine; phytoplasma disease; flavescence dorée; rootstock; transmission; latency; phytoplasma; certification; France;
Notes :A study was undertaken in a region of high flavescence dorée (FD) infection pressure in Aude, France, in order to determine the behaviour of rootstocks after natural infection by FD. Several rootstock propagation fields planted at the end of the seventies were left unprotected against the FD epidemics of 1982-1986, and sprayed with insecticides since 1987. Visual observations, indexing with Chardonnay, Pinot noir or Baco 22A, and serological detection of FD were made regularly since 1989. With 3309 C and Fercal rootstocks, delayed growth in the spring and incomplete ripening of canes can be observed on some of the infected plants. Other rootstocks show occasional leaf symptoms. However these symptoms are not sufficiently reliable for diagnosis, and most grapevine rootstocks are potential symptomless carriers of FD. Unlike *Vitis vinifera* scion varieties, rootstocks remain permanently infected. The infection is unevenly distributed in the canes, and as the concentration of FD agents is low in rootstocks, extensive sampling and very sensitive detection methods are necessary.

326. **Caudwell, A., J. Larrue, V. Tassart, S. Grenan, and R. Boidron.** 1993. Flavescence dorée on rootstock varieties: indexing results and hot water treatments, p. 98. In P. Gugerli (ed.), Extended abstracts 11th Meeting ICVG, Montreux, Switzerland, 6-9 September 1993. Federal Agricultural Research Station of Changins, CH-1260 Nyon, Switzerland.
Keywords :grapevine; phytoplasma; indexing; phytoplasma disease; flavescence dorée; rootstock; occurrence; distribution; control; hot water treatment; France; meeting; ICVG;
Notes : The behaviour of the FD pathogen in rootstocks is erratic and difficult to predict. Symptomless varieties are able to transmit the disease. Infection is irregularly distributed along the canes, and sampling for indexing tests is unreliable. Plants produced with infected rootstock could have a healthy appearance for several years and showed symptoms later in the field. Destruction of the FD MLOs by hot water treatment at 50^{o} C during 55 minutes is the best control method available so far.

327. **Caudwell, A., J. Larrue, C. Valat, and S. Grenan.** 1990. Les traitements à l'eau chaude des bois de vigne atteints de la Flavescence dorée (Hot water treatment of grapevine shoots infected with flavescence dorée). Progr. Agric. Vitic. **107**:281-286.
Keywords :grapevine; phytoplasma disease; flavescence dorée; hot water treatment; control; phytoplasma; France;
Notes : In French. Treatment prior to storage is the most efficient control method. 55°C/10 min. to 40°C/10 h. are the practical limits of efficient temperature/duration combinations. Recommended: 50°C/35-60 min.

328. **Caudwell, A., J. Larrue, C. Valat, and S. Grenan.** 1991. Hot water treatments against flavescence dorée of grapevine on dormant wood, p. 336-343. In I. C. Rumbos, R. Bovey, D. Gonsalves, W. B. Hewitt, and G. P. Martelli (ed.), Proceedings of the 10th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG). Plant Protection Institute, P.O. Box 303, 38001 Volos, Greece.
Keywords :grapevine; phytoplasma disease; flavescence dorée; hot water treatment; control; France; meeting; ICVG;
Notes : The agent of FD can be inactivated in dormant canes by immersing them in hot water for a time/temperature range of 10 hours at 40^{o} C. to 10 minutes at 55^{o} C. A temperature of 50^{o} C for 35-60 minutes is particularly suitable.

329. **Caudwell, A. and G.P. Martelli.** 1993. Flavescence dorée, p. 97-101. In G. P. Martelli (ed.), Graft-transmissible diseases of grapevines. Handbook for detection and diagnosis. FAO, Rome.
Keywords :grapevine; phytoplasma disease; symptoms; transmission; vector; *Scaphoideus titanus;* detection; diagnosis; France; Italy;

330. **Cazelles, O.** 1987. Les mycoplasmes, comme cause de maladie des plantes (Mycoplasmas as a cause of disease in plants), p. 17-33. In S. Ruini (ed.), Atti del Convegno sulla Flavescenza Dorata della Vite, Vicenza-Verona, Maggio 1987. Fondazione Sergio Bolla, Verona.
Keywords :grapevine; phytoplasma; phytoplasma disease; flavescence dorée; general; review; meeting; Switzerland;
Notes : In French, Eng. It. sum. Flavescenza dorata, Vicenza-Verona meeting.

331. **Cazelles, O.** 1990. La flavescence dorée de la vigne (Grapevine flavescence dorée). Rev. suisse vitic. arboric. hortic. **22**:37-38.
Keywords :grapevine; phytoplasma disease; flavescence dorée; symptoms; transmission; control; Switzerland;
Notes : Short description of symptoms, colour photographs.

332. **Cazelles, O., A. Caudwell, and M. Baillod.** 1989. La flavescence dorée de la vigne (Flavescence dorée of grapevine). Rev. suisse vitic. arboric. hortic. **21**:171-174.
Keywords :grapevine; phytoplasma disease; flavescence dorée; history; vector; leafhopper; *Scaphoideus titanus;* diagnosis; control; quarantine; France; Switzerland;
Notes : The first part of this paper is a review on the history of the disease and the present situation in France. A description of symptoms is given, with colour plates. The potential danger for the vineyards in the French and Italian speaking parts of Switzerland is also evaluated and prevention measures taken are mentioned. A survey of leafhopper populations in vineyards showed that *S. titanus* could be found only in Tessin. New quarantine measures were taken in 1989.

333. **Cazelles, O., C. Desbaillet, and A. Schmid.** 1992. Jaunisses de la vigne en Suisse romande et au Tessin (Grapevine yellows in the western part of Switzerland and in Tessin). Rev. suisse vitic. arboric. hortic. **24**:133-134.
Keywords :grapevine; phytoplasma disease; flavescence dorée; leafhopper; survey; *Scaphoideus titanus;* Switzerland;
Notes : Whereas a few cases of vines with symptoms of the yellows type have been recorded in the French speaking part of Switzerland, mostly on Chardonnay and in the absence of any *Scaphoideus titanus*, in the canton of Tessin, where *S. titanus* has been recorded in the Sottoceneri region, no case of typical yellows disease has been found so far. Flavescence dorée does not seem to occur in Switzerland.

334. **Cazelles, O. and C. Kuszala.** 1993. Prospection des jaunisses de la vigne en Suisse romande et au Tessin et comparaison avec la flavescence dorée par le test ELISA (Survey of grapevine yellows in the French speaking part of Switzerland and comparison with flavescence dorée by means of ELISA). Rev. suisse vitic. arboric. hortic. **25**:257-259.
Keywords :grapevine; phytoplasma disease; etiology; ELISA; Switzerland;
Notes : Samples collected on 39 Chardonnay grapevines in three viticultural regions of the French speaking part of Switzerland and in Tessin, and showing symptoms of yellows were tested for the presence of flavescence dorée MLO by ELISA. All tests gave negative results, indicating that the symptoms observed are not caused by flavescence dorée MLO.

335. **Cazenove, R. and R. Planas.** 1991. Lutte contre la Flavescence dorée de la vigne dans le cadre de l'agriculture biologique (Control of flavescence dorée in biological agriculture). Progr. Agric. Vitic. **108**:44-46.
Keywords :grapevine; phytoplasma disease; flavescence dorée; *Scaphoideus titanus;* leafhopper; control; insecticide; France;

Notes : Among insecticides recommended in the spray programmes of biological agriculture, some are practically useless against *Scaphoideus titanus*, vector of FD (pyrethrum, nicotine, rotenone). However, a combination of different elements (nicotine - white oil - pine oil - oligoelements) shows an interesting efficacy (80%).

336. **Chabbouh, N., G.P. Martelli, V. Savino, N. Greco, and R. Lafortezza.** 1993. Potato virus X in Tunisian grapevines, p. 28. In P. Gugerli (ed.), Extended abstracts 11th Meeting ICVG, Montreux, Switzerland, 6-9 September 1993. Federal Agricultural Research Station of Changins, CH-1260 Nyon, Switzerland.
Keywords :grapevine; potato virus X; mechanical transmission; ELISA; Tunisia; meeting; ICVG;
Notes : Two biologically distinct strains of potato virus X were recovered by mechanical inoculation from Carignan and Grenache grapevines in Tunisia. Symptoms appear to be of little economic importance, but the infection is more widespread than it was first thought for this virus in grapevines.

337. **Chabbouh, N., G.P. Martelli, V. Savino, N. Greco, and R. Lafortezza.** 1993. Potato virus X in Tunisian grapevines. Vitis **32**:165-169.
Keywords :grapevine; potato virus X; occurrence; symptoms; immunoassay; ELISA; Tunisia;
Notes : Potato virus X was found on Carignan and Grenache (about 4% of the vines of Grenache infected). Two biologically distinct strains were detected. Both have morphological, physico-chemical, serological and ultrastructural properties identical with those of the type species. Both strains are only slightly pathogenic to grapevine. They were re-inoculated to grape rootlings with difficulty.

338. **Chabbouh, N. and V. Savino.** 1997. Occurrence of enation disease in Tunisia, p. 47. In O. A. Sequeira,de, J. C. Sequeira, and M. T. Santos (ed.), Extended abstracts 12th Meeting ICVG, Lisbon, Portugal, 29 September-2 October 1997. Dept.Plant Pathology, Estação Agronomica Nacional, Oeiras, Portugal.
Keywords :grapevine; enation; occurrence; Tunisia; meeting; ICVG;
Notes : Enation disease was found in a few vines of cv. Grenache in the Cap Bon viticultural area, south of Tunis, and in a single vine of table grape cv. Testouri in northwestern Tunisia. Symptomatic vines showed delayed and bushy growth in the spring, short internodes, malformed basal leaves with thick veins and enations. Graft transmission by green grafting LN33 rooted cuttings with material from diseased vines gave only one successful transmission out of 20 grafted vines.

339. **Chang, C.J.** 1988. Metabolism of *Xylella fastidiosa* associated with Pierce's disease of grapevines (Abstract 718). Phytopathology **78**:1602.
Keywords :grapevine; Pierce's disease; *Xylella fastidiosa;* biology; USA;

340. **Chang, C.J.** 1995. *Xylella fastidiosa* and associated diseases. Detection, taxonomy and strain diversity. Plant Diagnostics Quarterly **16**:114-119.
Keywords :grapevine; Pierce's disease; *Xylella fastidiosa;* detection; classification; strain; nucleic acid assay; ELISA; immunofluorescence; PCR; RFLP; USA;
Notes : Methods of detection of *Xylella fastidiosa*. Isolation media for the agent, serology (ELISA, immunofluorescence), PCR, RFLP. Differentiation between strains of *X. fastidiosa.*

341. **Chang, C.J. and R.C. Donaldson.** 1993. *Xylella fastidiosa*: Cultivation in chemically defined medium. Phytopathology **83**:192-194.
Keywords :grapevine; Pierce's disease; *Xylella fastidiosa; in vitro;* culture medium; USA;
Notes :A medium XF-26 was used successfully to cultivate *Xylella fastidiosa* isolated from grapevines with Pierce's disease.

342. **Chang, C.J., C.D. Robacker, and R.P. Lane.** 1990. Further evidence for the isolation of *Xylella fastidiosa* on nutrient agar from grapevines showing Pierce's disease symptoms. Can. J. Pl. Pathol. **12**:405-408.
Keywords :grapevine; Pierce's disease; *Xylella fastidiosa;* etiology; USA;

343. **Chanson, G. and S. Grenan.** 1985. Le microgreffage, étude histologique (Micrografting, histological study). Progr. Agric. Vitic. **102**:281-283.
Keywords :grapevine; *in vitro;* micrografting; histology; France;
Notes : In French. Histological study of micrografts made in order to eliminate some viruses of grapevine shows that callus essentially results from the development of medullary parenchyma, which is an obstacle to a good union between scion and rootstock.

344. **Charayron, B.** 1997. La flavescence dorée dans les Départements de l'Aude et des Pyrénées-Orientales (Flavescence dorée in the Departments of Aude and Pyrénées-Orientales). Phytoma - La Défense des Végétaux *(496):*21-22.
Keywords :grapevine; flavescence dorée; *Scaphoideus titanus;* survey; control; insecticide; France;
Notes : In French. The region of Aude and Pyrénées-Orientales in southern France is heavily affected by flavescence dorée (FD). Attempts to control the disease included compulsory insecticide sprays against the vector, *Scaphoideus titanus*, eradication of infected vines and destruction of abandoned vineyards, as well as of wild *Vitis*. The first results are encouraging, but many problems remain.

345. **Charles, J.G.** 1993. A survey of mealybugs and their natural enemies in horticultural crops in North Island, New Zealand, with implications for biological control. Biocontrol Science and Technology **3**:405-418.
Keywords :grapevine; mealybug; biology; control; New Zealand;

346. **Charles, J.G. and D. Jordan.** 1993. Mealybugs associated with grapevine leafroll disease (GLR), p. 31-34. In D. T. Jordan (ed.), Proceedings of the New Zealand Grape and Wine Symposium, Auckland, 3-6 November 1993 (Vol.8). New Zealand Society for Viticulture and Oenology.
Keywords :grapevine; leafroll; GLRaV; survey; mealybug; vector; *Pseudococcus affinis; Pseudococcus calceolariae; Pseudococcus longispinus;* New Zealand;
Notes : In a survey of mealybug species present in 31 vineyards with grapevine leafroll disease made in March-May 1993 in New Zealand, two species were commonly found, *Pseudococcus longispinus* and *P.calceolariae. Pseudococcus affinis* was also found in one location. Observations show that leafroll is epidemic in New Zealand, the number of infected vines in a vineyard can double from one year to the next. However, there is no clear relationship between the relative abundance of mealybugs and leafroll incidence.

347. **Chavez L.B. and F. Varon de Agudelo.** 1995. Observaciones sobre enfermedades posiblemente de origen viral en vid (*Vitis* sp.) (Observations on diseases of possible viral origin in grapevine, *Vitis* sp.). Fitopatologia Colombiana **19***(2):*19-26.
Keywords :grapevine; rugose wood; corky bark; stem pitting; symptoms; Colombia;
Notes : In Spanish, Eng. sum. This paper describes studies on a disease of the rugose wood type occurring mainly in varieties Italia and Queen in the Cauca Valley in eastern Colombia. Corky bark and stem pitting were observed, negative staining with uranyl acetate for electron microscopy revealed isometric particles of 54 nm in diameter.

348. **Chen, J., C.J. Chang, R.L. Jarret, and N. Gawel.** 1992. Genetic variation among *Xylella fastidiosa* strains. Phytopathology **82**:973-977.
Keywords :grapevine; Pierce's disease; bacterium; *Xylella fastidiosa;* DNA; comparison; California; USA;
Notes : Study of similarities and differences among 24 strains of *Xylella fastidiosa* from 8 different hosts, including 16 strains from grapevine, by the method of restriction fragment length polymorphism. The grapevine strains are genetically very similar.

349. **Chen, K.H. and T.A. Chen.** 1995. A novel method for cloning DNA of plant pathogenic mycoplasmalike organisms. Can. J. Microbiol. **41**:753-757.
Keywords :grapevine; phytoplasma disease; phytoplasma; cloning; DNA; southern blot; nucleic acid assay; detection; Canada;

Notes :A new method was developed for cloning the DNA from plant-pathogenic mycoplasmalike organisms (MLOs). This procedure utilized random amplified polymorphic DNA (RAPD) and basic recombinant DNA techniques. It consisted of amplification of total DNA from diseased plants using one oligonucleotide primer with arbitrary sequence and separation of RAPD products in agarose gels. RAPD band of MLO origin were then recovered, and cloned into the specifically designed vector pCR(TM) II. With this method, a DNA fragment of the SA2 isolate of grapevine yellows MLO was cloned. Southern blot hybridizations revealed that most of the DNA in the unique RAPD band was derived from MLOs. Results from dot-blot hybridizations used for screening showed that approximately 60% of transformants harbored MLO-specific recombinant plasmids. This technique is relatively simple, quite efficient, and not limited by the amount of diseased material available. It does not depend on DNA sequence information for primer design and does not rely on restriction endonucleases for cloning. In addition, it can be used directly for disease diagnosis and for differentiation of closely related MLOs. This system may serve as a model for cloning DNAs of other fastidious plant pathogens.

350. **Chen, K.H., R. Credi, N. Loi, M. Maixner, and T.A. Chen.** 1994. Identification and grouping of mycoplasmalike organisms associated with grapevine yellows and clover phyllody diseases based on immunological and molecular analyses. Appl. Environ. Microbiol. **60**:1905-1913.
Keywords :grapevine; phytoplasma disease; phytoplasma; clover phyllody; immunoassay; nucleic acid assay; classification; identification; dot blot hybridization; immunofluorescence; PCR; RFLP; southern blot; Italy; USA; Germany;
Notes : The degree of relationship between various mycoplasmalike organisms (MLOs, phytoplasmas) associated with grapevine yellows diseases in Italy (Bologna, Udine, Rome) and Germany was studied using immunofluorescent staining, dot blot hybridization, PCR, RAPD, and RFLP. The relationship between these organisms and those causing clover phyllody in Italy and Canada was also studied. On the basis of these results, the isolates studied can be classified into five subgoups:
Subgroup 1: CA1 and CH1 grapevine yellows Bologna
Subgroup 2: SA1 and SA2 grapevine yellows, Bologna
Subgroup 3: GYU grapevine yellows Udine, CPhB and CPhC clover phyllody Italy
Subgroup 4: GYG grapevine yellows Germany (Vergilbungskrankheit)
Subgroup 5: GYR grapevine yellows Rome, CPhCa clover phyllody, Canada

351. **Chen, K.H., J.R. Guo, X.Y. Wu, N. Loi, L. Carraro, Y.H. Guo, Y.D. Chen, R. Osler, R. Pearson, and T.A. Chen.** 1993. Comparison of monoclonal antibodies, DNA probes, and PCR for detection of the grapevine yellows disease agent. Phytopathology **83**:915-922.
Keywords :grapevine; phytoplasma disease; detection; ELISA; immunofluorescence; DNA probe; nucleic acid assay; PCR; comparison; method; monoclonal antibodies; phytoplasma; strain; Italy; USA;
Notes : Two monoclonal antibodies were obtained using as immunogens partially purified MLOs (GY-MLO) from periwinkle infected through dodder from yellows-infected grapevine in Friuli, Italy (Udine) and in the Fingerlake region (New York). Using ELISA and indirect immunofluoescence (IF) staining, the MAbs were found to be specific for the GY-MLO. Both tests were satisfactory with periwinkle, but not always reliable with grapevine because of very low GY-MLO titre in phloem in diseased grapevines and the interference of plant pigments in dot blot immunoassays. Three oligonucleotides were synthesized for use as primers in PCR. Using these specific DNA probes in dot hybridizations, positive results were obtained with 10 ng of total DNA from GY-MLO-infected periwinkles. PCR could detect GY-MLO when only 10^{-2}pg of DNA from the same source was used as template. The labeled DNA probes were used to successfully detect GY-MLO in grapevine samples from Italy and the USA. Results from PCR indicate that related but distinct strains of GY-MLOs must exist, causing similar symptoms on grapevine. Almost all wild grapevines *(Vitis riparia)* growing near vineyards in New York showed a positive association with GY-MLO, without showing symptoms. They may serve as a reservoir for the yellows disease agent.

352. **Chen, K.H., S.Y. Wu, Y.D. Chen, Y.H. Guo, and T.A. Chen.** 1993. Detection of mycoplasmalike organism associated with grapevine yellows by polymerase chain reactions (Abstract). Phytopathology **83**:242.

Keywords :grapevine; phytoplasma disease; phytoplasma; detection; diagnosis; PCR; nucleic acid assay; periwinkle; USA;
Notes : Two DNA fragments of the MLO genome (GYD-1, GYD-2) selected in the laboratory, were shown to be specific for grapevine yellows MLO. Three oligonucleotides were synthesized as primers for PCR analysis. MLO isolates from periwinkle are genetically related but not identical with MLOs from grapevine in Italy and New York.

353. **Cherif, C., F. Askri, and N. Chabbouh.** 1993. The Tunisian programme for clonal and sanitary selection of grapevine, p. 163-164. In P. Gugerli (ed.), Extended abstracts 11th Meeting ICVG, Montreux, Switzerland, 6-9 September 1993. Federal Agricultural Research Station of Changins, CH-1260 Nyon, Switzerland.
Keywords :grapevine; sanitary selection; certification; Tunisia; meeting; ICVG;
Notes : Description of the Tunisian programme of sanitary selection and certification of grapevine.

354. **Chevalier, S.** 1995. Contribution à la détection et à la caractérisation de deux Clostérovirus, le Grapevine Virus A (GVA) et le Grapevine Leafroll associated virus 1 (GLRaV 1), agents impliqués dans deux maladies de la vigne: les cannelurees du tronc et l'enroulement (Contribution to detection and characterization of two closteroviruses, grapevine virus A (GVA) and grapevine leafroll associated virus 1 (GLRaV 1), agents implicated in two grapevine diseases: stem grooving and leafroll). Université Louis Pasteur, Strasbourg, France.
Keywords :grapevine; vitivirus; closterovirus; immunoassay; ELISA; nucleic acid assay; PCR; GVA; GLRaV-1; etiology; detection; properties; leafroll; rugose wood; stem grooving; thesis; France;
Notes : PhD thesis, University Louis Pasteur, Strasbourg, France. In French. As GVA cannot be detected satisfactorily by ELISA, a method involving immunocapture of virus particles by antisera followed by PCR of DNA obtained by reverse transcription of virus RNA (IC/PCR) was optimised for detecting GVA in infected grapevine leaves. Using this method, the author demonstrated the narrow correlation between the presence of GVA and Kober stem grooving (KSG). Infecting healthy plantlets of Kober 5BB and *Vitis rupestris* by heterografting them *in vitro* with GVA infected *Nicotiana benthamiana* produced GVA infected vines that remained symptomless for 12 months, but after grafting with a healthy scion, symptoms of stem grooving appeared on Kober 5BB, not on *V.rupestris*. Grafting appears to be necessary for the development of symptoms of KSG on Kober 5BB. Three serologically similar isolates of GVA, differing by their symptom severity on Kober 5BB were observed. Symptoms of a mild isolate could be aggravated by the additional presence of GLRaV-1. The evolution of histological symptoms was studied during 6 months on Kober 5BB infected with a mild isolate of GVA alone, or in mixed infection with GLRaV-1. The first symptoms appeared after four months in the first case, and already after 2 months in the second case. GVA was localized by immunodetection on histological sections. The results were similar for grafted or non grafted Kober 5BB, which showed that symptoms do not depend on the multiplication of GVA. However, the concomitant presence of GLRaV-1 seemed to enhance GVA multiplication. Both viruses were detected in the same cells.

355. **Chevalier, S., C. Greif, P. Bass, and B. Walter.** 1993. Investigations on the aetiology of Kober stem grooving, p. 49. In P. Gugerli (ed.), Extended abstracts 11th Meeting ICVG, Montreux, Switzerland, 6-9 September 1993. Federal Agricultural Research Station of Changins, CH-1260 Nyon, Switzerland.
Keywords :grapevine; vitivirus; GVA; rugose wood; Kober stem grooving; etiology; nucleic acid assay; France; meeting; ICVG;
Notes : The results suggest that GVA is involved in Kober stem grooving etiology, rather than in rupestris stem pitting , as previously suspected.

356. **Chevalier, S., C. Greif, P. Bass, and B. Walter.** 1993. Development of the immunocapture - reverse transcription - PCR procedure for detection of GVA in grapevine tissues, p. 151. In P. Gugerli (ed.), Extended abstracts 11th Meeting ICVG, Montreux, Switzerland, 6-9 Switzerland. Federal Agricultural Research Station of Changins, CH-1260 Nyon, Switzerland.
Keywords :grapevine; vitivirus; GVA; rugose wood; etiology; Kober stem grooving; detection; immunocapture; nucleic acid assay; reverse transcription; PCR; France; meeting; ICVG;

Notes : The method was used successfully to detect GVA in very young leaves of infected grapevines. The correlation between GVA and Kober stem grooving was confirmed in a survey of 60 plants.

357. **Chevalier, S., C. Greif, J. M. Clauzel, B. Walter, and C. Fritsch.** 1995. Use of an immunocapture-polymerase chain reaction procedure for the detection of grapevine virus A in Kober stem grooving-infected grapevines. J. Phytopathol. **143**:369-373.
Keywords :grapevine; rugose wood; vitivirus; Kober stem grooving; GVA; detection; PCR; nucleic acid assay; immunocapture PCR; monoclonal antibodies; purification; immunoassay; ELISA; indexing; heat therapy; comparison; etiology; France;
Notes : Reliable and highly sensitive detection of grapevine virus A (GVA) in grapevine leaf tissue by reverse transcription-initiated polymerase chain reaction was achieved after enrichment and partial purification of the virus from grapevine crude sap by an immunocapture (IC) procedure. In comparison with ELISA the gain of sensitivity was estimated up to 1000-fold in grapevine mature leaf tissue. Using IC-reverse transcription polymerase chain reaction (IC-RT-PCR), GVA could be detected in very young grapevine tissues where the virus titre was largely below the detection limit of ELISA. The comparison of IC-RT-PCR and biological indexing results for about 60 grapevine accessions revealed a good correlation between the presence of GVA and the development of Kober stem grooving (KSG) symptoms in the specific indicator rootstock Kober 5BB. Moreover, the elimination of KSG by heat treatment in two *Vitis vinifera* cultivars, Savagnin rose and Servant, was accompanied by the loss of detection of GVA by PCR, thus providing further argument for the involment of GVA in the aetiology of KSG (This paper is based on the PhD thesis of Dr Chevalier).

358. **Choueiri, E., N. Abou-Ghanem, and D. Boscia.** 1997. Grapevine virus A and grapevine virus D are serologically distantly related. Vitis **36**:39-41.
Keywords :grapevine; vitivirus; GVA; GVB; GVD; immunoassay; ELISA; western blot; immuno electron microscopy; tissue blot; Italy;
Notes : Grapevine trichovirus A (GVA) B (GVB) and D (GVD) are not serologically related when assayed with polyclonal antisera in ELISA and IEM tests. The results of a study with a larger array of serological techniques, including polyclonal and monoclonal (MAb) antibodies, ELISA, IEM, tissue blot, and Western blot, show that i) polyclonal antisera to GVA, GVB and GVD cross-reacted in Western blot with all antigens; ii) one out of 4 MAbs to GVA reacted in ELISA, Western blot and tissue blot with the homologous virus and GVD but not with GVB. It is concluded that GVA, GVB and GVD are serologically distantly related and that the single antigenic determinant common to GVA and GVD is likely to be a cryptotype.

359. **Choueiri, E., D. Boscia, M. Digiaro, M. A. Castellano, and G.P. Martelli.** 1996. Some properties of a hitherto undescribed filamentous virus of the grapevine. Vitis **35**:91-93.
Keywords :grapevine; GLRaV-7; closterovirus; occurrence; properties; immunoassay; leafroll; Albania; Italy;
Notes : An apparently new, non mechanically transmissible virus, of the closterovirus type was found in grapevines from Albania. The name grapevine leafroll-associated virus 7 (GLRaV-7) is proposed for this new virus. Particles were filamentous, with conspicuous cross-banding, 1500-1700 nm in length, coat protein subunits with Mr of ca. 37 kDa and a ssRNA genome of ca. 19.5 kb. A virus-specific antiserum was raised, which decorated virions at a dilution of 1:1000. It did not recognize particles of any of the 6 GLRaV (1-6), nor GVA and GVB. Graft transmission to grapevine leafroll indicators caused a mild leafroll reaction. The virus was serologically detected by ELISA in 141 vines out of 2226 from Albania, Greece, Hungary, Egypt and Italy.

360. **Choueiri, E., M. A. Castellano, M. Digiaro, G. Bottalico, and G.P. Martelli.** 1997. New data on grapevine leafroll-associated virus 7, p. 19-20. In O. A. Sequeira,de, J. C. Sequeira, and M. T. Santos (ed.), Extended abstracts 12th Meeting ICVG, Lisbon, Portugal, 29 September-2 October 1997. Dept.Plant Pathology, Estação Agronomica Nacional, Oeiras, Portugal.
Keywords :grapevine; leafroll; closterovirus; GLRaV-7; ultrastructure; etiology; immunoassay; immunoprinting; Italy; meeting; ICVG;

Notes : Grapevine leafroll-associated virus 7 (GLRaV-7) was discovered in 1996 in grapevines from Albania. The present paper reports on ultrastructural investigations, on diagnosis improvements and on the relation of this virus with leafroll disease. Immunoprinting assays were successful and very promising. GLRaV-7 appears to be a genuine leafroll virus, capable by itself alone to cause leafroll symptoms in grapevine. This would justify the suppression of the term "associated" in the name of this virus.

361. **Choueiri, E., M. Digiaro, and V. Savino.** 1997. Further evidence that grapevine virus A is the agent of Kober stem grooving, p. 39-40. In O. A. Sequeira,de, J. C. Sequeira, and M. T. Santos (ed.), Extended abstracts 12th Meeting ICVG, Lisbon, Portugal, 29 September-2 October 1997. Dept.Plant Pathology, Estação Agronomica Nacional, Oeiras, Portugal.
Keywords :grapevine; Kober stem grooving; rugose wood; etiology; GVA; vitivirus; Italy; meeting; ICVG;
Notes : In order to elucidate the etiological relationship between Kober stem grooving and grapevine virus A (GVA) "pure sources" of this virus were searched for in nature, or were obtained experimentally by transmission of GVA to healthy grapevines by *Pseudococcus longispinus* mealybugs fed on infected *Nicotiana clevelandii*. Nine sources apparently infected by GVA only were selected and top grafted on a standard set of indicators, including Kober 5BB, *V.rupestris* St.George and LN33. Three of the nine accessions supposed to be pure sources of GVA actually contained no other virus, and all of them gave symptoms of stem grooving on Kober 5BB. The six other sources also gave symptoms of Kober stem grooving, but some of them were infected with closteroviruses, rupestris stem pitting or LN33 stem grooving beside GVA. These facts provide further evidence that GVA is involved in the etiology of Kober stem grooving.

362. **Christensen, L.P., D.A. Golino, and M.M. Moriyama.** 1995. Comparison of registered selections of French Colombard and Chenin blanc with and without thermotherapy, p. 111-113. In J. M. Rantz (ed.), Proceedings of the International Symposium on Clonal Selection, Portland, Oregon, June 1995. The American Society for Enology and Viticulture, Portland, Oregon, USA.
Keywords :grapevine; clonal selection; heat therapy; performance; comparison; California; USA;
Notes : Three registered clonal selections each of French Colombard (FC) and Chenin blanc (Cb) were compared over 6 years of fruiting at the Kearney Agricultural Center. Each selection was represented with material indexed as virus-free without thermotherapy (FC1 and Cb1) and material of the same clone after thermotherapy (FC2=91 days, Cb4=116 days). A heat treated and registered clone from a different California vineyard (FC5 and Cb5) was also included. Heat-treated FC2 had larger berries, fewer berries per cluster, and less bunch rot than non heat-treated FC1; heat-treated Cb4 was more fruitful and higher yielding than Cb1. FC5 and Cb5 showed also some differences compared with non heat-treated material, but the origins are not comparable and the differences may be due to other factors than heat treatment.

363. **Cirami, R.M., R.J. Van Velsen, and J. Niejalke.** 1988. Grapevine virus indexing in the South Australian Vine Improvement Scheme, 1974-1987. Australian J. Experimental Agriculture **28**:645-649.
Keywords :grapevine; virus; indexing; sanitary selection; clonal selection; Australia;

364. **Clerc, L., C. Linder, and H. Günthart.** 1997. Première observation en Suisse romande de la cicadelle *Scaphoideus titanus* Ball (Homoptera, Jassidae), vecteur de la flavescence dorée de la vigne (First record of the leafhopper *Scaphoideus titanus* Ball (Homoptera, Jassidae), vector of flavescence dorée of grapevine, in the French speaking part of Switzerland). Rev. suisse vitic. arboric. hortic. **29**:245-247.
Keywords :grapevine; flavescence dorée; phytoplasma disease; *Scaphoideus titanus;* leafhopper; occurrence; Switzerland;
Notes : In French, Eng., Germ. and Ital. sum. The presence of *Scaphoideus titanus* was detected in the viticultural area of the canton of Geneva using yellow sticky traps. The epidemiological consequences and the risk of infections by flavescence dorée are discussed.

365. **Clingeleffer, P.R. and L.R. Krake.** 1992. Responses of Cabernet franc grapevines to minimal pruning and virus infection. Amer. J. Enol. Vitic. **43**:31-37.

Keywords :grapevine; leafroll; viroid; yellow speckle; yield; performance; economic importance; Australia;
Notes : Comparison of minimum pruning system with normal spur-pruning and effects of leafroll plus yellow speckle infection, as compared with virus-free material. Two Sultana inocula were transmitted by graft to healthy, virus-free material, both inocula contained leafroll and yellow speckle (one mild leafroll = H4, one more severe leafroll = H5). Significant effects were recorded on growth, yield (H4: -9%, H5: -23%) and sugar accumulation. Virus effects were amplified after 5 years. (This paper is completed in Rühl and Clingeleffer, 1993, ibidem **44**, 81-85 (ref.1338).

366. **Clog, E., P. Bass, and B. Walter.** 1990. Plant regeneration by organogenesis in *Vitis* rootstock species. Plant Cell Reports **8**:726-728.
Keywords :grapevine; virus elimination; rootstock; leaves; somatic embryogenesis; growth; temperature; *in vitro;* France;
Notes : Leaves of *Vitis* rootstocks from growth chamber of *in vitro* plantlets were wounded with a scalpel and cultured *in vitro* on a modified MS liquid medium containing different concentrations of benzyl-aminopurine, which is required for shoot formation. Rooted plantlets were formed after a short callus periode. The organogenesis capacity varied from about 40% (5BB) to 7% (41B). LN33 and SO4 were intermediate. *Vitis vinifera* Pinot noir and Chardonnay did not regenerate plantlets at all. The various parameters (age of source explant, culture medium composition, temperature) were examined and discussed.

367. **Coffin, R.S. and R. H.A. Coutts.** 1993. The closteroviruses, capilloviruses and other similar viruses: a short review. J. Gen. Virol. **74**:1475-1483.
Keywords :closterovirus; grapevine; capillovirus; viruses; classification; nomenclature;
Notes : This paper reviews the knowledge available in 1993 on these two groups of viruses. A table sums up the main properties of the viruses and subgroups. Details are given on the genome organization of some of the viruses. Important bibliography.

368. **Coiro, M.I.** 1991. Nematodi vettori di virus della vite (Nematode vectors of grapevine viruses), p. 325-338. In La viticoltura Veronese. Valpolicella-Valdadige. Istituto Sperimentale per la Viticoltura, Conegliano, Italy.
Keywords :grapevine; nematode; vector; Longidoridae; *Xiphinema index;* nepovirus; Italy;
Notes : In Italian. During the summer 1991, 120 soil samples were collected in vineyards of the Valpolicella and Valdadige regions. These samples were take in the rhizosphere of vines, to a maximum depth of 40 cm. The nematode fauna of these samples was determined. The species found were *Xiphinema pachtaicum* (29%), *X.index* (10%), *X.vuittenezi* (0.8%), *X.brevicolle* (1.7%) *Longidorus juvenilis* (0.8%), *Trichodorus viruliferus* (4.2%). The methods of control available are discussed.

369. **Coiro, M.I., M. Borgo, E. Egger, and F. Lamberti.** 1987. I nematodi Longidoridae e Trichodoridae nei vigneti della zona del Prosecco di Conegliano-Valdobbiadene. (Longidorid and Trichodorid nematodes of the Prosecco vineyards of the Conegliano- Valdobbiadene region). Riv. Vitic. Enol. **40**:320-325.
Keywords :grapevine; nematode; fanleaf; Longidoridae; Trichodoridae; *Xiphinema; Longidorus; Trichodorus;* vector; Italy;
Notes : In Italian. *Xiphinema index* was found in only 7% of vineyards prospected. In spite of this low proportion of vineyards infested with this vector of GFLV, fanleaf is very widespread in this region. The authors think it is due to a large extent to the use of unselected graftwood, often taken on fanleaf-diseased vines. Also present in the area are: *X. brevicolle, X. pachtaicum, X.* sp. (2), *Longidorus juvenilis, Trichodorus sparsus*.

370. **Coiro, M.I., D.J.F. Brown, and F. Lamberti.** 1990. Reproduction of *Xiphinema index* (Nematoda: Dorylaimida) on five plant species. Nematologica **36**:474-483.
Keywords :grapevine; *Xiphinema index;* Longidoridae; nematode; host range; control; Italy;
Notes : Research on possible alternate hosts for *Xiphinema index*. Grapevine, *Petunia hybrida*, tomato, mulberry, celery were used a host plants. Only grapevine was a good host. Tomato (cv. Ventura), celeri and mulberry were very poor hosts and may be useful in lowering *X.index* populations.

371. **Coiro, M.I., F. Lamberti, A. Agostinelli, and M.E. Vindimian.** 1989. I Longidoridae nei vigneti del Trentino. II: Il genere *Xiphinema* Cobb (Longidorid nematodes in the vineyards of the province of Trento. II: The genus *Xiphinema* Cobb). Nematol. medit. **17**:139-148.
Keywords :grapevine; nematode; survey; *Xiphinema; Xiphinema vuittenezi; Xiphinema index; Xiphinema pachtaicum; Xiphinema brevicolle;* occurrence; Italy;
Notes : In Italian, Eng.sum. Four species of the genus *Xiphinema* were found as a result of a survey made in the eighties in the province of Trento. *X.vuittenezi* was the most common species occurring throughout the province. *X.index* came next in prevalence, but was found only in Valsugana. *X.pachtaicum* was less common, and *X.brevicolle* occurred in low numbers, mainly in old vineyards growing on hills.

372. **Coiro, M.I., C.E. Taylor, M. Borgo, and F. Lamberti.** 1990. Resistance of grapevine rootstocks to *Xiphinema index*. Nematol. medit. **18**:119-121.
Keywords :grapevine; *Xiphinema index;* Longidoridae; rootstock; resistance; nematode; vector; Italy;
Notes :*Vitis candicans* is interesting as a source of resistance to *Xiphinema index* feeding. The resistance of the rootstock Dog Ridge is confirmed.

373. **Coiro, M.I., C.E. Taylor, and F. Lamberti.** 1987. Population changes of *Xiphinema index* in relation to host plant, soil type and temperature in southern Italy. Nematol. medit. **15**:173-181.
Keywords :grapevine; *Xiphinema index;* Longidoridae; nematode; host range; multiplication; temperature; Italy;
Notes : Fig and grapevine were both good hosts for *Xiphinema index* and peak populations of about 200 nematodes per ml of soil were reached in the glasshouse about 15 months after inoculation of pots (16 cm diameter) with 100 females. In the screenhouse, the peaks were slightly lower, but were reached after the same time. Population then declined. There were about two generations per year in the screenhouse and four in the glasshouse. Population densities were similar in sand and loam, but lower in clay soil.

374. **Coiro, M.I., C.E. Taylor, and F. Lamberti.** 1990. Reproduction of two populations of *Xiphinema index* in relation to host and temperature. Nematol. medit. **18**:117-118.
Keywords :grapevine; *Xiphinema index;* Longidoridae; nematode; biology; host range; temperature; Italy;
Notes : Two populations of *Xiphinema index* from Italy and from USA were compared for their rate of reproduction at various temperatures and host ranges, in pots in glasshouse. Both populations reproduced on fig, but not on *Petunia hybrida*. Only the USA population reproduced on tomato. Reproduction occurred at 22^{o} and 29^{o} C., but not at 15^{o} or 36^{o} C.

375. **Conradie, F.H.J., G.J. Le R. Kriel, and D.J.L. Visser.** 1989. Practical experience with heat treated clonal material in the Republic of South Africa, p. 165-168. In E. Tanne (ed.), Proceedings of the 9th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG), Kiryat Anavim, Israel, September 1987. The Volcani Center, P.O. Box 6, Bet Dagan , Israel.
Keywords :grapevine; heat therapy; virus elimination; stem grooving; rugose wood; leafroll; fleck; corky bark; performance; South Africa; meeting; ICVG;
Notes : The performance of heat treated and non-heat treated clones of 8 cvs. were compared in a field trial which was established in 1979. Harvesting results of 1982 to 1987 were recorded. Heat treated clones perform clearly better than non-heat treated ones: higher production, more vigourous growth, higher sugar content. The problem will be to control the vegetative growth in order to maintain the quality of wine. Reducing irrigation may be one of the solutions. The initial clonal material (non-heat treated) was infected with several viruses, listed in the abstract of the same paper (Phytoparasitica 17, 73-74): fleck, leafroll, corky bark, stem grooving. Interestingly, most of the affinity problems that existed with the original material and certain rootstocks disappeared once the same material had been heat treated.

376. **Conradie, F.J., G.J. Le R. Kriel, N.A. Spreeth, and D.J.L. Visser.** 1989. The influence of heat treatment on clonal material. Phytoparasitica **17**:73-74.
Keywords :grapevine; virus elimination; fleck; leafroll; rugose wood; corky bark; stem grooving; heat therapy; performance; South Africa; meeting; ICVG;

Notes : This paper appears in full under a different title in the Proceedings of the 9th meeting of ICVG, Kiryat Anavim, Israel, 1987, 165-168 (1989).

377. **Conradie, F.J. and D.J.L. Visser.** 1986. The influence of heat treatment on clonal material. Wynboer Tegnies *(14):* 15-17.
Keywords :grapevine; heat therapy; virus elimination; performance; yield; quality; South Africa;
Notes : Comparison of heat treated and non heat treated material. Heat treatment increases vigour, also yield by 3-4 t./ha, maturity of grapes is earlier, sugar content higher, acidity lower, pH higher. No mention is made of the viruses eliminated in heat treated clones and of those still present in controls.

378. **Conti, M.** 1986. Micoplasmi ed altri procarioti intracellulari, agenti fitopatogeni di crescente interesse (Mycoplasms and other intracellular prokaryotes, phytopathogenic agents of increasing interest). Ann. Accad. Agric. Torino **129**:25-41.
Keywords :phytoplasma; phytoplasma disease; prokaryote; review; general; Italy;
Notes : In Italian. Review on the main diseases caused by mycoplasmas and other intracellular prokaryotes.

379. **Conti, M.** 1991. Studies on a yellows-type disease of "Chardonnay" grapevine in Tuscany, p. 155-163. In I. C. Rumbos, R. Bovey, D. Gonsalves, W. B. Hewitt, and G. P. Martelli (ed.), Proceedings of the 10th Meeting of the International Council for the Study of Viruses and Virus Diseases od the Grapevine (ICVG). Plant Protection Institute, P.O. Box 303, 38001 Volos, Greece.
Keywords :grapevine; phytoplasma disease; graft transmission; leafhopper; *Euscelis incisus;* elm yellows; chrysanthemum yellows; symptoms; electron microscopy; Italy; meeting; ICVG;
Notes : Description of a yellows-like disease in Tuscany. The symptoms resemble those of "vein yellowing leafroll" and of other yellows- like diseases described in Italy. *Scaphoideus titanus*, vector of FD in France, was never found in affected vineyards. Attempts to transmit the disease by means of other leafhoppers captured in affected vineyards were negative. The disease was transmitted from diseased to healthy Chardonnay grapevine by graft. Attempts to transmit yellows from Chardonnay to elm (*Ulmus campestris*) by cleft-graft gave negative results, but healthy Chardonnay inoculated by cleft-graft from elm yellows-infected elm showed severe crinkling and thickening of the leaves one year after inoculation. Similar symptoms were obtained when healthy Chardonnay were exposed to feeding by *Euscelis incisus* infected with Chrysanthemum yellows MLOs.

380. **Conti, M.** 1991. Yellows-type diseases of grapevine in Italy. Phytoparasitica **19**:238.
Keywords :grapevine; phytoplasma disease; vector; *Scaphoideus titanus;* Italy;
Notes : Abstract. *Scaphoideus titanus*, vector of FD in France, has been recorded in the northern provinces of Italy where yellows diseases of the FD-type occur, but not in central and southern Italy where yellows diseases also occur. The author concludes that other vectors of grapevine yellows are present in Italy.

381. **Conti, M., C. Minucci, V. Territo, and G. Boccardo.** 1997. Epidemiology of grapevine die-back disease in Liguria, northern Italy, p. 61-62. In O. A. Sequeira,de, J. C. Sequeira, and M. T. Santos (ed.), Extended abstracts 12th Meeting ICVG, Lisbon, Portugal, 29 September-2 October 1997. Dept.Plant Pathology, Estação Agronomica Nacional, Oeiras, Portugal.
Keywords :grapevine; phytoplasma disease; aster yellows; elm yellows; flavescence dorée; vector; survey; leafhopper; *Scaphoideus titanus;* epidemiology; control; Italy; meeting; ICVG;
Notes : A severe phytoplasma disease is the cause of a severe dieback of grapevine called "Moria della vite" in Liguria, in northern Italy. It was first recorded in 1990, and spread rapidly in 1992-95, causing dramatic damage in affected vineyards. Surveys were carried out in eastern Liguria, in order to identify the phytoplasmas responsible for the disease. Samples of grapevine were collected at monthly intervals in infected vineyards, as well as from wild plants suspected to be reservoirs of infection. They were analysed for the presence of phytoplasmas by PCR- RFLP. Bait plants of *Catharanthus roseus* were placed in vineyards for one month, brought back in the screenhouse and checked for phytoplasmas by PCR-RFLP if symptoms of yellows appeared. Two different phytoplasmas were detected, one belonging to the aster yellows group, the other to the elm yellows group which includes flavescence dorée. So far, they were found

only in single infection. Phytoplasmas belonging to the aster yellows group were detected in several weeds and shrubs, mostly *Rubus fructicosus* and *Spartium junceum.* Populations of leafhoppers were monitored and the species determined. Several of them were known vectors of phytoplasmas.

382. **Courtois, N., F. Gaire, M.C. Mauro, S. Toutain, M. Burrus, L. Pinck, B. Walter, J. C. Audran, and B. Duteurtre.** 1997. Electroporation of grapevine protoplasts: inoculation of GFLV into grapevine for the screening of transgenic plants, p. 133-134. In O. A. Sequeira,de, J. C. Sequeira, and M. T. Santos (ed.), Extended abstracts 12th Meeting ICVG, Lisbon, Portugal, 29 September-2 October 1997. Dept.Plant Pathology, Estação Agronomica Nacional, Oeiras, Portugal.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; transgenic; *in vitro;* electroporation; protoplast; infection; France; meeting; ICVG;
Notes : The selection of GFLV-resistant rootstocks obtained by traditional breeding or by genetic engineering is difficult because it is necessary to inoculate candidate clones with the virus, an operation that requires graft or nematode transmission. The authors have developed a new way of inoculating GFLV into grapevine based on protoplast electroporation in order to identify GFLV- resistant clones. This method provides an efficient and rapid assay of GFLV resistance.

383. **Cousin, M.T.** 1995. Phytoplasmes et phytoplasmoses (Phytoplasmas and phytoplasma diseases). Agronomie **15**:245-264.
Keywords :grapevine; sanitary selection; control; phytoplasma disease; phytoplasma; review; classification; general; France;
Notes : The main characteristics of phytoplasmas (formerly called mycoplasmalike organisms, MLOs) and their phylogenetic position in relation with bacteria, mycoplasma, spiroplasma and viruses are described. Recent progress on knowledge of ribosomal DNA (16S and intergenic spacer 16S 23S), which has provided a better understanding of the taxonomic situation of phytopalsmas, is reviewed. Several groups can be characterized. The possibilities of control are discussed: sanitary selection, control of vector populations, search for natural resistance or resistance induced by genetic engineering. (A similar paper by the same author and under the same title appeared in Phytoma-La Défense des végétaux No 472, 22-30, 1995).

384. **Côrte, G. and A. Mendonça,de.** 1985. Importance de la culture de méristèmes pour la multiplication accélérée de clones de vigne exempts de virus. (Importance of meristem culture for quick multiplication of virus-free grapevine clones). Bull. OIV **58**:396-402.
Keywords :grapevine; *in vitro;* meristem tip culture; virus elimination; propagation; virus-free material; Portugal;
Notes : In French.

385. **Cravedi, P., P. Cervato, E. Mazzoni, and A. Libè.** 1993. Ricerche sulla diffusione di *Scaphoideus titanus* Ball (Homoptera: Cicadellidae) in vigneti della provincia di Piacenza (Research on the occurrence of *Scaphoideus titanus* Ball in vineyards of the Piacenza province). Annali Fac. Agr. Univ. Milano **33**:131-149.
Keywords :grapevine; phytoplasma disease; flavescence dorée; epidemiology; vector; leafhopper; *Scaphoideus titanus;* survey; occurrence; Italy;
Notes : A survey was carried out in vineyards of the province of Piacenza (northern Italy) on the occurrence and relative abundance of *Scaphoideus titanus* using yellow sticky traps. There was no correlation between the amount of *S.titanus* caught in vineyards and the percentage of grapevine with yellows symptoms.

386. **Cravedi, P., E. Mazzoni, and P. Cervato.** 1993. Osservazioni sulla biologia di *Scaphoideus titanus* Ball (Homoptera: Cicadellidae) (Observations on the biology of *Scaphoideus titanus* Ball (Homoptera:Cicadellidae)). Redia **76***(1):*57-70.
Keywords :grapevine; phytoplasma disease; flavescence dorée; vector; leafhopper; *Scaphoideus titanus;* occurrence; biology; Italy;
Notes : *Scaphoideus titanus* was found in eight vineyards of the Piacenza province and in neighbouring areas of two other provinces. A research was made on the occurrence and population density

of this insect using colour traps. The biology and ethology of the leafhopper is outlined.

387. **Credi, R.** 1989. Flavescenza dorata della Vite in Emilia Romagna: evoluzione della malattia nelle piante e suoi effetti sulla produzione e sullo sviluppo vegetativo (Flavescence dorée in Emilia Romagna: evolution of the disease in plants and effects on production and vegetative development). Phytopath. medit. **28**:113-121.
Keywords :grapevine; phytoplasma disease; flavescence dorée; symptoms; yield; growth; performance; economic importance; Italy;
Notes : Study of the reaction of 5 grapevines cvs. to natural infection with a flavescence dorée- like disease in 3 areas of Emilia-Romagna. Symptoms were similar to those reported in France. Recovery of infected vines was observed in a proportion varying from 8.6 to 85%, but this proportion was 91 to 100% in a vineyard where scions had been cut back above graft union after a frost. Losses in yield were about 47% for severely affected vines, 21% for slightly affected vines and 11% for recovered vines. The possibility of an interference of flavescence dorée with GFLV infection is discussed.

388. **Credi, R.** 1989. Virus-like symptoms on *Physalis floridana* approach-grafted with shoots of diseased grapevine plants. Phytoparasitica **17**:75-76.
Keywords :grapevine; graft transmission; *Physalis floridana;* Italy; meeting; ICVG;
Notes : Abstract.This paper appears in full in the Proceedings of the 9th meeting of ICVG, Kiryat Anavim, Israel, 1987, 197-202 (1989).

389. **Credi, R.** 1989. Virus-like symptoms on *Physalis floridana* approach-grafted with shoots of diseased grapevine plants, p. 197-202. In E. Tanne (ed.), Proceedings of the 9th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG), Kiryat Anavim, Israel, September 1987. The Volcani Center, P.O. Box 6, Bet Dagan , Israel.
Keywords :grapevine; virus-like diseases; symptoms; graft transmission; *Physalis floridana;* Italy; meeting; ICVG;
Notes : An unidentified pathogen was transmitted by approach-grafting of healthy *Physalis floridana* with shoots of grapevine with various types of sanitary states. The symptoms on *P. floridana* were of the virus type, but differed from any known virus disease. No pathogen could be isolated, identified or observed by classical means. No similar symptoms occurred in controls.

390. **Credi, R.** 1993. Differential indexing trials on grapevine rugose wood syndromes, p. 63. In P. Gugerli (ed.), Extended abstracts 11th Meeting ICVG, Montreux, Switzerland, 6-9 September 1993. Federal Agricultural Research Station of Changins, CH-1260 Nyon, Switzerland.
Keywords :grapevine; rugose wood; rupestris stem pitting; Kober stem grooving; LN 33 stem grooving; corky bark; occurrence; indexing; Italy; meeting; ICVG;
Notes :22 infected clones of 15 different cvs. were used for a graft indexing with *Vitis rupestris*, Kober 5 BB and LN 33 as indicators. 6 clones were shown to be affected with rupestris stem pitting (RSP) alone, 2 with Kober stem grooving (KSG), 1 with LN 33 stem grooving (LNSG), 8 with RSP+KSG, 1 with KSG+LNSG, 4 with RSP+KSG+LNSG. The presence of corky bark was not definitely ascertained.

391. **Credi, R.** 1993. Dodder transmission and *in situ* detection of MLOs associated with a grapevine yellows-type disease. Phytopath. medit. **32**:84.
Keywords :grapevine; phytoplasma disease; phytoplasma; transmission; dodder; periwinkle; electron microscopy; detection; Italy;
Notes : Abstract of a paper presented at a Workshop on Fruit and Grapevine Mycoplasma Diseases, Bologna, Italy, September 1993. Four out of 628 periwinkles connected by dodder with yellows-diseased grapevine shoots developed typical symptoms of phytoplasma disease. Thin sections examined in the electron microscope revealed the presence of typical MLOs, which are supposed to be the agents of the yellows disease in grapevine.

392. **Credi, R.** 1994. Mycoplasma-like organisms associated with a grapevine yellows disease occurring in Italy. J. Phytopathol. **141**:113-120.

Keywords :grapevine; phytoplasma; phytoplasma disease; electron microscopy; Italy;
Notes : Description of MLO structures observed by transmission electron microscopy in mature sieve tube elements of leaf veins of *Vitis vinifera* showing symptoms simlar to those of flavescence dorée in northern Italy. In general, the concentration of MLOs was very low, although large populations were found colonizing almost the entire lumen of two cells. The MLOs varied in size, shape and electron opacity. The bodies showed the typical ultrastructural details of other known plant pathogenic MLOs.

393. **Credi, R.** 1994. Occurrence of anomalous mycoplasma-like organisms in grapevine yellows-diseased phloem. J. Phytopathol. **142**:310-316.
Keywords :grapevine; phytoplasma disease; phytoplasma; flavescence dorée; cytopathology; ultrastructure; electron microscopy; symptoms; Italy;
Notes : Changes of pathological nature in the structure of phloem cells of leaves of *Vitis vinifera* cv. Caveccia showing symptoms of flavescence dorée-like disease were studied with the electron microscope. They consisted of obliteration, necrosis and collapse of the sieve elements and companion cells, presence of excessive callose accumulation in sieve plates of apparently normal sieve elements. The significance of these findings is discussed.

394. **Credi, R.** 1995. Epidemiological observations on grapevine enation disease in Emilia-Romagna (Italy). Phytopath. medit. **34**:88-92.
Keywords :grapevine; enation; epidemiology; symptoms; distribution; occurrence; Italy;
Notes : Epidemiological observations were made on enation disease of grapevine in a large vineyard of 645 vines of a clone of cv. Trebbiano Romagnolo grafted on SO4 rootstock. Over a 7 year period (1988-1994) the incidence of affected plants varied from 23.2% to 7.2%. There was a lot of symptom variation from a year to another year. The disease does not seem to spread within the vineyard, or if so, very little. It is probably brought from external sources, possibly with the graftwood or the rootstocks.

395. **Credi, R.** 1995. Graft-transmission of grapevine enation disease in Emilia-Romagna. Adv. Hort. Sci. **9**:167-169.
Keywords :grapevine; enation; graft transmission; Italy;
Notes : Investigations were carried out on graft transmission of enation disease in Emilia Romagna (northern Italy) with the cv. Trebbiano Romagnolo, a highly susceptible cv. The infected clone used for this trial had a symptom incidence in the field of 23.2% and 11.8 % in 1988 and 1989 respectively. It was used as rootstock and bench-grafted with heat treated virus-free Trebbiano Romagnolo, during the winter of 1989-1990. The vegetation was inspected for enation symptoms from 1990 to 1994. The disease was successfully transmitted. The highest proportion of vines with symptoms on the scion leaves was 6.1 %, in the first year (1990), and the same group had 5.9 % of vines with enation in the second year. In the three following years, no grafted vine showed symptoms of enation.

396. **Credi, R.** 1996. Effetto della malattia delle enazioni della vite sulla produzione e sullo sviluppo vegetativo nella cv. Trebbiano Romagnolo (Effect of enation disease of grapevine on the yield and growth of cv. Trebbiano Romagnolo). Petria **6**:59-64.
Keywords :grapevine; enation; economic importance; yield; performance; Italy;
Notes : The effect of enation disease on yield and growth of grapevine was evaluated over a 4-yr. period (1990-1993) in the region of Ravenna, Emilia-Romagna, Italy. The greatest reduction in yield occurred in the first two years of symptom occurrence, with yield losses from 10-72%, and the mean yield reduction over the whole period ranged from 13-20% .The differences in pruning wood weight were not significant.

397. **Credi, R.** 1997. Characterization of grapevine rugose wood disease sources from Italy. Plant Disease **81**:1288-1292.
Keywords :grapevine; rugose wood; etiology; survey; rupestris stem pitting; Kober stem grooving; grapevine fleck virus; GLRaV-1; GLRaV-3; GVA; closterovirus; vitivirus; Italy;
Notes : Budwood from 27 sources of grapevine rugose wood disease (RW) from northern Italy were graft-inoculated by chip budding to three *Vitis* indicators (*V.rupestris* St.George, Kober 5BB, LN33). After 3 or 4 years, the stems of the indicators were peeled and examined for rugose wood symptoms. Nine isolates

induced pitting only on St.George, four only on Kober 5BB. Three of the remaining isolates induced wood symptoms on LN33 and Kober 5BB, seven on St.George and Kober 5BB and four on the three indicators. ELISA tests revealed the presence of following viruses in the RW sources: GFkV, GLRaV 1 and 3, GVA. These results are discussed, and confirm the complex nature and etiology of rugose wood

398. **Credi, R.** 1997. Indexing tests on a grapevine rugose wood disease and mechanical transmission of two associated viruses. Phytopath. medit. **36**:1-7.
Keywords :grapevine; rugose wood; corky bark; etiology; indexing; immunoassay; ELISA; closterovirus; GLRaV-1; vitivirus; GVA; GVB; Italy;
Notes :A rugose wood-affected clone of the cv. Grapello was indexed by grafting with different woody indicators, tested by ELISA with several antisera to grapevine viruses, and by mechanical inoculation on herbaceous hosts. Xylem grooving and pitting symptoms were obtained on Kober 125AA, Kober 5BB, *V.rupestris* St. George, and 110 Richter. Leaf and cane symptoms typical for corky bark also developed on 125AA. LN33 showed no wood abnormalities. GLRaV-1 and GVA were detected by ELISA in grapevine extracts. A filamentous virus mechanically transmitted from Grapello grapevines to *Nicotianana benthamiana* and *N.occidentalis* was identified by ISEM as GVB.

399. **Credi, R. and A.R. Babini.** 1987. Miglioramento sanitario della vite ed incidenza di alcune malattie da virus e virus-simili nelle regioni dell'Emilia- Romagna e Piemonte (Sanitary selection of grapevine and incidence of some virus and virus-like diseases in Emilia-Romagna and Piedmont). Schw. landw. Forschung/La Recherche agronomique en Suisse **26**:328-331.
Keywords :grapevine; sanitary selection; indexing; fanleaf; nepovirus; leafroll; rugose wood; stem pitting; fleck; vein necrosis; vein mosaic; corky bark; occurrence; Italy;
Notes : In Italian, Eng. sum. 597 visually selected candidate clones of 48 cvs. were indexed on woody indicators, with following results: vein necrosis 71.6%; leafroll 38.3%; fleck 27.3%; stem pitting 22.4%; vein mosaic 17.9%; fanleaf 8.6%; corky bark 0.3%; free of theses diseases 5.6%.

400. **Credi, R. and A.R. Babini.** 1987. Attempted transmission of the pathogem causing a grapevine yellows disease in Italy, p. 177-178. In Proc. 7th Congress of the Mediterranean Phytopathological Union, Granada, Spain, 20-26 September 1987.
Keywords :grapevine; phytoplasma disease; graft transmission; Italy;

401. **Credi, R. and A.R. Babini.** 1996. Effect of virus and virus-like infections on the growth of grapevine rootstocks. Adv. Hort. Sci. **10**:95-98.
Keywords :grapevine; virus; virus-like diseases; growth; rootstock; closterovirus; GLRaV-1; GLRaV-3; rupestris stem pitting; rugose wood; Kober stem grooving; vein mosaic; vein necrosis; fleck; nepovirus; grapevine fanleaf virus; performance; economic importance; Italy;
Notes : The effect of some grapevine viruses and virus-like diseases on 420A, Kober 5BB and Teleki 5A was studied in a field trial in Italy. The rootstocks were infected by grafting different inoculum sources containing combinations of commonly occurring viruses and virus-like diseases. Over a 8-year period, a great reduction in plant growth was observed (79-89%) with GFLV + GLRaV-3. Kober stem grooving (KSG)+Rupestris stem pitting(RSP)+GLRaV-3+vein necrosis (VN) caused a reduction of 42-57% in cane weight. KSG+RSP+GLRaV-1+vein mosaic (VM) caused a decrease in growth of 66% in 420A and 48% in Kober 5BB, but no significant effect on Teleki 5A. Fleck+VM+VN caused a decrease in growth of 51% in 420A and 37% in Kober 5BB, but again Teleki 5A appeared to be tolerant to infection.

402. **Credi, R. and A.R. Babini.** 1997. Effects of virus and virus-like infections on growth, yield, and fruit quality of Albana and Trebbiano Romagnolo grapevines. Amer. J. Enol. Vitic. **48**:7-12.
Keywords :grapevine; virus; virus-like diseases; performance; economic importance; growth; yield; nepovirus; grapevine fanleaf virus; closterovirus; GLRaV-1; GLRaV-3; rugose wood; rupestris stem pitting; Kober stem grooving; vein mosaic; vein necrosis; fleck; Italy;
Notes : The effects of some grapevine viruses and virus-like diseases on performance of cvs. Albana and Trebbiano Romagnolo were studied in a field trial in the Emilia Romagna region (northern Italy). Plant growth and yield were studied over a period of seven years (1987-1993). Fruit maturity indices (^{o}Brix,

titrable acidity and pH) were measured from 1988 to 1993. Seven infected clones were used as inoculum sources. A:GFLV+GLRaV-3. B:RW(KSG+RSP)+GLRaV-3+VM. C:RSP+VN+VM. D:VN. E:VM. F:RW (KSG+RSP)+GLRaV-1+VM. G:Fk+VN+VM.(VN=vein necrosis; VM=vein mosaic; Fk=fleck; RW= rugose wood). Sources A, B, and F, which produced visible symptoms, caused an important decrease on yield and growth. Source A decreased cumulative fruit yield by 14.2% in Albana and 80.4% in Trebbiano Romagnolo, source B by respectively 72.9 and 46.6 and source F by 21.2% in Trebbiano Romagnolo. Pruning weight was also reduced, from 17.2% to 78.1%. Infectious sources C,D,E, and G (latent or semi-latent viruses or virus-like infections) had much less influence on both yield and growth, with no significant effect. No consistent differences in fruit maturity indices were recorded in any of the inoculated cvs. although Albana vines, infected with source B showed higher sugar concentration, significant in 5 out of 6 harvests. Titrable acidity and pH were significantly lower in vines inoculated with source A.

403. **Credi, R. and A.R. Babini.** 1997. Heat-therapy of virus-infected *Vitis vinifera* cultivars in Emilia Romagna (northern Italy), p. 167. In O. A. Sequeira,de, J. C. Sequeira, and M. T. Santos (ed.), Extended abstracts 12th Meeting ICVG, Lisbon, Portugal, 29 September-2 October 1997. dept.Plant Pathology, Estação Agronomica Nacional, Oeiras, Portugal.
Keywords :grapevine; virus elimination; heat therapy; *in vitro* propagation; Italy; meeting; ICVG;
Notes : In order to obtain virus-free clonal material from old grapevine populations, heat theray was applied successfully to several local varieties that were totally infected with several viruses but were interesting for local viticulture. The average virus elimination was 65.8% (range 19.5-100%). The method combined heat treatment of rooted vines and rooting of 0.5 cm shoot tips *in vitro*.

404. **Credi, R., A.R. Babini, and C. Petrini.** 1987. Ulteriori osservazioni su una malattia della vite simile alla flavescenza dorata in Emilia-Romagna (Further observations on a disease of grapevine similar to flavescence dorée in Emilia- Romagna), p. 141-148. In S. Ruini (ed.), Atti del Convegno sulla Flavescenza Dorata della Vite, Vicenza-Verona, Maggio 1987. Fondazione Sergio Bolla, Verona.
Keywords :grapevine; flavescence dorée; phytoplasma disease; symptoms; Emilia-Romagna; Italy; meeting;
Notes : In Italian, Fr. Eng. sum.Flavescenza dorata, Vicenza-Verona meeting.

405. **Credi, R., A.R. Babini, and C. Tosi.** 1986. Osservazioni su alcuni metodi di diagnosi del virus dell'arricciamento della vite con particolare riferimento al saggio sierologico immunoenzimatico (Observations on some methods of diagnosis of grapevine fanleaf virus with special reference to serological immunoenzymatic tests), p. 479-488. In Atti Giornate Fitopatologiche 1986, Riva del Garda, 24-27 marzo 1986, vol.1. Cooperativa Libraria Universitaria Editrice Bologna (CLUEB), Bologna, Italy.
Keywords :grapevine; fanleaf; grapevine fanleaf virus; nepovirus; detection; diagnosis; immunoassay; ELISA; Italy;
Notes : In Italian, Eng. sum. Atti of a phytopathological meeting at Riva del Garda, March 1986. CLUEB.

406. **Credi, R. and D. Callegari.** 1988. Profilo epidemiologico della flavescenza dorata della Vite in Emilia-Romagna: diffusione temporale, distribuzione spaziale delle piante ammalate e gradienti d'incidenza (Epidemiologic profile of grapevine flavescence dorée in Emilia-Romagna: spread, distribution of diseased plants, incidence gradients). Phytopath. medit. **27**:90-98.
Keywords :grapevine; phytoplasma disease; flavescence dorée; epidemiology; Italy;
Notes : Survey of vineyards in Emilia-Romagna, Italy, for the presence of flavescenza dorata (a yellows disease similar to flavescence dorée), 1983-1987. The percentage of diseased plants varied from 0.1 % to 42.8 %. The distribution is both random and clustered according to Van der Planck's doublet analysis. Gradients of incidence have been observed in two vineyards. The results suggest that the disease is brought into the vineyards from outside local sources.

407. **Credi, R. and L. Giunchedi.** 1996. Grapevine leafroll-associated viruses and grapevine virus A in selected *Vitis vinifera* cultivars in northern Italy. Plant Pathology **45**:1110-1116.
Keywords :grapevine; leafroll; etiology; closterovirus; GLRaV-1; GLRaV-3; vitivirus; GVA; occurrence; indexing; detection; immunoassay; ELISA; ISEM; Italy;

Notes : Grapevine leafroll-associated virus 1 (GLRaV-1), grapevine leafroll-associated virus 3 (GLRaV-3) and grapevine virus A (GVA) were detected in grapevines in a viticultural region of northern Italy (Emilia-Romagna) using immuno-electron microscopy. The virus incidence was subsequently determined with ELISA. A total of 60.6% of the 150 clonal selections tested, from 18 local *Vitis vinifera* cultivars, were found to be infected. ELISA did not reveal the presence of grapevine leafroll-associated virus 2 (GLRaV-2) or grapevine leafroll-associated virus 5 (GLRaV-5). GLRaV-1, GLRaV-3 and GVA were found alone or in various combinations. The most common findings were GLRaV-1 alone (25.3%) or associated with GVA (33%). Serological data confirmed that the majority (91%) of the clones known to be affected by grapevine leafroll (GLR), on its own or in association with rugose wood (RW), contained viruses. On the other hand, where the RW phenomenon was present on its own, only 40% of these clones were ELISA-positive. The implications for the biology of GLR and RW are discussed and the complex aetiology of these grapevine diseases is confirmed. The presence of still unknown clostero-like viruses and possible failures of the biological indexing may explain discrepancies between the results of immunoassays and indexing on woody indicators.

408. **Credi, R. and A. Santucci.** 1991. Sviluppo epidemico della flavescenza dorata in relazione ad alcune forme di allevamento della vite (Epidemic development of flavescence dorée in relation with some grapevine training systems). Vignevini **18***(6):*33-36.
Keywords :grapevine; phytoplasma disease; flavescence dorée; epidemiology; spread; Italy;
Notes : Over a six year period, the mean disease incidence was highest (20 %) with the G.D.C. system and lowest (6.7 %) with the Guyot system.

409. **Credi, R. and A. Santucci.** 1991. Serological detection of grapevine leafroll-associated closterovirus-like particles: Apparent absence of viral antigens in leaves of graft-inoculated American rootstocks, p. 71-80. In I. C. Rumbos, R. Bovey, D. Gonsalves, W. B. Hewitt, and G. P. Martelli (ed.), Proceedings of the 10th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG). Plant Protection Institute, P.O.Box 303, 38001 Volos, Greece.
Keywords :grapevine; leafroll; GLRaV-1; GLRaV-3; closterovirus; detection; immunoassay; ELISA; electron microscopy; Italy; meeting; ICVG;
Notes :GLRaV I and III were easily detected by ELISA in leaves of graft- inoculated *Vitis vinifera* cvs. and LN33 hybrid, but not in similar extracts from *V. rupestris* St.George and other American rootstocks. Electron microscope investigations confirm these results: virus particles cannot be detected in infected rootstocks.

410. **Credi, R. and A. Santucci.** 1992. Dodder transmission of mycoplasma-like organisms (MLOs) from grapevines affected by a flavescence dorée-type disease to Periwinkle. Phytopath. medit. **31**:154-162.
Keywords :grapevine; phytoplasma; phytoplasma disease; transmission; dodder; Italy;
Notes : 628 attempts were made to transmit the agent of a yellows disease of grapevine from Sangiovese, Caveccia and Chardonnay vines to periwinkle by the dodder species *Cuscuta campestris*. Only 4 positive results were recorded (0.6%). Thin sections of mid veins and petioles of periwinkle showing symptoms revealed the presence of typical MLOs. Graft transmission was possible from periwinkle to periwinkle. Discussion on etiological significance.

411. **Credi, R., A. Santucci, and L. Martini.** 1990. Trials on graft transmission of a Grapevine flavescence dorée-like disease. Phytopath. medit. **29**:7-13.
Keywords :grapevine; flavescence dorée; phytoplasma disease; graft transmission; nursery; Italy;
Notes : Bench grafting experiments were carried out in 1988 and 1989. In 1988, scions of Chardonnay and Baco 22A with one bud were grafted onto donor stock cuttings from diseased Pinot blanc and Sangiovese. In 1989, healthy Kober 5BB were grafted with diseased scions of Chardonnay and Sangiovese. The disease was transmitted, with the highest percentage at 13.5% (healthy Chardonnay/diseased Pinot), but average transmission was 5.6% to Chardonnay, 4% to Baco 22A. Symptoms of FD were also obtained on plants developing from buds of diseased Chardonnay and Sangiovese grafted onto healthy 5BB. The significance of these results in relation with the problem of FD dissemination with nursery material is discussed.

412. **Credi, R., O. Silvestroni, A. Santucci, and A. Canova.** 1991. Variation in Grapevine rootstock susceptibility to the rugose wood disease "legno riccio". Phytopath. medit. **30**:41-46.
Keywords :grapevine; legno riccio; stem pitting; corky bark; rugose wood; rootstock; varietal sensitivity; Italy;

413. **Crespy, A.** 1996. La Flavescence dorée en Espagne (Flavescence dorée in Spain). Progr. Agric. Vitic. **113**:470.
Keywords :grapevine; flavescence dorée; phytoplasma disease; occurrence; Spain;
Notes : In French. Important zones of infection of grapevines by flavescence dorée were observed recently in vineyards of the region of Gerone, Ampurdan and Costa Brava.

414. **Cupidi, A. and M. Barba.** 1986. Miglioramento sanitario della vite: germinazione di vinaccioli e coltura di microtalee (Sanitary improvement of grapevine: germination of seedlings and culture of microcuttings). Ann. Ist. sperim. Patol. veget. Roma **11**:41-46.
Keywords :grapevine; sanitary selection; *in vitro;* micropropagation; method; Italy;
Notes : A good method of culture of seedlings and microcuttings of grapevine is described. Small cuttings 6 mm long, with one node, were taken on green shoots, cultured *in vitro* on modified MS-medium in agar. There was 90% success with cuttings.

415. **Cupidi, A. and M. Barba.** 1993. Optimization of *in vitro* micrografting: Italian experience, p. 179. In P. Gugerli (ed.), Extended abstracts 11th Meeting ICVG, Montreux, Switzerland, 6-9 september 1993. Federal Agricultural Research Station of Changins, CH-1260 Nyon, Switzerland.
Keywords :grapevine; micrografting; *in vitro;* method; Italy; meeting; ICVG;

416. **Cupidi, A. and M. Barba.** 1993. Ottimizzazione del microinnesto *in vitro* per il risanamento della vite (Optimization of *in vitro* micrografting for grapevine sanitation). Vignevini **20***(4):*43-46.
Keywords :grapevine; *in vitro;* micrografting; virus; virus-like diseases; virus elimination; control; Italy;
Notes : This paper deals with improvements of *in vitro* micrografting technique applied to grapevine in order to eliminate viruses and virus-like diseases.

417. **D'Khili, B.** 1994. Etudes morphologiques, histochimiques et enzymologiques de l'incompatibilité au greffage chez la vigne. Recherche de techniques de caractérisation précoce (Morphological, histochemical and enzymological studies on graft incompatibility in grapevine. Research of early diagnosis methods). Ecole Nationale Supérieure d'Agronomie, Montpellier (France), 137 p.
Keywords :grapevine; incompatibility; diagnosis; symptoms; morphology; histochemistry; enzymology; France; thesis;
Notes : PhD Thesis in Agronomic Science, Viticulture, National Agronomic High School of Montpellier, France.

418. **D'Khili, B., D. Boubals, and S. Grenan.** 1994. Etude de l'incompatibilité au greffage chez la vigne. Cas des clones de variétés de *V. vinifera* L. greffés sur le 3309 Couderc *(V.riparia x V.rupestris)* (Study of graft-incompatibility in grapevine. The case of clones of *V.vinifera* L. varieties grafted onto 3309 Couderc *[V.riparia x V.rupestris]*). Progr. Agric. Vitic. **111**:411-414.
Keywords :grapevine; incompatibility; etiology; rootstock; *Vitis vinifera;* graft; France;
Notes : In French.

419. **D'Khili, B., D. Boubals, and S. Grenan.** 1994. Etude de l'incompatibilité au greffage chez la vigne (Study on graft incompatibility in grapevine). Progr. Agric. Vitic. **111**:351-359.
Keywords :grapevine; incompatibility; France;
Notes : In French. This is a review of graft incompatibility problems in grapevine. No mention is made of the possiblity of a viral etiology.

420. **D'Khili, B., D. Boubals, and S. Grenan.** 1996. Etude de l'incompatibilité au greffage chez la vigne (Study of grafting incompatibility in grapevine). Bull. OIV **69**:757-780.

Keywords :grapevine; incompatibility; micrografting; *in vitro;* green grafting; virus; method; comparison; France;
Notes : In French, Eng. sum. This study is aimed at better understanding incompatibility phenomena between some clones of *Vitis vinifera* and the rootstock 3309 Couderc *(V.riparia x V.rupestris)*, Syrah clone 101 on SO4 clone 5 *(V.riparia x V.berlandieri)* or Jaoumet on 57 Richter *(V.rupestris x V.berlandieri)*. Three grafting techniques were used: *in vitro* micrografting, green grafting and woody grafting. The possible role of a viral agent is discussed in the case of the incompatibility of Syrah grafted on SO4. This does not seem to be the case with *V.vinifera* on 3309. In the case of Jaoumet on 57 Richter, the cause of incompatibility seems to be an hormonal imbalance, as the addition of auxin to the medium of culture in micrografts experiments removes incompatibility.

421. **D'Khili, B. and S. Grenan.** 1995. Diagnostic rapide de la nécrose des nervures par la technique de microgreffage de tiges *in vitro* (Rapid diagnosis of vein necrosis using *in vitro* micrografting of shoots). J. Int. Sci. Vigne et Vin **29**:11-15.
Keywords :grapevine; vein necrosis; detection; diagnosis; micrografting; *in vitro;* sanitary selection; France;
Notes : In French, Eng. sum. Typical symptoms can be obtained on 110R in 30 days. The method is valuable for sanitary selection.

422. **D'Khili, B., S. Grenan, D. Boubals, and R. Boidron.** 1993. Graft incompatibility between grapevine clones: technical approach, p. 178. In P. Gugerli (ed.), Extended abstracts 11th Meeting ICVG, Montreux, Switzerland, 6-9 September 1993. Federal Agricultural Research Station of Changins, CH-1260 Nyon, Switzerland.
Keywords :grapevine; incompatibility; *in vitro;* green grafting; micrografting; France; meeting; ICVG;

423. **D'Khili, B., N. Michaux-Ferrière, and S. Grenan.** 1995. Etude histochimique de l'incompatibilité au microgreffage et greffage de boutures herbacées chez la vigne (Histochemical study of micrografting and green grafting incompatibility of grapevines). Vitis **34**:135-140.
Keywords :grapevine; incompatibility; histochemistry; detection; green grafting; micrografting; France;
Notes : In French, Eng.sum. This study of histochemical aspects of graft incompatibility is not directly related with virus-mediated incompatibility phenomena. The absence of vascular continuity always leads to incompatibility. However, the successful connection of vascular bundles is not necessarily sufficient for a successful graft. An uneven repartition of starch between graft and rootstock is typical for incompatibility, but it cannot be used for an early detection. Peroxydase activity cannot be used for a rapid characterization of incompatibility.

424. **da Camara Machado, A., R. Goelles, R. Moser, H. Katinger, and M. Laimer Da Camara Machado.** 1997. Biotechnical approaches to grapevine virus resistance breeding, p. 132. In O. A. Sequeira,de, J. C. Sequeira, and M. T. Santos (ed.), Extended abstracts 12th Meeting ICVG, Lisbon, Portugal, 29 September-2 October 1997. Dept.Plant Pathology, Estação Agronomica Nacional, Oeiras, Portugal.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; transgenic; breeding; Austria; Portugal; meeting; ICVG;

425. **Daire, X.** 1994. Détection et différenciation de mycoplasma-like organisms (MLO) associés aux maladies de la vigne de type jaunisse (Detection and differentiation of mycoplasma-like organisms (MLO) associated with grapevine yellows diseases). PhD thesis, Université de Bourgogne, UFR des Sciences de la Vie, Dijon, France.
Keywords :grapevine; phytoplasma disease; detection; identification; nucleic acid assay; immunoassay; phytoplasma; thesis; France;
Notes : PhD thesis, University of Dijon, France. In French.

426. **Daire, X., E. Boudon-Padieu, A. Bervillé, B. Schneider, and A. Caudwell.** 1992. Cloned DNA probes for detection of grapevine Flavescence dorée mycoplasma-like organism (MLO). Ann. Appl. Biol. **121**:95-103.
Keywords :grapevine; phytoplasma disease; flavescence dorée; phytoplasma; detection; nucleic acid assay; dot blot hybridization; DNA probe; France;
Notes : Total DNA from FD-diseased broadbean was centrifuged in a bisbenzimide-CsCl density gradient. Low density DNA was collected from the gradient, digested with *Hind*III, ligated into plasmid pUC18 and cloned in *E.coli*. Transformants were differentially screened by colony hybridization with 32P-labelled healthy and FD-infected leafhopper DNA as probes. The selected clones were shown to carry inserts which all hybridized with FD-diseased host DNA and not with DNA from healthy host. These 32P-labelled inserts, used as probes in dot blot hybridization, enabled detection of FD-MLO in field-collected samples of grapevine. However, because of the low MLO titre in this plant, an MLO enrichment procedure using tissue from main leaf veins was necessary to ensure efficient DNA extraction.

427. **Daire, X., E. Boudon-Padieu, E. Grenier, A. Bervillé, and A. Caudwell.** 1992. Characterization of flavescence dorée MLO using cloned DNA probes, p. 18. In IOM letters. 9th International Congress of the International Organization for Mycoplasmology, August 2-7, 1992. Ames, Iowa, USA.
Keywords :grapevine; phytoplasma disease; flavescence dorée; phytoplasma; detection; identification; nucleic acid assay; DNA probe; France;

428. **Daire, X., E. Boudon-Padieu, E. Grenier, A. Bervillé, and A. Caudwell.** 1992. Characterization of flavescence dorée MLO using cloned DNA probes. IOM Letters **2**:18.
Keywords :grapevine; flavescence dorée; phytoplasma; detection; nucleic acid assay; DNA probe; France;
Notes :9th International Congress IOM, August 2-7, Ames, Iowa, USA. (This reference duplicates preceding one).

429. **Daire, X., D. Clair, C. Kuszala, and E. Boudon-Padieu.** 1994. Detection and differentiation of grapevine yellows MLOs. IOM Letters **3**:253-254.
Keywords :grapevine; phytoplasma disease; phytoplasma; detection; identification; France;

430. **Daire, X., D. Clair, J. Larrue, and E. Boudon-Padieu.** 1997. Survey for grapevine yellows phytoplasmas in diverse European countries and Israel. Vitis **36**:53-54.
Keywords :grapevine; phytoplasma disease; phytoplasma; nucleic acid assay; PCR; RFLP; stolbur; flavescence dorée; Vergilbungskrankheit; elm yellows; France;
Notes : Phytoplasmas from 22 different origins in grapevines affected by yellows diseases were characterized using PCR-RFLP of a 16S rDNA region. Sixteen of them were from France, one from Switzerland, three from Italy, one from Spain and one from Israel. Four samples from the southern and southewestern part of France and one from Friuli-Venezia Giulia belonged to the Elm Yellows group (Flavescence dorée) all the others were of the stolbur group (Bois noir/Vergilbungskrankheit). The fact that none of these samples contained pytoplasmas belonging to the X-disease group shows that this goup probably plays a scondary role in grapevine yellows epidemics in Europe.

431. **Daire, X., D. Clair, J. Larrue, E. Boudon-Padieu, A. Alma, A. Arzone, L. Carraro, R. Osler, E. Refatti, G. Granata, R. Credi, E. Tanne, and A. Caudwell.** 1993. MLO detection by hybridization and PCR in grapevine stocks affected with grapevine yellows. Investigation on samples from various areas in different countries, p. 92. In P. Gugerli (ed.), Extended abstracts 11th Meeting ICVG, Montreux, Switzerland, 6-9 September 1993. Federal Agricultural Research Station of Changins, CH-1260 Nyon, Switzerland.
Keywords :grapevine; phytoplasma disease; flavescence dorée; etiology; occurrence; nucleic acid assay; RFLP; detection; phytoplasma; France; Friuli; Italy; meeting; ICVG;
Notes :A study with PCR and hybridization reveals that whereas samples of yellows-diseased grapevines from southern France reacted with FD-MLO specific probes, samples from northern France did not react positively. Further analysis revealed the presence of non-FD MLOs in all the samples that had tested FD negative. Two different RFLP profiles were found. FD *sensu stricto* could be detected in four grape varieties

harvested near Udine, Italy. All other samples from Italy (Bologna, Torino, Sicily) and from Israel were positive for the presence of non-FD MLOs with a constant restriction profile.

432. **Daire, X., D. Clair, J. Larrue, E. Boudon-Padieu, A. Alma, A. Arzone, L. Carraro, R. Osler, E. Refatti, G. Granata, R. Credi, E. Tanne, R. Pearson, and A. Caudwell.** 1993. Occurrence of diverse MLOs in tissues of grapevine affected by grapevine yellows in different countries. Vitis **32**:247-248.
Keywords :grapevine; phytoplasma disease; flavescence dorée; bois noir; phytoplasma; comparison; nucleic acid assay; PCR; RFLP; USA; France; Italy;
Notes : Extension of a previous work (Vitis 32, 159-163, 1993) to include samples from France, Italy, Israel and USA. Confirmation of the plurality of MLO types responsible for grapevine yellows. FD of southern France belongs to group IV, bois noir from Burgundy is similar to yellows in samples from Bologna, Torino, Sicily and Israel (group II) whereas yellows of Riesling in New York belongs to group III.

433. **Daire, X., D. Clair, J. Larrue, E. Boudon-Padieu, and A. Caudwell.** 1993. Diversity among mycoplasma-like organisms inducing grapevine yellows in France. Vitis **32**:159-163.
Keywords :grapevine; phytoplasma disease; phytoplasma; flavescence dorée; elm yellows; bois noir; diagnosis; RFLP; PCR; dot blot hybridization; nucleic acid assay; France;
Notes : Survey of grapevine samples collected in different viticultural areas in France. Analysis of MLOs' 16S RNA using PCR amplification and RFLP. Results indicate that typical flavescence dorée (FD) in southern France belongs to group IV according to Ahrens and Seemüller (1992) (elm yellows group). FDU ("flavescence dorée" of Udine, Italy) belongs to group III. Grape yellows in northern France and FD in southern France are distinct. Bois noir is perhaps caused by several distinct MLOs. This work showed the diversity in causal agents of yellows diseases of grapevine.

434. **Daire, X., D. Clair, W. Reinert, and E. Boudon-Padieu.** 1997. Detection and differentiation of grapevine yellows phytoplasmas belonging to the elm yellows group and to the stolbur subgroup by PCR amplification of non-ribosomal DNA. Eur. J. Plant Pathology **103**:507-514.
Keywords :grapevine; phytoplasma disease; phytoplasma; detection; classification; flavescence dorée; elm yellows; stolbur; PCR; RFLP; France;
Notes :RFLP analysis of non ribosomal DNA fragments of grapevine yellows phytoplasmas amplified by different primers corresponding to flavescence dorée (FD) and stolbur showed that the FD strains differed from the elm yellows strains isolated from elm. The RFLP profiles of the phytoplasmas infecting grapevine samples collected in Catalonia and the majority of those from northern Italy were of the FD type. Three other profiles were detected in grapevines from Palatinate (Germany). They were shown to correspond to the stolbur subgroup. The two primer pairs obtained from a stolbur strain, STOL4f/r and STOL11f2/r1 made it possible to detect phytoplasmas in yellows-diseased grapevines in France, Italy, Spain and Israel. Differentiation between phytoplasmas within the stolbur subgroup was not possible by RFLP.

435. **Daire, X., C. Kuszala, J. Larrue, A. Caudwell, C. Magnien, and J. Boulud.** 1993. Les jaunisses de la vigne, flavescence dorée, bois noir, etc..., en Bourgogne et dans les régions voisines (Grapevine yellows diseases, flavescence dorée, bois noir etc., in Burgundy and in neighbouring regions). Progr. Agric. Vitic. **110**:178-184.
Keywords :grapevine; phytoplasma disease; flavescence dorée; bois noir; occurrence; France;
Notes : Survey of yellows disease occurrence in Burgundy and in neighbouring regions. Patches of infection were found in Saône-et-Loire, Côte d'Or, Yonne, but not in Nièvre. The situation is rather stable. There is no clear relationship between disease occurrence and the presence of *Scaphoideus titanus*. ELISA tests were positive for flavescence dorée (FD) in Aude (taken as control FD region), negative in Burgundy, Franche-Comté and Alsace. The same results were obtained with PCR analysis. Three types of yellows seem to be present in France: FD in the South, a second type (bois noir) in Burgundy, Champagne, and Franche- Comté. In Ardèche, bois noir is detected as well as a third type, different from bois noir and FD.

436. **Daire, X., B. Schneider, E. Seemüller, S. Santoni, A. Bervillé, E. Boudon-Padieu, and A. Caudwell.** 1991. DNA cloning and detection of flavescence dorée mycoplasma-like organism (MLO), p. 484-487. In I. C. Rumbos, R. Bovey, D. Gonsalves, W. B. Hewitt, and G. P. Martelli (ed.), Proceedings of the 10th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG). Plant Protection Institute, P.O. Box 303, 38001 Volos, Greece.
Keywords :grapevine; phytoplasma disease; flavescence dorée; dot blot hybridization; detection; DNA probe; nucleic acid assay; cloning; phytoplasma; leafhopper; *Euscelidius variegatus;* France; meeting; ICVG;
Notes :6 DNA probes specific for flavescence dorée (FD) DNA were prepared from infected *Vicia faba* and *Euscelidius variegatus* leafhoppers. All of them hybridize strongly with with FD-infected host DNA but not with healthy controls. They may prove useful for diagnosis of FD in grapevine, for studying relationships of other grapevine yellows with FD and phylogenetic relationships between various plant MLOs.

437. **Danielli, A., A. Bertaccini, M. Vibio, N. Mori, E. Murari, G. Posenato, and V. Girolami.** 1996. Detection and molecular characterization of phytoplasmas in the planthopper *Metcalfa pruinosa* (Say) *(Homoptera: Flatidae)*. Phytopath. medit. **35**:62-65.
Keywords :grapevine; phytoplasma disease; transmission; leafhopper; *Metcalfa pruinosa;* detection; nucleic acid assay; PCR; RFLP; aster yellows; apple proliferation; IPVR; Italy;
Notes : This species of leafhopper is a new introduction in Europe, from its native area in North and South America. It was first recorded in Veneto in 1980 and spread rapidly in northern and central Italy. In order to detect the ability of this new species to transmit phytoplasma diseases, a study was made on the presence of mycoplamas in the bodies of *Metcalfa pruinosa* collected on weeds and in orchards in northern Italy, using nested-PCR technique. About 40% of the insects tested yielded amplification products that were genetically related to apple proliferation or aster yellows groups. RFLP analysis disclosed patterns typical for subgroups Maryland aster yellows (16SrI-B), Italian periwinkle virescence (16SrI-G) and a previously undescribed 16rI pattern, which has been also observed in *Scaphoideus titanus* Ball. Although the presence of mycoplasmas in a leafhopper does not necessarily imply a transmissibility, the results of this study show that *M. pruinosa* should be considered as a possible vector of pytoplasma diseases.

438. **Davis, R.E., A. Bertaccini, and I.M. Lee.** 1993. Biotechnological techniques in detection and differentiation of mycoplasmalike organisms isolated from naturally infected grapevines with symptoms of European yellows diseases. Phytopath. medit. **32**:86.
Keywords :grapevine; phytoplasma disease; phytoplasma; Europe; detection; nucleic acid assay; identification; dot blot hybridization; RFLP; DNA probe; *Scaphoideus titanus;* leafhopper; USA; Italy;
Notes : Abstract of a paper presented at a Workshop on Fruit and Grapevine Mycoplasma Diseases, Bologna, Italy, September 1992.

439. **Davis, R.E., A. Bertaccini, J.P. Prince, and M. Vibio.** 1993. Infection of grapevines in Emilia-Romagna by mycoplasmalike organisms (MLOs) related to Italian periwinkle virescence MLO: evidence from enzymatic amplification of MLO DNA. Phytopath. medit. **32**:149-152.
Keywords :grapevine; phytoplasma disease; detection; phytoplasma; IPVR; periwinkle; virescence; dot blot hybridization; nucleic acid assay; molecular analysis; relationship; PCR; Italy;
Notes : In a previous communication (ref. 440 below), the cloning of DNA fragments of a naturally MLO-infected periwinkle previously healthy and placed in a yellows-infected vineyard where it became infected, showing symptoms of virescence (Italian periwinkle virescence, IPVR) was described. Dot hybridization showed that IPVR MLO shared nucleotide sequence homologies with MLO strains transmitted experimentally from yellows-diseased grapevines from Apulia and Friuli-Venezia to periwinkle. It appeared that at least two distinct genomic clusters were represented by grapevine-infecting MLOs in Italy. The present communication confirms MLO infection in Chardonnay, Sangiovese and Caveccia in Emilia-Romagna. Although the MLOs were detected using a PCR designed for amplification of DNA from IPVR MLO, the precise relation of grapevine MLOs and IPVR MLOs is not yet clear.

440. **Davis, R.E., E.L. Dally, A. Bertaccini, R. Credi, I.M. Lee, R. Osler, L. Carraro, and M. Barba.** 1992. Cloned DNA probes for specific detection of Italian periwinkle virescence mycoplasmalike organism (MLO) and investigation of genetic relatedness with other MLOs. Phytopath. medit. **31**:5-12.
Keywords :grapevine; phytoplasma disease; phytoplasma; periwinkle; virescence; IPVR; detection; nucleic acid assay; dot blot hybridization; southern blot; relationship; clover phyllody; ash yellows; elm yellows; flavescence dorée; X-disease; Italy;
Notes : Healthy seedlings of *Catharanthus roseus* placed in a vineyard in northern Italy developed symptoms of phyllody and virescence of flowers indicating a possible infection by phytoplasmas. The pathogen was transmitted by grafting to healthy plants of periwinkle, and was named Italian periwinkle virescence (IPVR). DNA was extracted from these graft-inoculated plants and nucleic acid probes made with DNA cloned inserts obtained from it were used in dot and Southern hybridizations with IPVR and with other known phytoplasmas. Results indicated that a phytoplasma is associated with IPVR disease. Although IPVR was shown to share nucleotide sequence with several other diseases including X-disease, clover proliferation, ash yellows, elm yellows and flavescence dorée, IPVR phytoplasma could be distinguished from these and all other phytoplasmas studied.

441. **Davis, R.E., E.L. Dally, A. Bertaccini, R. Credi, R. Osler, V. Savino, L. Carraro, B. Di Terlizzi, M. Barba, and I.M. Lee.** 1992. RFLP analyses and dot hybridizations of chromosomal DNA distinguish two mycoplasmalike organisms (MLOs) associated with grapevine yellows disease. Phytopathology **82**:242.
Keywords :grapevine; phytoplasma disease; phytoplasma; nucleic acid assay; RFLP; dot blot hybridization; Italy;
Notes : On the basis of restricted fragment length polymorphism (RFLP) analyses and dot blot hybridization, it appears that at least two genetically different MLO yellows diseases are present in Italy.

442. **Davis, R.E., E.L. Dally, A. Bertaccini, I.M. Lee, R. Credi, R. Osler, V. Savino, L. Carraro, B. Di Terlizzi, and M. Barba.** 1993. Restriction fragment length polymorphism analyses and dot hybridizations distinguish mycoplasmalike organisms associated with *flavescence dorée* and southern European grapevine yellows disease in Italy. Phytopathology **83**:772-776.
Keywords :grapevine; phytoplasma disease; flavescence dorée; IPVR; etiology; aster yellows; nucleic acid assay; RFLP; diagnosis; detection; phytoplasma; Italy;
Notes : Biotinylated cloned DNA probes were used in dot hybridizations and RFLP analyses in order to compare MLOs associated with two grapevine yellows diseases (str. FDU of FD in northern Italy, Udine, and str. FDB of southern Italy, Apulia) and Italian periwinkle virescence (IPVR) strain G from northern Italy. Results indicated that at least two distinct MLOs are associated with grapevine yellows in Italy. FDU and FDB were shown to share some regions of DNA sequence homology with one another and with MLO strains G (IPVR) and aster yellows AY1. All four MLOs, however, are distinct. Strain FDB of southern Italy showed some similarities with strain G but was markedly different from FDU.

443. **Davis, R.E., E.L. Dally, D.E. Gundersen, and I.M. Lee.** 1996. Classification and phylogeny of Australian grapevine yellows phytoplasma. Phytopathology **86***(11 suppl.):*S43.
Keywords :grapevine; phytoplasma; phytoplasma disease; Australian grapevine yellows; classification; nucleic acid assay; PCR; RFLP; USA;
Notes : Abstract 380 A. On the basis of RFLP patterns of 16S rDNA amplified in PCR, the Australian grapevine yellows phytoplasma appears to have unique properties. It belongs to a new taxon proposed as "*Candidatus Phytoplasma solani* subsp. *australensis*"

444. **Davis, R.E., E.L. Dally, D.E. Gundersen, I.M. Lee, and N. Habili.** 1997. "*Candidatus* Phytoplasma australiense," a new phytoplasma taxon associated with Australian grapevine yellows. Internat. J. Systematic Bacteriol. **47**:262-269.
Keywords :grapevine; phytoplasma disease; phytoplasma; classification; nomenclature; flavescence dorée; Australian grapevine yellows; stolbur; RFLP; USA; Australia;
Notes : A phytoplasma detected in diseased 'Chardonnay' grapevines with symptoms of Australian grapevine yellows disease was used for PCR amplification of its DNA. This resulted in detection of phytoplasma DNA in all of the diseased plants examined but not in healthy seedling grapevines. Restriction

fragment length polymorphism (RFLP) patterns of amplified 16S ribosomal DNA differed from the patterns described for other phytoplasmas. On the basis of the RFLP patterns, Australian grapevine yellows phytoplasma was classified as a representative of a new subgroup, designated subgroup 16SrI-J, in phytoplasma 16S rRNA group 16SrI (aster yellows and related phytoplasmas). A phylogenetic study identified the Australian grapevine yellows phytoplasma as a member of a distinct subclade (subclade xii) in the phytoplasma clade of the class Mollicutes. A phylogenetic tree constructed on the basis of 16S rRNA gene sequences was consistent with the hypothesis that there was divergent evolution of Australian grapevine yellows phytoplasma and its closest known relative, European stolbur phytoplasma (subgroup 16SrI-G), from a common ancestor. The unique properties of the DNA from the Australian grapevine yellows phytoplasma clearly shows that it represents a new taxon, "*Candidatus* Phytoplasma australiense."

445. **Davis, R.E., E.L. Dally, and R. Jomantiene.** 1997. Grapevine yellows diseases: new perspectives on detection and identification of associated phytoplasmas, p. 53-54. In O. A. Sequeira,de, J. C. Sequeira, and M. T. Santos (ed.), Extended abstracts 12th Meeting ICVG, Lisbon, Portugal, 29 September-2 October 1997. Dept.Plant Pathology, Estação Agronomica Nacional, Oeiras, Portugal.
Keywords :grapevine; phytoplasma disease; phytoplasma; detection; identification; flavescence dorée; bois noir; Vergilbungskrankheit; stolbur; elm yellows; Australian grapevine yellows; molecular analysis; USA; meeting; ICVG;
Notes : So far at least four major grapevine yellows diseases have been recognized:
1. *Flavescence dorée sensu stricto* (FD), attributed to group 16SrV (elm yellows and related phytoplasmas;
2. *Bois noir* (BN), Vergilbungskrankheit (VK) and Mediterranean grapevine yellows (MeGY), attibuted to group 16SrI subgroup G (stolbur and related phytoplasmas);
3. *Australian grapevine yellows* (AGY) associated with 16 SrI subgroup J, recently named *Candidatus* Phytoplasma australiense;
4. *Virginia grapevine yellows disease* associated with a phytoplasma belonging to group 16SrIII subgroup E.
New refinements of detection and identification molecular techniques are required for a more precise determination. Beside analyses based on 16S rDNA, analyses of additional gene sequences such as ribosomal protein gene operon sequences may be useful, as well as the use of several enzymes (6 or more) in restriction analyses of 16S rDNA within a 16S rRNA gene group. Recent work in the authors' laboratory showed that the use of primer pair fSTOL/ rSTOL for stolbur in PCR may result in the amplification and detection of several mutually distinct phytoplasma other than stolbur.

446. **Davis, R.E., E.L. Dally, E. Tanne, and I.C. Rumbos.** 1997. Phytoplasmas associated with grapevine yellows in Israel and Greece belong to the stolbur phytoplasma subgroup, 16SrXII-A. Journal of Plant Pathology **79**:181-187.
Keywords :grapevine; phytoplasma; phytoplasma disease; stolbur; occurrence; classification; nucleic acid assay; PCR; RFLP; nucleotide sequence; USA; Greece; Israel;
Notes : Grapevine exhibiting symptoms of yellows disease have been observed for several years in Israel and Greece. The present study was aimed at determinig which types of phytoplasmas were responsible for these diseases, using the molecular methods of detection and diagnosis. Phytoplasma DNA was first amplified in nested polymerase chain reaction (PCR) primed by phytoplasma-universal primers known to prime amplification of 16SrDNA of phytoplasmas, and subsequent amplification was primed by group specific primers. Products from PCR were singly digested with several endonucleases and submitted to restriction fragment length polymorphism (RFLP) analysis. It results from this study that grapevine yellows in Israel and Greece are both caused by phytoplasmas belonging to the stolbur phytoplasma group 16SrXII, subgroup A.

447. **Davis, R.E. and J.P. Prince.** 1993. Grapevine yellows diseases: diverse etiologies indicated by new DNA-based methods for pathogen detection and identification -- Implications for epidemiology, p. 93-94. In P. Gugerli (ed.), Extended abstracts 11th Meeting ICVG, Montreux, Switzerland, 6-9 September 1993. Federal Agricultural Research Station of Changins, CH-1260 Nyon, Switzerland.
Keywords :grapevine; phytoplasma; phytoplasma disease; etiology; aster yellows; elm yellows; X-disease; detection; bois noir; flavescence dorée; nucleic acid assay; identification; DNA probe; dot blot hybridization; RFLP; PCR; epidemiology; USA; meeting; ICVG;

Notes : This is a review of recent work with various molecular biology methods for detecting and identifying grapevine yellows MLOs in different viticultural areas: dot hybridization using cloned MLO DNA probes, restriction fragment length polymorphism (RFLP) analysis of MLO genomic DNA, nucleotide sequencing of randomly cloned MLO DNA fragments, polymerase chain reaction (PCR), RFLP of amplified products. 13 MLO strains associated with yellows in Italy, France, Germany and USA were studied. MLOs in Italy and USA are related with aster yellows and X-disease MLOs respectively. A third group, elm yellows MLO group, may be represented by MLOs in grapevines with FD in France.

448. **Davis, R.E. and J.P. Prince.** 1994. Molecular diagnosis of mycopalsma-like organisms (MLOs) in plants - A review. Applied Biochemistry and Biotechnology **48**:23-26.
Keywords :grapevine; phytoplasma disease; flavescence dorée; phytoplasma; detection; nucleic acid assay; DNA; RFLP; PCR; aster yellows; X-disease; elm yellows; USA;
Notes : Review of diagnosis methods for plant yellows diseases. DNA based methods are among the most sensitive. They include restriction fragment length polymorphism (RFLP) and polymerase chain reaction (PCR). On the basis of studies made in the authors' laboratory, grapevine yellows appear to be caused by several different types of MLOs that can be classified with aster yellows, X-disease, and elm yellows MLO groups. These groups may overlap geographically and multiple infections may occur in individual plants, increasing the complexity of epidemiology and control.

449. **Davis, R.E., J.P. Prince, R.W. Hammond, E.L. Dally, and I.M. Lee.** 1992. Polymerase chain reaction detection of Italian periwinkle virescence mycoplasmalike organism (MLO) and evidence for relatedness with aster yellows MLOs. Petria **2**:183-192.
Keywords :grapevine; phytoplasma; phytoplasma disease; detection; classification; PCR; nucleic acid assay; aster yellows; IPVR; periwinkle; virescence; Italy;
Notes : The Italian periwinkle virescence (IPVR) MLO (strain G) was obtained originally from a naturally infected plant of *Cataranthus roseus* (L.) that had been placed as a healthy seedling in a northern Italy vineyard with vines showing symptoms of a flavescence dorée-like disease. It was shown previously to have nucleotide sequence homologies with with several other MLOs, in particular strain FDB, originating from a yellows-diseased grapevine in Apulia (Bari). In the present work, PCR amplification of MLO DNA was investigated for detection of IPVR and study its relationships with other MLOs. Oligonucleotide primer pair G35pm was designed on the basis of partial nucleotide sequences for a cloned IPVR MLO fragment. G35pm primed amplification of a 1200 base pairs DNA sequence when template consisted of total DNA extrated from IPVR-diseased plants or plants singly infected by MLOs previously classified in types II or III of the aster yellows (AY) MLO strain cluster. No MLO-specific amplification was observed when template consisted of DNA from healthy plants or plants infected by any of several MLOs classified as type I aster yellows MLOs or non-AY MLO cluster strains. Amplification of MLO-specific DNA was also observed when reaction mixtures contained DNA from IPVR MLO-infected plants and primers previously designed for cluster-specific amplification of AY MLO DNA. The results yielded detection of IPVR MLO in diseased plants, confirmed that this MLO is related to several other MLOs and indicated that it may be a member of the AY MLO strain cluster.

450. **Davis, R.E., B. Schneider, and K.S. Gibb.** 1997. Detection and differentiation of phytoplasmas in Australia. Aust. J. Agr. Res. **48**:535-544.
Keywords :grapevine; Australian grapevine yellows; phytoplasma; phytoplasma disease; PCR; RFLP; southern blot; classification; sequence analysis; Australia;
Notes : Phytoplasma ribosomal DNA from plants collected in different locations in Australia was detected in total DNA extracts by means of polymerase chain reaction (PCR), using two primer pairs P1 and P7, which amplified a 1800 base pair region of the phytoplasma genome, including the entire 16S rRNA gene, the spacer region between the 16S rRNA and 23S rRNA genes, and the start of the latter gene. Altogether 56 out of 63 plants belonging to 38 different species of 16 families contained phytoplasmas. RFLP analysis of the PCR-amplified DNA made it possible to divide the phytoplasmas into 2 groups. One of them contains the phytoplasma associated with Australian grapevine yellows and that of papaya dieback. These two phytoplasmas are both very similar to members of the aster yellows cluster. The other group contains tomato big bud group, very widespread in Australia, and sweet potato little leaf group of phytoplasmas, which are

closely related to a phytoplasma from *Crotalaria* in Thailand. The origin of Australian phytoplasmas seems to be Australasian and Asian rather than due to imports from America or Europe.

451. **de Sousa, E.** 1997. Efficiency of diagnosis of grapevine leafroll virus (GLRaV3), p. 106. In O. A. Sequeira,de, J. C. Sequeira, and M. T. Santos (ed.), Extended abstracts 12th Meeting ICVG, Lisbon, Portugal, 29 September-2 October 1997. Dept.Plant Pathology, Estação Agronomica Nacional, Oeiras, Portugal.
Keywords :grapevine; leafroll; closterovirus; GLRaV-3; detection; diagnosis; Portugal; meeting; ICVG;
Notes : Various types of samples were collected at different times of the year from vines affected with leafroll in vineyards of the Lisbon region, in order to determine the best conditions for leafroll detection by DAS-ELISA, in a research made in 1995, 1996 and 1997. Bark of one year shoot (wood shavings) was a good and convenient source in winter. Upper leaves were not suitable sources. From April to November, basal leaves, with or without symptoms, gave the most reliable results. Petiole of basal leaves were more suitable in the spring than leaf blades, but this difference disappeared during the summer and autumn. Virus infection was detected in the rachis of bunches, but not in the berries. The highest peak of ELISA readings occurred in July and August and coincided with the maximum expression of symptoms.

452. **Dechet, F.** 1991. Untersuchungen zur Wirkung von Pflanzen und Pflanzeninhaltstoffen auf *Xiphinema index* Thorne & Allen, 1950 (Nematoda, Dorylaimidae) (Research on the effects of plants and plant components on *Xiphinema index*). University of Kaiserslautern, Kaiserslautern, Germany.
Keywords :grapevine; nematode; *Xiphinema index;* biology; control; Germany;
Notes : PhD thesis (Dissertation).

453. **Dechet, F., M. Rüdel, and K.W. Eichhorn.** 1990. Untersuchungen über die Wirkung von Pflanzen und Pflanzeninhaltsstoffen auf *Xiphinema index* (Nematodae, Longidoridae)(Investigations on the effects of plants and plant components on *Xiphinema index*). Mitt. Biol. Bundesanstalt. f. Land- u. Forstwirtschaft Berlin-Dahlem *(266):*451.
Keywords :grapevine; nematode; X*iphinema index;* Longidoridae; control; Germany;
Notes : Study on the possibility of reducing the populations of *Xiphinema index* with plants *(Allium sativum, Lupinus album)* or plant extracts *(Calendula officinalis, Thymum vulgaris)* acting unfavourably on nematode survival.

454. **Decoin, M.** 1995. Flavescence dorée. La guerre des Corbières (Flavescence dorée. The war in Corbières). Phytoma - La Défense des Végétaux *(477):*26-28.
Keywords :grapevine; flavescence dorée; phytoplasma disease; leafhopper; *Scaphoideus titanus;* control; France;
Notes : In French, Eng.sum. Discussion on the problems caused by flavescence dorée in the vineyard of the Corbières region in southern France. The legal obligation to spray against the vector *Scaphoideus titanus* conflicts with the principles of biological viticulture. Abandoned vineyards have often fresh growth of infected vines which are a source of phytoplasmas and a host plant for *S.titanus.*

455. **Decoin, M.** 1997. Flavescence dorée: ne pas prendre une incubation pour une rémission... (Flavescence dorée: an incubation period should not be confused with a remission). Phytoma - La Défense des Végétaux *(498):*42-43.
Keywords :grapevine; phytoplasma disease; flavescence dorée; symptoms; hot water treatment; control; France;
Notes : The well know phenomenon of the disappearance of symptoms after a crisis may be misleading, as the pathogen is still present.The author insists on the importance of disinfecting budwood and rootstock canes with hot water wherever the disease is prevalent.

456. **Del Estal, P. and E. Vinuela.** 1991. Las cochinillas de la vid (The scale insects of grapevine). Vitivinicultura **2***(5):*42-44.
Keywords :grapevine; coccid; biology; control; Spain;

Notes : In Spanish. A description is given of the main mealybug and scale insects present on grapevine in Spain, on their biology and on control methods. Species concerned are: *Parthenolecanium corni* and *P.persicae, Pulvinaria vitis, Coccus hesperium* (Coccidae), *Planococcus citri* (Pseudococcidae). There is little mention to virus transmission.

457. **Del Serrone, P.** 1997. I "Giallumi della vite": un caso fitopatologico ancora aperto (The grapevine yellows, a phytopathological case that is still open). Petria **7**:51-62.
Keywords :grapevine; phytoplasma disease; phytoplasma; review; Italy;
Notes : In Italian. In this "Letter to the editors" the author raises the problem of the yellows diseases of grapevine. The use of nucleic acid assays made it possible to establish phylogenic relations of phytoplasmas with other Mollicutes. They belong to the Acheloplasmatales, distinct from the Mycoplasmatales, to which belong *Spiroplasma citri*. In Italy, the phytoplasmas found in grapevines belong to four distinct groups: Aster yellows, elm yellows (flavescence dorée, FD) , X disease and stolbur. The nested PCR technique made it possible to distinguish different subgroups in the aster yellows group: AY-G (alone or in combination with FD in Liguria and Emilia Romagna, AY-B in Piedmont, and AY-C in mixed infections with FD in Veneto. Stolbur, first considered as a subgroup of the aster yellows group, is now seen as a separate entity. It is the agent of bois noir in France, Vergilbungskrankheit in Germany, and is also found in grapevine in Italy and other countries. It is transmitted by the leafhopper *Hyalesthes obsoletus*. Diagnosis is based on symptoms, serology and nucleic acid assays. Symptoms are not specific, serology can be useful, especially with monoclonal antibodies, but the best tools are molecular hybridization techniques. As the phytoplasmas cannot be cultured *in vitro*, Koch's postulate has not been realized for any phytoplasma disease so far.

458. **Del Serrone, P. and M. Barba.** 1996. Giallume fitoplasmale della vite: quattro anni di esperienze in vigneti laziali (Grapevine phytolasmal yellows: four years of experiments in the vineyards of Latium), p. 30-31. In Atti Convegno Annuale SIPaV, Udine, 26-27 Settembre 1996. Società Italiana di Patologia Vegetale (SIPaV), Udine, Italy.
Keywords :grapevine; phytoplasma disease; survey; detection; nucleic acid assay; PCR; Italy;
Notes : In Italian. This paper summarizes the results of four years of research on grapevine yellows in the vineyards of Latium, the region around Rome (1992-1994). The disease was monitored by using PCR. It was shown to diffuse naturally, with a peak increase in 1993. The vegetative development of the plants suffered from the disease, but there was little mortality. A study of the insect fauna in affected vineyards revealed the presence of several species of cicadellids, but *Scaphoideus titanus* Ball was not present.

459. **Del Serrone, P. and M. Barba.** 1996. Importance of the vegetative stage for phytoplasma detection in yellows-diseased grapevines. Vitis **35**:101-102.
Keywords :grapevine; phytoplasma; phytoplasma disease; detection; nucleic acid assay; DNA probe; dot blot hybridization; Italy;
Notes : In order to improve the diagnosis of a grapevine yellows disease occurring in vineyards of Latium (Central Italy) and known to be caused by phytoplasmas related to the European aster yellows (EAY) group, a study was made at the Istituto Sperimentale per la Patologia Vegetale in Rome, with a view to determining the influence of the vegetative stage of grapevine on the detection of these micro-organisms by slot blot hybridization. A radio-labeled DNA probe (EAY 352) cloned from fragments of the EAY phytoplasma genome at the Istituto di Fitovirologia Applicata in Turin was used in this study. Six phenological stages were considered: I: leaf unfolding; II: inflorescence visible; III: flowers separated; IV: berry set; V: veraison; VI: berry ripening. Detection was attempted on crude sap or on purified DNA from either leaves or shoots. At stages I and II, phytoplasma detection was possible only with DNA extracts, and was successful with only a small percentage of samples. The hybridization signal was stronger at later stages (IV, V and VI) and good results were obtained with crude sap as well as with purified DNA. The most suitable material and stage for routine detection was found to be leaf tissue at berry ripening time. Cortical scrapings of mature canes gave also satisfactory results, with the advantage of a possible winter screening of material collected in late summer or autumn.

460. **Del Serrone, P., C. Minucci, and M. Barba.** 1995. Diffusione del Giallume Fitoplasmale della vite in impianti laziali (Diffusion of grapevine phytoplasma yellows in vineyards of Latium). Riv. Vitic. Enol. **48***(4):*11-16.
Keywords :grapevine; phytoplasma disease; phytoplasma; detection; nucleic acid assay; aster yellows; epidemiology; leafhopper; spread; Italy;
Notes : In Italian, Eng. sum. The spread of grapevine yellows disease was monitored in Latium vineyards during three years (1992-1994). In 1993, the disease reached its highest expression, with an increase of 76%. *Scaphoideus titanus* Ball was never found. The disease was associated with the presence of phytoplasmas belonging to the aster yellows cluster. The infection was confirmed by molecular diagnosis.

461. **Del Serrone, P., C. Minucci, M. Barba, M. Conti, and G. Boccardo.** 1995. Ottimzzazione della diagnosi molecolare di fitoplasmi in vite (Improvement of molecular diagnosis of phytoplasma diseases of grapevine). Petria **5**:161-170.
Keywords :grapevine; phytoplasma disease; aster yellows; phytoplasma; detection; nucleic acid assay; identification; diagnosis; dot blot hybridization; PCR; method; Italy;
Notes : In Italian, Eng.sum. Dot and slot-blot hybridization assays and polymerase chain reaction (PCR) were used for diagnosing MLOs in yellows-affected Chardonnay and White Pinot vines in the Rome and Latina provinces. The disease was transmitted to periwinkle *(Catharanthus roseus)* by dodder in the field. Both grapevine and periwinkle tissues were used for molecular detection of the phytoplasmas and for electron microscope observation. Both crude leaf sap and purified DNA of leaves of infected grapevines and periwinkles hybridized with European aster yellows (EAY 352) probe, which did not react with healthy controls. The purified DNA was amplified by PCR with primers designed on 16S rDNA or on the nucleotide sequence of the EAY 352 cloned insert. RFLP allowed to discriminate between the DNAs from healthy and infected plants.

462. **Delibasic, G., M. Babovic, and D. Petrovic.** 1993. The investigation of molecular weight of coat protein of grapevine fanleaf virus using polynomial regression, p. 188. In P. Gugerli (ed.), Extended abstracts 11th Meeting IVCVG, Montreux, Switzerland, 6- 9 September 1993. Federal Agricultural Research Station of Changins, CH-1260 Nyon, Switzerland.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; coat protein; Yugoslavia; meeting; ICVG;
Notes : The molecular weight of the coat proteing of grapevine fanleaf virus was determined by comparing the migration of this protein in gels with that of markers proteins of known molecular weights. It was estimated at 62.52 kd.

463. **Deloire, A., M. Charpentier, G. Berlioz, A. Colin, and G. Gimonnet.** 1995. Micropropagation of the grapevine: Results of 10 years of experiments in the Champagne vineyard and results of the first vinifications. Amer. J. Enol. Vitic. **46**:571-578.
Keywords :grapevine; micropropagation; *in vitro* propagation; *in vitro;* green grafting; performance; France;
Notes :A vineyard of 2 ha was planted in Champagne (France) in 1985 with vines growing on rootstocks 41B and 333EM, prepared by *in vitro* micropropagation and micrografting. Identical vines prepared with the usual bench grafting method with dormant wood were used as controls. Comparative observations on performance and phenology of both types of vines were made during 8 years. Some morphological abnormalities of leaves and stems of the *in vitro* propagated vines were observed during the first years of growth, and a poor flower differentiation was the cause of lower yields during the first four years. However these abnormalities disappeared after 7 years. The berries were normal in size, shape and maturity. No differences were noted in the quality of wines produced by the two types of grafted material.

464. **Demangeat, G., D. Esmenjaud, C. Erny, C. Belin, and B. Walter.** 1997. Development of methods to study interactions between nepoviruses and their vectors, p. 21-22. In O. A. Sequeira,de, J. C. Sequeira, and M. T. Santos (ed.), Extended abstracts 12th Meeting ICVG, Lisbon, Portugal, 29 September-2 October 1997. Dept. Plant Pathology, Estação Agronomica Nacional, Oeiras, Portugal.
Keywords :grapevine; fanleaf; grapevine fanleaf virus; arabis mosaic virus; nepovirus; *Xiphinema index;* detection; ELISA; PCR; immunocapture PCR; vector; transmission; France; meeting; ICVG;

Notes : Various methods were compared for detecting grapevine fanleaf virus (GFLV) in infected *Xiphinema index* nematodes. Biotin-streptavidin DAS-ELISA made it possible to detect the virus in extracts of batches of 10-20 nematodes collected in the field. Virus-free nematodes reared on fig roots were used as controls. Reverse transcription polymerase chain reaction (RT-PCR) detected the virus in single individuals. With immunocapture RT-PCR, at least five nematodes were necessary. Experiments on the persistence of GFLV in *X.index* showed that the infectious potential of a population devoid of access to infected grapevine or other host plant roots decreased consistently after 6 or 12 months, but batches of 5 nematodes were still positive in RT-PCR after 12 months. Adding virus-free *X.index* to pots containing each a virus-free and a GFLV-infected plant of Kober 5BB growing in sterilized potting mixture made it possible to show that transmission from infected to healthy plants occurred already after 2 months.

465. **Demangeat, G., O. Hemmer, C. Fritsch, O. Le Gall, and T. Candresse.** 1991. *In vitro* processing of the RNA-2-encoded polyprotein of two nepoviruses: tomato black ring virus and grapevine chrome mosaic virus. J. Gen. Virol. **72**:247-252.
Keywords :grapevine; tomato black ring virus; grapevine chrome mosaic virus; nepovirus; *in vitro;* protein; synthesis; RNA; France;
Notes :*In vitro* translation of RNA2 of TBRV and GCMV in a rabbit reticulocyte lysate, resulting in the synthesis of two polyproteins of 150K and 146K.

466. **Descamps, M.C. and L. d'Huart.** 1987. Culture *in vitro*. L'exemple des champagnes Mumm. (*In vitro* culture. The example of the champagne firm Mumm). Phytoma - La Défense des Végétaux *(392):*25-26.
Keywords :grapevine; clonal selection; sanitary selection; indexing; green grafting; *in vitro;* micropropagation; micrografting; France;
Notes : In French. This paper describes the clonal and sanitary selection methods used in Champagne and developed by the Champagne wine firm Mumm. Healty clones were obtained by *in vitro* meristem tip culture if necessary. Indexing was made by micrografting. A first step in the propagation of healthy clones was achieved by *in vitro* culture of microcuttings. Then a larger scale multiplication was made by green-grafting the selected material with a machine. The grafts were cultivated in the greenhouse on cubes of rockwool in a water saturated atmosphere. A machine for green grafting has been developed. The use of this method has been patented.

467. **Descotes, A. and D. Moncomble.** 1991. Court-noué. Les difficultés de la lutte chimique (Court noué. The difficulties of chemical control). Le Vigneron Champenois **112***(7/8)*:45-51.
Keywords :grapevine; grapevine fanleaf virus; fanleaf; nepovirus; nematode; vector; *Xiphinema; Longidorus;* Longidoridae; nematicide; soil fumigation; control; France;

468. **Descotes, A. and D. Moncomble.** 1995. Lutte contre le court-noué. Intérêt de la dévitalisation des ceps avant arrachage (Control of court-noué/fanleaf disease. Advantages of killing vines before eradication). Le Vigneron Champenois **116***(9)*:20-24.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; arabis mosaic virus; nematode; vector; Longidoridae; *Xiphinema index;* transmission; control; herbicide; fallow; France;
Notes : Discussion on the advantages of killing vines with a systemic herbicide before uprooting them, in order to avoid the continued feeding of nematodes on infected roots left in the soil. The experiments made in France show that destroying the vegetation of vines with glyphosate (roundup) before pulling up the vines delays considerably the reinfestation of the soil by *Xiphinema index*. It is suggested to combine this treatment with a fumigation with a nematicide and a period of fallow.

469. **Descotes, A., D. Moncomble, and G. Valentin.** 1989. Le court-noué, comment lutter? (Fanleaf, how to control it?). Le Vigneron Champenois **110***(7/8)*:408-421.
Keywords :grapevine; court-noué; nepovirus; grapevine fanleaf virus; arabis mosaic virus; fanleaf; control; nematode; vector; *Xiphinema index;* Longidoridae; soil fumigation; fallow; France;
Notes : Description of the vector nematode *Xiphinema index,* discussion on the control of the vector: 1-2 year fallow is sufficient in case of weak infestation, 6-7 years are necessary with heavy contaminations. The recommended nematicides are Shell DD (dichloropropane-dichloropropene) or Temik (Aldicarb).

470. **Di Terlizzi, B., A. Alma, M.A. Castellano, and V. Savino.** 1993. Further studies on yellows-like disorders in Apulia, p. 95-96. In P. Gugerli (ed.), Extended abstracts 11th Meeting ICVG, Montreux, Switzerland, 6-9 September 1993. Federal Agricultural Research Station of Changins, CH-1260 Nyon, Switzerland.
Keywords :grapevine; phytoplasma disease; etiology; epidemiology; vector; phytoplasma; leafhopper; dodder; Italy; meeting; ICVG;
Notes : Studies on the etiology and epidemiology of yellows diseases in southern Italy (Apulia). *Scaphoideus titanus* was not present in the area. There was evidence that yellows of grapevine was spreading in Apulia. Transmission of the agent by dodder from grapevine to periwinkle caused symptoms of virescence of flowers, yellowing and stunting of foliage of periwinkle.

471. **Di Terlizzi, B., M.A. Castellano, A. Alma, and V. Savino.** 1994. Present status of grapevine yellows in Apulia. Phytopath. medit. **33**:125-131.
Keywords :grapevine; phytoplasma disease; etiology; electron microscopy; Italy;
Notes : An outbreak of yellows was observed in over 30% of the vines of cvs. Primitivo, Negroamaro and Uva Rossa in the Salerno peninsula (southeastern Italy). No infection was recorded in Chardonnay. Periwinkle plants placed near infected vines showed symptoms of phyllody. The agent of the disease was transmitted by dodder from grapevine to periwinkle. MLOs were observed in periwinkle and in one grapevine by electron microscopy.

472. **Di Terlizzi, B., S. Rivieccio, M.A. Castellano, and V. Savino.** 1991. Occasional occurrence of yellows-like symptoms in Apulian grapevines, p. 425-431. In I. C. Rumbos, R. Bovey, D. Gonsalves, W. B. Hewitt, and G. P. Martelli (ed.), Proceedings of the 10th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG). Plant Protection Institute, P.O. Box 303, 38001 Volos, Greece.
Keywords :grapevine; phytoplasma disease; occurrence; transmission; dodder; phytoplasma; electron microscopy; Italy; meeting; ICVG;
Notes : Yellows-like symptoms are rare in Apulia. All attempts to transmit a causal agent from diseased to healthy grapevines by graft have failed so far. However yelows-type symptoms developed in a few cases in pot-grown periwinkles connected to symptomatic vines by dodder, and periwinkle plant grown near yellows-affected grapevines developed similar symptoms. MLOs were detected by electron microscopy in thin sections of leaves of these periwinkles and in dodder, but not in symptomatic grapevines. *Scaphoideus titanus* was not present in this region. The authors put forward the hypothesis that the agent of a yellow-like disease is present in weeds, and is occasionally transmitted by an unknow vector, with a low efficiency.

473. **Digiaro, M., D. Boscia, V. Simeone, and V. Savino.** 1997. Detrimental effect of filamentous viruses to table grape varieties newly introduced in southern Italy, p. 169-170. In O. A. Sequeira,de, J. C. Sequeira, and M. T. Santos (ed.), Extended abstracts 12th Meeting ICVG, Lisbon, Portugal, 29 September-2 October. Dept.Plant Pathology, Estação Agronomica Nacional, Oeiras, Portugal.
Keywords :grapevine; leafroll; closterovirus; GLRaV-1; GLRaV-2; GLRaV-3; GLRaV-7; nepovirus; grapevine fanleaf virus; grapevine fleck virus; vitivirus; GVA; performance; economic importance; Italy; meeting; ICVG;
Notes : Two new grapevine cultivars recently introduced in Apulian vineyards in southern Italy, Red Globe and King's Ruby, were severely affected by a disease of the leafroll type. A study was undertaken in order to asses the damage caused by this infection. Several viruses, GFkV, GFLV, GVA, GVB, GLRaV-1, GLRaV-2, GLRaV-3 and and GLRaV-7 were found in different combinations in most of the 218 vines tested. About half of the Red Globe vines died. The mean yield loss was 22% and 24% for Red Globe and King's Ruby respectively, and the sugar content of must was reduced by 43% and 50% respectively. The comparison was made between symptomatic and symptomless vines, the latter being not necessarily virus-free (and probably not). The origin of the infection is likely to come from budwood and/or rootstock rather than from mealybug vectors.

474. **Digiaro, M., R. Garau, and P. Saldarelli.** 1996. Caratterizzazione dei virus floematici della vite (Characterization of phloem-limited viruses of grapevine), p. 73-102. In G. P. Martelli, V. Savino, and M. Digiaro (ed.), Virus floematici e malattie della vite.
Keywords :grapevine; leafroll; rugose wood; etiology; research; review; Italy;
Notes : In Italian, Eng.sum. An account is given of the biological, epidemiological, physicochemical and molecular properties of phloem-limited viruses of grapevine. So far they consisted of seven closteroviruses, five trichoviruses (some of them are now named vitiviruses) and four taxonomically unassigned viruses with isometric particles. The role played by each of these viruses in the aetiology of major diseases such as leafroll, rugose wood, and fleck is discussed, in the light of the research work in the framework of the RAISA project.

475. **Digiaro, M., M. Popovic Bedzrob, A.M. D'Onghia, D. Boscia, and V. Savino.** 1993. On the correlation between grapevine virus A (GVA) and rugose wood, p. 45-46. In P. Gugerli (ed.), Extended abstracts 11th Meeting ICVG, Montreux, Switzerland, 6-9 September 1993. Federal Agricultural Research Station of Changins, CH-1260 Nyon, Switzerland.
Keywords :grapevine; leafroll; rugose wood; GVA; vitivirus; GLRaV-1; GLRaV-3; closterovirus; occurrence; synergism; etiology; Italy; meeting; ICVG;
Notes : Study in Apulian vineyards on the distribution and incidence of GVA, GLRaV I, GLRaV III, GFLV and GFkV, and possible correlation with rugose wood. 1828 vines were tested by ELISA. 88.3 % of the vines were infected by at least one of the five viruses mentioned above. Only 2 vineyards out of 17 had an infection level lower than 50 %, and 6 vineyards were totally infected. The level of infection was 77 % for GLRaV III, 56 % for GVA, 59 % for GFkV, 12 % for GLRaV I, 7 % for GFLV. It seems that the presence of GVA has some bearing on the occurrence of rugose wood, perhaps with an enhancing effect of GLRaV I and III. The authors put forward the hypothesis that rugose wood is the result of a complex infection involving several closteroviruses, including GVA and some of the leafroll agents.

476. **Digiaro, M., M. Popovic Bedzrob, A.M. D'Onghia, D. Boscia, and V. Savino.** 1994. On the correlation between grapevine virus A and rugose wood. Phytopath. medit. **33**:187-193.
Keywords :grapevine; rugose wood; etiology; survey; immunoassay; ELISA; GVA; vitivirus; GLRaV-1; GLRaV-3; closterovirus; nepovirus; grapevine fanleaf virus; grapevine fleck virus; Italy;
Notes : A survey was made in vineyards of Apulia (Italy) in order to assess the incidence of infection of vines by GVA, GLRaV I and III, GFLV, GFkV, with a view to establishing possible correlations between rugose wood and the presence of closteroviruses. Of 1828 vines tested, 88.3% were infected by at least one of these viruses. GLRaV III (67.3%), GVA (55.7%) and GFkV (59.3%) were the most widespread. The presence of closteroviruses in vineyards originally planted with tested material suggests a transmission by mealybug vectors. GVA is considered as the key factor in the development of rugose wood, GLRaV I and III playing the role of enhancement factors.

477. **Dimou, D., A.M. D'Onghia, M. Laimer Da Camara Machado, and V. Savino.** 1994. Occurrence of grapevine chrome mosaic nepovirus in Austria. J. Phytopathol. **142**:258-262.
Keywords :grapevine; nepovirus; grapevine chrome mosaic virus; GCMV; occurrence; Austria;
Notes :A virus was transmitted by mechanical inoculation to herbaceous hosts from Austrian grapevines with yellow mosaic symptoms and was identified as grapevine chrome mosaic nepovirus. It is indistinguishable from an Hungarian isolate of this virus.This is the first record of this virus in Austria.

478. **Dimou, D., A.M. D'Onghia, M. Laimer Da Camara Machado, and V. Savino.** 1996. Further occurrence of grapevine chrome mosaic nepovirus in Europe. Phytopath. medit. **35**:220.
Keywords :grapevine; nepovirus; grapevine chrome mosaic virus; occurrence; identification; properties; Austria;
Notes : Grapevine chrome mosaic virus (GCMV) was found a few years ago for the first time in Austria. An Austrian isolate of this virus was compared with the type isolate H5 of Hungarian origin, on the basis of host range, *in vitro* properties of the virus, electrophoretic characteristics of ss- and dsRNA of the virus, immuno-electron microscopy and serological relationships. No differences were recorded.

479. **Doazan, J.P.** 1991. Investigations by ELISA testing on the distribution of some viruses (fanleaf, arabis mosaic, leafroll) among varieties and clones of grapevine collected as genetic resources, p. 319-323. In I. C. Rumbos, R. Bovey, D. Gonsalves, W. B. Hewitt, and G. P. Martelli (ed.), Proceedings of the 10th Meeting of the International Council for the Study of Viruses and Virus Diseases of the grapevine (ICVG). Plant Protection Institute, P.O. Box 303, 38001 Volos, Greece.
Keywords :grapevine; virus; sanitary selection; grapevine fanleaf virus; arabis mosaic virus; leafroll; GLRaV-1; GLRaV-2; nepovirus; closterovirus; occurrence; collection; detection; ELISA; immunoassay; France; meeting; ICVG;
Notes : The sanitary state of two collections of grapevine varieties used for genetic research at the Research Station for Viticulture of Bordeaux was tested by ELISA. Here are the results of 2343 tests: ArMV 8.3%, GFLV 5.6%, GLRaV-I 2.6%, GLRaV-II 6.9%.

480. **Dolja, V., A.V. Karasev, and E.V. Koonin.** 1994. Molecular biology and evolution of closteroviruses. Sophisticated build-up of large RNA genomes. Annu. Rev. Phytopathol. **32**:261-285.
Keywords :grapevine; closterovirus; molecular analysis; genome; classification; review; USA;
Notes : This interesting review on closteroviruses deals with the structure of particles, the characterization of RNA, coat protein structure, vectors, cytopathology, genome organization, relationships between closteroviruses. The authors propose a tentative scenario for the evolution of closteroviridae and for a phylogenetic taxonomy of positive-strand RNA viruses. 92 references.

481. **Dolja, V.V., O. Tomashevskaya, V.P. Boyko, A.V. Karasev, T.D. Verderevskaya, and J.G. Atabekov.** 1996. Double-stranded RNA associated with the fleck disease of grapevine, p. 191. In Proceedings of the 8th Congress of the Mediterranean Phytopathological Union, Agadir, Marocco, 1990.
Keywords :grapevine; fleck; dsRNA; Moldavia; USSR;
Notes :dsRNA was recovered from young leaves of grapevine affected with fleck, and showed a discrete band sized at 7 kb. The yield was 0.5-1 microgram dsRNA per 100 g of leaf tissue. Book chapter.

482. **Doncarli, M.** 1990. Contribution à la connaissance de la biologie et de l'éthologie de *Scaphoideus titanus*, cicadelle vectrice de la flavescence dorée (Contribution to the knowledge of the biology and ethology of *Scaphoideus titanus*, leafhopper vector of flavescence dorée). CIVAM de la région corse, Lupino, F-20600 Bastia (Corse), France.
Keywords :grapevine; phytoplasma disease; flavescence dorée; leafhopper; vector; *Scaphoideus titanus;* biology; Corsica; France;
Notes : Publication of the Centre d'Information et de Vulgarisation pour l'Agriculture en Milieu Rural (CIVAM). Bibliographic review on biology and ethology of *Scaphopideus titanus*, vector of flavescence dorée, evolution of populations, distribution on the vines, survival on various plant species.

483. **Du Fretay, G., C. Vial, P. Bernard, and A. Bouet.** 1989. Lutte contre la cicdelle de la flavescence dorée. Des résultats intéressants obtenus lors des expérimentations de 1988 (Control of the leafhopper vector of flavescence dorée. Interesting results obtained in 1988 experiments). Progr. Agric. Vitic. **106**:170-174.
Keywords :grapevine; phytoplasma disease; control; leafhopper; vector; *Scaphoideus titanus;* insecticide; France;
Notes : In French. Results of field experiments made in southern France using various insecticides for controlling *Scaphoideus titanus*, vector of flavescence dorée.

484. **Duran-Vila, N., J.M. Arregui, and M.I. Molins.** 1991. Occurrence of viroids in grapevine cultivars grown in Spain, p. 279-286. In I. C. Rumbos, R. Bovey, D. Gonsalves, W. B. Hewitt, and G. P. Martelli (ed.), Proceedings of the 10th Meeting of the International Council For the Study of Viruses and Virus Diseases of the Grapevine (ICVG). Plant Protection Institute, P.O. Box 303, 38001 Volos, Greece.
Keywords :grapevine; viroid; occurrence; Spain; meeting; ICVG;
Notes :112 sources of grapevines grown in Spain were tested for viroids. Three viroids, GV-1, GV-2 and GV-3 were found in grapevine tissues. Only one source was found viroid-free, a 161-49 American rootstock.

485. **Duran-Vila, N., J. Juarez, and J.M. Arregui.** 1988. Production of viroid-free grapevines by shoot tip culture. Amer. J. Enol. Vitic. **39**:217-220.
Keywords :grapevine; viroid elimination; viroid; control; *in vitro;* meristem tip culture; Spain;
Notes : The explants correspond to the size of a meristem tip: meristem dome plus 1-2 leaf primordia.

486. **Duran-Vila, N., J. Juarez, J.M. Arregui, and M.I. Molins.** 1989. Production of viroid-free grapevines by shoot-tip culture, p. 77. In E. Tanne (ed.), Proceedings of the 9th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG), Kiryat Anavim, September 1987. The Volcani Center, P.O. Box 6,
Keywords :grapevine; viroid; viroid elimination; meristem tip culture; *in vitro*; Spain; meeting; ICVG;
Notes : Abstract. Shoot tips of grapevine cv. Cabernet Sauvignon including the meristematic dome plus 1-2 leaf primordia (0.1-0.2 mm) were grown *in vitro* and whole plants were recovered. They were all viroid-free. Other commercial scion and rootstock varieties are now treated in the same way in order to obtain viroid-free material for propagation.

487. **Duran-Vila, N., J. Juarez, J.M. Arregui, and M.I. Molins.** 1989. Production of viroid-free grapevines by shoot-tip culture. Phytoparasitica **17**:65.
Keywords :grapevine; viroid; viroid elimination; meristem tip culture; *in vitro;* Spain; meeting; ICVG;

488. **Düring, H.** 1988. Viren bedrohen die Erzeugung von Rebenpflanzgut (Viruses endanger the production of grapevine planting material). Der Deutsche Weinbau **43**:62-64.
Keywords :grapevine; virus; economic importance; certification; nursery; resistance; *in vitro;* micropropagation; detection; diagnosis; legislation; Germany;
Notes : Review of the main problems resulting from virus infections in nurseries and control of them. Resistant rootstocks found in California are interesting, but their use in Europe is open to question due to different climatic conditions. They will probably not be available here before 20 years. *In vitro* culture is very helpful. An account on the legal basis of grapevine planting material production in Germany and EEC is given.

489. **E.N.T.A.V.,** 1992. Flavescence dorée: appareil pour le traitement à l'eau chaude des bois et plants de vigne (Flavescence dorée: apparatus for hot water treatment of grapevine dormant shoots and plants). Progr. Agric. Vitic. **109**:494.
Keywords :grapevine; phytoplasma disease; flavescence dorée; *Agrobacterium;* hot water treatment; France;
Notes :3000 m of rootstock shoots or 5000 plants can be treated in hot water for a cost of 600 French francs. The treatment also destroys *Agrobacterium tumefaciens*. (E.N.T.A.V. = Etablissement National pour l'Amélioration de la Viticulture)

490. **Ebsary, B.A., T.C. Vrain, and M.B. Graham.** 1989. Two new species of *Xiphinema* (Nematoda:Longidoridae) from British Columbia vineyards. Can. J. Zool. **67**:801-804.
Keywords :grapevine; nepovirus; tomato ringspot virus; *Xiphinema bricolensis;* Longidoridae; nematode; vector; description; Canada;
Notes : One of the new species described, *Xiphinema bricolensis*, is vector of tomato ringspot virus from cucumber to cucumber.

491. **Egger, E., M. Borgo, and P. Antoniazzi.** 1985. Tolleranza dei portainnesti della vite ad alcune malattie virali o virus-simili. (Tolerance of grapevine rootstocks to some virus and virus-like diseases). Riv. Vitic. Enol. **38**:302-307.
Keywords :grapevine; rootstock; tolerance; nepovirus; grapevine fanleaf virus; vitivirus; GVB; rugose wood; stem pitting; legno riccio; Italy;
Notes :200 rootstock cvs. were tested for GFLV, GYMV (yellow mosaic), GVB, GLRV (legno riccio = stem pitting).

492. **Egger, E., C. Dell'Aquila, P. Antoniazzi, and F. Anaclerio.** 1987. Stato sanitario del clone R 8 della cv ad uva da vino Chardonnay con particolare riguardo alla flavescenza dorata (Sanitary state of clone R 8 of the variety Chardonnay with special reference to flavescence dorée), p. 157-164. In S. Ruini (ed.), Atti del Convegno sulla Flavescenza Dorata della Vite, Vicenza-Verona, Maggio 1987. Fondazione Sergio Bolla, Verona.
Keywords :grapevine; phytoplasma disease; flavescence dorée; Chardonnay; Italy; meeting;
Notes : In Italian, Fr. Eng. sum. Flavescenza dorata, Vicenza-Verona meeting.

493. **Egger, E. and A. Grasselli.** 1988. Diffusione in Toscana di una malattia della vite assimilabile alla flavescenza dorata sulla cultivar "Chardonnay" (Diffusion in Tuscany of a grapevine disease similar to flavescence dorée on cv. Chardonnay). L'Informatore Agrario **44***(11):*101-105.
Keywords :grapevine; phytoplasma disease; flavescence dorée; Chardonnay; occurrence; symptoms; Italy;
Notes : In Italian.

494. **Egger, E., A. Grasselli, and P. Storchi.** 1991. Results of a three year survey on flavescence dorée in an ampelographic collection in order to find out resistent varieties, p. 182-183. In I. C. Rumbos, R. Bovey, D. Gonsalves, W. B. Hewitt, and G. P. Martelli (ed.), Proceedings of the 10th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG). Plant Protection Institute, P.O. Box 303, 38001 Volos, Greece.
Keywords :grapevine; phytoplasma disease; flavescence dorée; resistance; Italy; meeting; ICVG;
Notes : A survey made in 1987-88 in the ampelographic collection of the Istituto sperimentale per la viticoltura di Conegliano showed an average proportion of 9.4% of vines showing symptoms of flavescemce dorée. Several varieties did not show any symptom during the considered period, although they were surrounded by diseased plants.

495. **Egger, E., A. Grasselli, and P. Storchi.** 1995. Flavescenza: Esistono vitigni resistenti? (Flavescence: are there resistent grapevine cultivars?). Vignevini **22***(1/2):*54-56.
Keywords :grapevine; phytoplasma disease; flavescence dorée; resistance; tolerance; Italy;
Notes : In the ampelographic collection of the Experimental Institute of Viticulture of Conegliano, Italy, a survey of 1281 cultivars planted in 1979 (5 plants per cv.) showed that 448 cultivars had symptoms of flavescence dorée (FD) in at least one year during a 3-year survey made from 1987 to 1989. Several varieties showed no symptoms in spite of the presence of infected vines nearby. The authors discuss the possibility that some of these varieties could provide a solution to the problems of FD, being either immune or tolerant.

496. **Engelbrecht, D.J.** 1989. Unique procedure to detect grapevine leafroll disease. Pl. Prot. News *(8):*7.
Keywords :grapevine; leafroll; vitivirus; GVA; immunoassay; ELISA; detection; South Africa;
Notes : Indirect ELISA of grapevine virus A, considered as the cause of leafroll. The diagnosis is still possible at dilutions higher than 1:1000.

497. **Engelbrecht, D.J. and R. Human.** 1989. Absence of grapevine virus A correlated with elimination of leafroll disease. Phytoparasitica **17**:73.
Keywords :grapevine; immunoassay; rugose wood; leafroll; vitivirus; GVA; meristem tip culture; virus elimination; *in vitro;* stem pitting; corky bark; fleck; ELISA; South Africa; meeting; ICVG;
Notes : This paper appears in full in the Proceedings of the 9th meeting of ICVG, Kiryat Anavim, Israel, 1987, 159-163 (1989).

498. **Engelbrecht, D.J. and R. Human.** 1989. Absence of grapevine virus A correlated with elimination of leafroll disease, p. 159-163. In E. Tanne (ed.), Proceedings of the 9th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG), Kiryat Anavim, Israel, September 1987. The Volcani Center, P.O.Box 6, Bet Dagan , Israel.
Keywords :grapevine; leafroll; fleck; corky bark; stem pitting; GVA; vitivirus; rugose wood; virus elimination; *in vitro;* meristem tip culture; ELISA; South Africa; meeting; ICVG;
Notes : Heat treated clones of various cvs. or clones obtained from *in vitro* shoot apex culture

were indexed with a range of indicators and tested for grapevine virus A (GVA) with ELISA in order to determine their health status. GVA appeared to be closely related with symptoms of leafroll. Corky bark and stem pitting were eliminated by *in vitro* apical culture.

499. **Engelbrecht, D.J. and G.G.F. Kasdorf.** 1987. Occurrence and transmission of grapevine virus A in South African grapevines. South Afr. J. Enol. Vitic. **8**:23-29.
Keywords :grapevine; closterovirus; leafroll; vitivirus; GVA; ELISA; ISEM; rugose wood; GLRaV-1; immunoassay; detection; *Planococcus ficus;* transmission; vector; mealybug; occurrence; South Africa;
Notes : Grapevine virus A was found in grapevines in South Africa. This virus was not associated with fleck or stem pitting. A second virus reacted with Gugerli's antiserum type 1. A third clostero- like virus is present with particles longer than those of GVA. GLRaV-I and GVA are present in *Planococcus ficus* fed on grapevines containing these viruses.

500. **Engelbrecht, D.J. and G.G.F. Kasdorf.** 1990. Transmission of grapevine leafroll disease and associated closteroviruses by the vine mealybug, *Planococcus ficus.*Phytophylactica **22**:341-346.
Keywords :grapevine; leafroll; GVA; vitivirus; GLRaV-3; closterovirus; transmission; vector; *Planococcus ficus;* mealybug; South Africa;
Notes :*Planococcus ficus* transmitted GVA and GLRaV-III from leafroll affected Waltham Cross vines to healthy LN33. GLRaV-I and II, present in the donor vines, were not transmitted.

501. **Engelbrecht, D.J. and G.G.F. Kasdorf.** 1990. Field spread of corky bark, fleck, leafroll and Shiraz decline diseases and associated viruses in South African grapevines. Phytophylactica **22**:347-354.
Keywords :grapevine; rugose wood; corky bark; fleck; leafroll; Shiraz disease; decline; epidemiology; spread; South Africa;

502. **Engelbrecht, D.J., G.G.F. Kasdorf, and F.A. Maré.** 1991. Field spread of stem grooving diseases in South African grapevines. Phytophylactica **23**:239-240.
Keywords :grapevine; rugose wood; corky bark; leafroll; stem grooving; rupestris stem pitting; Kober stem grooving; epidemiology; spread; South Africa;
Notes : Field spread of two distinct stem-groowing diseases from a *V. vinifera* grapevine to healthy LN33 interplanted vines was observed in South Africa: The first produced stem grooving on Kober 5BB when chip budded onto this indicator. The second produced typical corky bark on LN33. A third disorder was Rupestris stem pitting, and was present in sources testing negative for leafroll, corky bark and closteroviruses.

503. **Engelbrecht, D.J., G.F. Rowland, and W. du Toit.** 1987. An indirect enzyme-linked immunosorbent assay (ELISA) using a peroxidase-anti-peroxidase (PAP) complex for the detection of plant viruses. Phytophylactica **19**:125.
Keywords :ELISA; immunoassay; detection; peroxidase; method; general; South Africa;

504. **Eppler, A., V. Lesan, and A. Lazar.** 1989. Viruses and virus diseases in some vineyards in Romania. Meded. Fac. Landbouwwetenschappen Rijksuniversiteit Gent **54/2b**:491-497.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; arabis mosaic virus; strawberry latent ringspot virus; symptoms; nematode; *Xiphinema;* Longidoridae; survey; occurrence; Rumania;
Notes : Survey of several vineyards in Rumania. ArMV, GFLV and SLRV were detected. Symptoms, presence of different species of *Xiphinema.*

505. **Erny, C., C. Belin, D. Esmenjaud, G. Demangeat, L. Pinck, and B. Walter.** 1997. Molecular variability of grapevine fanleaf virus coat protein, p. 29-30. In O. A. Sequeira,de, J. C. Sequeira, and M. T. Santos (ed.), Extended abstracts 12th Meeting ICVG, Lisbon, Portugal, 29 September-2 October 1997. Dept.Plant Pathology, Estação Agronomica Nacional, Oeiras, Portugal.
Keywords :grapevine; grapevine fanleaf virus; arabis mosaic virus; nepovirus; coat protein; structure; molecular analysis; *Xiphinema index; Xiphinema diversicaudatum;* PCR; nucleotide sequence; France; meeting; ICVG;

Notes : The variability of the molecular structure of the coat protein of grapevine fanleaf virus was studied. Eight different sources of this virus originating from various countries were maintained in different hosts and in *Xiphinema index* vectors. Their coding RNA was reverse transcribed and the resulting DNA was amplified by PCR. Sequence analysis of the nucleotides of the coat protein of the different samples showed more than 90% analogy between the eight isolates. The mutations were distributed all along the sequence. The results do not allow to deduce that a particular region of the coat protein gene is responsible for virus recognition by the vector nematode.

506. **Esmenjaud, D.** 1986. Vigne. Les nématodes. (Grapevine. The nematodes). Phytoma - La Défense des Végétaux *(374):*24-27.
Keywords :grapevine; nematode; vector; Longidoridae; *Xiphinema index; Xiphinema diversicaudatum;* control; fallow; soil fumigation; France;

507. **Esmenjaud, D., P. Abad, L. Pinck, and B. Walter.** 1994. Detection of a region of the coat protein gene of grapevine fanleaf virus by RT-PCR in the nematode vector *Xiphinema index*. Plant Disease **78**:1087-1090.
Keywords :grapevine; grapevine fanleaf virus; nepovirus; nematode; vector; *Xiphinema index;* Longidoridae; nucleic acid assay; detection; reverse transcription; PCR; coat protein; gene; France;
Notes : The detection of grapevine fanleaf virus by RT-PCR was possible with extracts from 1-10 infected *Xiphinema index* nematodes. The molecular analysis of GFLV RNA2 amplified from infected *X.index* showed important variation in the GFLV coat protein gene structure.

508. **Esmenjaud, D., R. Pistre, and M. Bongiovanni.** 1988. Activité nématicide de l'aldicarbe sur sol très lourd, en application fractionnée ou non, contre *Xiphinema index* Thorne & Allen, 1950 (Nematoda: Longidoridae), vecteur du court-noué de la vigne (Nematicidal activity of aldicarb on very heavy soil, in simple or split application, against *Xiphinema index* Thorne & Allen, 1950 (Nematoda: Longidoridae), vector of fanleaf virus of grapevine). Meded. Fac. Landbouwwetenschappen Rijksuniversiteit Gent **53/2b :**885-891.
Keywords :grapevine; nepovirus; fanleaf; nematode; *Xiphinema index;* Longidoridae; vector; control; nematicide; aldicarb; France;
Notes : In French, Eng.sum. In a vineyard highly contaminated with the complex fanleaf/*Xiphinema index*, aldicarb was applied at 20 kg/ha/year in one application, or in four split applications (5 kg/ha each) per year, during one or two years, with the vines left in place. Young healthy grapevine indicators were planted between the rows, in order to check disease transmission. Soil samples were taken regularly and nematodes counted. A good nematicidal efficacy was recorded, especially with split applications, but virus contamination could not be significantly reduced. Trials in glasshouse confirmed field experiments.

509. **Esmenjaud, D., B. Walter, J.C. Minot, R. Voisin, and P. Cornuet.** 1993. Biotin-avidin ELISA detection of grapevine fanleaf virus in the vector nematode *Xiphinema index.* Journal of Nematology **25**:401-405.
Keywords :grapevine; grapevine fanleaf virus; nepovirus; nematode; vector; *Xiphinema index;* Longidoridae; detection; immunoassay; ELISA; France;
Notes : The possibility of using the biotin-avidin (BA) ELISA technique for detecting grapevine fanleaf virus (GFLV) in the nematode vector *Xiphinema index* was studied with greenhouse and field populations of this nematode. Batches of 2,4,8,16,32 and 64 individuals were used. Results show that BA-ELISA requires samples of at least 10 individuals for a safe detection of GFLV in *X.index*. It is suggested that comparing the absorbance with batches of increasing numbers of nematodes may reflect the viral infectious potential of different *X.index* populations.

510. **Esmenjaud, D., B. Walter, G. Valentin, Z.T. Guo, and D. Cluzeau.** 1992. Vertical distribution and infectious potential of *Xiphinema index* (Thorne & Allen, 1950) (Nematoda: Longidoridae) in fields affected by grapevine fanleaf virus in vineyards in the Champagne region of France. Agronomie **12**:395-399.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; nematode; *Xiphinema index;* Longidoridae; field; infection; distribution; ELISA; France;

Notes : The density of populations of the nematode *Xiphinema index* in relation to the soil depth level was studied in three vineyards infected with fanleaf in the Champagne wine-growing region of France. The results show that in the Mesnil vineyard with a high clay content, the lowest nematode count was recorded between 0 and 25 cm and the highest one between 55 and 70 cm. In the two other vineyards with more sandy soils, few nematodes were found between 0 and 40 cm, and the highest count was recorded below 90 cm in the chalk parent rock. ELISA absorbance of extracts of nematodes collected in the vineyard and crushed in batches of increasing size from 2 to 256 nematodes showed differences with similar batches from a control population reared on fig roots. This difference was observed with samples of two nematodes or more.

511. **Etienne, L., J.M. Clauzel, and M. Fuchs.** 1991. Simultaneous detection of several nepoviruses infecting grapevine in a single DAS-ELISA test using mixed antisera. J. Phytopathol. **131**:89-100.
Keywords :grapevine; grapevine fanleaf virus; arabis mosaic virus; tomato black ring virus; raspberry ringspot virus; nepovirus; detection; leaves; wood shavings; infection; ELISA; immunoassay; France;
Notes : The use of mixed polyclonal antibodies allowed in a single test the detection of several nepoviruses (ArMV + GFLV) or serotypes of nepoviruses (TBRV serotypes G + S and RRV serotypes E + G), in diseased grapevine leaves or grapevine wood shavings, as well as in mixtures of purified virions. The detection was as reliable and efficient as with single antibodies. Moreover, an increased absorbance was often observed in reactions with mixed antibodies and infections.

512. **Faggioli, F., P. Del Serrone, and M. Barba.** 1993. Diffusione del virus della maculatura infettiva della vite (GFkV) nel Lazio e sua rapida diagnosi sierologica (Occurrence of grapevine fleck virus (GFkV) in the Latium region and its quick serological detection). Riv. Vitic. Enol. **46***(2):*55-59.
Keywords :grapevine; fleck; grapevine fleck virus; occurrence; detection; immunoassay; ELISA; Italy;

513. **Faggioli, F., M. Manzo, G. Di Lernia, A. Spiezia, and M. Barba.** 1997. La selezion clonale della vite in Campania: aspetti fitosanitari (Clonal selection in Campania: phytosanitary aspects). Vignevini **24***(6):*53-59.
Keywords :grapevine; virus; virus-like diseases; survey; occurrence; Italy;
Notes : This paper reports on a 3-year study to identify and select clones that could be included in the national catalogue of grape varieties. They were tested for the presence of viruses and virus-like diseases. The results of these tests show that the situation in Campania is similar to that occurring in the rest of Italy. Most viruses and virus-like diseases are present and widely disseminated, especially in old and highly typical vineyards, which are often 100% infected. Eight tables specify the varieties considered, the number of clones, the results of indexing and of serological tests.

514. **Faggioli, F., M. Manzo, and A. Quacquarelli.** 1997. Clonal selection of the most representative grape varieties in Campania region: sanitary aspects, p. 168. In O. A. Sequeira,de, J. C. Sequeira, and M. T. Santos (ed.), Extended abstracts 12th Meeting ICVG, Lisbon, Portugal, 29 September-2 October 1997. Dept.Plant Pathology, Estação Agronomica Nacional, Oeiras, Portugal.
Keywords :grapevine; clonal selection; sanitary selection; Italy; meeting; ICVG;
Notes : A programme of clonal selection was set up in Campania (southern Italy). Six varieties were micrografted in order to eliminate viral infection, and were recovered virus-free. For 4 other varieties, healthy material was found in vineyards and could be included in the certification scheme.

515. **Faggioli, F., G. Pasquini, L. Riccioni, and M. Barba.** 1991. Further characterization and serology of grape leafroll associated virus III isolated from grape in Italy, p. 473-476. In I. C. Rumbos, R. Bovey, D. Gonsalves, W. B. Hewitt, and G. P. Martelli (ed.), Proceedings of the 10th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG). Plant Protection Institute, P.O. Box 303, 38001 Volos, Greece.
Keywords :grapevine; leafroll; GLRaV-3; closterovirus; properties; ELISA; ISEM; Italy; meeting; ICVG;
Notes : The isolate 16G from a leafroll-affected vine was used for preparing monoclonal antibodies. This virus is of GLRaV-III type, with a coat protein MW of 42 kd.

516. **Faggioli, F., L. Riccioni, M. Mazzei, and M. Barba.** 1992. Purification and characterization of a new virus found in Grapevine. Phytopath. medit. **31**:37-40.
Keywords :grapevine; grapevine labile rod-shaped virus; new virus; purification; immunoassay; ISEM; Italy;
Notes :A new rod-shaped virus has been found associated with a Merlot symptomless grapevine near Rome. The name *Grapevine labile rod-shaped virus* (GLRSV) is proposed. The particles are 23 nm in diameter, with two modal lengths of 150-175 nm and 275-300 nm. The virus was partially purified from grapevine extracts and an antiserum was prepared. All attempts to transmit GLRSV by mechanical inoculation failed. The particles were not decorated in ISEM tests by antisera against GLRaV I,II,III, GVA,TMV,TBRV or BNYVV. It is suggested that GLRSV is a new member of the labile rod-shaped virus group.

517. **Fanizza, G. and L. Ricciardi.** 1988. The response of a range of genotypes of *Vitis vinifera* to sequential shoot tip cultures at high temperatures. Euphytica **39**:19-23.
Keywords :grapevine; *in vitro;* virus elimination; shoot tip culture; heat therapy; physiology; Italy;

518. **Faoro, F.** 1997. Cytopathology of closteroviruses and trichoviruses infecting grapevines, p. 29-47. In P. L. Monette (ed.), Filamentous viruses of woody plants. Research Signpost, Trivandrum, India.
Keywords :grapevine; closterovirus; trichovirus; vitivirus; cytopathology; Italy;

519. **Faoro, F. and R. Carzaniga.** 1995. Cytochemistry and immunocytochemistry of the inclusion bodies induced by grapevine leafroll-associated closteroviruses GLRaV-1 and GLRaV-3. Riv. Pat. Veg., S.V, **5**:85-94.
Keywords :grapevine; leafroll; GLRaV-1; GLRaV-3; cytopathology; immunocytochemistry; closterovirus; Italy;
Notes : Cytopathology of grapevines infected with the GLRaV-1 or -3 viruses. Vesiculated mitochondria induced by infection by these viruses contained small vesicules filled with finely stranded material that appears to be mainly composed of RNA. Electron-dense granules are protein inclusions, which are virus-coded, but distinct from coat protein. Vesiculated mitochondria are involved in the replication of the virus.

520. **Faoro, F. and P. Gugerli.** 1997. Cytological alterations associated with an unidentified isometric grapevine virus (UIGV), p. 31-32. In O. A. Sequeira,de, J. C. Sequeira, and M. T. Santos (ed.), Extended abstracts 12th Meeting ICVG, Lisbon, Portugal, 29 September-2 October 1997. Dept.Plant Pathology, Estação Agronomica Nacional, Oeiras, Portugal.
Keywords :grapevine; isometric; virus; ultrastructure; new virus; Italy; Switzerland; meeting; ICVG;
Notes : Typical cytopathic alterations were observed in leaves of grapevines infected with grapevine fleck virus (GFkV). They included the presence of double-membraned vesicles formed in the boundary of plastids and mitochondria and of numerous isometric particles in sieve tubes. Similar alterations, however, were found in plants that were not infected with GFkV. This was the case in particular for two clones of Gamay Rouge de la Loire studied by Gugerli *et al.* 1997 (Ibidem, p. 33-34) and for a LN33 vine infected by graft from the above-mentioned Gamay Rouge de la Loire. The symptoms are described. The virus was named provisionally *unidentified isometric grapevine virus* (UIGV). Although other viruses were present in the examined samples (GLRaV-4 and -5), it is very likely that the cytopathic symptoms observed are produced by UIGV.

521. **Faoro, F. and R. Tornaghi.** 1991. Closteroviruses and P-proteins in *Vitis vinifera*: means of discrimination. Gior. Bot. Ital. **125**:998-999.
Keywords :grapevine; closterovirus; identification; electron microscopy; cytopathology; ultrastructure; protein; immunogold labelling; Italy;
Notes : Closteroviruses can easily be mistaken with filamentous P-proteins which are normal phloem structures. In order to distinguish both structures, the authors suggest to use a fixation in a mixture of 2.5% of paraformaldehyde and 1.5% glutaraldehyde, followed with embedding in Epon-Araldite or London Resin White. This procedure enhances the cross striation of virus particles and made distinction with P-protein easier.

522. **Faoro, F., R. Tornaghi, and G. Belli.** 1988. Immunocytochemical localization of closteroviruses in *Vitis vinifera*, p. 2/94. In Abstracts 5th International Congress of Plant Pathology, Kyoto, Japan.
Keywords :grapevine; closterovirus; cytopathology; immunocytochemistry; meeting; ISPP; Italy;
Notes : Congress ISPP, Kyoto, Japan. Abstract. Book chapter.

523. **Faoro, F., R. Tornaghi, and G. Belli.** 1991. Localization of closteroviruses on grapevine thin sections and their identification by immunogold labelling. J. Phytopathol. **133**:297-306.
Keywords :grapevine; closterovirus; vitivirus; GVA; leafroll; GLRaV-1; GLRaV-3; immunogold labelling; immunoassay; electron microscopy; cytopathology; Italy;
Notes : Different embedding and fixation procedures have been tested in order to facilitate closterovirus identification on thin sections of leafroll-affected grapevine plants. Standard method with glutaraldehyde and osmium tetroxide proved to be the most reliable for cytopathological studies, while simultaneous fixation with glutaraldehyde, picric acid and osmium tetroxide facilitated discrimination between agregates of P-proteins and virus particles. However, identification of individual virions among P-protein filaments is only possible by immunogold labelling.

524. **Faoro, F., R. Tornaghi, and G. Belli.** 1991. Different approaches to the identification of grapevine leafroll- associated closteroviruses on thin sections of *Vitis vinifera*, p. 239-242. In I. C. Rumbos, R. Bovey, D. Gonsalves, W. B. Hewitt, and G. P. Martelli (ed.), Proceedings of the 10th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG). Plant Protection Institute, P.O. Box 303, 38001 Volos, Greece.
Keywords :grapevine; leafroll; GLRaV-1; GLRaV-3; closterovirus; identification; immunogold labelling; electron microscopy; Italy; meeting; ICVG;
Notes : GLRaV-I and III closterovirus particles associated with leafroll and present in leaf main veins of infected material of cvs. Barbera, Cortese, Croatina and Merlot were identified by immunolabelling.

525. **Faoro, F., R. Tornaghi, and G. Belli.** 1992. Vesiculation of mitochondria associated with grapevine phloem-limited viruses, p. 431-432. In L. Megias-Megias, M. I. Rodrigues-Garcia, A. Rios, and J. M. Arias (ed.), Electron Microscopy. Proceedings EUREM 92, Granada, Spain. Vol.3. Universidad de Granada, Granada, Spain.
Keywords :grapevine; closterovirus; leafroll; GLRaV-3; grapevine fleck virus; ultrastructure; electron microscopy; cytopathology; meeting; Italy;
Notes : Book chapter.

526. **Faoro, F., R. Tornaghi, S. Cinquanta, and G. Belli.** 1992. Cytopathology of grapevine leafroll associated virus III (GLRaV- III). Riv. Pat. Veg.,S.V, **2**:67-83.
Keywords :grapevine; leafroll; closterovirus; GLRaV-3; symptoms; ultrastructure; cytopathology; histology; immunogold labelling; Italy;
Notes : Study of cytopathic effects of GLRaV-3 in grapevine. Identification of virus particles by immunogold labelling.

527. **Faoro, F., R. Tornaghi, and A. Fortusini.** 1989. Cytological alterations associated with closterovirus serotype III (GLRV-3) in leafroll-diseased grapevines, p. 47. In Abstracts of the International Symposium on Electron Microscopy Applied in Plant Pathology, Konstanz, Germany.
Keywords :grapevine; closterovirus; GLRaV-3; leafroll; cytopathology; electron microscopy; meeting; Italy;
Notes : Abstract. Book chapter.

528. **Faoro, F., R. Tornaghi, and P. Gugerli.** 1993. Cytopathology of grapevine leafroll-associated virus I (GLRaV-I), p. 19-20. In P. Gugerli (ed.), Extended abstracts 11th Meeting ICVG, Montreux, Switzerland, 6-9 September 1993. Federal Agricultural Research Station of Changins., CH-1260 Nyon, Switzerland.
Keywords :grapevine; leafroll; GLRaV-1; GLRaV-3; closterovirus; ultrastructure; cytopathology; comparison; Italy; Switzerland; meeting; ICVG;

Notes : Comparison of ultrastructure of grapevine cells infected with GLRaV-I and III.

529. **Farmer, M.J. and E. Boudon-Padieu.** 1993. Cloning and expression of flavescence dorée-MLO membrane protein in lambda ZAP II expression vector, p. 97. In P. Gugerli (ed.), Extended abstracts 11th Meeting ICVG, Montreux, Switzerland, 6-9 September 1993. Federal Agricultural Research Station of Changins, CH 1260 Nyon, Switzerland.
Keywords :grapevine; flavescence dorée; phytoplasma disease; cloning; phytoplasma; France; meeting; ICVG;

530. **Farmer, M.J. and E. Boudon-Padieu.** 1994. Cloning and expression of Flavescence dorée mycoplasma-like organism membrane protein in Lambda Zap expression vector. IOM Letters **3**:237.
Keywords :grapevine; phytoplasma disease; flavescence dorée; cloning; protein; gene; USA; France;
Notes : Paper presented at the 10th Meeting of the International Organization for Mycoplasmology, Bordeaux 1994.

531. **Fauquet, C.M. and G.P. Martelli.** 1995. Updated ICTV list of names and abbreviations of viruses, viroids, and satellites infecting plants. Arch. Virol. **140**:393-413.
Keywords :grapevine; virus; viroid; nomenclature; classification;

532. **Feld, B.S. and B.N. Milkus.** 1989. [Applicability of ELISA for the detection of leafroll virus in grapevines], p. 67-68. In J. Polak, J. Chod, V. Rimsa, J. Vacke, and A. Ryvova (ed.), Plant Virology. Proceedings of the 10th Conference of the Czechoslovak Plant Virologists, Prague, 1989. Vyskumny Ustav Rostlinné Vyroby, 161 06, Prague 6-Ruzyné, Drnovska 507, Czechoslovakia.
Keywords :grapevine; leafroll; closterovirus; detection; immunoassay; ELISA; Ukraine; meeting;
Notes : In Czech, Eng.sum. ELISA (sandwich, indirect and PAP methods) was used for detecting closterovirus particles of 2000 nm associated with leafroll in grapevines (GLRaV III ?). PAP was more sensitive than indirect ELISA. Book chapter.

533. **Ferreira, A.A.** 1985. Materiais de propagação vegetativa da videira (Grapevine material for vegetative propagation). Protecção da Produção Agricola **1**:153-180.
Keywords :grapevine; certification; propagation; virus-free material; indexing; virus; virus-like diseases; detection; legislation; Portugal;
Notes : In Portuguese. A description is given of the system of production of certified material for grapevine propagation in the European Economic Community (EEC) and of its application in Portugal, as a result of the recent EEC membership of this country.

534. **Ferro Cepeda, E.M.** 1990. Aplicacion de las técnicas de cultivo de apices caulinares en el saneamiento de clones seleccionados de vid, var. Albariño (Application of *in vitro* meristem tip culture to the sanitation of selected clones of the grapevine variety Albariño). University of Santiago de Compostela, Servicio de Publicacions, Santiago de Compostela (Spain).
Keywords :grapevine; fanleaf; grapevine fanleaf virus; virus elimination; *in vitro;* meristem tip culture; heat therapy; thesis; Spain;
Notes : In Spanish, Eng.sum. PhD thesis (Microfilms). The classical technique of *in vitro* culture of 0.2-0.3 mm meristem tips was used in order to eliminate viruses from selected clones of cv. Albariño. For eliminating grapevine fanleaf virus, it was necessary to maintain the cultures at 39^{o} C during 15-18 days.

535. **Firrao, G. and C. Bazzi.** 1994. Specific identification of *Xylella fastidiosa* using the polymerase chain reaction. Phytopath. medit. **33**:90-92.
Keywords :grapevine; Pierce's disease; *Xylella fastidiosa;* detection; PCR; nucleic acid assay; Italy;
Notes :A detection method for *Xylella fastidiosa*, agent of Pierce's disease has been set up using PCR assay and based on amplification of part of the 16S rRNA gene, using the primer pair XF1-XF6.

536. **Flak, W. and H. Gangl.** 1994. Grobkartierung des Rebvirosenbefalls in der Weinbauregion Burgenland mittels ELISA (Mapping od grapevine virus diseases in the viticultural region of Burgenland with ELISA). Mitt. Klosterneuburg **44**:163-167.
Keywords :grapevine; immunoassay; detection; ELISA; virus; occurrence; survey; arabis mosaic virus; grapevine fanleaf virus; nepovirus; leafroll; GLRaV-1; GLRaV-3; closterovirus; Austria;
Notes : In German, Eng. and Fr. sum. Four virus diseases were checked using polyclonal and monoclonal antibodies with DAS-ELISA against GFLV, ArMV, GLRaV-1 and -3. 953 samples were taken at random. 30% were found infected with one or several of these viruses: ArMV 7.9%, GFLV 8.5%, GLRaV-I 71.6%, GLRaV-III 12 %.

537. **Flores, R., N. Duran-Vila, V. Pallas, and J.S. Semancik.** 1985. Detection of viroid and viroid-like RNAs from grapevine. J. Gen. Virol. **66**:2095-2102.
Keywords :grapevine; viroid; detection; nucleic acid assay; Spain; USA;

538. **Fonseca, M.E.N. and G.B. Kuhn.** 1994. Natural infection of grapevine by citrus exocortis viroid and hop stunt viroid in Brazil. Fitopatologia Brasileira **19** *(Suplemento):*285-286.
Keywords :grapevine; viroid; citrus exocortis viroid; CEVd-g; hop stunt viroid; occurrence; Brazil;
Notes : First record of these two viroids in Brazil. They were detected by double polyacrylamide gel electrophoresis on Cabernet Sauvignon, in the State of Rio Grande do Sul. These findings were confirmed by Northern blot analysis using full length HSVd and CEVd cDNA probes. (Abstract of a paper presented at the 27th annual meeting of the Brazilian Phytopathological Society).

539. **Forsline, P.L., J. Hoch, W.F. Lamboy, J.S. Hu, J.R. McFerson, D.A. Golino, and D. Gonsalves.** 1996. Comparative effectiveness of symptomatology and ELISA for detecting two isolates of grapevine leafroll on graft-inoculated Cabernet franc. Amer. J. Enol. Vitic. **47**:239-243.
Keywords :grapevine; leafroll; closterovirus; GLRaV-3; GLRaV-4; indexing; ELISA; wood shavings; comparison; USA; California;
Notes : Two isolates of grapevine leafroll (GLRaV-3 and 4, respectively on Pinot noir and Thompson seedless) were submitted to indexing with Cabernet franc as indicator and to ELISA using bark shavings on dormant canes as antigens. ELISA was also used to confirm transmission of the viruses to the indicator. GLRaV-3 was detected by indexing by the end of the first full growing season, and GLRaV-4 by the end of the second season. ELISA reaction was stronger with GLRaV-3 than with GLRaV-4. ELISA results were consistent with results of indexing. The authors conclude that ELISA is useful for a rapid detection of GLRaV-3 and -4 in dormant source grapevines and in inoculated Cabernet franc indicators.

540. **Fortusini, A.** 1989. La flavescenza dorata (Golden flavescence). Terra e Vita **30***(14):*99-100.
Keywords :grapevine; flavescence dorée; phytoplasma disease; Italy;
Notes : In Italian. Description of flavescence dorée symptoms and characteristics.

541. **Fortusini, A. and G. Belli.** 1987. La flavescenza dorata della vite in Italia: inizi e sviluppi della malattia; affinità e differenze con altre ampelopatie (Flavescence dorée of grapevine in Italy: origin and development of the disease; affinity and differences with other diseases), p. 91-98. In S. Ruini (ed.), Atti del Convegno sulla Flavescenza Dorata della Vite, Vicenza-Verona, Maggio 1987. Fondazione Sergio Bolla, Verona.
Keywords :grapevine; phytoplasma disease; flavescence dorée; symptoms; Italy; meeting;
Notes : In Italian, Fr. Eng. sum. Flavescenza dorata, Vicenza-Verona meeting.

542. **Fortusini, A., S. Cinquanta, and G. Belli.** 1989. Mixed infections of nepo- and clostero-viruses associated with corky bark and stem pitting in grapevine, p. 131-134. In E. Tanne (ed.), Proceedings of the 9th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG), Kiryat Anavim, Israel, September 1987. The Volcani Center, P.O. Box 6, Bet Dagan , Israel.
Keywords :grapevine; rugose wood; corky bark; stem pitting; etiology; nepovirus; closterovirus; arabis mosaic virus; grapevine fanleaf virus; Italy; meeting; ICVG;

Notes : In two vineyards of cv. Alphonse Lavallée (Ribier), several vines showed corky bark on the canes and stem pitting on the rootstocks. Sixteen vines were examined for the presence of viruses by mechanical inoculation onto herbaceous plants, electron microscopy and serology. In all cases, mixed infections of nepo- and closteroviruses were found. The authors put forward the hypothesis that stem pitting and corky bark are caused by a mixed infection with a nepovirus (ArMV or GFLV) and one or more filamentous virus that can be related to closteroviruses.

543. **Fortusini, A., S. Cinquanta, and G. Belli.** 1989. Mixed infections of nepo- and clostero-viruses associated with corky bark and stem pitting in grapevine. Phytoparasitica **17**:70.
K**eywords :**grapevine; rugose wood; etiology; nepovirus; grapevine fanleaf virus; arabis mosaic virus; corky bark; stem pitting; closterovirus; electron microscopy; immunoassay; Italy; meeting; ICVG;
Notes : Abstract. Hypothesis of a mixed infection closterovirus - nepovirus as a cause of corky bark and stem pitting. This paper appears in full in the Proceedings of the 9th meeting of ICVG, Kiryat Anavim, Israel, 1987, 131-134 (1989).

544. **Fortusini, A., S. Cinquanta, and G. Belli.** 1991. Serological identification of different closteroviruses associated with grapevine leafroll in northern Italy, p. 412-415. In I. C. Rumbos, R. Bovey, D. Gonsalves, W. B. Hewitt, and G. P. Martelli (ed.), Proceedings of the 10th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG). Plant Protection Institute, P.O. Box 303, 38001 Volos, Greece.
Keywords :grapevine; sanitary selection; leafroll; closterovirus; vitivirus; GLRaV-1; GLRaV-2; GLRaV-3; GVA; occurrence; ELISA; ISEM; Italy; meeting; ICVG;
Notes :23 grapevine clones collected in the Center for sanitary selection of agricultural crops (CNR) of the Istituto di Patologia Vegetale, University of Milano, were tested by ELISA and ISEM for GLRaV-I, II, III and GVA. All grapevine clones that had shown leafroll symptoms contained one or more closteroviruses, whereas all the symptomless clones were virus-free. GLRaV-III appears to be the most widespread agent of leafroll, whereas GVA is rather uncommon and sporadic.

545. **Fortusini, A., S. Cinquanta, and P. Casati.** 1993. Frequent occurrence of GLRaV-I and GLRaV-III in leafroll affected grapevines in Lombardy (Northern Italy), p. 116-117. In P. Gugerli (ed.), Extended abstracts 11th Meeting ICVG, Montreux, Switzerland, 6-9 September 1993. Federal Agricultural Research Station of Changins, CH-1260 Nyon, Switzerland.
Keywords :grapevine; leafroll; GLRaV-1; GLRaV-3; closterovirus; occurrence; ELISA; immuno electron microscopy; ISEM; Italy; meeting; ICVG;
Notes :GLRaV-III is the most frequent closterovirus found in leafroll-diseased grapevines in Oltrepò Pavese. GLRaV-I is frequent in Valtellina.

546. **Fortusini, A., R. Garau, and A. Minafra.** 1996. Epidemiologia dei virus floematici associati al complesso dell'accartocciamento fogliare e del legno riccio della vite (Epidemiology of phloem-limited viruses associated with the leafroll complex and rugose wood of grapevine), p. 103-116. In G. P. Martelli, V. Savino, and M. Digiaro (ed.), Virus floematici e malattie della vite.
Keywords :grapevine; leafroll; rugose wood; epidemiology; research; review; Italy;
Notes : In Italian, Eng.sum. This is a review on recent work on the epidemiology of leafroll and rugose wood diseases with special reference to the work done in the framework of the RAISA research work in Italy.

547. **Fortusini, A., R. Garau, and V. Savino.** 1994. Accartocciamento fogliare e legno riccio della vite: stato attuale delle conoscenze (Grapevine leafroll and rugose wood: present status of knowledge), p. 255-266. In Atti Giornate Fitopatologiche 1994, Montesilvano Lido (Pescara), 9-12 maggio 1994, Vol.2. Cooperativa Libraria Universitaria Editrice Bologna (CLUEB), Bologna, Italy.
Keywords :grapevine; leafroll; rugose wood; legno riccio; symptoms; GLRaV; transmission; review; Italy;
Notes : In Italian. Meeting at Montesilvano Lido, Italy, May 1994. Atti, CLUEB.

548. **Fortusini, A., R. Pontiroli, and G. Belli.** 1988. Nuovi dati e osservazioni sulla Flavescenza dorata della vite nell'Oltrepò pavese (New data and observations on flavescence dorée of grapevine in Oltrepo pavese). Vignevini **15** *(3):*67-69.
Keywords :grapevine; phytoplasma disease; flavescence dorée; symptoms; transmission; *Scaphoideus littoralis;* leafhopper; spread; Italy;
Notes : From 1985 to 1987, a survey was made in three vineyards of cv.Chardonnay in three different areas in the Oltrepò Pavese in northern Italy (region of Pavia). In two of these vineyards, insecticide treatments were carried out with dimethoate and endosulfan, while the third vineyard was not treated. In the two treated vineyards, the percentge of vines with flavescence dorée symptoms decreased from respectively 18.2%and 25% (1985) to 12.3% and 20.6% (1987) whereas in the untreated vineyard, this percentage increased from 32.5% (1985) to 57.4% (1987).

549. **Fortusini, A., M. Saracchi, and G. Belli.** 1989. Trasmissione sperimentale della flavescenza dorata della vite mediante *Scaphoideus titanus* Ball in Italia (Experimental transmission of flavescence dorée of grapevine with *Scaphoideus titanus* Ball in Italy). Vignevini **16***(9):*43-46.
Keywords :grapevine; phytoplasma disease; flavescence dorée; transmission; leafhopper; vector; *Scaphoideus titanus;* Italy;
Notes : In Italian. Transmission trials of a yellows disease of grapevine observed in northern Italy by means of the leafhopper *Scaphoideus titanus* Ball gave positive results in 4 out of 6 tests. Yellows disease of grapevine in northern Italy can therefore be considered as being probably the same disease as flavescence dorée in France.

550. **Fortusini, A., G. Scattini, S. Cinquanta, and S. Prati.** 1996. Diffusione naturale del virus 1 (GLRV-1), del virus 3 (GLRV-3) dell'accartocciamento fogliare e del virus della maculatura infettiva o "fleck"(GFkV) della vite (Natural spread of grapevine leafroll virus 1 (GLRV-1), grapevine leafroll virus 3 (GLRV-3) and grapevine fleck virus (GFkV)). Inform. Fitopatol. **46***(12):*39-43.
Keywords :grapevine; leafroll; fleck; closterovirus; GLRaV-1; GLRaV-3; grapevine fleck virus; coccid; spread; Italy;
Notes : In Italian, Eng. sum. In a vineyard planted in 1979 at the estate of Riccagioia at Torazza Coste, Lombardia, northern Italy, 13 clones were originally virus-free and one was infected with leafroll. In 1994, of the 223 vines originally virus-free, 21 in 1994 and 38 in 1995 had symptoms of leafroll. ELISA tests revealed that 49 vines were infected with GLRV-3 and 8 with GLRV-1. Evidence of natural spread of GFkV was also obtained. This is the first record on natural spread of GLRV-1. Mealybugs were never found in this vineyard. *Pulvinaria vitis* L. is present in this area and may be responsible for the spread of leafroll in this case.

551. **Fortusini, A., G. Scattini, S. Prati, S. Cinquanta, and G. Belli.** 1997. Transmission of grapevine leafroll virus 1 (GLRV-1) and grapevine virus A (GVA) by scale insects, p. 121-122. In O. A. Sequeira,de, J. C. Sequeira, and M. T. Santos (ed.), Extended abstracts 12th Meeting ICVG, Lisbon, Portugal, 29 September-2 October 1997. Dept.Plant Pathology, Estação Agronomica Nacional, Oeiras, Portugal.
Keywords :grapevine; leafroll; closterovirus; GLRaV-1; vitivirus; GVA; transmission; scale insects; *Parthenolecanium corni; Neopulvinaria innumerabilis*; coccid; vector; Italy; meeting; ICVG;
Notes : *Parthenolecanium corni* Bouché is clearly a vector of GLRV-1 but does not seem to be vector of GVA. *Neopulvinaria innumerabilis* Rathvon is capable of transmitting GVA and GLRV-1, at least when the latter is associated with GVA. The transmissibility of some of these viruses seems to depend on the accession used for the transmission. Two accessions of cv. Barbera were used: M1-B7 was symptomless but infected with GLRV-1; F7 V8 was infected with GLRV-1 and GVA and showed strong leafroll symtoms. The two GLRV-1 may therefore represent different strains.

552. **Fortusini, A., G. Scattini, M. Saracchi, and S. Cinquanta.** 1995. Indagini sull'epidemiologia della Flavescenza dorata della vite e su possibili interazioni tra infezioni virali e malattia (Investigations on the epidemiology of grapevine Flavescence dorée and on possible interactions between virus infections and disease). Riv. Pat. Veg., S.V, **5**:75-84.

Keywords :grapevine; phytoplasma disease; flavescence dorée; epidemiology; phytoplasma; interaction; virus; symptoms; Italy;
Notes : In Italian, Eng. sum. Flavescence dorée (FD) is present in southern France and northern Italy (Lombardia and Veneto). This paper reports on detailed inspections conducted during 6 years (1988-1993) in a vineyard of cv. Chardonnay in Oltrepò pavese (Lombardia). The vineyard was planted in 1982. It showed the first FD symptoms few years after planting and was never treated with insecticides. The rate of symptomatic plant ranged from 52.4% to 68.3% during the 6 year period of observations, with constant alternance of recovery and reinfections, typical of FD. 97 plants never showed any sign of disease. No evidence of a protection against FD by nepovirus infection was recorded. The possibility of resistance factors in these vines is being investigated.

553. **Frantz, E.J. and M.A. Walker.** 1995. Correlating ELISA values with the growth and yield components of GFLV infected grapevines. Vitis **34**:131-132.
Keywords :grapevine; grapevine fanleaf virus; ELISA; yield; growth; nepovirus; fanleaf; symptoms; performance; California; USA;
Notes : In a field trial made in California, performance parameters (growth and yield) of several Cabernet Sauvignon vines grafted on AXR#1 rootstock infected with grapevine fanleaf virus (GFLV) were determined in order to compare them with the results of ELISA. The correlation between ELISA absorbance values and berry weight, cluster weight and yield was negative. However, there was no correlation between ELISA values and prunung weights or berry numbers. Apparently, the virus titer is not the only factor which determines symptom expression in GFLV infected grapevines.

554. **Fraschini, P.** 1990. Nuovi portinnesti americani di vite resistenti ai nematodi (New American grapevine rootstocks resistant to nematodes). Vignevini **17***(4):*30-32.
Keywords :grapevine; nematode; resistance; *Xiphinema index; Xiphinema*; Longidoridae; nepovirus; grapevine fanleaf virus; control; rootstock; Italy;
Notes : The main aspects of this paper are resistance to *Meloidogyne* and *Xiphinema* in relation with direct damage. However, the problem of transmission of fanleaf virus by *X.index* is also discussed.

555. **Fresno, J.** 1992. Correlacion bioecologica entre nematodos trasmisores de virus y el virus del entrenudo corto (GFLV) (Bioecological correlation between virus vector nematodes and grapevine fanleaf virus). Faculty of sciences, University of Madrid, Madrid, Spain.
Keywords :grapevine; nematode; vector; *Xiphinema index*; Longidoridae; nepovirus; grapevine fanleaf virus; thesis; Spain;
Notes : PhD thesis, University of Madrid. In Spanish.

556. **Fresno, J. and M. Arias.** 1993. Detection of grapevine fanleaf virus (GFLV) in vineyards along the whole year and in its vector nematode *Xiphinema index*, p. 148-149. In P. Gugerli (ed.), Extended abstracts 11th Meeting ICVG, Montreux, Switzerland, 6-9 September 1993. Federal Agricultural Research Station of Changins, CH-1260 Nyon, Switzerland.
Keywords :grapevine; grapevine fanleaf virus; nepovirus; detection; ELISA; immunoassay; nematode; *Xiphinema index*; Longidoridae; Spain; meeting; ICVG;
Notes :GFLV concentration was analyzed by DAS-ELISA in different tissues of field- and glasshouse-grown vines: leaves, tip shoots, vine canes, tendrils, roots, apical meristem, primordia, bunches of grapes, isolated berries, skin of berries, at different levels of the plants. The virus was detected during the whole year, with a maximum sensitivity in young leaves and in the spring. The virus was also detected in small batches of *Xiphinema index* (five or more individuals).

557. **Fresno, J., M. Arias, J. del Moral, and J. Romero.** 1997. Grapevine leafroll (GLRaV), fleck (GFkV) and grapevine fanleaf (GFLV)-*Xiphinema index* in the vineyards of the Guadiana basin, Spain, p. 115-116. In O. A. Sequeira,de, J. C. Sequeira, and M. T. Santos (ed.), Extended abstracts 12th Meeting ICVG, Lisbon, Portugal, 29 September-2 October 1997. Dept.Plant Pathology, Estação Agronomica Nacional, Oeiras, Portugal.
Keyworde; Longidoridae; Spain; meeting; ICVG;

Notes : More than 1000 samples from vines and soil were collected in vineyards of La Mancha (Spain) and analysed by DAS-ELISA for the presence of the three viruses mentioned in the title and grapevine virus A (GVA). The most widespread virus was GFkV (36%), followed by GLRaV-3 (24%) and GLRaV-1 (6%). GFLV was less frequent than expected (about 6%) and GVA was never detected.

558. **Frison, E.A. and R. Ikin.** 1991. FAO/IBPGR Technical Guidelines for the Safe Movement of Grapevine Germplasm. Food and Agric. Organiz. (FAO), Int. Board for Plant Genetic Resources (IBPGR), Rome, Italy.
Keywords :grapevine; virus; virus-like diseases; viroid; phytoplasma disease; bacterial diseases; control; quarantine; hot water treatment; ajinashika disease; fanleaf; nepovirus; fleck; leafroll; line pattern; rugose wood; yellow dwarf; yellow mottle; yellow speckle; asteroid mosaic; bushy stunt; enation; incompatibility; roditis leaf discoloration; summer mottle; vein mosaic; vein necrosis; flavescence dorée; Pierce's disease;
Notes : This publication results from a meeting held at Athens in September 1990. Its aim is to establish special quarantine measures recommended for the international exchange of grape germplasm material between Institutes. It is not intended as guidelines for commercial quarantine. Booklet.

559. **Fry, S.M., J. S. Huang, and R.D. Milholland.** 1994. Isolation and preliminary characterization of extracellular proteases produced by strains of *Xylella fastidiosa* from grapevines. Phytopathology **84**:357-363.
Keywords :grapevine; Pierce's disease; *Xylella fastidiosa;* protein; enzyme; USA;

560. **Fry, S.M. and R.D. Milholland.** 1988. Multiplication and translocation of the Pierce's disease bacterium in grapevines. Phytopathology **78**:1451.
Keywords :grapevine; Pierce's disease; bacterium; multiplication; symptoms; USA;
Notes : French Colombard susceptible and Carlos (muscadine) resistant, both inoculated with Pierce's disease bacterium. Study of multiplication and translocation of the disease agent in vines.

561. **Fry, S.M. and R.D. Milholland.** 1990. Multiplication and translocation of *Xylella fastidiosa* in petioles and stems of grapevine resistant, tolerant, and susceptible to Pierce's disease. Phytopathology **80**:61-65.
Keywords :grapevine; Pierce's disease; *Xylella fastidiosa;* resistance; tolerance; susceptibility; multiplication; strain; USA;
Notes : French Colombard is susceptible to Pierce's disease bacterium; *Vitis rotundifolia*, cv. Carlos is tolerant; *V. rotundifolia* cv. Noble is resistant. There are differences in multiplication rate and translocation speed between susceptible and tolerant or resistant varieties.

562. **Fry, S.M. and R.D. Milholland.** 1990. Response of resistant, tolerant, and susceptible grapevine tissues to invasion by the Pierce's disease bacterium, *Xylella fastidiosa*. Phytopathology **80**:66-69.
Keywords :grapevine; Pierce's disease; *Xylella fastidiosa;* symptoms; resistance; tolerance; susceptibility; variety; USA;
Notes : The occlusion of leaf veins by bacteria and pectins, and by tyloses are the main causes of grapevine dieback due to Pierce's disease bacterium. The occlusion by tyloses is identical in the 3 var. considered (French Colombard, susceptible; *Vitis rotundifolia* Carlos tolerant; *V. rotundifolia* Noble resistant). The occlusion by bacteria and pectins is greatest in *V. vinifera.*

563. **Fry, S.M., R.D. Milholland, and P.Y. Huang.** 1990. Isolation and growth of strains of *Xylella fastidiosa* from infected grapevines on nutrient agar media. Plant Disease **74**:522-524.
Keywords :grapevine; Pierce's disease; *Xylella fastidiosa;* strain; USA;
Notes : Two strains of *Xylella fastdiosa* have been distinguished, named FC and C. Strain C grows more slowly than FC. Both strains show a loss of aggressiveness after 8 months of subculturing.

564. **Fuchs, M.** 1987. Grapevine fanleaf virus detection by molecular hybridization with cDNA probes. Bulletin OEPP/EPPO Bulletin **17**:314-315.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; detection; nucleic acid assay; cDNA; France;

Notes :31st Meeting of the French Phytopathological Society., Versailles, 13-14 November 1986.

565. **Fuchs, M.** 1989. Le Grapevine fanleaf virus, agent du court-noué de la vigne: approche moléculaire de la prémunition, structure et expression du RNA satellite (Grapevine fanleaf virus, agent of grapevine fanleaf: molecular aspects of cross-protection, structure and expression of satellite RNA). Université Louis Pasteur, Stasbourg, France, 191 p.
Keywords :grapevine; nepovirus; fanleaf; grapevine fanleaf virus; court-noué; structure; satellite RNA; cross-protection; thesis; France;
Notes : PhD thesis, in French.University Louis Pasteur, Strasbourg, France.

566. **Fuchs, M., M. Pinck, L. Etienne, L. Pinck, and B. Walter.** 1991. Characterization and detection of grapevine fanleaf virus by using cDNA probes. Phytopathology **81**:559-565.
Keywords :grapevine; nepovirus; fanleaf; grapevine fanleaf virus; detection; nucleic acid assay; cDNA; dot blot hybridization; France;

567. **Fuchs, M., M. Pinck, M.A. Serghini, L. Pinck, and B. Walter.** 1991. The satellite RNA associated with grapevine fanleaf virus strain F13, p. 131-137. In I. C. Rumbos, R. Bovey, D. Gonsalves, W. B. Hewitt, and G. P. Martelli (ed.), Proceedings of the 10th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG). Plant Protection Institute, P.O. Box 303, 38001 Volos, Greece.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; strain; satellite RNA; symptoms; virus multiplication; France; meeting; ICVG;
Notes : Several strains of grapevine fanleaf virus (GFLV), in particular strain F13, have a satellite RNA in addition to the two genomic RNAs. Biologically active transcripts of the F13 satellite RNA were synthesized and co-inoculated to *Chenopodium quinoa* with strains of GFLV devoid of satellite RNA. A comparison with *C.quinoa* inoculated without satellite RNA shows that this additional RNA causes a delay in symptom expression and a reduction in the amount of virions formed.

568. **Fuchs, M., M. Pinck, M.A. Serghini, M. Ravelonandro, B. Walter, and L. Pinck.** 1989. The nucleotide sequence of satellite RNA in grapevine fanleaf virus, strain F 13. J. Gen. Virol. **70**:955-962.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; nucleotide sequence; satellite RNA; RNA; strain; F 13; France;

569. **Fuchs, M., B. Walter, M. Pinck, and L. Pinck.** 1989. Genome study of grapevine fanleaf virus Phytoparasitica **17**:58.
Keywords :grapevine; grapevine fanleaf virus; nepovirus; genome; viral RNAs; nucleotide sequence; arabis mosaic virus; nucleic acid assay; satellite RNA; F 13; meeting; ICVG; France;
Notes : Abstract. This paper appears in full in the Proceedings of the 9th meeting of ICVG, Kiryat Anavim, Israel, 1987, 11-16, 1989.

570. **Fuchs, M., B. Walter, M. Pinck, and L. Pinck.** 1989. A study of the genome of grapevine fanleaf virus, p. 11-16. In E. Tanne (ed.), Proceedings of the 9th Meeting of the International Council for the Study of Viruses and Virus Disease of the Grapevine (ICVG), Kiryat Anavim, Israel, September 1987. The Volcani Center, P.O. Box 6, Bet Dagan , Israel.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; arabis mosaic virus; F 13; nucleic acid assay; genome; viral RNAs; nucleotide sequence; satellite RNA; France; meeting; ICVG;
Notes : The different isolates of grapevine fanleaf virus (GFLV) reported so far have a bipartite genome of single positive-stranded RNA molecules. The F13 isolate reported in this paper differs from the other isolates by the severity of the symptoms induced in *Chenopodium quinoa* and the presence of an additional low molecular weight RNA 3. The properties of the three RNAs are given.cDNA copies of the viral RNA were used as molecular tools for the detection of viral RNA in northern blot hybridizations in extracts of various organs of host plants of the virus.

571. **Gabrijel, S.** 1987. *Scaphoideus titanus* Ball (= *Sc. littoralis* Ball), novi stetnik vinove loze u Jugoslaviji (*Scaphoideus titanus* Ball (= *Sc. littoralis* Ball), new parasite of grapevine in Yugoslavia). Zasht. Bilja **38**:349-357.
Keywords :grapevine; phytoplasma disease; flavescence dorée; *Scaphoideus titanus;* leafhopper; occurrence; Slovenia;
Notes : In southwestern Slovenia, five species of leafhoppers were recorded so far on grapevine: *Philaenus spumarius, Cercopis sanguinea* (Cercopidae), *Empoasca flavescens* (Typhlocibidae), *Stictocephala bisonia* (Membracidae), *Scaphoideus titanus* (Jassidae). *S. titanus* Ball was found for the first time near Goriska Brda in 1983, and was later found to be widespread in southwestern Slovenia.

572. **Galet, P.** 1995. Précis de pathologie viticole (Handbook of grapevine phytopathology). Lavoisier Tec & Doc, 11 rue Lavoisier, F-75384 Paris Cedex 08.
Keywords :grapevine; pathology; handbook; France;
Notes : In French. This book is a shortened and updated version of the well known 2- volume book "Les maladies et les parasites de la vigne" published in 1977.

573. **Gallitelli, D., G.P. Martelli, and A. Di Franco.** 1989. Grapevine Algerian latent virus, a newly recognized tombusvirus, p. 41-48. In E. Tanne (ed.), Proceedings of the 9th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG), Kiryat Anavim, Israel, September 1987. The Volcani Center, P.O. Box 6, Bet Dagan , Israel.
Keywords :grapevine; grapevine Algerian latent virus; tombusvirus; purification; properties; cytopathology; ultrastructure; symptoms; Algeria; Italy; meeting; ICVG;
Notes : A new mechanically transmissible virus was found in a *Vitis vinifera* grapevine in the region of Mascara in western Algeria, and was named Algerian latent virus. It belongs to the group of tombusviruses and has isometric particles of *ca.* 32 nm in diameter. Purified preparations contained a single component sedimenting at 128S with a buoyant density in cesium chloride of 1.34 g/cm^3 .The genome is a single-stranded RNA with an apparent size of 4700 nucleotides and shows 15% estimated homology with the type strain of tomato bushy stunt. The viral capsid is made up of a single type of protein with an estimated mw. of 37 kD. The ultrastructure of infected cells and cytopathology is similar to that of other members of the tombusvirus group. Attempts to re-inoculate the virus to grapevine seedlings were unsuccessful.

574. **Gallitelli, D., G.P. Martelli, and A. Di Franco.** 1989. Grapevine Algerian latent virus, a newly recognized tombusvirus . Phytoparasitica **17**:61-62.
Keywords :grapevine; grapevine Algerian latent virus; tombusvirus; purification; properties; ultrastructure; symptoms; Algeria; meeting; ICVG;
Notes : Abstract. This paper appears in full in the Proceedings of the 9th meeting of ICVG, Kiryat Anavim, Israel, 1987, 41-48 (1989).

575. **Gallitelli, D., V. Savino, and G.P. Martelli.** 1985. The use of a spot hybridization method for the detection of Grapevine virus A in the sap of Grapevine. Phytopath. medit. **24**:221-224.
Keywords :grapevine; vitivirus; GVA; nucleic acid assay; detection; Italy;

576. **Galzy, R.** 1985. Les possibilités de conservation *in vitro* d'une collection de clones de vignes (Possibilities of keeping grapevine clones in *in vitro* collections). Bull. OIV **58**:377-390.
Keywords :grapevine; clonal selection; collection; *in vitro;* France;
Notes : In French. *In vitro* culture provides a very useful way of keeping grapevine clones free of contamination by viruses or other pathogens, with the advantage of needing less space and work than a collection in a screenhouse or in the field.

577. **Garau, R., P.P. Fiori, V.A. Prota, G. Tolu, M. Fiori, and U. Prota.** 1997. Effect of virus infection on own-rooted clones of different wine grapes cultivars from Sardinia, p. 171-172. In O. A. Sequeira,de, J. C. Sequeira, and M. T. Santos (ed.), Extended abstracts 12th Meeting ICVG, Lisbon, Portugal, 29 September-2 October 1997. Dept.Plant Pahtology, Estação Agronomica Nacional, Oeiras, Portugal.

Keywords :grapevine; performance; economic importance; leafroll; closterovirus; GLRaV-1; GLRaV-2; GLRaV-3; nepovirus; grapevine fanleaf virus; grapevine fleck virus; Italy; meeting; ICVG;
Notes : Own-rooted clones of several grapevine cultivars (Cannonau, Pascale di Cagliari, Vermentino and Vernaccia) were tested by ELISA for the presence of GVA, GLRaV-1, -2 and -3, and GFkV. 25 virus-free clones and 56 virus-infected clones were compared for their performances during 9 years (1988-1996). Only cv. Cannonau showed a significant difference in yield (-21,6%) , but the differences in sugar content and acidity (-4.4% and -0.4% respectively) were not significant. For the three other varieties, the differences in yield, sugar content and acidity were not significant. These results may seem surprising, but the collection in which this experiment was made already resulted from a selection. Most of the clones were symptomless and had already reached a pomological and yield performance above the average. On the other hand, the fact that the vines were not grafted may explain the relatively low difference in performance between healthy and virus-infected clones.

578. **Garau, R., C. Minucci, V.A. Prota, G. Boccardo, and M. Fiori.** 1997. Phytoplasma diseases of grapevines in Sardinia, p. 71-72. In O. A. Sequeira,de, J. C. Sequeira, and M. T. Santos (ed.), Extended abstracts 12th Meeting ICVG, Lisbon, Portugal, 29 September-2 October 1997. Dept.Plant Pathology, Estação Agronomica Nacional, Oeiras, Portugal.
Keywords :grapevine; phytoplasma disease; aster yellows; Sardinia; Italy; meeting; ICVG;
Notes : Symptoms of yellows-diseases of grapevine occurring in Sardinia are described. As *Scaphoideus titanus* is not present in the island, the presence of flavescence dorée can be ruled out. Molecular hybridization test made at the Istituto di Fitopatologia applicata in Torino with a probe (EAY 352) specific for European aster yellows gave positive results with six cultivars affected by yellows. The situation in Sardinia is therefore similar to that occurring in southern Italy. The origin of the infection is more likely to be in the environment of vineyards than in imported rootstock or graftwood material.

579. **Garau, R., V. Padilla, I. Rumbos, B. Walter, and V. Savino.** 1997. Indexing for the identification of virus and virus-like diseases of the grapevine, p. 97-117. In B. Walter (ed.), Sanitary selection of the grapevine. Protocols for detection of viruses and virus-like diseases (Les Colloques no 86). INRA Editions, Paris, France.
Keywords :grapevine; virus; virus-like diseases; identification; indexing; method; France;

580. **Garau, R., U. Prota, and M. Cugusi.** 1989. Reproduction of enation symptoms by grafting in Sardinia. Phytoparasitica **17**:76.
Keywords :grapevine; enation; graft transmission; Sardinia; Italy; symptoms; meeting; ICVG;
Notes : This paper appears in full in the Proceedings of the 9th meeting of ICVG, Kiryat Anavim, Israel, 1987, 203-206 (1989). The name of the 3rd author, M. Cugusi, was omitted in the abstract published in Phytoparasitica. It is included in this reference.

581. **Garau, R., U. Prota, and M. Cugusi.** 1989. Studies on reproduction of enation symptoms by grafting in Sardinia, p. 203-206. In E. Tanne (ed.), Proceedings of the 9th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG), Kiryat Anavim, Israel, September 1987. The Volcani Center, P.O. Box 6, Bet Dagan , Israel.
Keywords :grapevine; enation; graft transmission; symptoms; Sardinia; Italy; meeting; ICVG;
Notes : Enation disease is present in Sardinia. It can be reproduced by grafting, but no vector is known. In experiments aiming at determining the susceptibility of different cultivars and rootstocks to graft transmission of the disease, the hybrid LN33 (Couderc 1613 x *Vitis vinifera*) was found to be the most sensitive grapevine indicator. It was possible, with this hybrid, to detect latent infection in *V.vinifera* cultivars. The experiment confirmed the inconsistency in symptom reproduction in consecutive years and, in general, the late appearance of enations, usually not before 2 years after grafting.

582. **Garau, R., U. Prota, and M. Cugusi.** 1989. Research on wood disorders (stem pitting and/or stem grooving) of grapevine in Sardinia. Phytoparasitica **17**:71.
Keywords :grapevine; rugose wood; stem pitting; stem grooving; graft transmission; indexing; closterovirus; electron microscopy; Sardinia; Italy; meeting; ICVG;

Notes : Abstract. This paper appears in full in the Proceedings of the 9th meeting of ICVG, Kiryat Anavim, Israel, 1987, 135-141 (1989). The name of the third author, M. Cugusi, was omitted in the abstract. It is added in this reference.

583. **Garau, R., U. Prota, and M. Cugusi.** 1989. Investigations on wood disorders (stem pitting and/or stem grooving) of grapevine in Sardinia, p. 135-141. In E. Tanne (ed.), Proceedings of the 9th meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG), Kiryat Anavim, Israel, September 1987. The Volcani Center, P.O. Box 6, Bet Dagan , Israel.
Keywords :grapevine; rugose wood; stem pitting; stem grooving; rupestris stem pitting; corky bark; closterovirus-like particles; graft transmission; indexing; Sardinia; Italy; meeting; ICVG;
Notes : Several clones of Italia vines were indexed on LN 33, St-George, Kober 5BB, 110 R, Baco 22A, *Vitis vinifera* cv. Barbera. Closteroviruses were present in almost all donor plants. The results confirm the idea that wood disorders are of several types. Beside corky bark and rupestris stem pitting (Goheen), a third disease is present.

584. **Garau, R., V.A. Prota, D. Boscia, M. Fiori, and U. Prota.** 1995. *Pseudococcus affinis* Mask., new vector of grapevine trichoviruses A and B. Vitis **34**:67-68.
Keywords :grapevine; vitivirus; GVA; GVB; *Pseudococcus affinis;* mealybug; vector; transmission; epidemiology; Italy;
Notes : Grapevine virus A (GVA) and grapevine virus B (GVB) [formerly attributed to the trichovirus group and now belonging to the new vitivirus group (1997)], were transmitted experimentally by the mealybug *Pseudococcus affinis* Mask. from grapevine to herbaceous hosts. This is the fourth mealybug species which is capable of transmitting these viruses.

585. **Garau, R., V.A. Prota, D. Boscia, R. Piredda, and U. Prota.** 1993. Studies on grapevine virus B isolates from corky bark-affected vines in Sardinia. Riv. Pat. Veg., S.V, **3**:83-89.
Keywords :grapevine; rugose wood; corky bark; vitivirus; GVB; isolate; Sardinia; Italy;
Notes : Two groups of *Vitis* inducing distinct corky bark reactions in graft transmission to LN33 were identified in Sardinia. Grapevine virus B (GVB) was isolated in over 60% of mechanical transmissions to *Nicotiana occidentalis* from donors inducing severe symptoms on LN33, but not from donors eliciting weak and erratic reaction on this indicator. It appears that there are variants of GVB with distinct symptom severity on LN33.

586. **Garau, R., V.A. Prota, D. Boscia, R. Piredda, and U. Prota.** 1993. Grapevine virus B in Sardinia, p. 47-48. In P. Gugerli (ed.), Extended abstracts 11th Meeting ICVG, Montreux, Switzerland, 6-9 September 1993. Federal Agricultural Research Station of Changins, CH-1260 Nyon, Switzerland.
Keywords :grapevine; GVB; vitivirus; corky bark; occurrence; rugose wood; etiology; Sardinia; Italy; meeting; ICVG;
Notes :GVB is a closterovirus 800 nm long recently isolated from corky bark-infected vines (Boscia *et al.*, 1993, Arch.virol., 130, 109-120). The virus was transmitted to *Nicotiana occidentalis* by mechanical inoculation with sap from young roots of greenhouse-forced grapevine cuttings. It induced necrotic local lesions followed by systemic vein clearing. Dodder can acquire the virus, but it is unable to transmit it. GVB is common in Sardinia and is often associated with corky bark. Variants of the virus can be distinguished by the symptoms induced in herbaceous hosts.

587. **Garau, R., V.A. Prota, R. Piredda, D. Boscia, and U. Prota.** 1993. Kober stem grooving and grapevine virus A: a possible relationship, p. 54-55. In P. Gugerli (ed.), Extended abstracts 11th Meeting ICVG, Montreux, Switzerland, 6-9 September 1993. Federal Agricultural Research Station of Changins, CH-1260 Nyon, Switzerland.
Keywords :grapevine; rugose wood; rupestris stem pitting; LN 33 stem grooving; Kober stem grooving; etiology; GVA; relationship; immunoassay; ELISA; corky bark; GLRaV-1; GLRaV-3; closterovirus; vitivirus; detection; indexing; Italy; ICVG; meeting;
Notes : Rugose wood is common in Sardinia. Rupestris stem pitting (RSP), Kober stem grooving (KSG), corky bark (CB) and LN 33 stem grooving (LNSG) were all identified. An analysis of the data of indexing

trials with 84 donor vines of different cvs. and the relative presence of GVA, GLRaV-I and GLRaV-III has revealed a preferential association of GVA with Kober stem grooving.

588. **Garau, R., V.A. Prota, R. Piredda, D. Boscia, and U. Prota.** 1994. On the possible relationship between Kober stem grooving and grapevine virus A. Vitis **33**:161-163.
Keywords :grapevine; rugose wood; rupestris stem pitting; Kober stem grooving; etiology; GVA; vitivirus; associated; closterovirus-like particles; indexing; Italy;
Notes : In order to establish a possible relationship between two diseases of the rugose wood complex,i.e. Rupestris stem pitting (RSP) and Kober stem grooving (KSG) with GVA, GLRaV I or III, 84 cloned accessions of different grapevine cvs. were analyzed by ELISA and by indexing on *Vitis rupestris*, Kober 5BB and LN33. A close association of GVA with Kober stem grooving was recorded. None of the viruses examined (GVA, GLRaV I and III) is involved in the etiology of Rupestris stem pitting.

589. **Garau, R., V.A. Prota, R. Piredda, and U. Prota.** 1993. Further studies on corky bark in Sardinia, p. 72-73. In P. Gugerli (ed.), Extended abstracts 11th Meeting ICVG, Montreux, Switzerland, 6-9 September 1993. Federal Agricultural Research Station of Changins, CH-1260 Nyon, Switzerland.
Keywords :grapevine; rugose wood; corky bark; GVB; vitivirus; indexing; indicator; graft transmission; Sardinia; Italy; meeting; ICVG;
Notes : Indexing 87 *Vitis vinifera* clones of white and red fruited varieties by omega graft with LN 33 and several other *Vitis* rootstocks or *V.vinifera* cvs. as indicators showed that donor vines can be classified in two groups according to their reaction on LN 33: 1) Vines producing typical strong symptoms of corky bark and 2) Vines producing mild, incomplete or inconsistent reactions. Grapevine virus B was recovered from 63 % of the vines that reacted with symptoms of type 1), and from none of the vines producing symptoms of type 2). Diagnosis based on symptoms in the field is not reliable. CB is often latent in *V.vinifera.* No better indicator than LN 33 has been found so far, and even this hybrid gave sometimes unclear responses.

590. **Garau, R., V.A. Prota, R. Piredda, and U. Prota.** 1993. A stunting factor in *Vitis vinifera* transmitted by grafting to Kober 5BB, p. 74-75. In P. Gugerli (ed.), Extended abstracts 11th Meeting ICVG, Montreux, Switzerland, 6-9 September 1993. Federal Agricultural Research Station of Changins, CH-1260 Nyon, Switzerland.
Keywords :grapevine; incompatibility; stunting factor; etiology; indexing; Sardinia; Italy; meeting; ICVG;
Notes : Severe stunting occurred in several cases when Kober 5BB was grafted onto different *Vitis vinifera* varieties in the course of indexing. Attempts to identify the stunting factor, which is graft-transmissible and probaly of viral nature, have so far failed. It does not produce symptoms on *V.vinifera, V.rupestris* and LN 33.

591. **Garau, R., V.A. Prota, R. Piredda, and U. Prota.** 1994. Investigations on a stunting factor in *Vitis vinifera* L. transmissible by grafting to 'Kober 5BB'. Phytopath. medit. **33**:113-118.
Keywords :grapevine; incompatibility; stunting factor; graft transmission; etiology; Italy; Sardinia;
Notes : This paper reports on research carried out in Sardinia (Italy) on an incompatibility factor that is symptomless in *Vitis rupestris*, LN33 and *V.vinifera* L., and produces symptoms when certain clones of Malvasia di Bosa, and to a lesser extent Aleatico, Cannonau, Monica, Pascale di Cagliari and Vermentino are grafted onto Kober 5BB. Rupestris stem pitting, leafroll, fleck, GVA, GVB, GLRaV I and III were detected in incompatible as well as in normal clones, without any clear relation with incompatibility. Apparently the incompatibility factor is a graft-transmissible pathogen that is distinct from these viruses.

592. **Garau, R., V.A. Prota, R. Piredda, and U. Prota.** 1994. New observations on corky bark in Sardinia. Phytopath. medit. **33**:168-171.
Keywords :grapevine; rugose wood; corky bark; occurrence; symptoms; indexing; Sardinia; Italy;
Notes : Corky bark is present in Sardinia, but in low incidence, depending on the cultivar. Diagnosis by symptoms on the vines in the field is not reliable. Corky bark may be latent in *Vitis vinifera*. Indexing is therefore mandatory for selection. No better indictor than LN33 can be proposed.

593. **Garau, R., V.A. Prota, and U. Prota.** 1991. Distribution of Kober stem grooving and Rupestris stem pitting of grapevine in symptomless cv. Torbato scions, p. 175-181. In I. C. Rumbos, R. Bovey, D. Gonsalves, W. B. Hewitt, and G. P. Martelli (ed.), Proceedings of the 10th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG). Plant Protection Institute, P.O. Box 303, 38001 Volos, Greece.
Keywords :grapevine; legno riccio; Kober stem grooving; rupestris stem pitting; rugose wood; graft transmission; symptoms; Italy; meeting; ICVG;
Notes : Three symptomless cv. Torbato scions grafted onto Kober 5BB rootstocks which showed severe symptoms of "legno riccio" (rugose wood) were analysed for the presence of graft transmissible factors eliciting alterations of the woody cylinder. Pruning wood from these plants was collected during 5 years and omega grafted onto healthy Kober 5BB and *Vitis rupestris* (932 grafts). After several years of growth (2-6 years), the vines were pulled out and peeled for symptom observation on the woody cylinder. No symptom appeared on the Torbato scion part. All Kober 5BB showed severe and extended stem grooving (longitudinal grooves) , and all *V. rupestris* showed stem pitting (small pits sometimes grouped in longitudinal bands). It was concluded that Torbato plant were systematically infected with two graft-transmissible factors, without showing symptoms, possibly Kober stem grooving and rupestris stem pitting.

594. **Garcia, G., C. Chay, A. Rowhani, F. Ponz, and J. Romero.** 1991. Clonaje y caracterizacion de cDNA del virus del entrenudo corto infeccioso de la vid (GFV) (Cloning and characterization of cDNA of grapevine fanleaf virus). Phytopathology **81**:693.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; detection; cloning; cDNA; viral proteins; *in vitro;* synthesis; USA;
Notes : Cloning cDNA of GFLV. *In vitro* synthesis of viral proteins using rabbit reticulocytes.

595. **Garcia-Arenal, F., V. Pallas, and R. Flores.** 1987. The sequence of a viroid from grapevine closely related to severe isolates of citrus exocortis viroid. Nucleic Acids Research **15**:4203-4210.
Keywords :grapevine; viroid; CEVd-g; nucleotide sequence; Spain;
Notes : The primary structure of a grapevine viroid (GVs) isolated in Spain was determined. The sequence consisted of 369 nucleotides residues forming a circular molecule. GVs presented extensive homology with viroids of the potato spindle tuber (PSTV) group, that was specially high in the case of citrus exocortis viroid (CEV), both with cases causing severe (92% with CEV-A) and mild (89% with CEV-DE26) symptoms on tomato. Comparisons of secondary structures of GVs and CEV-A were reported.

596. **Garcia-Benavides, P., J. Lopez-Robles, J. Fresno, and M. Arias.** 1994. Correlacion entre *Xiphinema index* y el virus del entrenudo corto en los viñedos de Castilla-Leon (España central) (Correlation between *Xiphinema index* and grapevine fanleaf virus in vineyards of Castile-Leon, Central Spain). Nematol. medit. **22**:21-24.
Keywords :grapevine; nematode; vector; *Xiphinema index;* Longidoridae; nepovirus; grapevine fanleaf virus; Spain;
Notes : In Spanish, Eng. sum.

597. **Garnsey, S.M. and M. Cambra.** 1993. Enzyme-linked immunosorbent assay (ELISA), p. 169-192. In G. P. Martelli (ed.), Graft-transmissible diseases of grapevines. Handbook for detection and diagnosis. FAO, Rome.
Keywords :grapevine; immunoassay; ELISA; method; USA;

598. **Gärtel, W.** 1985. Über eine gefährliche, im deutschen Weinbau erstmals an der Kernerrebe beobachtete Rebenkrankheit (On a dangerous grapevine disease found for the first time in German viticulture on cv. Kerner). Rebe und Wein,Weinsberg **38**:406-410.
Keywords :grapevine; Kerner disease; symptoms; occurrence; Germany;
Notes : In German. The new grapevine variety Kerner obtained in 1969 by crossing Riesling with Trollinger was first affected around the years 1979-1980 by a severe disease called Kerner Krankheit in German, Kerner disease in English. The author describes the symptoms and occurrence of the disease in German vineyards. The similarity of symptoms with stem pitting is noted, but the cause of Kerner disease is

not known. Bacteria were found in xylem using the scanning electron microscope, but their role in the disease cannot be ascertained. So far, no control measure can be recommended.

599. **Gemmrich, A.R.** 1989. Neue Verfahren zum Nachweis von Viren in Reben (New methods for detecting viruses in grapevines). Rebe und Wein,Weinsberg **42**:55-57.
Keywords :grapevine; immunoassay; ELISA; detection; diagnosis; control; Germany;
Notes : In German. The author discusses the advantages and disadvantages of the most recent tests used for detecting grapevine viruses, i.e. ELISA and the nucleic acid hybridization test (called here NUSHY-Test for Nukleinsäurehybridisierungs-Test). The NUSHY test is more sensitive, can be used all the year round, and can be varied in the range of its array of detected viruses. The author consider it as much better than ELISA for routine work.

600. **Gemmrich, A.R. and E. Konstanzer.** 1992. Wie sicher sind serologische Teste ? (How sure are serological tests ?). Der Deutsche Weinbau **47**:494-495.
Keywords :grapevine; nepovirus; arabis mosaic virus; grapevine fanleaf virus; leafroll; associated; closterovirus; detection; immunoassay; quarantine; sanitary selection; certification; Germany;
Notes : Discussion on the reliability of serological tests for the detection of plant viruses, in particular grapevine fanleaf virus, leafroll-associated viruses, arabis mosaic virus.

601. **Gemmrich, A.R., G. Link, and M. Seidel.** 1993. Detection of grapevine fanleaf virus (GFLV) in infected grapevines by non-radioactive nucleic acid hybridisation. Vitis **32**:237-242.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; detection; comparison; cDNA; northern blot; nucleic acid assay; immunoassay; ELISA; method; Germany;
Notes :A nucleic acid hybridization method using a non-radioactive labeled cDNA probe was developed for detecting grapevine fanleaf virus (GFLV) in grapevine tissue extracts. Detection in crude sap of grapevine was too erratic. A method was therefore developed for extracting the total RNA in a large number of samples using a microscale system. GFLV infections were easily and successfully detected by Northern blot hybridization or by slot blot hybridization. Discrepancies were sometimes observed between the results of ELISA and slot blot. The hybridization method is more laborious than ELISA and appears to be especially suitable for testing extracts of several samples mixed together.

602. **Ghorbani, S.** 1988. Identification of grapevine fanleaf virus in Iran, p. 61. In Abstracts of the 5th International Congress of Plant Pathology, Kyoto, Japan.
Keywords :grapevine; nepovirus; fanleaf; grapevine fanleaf virus; occurrence; meeting; ISPP; Iran;
Notes : First "official" report of GFLV in Iran. Congress ISPP,Kyoto, Japan. Abstract. Book chapter.

603. **Gil Monreal, M.** 1985. Palomino: Seleccion clonal y sanitaria (Palomino, clonal and sanitary selection). Vina y Vino *(28):*44-46.
Keywords :grapevine; clonal selection; sanitary selection; heat therapy; virus elimination; Palomino; Spain;
Notes : Mostly sanitary selection, heat therapy.

604. **Girolami, V. and E. Egger.** 1993. Prevenzione e cura (Prevention and cure), p. 49-54. In E. Refatti (ed.), Extended Abstract, Convegno "La flavescenza dorata ed altri giallumi della vite, stato attuale delle conoscenze e problemi di lotta". Eurovite'93, Gorizia, Italy.
Keywords :grapevine; phytoplasma disease; flavescence dorée; *Scaphoideus titanus*; leafhopper; control; insecticide; hot water treatment; Italy;
Notes : In Italian. Extended abstracts of papers presented at a meeting on flavescence dorée (FD) and other grapevine yellows at Gorizia, Italy, in December 1993. Role of contamination in nursery, possibility of improving diseased vines by pollarding, use of hot water bath for destroying phytoplasmas in grapevine graftwood and rootstocks, chemical sprays against the vectors.

605. **Goheen, A.C.** 1989. Virus diseases and grapevine selection. Amer. J. Enol. Vitic. **40**:67-72.

Keywords :grapevine; virus diseases; virus-like diseases; clonal selection; sanitary selection; review; USA; California;
Notes : Retirement lecture of A.C. Goheen. Review on grapevine sanitary selection in California.

606. **Goheen, A.C., D. Gonsalves, G.P. Martelli, D.C. Ramsdell, V. Savino, and G. Stellmach.** 1988. Diseases caused by viruses and viruslike agents, p. 47-54. In R. C. Pearson and A. C. Goheen (ed.), Compendium of grape diseases. APS Press, The American phytopathological Society, St. Paul, Minnesota 55121, USA.
Keywords :grapevine; virus diseases; virus-like diseases; handbook; corky bark; grapevine fanleaf virus; nepovirus; trichovirus; vitivirus; closterovirus; tomato ringspot virus; tobacco ringspot virus; peach rosette mosaic virus; leafroll; rugose wood; rupestris stem pitting; USA;
Notes : The part of this book concerning virus and virus-like diseases contains following chapters, illustrated by colour photographs: Martelli, G.P. & Savino, V.: Fanleaf degeneration; Gonsalves, D.: Tomato ringspot virus decline; Gonsalves, D.: Tobacco ringspot decline; Ramsdell, D.C.: Peach rosette mosaic decline; Goheen, A.C.: Leafroll; Goheen, A.C.: Corky bark; Goheen, A.C.: Rupestris stem pitting; Goheen, A.C. & Stellmach, G.: Other virus and viruslike diseases. Compendium APS Press. Book chapter.

607. **Goheen, A.C. and D. L. Hopkins.** 1988. Pierce's disease, p. 44-45. In R. C. Pearson and A. C. Goheen (ed.), Compendium of grape diseases. APS Press, American Phytopathological Society, St. Paul, Minnesota, 55121 USA.
Keywords :grapevine; Pierce's disease; handbook; USA;
Notes : This chapter is illustrated by colour photographs. Compendium APS Press. Book chapter.

608. **Golino, D.A.** 1992. The Davis grapevine virus collection. Amer. J. Enol. Vitic. **43**:200-205.
Keywords :grapevine; virus; collection; viroid; leafroll; corky bark; rugose wood; rupestris stem pitting; nepovirus; grapevine fanleaf virus; tomato ringspot virus; strain; California; USA;
Notes : This paper describes the collection of grapevine viruses, virus-like diseases and indicators established at the University of California, Davis, USA. The collection provides material for research, comparative studies and teaching to many Institutes in USA and in other countries.

609. **Golino, D.A.** 1993. Potential interactions between rootstocks and grapevine latent viruses. Amer. J. Enol. Vitic. **44**:148-152.
Keywords :grapevine; etiology; incompatibility; bushy stunt; corky bark; Kober stem grooving; leafroll; legno riccio; rugose wood; LN 33 stem grooving; rupestris stem pitting; vein mosaic; vein necrosis; California; USA;
Notes : A list of virus and virus-like diseases likely to affect rootstock- scion compatibility includes: bushy stunt (Savino et al. 1991), corky bark, infectious graft incompatibility (Durquéty et al., 1973; Legin and Walter, 1986), Kober stem grooving, leafroll, legno riccio, LN33 stem grooving, rupestris stem pitting, vein mosaic, vein necrosis. It is completed by a summary of studies on the subject by Prudencio (1985) and Credi et al.(1991). Cases were reported in California of virus-like diseases diseases occurring in vineyards with certified rootstocks and whose scion wood came from non certified, but symptom-free vines. Hypothesis of an interaction between scion and rootstock. A virus that can be latent on some rootstocks may be virulent on others.

610. **Golino, D.A.** 1993. Pierce's disease, p. 107-114. In G. P. Martelli (ed.), Graft-transmissible diseases of grapevines. Handbook for detection and diagnosis. FAO, Rome.
Keywords :grapevine; Pierce's disease; *Xylella fastidiosa;* symptoms; transmission; detection; diagnosis; control; USA;

611. **Golino, D.A. and V. Butler.** 1991. A preliminary analysis of grapevine indexing records at Davis, California, p. 369-372. In I. C. Rumbos, R. Bovey, D. Gonsalves, W. B. Hewitt, and G. P. Martelli (ed.), Proceedings of the 10th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG). Plant Protection Institute, P.O. Box 303, 38001 Volos, Greece.

Keywords :grapevine; indexing; fanleaf; fleck; leafroll; rugose wood; corky bark; rupestris stem pitting; USA; California; meeting; ICVG; occurrence;
Notes : The grapevine field indexing records of grapevine at the University of Davis, Calif. USA were computerized with a Lotus 1-2-3 programme. They include 6482 selections from around the world. The overall rates of infection were as follows: Leafroll (indexed with Cabernet franc): 22.6% ; Rupestris stem pitting (indexed with St.-George):30.5% ; Corky bark (indexed with LN33): 12.4% ; Fanleaf (indexed with St.-George): 14.4% ; Fleck (indexed with St.-George): 0.3%.

612. **Golino, D.A., P. Freese, and J.A. Wolpert.** 1993. Preliminary results on the use of meristem tip culture for the elimination of grapevine leafroll associated virus from four Napa Valley selections of Cabernet Sauvignon. Amer. J. Enol. Vitic. **44**:351-352.
Keywords :grapevine; leafroll; virus elimination; *in vitro;* meristem tip culture; performance; California; USA;
Notes : In view of the concern often encountered among viticulturists that virus elimination by heat therapy or meristem tip culture may be detrimental to wine quality, an experiment has been started with four Napa Valley Cabernet Sauvignon selections known for producing high qulity wines. Four typical vines were selected in each vineyard. The disease status of the original vines was determined by ELISA and woody indexing. All but one of these vines were ELISA positive for leafroll. Each of these vines have been subjected to meristem tip culture to eliminate viruses. Clones free of leafroll will be compared with the original material for their respective performances.

613. **Golino, D.A., P. Hargis, J. Phillips, A. Rowhani, and D. Gonsalves.** 1993. Ribavirin as an antiviral agent for treating selected grapevine viruses. Amer. J. Enol. Vitic. **44**:356.
Keywords :grapevine; leafroll; fanleaf; closterovirus; nepovirus; corky bark; virus elimination; *in vitro;* chemotherapy; ribavirin; California; USA;
Notes : Nodes taken from *Vitis vinifera* grapevines infected with grapevine fanleaf, grapevine leafroll associated viruses or grapevine corky bark were grown *in vitro* on media containing 0, 1, 10, 20, and 50 ppm ribavirin. Four-millimeter tips taken from these plants were cultured on standard media (without ribavirin) and the resulting plants were transferred to soil. ELISA testing was used to detect the presence of virus when plants reached at least 50 cm. All explants from nodes grown on media with 50 ppm ribavirin, and most of those from 20 ppm ribavirin media died. ELISA of nodes grown on ribavirin shows that the original viruses are still present, a fact that was expected as ribavirin only inhibits replication of viruses. The plants grown from tips of vines originally infected with GLRaV-4 were negative for virus. For the other viruses, results are mixed. Whether negative plants are really virus-free or only at a too low virus titre for detection will be ascertained in further tests.

614. **Golino, D.A., A. Rowhani, S. Sim, M. Cunningham, and R. Smith.** 1997. First report of grapevine Kober stem grooving in the United States. Plant Disease **81**:1094.
Keywords :grapevine; Kober stem grooving; rugose wood; closterovirus; GLRaV-2; GLRaV-3; vitivirus; GVA; indexing; USA; California;
Notes : For the first time, Kober 5BB was included as an indicator in a field survey in California. Kober stem grooving was detected on this indicator grafted with a selection of Sauvignon blanc from the County of Sonoma, and the determination was confirmed by ELISA showing the presence of GLRaV-2 and 3, as well as GVA which is known to be associated with Kober stem grooving. This is the first report of Kober stem grooving in the United States.

615. **Golino, D.A., A. Rowhani, P. Verdegaal, R. Smith, E. Weber, and A. Walker.** 1992. Grapevine fanleaf virus and tomato ringspot virus distribution in vineyards in three California counties as determined by F(ab')2 ELISA testing. Phytopathology **82**:1133 (Abstract A 658).
Keywords :grapevine; nepovirus; ELISA; F(ab')2; immunoassay; grapevine fanleaf virus; tomato ringspot virus; detection; survey; geographical distribution; California; USA;
Notes :GFLV was detected in 17 of 44 sites in San Joaquin county, 11 of 27 sites in Sonoma county and 22 of 32 sites in Napa county. TomRSV was rarely detected: 0 site in San Joaquin county, 1 in Napa county and 5 in Sonoma county.

616. **Golino, D.A., S.T. Sim, R.J. Gill, and A. Rowhani.** 1994. Evidence that California mealy bug species can transmit grapevine leafroll-associated viruses. Amer. J. Enol. Vitic. **45**:356.
Keywords :grapevine; leafroll; closterovirus; corky bark; rugose wood; GLRaV-3; *Pseudococcus affinis; Pseudococcus longispinus;* mealybug; vector; transmission; California; USA;
Notes : Abstract. *Pseudococcus longispinus,* the long-tailed mealybug, and *P.affinis*, the obscure mealybug were shown in experiments to be able to transmit GLRaV-3 and corky bark viruses.

617. **Golino, D.A., S.T. Sim, and A. Rowhani.** 1995. Transmission studies of grapevine leafroll associated virus and grapevine corky bark associated virus by the obscure mealybug. Amer. J. Enol. Vitic. **46**:408.
Keywords :grapevine; leafroll; corky bark; GLRaV-1; GLRaV-3; GCBaV; rugose wood; transmission; leafhopper; *Pseudococcus affinis; Pseudococcus longispinus;* mealybug; vector; USA;
Notes : Abstract. In transmission experiments made at the Plant pathology department of the University of California, Davis, the obscure mealybug, *Pseudococcus affinis* transmitted GLRaV-3, isolate 109, with a minimum acquisition feeding period of 20 days, and a transmission feeding period of 14 days. About one third of inoculated vines became infected. Infection did not become systemic immediately after transmission. *P.affinis* did not transmit GLRaV-2 in any of three experiments involving 87 Cabernet Franc and LN33 vines. Preliminary experiments indicate that *P.affinis* and *P.longispinus* are able to transmit grapevine corky bark virus at a low rate.

618. **Golino, D.A., P. Verdegaal, A. Rowhani, and A. Walker.** 1992. Sampling procedures to find nepoviruses in grapevines need improvement. California Agriculture **46***(3):*11-13.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; tomato ringspot virus; detection; indexing; immunoassay; ELISA; sampling; California;

619. **Gonsalves, D. and F. Zee.** 1986. Recent research development in virus diseases of grapevines, p. 104-108. In Taipeh Food and Fertilizer Technology Center for the Asian and Pacific Region,Taiwan. (ed.), Plant Virus Diseases of Horticultural Crops in the Tropics and Subtropics. FFTC Book Series Nr 33, Taipeh, Taiwan.
Keywords :virus diseases; virus-like diseases; grapevine; general; review;
Notes : In English, Chin. and Jap. sum. FFTC, Taipeh, Taiwan. Book chapter. Technical Bulletin No 92.

620. **Gonzalez, E., T. Diaz, and M.V. Mosquera.** 1995. Effects of various types of virus on *Vitis vinifera* L. cv. Albariño cultivated *in vitro*. Vitis **34**:243-244.
Keywords :grapevine; leafroll; closterovirus; GLRaV-1; GLRaV-3; grapevine fleck virus; stem pitting; *in vitro* propagation; *in vitro;* growth; performance; Spain;
Notes : The shoot tips of cv. Albariño, either healthy or infected with GLRaV-3, GFkV+GLRaV-1, or stem pitting were cultivated *in vitro*. The multiplication and rooting were best with healthy material.

621. **Gonzalez, E., M.V. Mosquera, M.C. San José, and T. Diaz.** 1997. Influence of virus on the chlorophyll, carotenoid and polyamine contents in grapevine microcuttings. J. Phytopathol. **145**:185-187.
Keywords :grapevine; physiology; GLRaV-1; GLRaV-3; stem pitting; *in vitro;* symptoms; Spain;
Notes : The effect of different types of virus infections on chlorophylls, carotenoids and free polyamines was studied in shoots of cv. Albariño cultivated *in vitro.*

622. **Goodwin, P.H., J.E. DeVay, and C.P. Meredith.** 1985. Water relations of *Vitis vinifera* L. infected with Pierce's disease bacteria. Phytopathology **75**:1350.
Keywords :grapevine; Pierce's disease; physiology; water; USA;

623. **Goodwin, P.H., J.E. DeVay, and C.P. Meredith.** 1986. Water status of vineyard-grown *Vitis vinifera* cv. 'Chardonnay' with Pierce's disease. Phytopathology **76**:843.
Keywords :grapevine; Pierce's disease; symptoms; physiology; water; USA;
Notes : Turgor measurements of healthy and diseased plants.

624. **Goodwin, P.H., J.E. DeVay, and C.P. Meredith.** 1987. Association of vascular occlusion and water stress with Pierce's disease of the grapevine. Phytopathology **77**:1710.
Keywords :grapevine; Pierce's disease; symptoms; physiology; USA;
Notes : The infection caused a resistance to flow of sap in xylem, and the closure of stomata. The proline level in Pierce's disease-infected vines was six times higher than in healthy vines.

625. **Goodwin, P.H., J.E. DeVay, and C.P. Meredith.** 1988. Physiological responses of *Vitis vinifera* cv.'Chardonnay' to infection by the Pierce's disease bacterium. Physiological and Molecular Plant Pathology **32**:17-32.
Keywords :grapevine; Pierce's disease; *Xylella fastidiosa*; symptoms; physiology; water; California; USA;
Notes : Vegetative growth was lower in Pierce's disease-infected vines than in healthy ones. Diurnal transpiration and photosynthesis were inhibited. There were higher concentrations of abscissic acid, glucose, fructose, Ca2+, Mg++, and lower concentration of K+. The symptoms of Pierce's disease appears to result from a mild but prolonged water stress which accelerates leaf senescence.

626. **Goodwin, P.H., J.E. DeVay, and C.P. Meredith.** 1988. Roles of water stress and phytotoxins in the development of Pierce's disease of the grapevine. Physiological and Molecular Plant Pathology **32**:1-15.
Keywords :grapevine; Pierce's disease; *Xylella fastidiosa*; water; symptoms; California; USA;
Notes : Water exchanges of healthy Chardonnay were compared with those of plants with Pierce's disease. Water potential and cell turgor were lower in Pierce's disease-infected plants, whereas proline levels were higher. The possible role of phytotoxins is discussed.

627. **Goodwin, P.H. and C.P. Meredith.** 1988. New clues in understanding Pierce's disease. California Agriculture **42** *(1):*6-7.
Keywords :grapevine; Pierce's disease; symptoms; California; USA;
Notes : Symptom expression in relation with stomatal resistance.

628. **Goszczynski, D.E., G.G.F. Kasdorf, and G. Pietersen.** 1995. Production of antisera to western blot bands - a means for identification of viruses from leafroll-affected grapevines, p. 96-97. In P. G. Goussard, E. Archer, D. Saayman, A. Tromp, and J. Van Wyk (ed.), Proceedings of the first SASEV International Congress, November 1995, Cape Town, South Africa. South African Society for Enology and Viticulture, PO Box 2092, Dennesig 7601, South Africa.
Keywords :grapevine; leafroll; GLRaV-1; GLRaV-2; GLRaV-IIa; GLRaV-IIb; GLRaV-3; GLRaV-6; closterovirus; detection; western blot; immunoassay; South Africa;
Notes : Three major bands (A,B and C) were consistently detected in Western blots in virus preparations purified from *Vitis vinifera* cv. Black Spanish, following reaction with an homologous antiserum. Proteins of band A and B reacted specifically with antiserum to GLRaV-3 and 1 respectively, whereas band C did not react with any of antisera to GLRaV-1,2,3,4,5. Antisera were made with proteins of bands A and B as antigens in rabbits and B and C in mice. Using these antisera in IEM and Western blots showed in addition that anti C antiserum did not react with GLRaV-2a and 2b of the Swiss isolate of Chasselas 8/22, whereas antibodies to GLRaV-2a cross reacted with band C, indicating a unilateral serological relation between these two viruses. According to Boscia et al., Vitis 34, 171-5, 1995, GLRaV-2a of Gugerli and Ramel (1993) is now named GLRaV-6, whereas GLRaV-2b is GLRaV-2.

629. **Goszczynski, D.E., G.G.F. Kasdorf, and G. Pietersen.** 1995. Production and use of antisera specific to grapevine leafroll-associated viruses following electrophoretic separation of their proteins and transfer to nitrocellulose. Afr. Pl. Prot. **1***(1):*1-8.
Keywords :grapevine; leafroll; GLRaV-1; GLRaV-3; closterovirus; detection; immunoassay; electrophoresis; protein; SDS-PAGE; western blot; ELISA; immuno electron microscopy; South Africa;
Notes : Antisera specific to grapevine leafroll-associated viruses type I (GLRaV-1) and III (GLRaV-3) were produced using the proteins of viruses partially purified from a multiple-infected leafroll-affected grapevine. Viral proteins were separated by SDS-PAGE, immobilized on nitrocellulose, and then used as immunogens. Such antisera were used with success for specific detection of GLRaV-1 and -3 by Western blot, IEM and ELISA techniques.

630. **Goszczynski, D.E., G.G.F. Kasdorf, and G. Pietersen.** 1996. Western blots reveal that grapevine viruses A and B are serologically related. J. Phytopathol. **144**:581-583.
Keywords :grapevine; vitivirus; GVA; GVB; GVD; immunoassay; western blot; relationship; South Africa;
Notes : Isolates of GVA and GVB were obtained by mechanical transmisson from grapevines to *Nicotiana benthamiana*. Western blot studies of these isolates showed that they share common antigens. Antiserum to GVB-Se decorated all virus particles from *N.benthamiana* infected with a virus mechanically transmitted from Shiraz grapevines, that was shown to be GVB (isolate 94/971). Only a GVB-specific monoclonal antibody failed to react with GVA. This contradicts previous results which showed that the two virus were serologically unrelated (Boscia et al.1993, ref.197; 1994, ref.198). Besides, a serological relationship was established between South African GVA and GVB isolates and GVD, and also with Heracleum latent virus (HLV) (Bem and Murant, Ann. Appl. Biol. 92, 243-256, 1979).

631. **Goszczynski, D.E., G.G.F. Kasdorf, and G. Pietersen.** 1997. Production of antisera to grapevine leafroll-associated viruses using electrophoretically resolved antigens, p. 49-58. In P. L. Monette (ed.), Filamentous viruses of woody plants. Research Signpost, Trivandrum, India.
Keywords :grapevine; leafroll; closterovirus; GLRaV-1; GLRaV-3; immunoassay; ELISA; western blot; detection; South Africa;

632. **Goszczynski, D.E., G.G.F. Kasdorf, and G. Pietersen.** 1997. Production and use of an antiserum to grapevine virus B capsid protein purified from SDS-polyacrylamide gels. Vitis **36**:191-194.
Keywords :grapevine; vitivirus; GVB; immunoassay; ELISA; detection; South Africa;
Notes : An antiserum was produced to the electrophoretically-separated protein of the capsid of grapevine virus B (GVB). The antibodies that cross-reacted with grapevine virus A were eliminated, and the antiserum was efficiently used for the detection of GVB.

633. **Goszczynski, D.E., G.G.F. Kasdorf, and G. Pietersen.** 1997. ELISA for the detection of grapevine leafroll-associated viruses 1, 2, 3 and grapevine virus B based on polyclonal antibodies, p. 101-102. In O. A. Sequeira,de, J. C. Sequeira, and M. T. Santos (ed.), Extended abstracts 12th Meeting ICVG, Lisbon, Portugal, 29 September-2 October 1997. Dept.Plant Pathology, Estação Agronomica Nacional, Oeiras, Portugal.
Keywords :grapevine; closterovirus; leafroll; GLRaV-1; GLRaV-2; GLRaV-3; vitivirus; GVB; detection; immunoassay; ELISA; method; South Africa; meeting; ICVG;
Notes : A variant of ELISA, indirect antibody-trapped (ATA)-ELISA was adapted for the detection of grapevine viruses GLRaV-1, -2, -3, and GVA.

634. **Goszczynski, D.E., G.G.F. Kasdorf, G. Pietersen, and H. Van Tonder.** 1996. Detection of two strains of grapevine leafroll-associated virus 2. Vitis **35**:133-135.
Keywords :grapevine; strain; GLRaV-2; symptoms; cytopathology; serology; dsRNA; leafroll; closterovirus; mechanical transmission; capsid; protein; South Africa;
Notes : Two strains of grapevine leafroll associated virus 2 (GLRaV-2) were isolated from leafroll-affected grapevines *Vitis vinifera* cv. Muscat of Alexandria and hybrid LN33, respectively) by mechanical inoculation to *Nicotiana benthamiana*. They were designated as 94/970 and 93/955. They differed by the symptoms they produced on *N.benthamiana*. The first strain induced chlorotic lesions and occasionally white necrotic local lesions followed by systemic vein clearing, and occasionnally vein necrosis. The second strain produced chlorotic local lesions which turned to metallic-opalescent , solid necrotic local lesions. Vein clearing produced by this isolate was followed by a strong vein necrosis. Cytopathic alterations in *N.benthamiana* differed in intensity, the isolate 93/955 inducing the most severe alterations. The two strains were identical with regard to their serological properties or to the molecular weight of their capsid protein. Small differences in the patterns of minor dsRNA bands were observed.

635. **Goszczynski, D.E., G.G.F. Kasdorf, G. Pietersen, and H. Van Tonder.** 1996. Grapevine leafroll-associated virus 2 (GLRaV-2) - Mechanical transmission, purification, production and properties of antisera, detection by ELISA. South Afr. J. Enol. Vitic. **17**:15-26.
Keywords :grapevine; leafroll; closterovirus; GLRaV-2; mechanical transmission; *Nicotiana;* purification; immunoassay; immuno electron microscopy; western blot; ELISA; South Africa;
Notes :GLRaV-2 was transmitted from *Vitis vinifera* to *Nicotiana benthamiana* by inoculation with grapevine leaf petioles extract concentrated by ultracentrifugation. Infected *N.benthamiana* plants showed chlorotic local lesions, systemic vein clearing followed by yellowing, stem necrosis and death of the plant. They contained only GLRaV-2. Antisera produced against this virus was successfully used for the detection of GLRaV-2 in immunoelectron microscopy, in Western blot after concentration of the extracts by centrifugation, and in ELISA. Treatment of purified GLRaV-2 preparations with glutaraldehyde before immunization markedly improved the quality of the antisera.

636. **Goussard, P.G. and J. Wiid.** 1992. The elimination of fanleaf virus from grapevines using *in vitro* somatic embryogenesis combined with heat therapy. South Afr. J. Enol. Vitic. **13**:81-83.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; virus elimination; *in vitro;* somatic embryogenesis; heat therapy; South Africa;

637. **Goussard, P.G. and J. Wiid.** 1993. The use of *in vitro* somatic embryogenesis to eliminate phloem limited virus and nepoviruses from grapevines, p. 165-166. In P. Gugerli (ed.), Extended abstracts 11th Meeting ICVG, Montreux, Switzerland. Federal Agricultural Research Station of Changins, CH-1260 Nyon, Switzerland.
Keywords :grapevine; grapevine fanleaf virus; yellow mosaic; nepovirus; closterovirus; virus elimination; heat therapy; *in vitro;* somatic embryogenesis; South Africa; meeting; ICVG;
Notes :*In vitro* somatic embryogenesis can be used for eliminating phloem limited viruses, but not for fanleaf virus. The authors propose a combination of this method with heat treatment at 36^{o} C for 60 days in order to eliminate both types of viruses.

638. **Goussard, P.G. and J. Wiid.** 1995. The use of *in vitro* somatic embryogenesis in grapevine improvement, P. G. Goussard, E. Archer, D. Saayman, A. Tromp, and J. Van Wyk (ed.), Proceedings of the First SASEV International Congress, Cape Town, South Africa, November 1995. South African Society for Enology and Viticulture, P.O.Box 2092, Dennesig 7601, South Africa.
Keywords :grapevine; somatic embryogenesis; *in vitro;* sanitary selection; GLRaV; leafroll; grapevine fanleaf virus; closterovirus; nepovirus; grapevine fleck virus; ELISA; ISEM; virus elimination; South Africa;
Notes : Somatic embryogenesis has been used so far with a view to improving the quality of *Vitis* cultivars. The present paper shows that it can be used very conveniently as a method for virus elimination. Anthers and ovaries of plants known to be infected with leafroll, fanleaf, yellow mosaic and fleck were aseptically excised from the flower buds. Explants were cultured at 25°C on the basal medium of Nitsch and Nitsch supplemented with growth regulators. Pro embryonic masses were transferred to hormone-free basal medium, mature embryos were germinated and plantlets were acclimatized and transferred to soil. Grapevine leafroll associated viruses (not specified), grapevine fanleaf virus (with or without yellow mosaic symptoms) and grapevine fleck virus were eliminated.

639. **Goussard, P.G., J. Wiid, and G.G.F. Kasdorf.** 1991. The effectiveness of *in vitro* somatic embryogenesis in eliminating fanleaf virus and leafroll associated viruses from grapevines. South Afr. J. Enol. Vitic. **12**:77-81.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; closterovirus; leafroll; GLRaV-1; GLRaV-3; vitivirus; GVA; *in vitro;* virus elimination; somatic embryogenesis; South Africa;

640. **Goussard, P.G., J. Wiid, G.G.F. Kasdorf, and D.J. Newton.** 1991. The elimination of leafroll associated viruses from grapevines (*Vitis*) using *in vitro* somatic embryogenesis, p. 344-352. In I. C. Rumbos, R. Bovey, D. Gonsalves, W. B. Hewitt, and G. P. Martelli (ed.), Proceedings of the 10th Meeting

of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG). Plant Protection Institute, P.O. Box 303, 38001 Volos, Greece.
Keywords :grapevine; leafroll; closterovirus; vitivirus; GVA; GLRaV-1; GLRaV-3; *in vitro;* somatic embryogenesis; virus elimination; South Africa; meeting; ICVG;
Notes : Ovaries from inflorescences of leafroll-infected *Vitis vinifera* vines cv. Roobernet were cultured *in vitro* until somatic embryos were formed with cotyledons and roots. These plantlets were acclimatized and transferred to soil. ISEM and ELISA showed that GVA, GLRaV-I and GLRaV-III, which were present in the source plants, were absent in plants regenerated by somatic embryogenesis.

641. **Gölles, R., A. da Camara Machado, A. Minafra, R. Moser, H. Katinger, and M. Laimer Da Camara Machado.** 1997. Regeneration of *Vitis* sp. transformed with coat protein gene sequences of four different grapevine viruses, p. 139. In O. A. Sequeira,de, J. C. Sequeira, and M. T. Santos (ed.), Extended abstracts 12th Meeting ICVG, Lisbon, Portugal, 29 September-2 October 1997. Dept.Plant Pathology, Estação Agronomica Nacional, Oeiras, Portugal.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; arabis mosaic virus; vitivirus; GVA; GVB; transgenic; coat protein gene; Austria; meeting; ICVG;
Notes : Chimeric coat protein genes of GFLV, ArMV, GVA and GVB were introduced into embryogenic cultures of *Vitis vinifera* cv.Russalka and *V.rupestris x V. Berlandieri* via *Agrobacterium*-mediated transformation. Putative transgenic embryos were selected and germinated. The most promising plant lines will be propagated *in vitro* and used for challenge infection experiments.

642. **Gölles, R., R. Moser, A. da Camara Machado, H. Katinger, and M. Laimer Da Camara Machado.** 1997. Viral resistance in *Nicotiana benthamiana* expressing altered forms of the coat protein gene of grapevine fanleaf virus, p. 138. In O. A. Sequeira,de, J. C. Sequeira, and M. T. Santos (ed.), Extended abstracts 12th Meeting ICVG, Lisbon, Portugal, 29 September-2 October 1997. Dept.Plant Pathology, Estação Agronomica Nacional, Oeiras, Portugal.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; transgenic; *Nicotiana;* coat protein gene; Austria; meeting; ICVG;
Notes : Some plants transgenic for the full-length CP gene were fully resistant to virus infection, no symptoms developed and no virus was detectable.

643. **Graham, M.B., B.A. Ebsary, T.C. Vrain, and J.M. Webster.** 1988. Distribution of *Xiphinema bricolensis* and *X.pacificum* in vineyards of the Okanogan and Similkameen Valleys, British Columbia. Can. J. Pl. Pathol. **10**:259-262.
Keywords :grapevine; nepovirus; tomato ringspot virus; vector; nematode; *Xiphinema;* Longidoridae; survey; occurrence; Canada;
Notes :*Xiphinema* species were found in 95% of 79 vineyards surveyed and in 80% of 280 soil samples collected in the main grape growing areas of British Columbia. *X. bricolensis* was predominant and was found in a wide range of soil types. It was associated with every grape cultivar surveyed. *X. pacificum* was identified in only 2 soil samples. The importance of *X.bricolensis* as a nepovirus vector is discussed. It was shown to transmit tomato ringspot virus from cucumber to cucumber. The virus does not occur in British Columbia, but is common in Ontario and eastern USA. If introduced in British Columbia, it could perhaps spread dangerously because of the presence of a vector already widespred. The two species mentioned here were formely included in the species *Xiphinema americanum. X.bricolensis = X.occiduum* in British Columbia. *X.pacificum* is a new species (Ebsary *et al.*,1989, Can.J.zool.67, ref.490).

644. **Granata, G. and A. Appiano.** 1989. A grapevine disease in Italy resembling infectious necrosis. Phytoparasitica **17**:59.
Keywords :grapevine; infectious necrosis; symptoms; graft transmission; meeting; ICVG; Italy;
Notes : Abstract. This paper appears in full in the Proceedings of the 9th meeting of ICVG, Kiryat Anavim, Israel, 1987, 19-22, 1989.

645. **Granata, G. and A. Appiano.** 1989. A grapevine disease in Italy resembling infectious necrosis, p. 19-22. In E. Tanne (ed.), Proceedings of the 9th Meeting of the International Council for the Study of Viruses

and Virus Diseases of the Grapevine (ICVG), Kiryat Anavim, Israel, September 1987. The Volcani Center, P.O. Box 6, Bet Dagan , Israel.
Keywords :grapevine; infectious necrosis; symptoms; cytopathology; electron microscopy; Sicily; Italy; meeting; ICVG;
Notes : A grapevine disease similar to the infectious necrosis described in Czechoslovakia was found in Sicily in cv. Italia in 1981 and later in Piedmont in cv. Nebbiolo. The present paper reports further results of cytological investigations aimed at elucidating the etiology of this disease.

646. **Granata, G. and L. Carraro.** 1993. Sintomatologia ed evoluzione della malattia nelle piante infette (Symptomatology and evolution of the disease in infected plants), p. 19-22. In E. Refatti (ed.), Extended Abstracts, Convegno "La flavescenza dorata ed altri giallumi della vite, stato attuale delle conoscenze e problemi di lotta". Eurovite'93, Gorizia, Italy.
Keywords :grapevine; phytoplasma disease; flavescence dorée; symptoms; Italy;
Notes : In Italian. Extended abstracts of papers presented at a meeting on flavescence dorée and other grapevine yellows at Gorizia, Italy, in December 1993.

647. **Granata, G. and V. Grimaldi.** 1991. Electron microscopic detection of mycoplasma-like organisms in epidemic yellow affected grapevines. Petria **1**:171-175.
Keywords :grapevine; phytoplasma disease; phytoplasma; detection; electron microscopy; Italy;

648. **Granata, G. and A. Russo.** 1990. Indagini su un giallume epidemico simile alla "Flavescenza dorata"(Research on an epidemic yellows disease similar to flavescence dorée). Vignevini **17***(5):*69-71.
Keywords :grapevine; phytoplasma disease; leafhopper; symptoms; vector; Sicily; Italy;
Notes : In Italian, Eng.sum. Surveys were made in 2 vineyards in the province of Palermo, with cv. Inzolia (planted 1971) and Chardonnay (planted 1982). They showed that the disease is epidemic. Inzolia is highly susceptible. A search was made for a possible vector. *Scaphoideus titanus* was not found. 11 spp. of Cixiidae, Cercopidae and Cicadellidae were collected. *Philaenus spumarius* and *Euscelis lineolatus* can be considered as potential vectors. Yellows disease from Sicily is perhaps different from flavescence dorée or bois noir.

649. **Gravaud, A.** 1997. Lutte contre la flavescence dorée de la vigne en Aquitaine (Control of flavescence dorée of grapevine in Aquitaine). Phytoma - La Défense des Végétaux *(496):*20.
Keywords :grapevine; flavescence dorée; *Scaphoideus titanus;* control; vector; France;
Notes : In French. (Summary in Rev.Pl.Pathol. 77, 1998,p.196,#1444).

650. **Grecu, C., E. Buciumeanu, I. Tita, and D. Baditescu.** 1993. Detection of grapevine fanleaf virus by ELISA and electron microscopy: comparison between different sources and organs, p. 152. In P. Gugerli (ed.), Extended abstracts 11th Meeting ICVG, Montreux, Switzerland, 6-9 September 1993. Federal Agricultural Research Station of Changins, CH-1260 Nyon, Switzerland.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; detection; virus elimination; shoot tip culture; immunoassay; ELISA; electron microscopy; immunogold labelling; comparison; method; Rumania; meeting; ICVG;
Notes : Shoot tip cultures were better sources than field-grown vines for DAS-ELISA and electron microscopy with immunogold labelling in studies on presence and localization of GFLV.

651. **Greif, C., G. Cloquemin, G. Blaszczyk, J. Gillet, M. J. Perrot-Minnot, S. Grenan, and B. Walter.** 1997. Epidemiological survey of the grapevine leafroll disease in French wine growing regions, p. 119-120. In O. A. Sequeira,de, J. C. Sequeira, and M. T. Santos (ed.), Extended abstracts 12th Meeting ICVG, Lisbon, Portugal, 29 September-2 October 1997. Dept.Plant Pathology, Estação Agronomica Nacional, Oeiras, Portugal.
Keywords :grapevine; leafroll; epidemiology; survey; closterovirus; GLRaV-1; GLRaV-3; mealybug; France; meeting; ICVG;
Notes : A survey on the presence of leafroll in French vineyards of Beaujolais and Burgundy was made in 1994-1995. GLRaV-1 and GLRaV-3 were detected in all plots examined except in Odenas (Beaujolais)

where GLRaV-1 was not present. The percentage of infected vines varied from 0% to 80% . Mealybugs collected in these vineyards belonged to the species *Pulvinaria vitis, Parthenolecanium corni* and *Heliococcus bohemicus*. In Languedoc-Roussillon, mealybugs collected were mostly *Planococcus ficus, P.citri* and *Pulvinaria vitis.*

652. **Greif, C., R. Garau, D. Boscia, V. A. Prota, M. Fiori, P. Bass, B. Walter, and U. Prota.** 1995. The relationship of grapevine leafroll-associated closterovirus 2 with a graft incompatibility condition of grapevines. Phytopath. medit. **34**:167-173.
Keywords :grapevine; leafroll; GLRaV-2; closterovirus; graft; incompatibility; etiology; rootstock; France; Italy;
Notes : It has been known for several years in France and Italy that some clones of *Vitis vinifera* were incompatible with the rootstock Kober 5 BB. Affected vines were severely stunted and had a bushy growth. The stunting factor was shown to be graft-transmissible and could be eliminated by heat therapy, suggesting a viral etiology. In France, a close association was shown to exist between this graft-incompatibility and the presence in affected vines of grapevine leafroll-associated virus 2 (GLRaV-2). In Sardinia, similar but independent investigations showed that GLRaV-1, GLRaV-3, GVA, GVB and grapevine fleck virus (GFkV) were not involved in this incompatibility. However, GLRaV-2 was not included in these tests. Recently, a more extensive and joint research was made at Colmar (France), Bari and Sassari (Italy) in order to assess the role of the different viruses present in several grapevine accessions known to contain the incompatibility factor. These viruses were detected by indexing or by DAS-ELISA with antisera to GLRaV-1, -2, -3, GVA, GVB and GFkV. Nearly all incompatible accessions were infected with GLRaV-2, whereas the other viruses detected showed little association with this condition. This research supports the hypothesis of a cause-effect relationship of GLRaV-2 with the graft incompatibility of Kober 5BB and *Vitis vinifera*.

653. **Greif, C., R. Legin, P. Cornuet, and B. Walter.** 1993. Involvement of two grapevine leafroll-associated viruses in syndromes distinct from leafroll of *Vitis vinifera*, p. 64. In P. Gugerli (ed.), Extended abstracts 11th Meeting ICVG, Montreux, Switzerland, 6-9 September 1933. Federal Agricultural Research Station of Changins, CH-1260 Nyon, Switzerland.
Keywords :grapevine; leafroll; GLRaV-1; GLRaV-2; closterovirus; etiology; indexing; incompatibility; France; meeting; ICVG;
Notes : Indexing of 125 leafroll-infected *Vitis vinifera* cvs. was made by graft-inoculation using Pinot noir, *V. riparia* Gloire and Kober 5BB as indicators. Cabernet franc and 44 Laquenexy were also used occasionally as indicators. GLRaVs were detected by ELISA with polyclonal antisera. Results show that leafroll on Riparia Gloire ("leafroll II") corresponds to a particular strain of GLRaV-I, or to the interaction of GLRaV-I with an unknown factor. Graft incompatibility on Kober 5 BB appears to be caused by GLRaV-II or by interaction of this virus with a factor present in the rootstock.

654. **Greif, C. and B. Walter.** 1997. The European collection of grapevine virus diseases, p. 152. In O. A. Sequeira,de, J. C. Sequeira, and M. T. Santos (ed.), Extended abstracts 12th Meeting ICVG, Lisbon, Portugal, 29 September-2 October 1997. Dept.Plant Pathology, Estação Agronomica Nacional, Oeiras, Portugal.
Keywords :grapevine; virus diseases; collection; France; meeting; ICVG;
Notes : This paper describes the European collection of grapevine virus diseases which was initiated in Colmar in 1994. So far 53 accessions have been included, originating from 8 countries. The viruses or virus-like diseases concerned are: GFkV, GLRaV-1 to 5, GVA, GVB, leafroll, rupestris stem pitting, LN33 stem grooving, enation, vein necrosis, vein mosaic, GFLV, ArMV, GCMV, RRV, SLRV, TBRV (see also next reference).

655. **Greif, C. and B. Walter.** 1997. The European reference collection of grapevine virus diseases, p. 171-181. In B. Walter (ed.), Sanitary selection of the grapevine. Protocols for detection of viruses and virus-like diseases (Les Colloques no 86). INRA Editions, Paris.
Keywords :grapevine; virus; virus-like diseases; collection; Europe; France;

Notes : The main grapevine viruses and virus-like diseases known to exist in European grapevine cultivars are represented in a reference collection at the INRA Centre of Colmar, France. They are kept in an insect-proof greenhouse, and maintained in the grapevine accessions provided by each donor laboratory as well as in graft-inoculated rootstock indicators. The virus content of each accession is checked by biological indexing, and by ELISA and PCR analyses.

656. **Grenan, S.** 1985. Elimination des virus par les techniques de culture *in vitro* (Virus elimination by *in vitro* techniques), p. 204-206. Colloque Amélioration de la Vigne et Culture in Vitro 1985. Moët Hennessy, Paris.
Keywords :grapevine; *in vitro;* virus elimination; micrografting; France;
Notes : In French and English. Meeting on the improvement of grapevine and *in vitro* culture, organized by Moët-Hennessy.

657. **Grenan, S.** 1993. 11e Congrès de l'ICVG - Conseil international pour l'étude des virus et maladies à virus de la vigne. Montreux (Suisse) 6-9 septembre 1993 (11th meeting of ICVG - International Council for the Study of Viruses and Virus diseases of Grapevine. Montreux, (Switzerland) 6-9th September 1993). Progr. Agric. Vitic. **110**:523-526.
Keywords :grapevine; virus; virus-like diseases; phytoplasma disease; viroid; meeting;
Notes : Summary of the main contribution presented at this meeting.

658. **Grenan, S.** 1994. Multiplication *in vitro* et caractéristiques juvéniles de la vigne (*In vitro* multiplication and juvenile characteristics of grapevine). Bull. OIV **67**:5-14.
Keywords :grapevine; *in vitro;* micropropagation; morphology; physiology; France;
Notes : Paper presented to the OIV experts' group "selection of grapevine", Paris, 29.11.1993. *In vitro* culture produced a return of juvenile characters of the variety, similar to those of seedlings (leaf shape, shoots, fertility). Grafting rootstocks with nodes of superior parts of shoots gave normal vines with adult characters. Carignan and Grenache from *in vitro* culture gave higher yields without loss in sugar content of the must.

659. **Grenan, S., M. Leguay, A. Bonnet, and R. Boidron.** 1993. ELISA for detection of ArMV and GFLV in grapevine: schedule of 3 years of control tests, p. 134. In P. Gugerli (ed.), Extended abstracts 11th Meeting ICVG, Montreux, Switzerland, 6-9 September 1993. Federal Agricultural Research Station of Changins, CH-1260 Nyon, Switzerland.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; arabis mosaic virus; detection; immunoassay; ELISA; multiplication; virus-free material; France; meeting; ICVG;
Notes : From 1990 to 1993, 22850 tests with ELISA were made on grapevine basic material and mother plants of certified material in order to check the possible presence of GFLV and ArMV. Altogether an infection rate of 6 % was found. This includes retesting procedures in plots where one plant had been previously found infected. In this case, all plants of the plot were retested.

660. **Grenan, S., M. Leguay, and G. Cloquemin.** 1997. Sanitary check-up of grapevine mother plants in France, p. 157-158. In O. A. Sequeira,de, J. C. Sequeira, and M. T. Santos (ed.), Extended abstracts 12th Meeting ICVG, Lisbon, Portugal, 29 September-2 October 1997. Dept.Plant Pathology, Estação Agronomica Nacional, Oeiras, Portugal.
Keywords :grapevine; multiplication; virus-free material; certification; detection; nepovirus; grapevine fanleaf virus; arabis mosaic virus; indexing; ELISA; France; meeting; ICVG;
Notes : This paper summarizes the methods used in France in order to check the sanitary state of certified planting material of grapevine. From 1990 to 1997, 110226 tests were made with ELISA in order to detect the possible presence of GFLV and/or ArMV in multiplication fields. There is still a certain degree of contamination, the possible origins of which are discussed.

661. **Grenan, S. and C. Valat.** 1987. Incompatibilité au greffage d'un clone de Syrah (Graft incompatibility of a clone of grapevine cv. Syrah). Schw. landw. Forschung/La Recherche agronomique en Suisse **26**:317-319.

Keywords :grapevine; incompatibility; etiology; virus-like diseases; indexing; France;
Notes : The grapevine cv. Syrah, clone 101, contains an incompatibility factor that appears when this clone is grafted on the rootstock SO4 clone 5. During the 7-8 first years of growth, up to 50% of grafted vines may die back. No known virus was detected by indexing on Rupestris St.George or LN33. Chlorotic spots apper sometimes on leaves of LN33, SO4 or 5BB grafted with Syrah 101. Other Syrah clones that are compatible with SO4 can be "infected" by graft with the incompatibility factor, that appears therefore as a virus-like agent. The most important problem, in practice, is due to the fact that incompatibility appears only after a few years.

662. **Grenan, S. and C. Valat.** 1992. Incidences de la thermothérapie *in vitro* sur les caractéristiques de production de quelques variétés de *Vitis vinifera* (Influence of *in vitro* heat therapy on production characteristics of some *Vitis vinifera* varieties). J. Int. Sci. Vigne et Vin **26**:155-162.
Keywords :grapevine; heat therapy; *in vitro;* virus elimination; performance; yield; quality; France;
Notes : There is no lowering of quality as a consequence of *in vitro* heat therapy. A slight increase in yield is recorded, but it is not statistically significant.

663. **Gribaudo, I., R. Lenzi, and F. Mannini.** 1994. Esperienze di risanamento da virosi per coltura di meristemi nel corso della selezione clonale di vitigni liguri e piemontesi (Grapevine clonal selection in Piedmont and Liguria: virus eradication through meristem culture). Quad. Vitic. Enol. Univ. Torino **18**:81-89.
Keywords :grapevine; meristem tip culture; virus elimination; *in vitro;* GLRaV-1; GLRaV-3; closterovirus; GVA; vitivirus; clonal selection; Italy;
Notes : Description and summary of the usual methods for obtaining virus-free material of grapevine for propagation. In the experiments reported here, meristem culture was used for curing some cultivars infected with GLRaV-1, GLRaV-3 and GVA. The cv. Albarola was easier to obtain virus-free than Vermentino. In one case, GLRaV-3 and GVA were eliminated, but not GLRaV-1.

664. **Gribaudo, I., F. Mannini, and R. Lenzi.** 1997. Virus elimination in grapevine cultivars of north-western Italy through meristem culture and *in vitro* thermotherapy, p. 165-166. In O. A. Sequeira,de, J. C. Sequeira, and M. T. Santos (ed.), Extended abstracts 12th Meeting ICVG, Lisbon, Portugal, 29 September-2 October 1997. Dept.Plant Pathology, Estação Agronomica Nacional, Oeiras, Portugal.
Keywords :grapevine; virus elimination; meristem tip culture; *in vitro;* heat therapy; vitivirus; GVA; closterovirus; GLRaV-1; GLRaV-3; Italy; meeting; ICVG;
Notes : The results of the work of the Center for genetic improvement and biology of grapevine and of the Institute of applied plant virology of Turin (Italy) on grapevine sanitation are described. Virus elimination was obtained, when necessary, by meristem culture and/or *in vitro* heat therapy.

665. **Griesbach, J.A.** 1995. Detection of tomato ringspot virus by polymerase chain reaction. Plant Disease **79**:1054-1056.
Keywords :grapevine; tomato ringspot virus; yellow vein; detection; PCR; USA;
Notes : Polymerase chain reaction was applied to grapevine yellow vein virus, with a sensitivity about 100 times higher than ELISA.

666. **Grousson, C.** 1992. Synthèse sur la maladie de Pierce (Synthesis on Pierce's disease). Progr. Agric. Vitic. **109**:257-262.
Keywords :grapevine; Pierce's disease; *Xylella fastidiosa;* quarantine; France;
Notes : In French. The author sums up the present knowledge on Pierce's disease and on its agent, *Xylella fastidiosa*. The measures to prevent its introduction in France and the risks of infestation and spread of this disease in France are discussed.

667. **Gugerli, P.** 1986. Grapevine fanleaf virus, p. 431-444. In H. U. Bergmeyer (ed.), Methods of enzymatic analysis (Vol.XI). Verlag Chemie, Weinheim FRG.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; detection; ELISA; immunoassay; analysis; Switzerland;

Notes : Book chapter. In the 3rd edition, p.474-481.

668. **Gugerli, P.** 1987. Grapevine leafroll disease: rapid diagnosis by electron microscopy and serology. Schw. landw. Forschung/La Recherche agronomique en Suisse **26**:388-389.
Keywords :grapevine; leafroll; detection; electron microscopy; immunoassay; ELISA; closterovirus; Switzerland;
Notes : Several closteroviruses can be detected in extracts from leafroll-affected vines after concentration by centrifugation. The longest particles are 1800-2200 nm long. ELISA can be also used for detecting the virus in crude sap.

669. **Gugerli, P.** 1991. Grapevine closteroviruses, p. 40-51. In I. C. Rumbos, R. Bovey, D. Gonsalves, W. B. Hewitt, and G. P. Martelli (ed.), Proceedings of the 10th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG). Plant Protection Institute, P.O. Box 303, 38001 Volos, Greece.
Keywords :grapevine; closterovirus; closterovirus-like particles; vitivirus; GVA; GLRaV-1; GLRaV-2; GLRaV-3; GLRaV-4; mealybug; *Pseudococcus longispinus; Planococcus ficus; Planococcus citri;* leafroll; rugose wood; corky bark; stem pitting; review; Switzerland; meeting; ICVG;
Notes : Review on present knowledge on grape closteroviruses, as an intoductory lecture to the session on closteroviruses at the 10th meeting of ICVG.

670. **Gugerli, P.** 1995. Porte-greffe résistant aux virus de la dégénérescence infectieuse de la vigne ? (Are there rootstocks resistant to the viruses of infectious degeneration of grapevine ?). Rev. suisse vitic. arboric. hortic. **27**:308-309.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; arabis mosaic virus; raspberry ringspot virus; resistance; transgenic; rootstock; Switzerland;
Notes : In French. The attempts to find rootstocks that are resistant to the nepovirus responsible for the infectious degeneration of grapevine (mainly GFLV, ArMV, RRV) have been so far disappointing. After reviewing the recent work in this field, the author reports on experiments made at the Federal research station of Changins, Switzerland. The rootstock Börner (*Vitis riparia* 183 Geisenheim x *Vitis cinerea*) was experimented in the glasshouse and in some vineyards infected with the complex *Xiphinema index*/GFLV in the French-speaking part of Switzerland. The first results confirm that this rootstock is less favourable to the multiplication of *X.index* than the control rootstock 3309. However it is a very good host for GFLV and transmits it quickly to the scion variety (Chasselas). Besides, Chasselas grafted on the rootstock Börner shows a strong chlorosis. The introduction of resistance factors in grapevine by genetic engineering seems more promising.

671. **Gugerli, P., J.J. Brugger, and P. Basler.** 1990. Les maladies de l'enroulement, du bois strié et de l'écorce liégeuse de la vigne (Grapevine leafroll, rugose wood and corky bark). Rev. suisse vitic. arboric. hortic. **22**:35-36.
Keywords :grapevine; closterovirus; leafroll; rugose wood; corky bark; symptoms; Switzerland;
Notes : Short description of symptoms, illustrated by colour photographs.

672. **Gugerli, P., J.J. Brugger, and P. Basler.** 1990. Dégénérescence infectieuse ou court-noué de la vigne (Grapevine fanleaf). Rev. suisse vitic. arboric. hortic. **22**:33-34.
Keywords :grapevine; fanleaf; court-noué; grapevine fanleaf virus; arabis mosaic virus; raspberry ringspot virus; nepovirus; *Xiphinema index; Xiphinema diversicaudatum; Longidorus;* symptoms; control; Switzerland;
Notes : Short description of symptoms, colour photographs.

673. **Gugerli, P., J.J. Brugger, and M.E. Ramel.** 1997. Identification immuno-chimique du 6e virus associé à la maladie de l'enroulement de la vigne et amélioration des techniques de diagnostic pour la sélection sanitaire en viticulture (Immunochemical identification of the sixth virus associated with grapevine leafroll disease and improvement of the diagnostic techniques for the sanitary selection in viticulture). Rev. suisse vitic. arboric. hortic. **29**:137-141.

Keywords :grapevine; leafroll; closterovirus; GLRaV-6; detection; monoclonal antibodies; immuno-blot; immuno electron microscopy; ELISA; sanitary selection; immunoassay; Switzerland;
Notes : It is known since 1984 that several closteroviruses are associated with the leafroll disease of grapevine. Grapevine leafroll-associated virus 6 (GLRaV-6) was described initially as grapevine leafroll-associated virus IIa (GLRaV-IIa) , which was given this name when it was realized that grapevine leafroll-associated virus II (GLRaV-II), isolated from vines of Chasselas clone 8/22 producing atypical leafroll symptoms on a Gamay indicator, was in fact a mixture of two closteroviruses. It was later agreed among virologists working on this subject that GLRaV-IIa would be named GLRaV-6 and the other entity of the former GLRaV-II would remain as GLRaV-2. A new monoclonal antibody (MCA 36-117) specific to GLRaV-6 was prepared. It has made it possible to characterize this virus. The dominant maximum particle size was found to be 1600-1700 nm. A molecular weight of 32 kDa was determined for the coat protein, a value which is clearly distinct from those observed with the other leafroll-associated closteroviruses and with grapevine virus A (GVA). MCA 36-117 allowed a precise detection of GLRaV-6 in petioles and leaf blades of infected Chasselas 8/22. The practical implications of this new serological tool for research and diagnosis are discussed.

674. **Gugerli, P., J.J. Brugger, and M.E. Ramel.** 1997. Immuno-chemical and biological distinction of grapevine leafroll associated viruses 2 and 6 in complex infections with other known and unidentified viruses, p. 33-34. In O. A. Sequeira,de, J. C. Sequeira, and M. T. Santos (ed.), Extended abstracts 12th Meeting ICVG, Lisbon, Portugal, 29 September-2 October 1997. Dept.Plant Pathology, Estação Agronomica Nacional, Oeiras, Portugal.
Keywords :grapevine; closterovirus; GLRaV-2; GLRaV-6; detection; identification; immuno electron microscopy; western blot; immunoassay; ELISA; Switzerland; meeting; ICVG;
Notes : Leafroll type II, which is frequently found infecting Chasselas in Switzerland, produces atypical symptoms of leafroll when transmitted by graft to Gamay Rouge de la Loire. Grapevine leafroll-associated virus 2 and -6 (GLRaV-2, -6) were shown to be involved in this type of leafroll. In order to better understand the inteactions between these two viruses and possible interactions with other viruses, a study was undertaken on the immuno-chemical and biological properties of these two viruses. The results of this study show that GLRaV-2 differs significantly from all other grapevine leafroll-associated closteroviruses in physical and biological properties. GLRaV-2 is closely related to leafroll type II symptoms. GLRaV-6 is not associated with corky bark. Grapevine fleck virus is not involved in leafroll type II etiology. A new virus named *unidentified isometric grapevine virus* (UIGV) was found in a healthy as well as in a leafroll affected Chasselas clone (see ref.520). It is not associated with leafroll type II symptoms. GLRaV-6 has a coat protein apparent molecular weight of 32 kD, a value clearly distinct from that of the other GLRaVs.

675. **Gugerli, P. and M.E. Ramel.** 1993. Grapevine leafroll associated virus II analyzed by monoclonal antibodies, p. 23-24. In P. Gugerli (ed.), Extended abstracts 11th Meeting ICVG, Montreux, Switzerland, 6-9 September 1993. Federal Agricultural Research Station of Changins, CH-1260 Nyon, Switzerland.
Keywords :grapevine; rugose wood; leafroll; corky bark; etiology; associated; closterovirus; GLRaV-2; GLRaV-6; GLRaV-IIa; GLRaV-IIb; immunoassay; detection; monoclonal antibodies; Switzerland; meeting; ICVG;
Notes :GLRaV-II is not serologically related with GLRaV-I or -III.The use of monoclonal antibodies against the original GLRaV-II isolate shows that this was not a pure virus isolate. The authors distinguish 2 components: GLRaV-IIa and GLRaV-IIb. The latter is characterized by the low molecular weight of its coat protein and a very clear cross-banding of the particles in the EM. It is associated with leafroll in some cultivars, but also with corky bark disease. The former component of GLRaV II (IIa) still needs to be characterized.

676. **Gugerli, P., B. Rosciglione, J.J. Brugger, S. Bonnard, M.E. Ramel, and F. Tremea.** 1990. Etiological studies and diagnostic of grapevine leafroll disease improved by monoclonal antibodies, p. 47-54. In A. Schots (ed.), Monoclonal antibodies in agriculture. Proc. Symposium "Perspectives for monoclonal antibodies in agriculture", Wageningen, Netherlands, May 1990. Pudoc, Wageningen.
Keywords :grapevine; leafroll; closterovirus; monoclonal antibodies; immunoassay; diagnosis; etiology; Switzerland;

677. **Gugerli, P., B. Rosciglione, J.J. Brugger, S. Bonnard, M.E. Ramel, and F. Tremea.** 1991. Further characterization of grapevine leafroll disease, p. 59-60. In I. C. Rumbos, R. Bovey, D. Gonsalves, W. B. Hewitt, and G. P. Martelli (ed.), Proceedings of the 10th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine. Plant Protection Institute, P.O.Box 303, 38001 Volos, Greece.
Keywords :grapevine; leafroll; GLRaV-1; GLRaV-2; GLRaV-3; closterovirus; GVA; vitivirus; fleck; heat therapy; virus elimination; meeting; ICVG; Switzerland;
Notes : Closteroviruslike particles of three serologically distinct entities were confirmed to be associated with three distinct symptoms of grapevine leafroll in Switzerland. The putative viruses are provisionally named grapevine leafroll associated virus I, II and III (GLRaV-I, II and III). The size of particles range from 1800 to 2200 nm. Monoclonal antibodies were produced to GLRaV-I and III. Heat therapy eliminated GLRaV particles. Serologically distinct closteroviruslike particles found in leafroll infected Emperor, Zinfandel and Black seedless grapevines suggest the presence of further GLRaV's. GVA and an isometric virus strictly associated with fleck disease (named Grapevine fleck associated virus, GFaV) were found to have no relationship with leafroll.

678. **Guidoni, S., F. Mannini, A. Ferrandino, N. Argamante, and R. Di Stefano.** 1997. The effect of grapevine leafroll and rugose wood sanitation on agronomic performance and berry and leaf phenolic content of a Nebbiolo clone (*Vitis vinifera* L.). Amer. J. Enol. Vitic. **48**:438-442.
Keywords :grapevine; leafroll; rugose wood; GLRaV-3; GVA; performance; Italy;
Notes : Virus elimination (GLRaV-3, GVA) from an infected clone (415) of Nebbiolo provided healthy vine progeny that had a wider and a greener canopy able to achieve a better photosynthetic activity than that of the infected mother plant, resulting in an early grape maturity. Anthocyanins, hydroxycinamoyltartaric acids, flavonols and catechins were analyzed by HPLC and total anthocyanins by spectrophometry. Healthy vines had a lower anthocyanin accumulation rate in leaf blades, whereas anthocyanin and phenol content in berries was higher. The practical consequences of theses facts are discussed.

679. **Guillot, R.** 1991. Incompatibilité au greffage des Riparia Rupestris (Graft incompatibility of Riparia Rupestris rootstocks). Progr. Agric. Vitic. **108**:165-166.
Keywords :grapevine; incompatibility; Cabernet Sauvignon; rootstock; France;
Notes : In French. This paper follows a note in Progr. agric. vitic. 1986, No 21, reporting incompatibilities between 3309C and Chenin blanc, Pineau d'Aunis and Grolleau, and between 101-14 MG and Grolleau. With the increasing use of rootstock clones, these phenomena will become more apparent because of their larger impact if a whole clone is incompatible. Incompatibility problems were observed in 1990 with Sauvignon grafted on 3309 No 111 at Sancerre, with Sauvignon and Cabernet Sauvignon on the same rootstock clone in Maine et Loire, and also in Ardèche with Cabernet-Sauvignon on 3309 No 111.

680. **Guo, J.R., T.A. Chen, and N. Loi.** 1991. Production of monoclonal antibodies against flavescence dorée mycoplasma-like organism. Phytopathology **81**:1210-Abstract 5.
Keywords :grapevine; phytoplasma disease; flavescence dorée; immunoassay; monoclonal antibodies; phytoplasma; immunofluorescence; immuno-blot; New York; USA;
Notes : The monoclonal antibodies are used for localizing MLO's in the tissues by immunofluorescence, and for dot blot analysis, which is as sensitive as ELISA for detecting MLO's in crude sap.

681. **Guo, J.R., T.A. Chen, N. Loi, and R.C. Pearson.** 1992. Cloning of chromosomal DNA of the mycoplasmalike organism (MLO) associated with grapevine yellows. Phytopathology **82**:243.
Keywords :grapevine; phytoplasma disease; phytoplasma; DNA; cloning; DNA probe; detection; nucleic acid assay; dot blot hybridization; New York; USA;
Notes : Myoplasmal DNA was extracted from periwinkle by CsCl buoyant density gradient centrifugation. After digestion with Eco R-I restriction enzyme, the fragments were ligated with Eco R-I digested pUCl9 and transferred into *E.Coli* DH5x cells. Two recombinants plasmids specific to grapevine yellows MLO were selected (9.0 and 1.6 Kb). Dot blot assay was used for detection. The cloned DNA could

detect as little as 10 ng total DNA from infected periwinkle or grapevine plants infected with yellows in Geneva, New York.

682. **Gürsoy, Y.Z.** 1988. Vein necrosis: new viruslike disease in Turkish vineyards. Journal of Turkish Phytopathology **17***(1):*43-45.
Keywords :grapevine; vein necrosis; occurrence; symptoms; Turkey;
Notes : In English, Turk.sum.

683. **Habili, N., A.J.W. Ewart, C.F. Fazeli, N.S. Scott, L.R. Krake, and M.A. Rezaian.** 1996. Virus types associated with grapevine leafroll disease in Australia. The Australian Grapegrower and Winemaker **33***(390a):*25-28.
Keywords :grapevine; leafroll; closterovirus; GLRaV-1; GLRaV-2; GLRaV-3; GLRaV-4; GLRaV-5; survey; immunoassay; ELISA; Australia;
Notes : All five leafroll associated viruses GLRaV-1 to 5 have been detected in Australian vineyards, using mainly serological methods (ELISA). GLRaV-3 was also detected by nucleic acid hybridization. None of the five viruses was clearly more prevalent than the others in the survey. GLRaV-1, 2, 4, and 5, but not GLRaV-3, were present in a symptomatic Sultana vine, with a high incidence of GLRaV-4. No correlation was found between symptom type and the presence of one or the other of the five viruses. Recommendations are given to growers and viticulture specialists in order to reduce the incidence and spread of these viruses.

684. **Habili, N., C.F. Fazeli, A. Ewart, R. Hamilton, R. Cirami, P. Saldarelli, A. Minafra, and M.A. Rezaian.** 1995. Natural spread and molecular analysis of grapevine leafroll- associated virus 3 in Australia. Phytopathology **85**:1418-1422.
Keywords :grapevine; leafroll; GLRaV-3; closterovirus; spread; epidemiology; nucleic acid assay; cDNA; ELISA; northern blot; detection; PCR; nucleotide sequence; Australia;
Notes : Natural spread of grapevine leafroll disease was observed in a Pinot Noir clonal evaluation trial in South Australia. The trial consisted of 13 clones with the spread apparently initiated from 3 leafroll-infected clones: Antav 543, Geisenheim 20, and Bourgogne H199A. The occurrence of grapevine leafroll-associated virus 3 (GLRaV-3) was suspected. All 104 vines in the trial were tested by enzyme-linked immunosorbent assay using antibody to GLRaV-3 and by slot blot hybridization analysis using double- stranded RNA as target and labeled GLRaV-3-specific cDNA as probe. Both tests linked GLRaV- 3 with the disease spread and detected the infection prior to the onset of symptoms. A cDNA clone from an Italian isolate of GLRaV-3 hybridized in Northern blots with three major dsRNAs of 19.5, 1.9, and 0.9 kbp extracted from leafroll-infected vines. The cloned cDNA insert of approximately 1 kbp was sequenced, and a set of primers designed based on the sequence was used to obtain a corresponding polymerase chain reaction product from the ANTAV 543 isolate grown in Australia. The nucleotide sequence of the cDNA clones from the two isolates of GLRaV-3 showed 99.5% identity and contained an open reading frame (ORF) encoding a putative protein with a molecular mass of 20.4 kDa with no significant homology to known protein sequences. This ORF was mapped near the 3'-end of the plus strand viral genome and had a 3'-untranslated AU-rich region of approximately 347 nucleotide residues.

685. **Habili, N., C.F. Fazeli, L.R. Krake, G. Fletcher, A.M. deLane, R. Bonfiglioli, R.H. Symons, N.S. Scott, and M. A. Rezaian.** 1997. Grapevine leafroll associated viruses in Australia: detection tools developed and virus types identified, p. 87-88. In O. A. Sequeira,de, J. C. Sequeira, and M. T. Santos (ed.), Extended abstracts 12th Meeting ICVG, Lisbon, Portugal, 29 September-2 October 1997. Dept.Plant Pathology, Estação Agronomica Nacional, Oeiras, Portugal.
Keywords :grapevine; leafroll; closterovirus; GLRaV-1; GLRaV-2; GLRaV-3; GLRaV-4; GLRaV-5; detection; immunoassay; nucleic acid assay; ELISA; cDNA; PCR; spread; Australia; meeting; ICVG;
Notes : This paper summarizes the work done in Australia from the sixties to 1997 on the detection of grapevine-leafroll associated viruses. So far, GLRaV-1 to -5 were found in different viticultural regions of Australia.

686. **Habili, N., C.F. Fazeli, and M.A. Rezaian.** 1997. Identification of a cDNA clone specific to grapevine leafroll-associated virus 1, and occurrence of the virus in Australia. Plant Pathology **46**:516-522.

Keywords :grapevine; leafroll; closterovirus; GLRaV-1; detection; cDNA probe; PCR; ELISA; western blot; performance; immunoassay; nucleic acid assay; Australia;
Notes : A cDNA clone derived from a Sultana grapevine (also called Thompson seedless or Sultanina) was shown to hybridize with dsRNA from grapevines affected with leafroll and reacting with GLRaV-1 antibody. After sequencing cDNA, specific primers were designed and used in RT-PCR with several grapevine varieties. The same sources were also tested with Western blot and ELISA for GLRaV-1. A good correlation was established between the presence of GLRaV-1 and positive RT-PCR reactions. GLRaV-1 occurrence was also correlated with low yields of the Sultana clones tested. The most suitable time for detecting this virus was early in summer. In a variegated clone of Sultana, GLRaV-1 concentration was significantly higher in white areas than in green ones.

687. **Habili, N., L.R. Krake, M. Barlass, and M.A. Rezaian.** 1992. Evaluation of biological indexing and dsRNA analysis in grapevine virus elimination. Ann. Appl. Biol. **121**:277-283.
Keywords :grapevine; leafroll; rugose wood; stem pitting; fleck; viroid; yellow speckle; indexing; dsRNA; detection; *in vitro;* virus elimination; fragmented shoot apex culture; Australia;
Notes : Biological indexing and dsRNA assays were evaluated and compared for their respective usefulness for the detection of viruses before and after attempted virus elimination by fragmented shoot apex culture (FSAC). Both methods were applied to several varieties of imported grapevines before and after FSAC. A good correlation was observed between the presence or absence of some specific dsRNA species and the presence or absence of leafroll. The dsRNA species associated with leafroll and low productivity of Sultana clones were removed by FSAC. Indexing and dsRNA assay showed no recurrence of the disease after 10 years of culture. It is concluded that dsRNA assay could be used as a faster and cheaper method than biological indexing by grafting for assaying the successful elimination of leafroll after FSAC.

688. **Habili, N. and F.W. Nutter,Jr.** 1997. Temporal and spatial analysis of grapevine leafroll- associated virus 3 in Pinot Noir grapevines in Australia. Plant Disease **81**:625-628.
Keywords :grapevine; leafroll; closterovirus; GLRaV-3; epidemiology; distribution; survey; Australia;
Notes : An epidemic of grapevine leafroll due to GLRaV-3 was surveyed during eleven years in a field trial in Nuriootpa, South Australia. The inoculum was introduced purposedly as infected budwood. The incidence of leafroll at the time of planting (1986) was 23.1%. Infected vines were planted in a random pattern. The first change in disease incidence was observed 8 years after planting (27.9%). Disease incidence increased to 51.9% by 1996. Disease progress and rate curves showed that the logistic (R-2 = 96.2) and Gompertz (R-2 = 96.3) growth models would be most suitable for describing the evolution of the disease. The logistic model was chosen for comparing this epidemic (South Australia) with a GLRaV- 3 epidemic in Cabernet Sauvignon grapevines in New Zealand. The logistic rate of GLR spread with respect to time was 0.35 logit/year in South Australia and was nearly three times faster (1.19 logits/year) for GLRaV-3 spread in New Zealand. The arrangement of infected vines within rows in South Australia was random up to 8 years after transplanting but subsequently became highly aggregated. It seem that first-infected plants are contributing to new infections (plant-to-plant spread likely), and that a biotic vector is probably involved.

689. **Habili, N. and M.A. Rezaian.** 1995. Cloning and molecular analysis of double-stranded RNA associated with grapevine leafroll disease. Ann. Appl. Biol. **127**:95-103.
Keywords :grapevine; closterovirus; leafroll; molecular analysis; dsRNA; northern blot; cDNA probe; cloning; Australia;
Notes : Several dsRNA species were detected in a low yielding Sultana clone B4L (*Vitis vinifera,* syn. Thompson seedless) affected with leafroll in Southern Australia. Total dsRNA from this clone was extracted and used as a template to produce clones of cDNA. These clones were used in northern blot analysis of dsRNA extracted from Sultana B4L clone and from other Sultana sources characterized by various performances in the field. On the basis of the hybridization of each probe with dsRNA from different Sultanas, the cDNA clones could be divided into three groups. One group of the cDNA clones hybridized to high molecular weight dsRNA (19.5 kbp) extracted from low yielding Sultanas. A second group hybridized to dsRNA of high M(r) from three low yielding Sultana vines whereas a third group hybridized to several smaller dsRNA with a size from 1.15 to 6.5 kbp. Part of the dsRNA sequence was

determined. These results indicate that more than one virus was present in the Sultana clone B4L and that dsRNA 6 (1.15 kbp) may be of viral origin.

690. **Habili, N., M.A. Rezaian, and J.V. Possingham.** 1991. Prime vine production by primers. The Australian Grapegrower and Winemaker **28***(328):*72-73.
Keywords :grapevine; quality; selection; Australia;

691. **Habili, N. and Scott N.S.** 1994. Towards grapevine virus control by genetic engineering. The Australian Grapegrower and Winemaker **31***(366a):*72-74.
Keywords :grapevine; virus; control; transgenic; Australia;

692. **Haidar, M.M., M. Digiaro, W. Khoury, and V. Savino.** 1996. Viruses and virus diseases of grapevine in Lebanon. Bulletin OEPP/EPPO Bulletin **26**:147-153.
Keywords :grapevine; virus; virus-like diseases; phytoplasma disease; occurrence; vitivirus; GVA; GVB; rugose wood; leafroll; closterovirus; GLRaV-1; nepovirus; grapevine fanleaf virus; grapevine fleck virus; survey; Lebanon;
Notes : Symptoms of viruses on grapevine in the main viticultural areas of Lebanon included rugose wood, leafroll, fanleaf. Phytoplasma diseases were also observed with low frequency. ELISA showed the presence of one or more viruses in 53 % of 1536 *Vitis vinifera* tested (cvs. Tfahifi, Cinsaut and Cardinal). GVA was prevalent (32.4 %), GFkV (19.5 %). GLRaV-1, GVB and GFLV were in low incidence (1.1 - 3.6 %).

693. **Hajdu, E.** 1995. Grapevine selection in Hungary, p. 121-123. In J. M. Rantz (ed.), Proceedings of the International Symposium on Clonal Selection, Portland, Oregon, USA, June 1995. The American Society for Enology and Viticulture, Portland, Oregon, USA.
Keywords :grapevine; clonal selection; sanitary selection; Hungary;
Notes : Description of the system of clonal and sanitary selection in Hungary.

694. **Hajdu, E., O. Luntz, and J. Lazar.** 1994. Virusfreie Klone von Rebsorten in Ungarn (Virus-free clones of grapevine in Hungary). Forschungsinstitut für Weinbau und Kellerwirtschaft, 6000 Kecskemét, Kisfai 182 (Hungary).
Keywords :grapevine; virus-free material; clonal selection; sanitary selection; Hungary;
Notes : List of virus-free grapevine varieties available in Hungary, with 57 colour photographs and a short description of each variety. There is also a version in Hugarian, under the title "Szolofajtaink virusmentes klonjai". Same authors, editor and publisher. Book.

695. **Halbrendt, J.M.** 1993. Virus vectors Longidoridae and their associated viruses in the Americas. Russian Journal of Nematology **1**:65-68.
Keywords :grapevine; peach rosette mosaic virus; nepovirus; grapevine fanleaf virus; tomato ringspot virus; vector; *Xiphinema americanum; Xiphinema index;* nematode; Longidoridae; USA;
Notes : Five *Xiphinema* and one *Longidorus* spp. were found as natural vectors of plant viruses throughout North and South America. All native *Xiphinema* vectors belong to the *X.americanum* group and transmit tomato ringspot, cherry rasp leaf or peach rosette mosaic viruses. Grapevine fanleaf virus and its main vector *X.index* were introduced in America with infested grapevine propagation material and adhering soil.

696. **Hans, F., M. Fuchs, and L. Pinck.** 1990. Infection of mesophyll protoplasts of *Chenopodium quinoa* with grapevine fanleaf virus RNA strain F13 and transcripts of its satellite RNA, p. 482. In Abstracts of the 8th International Congress of Virology, Berlin 1990.
Keywords :grapevine; nepovirus; infection; grapevine fanleaf virus; RNA; protoplast; strain; satellite RNA; France; meeting;
Notes : Abstract. Book chapter.

697. **Hans, F., M. Fuchs, and L. Pinck.** 1992. Replication of grapevine fanleaf virus satellite RNA transcripts in *Chenopodium quinoa* protoplasts. J. Gen. Virol. **73**:2517-2523.

Keywords :grapevine; nepovirus; grapevine fanleaf virus; protoplast; satellite RNA; multiplication; *Chenopodium quinoa;* France;

698. **Hans, F., M. Pinck, and L. Pinck.** 1993. Location of the replication determinants of the satellite RNA associated with grapevine fanleaf nepovirus (strain F13). Biochimie **75**:597-603.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; strain; F 13; genome; RNA; structure; cDNA; replication; satellite RNA; organization; France;
Notes : The F13 isolate of grapevine fanleaf virus has a RNA satellite of 1114 nucleotides, named RNA-3, which codes for a non-structural protein P3 of M(r) 37 K. No function has so far been attributed to P3. A full-length cDNA clone of GFLV-F13 RNA-3 was modified using several mutagenic oligonucleotides. 14 mutated clones obtained were used to study the mechanisms involved in the replication of satellite RNA and the role of protein P3.

699. **Hansen, A.J.** 1985. An end to the dilemma - Virus-free all the way. HortScience **20**:852-859.
Keywords :grapevine; virus; virus elimination; certification; quarantine; heat therapy; meristem tip culture; chemotherapy; propagation; virus-free material; legislation; control; review; general; Canada;
Notes : Review of the general problem of obtaining and maintaining virus-free planting material. Biology of viruses, spread, detection, elimination, registration and certification regulations. The use of virus-free material for a given species or variety has to take account of the cost of the certification procedure versus the advantage obtained. The author insists on the importance of getting rid of viruses in breeding material.

700. **Harris, A.R.** 1988. *Xiphinema index*-resistant *Vitis* rootstocks screened for comparative field performance in a Chasselas vineyard replant site. Vitis **27**:243-251.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; resistance; nematode; *Xiphinema index;* Longidoridae; performance; rootstock; Chasselas; *Vitis;* Australia;
Notes : 35 rootstocks were tested over 10 years with Chasselas in north eastern Victoria, Australia, for resistance to *Xiphinema index*. Yield and vigour were recorded. Tests were made for detecting the presence of GFLV. The list of rootstocks tested include 25 hybrid seedlings bred by Lider & Kunde ("Lider seedlings"). Several rootstocks showed promising results.

701. **Hassani, Z.** 1991. Application du microgreffage *in vitro* de la vigne, à l'étude d'anomalies physiologiques et virales (*In vitro* micrografting of grapevine applied to the study of physiological and viral abnormalities). Ecole Nationale Supérieure Agronomique de Montpellier, Montpellier.
Keywords :grapevine; virus; micrografting; *in vitro;* method; France;
Notes : PhD Thesis in Agronomic Science, National Agronomic High School of Montpellier, France.

702. **Hassani, Z. and D. Boubals.** 1991. Le microgreffage *in vitro*: Une technique rapide et efficace de révélation du virus de la nécrose des nervures de 110 Richter (*In vitro* micrografting: A quick and efficient method for detecting the virus of vein necrosis of 110 Richter). Progr. Agric. Vitic. **108**:443-445.
Keywords :grapevine; vein necrosis; detection; *in vitro;* micrografting; France;
Notes : In French, Eng. sum.

703. **Hassim, Z.** 1985. Plant parasitic nematodes from vineyards in Jordan. Nematol. medit. **13**:117-118.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; *Xiphinema index;* Longidoridae; nematode; occurrence; Jordan;
Notes : List of 25 plant parasitic nematodes in vineyards in Jordan. *Xiphinema index* is present, as well as GFLV.

704. **Hatzinikolakis, H.K. and K.A. Roubelakis-Angelakis.** 1993. A modified method for *in vitro* thermotherapy and meristem culture for production of virus-free grapevine plant material, p. 172. In P. Gugerli (ed.), Extended abstracts 11th Meeting ICVG, Montreux, Switzerland, 6-9 September 1993. Federal Agricultural Research Station of Changins, CH-1260 Nyon, Switzerland.
Keywords :grapevine; heat therapy; *in vitro*; meristem tip culture; virus elimination; control; Greece; meeting; ICVG;

Notes :A combined *in vitro* thermotherapy and meristem culture method for obtaining virus-free grapevine material, using one node green cutting implanted aseptically on a solidified culture medium for a heat treatment of 70 days, followed by excision of axillary buds and transfer on Murashige and Skoog medium supplemented with 6-benzylaminopurine. After 3-4 weeks, transfer to Roubelakis medium for rooting.

705. **Hernandez, L. and F.M. Ochoa Corona.** 1997. Deteccion de *Xylella fastidiosa* Wells *et al.* por ELISA-DAS en vid (*Vitis vinifera* L.) y malezas en viñedos del Municipio Mara, estado Zulia, Venezuela (ELISA-DAS detection of *Xylella fastidiosa* Wells *et al.* in grapevine (*Vitis vinifera* L.) and weeds in vineyards of Mara county, Zulia state, Venezuela). Revista de la Facultad de Agronomia,Universidad de Zulia **14**:297-306.
Keywords :grapevine; Pierce's disease; *Xylella fastidiosa*; detection; ELISA; immunoassay; Venezuela;
Notes : In Spanish, Eng. sum. *Xylella fastidiosa* was identified by DAS-ELISA in 8 grapevine cultivars.

706. **Hewitt, W.B.** 1989. The beginning and twenty-five years of ICVG, p. 7-9. In E. Tanne (ed.), Proceedings of the 9th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG), Kiryat Anavim, Israel, September 1987. The Volcani Center, P.O. Box 6, Bet Dagan , Israel.
Keywords :grapevine; history; review; meeting; ICVG; USA;
Notes : This short history of the International Council for the Study of Viruses and Virus Diseases of Grapevine (ICVG), now including virus-like diseases such as viroids and phytoplasma diseases, relates the origin and development of this group. Its creation was decided at the end of the 3rd O.I.V. Conference on Virus Diseases of the Grapevine held at Oeiras, Portugal, in May 1962, with the idea that scientists engaged in virological research would be able to exchange ideas on their studies. The first meeting, organized by R.Bovey, took place in August 1964 at the Federal Agricultural Research Station of Changins (Switzerland). A Steering Committee was formed with 7 members, with R.Bovey as secretary. The meeting was followed by visits in vineyards of Franche-Comté and Burgundy in France (organized by A.Caudwell and A.Vuittenez).
The following meetings were (list completed up to 1997):
1965: Davis, California (Organized by W.B.Hewitt)
1967: Bernkastel-Kues, Germany (W.Gärtel) (Prof.W.B. Hewitt was elected as president of ICVG)
1970: Colmar, France (A.Vuittenez and A.Caudwell)
1973: Salice Terme and Catania, Italy (E.Baldacci, G.Belli, E.Refatti)
1976: Cordoba and Madrid , Spain (A.Peña-Iglesias)
1980: Niagara Falls, Canada, Geneva and East Lansing , USA (H.Dias, D.Gonsalves and D.C.Ramsdell)
1984: Bari and Sassari, Italy (G.P.Martelli and U.Prota)
1987: Kiryat Anavim, Israel (E.Tanne) (Prof.G.P.Martelli was elected president of ICVG following the decision of Prof. Hewitt to give up the presidency. Prof. Hewitt was acclaimed honorary president.
1990: Volos, Greece (I.C.Rumbos)
1993: Montreux, Switzerland (P.Gugerli)
1997: Lisbon, Portugal (O.A. De Sequeira, J.C. Sequeira)
The main objectives and some highlights of ICVG are outlined, as well a some unresolved questions.

707. **Hewitt, W.B.** 1989. Twenty-five years of the ICVG. Phytoparasitica **17**:57-58.
Keywords :grapevine; ICVG; history; review; meeting; USA;
Notes : Abstract of introductory paper to the 9th meeting of ICVG, September 6-11,1987. The full paper appears in the Proceedings of the 9th meeting of ICVG, Kiryat Anavim, Israel, 1987, 7-9, 1989 (ref.706).

708. **Hewitt, W.B.** 1991. Viroses and virus-like diseases of grapevines: an overview of results of research -- approaches and accomplishments on cause, nature and control, p. 21-39. In I. C. Rumbos, R. Bovey, D. Gonsalves, W. B. Hewitt, and G. P. Martelli (ed.), Proceedings of the 10th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG). Plant Protection Institute, P.O. Box 303, 38001 Volos, Greece.
Keywords :grapevine; virus diseases; virus-like diseases; viroid; control; review; USA; meeting; ICVG;

Notes : Review on the present knowledge on grapevine virus and virus- like diseases and their agents. Opening lecture of the 10th Meeting of ICVG, Volos, Greece, 1990.

709. **Hibrand, L., O. Le Gall, T. Candresse, and J. Dunez.** 1992. Immunodetection of the proteins encoded by grapevine chrome mosaic nepovirus RNA2. J. Gen. Virol. **73**:2093-2098.
Keywords :grapevine; nepovirus; grapevine chrome mosaic virus; detection; immunoassay; protein; RNA; France;

710. **Hidalgo, L., A. Garcia de Lujan, and I. Benitez Sidon.** 1985. Etat actuel de la sélection clonale et du contrôle du matériel de multiplication de la vigne en Espagne (Clonal selection and certification of grapevine propagation material in Spain). Bull. OIV **58**:362-376.
Keywords :grapevine; clonal selection; certification; propagation; performance; Spain;
Notes : In French. Report on the present state of clonal selection and certification of grapevine in Spain. Results and perspectives.

711. **Hill, B.L.** 1994. Characteristics of multiplication and spread of *Xylella fastidiosa* in plant hosts and insects vectors. University of California, Berkeley.
Keywords :grapevine; Pierce's disease; *Xylella fastidiosa*; multiplication; vector; thesis; California; USA;
Notes : PhD thesis.

712. **Hill, B.L. and A.H. Purcell.** 1995. Multiplication and movement of *Xylella fastidiosa* within grapevine and four other plants. Phytopathology **85**:1368-1372.
Keywords :grapevine; Pierce's disease; *Xylella fastidiosa;* multiplication; host range; California; USA;
Notes : Beside grapevine, Himalayan blackberry *(Rubus discolor)*, California mugwort *(Artemisia douglasiana)*, watergrass *(Echinochloa crus-galli)*and Bermuda grass *(Cynodon dactylon)* are preferred plants for the main vectors of *Xylella fastidiosa* and often grow near vineyards in California. The aim of this study was to know if Pierce's disease bacterium could become systemic in these plants. The bacterium moved systemically only in grapevine and blackberry. It was never detected in inoculated Bermuda grass, contrary to earlier reports by Freitag.

713. **Hill, B.L. and A.H. Purcell.** 1995. Acquisition and retention of *Xylella fastidiosa* by an efficient vector, *Graphocephala atropunctata*. Phytopathology **85**:209-212.
Keywords :grapevine; Pierce's disease; *Xylella fastidiosa;* leafhopper; vector; transmission; USA;

714. **Hill, B.L. and A.H. Purcell.** 1997. Populations of *Xylella fastidiosa* in plants required for transmission by an efficient vector. Phytopathology **87**:1197-1201.
Keywords :grapevine; Pierce's disease; *Xylella fastidiosa;* transmission; froghopper; leafhopper; vector; California; USA;

715. **Hollo, R. and S. Misik.** 1994. Producing of virus-free basic propagating material of new resistant hybrids, p. 56-57. In VIth International Symposium on Grape Breeding, Yalta, Crimea, Ukraine, 4-10 September 1994. Abstracts. Office International de la Vigne et du Vin (OIV), Paris, France.
Keywords :grapevine; virus-free material; resistance; *in vitro* propagation; Hungary; meeting;
Notes : Symposium on Grape Breeding, Yalta 1994. Abstract. Five newly bred interspecific grape hybrids were investigated in order to know how they can be propagated *in vitro* and if viruses can be eliminated by shoot apex culture.

716. **Hongcang, G., Y. Dunyu, L. Hunting, Q. Bingsheng, W. Jinfang, and T. Bo.** 1994. [Detection of grapevine fanleaf virus by dot-blot hybridization with biotin labelled GFV-cDNA probes]. Virol. Sin. **9***(1):*53-58.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; detection; cDNA; dot blot hybridization; nucleic acid assay; China;
Notes : In Chinese, Engl. sum.

717. **Hopkins, D.L.** 1985. Effects of plant growth regulators on development of Pierce's disease symptoms in grapevine. Plant Disease **69**:944-946.
Keywords :grapevine; Pierce's disease; symptoms; growth substance; IAA; kinetin; etephon; abscissic acid; USA;
Notes : Indole-acetic acid and kinetin prevented the development of symptoms of Pierce's disease on *V. rotundifolia* (resistant variety), not on Carignan (highly susceptible). Etephon and abscissic acid slightly enhanced the symptoms.

718. **Hopkins, D.L.** 1985. Water stress in grapevines with Pierce's disease. Phytopathology **75**:500.
Keywords :grapevine; Pierce's disease; symptoms; physiology; water; USA;
Notes : Water stress is a cause of the leaf marginal necrosis in Pierce's disease.

719. **Hopkins, D.L.** 1985. Physiological and pathological characteristics of virulent and avirulent strains of the bacterium that causes Pierce's disease of grapevine. Phytopathology **75**:713-717.
Keywords :grapevine; Pierce's disease; bacterium; physiology; pathology; USA;

720. **Hopkins, D.L.** 1988. *Xylella fastidiosa* and other fastidious bacteria of uncertain affiliation, p. 95-103. In N. W. Schaad (ed.), Laboratory Guide for Identification of Plant Pathogenic Bacteria. The American Phytopathological Society Press, St.Paul, Minnesota, USA.
Keywords :grapevine; Pierce's disease; *Xylella fastidiosa;* detection; identification; method; USA;

721. **Hopkins, D.L.** 1989. *Xylella fastidiosa*: Xylem-limited bacterial pathogen of plants. Annu. Rev. Phytopathol. **27**:271-290.
Keywords :grapevine; Pierce's disease; *Xylella fastidiosa;* symptoms; description; general; USA;
Notes : Description of the pathogen, properties, symptoms, transmission, vectors,main hosts. 84 references.

722. **Hopkins, D.L.** 1991. Colonization of grapevine by various strains of *Xylella fastidiosa*. Phytopathology **81**:812-Abstract.
Keywords :grapevine; Pierce's disease; *Xylella fastidiosa;* multiplication; bacterium; strain; Florida; USA;
Notes : Grapevine strains were compared with strains from oak, goldenrod, sumac, sycamore. Grapevine strains multiplied 10 to 100 times more rapidly in stems or petioles of grapevine than the other strains. All strains multiplied in grapevine, but only grapevine strains reproduced typical Pierce's disease in Carignane.

723. **Hopkins, D.L.** 1995. *Xylella fastidiosa* and associated diseases. History and significnce. Plant Diagnostics Quarterly **16**:107-110.
Keywords :grapevine; Pierce's disease; *Xylella fastidiosa;* economic importance; history; control; USA;
Notes : Major diseases caused by *Xylella fastidiosa*, economic importance and control strategies.

724. **Hopkins, D.L. and W.C. Adlerz.** 1988. Natural hosts of *Xylella fastidiosa* in Florida. Plant Disease **72**:429-431.
Keywords :grapevine; Pierce's disease; *Xylella fastidiosa;* host range; Florida; USA;
Notes : Review on the subject.

725. **Horvath, J., J. Lehoczky, M. Nemeth, P. Salamon, and S. Kobza.** 1994. Viruses and virus-like diseases of woody plants in Hungary. Acta Phytopathol. Entomol. Hung. **29**:129-136.
Keywords :grapevine; virus; virus diseases; virus-like diseases; nepovirus; symptoms; occurrence; review; Hungary;
Notes : In Hungary, grapevines are infected by eight nepoviruses, four air-borne viruses and three viruses that have not been exactly identified so far.

726. **Horvath, J., I. Tobias, and K. Hunyadi.** 1994. New natural herbaceous hosts of grapevine fanleaf nepovirus. Horticultural Science **26***(1)*:31-32.

Keywords :grapevine; nepovirus; grapevine fanleaf virus; host range; birthwort; *Aristolochia; Lagenaria;* Hungary;
Notes :A virus was transmitted from grapevine, *Aristolochia clematitis* and *Lagenaria siceraria* cv. turbinata growing in the region of Lake Balaton, Hungary to various herbaceous hosts. It was identified by serology as grapevine fanleaf virus. *Aristolochia* and *Lagenaria* appear therefore to be new natural hosts for this virus (Horticultural Science is the continuation of Kertgazdasag, and is published in Budapest.)

727. **Hu, J.S., D. Boscia, and D. Gonsalves.** 1989. Use of monoclonal antibodies in the study of closteroviruses associated with grape leafroll disease. Phytopathology **79**:1189.
Keywords :grapevine; leafroll; closterovirus; monoclonal antibodies; USA;

728. **Hu, J.S. and D. Gonsalves.** 1988. Biochemical and serological characterization of closterovirus- like particles associated with grapevine leafroll disease. Phytopathology **78**:1568
Keywords :grapevine; leafroll; closterovirus; immunoassay; properties; USA;

729. **Hu, J.S., D. Gonsalves, D. Boscia, M. Maixner, and D. Golino.** 1991. Comparison of rapid detection assays for grapevine leafroll disease associated closteroviruses. Vitis **30**:87-95.
Keywords :grapevine; leafroll; closterovirus; detection; GLRaV-2; GLRaV-3; GLRaV-4; immunoassay; method; comparison; ELISA; dsRNA; ISEM; USA;
Notes : ELISA, dsRNA and ISEM were compared for their sensitivity, specificity and simplicity in detecting leafroll associated closteroviruses. ELISA is sensitive and easy to use, but different antisera are necessary to detect different types of GLRaV. The possibility of using a mixture of several anti-GLRaV sera was investigated. dsRNA analysis can detect all the types of GLRaV, but is less sensitive and more difficult than ELISA. Besides, it is not specific. ISEM is sensitive and rapid, but it needs an electron microscope, and several antisera. Recommended for large scale tests: ELISA with multiple antisera. The other methods should be used only for checking doubtful results, as they are more time-consuming.

730. **Hu, J.S., D. Gonsalves, D. Boscia, and S. Namba.** 1990. Use of monoclonal antibodies to characterize grapevine leafroll associated closteroviruses. Phytopathology **80**:920-925.
Keywords :grapevine; leafroll; closterovirus; NY-1; GLRaV-3; immunoassay; western blot; ELISA; ISEM; immuno-blot; immunogold labelling; monoclonal antibodies; Japan; USA; Italy;
Notes :NY-1 monoclonal antibodies reacted with type III closteroviruses, not with I, II and IV isolates in ELISA, ISEM, dot-immunoblotting, western blotting, immunogold labelling of particles.

731. **Hu, J.S., D. Gonsalves, D. Boscia, and S. Namba.** 1991. Production and application of monoclonal antibodies against grapevine leafroll disease associated closteroviruses, p. 407. In I. C. Rumbos, R. Bovey, D. Gonsalves, W. B. Hewitt, and G. P. Martelli (ed.), Proceedings of the 10th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG). Plant Protections Institute, P.O. Box 303, 38001 Volos, Greece.
Keywords :grapevine; leafroll; GLRaV-3; closterovirus; detection; immunoassay; method; monoclonal antibodies; ELISA; immuno electron microscopy; immuno-blot; western blot; USA; Japan; Italy; meeting; ICVG;
Notes : Abstract. Monoclonal antibodies against GLRaV-III isolate NY-1 react with NY-1 and other type III isolates, but not with type I, II or IV isolates. Good sensitivity in different kinds of ELISA, ISEM, dot-immunoblotting and Western blotting.

732. **Hu, J.S., D. Gonsalves, and D. Teliz.** 1989. Detection and characterization of closterovirus-like particles associated with grapevine leafroll disease in New York, p. 117-118. In E. Tanne (ed.), Proceedings of the 9th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG), Kiryat Anavim, Israel September 1987. The Volcani Center, P.O. Box 6, Bet Dagan , Israel.
Keywords :grapevine; closterovirus; leafroll; GLRaV-3; NY-1; detection; ISEM; ELISA; SDS-double diffusion; western blot; immunoassay; New York; USA; meeting; ICVG;

733. **Hu, J.S., D. Gonsalves, and D. Teliz.** 1990. Characterization of closterovirus-like particles associated with grapevine leafroll disease. J. Phytopathol. **128**:1-14.
Keywords :grapevine; leafroll; closterovirus; purification; immunoassay; western blot; ELISA; SDS-PAGE; NY-1; NY-2; GLRaV-3; CA isolates; classification; USA;
Notes : The purification procedure of Zee et al. 1987 was improved. Antisera against CA-4 isolate (California isolate) were used in ELISA. NY-1 strain particles measured 1800-1900 nm. in length. The molecular weight of the coat protein of NY-1 and NY-2 was 43 000 daltons in SDS-PAGE analysis. The bands with this molecular weight reacted in Western blotting tests with specific polyclonal and monoclonal antibodies. A large dsRNA molecule of about 10 x 10^3 Mr was detected in extracts from leaves from leafroll-diseased vines, but not from healthy vines. Several serotypes, often in mixed infections. Grouping proposed: Type I: 2200 nm (Gugerli et al. 1984) Type II: 1800 nm (Id.) Type III: 1800-1900 nm (= NY- 1) Type IV: CA 4 (California, Thompson seedless). None of the leafroll samples reacted with GVA antiserum or with antisera to isometric particles. CA= California isolates: 1=Emperor; 2= Melon; 3= Blackrose; 4= Thompson seedless; 5= Italia. AK= Arkansas isolates.

734. **Hu, J.S., D. Gonsalves, and D. Teliz.** 1991. Characterization of grapevine leafroll disease associated closteroviruses, p. 58. In I. C. Rumbos, R. Bovey, D. Gonsalves, W. B. Hewitt, and G. P. Martelli (ed.), Proceedings of the 10th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG). Plant Protection Institute, P.O. Box 303,, 38001 Volos, Greece.
Keywords :grapevine; closterovirus; leafroll; NY-1; GLRaV-3; GLRaV-4; immunoassay; USA; meeting; ICVG;
Notes : Abstract. See paper by the same authors in J.Phytopathol. 128, 1- 14, 1990.

735. **Hu, J.S., D. Teliz, and D. Gonsalves.** 1989. Detection of closterovirus-like particles from crude plant extracts with immunosorbent electron microscopy. Phytoparasitica **17**:76-77.
Keywords :grapevine; immunoassay; leafroll; closterovirus; ISEM; ELISA; SDS-double diffusion; detection; closterovirus-like particles; electron microscopy; meeting; ICVG; USA; Mexico;

736. **Hu, J.S., D. Teliz, and D. Gonsalves.** 1989. Detection of closterovirus-like particles from crude plant extracts with immunosorbent electron microscopy (ISEM), p. 207. In E. Tanne (ed.), Proceedings of the 9th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG), Kiryat Anavim, Israel, September 1987. The Volcani Center, P.O. Box 6, Bet Dagan , Israel.
Keywords :grapevine; closterovirus; GLRaV-3; NY-1; leafroll; ISEM; detection; ELISA; SDS-double diffusion; western blot; immunoassay; New York; USA; meeting; ICVG;
Notes : The same abstract appears in Phytoparasitica 17, 76-77, 1989

737. **Hu, J.S., M. Wang, M. Maixner, and D. Gonsalves.** 1990. Mechanical transmission and characterization of a closterovirus from a grapevine leafroll infected grapevine. Phytopathology **80**:986.
Keywords :grapevine; leafroll; closterovirus; vitivirus; GVA; apple stem pitting virus; *Nicotiana;* transmission; properties; immunoassay; USA;
Notes : The virus was transmitted from grapevine to *Nicotiana occidentalis*, and retransmitted to *N. benthamiana*. Symptoms on *Nicotiana* are described. The virus is latent in *Vinca rosea, Datura stramonium, Gomphrena globosa, Cucurbita maxima, Cucumis sativus.* The particles measure 800 nm in length. The coat protein Mw is 24 kd. A polyclonal antiserum reacts with GVA and apple stem pitting virus.

738. **Hu, J.S., M. Wang, M. Maixner, and D. Gonsalves.** 1991. Mechanical transmission and characterization of a closterovirus from a grapevine leafroll diseased grapevine, p. 411. In I. C. Rumbos, R. Bovey, D. Gonsalves, W. B. Hewitt, and G. P. Martelli (ed.), Proceedings of the 10th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG). Plant Protection Institute, P.O. Box 303, 38001 Volos, Greece.
Keywords :grapevine; leafroll; mechanical transmission; vitivirus; GVA; herbaceous hosts; immunoassay; ELISA; ISEM; western blot; apple stem pitting virus; USA; meeting; ICVG;
Notes : Abstract. A filamentous virus was transmitted from a leafroll-diseased grape to *Nicotiana occidentalis, N. benthamiana* and several other herbaceous hosts. The particles measure 800 nm in length,

and have a coat protein of 24 Kd. Several dsRNA wiith a MW of 3.5 x 10^6 to 5 x 10^6 were isolated. Polyclonal antibodies reacted against the homologous virus and also against GVA and apple stem pitting virus in ELISA, ISEM and Western blot assays.

739. **Huang, P.Y., R.D. Milholland, and M.E. Daykin.** 1986. Structural and morphological changes associated with the Pierce's disease bacterium in bunch and muscadine grape tissues. Phytopathology **76**:1232-1238.
Keywords :grapevine; Pierce's disease; bacterium; symptoms; histology; USA;
Notes : Polymorphism in bacterial wall structure, with 3 types: 1: rippled, 2: intermediate, 3: smooth.

740. **Huss, B., S. Muller, G. Sommermeyer, B. Walter, and M.H.V. Van Regenmortel.** 1987. Grapevine fanleaf virus monoclonal antibodies: their use to distinguish different isolates. J. Phytopathol. **119**:358-370.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; monoclonal antibodies; immunoassay; ELISA; isolate; strain; F 13; France;
Notes : Strain F 13 of grapevine fanleaf virus was used for preparing monoclonal antibodies. They were used for studying 41 isolates.

741. **Huss, B. and B. Walter.** 1987. Diagnostic des virus du court-noué de la vigne et étude d'interactions entre isolats. Utilisation d'anticorps monoclonaux (Diagnosis of grapevine court-noué viruses [GFV and ArMV] and experiments on cross-protection between isolates. Use of monoclonal antibodies). Progr. Agric. Vitic. **104**:275-277.
Keywords :grapevine; grapevine fanleaf virus; immunoassay; ELISA; monoclonal antibodies; cross-protection; arabis mosaic virus; court-noué; isolate; strain; nepovirus; diagnosis; detection; France;
Notes : There was a certain degree of cross protection between strains of ArMV and GFV (mild strains versus severe strains).

742. **Huss, B., B. Walter, L. Etienne, and M.H.V. Van Regenmortel.** 1986. Grapevine fanleaf virus detection in various grapevine organs using polyclonal and monoclonal antibodies. Vitis **25**:178-188.
Keywords :grapevine; immunoassay; ELISA; monoclonal antibodies; wood shavings; grapevine fanleaf virus; nepovirus; detection; France;
Notes : Detection of fanleaf in wood shavings from dormant shoots in winter.

743. **Huss, B., B. Walter, and M. Fuchs.** 1989. Cross-protection between arabis mosaic virus and grapevine fanleaf virus isolates in *Chenopodium quinoa*. Ann. Appl. Biol. **114**:45-60.
Keywords :grapevine; arabis mosaic virus; grapevine fanleaf virus; nepovirus; isolate; cross-protection; France;

744. **Imada, J.** 1990. [Simplification of an indexing method for grapevine fleck by the use of cutting-grafts]. Bull. Fruit Tree Research Station (Yamanashi) **17**:55-61.
Keywords :grapevine; fleck; detection; indexing; Japan;
Notes : In Japanese. Use of cuttings of dormant or growing shoots of St.George for detecting fleck. Dormant wood is stored for 1-12 months, grafted and sprouted. 94% sprouting and 81% symptom expression. With growing wood, sprouting rate is low, but fleck could be well detected. Temperature: 23°C. Symptoms appear after 3-8 weeks.

745. **Ioannou, N.** 1991. Incidence and economic importance of virus and virus-like diseases of grapevine in Cyprus, p. 353-362. In I. C. Rumbos, R. Bovey, D. Gonsalves, W. B. Hewitt, and G. P. Martelli (ed.), Proceedings of the 10th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG). Plant Protection Institute, P.O. Box 303, 38001 Volos, Greece.
Keywords :grapevine; virus; viroid; virus diseases; occurrence; economic importance; fanleaf; yellow mosaic; leafroll; rugose wood; legno riccio; corky bark; fleck; vein necrosis; yellow speckle; Cyprus; meeting; ICVG;

Notes : Fanleaf, yellow mosaic, leafroll and rugose mosaic (legno riccio) are the most important grape virus diseases in Cyprus. Corky bark, fleck, vein necrosis and a vein banding of the yellow speckle type were also present, but seem less important.

746. **Ioannou, N.** 1991. Incidence and probable etiology of a vein banding-like disease of grapevine in Cyprus, p. 465-472. In I. C. Rumbos, R. Bovey, D. Gonsalves, W. B. Hewitt, and G. P. Martelli (ed.), Proceedings of the 10th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG). Plant Protection Institute, P.O. Box 303, 38001 Volos, Greece.
Keywords :grapevine; GYSVd-1; viroid; nepovirus; grapevine fanleaf virus; veinbanding; etiology; Cyprus; meeting; ICVG;
Notes : Hypothesis that the disease is caused by the yellow speckle viroid alone (mild symptoms) or in synergy with GFLV (severe symptoms).

747. **Ioannou, N.** 1993. Occurrence and natural spread of grapevine leafroll-associated closteroviruses in Cyprus, p. 111-112. In P. Gugerli (ed.), Extended abstracts 11th Meeting ICVG, Montreux, Switzerland, 6-9 September 1993. Federal Agricultural Research Station of Changins, CH-1260 Nyon, Switzerland.
Keywords :grapevine; leafroll; GLRaV-1; GLRaV-2; GLRaV-3; GLRaV-4; closterovirus; occurrence; epidemiology; spread; ELISA; indexing; Cyprus; meeting; ICVG;
Notes : Leafroll is widespread in Cyprus, and mostly caused by GLRaV-III(22 %). GLRaV I, II and IV are also present in lower proportion. Type I seems to be closely associated with leafroll. Type IV was mostly detected in vines indexing negatively for leafroll. The situation of Type III is intermediate: 42 % of cases were among leafroll positive (indexing) vines, 18 % among leafroll negative. Evidence of a natural spread of GLRaV-III is presented.

748. **Ioannou, N. and D. Gonsalves.** 1991. Grapevine leafroll disease in Cyprus: Incidence, evaluation of indicators and serological detection of a closterovirus in diseased vines, p. 251-258. In I. C. Rumbos, R. Bovey, D. Gonsalves, W. B. Hewitt, and G. P. Martelli (ed.), Proceedings of the 10th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG). Plant Protection Institute, P.O. Box 303, 38001 Volos, Greece.
Keywords :grapevine; leafroll; indexing; indicator; GLRaV-3; ELISA; immunoassay; closterovirus; detection; Cyprus; meeting; ICVG;
Notes : Leafroll is widespread in Cyprus vineyards, especially in introduced cultivars. Cabernet franc was the best indicator. ELISA (NY-1 or type III antiserum) was positive in about 30% of samples from vines indexing positive for leafroll.

749. **Ioannou, N., A. Hadjinicolis, and A. Hadjinicoli.** 1997. Epidemiology of the grapevine leafroll-mealybug complex in Cyprus, p. 123-124. In O. A. Sequeira,de, J. C. Sequeira, and M. T. Santos (ed.), Extended abstracts 12th Meeting ICVG, Lisbon, Portugal, 29 September-2 October 1997. Dept.Plant Pathology, Estação Agraonomica Nacional, Oeiras, Portugal.
Keywords :grapevine; leafroll; closterovirus; epidemiology; GLRaV-1; GLRaV-2; GLRaV-3; GLRaV-4; spread; vector; *Planococcus citri; Planococcus ficus;* mealybug; Cyprus; meeting; ICVG;
Notes : GLRaV-3 is the most common agent of leafroll found in Cyprus. There is clear evidence of virus spread by air-borne vectors, but the rate of spread differs from a location to another. The incidence of the virus in different varieties of grapevine was recorded. It is much lower in American rootstocks than in *Vitis vinifera* cultivars. Two mealybug species were found in Cyprus: *Planococcus ficus* and *P.citri.* Both transmitted GLRaV-3, but the former was a more efficient vector than the latter. Detection of GLRaV-3 in *V.rupestris* was more sensitive if the rootstock to be tested was first top grafted with healthy Cabernet franc or LN33, the leaves of the latter varieties being used for ELISA. Rupestris stem pitting seems to spread naturally in the field.

750. **Ipach, U.** 1995. Grünveredlung als Virustest (Green grafting as a virus test). Das Deutsche Weinmagazin *(19):*18-20.
Keywords :grapevine; indexing; green grafting; corky bark; rugose wood; fleck; leafroll; GLRaV-1; GLRaV-3; closterovirus; Germany;

Notes : In German. Paper presented at the 18th International Meeting of Grape Breeders, Geisenheim, 7-8.7.1994. Good indexing results were obtained with LN33 for corky bark (in the spring), St.-George for fleck, Cabernet franc, Pinot noir and LN33 for leafroll (GLRaV-1 and 3). Grafted plants were kept first at 32^{o}C (2-3 weeks), later at 20^{o}C. Symptoms were visible after 18-22 weeks.

751. **Ipach, U., B. Altmayer, and K.W. Eichhorn.** 1992. Detection of arabis mosaic virus using the polymerase chain reaction (PCR). Vitis **31**:213-219.
Keywords :grapevine; arabis mosaic virus; nepovirus; detection; *Chenopodium quinoa*; cDNA; nucleic acid assay; PCR; Germany;
Notes : Polymerase chain reaction (PCR) is proposed as a sensitive method for detecting arabis mosaic virus in total nucleic acid extracts from grapevine or *Chenopodium quinoa.* The amount of nucleic acids obtained from 5 mg of grapevine leaves or 1 mg of *C.quinoa* leaves was sufficient for an accurate determination.

752. **Ipach, U., B. Altmayer, and K.W. Eichhorn.** 1992. Neue Nachweis Methode für Arabis-Mosaik-Virus mit Hilfe der Polymerase Chain Reaktion (PCR) (New detection method for arabis mosaic virus using polymerase chain reaction, PCR). Mitt. Biol. Bundesanstalt. f. Land- u. Forstwirtschaft Berlin-Dahlem *(283):*222.
Keywords :grapevine; nepovirus; arabis mosaic virus; grapevine fanleaf virus; raspberry ringspot virus; detection; nucleic acid assay; PCR; Germany;
Notes : In German.

753. **Ipach, U., L. Kling, and M. Rüdel.** 1994. Nachweis von Grapevine Leafroll associated virus I und III (GLRaV I und III) bei Reben (Detection of grapevine associated virus I and III (GLRaV I and III) in grapevines). Mitt. Biol. Bundesanstalt. f. Land- u. Forstwirtschaft Berlin-Dahlem *(301):*151.
Keywords :grapevine; leafroll; closterovirus; GLRaV-1; GLRaV-n3; green grafting; indexing; ELISA; immunoassay; detection; Germany;
Notes : In German. Abstract of a paper presented at the 49th "Pflanzenschutztagung" held in Heidelberg in September 1994. In Germany, GLRaV-1 is the most common of the leafroll associated closteroviruses. Green grafting indexing and ELISA were used for detection. For green grafting, Cabernet franc and Pinot noir were good indicators. Grafted indicators were placed in a glasshouse at 32^{o} C for two weeks, and later at 20^{o} C. Symptoms were expressed after 18-22 weeks.

754. **Ipach, U., L. Kling, and M. Rüdel.** 1995. Nachweis und Verbreitung von Grapevine Fleck Virus (GFkV) im Weinbaugebiet der Pfalz (Detection and occurrence of grapevine fleck virus (GFkV) in Palatinate). Mitteilungen der Deutschen Phytomedizinischen Gesellschaft (DPG) **25***(1):*25.
Keywords :grapevine; fleck; grapevine fleck virus; detection; ELISA; occurrence; synergism; GLRaV-3; Germany;
Notes : In German. ELISA is a better method for detecting GFkV than indexing (woody or green grafting). The virus can be detected in leaves or in wood shavings during all the growing season, with higher extinction values for glasshouse-grown material. The virus appears to be more widespread in Palatinate than formerly thought. Its dissemination seems to be mainly due to vegetative propagation of contaminated material. Preliminary experiments in greenhouse showed that symptoms of leafroll due to GLRaV-3 were worsened when fleck virus was also present.

755. **Ipach, U., L. Kling, and M. Rüdel.** 1996. Die Grünveredlung - Testmöglochkeit für die Gesundheitsselektion bei Reben? - Ergebnisse aus drei Versuchsjahren (Green grafting - a method for sanitary selection of grapevines? - Results from three years of experiments). Vitic. Enol. Sci. **51**:109-115.
Keywords :grapevine; green grafting; indexing; sanitary selection; nepovirus; GLRaV; vein mosaic; vein necrosis; fleck; rugose wood; enation; Germany;
Notes :(The Journal was formerly Wein-Wissenschaft, Wiesbaden). Green grafting was found to be advantageous for vein mosaic, providing reliable results after ten weeks. For leafroll and corky bark it took six months, and for vein necrosis 12 months for final evaluation. For fleck, good results were obtained only when using special temperature conditions. For GFLV, green grafting was not considered a safe method of

detection. No good results were obtained with ArMV, RRV (cherry strain) enation and rugose wood. The advantages of the method versus its costs are discussed.

756. **Ivezic, M., D. Samota, and J.H. O'Bannon.** 1985. [Plant parasitic nematodes of vineyards, with special reference to the genus *Xiphinema*]. Zasht. Bilja **36**:255-261.
Keywords :grapevine; nematode; *Xiphinema; Xiphinema vuittenezi; Xiphinema pachtaicum;* Longidoridae; Yugoslavia;
Notes : In Serbian, Eng.sum. On the basis of a 3-year investigation in the regions of Slavonia and Baranja, Yugoslavia, it appears that in vineyards, plant parasitic nematodes are numerous. *Xiphinema vuittenezi* and *X. pachtaicum* were found in high numbers, as well as many other species. There is no mention of *X. index.*

757. **Iwanami, T., S. Namba, S. Yamashita, Y. Doi, J. Takahashi, and K. Ishii.** 1987. Purification of grapevine leafroll virus (GLRV). Ann. Phytopathol. Soc. Japan **53**:655-658.
Keywords :grapevine; leafroll; purification; closterovirus; Japan;
Notes : In English, Jap.sum. Filamentous particles 1500-2000 nm long with transverse striation were recovered from leafroll-infected grapevines. Evidence from morphology suggests that the virus belongs to the closterovirus group, subgroup II. Transmission attempts to herbaceous hosts were unsuccessful.

758. **Jako, N.** 1985. Elimination de l'enroulement par culture d'apex chez la vigne (Elimination of leafroll by shoot apex culture in grapevine), p. 209-210. Colloque Amélioration de la Vigne et Culture in Vitro 1985. Moët-Hennessy, Paris.
Keywords :grapevine; leafroll; virus elimination; *in vitro;* meristem tip culture; Hungary;
Notes : In French and English. Meeting on the improvement of grapevine and *in vitro* culture, organized by Moët-Hennessy.

759. **Jako, N.** 1986. Elimination de l'enroulement chez le Pinot noir et le Merlot au moyen des cultures d'apex (Elimination of leafroll in Pinot noir and Merlot using shoot apex culture). Conn. Vigne Vin **20***(2):*77-86.
Keywords :grapevine; leafroll; virus elimination; *in vitro;* meristem tip culture; Hungary;
Notes : In French. Leafroll was eliminated from cvs. Pinot noir and Merlot by culturing apical meristems of dormant buds in Murashige-Skoog macroelements, Nitsch & Nitsch microelements. Growth March-June next year.

760. **Jako, N.** 1988. [Elimination of leafroll virus from grapevine using shoot meristem culture.]. Szölötermestés es Boraszat **10***(2/3):*16-20.
Keywords :grapevine; virus elimination; leafroll; *in vitro;* meristem tip culture; Hungary;
Notes : In Hungarian. Germ., Eng., Ruman. summary. Shoot meristem 0.5- 1.0 mm with 2-4 leaf initials were successfully used for leafroll elimination from grapevine cvs. Pinot noir and Merlot. MS basic medium + Nitsch microelements, vitamins, aminoacids. The growth medium included BA and IAA of different concentrations, according to the stage of development. 25-27°C, 16 h. photoperiod, 1000-3000 lux. Complete elimination of leafroll was obtained.

761. **Jakob, B., Y. Gamalei, R. Wolf, U. Heber, and H. J. Gross.** 1997. Photooxidative damage in young leaves of declining grapevine: Does it result from a new and possibly viroid- related disease? Plant Cell Physiology **38**:1-9.
Keywords :grapevine; viroid; GYSVd-1; HSVd-g; symptoms; Germany;
Notes : An early chlorosis of young expanding leaves of grapevine has been observed for several years in vineyards of Frankonia in Germany, especially on the cvs. Bacchus and Müller-Thurgau. Screening for viroid infection in a severely affected vineyard revealed that 98% of the plants were infected with hop stunt viroid (HSVd-g) and about 80% with grapevine yellow speckle viroid (GYSVd-1). Viroids, however, were found also in part of the healthy looking vines. Leaves of chlorotic vines were investigated for physiological and ultrastructural disorders. Chlorosis in affected plants was much stronger in young expanding leaves than in old ones. Chemical analysis did not reveal mineral deficiencies. The quantum yield of photosynthesis and the number of PSI reaction centers were lower in chlorotic leaves than in healthy ones. Persisting

photoinhibition occurred in leaves of affected vines. Electron microscope studies revealed several pathological changes typical of old senescing leaves. Nitrogen and protein contents were high in affected plants.The authors suggest that viroid infection could be responsible for the observed decline of grapevine. To explain the fact that viroids were also found in healthy looking plants, they put forward the hypothesis of a latency period in viroid infection. The relationship between viroid infection and chlorosis will be probably clarified when viroid-free material of susceptible cultivars will be available

762. **Jelkmann, W., E. Maiss, E. Breyel, and R. Casper.** 1988. Production and use of cDNA clones from arabis mosaic virus. Ann. Appl. Biol. **113**:483-491.
Keywords :grapevine; arabis mosaic virus; nepovirus; cDNA; nucleic acid assay; detection; Germany;
Notes :cDNA probes were used for detection of arabis mosaic virus, derived from clones obtained from grapevine and strawberry, and experimented with strawberry.

763. **Jermini, M. and M. Baillod.** 1996. Proposition d'une méthode de contrôle des populations de *Scaphoideus titanus* Ball dans le vignoble (Proposal of a method for estimating population density of *Scaphoideus titanus* Ball in vineyards). Rev. suisse vitic. arboric. hortic. **28**:201-204.
Keywords :grapevine; phytoplasma disease; *Scaphoideus titanus;* leafhopper; occurrence; detection; Switzerland;
Notes : The method is based on visual observation of larvae from mid-May until the first L4 larvae appear, and on the use of yellow sticky traps till the end of the season.

764. **Jermini, M., G. D'Adda, J. Baumgärtner, G. C. Lozzia, and M. Baillod.** 1993. Nombre des pièges englués nécessaires pour estimer la densité relative des populations de la cicadelle *Scaphoideus titanus* Ball en vignoble (Number of sticky traps necessary for estimating populations of the leafhopper *Scaphoideus titanus* Ball in vineyards). Boll. Zool. agr. Bachic. Ser.II, **25***(1):*91-102.
Keywords :grapevine; phytoplasma disease; *Scaphoideus titanus;* leafhopper; occurrence; detection; Switzerland; Italy;
Notes : Yellow sticky traps were placed horizontally within the canopy in two vineyards in Castelrotto (Ticino, Switzerland) and Ghemme (near Novara, Italy) in order to estimate the population density of *S. titanus.*

765. **Jermini, M., G. D'Adda, A. Rossi, M. Baillod, and G.C. Lozzia.** 1993. Type de piège et son optimisation pour le contrôle des populations de la cicadelle *Scphoideus titanus* Ball (Abstract) (Type of trap and its optimization for the monitoring of populations of the leafhopper *Scaphoideus titanus* Ball), B. Dubos (ed.), Proceedings of the IOBC working group "Integrated control in viticulture. INRA, Bordeaux, France.
Keywords :grapevine; *Scaphoideus titanus;* leafhopper; survey; method; control; Switzerland;
Notes : In French. Book chapter.

766. **Jermini, M., A. Rossi, and M. Baillod.** 1992. Etat actuel de la diffusion au Tessin de *Scaphoideus titanus* Ball, vecteur de la flavescence dorée (Present distribution of the leafhopper *Scaphoideus titanus* Ball, vector of flavescence dorée, in the Italian speaking part of Switzerland). Rev. suisse vitic. arboric. hortic. **24**:137-139.
Keywords :grapevine; *Scaphoideus titanus;* occurrence; leafhopper; survey; phytoplasma disease; Switzerland;
Notes :*Scaphoideus titanus* was found in a few vineyards in the Sopraceneri part of the Ticino canton, including three nurseries. Although one case of suspected yellows was observed on Merlot in Ticino in 1990, flavescence dorée or similar grapevine yellows diseases are apparently not present in Switzerland.

767. **Jermini, M., A. Rossi, and M. Baillod.** 1992. Etude du piégeage de la cicadelle *Scaphoideus titanus* Ball à l'aide de pièges jaunes (Study on the use of different yellow traps for catching the leafhopper *Scaphoideus titanus* Ball. Rev. suisse vitic. arboric. hortic. **24**:235-239.
Keywords :grapevine; leafhopper; *Scaphoideus titanus;* survey; Switzerland;

Notes : Three different types of yellow traps were compared in relation with their position on the vine. The best results were obtained with Aeroxon traps in horizontal position in the vegetation or under the grapes.

768. **Jia, L. and M.A. Walker.** 1995. Evaluation of embryo-rescued seedlings of Thompson seedless for resistance to grapevine fanleaf virus. Amer. J. Enol. Vitic. **46**:415.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; resistance; California; USA;
Notes : Abstract. The idea of this work is to see if there are differences in tolerance/resistance to GFLV within the descent of Thompson seedless. About 6000 embryos were rescued from four-week-old berries of this cv., and produced 125 seedlings, which were tested for resistance to GFLV by micrografting a node of each seedling onto a small GFLV-infected Cabernet Sauvignon plant cultured in tissue culture. After six weeks, the scions of Thompson Seedless and the rootstocks of Cabernet Sauvignon were tested for GFLV with ELISA. So far, all rescued seedling were equally susceptible.

769. **Jimenez, F. and A.C. Goheen.** 1986. Isolation and purification of grapevine fanleaf virus. Phytopathology **76**:373-374.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; purification; method; comparison; California; USA;
Notes : Comparison of two methods.

770. **Jiménez A., L.G.** 1985. El mal de Pierce de la vid en Venezuela: evidencia immunologica (Pierce's disease in Venezuela: immunological evidence of its occurrence). Phytopathology **75**:1175.
Keywords :grapevine; Pierce's disease; occurrence; immunoassay; ELISA; Venezuela;
Notes : First evidence of the presence of Pierce's disease in Venezuela.

771. **Jiménez A., L.G.** 1985. Evidencia immunologica del mal de Pierce de la vid en Venezuela (Serological detection of Pierce's disease in Venezuela). Turrialba **35**:243-247.
Keywords :grapevine; immunoassay; Pierce's disease; detection; occurrence; Venezuela;

772. **Jiménez A., L.G. and A. Ingalls.** 1990. *Vitis caribaea* as a source of resistance to Pierce's disease in breeding grapes for the tropics, p. 262-270. In G. Alleweldt (ed.), Proceedings of the 5th International Symposium on Grape Breeding, September 1989. St.Martin/Pfalz, Germany. Bundesforschungsanstalt für Rebenzüchtung Geilweilerhof, D-76833 Siebeldingen, BRD.
Keywords :grapevine; Pierce's disease; resistance; breeding; germplasm; Costa Rica; meeting;
Notes : Special issue of Vitis. Book chapter. A native Costarican grapevine, *Vitis caribaea*, was found growing unaffected by Pierce's disease in Costa Rica, where the disease is endemic. It can be crossed with *V. vinifera*, seeds are fertile and studies on resistnce of hybrids are under way. Resistance appears to be determined by dominant genes.

773. **Jiménez A., L.G. and F. Morales-Bance.** 1991. Distribucion del mal de Pierce de la vid en Costa Rica determinada mediante la técnica ELISA (Distribution of Pierce's disease of grapevine in Costa Rica as determined by means of ELISA). Agronomia Costarricense **9** *(1):*79-83.
Keywords :grapevine; Pierce's disease; occurrence; ELISA; Costa Rica;
Notes : In Spanish.

774. **Jin, Y. and M.A. Walker.** 1996. Identification of *Vitis x Muscadinia* hybrids with strong resistance to *Xiphinema index*. Amer. J. Enol. Vitic. **47**:350.
Keywords :grapevine; nematode; Longidoridae; *Xiphinema index;* resistance; *Vitis; Muscadinia;* hybrid; nepovirus; grapevine fanleaf virus; California; USA;
Notes : Abstract of a paper presented at the 47th annual meeting of ASEV, Reno, Nevada, 26-28 June 1996. Two hundred *Vitis x Muscadinia* hybrids were tested for their resistance to *Xiphinema index* feeding. Several of them showed an interesting resistance to feeding by this nematode and gall formation. The relation of this resistance to feeding with a possible resistance to GFLV transmission is under study.

775. **Jones, A.T., D.J.F. Brown, W. J. McGavin, M. Rüdel, and B. Altmayer.** 1994. Properties of an unusual isolate of raspberry ringspot virus from grapevine in Germany and evidence for its possible transmission by *Paralongidorus maximus*. Ann. Appl. Biol. **124**:283-300.
Keywords :grapevine; raspberry ringspot virus; occurrence; immunoassay; symptoms; *Paralongidorus;* vector; Longidoridae; nematode; nepovirus; transmission; Germany;
Notes : This distinct strain of RRV (RRV-P) was found in several cvs. of grape in localised areas of the German Palatinate. It was transmitted at low level by *Paralongidorus maximus*. It is serologically related to the type (RRV-E = English strain), which is transmitted by *Longidorus macrosoma*. Description of the properties of this strain, host range, symptoms on herbaceous hosts, dilution end point, sedimentation characteristics, coat protein, RNA. The incidence of RRV-P in vineyards was not associated with the presence of *Longidorus* nematodes in the soil, but with the distribution of *P. maximus*.

776. **Jordan, D., C. Petersen, L. Morgan, and A. Segaran.** 1993. Spread of grapevine leafroll and its associated virus in New Zealand vineyards, p. 113-114. In P. Gugerli (ed.), Extended abstracts 11th Meeting ICVG, Montreux, Switzerland, 6-9 September 1993. Federal Agricultural Research Station of Changins, CH-1260 Nyon, Switzerland.
Keywords :grapevine; closterovirus; leafroll; spread; mealybug; epidemiology; occurrence; New Zealand; meeting; ICVG;
Notes : Patterns of leafroll spread were studied in four vineyards in New Zealand. From 1988 to 1992, the number of infected vines doubled each year in three of the four vineyards, whereas spread was less important in the fourth one. Spread is restricted to short distances, generally along the rows, sometimes to the next row. The vector is not known, but mealybugs are present in the vineyards, sometimes in large numbers.

777. **Jordan, D.T. and C.L. Petersen.** 1992. Spread of leafroll virus in New Zealand vineyards, p. 49-52. In D. T. Jordan (ed.), Proceedings of the New Zealand Grape and Wine Symposium, Christchurch, 7-9 November 1992. New Zealand Society of Viticulture and Oenology,
Keywords :grapevine; leafroll; closterovirus; spread; New Zealand;

778. **Juarez, J., J. M. Arregui, M. I. Molins, and N. Duran-Vila.** 1991. Shoot-tip culture and the recovery of viroid-free grapevines, p. 289-296. In I. C. Rumbos, R. Bovey, D. Gonsalves, W. B. Hewitt, and G. P. Martelli (ed.), Proceedings of the 10th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG). Plant Protection Institute,P.O. Box 303, 38001 Volos, Greece.
Keywords :grapevine; viroid elimination; viroid; *in vitro;* meristem tip culture; sanitary selection; control; Spain; meeting; ICVG;
Notes :17 wine grape varieties, 5 rootstocks and 3 *Vitis* species were recovered viroid-free following meristem-tip culture. Cold treatment did not improve the recovery process. Meristem + 1-2 leaf primordia 0.1-0.2 mm were used as explants.

779. **Kamper, S.M., W.J. French, and S.R. De Kloet.** 1985. Genetic relationships of some fastidious xylem-limited bacteria. Internat. J. Systematic Bacteriol. **35**:185-188.
Keywords : Pierce's disease; phony peach; plum leaf scald; periwinkle wilt; bacterium; nucleic acid assay; relationship; USA;
Notes :DNA-DNA hybridization techniques were used in order to determine the relations between fastidious Gram negative xylem-limited bacteria causing the diseases mentioned in keywords.

780. **Kartuzova, V.I., B.N. Milkus, and A.G. Odinec.** 1989. The use of ELISA for detection of grapevine fanleaf virus (In Czech and English), p. 113-114. In J. Polak, J. Chod, V. Rimsa, J. Vacke, and A. Ryvova (ed.), Plant Virology. Proceedings of the 10th Conference of the Czechoslovak Plant Virologists, Prague, 1989. Vyzkumny Ustav Rostlinné Vyroby, 161 06 Prague 6-Ruzyné, Drnovska 507, Czechoslovakia.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; detection; immunoassay; ELISA; meeting; Ukraine;
Notes : Book chapter.

781. **Kassemeyer, H.H.** 1990. Serological detection of closterovirus-like particles associated with grapevine leafroll disease - an improvement in clonal selection, p. 489. In G. Alleweldt (ed.), Proceedings of the 5th International Symposium on Grape Breeding, September 1989. St.Martin/Pfalz, Germany. Bundesanstalt für Rebenzüchtung Geilweilerhof, Siebeldingen, Germany.
Keywords :grapevine; leafroll; GLRaV-1; GLRaV-3; closterovirus; detection; clonal selection; immunoassay; ELISA; Germany;
Notes : Special issue of Vitis. Book chapter. ELISA was useful for detecting GLRaV-1 and 3. Its contribution to clonal selection is discussed.

782. **Kassemeyer, H.H.** 1991. Investigations about the occurrence of closterovirus-like particles in grapevines in Germany, p. 81-88. In I. C. Rumbos, R. Bovey, D. Gonsalves, W. B. Hewitt, and G. P. Martelli (ed.), Proceedings of the 10th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG). Plant Protection Institute, P.O. Box 303, 38001 Volos, Greece.
Keywords :grapevine; leafroll; GLRaV-1; GLRaV-3; closterovirus; ISEM; ELISA; Germany; meeting; ICVG;
Notes : Closterovirus-like particles serologically related with GLRaV-I and GLRaV-III were found in many grapevine cvs. grown in Germany. A good correlation was obtained in most cases between results of ELISA and leafroll symptoms as observed in the field. ISEM was also used in this study.

783. **Kassemeyer, H.H.** 1992. Certification of grapevines in Germany, p. 67-73. In G. P. Martelli (ed.), Grapevine Viruses and Certification in EEC Countries: State of the Art. Quaderno No 3, Istituto Agronomico Mediterraneo (I.A.M.), Bari, Italy.
Keywords :grapevine; certification; legislation; Germany; meeting; EEC;

784. **Kassemeyer, H.H., G. Busam, and U. Matern.** 1997. Induced resistance of grapevine - Preliminary results on host reaction in virus infected grapevines, p. 129-130. In O. A. Sequeira,de, J. C. Sequeira, and M. T. Santos (ed.), Extended abstracts 12th Meeting ICVG, Lisbon, Portugal, 29 September-2 October 1997. Dept.Plant Pathology, Estação Agronomica Nacional, Oeiras, Portugal.
Keywords :grapevine; leafroll; resistance; induction; Germany; meeting; ICVG;
Notes : In order to study the mechanisms of systemic acquired resistance to different pathogens triggered by various elicitors (e.g. polysaccharides of fungal and bacterial cell walls), experiments were made with cell suspension cultures of *Vitis vinifera* L. cv. Pinot noir or with cuttings of the same variety. Various elicitors were used and the response of cells was studied by molecular or immunological tools.

785. **Kassemeyer, H.H., S. Grenan, and C. Greif.** 1997. Use of green grafting for the biological indexing of grapevine virus and virus-like diseases, p. 119-127. In B. Walter (ed.), Sanitary selection of the grapevine. Protocols for detection of viruses and virus-like diseases (Les Colloques no 86). INRA Editions, Paris, France.
Keywords :grapevine; virus; virus-like diseases; detection; indexing; green grafting; method; Germany; France;
Notes : Green grafting allows a rapid detection (a few weeks) of leafroll, fleck, corky bark, vein mosaic and vein necrosis. A reliable detection of stem pitting/stem grooving syndromes is possible within 8-12 months. Controlling the growth conditions (temperature, light, humidity) is important for standardizing the method.

786. **Katis, N., S. Hatziloukas, M. Tsagris, I.C. Rumbos, and K.A. Roubelakis-Angelakis.** 1991. Presence of closteroviruses and viroids in grapevine varieties with symptoms of leaf roll and stem pitting diseases, p. 450-457. In I. C. Rumbos, R. Bovey, D. Gonsalves, W. B. Hewitt, and G. P. Martelli (ed.), Proceedings of the 10th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG). Plant Protection Institute, P.O. Box 303, 38001 Volos, Greece.
Keywords :grapevine; leafroll; closterovirus; stem pitting; rugose wood; etiology; GLRaV-1; GLRaV-3; HSVd-g; viroid; Crete; Greece; meeting; ICVG;

Notes : Study of the etiology of leafroll and stem pitting of grapevine in Crete, Greece. GLRaV-I and GLRaV-III (As NY-1) were detected by ELISA. GVA was not found. Viroid RNA closely related to hop stunt virod was also detected, but there was no association with a specific disease.

787. **Katsirdakis, K.X., U.J. Potter-Damoulakis, N.I. Katis, and K.A. Roubelakis-Angelakis.** 1989. Comparison of pollen grains from grapevine-fan-leaf-infected and non-infected grapevines . Phytoparasitica **17**:65-66.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; pollen; electron microscopy; structure; comparison; Greece; ICVG; meeting;
Notes : This paper appears in full in the Proceedings of the 9th ICVG meeting, Kiryat Anavim, Israel, 1987, 79-86, 1989.

788. **Katsirdakis, K.X., U.J. Potter-Damoulakis, N.J. Katis, and K.A. Roubelakis-Angelakis.** 1989. Comparative studies of pollen grains from fanleaf-infected and healthy grapevines, p. 79-86. In E. Tanne (ed.), Proceedings of the 9th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG), Kiryat Anavim, Israel, September 1987. The Volcani Center, P.O. Box 6, Bet Dagan , Israel.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; pollen; electron microscopy; structure; Greece; meeting; ICVG;

789. **Khan, F.A., I.D. Erinle, and P.S. Chindo.** 1993. Survey of plant parasitic nematodes associated with grapevine in four northern states of Nigeria and observations on grapevine fanleaf virus. Journal of African Zoology **107**:505-510.
Keywords :grapevine; nematode; survey; nepovirus; grapevine fanleaf virus; occurrence; *Xiphinema italiae;* Longidoridae; Nigeria;
Notes : Analysis of 490 soil and root samples collected from grapevine in 98 vineyards in 8 sites of 4 northern states of Nigeria revealed the presence of 24 different genera of plant parasitic nematodes. Grapevine fanleaf virus was recorded for the first time in Nigeria and seems to be confined to a single grapevine variety. *Xiphinema italiae* is suspected to be the vector, as the usual vector of this virus, *X.index*, has not been found in Nigeria.

790. **Khoury, W. and V. Savino.** 1995. Diseases and pest outbreaks, Lebanon. Viruses affecting grapevine in Lebanon. Arab and Near East Plant Protection Newsletter *(20).*
Keywords :grapevine; virus; survey; grapevine fanleaf virus; nepovirus; stem pitting; leafroll; rugose wood; closterovirus; GLRaV; occurrence; Lebanon;
Notes : GFLV, stem pitting associated closterovirus and grapevine leafroll associated viruses were found in 50 % of samples examined.

791. **Kim, K.S., D. Gonsalves, D. Teliz, and K.W. Lee.** 1987. An ultrastructural study of a closterovirus infection in diseased grapevines occurring in Arkansas. Phytopathology **77**:1765.
Keywords :grapevine; closterovirus; NY-1; GLRaV-3; USA;

792. **Kim, K.S., D. Gonsalves, D. Teliz, and K.W. Lee.** 1989. Ultrastructure and mitochondrial vesiculation associated with closteroviruslike particles in leafroll-diseased grapevines. Phytopathology **79**:357-360.
Keywords :grapevine; leafroll; symptoms; ultrastructure; cytopathology; electron microscopy; closterovirus; NY-1; GLRaV-3; ELISA; USA;
Notes : Riesling and Chardonnay with LR symptoms had flexuous particles 12 nm in diameter. They were associated with clusters of membraneous vesicles 50-100 nm in diameter originating from modified mitochondria. ELISA showed the virus to be related serologically with NY-1 closterovirus.

793. **Kimura, S., T. Takahashi, and M. Goto.** 1986. [Application of enzyme-linked immunosorbent assay to the indexing of grapevines for grapevine fanleaf virus]. Res. Bull. Pl. Prot. Serv. Japan **22**:61-65.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; ELISA; immunoassay; detection; Japan;

Notes : In Japanese, Eng. sum. The best extraction buffer was 2.5 % nicotine and 2 % polyvinylpyrrolidone (PVP). Extraction from upper leaves in June gave the best results.

794. **Knorr, D.A., A.J. Blasband, A. Rowhani, and D.A. Golino.** 1993. Fluorescence-based PCR assay for detection of grapevine fanleaf virus (Abstract). Phytopathology **83**:1397.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; detection; PCR; fluorescence; nucleic acid assay; California; USA;
Notes : Fluorescent-labelled nucleotides or oligonucleotides primers were used in combination with PCR. GFLV was detected in as little as 400 ng of grapevine tissue.

795. **Knorr, D.A., A. Rowhani, and D.A. Golino.** 1993. Fluorescence-based PCR assay for the detection of grapevine fanleaf virus. Amer. J. Enol. Vitic. **44**:352.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; detection; nucleic acid assay; PCR; fluorescence; California; USA;
Notes : An assay using fluorescent labelled oligonucleotide primers in combination with the polymerase chain reaction (PCR) has been developed for the detection of GFLV. PCR products specific for the GFLV cappsid gene were generated with as little as 400 ng of infected grapevine leaves. The assay is being developed for use in large-scale indexing.

796. **Koenig, R., M. Rüdel, and D.E. Lesemann.** 1989. Detection of petunia asteroid mosaic, carnation ringspot and tobacco necrosis viruses in ditches and drainage canals in a grapevine-growing area in West Germany. J. Phytopathol. **127**:169-172.
Keywords :grapevine; petunia asteroid mosaic virus; detection; occurrence; Germany;
Notes : Petunia asteroid mosaic virus was detected in ditches in a grapevine growing area, where it had been found previously to occur in grapevines.

797. **Koltunow, A.M., L.R. Krake, S.D. Johnson, and M.A. Rezaian.** 1989. Two related viroids cause grapevine yellow speckle disease independently. J. Gen. Virol. **70**:3411-3419.
Keywords :grapevine; viroid; yellow speckle; detection; nucleic acid assay; etiology; Australia;
Notes : Two oligonucleotide probes were synthesized for detection of these viroids. Yellow speckle can result from infection by either of these two viroids, or by both together. GYSVd (the first yellow speckle viroid described, now GYSVd-1), has a rod-like structure. GV 1B is now GYSVd-2.

798. **Koltunow, A.M., L.R. Krake, and M.A. Rezaian.** 1988. Hop stunt viroid in Australian grapevine cultivars: potential for hop infection. Australasian Plant Pathology **17** *(1):*7-10.
Keywords :grapevine; viroid; hop stunt viroid; HSVd-g; spread; epidemiology; DNA probe; northern blot; nucleic acid assay; cDNA; Australia;
Notes : Complementary DNA to hop stunt viroid was prepared by reverse transcription and cloned in phage M 13 mp 19. A ssDNA probe was prepared by transcribing cDNA insert and used to screen grapevine RNA extracts by northern blot analysis. The sensitivity is about 1 ng HSV/g tissue. HSV is widely distributed in Australia. There is evidence of spread.

799. **Koltunow, A.M. and M.A. Rezaian.** 1988. Grapevine yellow speckle viroid: structural features of a new viroid group. Nucleic Acids Research **16**:849-864.
Keywords :grapevine; yellow speckle; GYSVd-1; nucleotide sequence; structure; viroid; Australia;
Notes : The grapevine yellow speckle viroid is a single-stranded circular RNA of 367 nucleotides forming a rod-like secondary structure. It has 37% analogy with apple scar skin viroid and some sequence homology with potato spindle tuber viroid.

800. **Koltunow, A.M. and M.A. Rezaian.** 1989. Grapevine viroid 1B, a new member of the apple scar skin viroid group contains the left terminal region of tomato planta macho viroid. Virology **170**:575-578.
Keywords :grapevine; yellow speckle; viroid; genome; Australia;
Notes : Grapevine viroid 1B is one of the agents of yellow speckle, and is named since 1990 Grapevine yellow speckle viroid 2 (GYSVd-2).

801. **Koltunow, A.M. and M.A. Rezaian.** 1989. A scheme for viroid classification. Intervirology **30**:194-201.
Keywords :grapevine; viroid; classification; Australia;
Notes :A scheme for viroid classification is proposed on the basis of the strictly conserved core sequence present in the central portion of the secondary structure of viroids.

802. **Korosec-Koruza, Z.** 1992. [Suitable methods for the detection of virus diseases in the selection of the grapevine *(Vitis vinifera L.)*]. Poljopriv. znans. smotra **57**:125-139.
Keywords :grapevine; virus diseases; grapevine fanleaf virus; nepovirus; GLRaV-1; closterovirus; immunoassay; ELISA; rupestris stem pitting; indexing; detection; method; selection; clonal selection; Slovenia;
Notes : In Croatian, Eng. sum. This is an extended summary of the PhD thesis of Mrs Korosec-Koruza in the Yearbook of the Faculty of Agriculture of the University of Zagreb (Agriculturae Conspectus Scientificus). The original text of the thesis is in Slovenian. ELISA was used for detecting GFLV and GLRaV-1, and indexing for rupestris stem pitting. 43% of the Rebula vines tested were found infected with GFLV by ELISA. All the fruitless vines were infected with GFLV. Clonal material was only 2% infected versus 68% for the non clonal material. Indexing showed the presence of rupestris stem pitting in cv. Refosk. GLRaV-1 was detected in cvs. Zametova and Refosk.

803. **Korosec-Koruza, Z. and B. Koruza.** 1997. Never ending story of grapevine clonal selection, p. 173-174. In O. A. Sequeira,de, J. C. Sequeira, and M. T. Santos (ed.), Extended abstracts 12th Meeting ICVG, Lisbon, Portugal, 29 September-2 October 1997. Dept.Plant Pathology, Estação Agronomica Nacional, Oeiras, Portugal.
Keywords :grapevine; clonal selection; Slovenia; meeting; ICVG;
Notes : The development of grapevine clonal selection in Slovenia is outlined. It started in 1956 and was first made by visual inspection and symptom-based selection. In recent years, the selection has been completed by ELISA detection of leafroll and infectious degeneration, and indexing. This programme demands a lot of expensive tests, which have to be repeated, but to what extent, in what time intervals, at what cost? The presence of many local varieties which are often heavily infected with viruses raises the question of a choice, because it would be too costly to cure all of them. How is it possible to evaluate the risk of loosing valuable genetic resources? The importance of latent infections in rootstocks is also stressed.

804. **Koruza, B.** 1993. [Influence of micropropagation and *in vitro* virus elimination on phenotypical modifications of grapevine *(Vitis vinifera L.)*]. Zbornik Biotehniske Fakultete Univerze v Ljubljani **61**:123-134.
Keywords :grapevine; virus; virus elimination; morphology; physiology; micropropagation; Slovenia;
Notes : In Slovenian, Eng. sum. Meristem culture was used for eliminating GFLV, GLRaV-1 and -2 in grapevine cv. Refosco. The closteroviruses were eliminated at 100% whereas the explants were only 60% free of GFLV. Phenotypical alterations were observed in *in vitro* propagated plants: modified leaf shape, irregular distribution of tendrils, differences in pilosity of the leaf blade. The majority of these alterations disappeared after the first pruning, but not all. For instance leaves of *in vitro* grown plants had a weaker leaf pubescence in comparison with leaves on mother plants.

805. **Koruza, B.** 1996. [Results of the study of grapevine yellows disease dispersal in Slovenia]. Sodobno Kmetijstvo **29**:403-406.
Keywords :grapevine; phytoplasma disease; bois noir; occurrence; survey; Slovenia;
Notes : In Slovenian, Eng.sum. A survey of grapevine yellows diseases was made from 1991 to 1995 in 3 grape production regions of Slovenia. The rate of infection varied from 2 to 38%, depending on regions. The disease appeared to be of bois noir type. *Scaphoideus titanus*, vector of flavescence dorée, was not present. Damage due to the disease ranged from 20 to 40%.

806. **Koruza, B. and S. Jelaska.** 1993. Influence of meristem culture and virus elimination on phenotypical modifications of grapevine (*Vitis vinifera* L. cv. Refosk). Vitis **32**:59-60.

Keywords :grapevine; virus elimination; *in vitro;* meristem tip culture; grapevine fanleaf virus; nepovirus; GLRaV-1; GLRaV-3; closterovirus; morphology; Slovenia;
Notes :GFLV, GLRaV-1 and GLRaV-3 were eliminated by meristem culture *in vitro.* Morphological changes appeared in the first stage of culture, but they disappeared 5 months after the first pruning.

807. **Koruza, B. and Z. Korosec-Koruza.** 1991. Grapevine stem pitting disease: A possible additional factor in stalk necrosis (Stiellähme), p. 211-217. In I. C. Rumbos, R. Bovey, D. Gonsalves, W. B. Hewitt, and G. P. Martelli (ed.), Proceedings of the 10th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG). Plant Protection Institute, P.O. Box 303, 38001 Volos, Greece.
Keywords :grapevine; rugose wood; stem pitting; stalk necrosis; Stiellähme; synergism; Slovenia; meeting; ICVG;
Notes : The incidence of stalk necrosis of grapevine (Stiellähame, dessèchement de la rafle, essiccamento del raspo, bunch stem dieback, shanking) is significantly higher in vines of cv. Refosk *(V. vinifera)* grafted onto *V. rupestris* rootstock when the latter is affected with stem pitting than in healthy vines. Stem pitting infections appears as an additional stress factor for stalk necrosis.

808. **Kölber, M., J. Lazar, R.E. Davis, E. Dally, G. Tökes, G. Szendrey, J. Mikulas, L. Krizbai, and E. Papp.** 1997. Occurrence of grapevine yellows disease in grapevine growing regions of Hungary, p. 73-74. In Extended abstracts 12th Meeting ICVG, Lisbon, Portugal, 29 September-2 October 1997. Dept.Plant Pathology, Estação Agronomica Nacional, Oeiras, Portugal.
Keywords :grapevine; phytoplasma disease; stolbur; aster yellows; survey; Hungary; meeting; ICVG;
Notes : Yellows disease symptoms were observed in Hungary for the first time in 1971. In autumn 1993, a survey was begun to determine the presence of yellows-affected vines in different regions of Hungary and to detect and identify phytoplasmas if present. More than 6700 vines were examined for the presence of yellows symptoms, which were found or suspected in about one third of the plant examined. PCR assays showed that phytoplasmas of the 16S rRNA 16SrI, subgroup stolbur were present in diseased gapevines of seven cultivars growing in four different viticultural regions. Symptoms were typical of the bois noir type.

809. **Kölber, M., J. Lehoczky, E. Balazs, J. Lazar, and I. Tobias.** 1991. Five-year research plan for improvement of virus screening methods in Hungary, 1991-1995, p. 114. In Vigne et environnement/Grapevine and Environment, Conference 1991. Abstracts. Budapest, 29th September- 1st October 1991. Moët Hennessy - Louis Vuitton, Paris.
Keywords :grapevine; virus-free material; detection; diagnosis; Hungary;
Notes : Program 1991-1995 for virological sanitation of grapevine in Hungary.

810. **Krake, L.R.** 1993. Characterization of grapevine leafroll disease by symptomatology. The Australian & New Zealand Wine Industry Journal **8**:40-44.
Keywords :grapevine; leafroll; symptoms; economic importance; Australia;
Notes : Young clonal healthy *Vitis vinifera* plants of Cabernet franc, Emperor, Mission, Sultana, Baco Blanc, and LN33 were infected by chip budding from 20 different sources of leafroll. Leafroll symptoms produced on these vines were shown to vary considerably according to the different sources of infection, but to be reproducible by graft transmission. Foliar symptoms are described and discussed. Four symptomatological types of the disease are proposed: I=intense interveinal discolouration and/or necrosis; G=interveinal reddening or yellowing with distinct green main veins; R=reddening of ends of main veins and leaf margins; S=severe stunting. The reduction of berry colour varies from a type to another. The reduction of the ^{o}Brix of the berries and juice varies from -1 to -6. The berries of the healthy control Emperor had a sugar content corresponding to 22.5^{o}Brix, whereas for the most heavily affected Emperor the sugar content corresponded to 17^{o} Brix.

811. **Krastanova, S., M. Perrin, P. Barbier, G. Demangeat, P. Cornuet, N. Bardonnet, L. Otten, L. Pinck, and B. Walter.** 1995. Transformation of grapevine rootstocks with the coat protein gene of grapevine fanleaf nepovirus. Plant Cell Reports **14**:550-554.

Keywords :grapevine; grapevine fanleaf virus; nepovirus; rootstock; transgenic; coat protein; gene; cross-protection; France;
Notes : As chemical control of fanleaf disease and of its nematode vector with nematicides is more and more problematic because of lack of long term efficiency and restriction of nematicide use for environmental reasons, the possibility of a cross-protection obtained by introducing the coat protein (CP) gene of grapevine fanleaf virus (GFLV) into grapevines is an attractive solution. A chimaeric gene consisting of the CP of GFLV F13 was introduced via *Agrobacterium tumefaciens*-mediated transformation into *Vitis rupestris* and Richter 110 rootstocks. Transformation was performed on embryonic callus obtained from anthers and on hypocotyl fragments from mature embryos. Success of the transformation was assessed by PCR and Southern analyses. Transformants with a number of copies of the CP gene varying from one to five were obtained. ELISA with virus specific antibodies revealed various levels of expression of the GFLV CP in the differents transformants.

812. **Krastanova, S. and M. Yankulova.** 1992. [ELISA aided detection of grapevine leafroll virus - GLRV]. Rastenievudni Nauki,Sofia **29***(1-2)*:90-94.
Keywords :grapevine; leafroll; immunoassay; closterovirus; GLRaV-1; GLRaV-3; ELISA; Bulgaria;
Notes : In Bulgarian, Eng. Russ. sum. Detection of a grapevine leafroll associated virus (probably GLRaV-3) by ELISA. Only 20 of leafroll symptomatic vines gave a positive reaction with the antiserum (IgG III Colmar). No reaction occurred with IgG I Colmar and with an antiserum from Odessa. The presence of other types of GLRaV is likely to occur.

813. **Kriel, G.J. Le R.** 1991. Control of virus and viruslike diseases of grape vines and the performance of healthy material, p. 306-318. In I. C. Rumbos, R. Bovey, D. Gonsalves, W. B. Hewitt, and G. P. Martelli (ed.), Proceedings of the 10th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG). Plant Protection Institute, P.O. Box 303, 38001 Volos, Greece.
Keywords :grapevine; virus elimination; virus; virus diseases; virus-like diseases; sanitary selection; heat therapy; certification; meristem tip culture; quarantine; vector; control; resistance; performance; virus-free material; review; South Africa; meeting; ICVG;
Notes : Review on the subject, presented as an introductory lecture to session 5 of the 10th Meeting of ICVG at Volos, Greece, 1990.

814. **Kuhn, G.B.** 1989. Identificação, incidência e controle do virus do enrolamento da folha da videira no Estado do Rio Grande do Sul (Identification, incidence and control of grapevine leafroll virus in Rio Grande do Sul). Fitopatologia Brasileira **14**:220-226.
Keywords :grapevine; leafroll; identification; indexing; occurrence; survey; control; Brazil;
Notes : In Portuguese, Eng. sum. Description of symptoms. In indexing, Cabernet franc, Pinot noir, Mission, LN33 and Merlot were used as indicators. About 32 000 vines were inspected and the symptoms were detected in 98 % of them. Indexing of 100 plants showing symptoms of leafroll confirmed visual symptoms. Indexing of 323 vines of American cvs. showed a rate of infection of 77%. Rootstocks were also infected, but to a lesser extent. In vineyards formed with imported grafts of *Vitis vinifera*, the rate of infection ranged from 7.5% to 24.5% in 9 dark-coloured cvs.

815. **Kuhn, G.B.** 1989. Efeitos causados pelo virus do enrolamento da folha da videira na cultivar Cabernet franc (Effect of grapevine leafroll virus on the cultivar Cabernet franc). Fitopatologia Brasileira **14**:280-283.
Keywords :grapevine; leafroll; economic importance; performance; Brazil;
Notes : In Portuguese, Eng. sum. The effects of leafroll on quality and yield were investigated in an eight-year-old vineyard of cv. Cabernet franc grafted on rootstock 101-14. Vines with medium and strong symptoms had a cluster number reduced respectively by 29.18% and 42.4% in comparison with healthy vines. The yield loss was 32.6% on vines with medium symptoms and 62.8% on vines with strong symptoms. The weight of winter pruning wood was lower by 36.3% and 65.2% respectively with vines with medium and strong symptoms. Healthy plants had a gain of 0.9 ^{o}Brix and 11.1 g/l. of sugars over plants with medium symptoms, and 2.7 ^{o}Brix and 25.6 g/l of sugars over plants with strong symptoms. The total acidity was not significantly affected.

816. **Kuhn, G.B.** 1992. Caneluras do tronco, doença presente nos vinhedos do Rio Grande do Sul (Stem-pitting disease of grapevine present in Rio Grande do Sul). Fitopatologia Brasileira **17**:194.
Keywords :grapevine; rugose wood; stem pitting; legno riccio; occurrence; symptoms; Brazil;
Notes : In Portuguese. Stem pitting was observed for the first time in 1984 on the cv. *Vitis vinifera* Pirovano, and later on other *vinifera* cvs and American rootstocks. Description of symptoms. Affected plant often die in a few years. Depending on the combination scion-rootstock, both components will die, in other cases, only the scion dies and the rootstock continues to live and grow. Symptoms are very similar to those of the "legno riccio" known in Europe. (Abstract of a paper presened at the 27th annual meeting of the Brazilian Phytopathological Society).

817. **Kuhn, G.B.** 1992. Intumescimento dos ramos da videira ("corky bark"), doença constatada no Rio Grande do Sul (Swelling of grapevine stems (corky bark), a disease present in the state of Rio Grande do Sul). Fitopatologia Brasileira **17**:399-406.
Keywords :grapevine; rugose wood; corky bark; occurrence; symptoms; Brazil;
Notes : In Portuguese, Eng. sum. Corky bark of grapevine has been observed in the state of Rio Grande do Sul, Brazil, since 1978. Description of the symptoms on the *Vitis labrusca* cvs. Isabel and Niagara and *V.vinifera* cvs. In 9 infected vineyards of Isabel and Niagara, the level of infection varied between 2 and 11% of the 4168 plants observed.

818. **Kuhn, G.B.** 1992. Manchas de nervuras da folha da videira (*Vitis* spp.), doença constatada no Rio Grande do Sul (Fleck of grapevine (*Vitis* spp.) a disease recorded in the state of Rio Grande do Sul). Fitopatologia Brasileira **17**:435-440.
Keywords :grapevine; fleck; occurrence; indexing; Brazil;
Notes : In Portuguese, Eng. sum. Fleck is widespread in the State of Rio Grande do Sul, Brazil. By indexing on *V.rupestris*, the agent was found in about 20% of the grapevine cvs tested, and in about 7% of the rootstocks.

819. **Kuhn, G.B.** 1992. Principais virus e doenças consideradas de origem viral que ocorrem nos vinhedos do Rio Grande do Sul (Main virus and virus-like diseases occurring in vineyards of Rio Grande do Sul). EMBRAPA, 95700-000 Bento Gonçalves, Brazil.
Keywords :grapevine; leafroll; corky bark; rugose wood; stem pitting; fanleaf; occurrence; symptoms; detection; economic importance; Brazil;
Notes : In Portuguese. Circular Tecnica No 16. Description illustrated with color photographs of symptoms of five important virus and virus-like diseases of grapevine present in the region of Rio Grande do Sul: leafroll, corky bark, stem pitting fanleaf. Transmission, detection, damage and economic importance.

820. **Kuhn, G.B.** 1994. Alterações nas folhas e nos ramos da videira (*Vitis* spp.) causadas por virus no Rio Grande do Sul (Leaf and shoot alterations caused by viruses in the State of Rio Grande do Sul). Fitopatologia Brasileira **19** *(Suplemento):*329.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; symptoms; occurrence; Brazil;
Notes : In Portuguese. Symptoms caused by grapevine fanleaf virus. The disease is widespread, but its incidence is low in the region, about 2-3 % of the 610 plants indexed (Abstract of a paper presented at the 27th annual meeting of the Brazilian Phytopathological Society).

821. **Kuhn, G.B.** 1994. Necrose das nervuras, doença que ocorre de forma latente na maioria das cultivares de videira no Rio Grande do Sul (Vein necrosis, a disease that is latent in most grapevine cultivars in the state of Rio Grande do Sul). Fitopatologia Brasileira **19**:79-83.
Keywords :grapevine; vein necrosis; indexing; occurrence; Brazil;
Notes : In Portuguese, Eng. sum. Indexing on 100R showed an infection rate of 70.8% in 23 *vinifera* cultivars, 34.4% in 7 American scion cultivars and 38.2% in 17 rootstock cultivars. No symptoms appeared on these cultivars. Vein necrosis symptoms developed only on R 110 and Solferino rootstocks *(Vitis berlandieri x V.riparia).*

822. **Kuhn, G.B.** 1996. Necrose das nervuras e manchas das nervuras da folha da videira, doenças que ocorrem de forma latente nos vinhedos do Rio Grande do Sul (Vein necrosis and fleck of grapevine, diseases occurring in a latent form in the vineyards of Rio Grande do Sul). EMBRAPA, 95700-000 Bento Gonçalves, Brazil.
Keywords :grapevine; fleck; vein necrosis; occurrence; detection; economic importance; Brazil;
Notes : In Portuguese. Circular Tecnica No 19. Description of symptoms illustrated with color photographs of vein necrosis and fleck of grapevine. Occurrence in vineyards of the Rio Grande do Sul region, detection, agent, economic importance.

823. **Kuniyuki, H.** 1985. Efeito adverso da luz e da temperatura elevada na manifestação dos sintomas do mosaico das nervuras da videira em São Paulo (Adverse effect of light and of high temperature on symptom expression of grapevine vein mosaic in São Paulo). Summa Phytopathologica **11**:48-49.
Keywords :grapevine; fleck; symptoms; indexing; light; temperature; Brazil;
Notes : In Portuguese and English. Grapevine fleck disease was found commonly in commercial vineyards in the state of São Paulo, Brazil. Description of the symptoms, problem of latent infection in many cvs., need for indexing, symptoms on Rupestris du Lot and Kober 5BB used as indicators, in the field and in the greenhouse. The best response in indexing is in the spring growth when temperature is not yet too high. High temperatures tend to mask symptoms. Shading indicator plants or lowering temperature in growth chambers may solve the problem if the number of tests is not too high. The term mosaico das nervuras is misleading, it is not for vein mosaic, but for fleck.

824. **Kuniyuki, H. and J.A. Betti.** 1987. Obtenção de clones isentos de virus de videira através da termoterapia em São Paulo (Production of virus-free grapevine clones by heat therapy in São Paulo). Summa Phytopathologica **13**:173-184.
Keywords :grapevine; virus elimination; heat therapy; leafroll; rugose wood; corky bark; fleck; Brazil;
Notes : In Portuguese, Eng. sum. Description of a program for obtaining virus-free material of the most important grapevine varieties grown in Brazil. Grapevines were heat treated at 36-38^{o}C for at least 60 days under 12-16 hours of illumination per day. After 60 or more days, tips of approximately 1 cm from treated vines were grafted onto young grapevine seedlings. After sufficient growth, the new vines were indexed with standard grapevine virus indicators. So far 14 scion and rootstock varieties were obtained virus-free. The initial material was infected with leafroll, fleck and/or corky bark diseases.

825. **Kuniyuki, H., J.A. Betti, and A.S. Costa.** 1994. Termoterapia prolongada dificulta a obtenção de material propagativo livre de virus de videira (Prolonged heat-treatment hinders production of virus-free grapevines by means of propagation of shoot tips). Fitopatologia Brasileira **19**:209-213.
Keywords :grapevine; heat therapy; leafroll; rugose wood; corky bark; fleck; virus elimination; Brazil;
Notes : In Portuguese, Eng.sum. Routine treatments at 36-38^{o} C for 60-80 days of grapevines affected with leafroll, corky bark and fleck gave about 70% of healthy clones when shoot tips 1 cm long were propagated by grafting onto healthy rootstocks. Only 21.5% of virus elimination was obtained from shoot tips of similar grapevine material, treated in the same way, but after heat treatment during more than 180 days.

826. **Kuniyuki, H., J.A. Betti, and A.S. Costa.** 1995. Eliminação de virus de videira através do tratamento por calor de gemas verdes enxertadas em porta-enxertos sadios (Elimination of grapevine viruses by heat treatment of green buds grafted onto healthy rootstocks). Fitopatologia Brasileira **20**:102-106.
Keywords :grapevine; leafroll; rugose wood; corky bark; fleck; heat therapy; green grafting; virus elimination; Brazil;
Notes : In Portuguese, Eng.sum. Heat therapy of whole grapevine plants at 36-38^{o} C for 60-80 days, and grafting green tips of about 1 cm in length onto young grapevine seedlings was the standard method for obtaining healthy clones of local varieties at the Agronomy Institute of Sao Paulo, Brazil. A new method, developed recently, consisted in grafting green buds 0.6-0.8 cm long from the plant to be cured, onto a well developed healthy rootstock. After 5 to 7 days, when bud take was secured, the grafted plants were heat treated for 60-80 days at 36-38^{o} C. Success varied from 58.5 to 65.5 percent. Indexing could be performed 2-3 months after the end of heat treatment.

827. **Kuniyuki, H., J.A. Betti, V.A. Yuki, and A.S. Costa.** 1997. Influência da variedade indicadora e do ambiente na detecção do enrolamento da folha da videira (Influence of the indicator variety and the environment on the detection of grapevine leafroll virus). Fitopatologia Brasileira **22**:488-491.
Keywords :grapevine; leafroll; closterovirus; detection; indexing; indicator; method; Brazil;
Notes : In Portuguese, Engl.sum.

828. **Kuniyuki, H. and A.S. Costa.** 1987. Incidência de virus da videira em São Paulo (Incidence of grapevine viruses in the state of São Paulo). Fitopatologia Brasileira **12**:240-245.
Keywords :grapevine; virus diseases; economic importance; indexing; occurrence; fanleaf; grapevine fanleaf virus; leafroll; rugose wood; stem pitting; fleck; corky bark; control; Brazil;
Notes : In Portuguese, Eng. sum. This paper deals with the incidence of grapevine virus diseases in the state of São Paulo, Brazil, on the basis of observations and indexing. All 28 scion varieties tested for leafroll were infected, with a level of infection ranging from 16 to 100%. Grapevine fleck was found in 26 varieties with an incidence of 20 to 100%. Corky bark was found in 15 out of the 28 varieties tested with an incidence of 3 to 50%. Grapevine fanleaf virus was found only in the variety Niagara with an incidence of about 2%. Rootstocks were also infected with these viruses to a more or less similar extent. There was no evidence of spread of the viruses considered in the study.

829. **Kuniyuki, H. and A.S. Costa.** 1994. Mosaico das nervuras, uma virose da videira em São Paulo (Fleck, a virus disease of grapevine in the State of São Paulo). Summa Phytopathologica **20**:152-157.
Keywords :grapevine; virus elimination; fleck; occurrence; symptoms; indexing; heat therapy; Brazil;
Notes : In Portuguese, Eng. sum. This paper does not concern vein mosaic, but fleck. The confusion with the French name "mosaïque des nervures" (= vein mosaic) can be misleading. Indexing of grapevine with the rootstocks Golia, Rupestris du Lot and Kober 5BB in the State of Sao Paulo, Brazil, showed that 12 scion varieties were 100 % infected with grapevine fleck, whereas 32 others were partially infected. Of the 19 rootstock varieties tested, 7 were free of the virus and 12 were infected at a rate varying from 17 to 87%. Fleck was widespread in all viticultural regions of the State. The virus was easily transmitted by graft, but not by grapevine seed nor by mechanical inoculation of many herbaceous plants with sap from infected grapevines. There was no evidence of a transmission by a vector. Thus the dissemination of fleck appears to be essentially due to the vegetative propagation of infected material. Electron microscope examination of leaf dip preparations or thin sections of infected grapevine leaves did not reveal the presence of virus particles or cytopathogenic alterations that could be associated with fleck. Three different isolates of fleck were distinguished on the basis of their symptoms on the indicators mentioned above. Healthy clones were obtained by heat therapy or by selection based on indexing.

830. **Kuniyuki, H. and A.S. Costa.** 1995. Ocorrência de mais um isolado do virus do mosaico das nervuras da videira que não causa sintomas no porta-enxerto Kober 5BB (Occurrence of one more isolate of grapevine fleck virus that does not induce symptoms on the rootstock Kober 5BB). Fitopatologia Brasileira **20**:618-622.
Keywords :grapevine; fleck; occurrence; symptoms; isolate; Brazil;
Notes : The authors distinguished isolates of fleck (mosaico das nervuras), that did not cause symptoms on the indicator Rupestris du Lot. They named GFkV-C the common isolate causing the classical vein clearing symptoms on Rupestris and also on Kober 5BB, and GFkV-K an isolate from the Japanese variety Kyoho that caused vein clearing symptoms on Kyoho and Rupestris, but not on 5BB. They found in the cv. Italia another isolate of fleck that does not produce symptoms on 5BB, and named it GFkV-I.

831. **Kuniyuki, H., G.B. Kuhn, and A.S. Costa.** 1994. Ocorrência da necrose das nervuras da videira no estado de São Paulo (Occurrence of grapevine vein necrosis in the State of São Paulo). Fitopatologia Brasileira **19** *(Suplemento):*322.
Keywords :grapevine; vein necrosis; occurrence; indexing; Brazil;
Notes : In Portuguese. Grapevine vein necrosis, already recorded in the State of Rio Grande do Sul, has been also found in the State of São Paulo. It was detected by indexing on 110 R, and was found in many

cultivars and also in several rootstocks (Abstract of a paper presented at the 27th annual meeting of the Brazilian Phytopathological Society).

832. **Kuniyuki, H., G.B. Kuhn, V.A. Yuki, and A.S. Costa.** 1997. Ocorrência, transmissão e termoterapia do agente da necrose das nervuras da videira no estado de São Paulo (Occurrence, transmission and heat therapy of the agent of grapevine vein necrosis in the State of São Paulo). Fitopatologia Brasileira **22**:186-190.
Keywords :grapevine; vein necrosis; occurrence; transmission; heat therapy; Brazil;
Notes : In Portuguese, Eng. sum. Indexing tests with the indicator *Vitis rupestris x V. Berlandieri 110 R* showed the presence of vein necrosis with an infection rate of 57 % in 25 scion varieties and 46 % in 9 rootstocks varieties in the State of São Paulo, Brazil. The disease appeared to be of low economic importance. It was easily transmitted by vegetative propagation, but not by seed or by mechanical inoculation. There was no evidence of a natural dissemination. Attempts to transmit vein necrosis by means of the aphid *Aphis illinoisensis* Shimer gave negative results. The agent was eliminated by heat therapy, using the classical method of keeping potted vines in a heat chamber for 60-80 days at 36-38^{o}C., and rooting shoot tips under mist. Vein necrosis symptoms were observed only on the susceptible rootstock 110 R. Control can be easily achieved by using disease-free material.

833. **Kuniyuki, H., F.P. Martins, E.J.P. Pires, M.M. Terra, and A.S. Costa.** 1992. Seleção de matrizes livres de virus de quatro variedades de copa e de três porta-enxertos de videira criados no Instituto Agronômico de Campinas (Selection of virus-free plants of four grapevine scion varieties and three rootstocks bred at the Instituto Agronômico of Campinas). Fitopatologia Brasileira **17**:273-277.
Keywords :grapevine; sanitary selection; leafroll; fleck; fanleaf; rugose wood; corky bark; indexing; occurrence; Brazil;
Notes : The most important grape varieties and rootstocks cultivated in the vineyards of the state of São Paulo, Brazil, are 100% virus-infected. Indexing of 24 scion varieties bred at the Agronomic Institute of Campinas showed that 19 of them were were 100% infected with leafroll or fleck or with both. One variety was partly infected with corky bark. Of the four rooststocks tested, four were free of the viruses detectable with the indexing scheme, whereas one was 100% infected with leafroll and the other was partially infected with leafroll and fleck. Fanleaf and stem pitting were not detected in indexed plants. The high incidence of viruses in newly bred plants is explained by the propagation of these varieties on unselected commercial rootstocks. A few scion and rootstock varieties were selected and will be propagated. The new varieties that are infected will be heat-treated or made virus-free by meristem tip culture.

834. **Kuniyuki, H., F.P. Martins, M.M. Terra, and E.J.P. Pires.** 1992. Não-transmissibilidade de quatro virus da videira através da semente (Non-transmissibility of four viruses of grapevine through seeds). Fitopatologia Brasileira **17**:278-281.
Keywords :grapevine; seed transmission; indexing; negative; closterovirus; leafroll; fleck; corky bark; nepovirus; grapevine fanleaf virus; Brazil;
Notes : In Portuguese, Eng. sum. A total of 1924 seedlings were obtained from seeds of plants that were infected, separately or in mixture, by grapevine leafroll, fleck, corky bark or fanleaf viruses. These plants belonged to 19 scion varieties and 4 rootstocks. All tests gave negative results in indexing using various indicator varieties, and no plant showed any symptom typical of a virus disease. The four viruses mentioned above are apparently not transmissible by seeds.

835. **Kuniyuki, H., J. Vega, F.P. Martins, and A.S. Costa.** 1994. Mosaico da videira Traviu, uma doença causada pelo virus da folha em leque em São Paulo (Grapevine Traviu mosaic, a disease caused by fanleaf virus in São Paulo State). Fitopatologia Brasileira **19**:224-230.
Keywords :grapevine; nepovirus; fanleaf; grapevine fanleaf virus; Brazil;
Notes : In Portuguese, Eng. sum. A virus disease of the variety Traviu *(Vitis riparia x V.rupestris x V.cordifolia)*, also called Riparia de Traviu, was found in some vineyards of the State of São Paulo. It is characterized by chlorotic spots, rings and lines on the leaves. A virus with isometric particles was transmitted to herbaceous hosts by mechanical inoculation and was identified by ISEM as grapevine fanleaf

virus. The symptoms differ from those described for fanleaf in other countries. No vector was present in the soil.

836. **Kuniyuki, H., V.A. Yuki, C.L. Costa, and A.S. Costa.** 1995. Não transmissão de três virus da videira através do afideo *Aphis illinoisensis* (No evidence of a transmission of three grapevine viruses by the aphid *Aphis illinoisensis*). Fitopatologia Brasileira **20**:513-514.
Keywords :grapevine; leafroll; corky bark; fleck; transmission; aphid; negative; Brazil;
Notes : In Portuguese, Eng. sum. Attempts to transmit grapevine leafroll-associated virus (not specified, probably GLRaV-3), corky bark and fleck by *A.illinoisensis* gave negative results.

837. **Kuszala, C.** 1986. Influence du sexe et de l'âge des insectes vecteurs injectés dans l'épreuve d'infectivité des jaunisses des plantes. Mesure radiographique du volume injecté à *Euscelidius variegatus* (Kirschbaum) (Influence of sex and age of vector insects receiving injections in the infectivity test for plant yellows. Radiographic measurement of the volume injected to *Euscelidius variegatus*). Agronomie **6**:591-598.
Keywords :grapevine; phytoplasma disease; flavescence dorée; infectivity; microinjection; *Euscelidius variegatus;* vector; leafhopper; France;
Notes : In French. Males of the leafhopper *Euscelidius variegatus* were more effective vectors than females for transmitting plant yellows disease agents after receiving injections.

838. **Kuszala, C.** 1996. Influence du milieu d'extraction sur la détection du bois noir et de la flavescence dorée de la vigne, par des anticorps poly- et monoclonaux dirigés contre les phytoplasmes du *stolbur* et de la flavescence dorée (Influence of extraction medium on bois noir and flavescence dorée detection, using polyclonal and monoclonal antibodies against stolbur and flavescence dorée phytoplasmas). Agronomie **16**:355-365.
Keywords :grapevine; phytoplasma disease; bois noir; flavescence dorée; ELISA; detection; immunoassay; method; stolbur; elm yellows; France;
Notes : Using the double antibody sandwich immunsorbent assay (DAS-ELISA) technique, the author showed that a monoclonal antibody specific for stolbur phytoplasma could detect the agent of "bois noir" in extracts of diseased grapevine in France (Burgundy and Alsace), Italy (Bologna and Sicily), and Switzerland (Geneva and Valais). Samples from Champagne (6) and Franche Comté (11) gave negative results. A common extraction method was devised for detecting flavescence dorée and stolbur in grapevine with the same extraction medium for ELISA.

839. **Kuszala, C.** 1996. Survie du phytoplasme de la flavescence dorée de la vigne en présence d'extraits d'hôtes insectes et végétaux (Survival of the grapevine flavescence dorée phytoplasma in the presence of insect or plant extracts). Agronomie **16**:573-583.
Keywords :grapevine; phytoplasma disease; flavescence dorée; infectivity; leafhopper; *Euscelidius variegatus;* periwinkle; broadbean; microinjection; France;
Notes : In French, Eng. sum. The effects of extracts of healthy host plants *(Catharanthus roseus, Vicia faba and Vitis vinifera)* and leafhoppers*(Euscelidius variegatus)* on the pathogenicity of the flavescence dorée (FD) phytoplasma were studied by adding known quantities of these extracts to the medium containing phytoplasmas extracted from infected leafhoppers. All operations were made in sterile conditions. After centrifugation and filtration of the mixtures, part of them were frozen immediately at minus 70^{o} C and kept frozen until the infectivity of the phytoplasmas could be tested. The rest was incubated for 18 h at 23^{o} C, and then also frozen at minus 70^{o}C. Both types of mixtures were inoculated, after thawing, by microinjection into healthy leafhoppers, followed by FD transmission through the feeding of these insects onto healthy *Vicia faba* (infectivity test). Results showed that extracts of healthy leafhoppers tend to lower the viability of FD phytoplasmas. Extracts from males were less toxic than those from females or larvae. Extraction of FD phytoplasmas from broadbean *(Vicia faba)* gave better results with stems than with leaves. Extracts from healthy plants were always toxicfor phytoplasmas, the less toxic of the three plant extracts tested being that of *Catharanthus roseus*. The best survival of FD phytoplasmas was obtained by quickly diluting the extracts of infectious leafhoppers or plants in the survival medium 1379.

840. **Kuszala, C., A. Caudwell, O. Cazelles, R. Credi, G. Granata, G. Kriel, P. Magarey, R.C. Pearson, E. Refatti, and E. Tanne.** 1993. Grapevine yellows in different areas of the world: investigation by ELISA using flavescence dorée specific antibodies, p. 99-100. In P. Gugerli (ed.), Extended abstracts 11th Meeting ICVG, Montreux, Switzerland, 6-9 September 1993. Federal Agricultural Research Station of Changins, CH-1260 Nyon, Switzerland.
Keywords :grapevine; phytoplasma; phytoplasma disease; Australian grapevine yellows; flavescence dorée; bois noir; immunoassay; ELISA; detection; identification; France; Italy; Switzerland; Israel; South Africa; USA; Australia; meeting; ICVG;
Notes :280 grapevine samples (canes or leaves) were collected in the 7 countries mentioned in the keywords and tested for the presence of FD antigens by ELISA using specific monoclonal or polyclonal antibodies. In Europe, FD was detected in two regions: southern France and Friuli (northern Italy). All symptomatic vines in northeastern France reacted negatively and are to be considered as Bois noir. No positive reaction was obtained with any of the other samples.

841. **Kuszala, C., O. Cazelles, J. Boulud, R. Credi, G. Granata, G. Kriel, P. Magarey, C. Magnien, R.C. Pearson, E. Refatti, E. Tanne, and A. Caudwell.** 1993. Contribution à l'étude des jaunisses de la vigne dans le monde. Prospection par test Elisa spécifique du *mycoplasma-like organism* (MLO) de la flavescence dorée (Contribution to the study of grapevine yellows in the world. Prospection by means of Elisa test specific for the *mycoplasma-like organism* (MLO) of flavescence dorée). Agronomie **13**:929-933.
Keywords :grapevine; phytoplasma disease; flavescence dorée; bois noir; phytoplasma; occurrence; economic importance; detection; quarantine; immunoassay; ELISA; France; Switzerland; Italy; Australia; Shiraz disease; South Africa; Israel; USA;
Notes : In French, Eng. sum. An immunological study was made of 280 samples from grapevines showing symptoms of yellows collected in France, Italy, Switzerland, Israel, North America, South Africa, Australia. All samples were tested by ELISA with polyclonal and monoclonal antibodies against flavescence dorée (FD). Results showed that FD is confined in two regions: southern France and northern Italy (Friuli). In France, these results have allowed clarification of a very confusing situation concerning FD and Bois noir (BN). All the symptomatic vines of north-eastern France reacted negatively, and hence probably belonged to BN. Some samples from the south of the Rhone Valley (Ardèche) reacted simlarly. No positive FD reaction was obtained with samples showing Grapevine Yellows (GY) symptoms from Sicily, Emilia Romagna (Italy), Switzerland (Western part and Tessin), Israel, USA (New York State), South Australia or with Shiraz disease from the Republic of South Africa. These results suggest that there is no serological relationship between FD-MLO and the agents of the other GY. However, this study does not exclude the possibility that FD could be present in some parts of these areas. The authors insist on the economic importance of the GY other than FD, the risk of epidemics and the necessitiy to promote protection, cure and eventually quarantine measures.

842. **Kuszala, C., R. Meignoz, and A. Caudwell.** 1991. Evolution of MLO antigens of grapevine flavescence dorée according to the age of infection in broadbean,*Vicia faba*, p. 219-224. In I. C. Rumbos, R. Bovey, D. Gonsalves, W. B. Hewitt, and G. P. Martelli (ed.), Proceedings of the 10th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG). Plant Protection Institute, P.O. Box 303, 38001 Volos, Greece.
Keywords :grapevine; phytoplasma disease; flavescence dorée; detection; broadbean; phytoplasma; immunoassay; ELISA; France; meeting; ICVG;
Notes : A study was carried out in order to determine the distribution of FD MLO antigens in different organs of infected braodbeans at different times after infection, using DAS ELISA with polyclonal antibodies for coating and 3 different monoclonal antibodies for detection. Results showed a great variation in MLO antigen concentration in leaves, the highest being in the upper leaves, and less variation in roots and internodes. There was also important variations in reactivity between the three monoclonal antibodies.

843. **Kyriakopoulou, P.E.** 1991. Symptoms of grapevine asteroid mosaic in Greece, p. 143-146. In I. C. Rumbos, R. Bovey, D. Gonsalves, W. B. Hewitt, and G. P. Martelli (ed.), Proceedings of the 10th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG). Plant Protection Institute, P.O. Box 303, 38001 Volos, Greece.

Keywords :grapevine; asteroid mosaic; symptoms; Greece; meeting; ICVG;
Notes : Description of a virus-like disease resembling asteroid mosaic found in Greece in 1990.

844. **Kyriakopoulou, P.E. and M. Girkis.** 1996. Angular paraveinal chlorotic lesions in grapevine. A new virus disease ? Phytopath. medit. **35**:232.
Keywords :grapevine; virus-like diseases; graft transmission; mechanical transmission; Greece;
Notes : An apparently new virus-like disease was observed on the hybrid Baresna x Baresana at the Grapevine Institute of the National Research Foundation of Lycovrissi, Greece. Affected vines were fruitless, or bearing very small grapes with small and severely altered berries. Characteristic angular, chlorotic to yellow lesions were present on the leaf blades, adjecent to veins or to vein angles. Similar symptoms appeared also on graft-inoculated Sultanina vines. Local lesions, first chlorotic and later necrotic, developed on *Chenopodium amaranticolor* after mechanical inoculation with sap from diseased vines.

845. **Kyriakopoulou, P.E., E.A. Tzortzakakis, and M. Tsagris.** 1993. Grapevine asteroid mosaic in Greece: positive indexing results and viroids associated, p. 41. In P. Gugerli (ed.), Extended abstracts 11th Meeting ICVG, Montreux, Switzerland, 6-9 September 1993. Federal Agricultural Research Station of Changins, CH-1260 Nyon, Switzerland.
Keywords :grapevine; asteroid mosaic; viroid; indexing; Greece; meeting; ICVG;
Notes :(The second author is E.A.Tzortakakis, not S.Tzortakaki as indicated in the Extended abstract p.41.) Using molecular probes to several viroids, positive signals were obtained with HSVd and GYSVd probes, but not with CEVd and PSTVd (potato spindle tuber viroid) probes. The correlation of asteroid mosaic with these viroids was not demonstrated.

846. **La Notte, P., N. Buzkan, E. Choueiri, A. Minafra, and G.P. Martelli.** 1997. Acquisition and transmission of grapevine virus A by the mealybug *Pseudococcus longispinus.* Journal of Plant Pathology **79**:79-85.
Keywords :grapevine; leafroll; vitivirus; GVA; closterovirus; GLRaV-3; transmission; mealybug; *Pseudococcus longispinus;* Italy;
Notes :GVA was acquired by *Pseudococcus longispinus* from *Nicotiana clevelandii* in as little as 15 minutes when feeding on the plant or 12 h. when feeding on purified virus preparations through a membrane. The virus was retained for up to 48 h. when the vectors were fasting, but not more than 15 h. when they were allowed to feed on healthy plants. Insect vectors transmitted the virus without latent period when fed for 30 min. Most mealybug populations collected in vineyards were carrying both GVA and GLRaV-3.

847. **La Notte, P., A. Minafra, and P. Saldarelli.** 1997. A spot-PCR technique for the detection of phloem-limited grapevine viruses. J. Virol. Methods **66**:103-108.
Keywords :grapevine; virus; detection; nucleic acid assay; PCR; Italy;
Notes : This is a rapid and easy sampling and virus detection method, using leaf petiole to express crude sap, which was spotted on a nylon membrane. The nucleic acid of the virus was solubilized and amplified by RT-PCR. The release of the viral template was improved by a thermal treatment of 10 min. at 95^{o} C. The method was used successfully with samples from GVA, GVB, and GLRaV-3 infected grapevines with a sensitivity comparable to that of standard PCR technique. The membranes can be processed up to one month after spotting. Duplex PCR (amplification of two viruses from a mixed-infected grapevine source) was possible with GVA and GLRaV-3 using a mixture of specific primers in the same reaction. The method may prove useful for screening grapevine viruses in the selection and certification processes.

848. **Lahogue, F. and G. Boulard.** 1996. Recherche de gènes de résistance naturelle à deux viroses de la vigne: le court-noué et l'enroulement (Search for natural resistance genes for two grapevine virus diseases: court-noué and leafroll). Vitis **35**:43-48.
Keywords :grapevine; grapevine fanleaf virus; arabis mosaic virus; nepovirus; GLRaV-1; GLRaV-3; leafroll; closterovirus; selection; resistance; green grafting; France;
Notes :734 grapevines representing the main classes of the family of Vitaceae (American and Asian *Vitis*, *Vitis vinifera*, interspecific hybrids) were screened for their natural resistance to court-noué (GFLV alone or

in mixed infection with ArMV or other nepoviruses) and to leafroll (GLRaV-1 and 3). Special attention was paid to Middle East *V.vinifera* varieties. Inoculation was made by green grafting. The authors conclude that this method of inoculation is too advantageous for the virus and does not reflect the natural conditions. It is not suitable for this type of investigation.

849. **Lahogue, F., G. Boulard, and C. Schneider.** 1995. Comparaison de différentes techniques de greffage vis-à-vis de leur efficacité de transmission virale sur vigne (Comparison of different grafting methods concerning their efficiency for virus transmission on grapevine). Vitis **34**:177-183.
Keywords :grapevine; graft transmission; green grafting; dormant wood; comparison; France;
Notes : In French, Eng. sum. Three grafting methods were compared: dormant wood grafting, green grafting with or without prior rooting of the rootstock. Dormant wood grafting using a rootstock as the inoculum source was the most efficient inoculation method. Good results were also obtained using green grafting with an unrooted rootstock as the inoculum source.

850. **Lahogue, F., G. Boulard, C. Schneider, and B. Walter.** 1993. Search for resistance genes to grapevine viruses in Vitis species, p. 171. In P. Gugerli (ed.), Extended abstracts 11th Meeting ICVG, Montreux, Switzerland, 6-9 September 1993. Federal Agricultural Research Station of Changins, CH-1260 Nyon, Switzerland.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; arabis mosaic virus; closterovirus; leafroll; resistance; control; France; meeting; ICVG;
Notes : This paper relates the attempts to find grapevine varieties or wild accessions that are resistant to GFLV, ArMV and the leafroll associated viruses. So far, the only available source of resistance is a wild Iranian *Vitis vinifera* obtained by Walker and Meredith (1990).

851. **Lamberti, F.** 1991. Nematodi parassiti della vite e relativa lotta (Parasitic nematodes of grapevine an their control). Vignevini **18***(11):*43-46.
Keywords :grapevine; nematode; control; Italy;
Notes : The paper concerns mainly the direct damage caused by parasitic nematodes.

852. **Lamberti, F., L. Catalano, V.A. Melillo, and G. Roccuzzo.** 1991. Note nematologiche sulla viticoltura Siciliana (Nematological note on Sicilian viticulture). Vignevini **18***(9):*41-42.
Keywords :grapevine; nematode; *Xiphinema index; Xiphinema italiae;* Longidoridae; occurrence; control; Italy;
Notes :*Xiphinema index* was recorded in 27.4% of vineyards sampled. *X. italiae* was found in 17.5 % of them. It is considered as a vector of GFLV. The island of Pantellaria is free of both species.

853. **Lamberti, F. and A. Ciancio.** 1993. Diversity of *Xiphinema americanum*-group species and hierarchical cluster analysis of morphometrics. Journal of Nematology **25**:332-343.
Keywords :grapevine; nematode; *Xiphinema americanum;* Longidoridae; vector; classification; Italy;
Notes : The former *Xiphinema americanum* species is now broken down into 39 species and five subgroups: *X.brevicolle* (7 species), *X. americanum* (17 species), *X.taylori* (2 species), *X.pachtaicum* (8 species, *X. lamberti* (5 species). The vector capacities of these different species are not known.

854. **Lamberti, F. and A. Ciancio.** 1994. The relationship between species within the *Xiphinema americanum*-group (Nematoda: Dorylaimida). Bulletin OEPP/EPPO Bulletin **24**:475-484.
Keywords :grapevine; *Xiphinema americanum;* Longidoridae; nematode; classification; Italy;
Notes :39 species attributed to this group. 5 subgroups. Wide intra-population and intra-specific variation. No mention of virus transmission capabilities.

855. **Lamberti, F. and A.M. Golden.** 1986. On the identity of *Xiphinema americanum sensu lato* in the nematode collection of Gerald Thorne with description of *X.thornei* sp.n. Nematol. medit. **14**:163-171.
Keywords :grapevine; nematode; classification; *Xiphinema; Xiphinema americanum;* Longidoridae; Italy; USA;

Notes : The nematode collection of G.Thorne of *Xiphinema americanum* was studied. It contained five different species: *X.americanum sensu stricto* from Massachusetts, Mississipi and Texas, *X.brevicolle* from Utah and Nevada, *X.californicum* from California and Mexico, *X.utahense* from Utah and Oregon, *X.thornei* sp.n. from Colorado and Idaho. No data are given as to the capacity of these species to transmit grapevine viruses.

856. **Lamberti, F., N. Greco, and M. Basile.** 1986. Treatments of soil--nematological aspects. Bulletin OEPP/EPPO Bulletin **16**:327-333.
Keywords :general; nematode; Longidoridae; control; nematicide; soil fumigation; Italy;
Notes : Discussion on the problem of soil disinfection against nematodes. Necessity of determining the identity of the nematodes species present in the soil and their density, persistance of the product, influence of soil texture and temperature, economic conditions.

857. **Lamberti, F., A. Ortez, M.I. Coiro, C. Frausin, C. Spessotto, A. Agostinelli, V. Radicci, and E. Refatti.** 1992. Nematodi Longidoridi nei vigneti della Provincia di Pordenone (Longidorid nematodes in the vineyards of the Pordenone province), p. 81-102. In IV Congresso della Società italiana di Nematologia, Pordenone, giugnio 1992 (IVth Congress of the Italian Society of Nematology, Pordenone, June 1992).
Keywords :grapevine; nematode; survey; Longidoridae; *Longidorus; Xiphinema;* occurrence; Italy;
Notes : In Italian, Eng.sum. A survey with 227 soil samples taken in various vineyards of two viticultural areas of the province of Pordenone showed the presence of one or more species of *Longidorus* or *Xiphinema* in 25% of the samples. Six species of *Longidorus* and five species of *Xiphinema* were found. Book chapter.

858. **Lamberti, F. and F. Roca.** 1987. Present status of nematodes as vectors of plant viruses, p. 321-328. In J. A. Veech and D. W. Dickson (ed.), Vistas on Nematology. Society of Nematologists, Hyattsville, Ma., USA.
Keywords :grapevine; nepovirus; Longidoridae; *Longidorus; Xiphinema;* nematode; vector; transmission; review; Italy;
Notes : Book chapter. 25th Anniversary Publication of the Journal of Nematology. The problem of knowing which species transmits which virus is discussed. Several reports of transmission of a given virus by a nematode species are doubtful because of uncertain identification of the nematode vector. This is specially true with *Xiphinema americanum,* which now appears to be a complex of several distinct species. Transmission of GFLV by *X.italiae* was not confirmed in Italy by Lamberti and co-workers, despite several attempts with Italian strains of the virus and populations of this species.

859. **Lamberti, F., F. Roca, and A. Agostinelli.** 1985. I Longidoridae (Nematoda, Dorylaimida) delle regioni italiane. I.La Puglia (The Longidoridae (Nematoda, Dorylaimida) of the Italian region. I. Apulia). Nematol. medit. **13**:21-60.
Keywords :grapevine; nematode; vector; nepovirus; grapevine fanleaf virus; Longidoridae; *Longidorus; Xiphinema; Xiphinema index; Xiphinema italiae;* occurrence; description; Italy;
Notes : In Italian, Eng. sum. The Longidorid nematodes of the Apulia region in the South of Italy are described. Among vectors of grapevine viruses, *Xiphinema index* is widespread in Apulia. It occurs almost exclusively in the rhizosphere of grapevine or fig. In vineyards, it occurs often in mixed populations with *X.italiae* and/or *X.pachtaicum.* The capacity of *X.italiae* to transmit grapevine fanleaf virus has been tested with Apulian populations in many instances, without any success (65 references).

860. **Lamberti, F., C.E. Taylor, and F. Roca.** 1989. Nematode vectors of viruses infecting grapevine, p. 63-66. In E. Tanne (ed.), Proceedings of the 9th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG), Kiryat Anavim, Israel, September 1987. The Volcani Center, P.O. Box 6, Bet Dagan , Israel.
Keywords :grapevine; nematode; vector; nepovirus; *Xiphinema; Longidorus;* Longidoridae; transmission; review; Italy; meeting; ICVG;

861. **Lamberti, F., C.E. Taylor, and J.W. Seinhorst.** 1997. Nematode vectors of plant viruses. Plenum Press, London.

Keywords :nematode; vector; virus; handbook; Italy; England;

862. **Lammers, A.H., R.F. Allison, and D.C. Ramsdell.** 1995. Cloning and sequencing of peach rosette mosaic virus RNA1. Phytopathology **85**:1152.
Keywords :grapevine; peach rosette mosaic virus; sequence analysis; genome; USA;
Notes : The virus genome consists of a 2 ssRNA of rspectively 8 and 7 kb. PRMV is transmitted by nematodes and by seed. A grapevine isolate was propagated on *C.quinoa*. A complete sequence of RNA1 was determined.

863. **Laurent, J.C. and R. Agulhon.** 1986. Réunion sur la flavescence dorée (Meeting on flavescence dorée). Progr. Agric. Vitic. **103**:513-514.
Keywords :grapevine; phytoplasma disease; flavescence dorée; occurrence; control; insecticide; leafhopper; vector; *Scaphoideus titanus;* France;
Notes : This paper reports on a meeting on flavescence dorée held at Nimes, France, in October 1986. Observations on the situation in southern France departments, map of main disease foci and contamination zones, control measures, legislation, etc., for 1987.

864. **Laurent, J.C. and R. Agulhon.** 1989. La flavescence dorée de la vigne. Situation et évolution de la maladie et de la cicadelle vectrice dans le vignoble français (Grapevine flavescence dorée. Situation and evolution of the disease and of its vector leafhopper in French vineyards), p. 489-496. In R. Cavalloro (ed.), Plant-Protection Problems and Prospects of Integrated Control in Viticulture. Proceedings of the CEC/IOBC International Symposium, Lisboa-Vila Real, Portugal, June 1988. Commission of the European Communities, L-2920 Luxembourg.
Keywords :grapevine; phytoplasma disease; flavescence dorée; epidemiology; *Scaphoideus titanus;* vector; leafhopper; occurrence; symptoms; economic importance; France;
Notes : In French. Book chapter.

865. **Laviña, A., A. Batlle, J. Larrue, D. Clair, and E. Boudon-Padieu.** 1997. Incidence and dissemination of grapevine bois noir phytoplasma, p. 237-240. In 10th Congress of the Phytopathological Union, Montpellier-Le Corum (France), June 1-5, 1997. ORSTOM, B.P.5045, F-34032 Montpellier.
Keywords :grapevine; phytoplasma; phytoplasma disease; bois noir; occurrence; survey; epidemiology; Spain;
Notes : In a survey of phytoplasmas present in grapevines in Spain made in 1994 and 1995, only Bois noir phytoplasmas were detected in five plots out of fifteen in Catalonia and ten out of ten in Navarra. No phytoplasma was detected in Aragon. In a survey in 1996, FD was also detected in many plots in the northeastern Catalonia region. The detection was made by ELISA and PCR. Bois noir appeared to spread along the rows.

866. **Laviña, A., A. Batlle, J. Larrue, X. Daire, D. Clair, and E. Boudon-Padieu.** 1995. First report of grapevine bois noir phytoplasma in Spain. Plant Disease **79**:1075.
Keywords :grapevine; bois noir; PCR; RFLP; stolbur; aster yellows; classification; phytoplasma disease; Spain;
Notes :A yellows disease was observed for the last 5 years in Catalonia (northeastern Spain), with symptoms of leaf rolling, vein chlorosis and necrosis, withering of flowers, absence of lignification in autumn. Analysis of DNA from phytoplasma by PCR and RFLP showed that the agent of the disease belonged to the aster yellows phytoplasma group and was present in all symptomatic grapevines tested. Further analysis showed that the phytoplasma was most closely related to the stolbur phytoplasma, and was similar to the phytoplasma associated with bois noir in France. This is the first report of bois noir in Spain.

867. **Lazar, J., G. Farkas, E. Farkas, and J. Mikulas.** 1995. [Identification of the components of the rugose wood complex in Hungary using woody indicators], p. 95. In G. Saringer, I Seprös, and A. Szemessy (ed.), Proceedings of the 41th Plant Protection Days, February 21-22, 1995, Budapest, Hungary. Research Institute of Viticulture and Oenology, H-6000 Kecskemet, Hungary.
Keywords :grapevine; rugose wood; indexing; Hungary;

Notes : In Hungarian. (See abstr. 3H18, Vitis 34 (3),p.78, 1995).

868. **Lazar, J., E. Hajdu, and J. Mikulas.** 1997. Identification of grapevine rugose wood complex in Hungary: occurrence of rupestris stem pitting, Kober stem grooving and LN33 stem grooving, p. 41-42. In O. A. Sequeira,de, J. C. Sequeira, and M. T. Santos (ed.), Extended abstracts 12th Meeting ICVG, Lisbon, Portugal, 29 September-2 October 1997. Dept.Plant Pathology, Estação Agronomica Nacional, Oeiras, Portugal.
Keywords :grapevine; rugose wood; rupestris stem pitting; Kober stem grooving; LN 33 stem grooving; occurrence; Hungary; meeting; ICVG;
Notes : Several rootstocks and European grapevine cultivars were indexed for the viruses thought to be responsible for rugose wood complex of grapevine. 22.4% of the tested vines were shown to be infected with rupestris stem pitting, 19.6% with Kober stem grooving, and 13% with LN33 stem grooving. Corky bark was not definitely ascertained. Besides, leafroll, fleck, vein necrosis and vein mosaic were detected.

869. **Lazar, J., M. Kölber, E. Farkas, G. Farkas, and J. Lehoczky.** 1995. Occurrence of grapevine leafroll associated closteroviruses (GLRaV-s) in Hungary. Meded. Fac. Landbouwwetenschappen Rijksuniversiteit Gent **60/2a**:307-308.
Keywords :grapevine; leafroll; closterovirus; vitivirus; GLRaV-1; GLRaV-2; GLRaV-3; GLRaV-4; GVA; occurrence; meeting; Hungary;
Notes : Extended abstracts 47th International Symposium on Crop Protection, Gent, Belgium, 9 May 1995. GLRaV-1, -2, -3, -4, and GVA occur in Hungary. They were detected by DAS-ELISA.

870. **Lazar, J., M. Kölber, and J. Lehoczky.** 1990. [Detection of some nepoviruses (GFV, GFV-YM, GCMV, ArMV) in the seeds and seedlings of grapevine by ELISA]. Kertgazdasag **22***(4)*:58-72.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; grapevine chrome mosaic virus; arabis mosaic virus; detection; immunoassay; ELISA; seed transmission; Hungary;
Notes : In Hungarian, Eng. sum. Investigations were carried out from 1983 to 1987 in order to verify if grapevine fanleaf virus (GFLV), arabis mosic virus (ArMV), and grapevine chrome mosaic virus (GCMV) were transmitteed through the seeds of grapevine. Seeds from infected vines, checked by ELISA, were collected and germinated. The percentage of germination varied from 14% to 69%. Part of the seeds were crushed and extracts of the whole seed was tested by ELISA. Among 17 dormant seed groups tested, only one (ArMV) gave negative results. All seedlings grown from seeds of infected vines were symptomless. However, GFLV was detected in 14 of 28 seedlings (50%) from GFLV-infected vines in the first year, but detection was inconsistent in the following year. GCMV was transmitted in 4 out of 36 seedlings (11%). ArMV was not transmitted.

871. **Le Gall, O., T. Candresse, V. Brault, C. Bretout, L. Hibrand, and J. Dunez.** 1988. Cloning full length cDNA of grapevine chrome mosaic nepovirus. Gene **73**:67-75.
Keywords :grapevine; grapevine chrome mosaic virus; nepovirus; cDNA; cloning; France;
Notes : Cloning of full length DNA copies of the two genomic RNAs of grapevine chrome mosaic virus (GCMV) was made using a rapid and efficient procedure.

872. **Le Gall, O., T. Candresse, V. Brault, and J. Dunez.** 1989. Nucleotide sequence of Hungarian grapevine chrome mosaic nepovirus RNA1. Nucleic Acids Research **17**:7795-7807.
Keywords :grapevine; grapevine chrome mosaic virus; nepovirus; nucleotide sequence; RNA; cDNA; France;

873. **Le Gall, O., T. Candresse, and J. Dunez.** 1988. Nucleotide sequence of the 3' ends of the double-stranded RNAs of grapevine chrome mosaic nepovirus. J. Gen. Virol. **69**:423-428.
Keywords :grapevine; grapevine chrome mosaic virus; tomato black ring virus; nucleotide sequence; comparison; RNA; dsRNA; nepovirus; France;
Notes :GCMV is distantly related serologically to TBRV. The genome is divided up among two positive sense ssRNAs. dsRNAs associated with GCMV multiplication was purified from infected *Chenopodium quinoa* (Dodds et al.,1984, Ann.Rev.Phytopathol.22, 151-168). Two virus specific dsRNAs of about 7200

and 4800 base pairs correspond to the genome of the virus. The 3' ends of RNA1 and RNA2 (presumably minus strands) closely resemble those complementary to the 5' ends of the RNAs of TBRV strains, which is distantly related to GCMV.

874. **Le Gall, O., T. Candresse, and J. Dunez.** 1995. Transfer of the 3' non-translated region of grapevine chrome mosaic virus RNA-1 by recombination to tomato black ring virus RNA-2 in pseudorecombinant isolates. J. Gen. Virol. **76**:1285-1289.
Keywords :grapevine; grapevine chrome mosaic virus; tomato black ring virus; RNA; nepovirus; France;
Notes : The 3' non translated regions (3'NTR) of the two genomic RNAs (RNA-1 and RNA-2) of grapevine chrome mosaic (GCMV) are identical, as it is the case for tomato black ring virus (TBRV) and many other nepoviruses. The structure of the 3'NTR of two recombinant isolates containing the RNA-1 of GCMV and the RNA-2 of TBRV was studied. These two viruses differ both in sequence and size of their 3'NTRs so that the 3'NTR of the two genomic RNAs should be different in the absence of recombination. The results of this study show that within three passages, the 3'NTR of RNA1 (GCMV) was transferred to RNA-2, thus restoring identity of the two RNAs. The site of recombination was shown to be near the 3' end of the open reading frame.

875. **Le Gall, O., T. Candresse, and J. Dunez.** 1997. An RNA-dependent-RNA-polymerase activity associated with grapevine chrome mosaic nepovirus infection. Arch. Virol. **142**:151-156.
Keywords :grapevine; nepovirus; grapevine chrome mosaic virus; replication; RNA; dsRNA; molecular analysis; France;
Notes :A virus-induced RNA polymerase activity that is specific to viral RNA and RNA-dependent has been observed *in vitro* to be associated with membrane extracts of plants of three different species after infection with grapevine chrome mosaic nepovirus (GCMV). The products of this activity are full-length, positive sense GCMV RNAs present in double-stranded structures. As has been demonstrated for a virus relative to nepoviruses, cowpea mosaic comovirus, this activity probably corresponds to the replication complex of nepoviruses.

876. **Le Gall, O., M. Lanneau, T. Candresse, and J. Dunez.** 1995. The nucleotide sequence of the RNA-2 of an isolate of the English serotype of tomato black ring virus: RNA recombination in the history of nepoviruses. J. Gen. Virol. **76**:1279-1283.
Keywords :grapevine; isolate; tomato black ring virus; grapevine chrome mosaic virus; nepovirus; RNA; recombination; genome; protein; nucleotide sequence; France;
Notes : The nucleotide sequence of the RNA-2 of a carrot isolate of tomato black ring virus (English serotype TBRV-ED) was determined. Comparisons with grapevine chrome mosaic virus shows that recombinations have occurred between RNA-2 of these two viruses.

877. **Le Gall, O., L. Torregrosa, Y. Danglot, T. Candresse, and A. Bouquet.** 1994. *Agrobacterium*-mediated genetic transformation of grapevine somatic embryos and regeneration of transgenic plants expressing the coat protein of grapevine chrome mosaic nepovirus (GCMV). Plant Sci. **102**:161-170.
Keywords :grapevine; transgenic; coat protein; nucleic acid assay; immunoassay; nepovirus; grapevine chrome mosaic virus; ELISA; southern blot; western blot; selection; resistance; control; France;
Notes : In a previous paper (Brault et al., Pl. Mol. Biol. 21, 89-97, 1993) (réf. 261) it was shown that a hybrid gene expressing the coat protein of grapevine chrome mosaic, transferred into tobacco plants, was able to confer a certain degree of resistance to infection by this virus. The present paper reports on similar attempts with grapevine. The coat protein gene of GCMV was introduced in embryogenic cultures of tissues of the grapevine rootstock 110 Richter *(Vitis berlanderi* x *V. rupestris)* by means of a disarmed strain of *Agrobacterium tumefaciens,* LBA 4404. The callus cultures that were used derived from the vegetative tissues of anthers. Embryogenic calluses of nine putative transgenic clones were assayed for the presence of the four genes present in the construct (GUS, resistance to hygromycin and kanamycin, and the coat protein gene of GCMV). Five of these clones were able to regenerate rooted plantlets. The integration of the coat protein gene was checked by southern blot, ELISA and western blot. The stability of this integration and its protective usefulness against infection by GCMV will constitute the next steps of this research.

878. **Lee, R.F., S.M. Garnsey, R.H. Brlansky, and A.C. Goheen.** 1987. A purification procedure for enhancement of citrus tristeza virus yields and its application to other phloem-limited viruses. Phytopathology **77**:543-549.
Keywords :grapevine; rugose wood; corky bark; closterovirus; purification; method; USA;

879. **Lefol, C.** 1993. Etude des systèmes de reconnaissance entre le MLO (Mycoplasma-like organism) de la Flavescence dorée de la vigne et une cicadelle vectrice *Euscelidius variegatus* Kbm. (Study of the recognition systems between the MLO (Mycoplasma-like organism) of grapevine flavescence dorée and a leafhopper vector, *Euscelidius variegatus* Kbm.). University of Dijon, Dijon, France.
Keywords :grapevine; phytoplasma disease; phytoplasma; flavescence dorée; leafhopper; vector; *Euscelidius variegatus;* France;
Notes : In French. PhD Thesis, University of Dijon, France.

880. **Lefol, C., A. Caudwell, J. Lherminier, and J. Larrue.** 1993. Attachment of the Flavescence dorée pathogen (MLO) to leafhopper vectors and other insects. Ann. Appl. Biol. **123**:611-622.
Keywords :grapevine; phytoplasma disease; flavescence dorée; phytoplasma; vector; *Scaphoideus titanus; Euscelidius variegatus;* leafhopper; relationship; broadbean; immunolabelling; France;
Notes : The sites of attachment of FD phytoplasmas on the vectors *S. titanus* and *E. variegatus* or other leafhoppers was studied by incubating immunolabelled phytoplasmas with macerated healthy insects or cryosections of them. Attachment occurs on acini IV and V of the salivary glands and on some acini III, on the ventricules of the alimentary tract and on the abdomen fat bodies. Attachment is not restricted to vector species.

881. **Lefol, C., J. Lherminier, E. Boudon-Padieu, J. Larrue, C. Louis, and A. Caudwell.** 1994. Propagation of flavescence dorée MLO (Mycoplasma-like organism) in the leafhopper vector *Euscelidius variegatus* Kbm. J. Invert. Pathol. **63**:285-293.
Keywords :grapevine; phytoplasma disease; flavescence dorée; phytoplasma; leafhopper; vector; *Euscelidius variegatus;* propagation; ELISA; immunogold labelling; France;
Notes : Indirect ELISA studies allowed to follow the distribution of flavescence dorée mycoplasma-like organisms in different organs of the vector, *Euscelidius variegatus*, according to the time elapsed after the feeding period. Colloidal gold indirect immunolabelling was used to visualize the MLO cells in the infected organs.The digestive tract was the first organ to become infected. Infected cells were not numerous but were crowded with MLO particles. Infection did not seem to be localized in specific cells. MLO multiplied in the cytoplasm of the midgut cells and reached the haemolymph either by crossing between two cells or through individually infected cells. By circulating in the haemolymph, MLO infected salivary glands, in which they subsequently multiplied. Fat bodies and finally brain cells were infected. MLO increased in all these organs. Mycetomes were occasionally infected. No MLO were detected in Malpighian tubules or in male or female genitalia.

882. **Lefol, C., J. Lherminier, E. Boudon-Padieu, R. Meignoz, J. Larrue, C. Louis, A.C. Roche, and A. Caudwell.** 1994. Presence of attachment sites accounting for recognition between the Flavescence dorée MLO and its leafhopper vector. IOM Letters **3**:282-283.
Keywords :grapevine; phytoplasma disease; flavescence dorée; leafhopper; vector; France;
Notes : Paper presented at the 10th Meeting of the International Organization for Mycoplasmology (IOM), Bordeaux 1994.

883. **Legin, R., P. Bass, L. Etienne, and M. Fuchs.** 1993. Selection of mild virus strains of fanleaf degeneration by comparative field performance of infected grapevines. Vitis **32**:103-110.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; arabis mosaic virus; cross-protection; strain; performance; France;
Notes : Healthy clones of *Vitis vinifera* cv. Klevener de Heiligenstein, Chardonnay and Pinot noir were graft-inoculated with potential mild strains of ArMV (Ta) or GFLV (CB844 or F-13). The vines were planted in a nematode-free soil and screened for field performance over a 5-year period. ArMV-Ta had the

mildest effect on vigour and yield of the 3 cvs. tested. This clone was selected as a potential mild strain for cross protection to control fanleaf degeneration.

884. **Legin, R., O. Le Gall, and B. Walter.** 1987. Comparaison de plusieurs types d'enroulement de la vigne. (Comparison of several types of grapevine leafroll). Schw. landw. Forschung/La Recherche agronomique en Suisse **26**:313-316.
Keywords :grapevine; leafroll; vein yellowing leafroll; GLRaV-3; closterovirus; GVA; vitivirus; rugose wood; stem pitting; heat therapy; indexing; virus elimination; spread; France;
Notes : In French, Eng. sum. The authors distinguish several types of leafroll, depending on symptoms on Riparia Gloire and Pinot noir, resistance to heat therapy and serology: 1. Leafroll appearing by indexing on Riparia Gloire and eliminated after 200 days of heat treatment from cv. Servant. 2. Leafroll appearing on Pinot noir, eliminated from Servant after 300 days of heat therapy. Both viruses spread very slowly. In Burgondy, vein yellowing leafroll of Chardonnay spreads more quickly than 1. and 2. Antisera against leafroll type III (Gugerli) and GVA (Luisoni) gave positive response with leafroll on *Vitis riparia*, and also with extracts from vines with stem pitting.

885. **Legin, R., O. Le Gall, D. Zimmermann, P. Bass, B. Walter, R. Meignoz, and A. Caudwell.** 1989. Closterovirus-like particles in Chardonnay infected with the "vein yellowing leafroll" disease in Champagne (VYLR), p. 97-106. In E. Tanne (ed.), Proceedings of the 9th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG), Kiryat Anavim, Israel, September 1987. The Volcani Center, P.O. Box 6, Bet Dagan , Israel.
Keywords :grapevine; vein yellowing leafroll; closterovirus-like particles; electron microscopy; immunoassay; indexing; GLRaV-1; GLRaV-3; closterovirus; NY-1; Chardonnay; France; meeting; ICVG;
Notes : Vein yellowing leafroll is probably a virus disease. The hypothesis of a mycoplasma disease was not substantiated. The possible role of one or several closteroviruses is under study.

886. **Legin, R., O. Le Gall, D. Zimmermann, P. Bass, B. Walter, R. Meignoz, and A. Caudwell.** 1989. Closterovirus-like particles in Chardonnay infected with the "vein yellowing leafroll" disease in Champagne, France. Phytoparasitica **17**:67.
Keywords :grapevine; immunoassay; rugose wood; graft transmission; Champagne; ELISA; detection; ultrastructure; Chardonnay; vein yellowing leafroll; leafroll; symptoms; closterovirus; GLRaV-1; GLRaV-3; NY-1; stem pitting; corky bark; fleck; France; meeting; ICVG;
Notes : Abstract. There was no 100 % correlation between positive serological reaction and symptoms. This paper appears in full in the Proceedings of the 9th meeting of ICVG, Kiryat Anavim, Israel, 1987, 97-106 (1989).

887. **Legin, R. and B. Walter.** 1986. Regenerierung von Virosen befallener Reben durch Thermo-Therapie oder Wärmebehandlung und Schnellvermehrung der Rebe. (Cure of virus-infected grapevines by heat therapy and quick multiplication of grapevine material). Wein-Wiss. **41**:14-25.
Keywords :grapevine; *in vitro*; heat therapy; propagation; virus elimination; performance; fleck; vein mosaic; vein necrosis; rugose wood; stem pitting; leafroll; leaf reddening; red leaf; France;
Notes : In German, Eng. Fr. sum. Potted plants were heat treated at 38°C., then cultured *in vitro* on agar or as micrografts of small shoot apices (about 1 mm). Treated plants were Servant and Klevener von Heiligenstein. Viruses eliminated were fleck, vein mosaic, vein necrosis, stem pitting, leafroll, leafroll on Riparia Gloire, infectious chlorosis and leaf reddening of Pinot noir (Red leaf).

888. **Legin, R. and B. Walter.** 1986. Etude de phénomènes d'incompatibilité au greffage chez la vigne. (Study of graft incompatibility phenomena in grapevine). Progr. Agric. Vitic. **103**:279-283.
Keywords :grapevine; incompatibility; etiology; virus diseases; heat therapy; virus elimination; France;
Notes : In French. The incompatibility of Pinot noir on 5 BB can be eliminated by heat therapy (58 days at 37°C). Hypothesis of two pathogens, one from the budwood is thermolabile, the other determines the sensitivity of the rootstock.

889. **Legin, R. and B. Walter.** 1989. An unusual virus-like yellow dwarf symptom of *V.vinifera* "Pinot noir", p. 49-55. In E. Tanne (ed.), Proceedings of the 9th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG), Kiryat Anavim, Israel, September 1987. The Volcani Center, P.O. Box 6, Bet Dagan , Israel.
Keywords :grapevine; leaf reddening; red leaf; leafroll; Pinot noir; Klevener; virus-like diseases; graft transmission; indexing; symptoms; France; meeting; ICVG;
Notes : When some lines of *Vitis vinifera* "Klevener de Heiligenstein" (= Savagnin rose) are grafted onto the indicator *V.vinifera* Pinot noir, they cause unusual dwarfing followed by yellowing and reddening of the leaves. The symptoms resemble those of the infectious chlorosis and leaf reddening of Pinot noir (Legin et al.1979, Ann. Phytopathol. 11, 136-137) but there is no stem pitting on Pinot noir.

890. **Legin, R. and B. Walter.** 1989. An unusual virus-like yellow dwarf symptom of *Vitis vinifera* 'Pinot noir'. Phytoparasitica **17**:62.
Keywords :grapevine; leafroll; Klevener; graft transmission; symptoms; virus-like diseases; Pinot noir; red leaf; leaf reddening; meeting; ICVG; France;
Notes : Abstract. Differs from infectious chlorosis and leaf reddening of Pinot noir by inducing no stem pitting on Pinot noir. Klevener de Heligenstein (=Savagnin rose). Symptoms on various cvs. This paper appears in full in the Proceedings of the 9th meeting of ICVG, Kiryat Anavim, Israel, 1987, 49-55 (1989).

891. **Leguay, M.** 1994. Contrôles de la conservation de l'état sanitaire en sélection clonale (Checking the preservation of the sanitary status following clonal selection), p. 111-115. In VIth International Symposium on Grape Breeding, Yalta, Crimea, Ukraine, 4-10 September 1994. Office International de la Vigne et du Vin, Paris, France.
Keywords :grapevine; clonal selection; sanitary selection; certification; France;
Notes : In French. Book chapter. Symposium Grape Breeding, Yalta, Ukraine, 1994. Oral presentation. This paper reviews the French strategy for preserving the sanitary state of grapevine stocks that underwent clonal and sanitary selection, and the results obtained after 30 years.

892. **Lehoczky, J.** 1991.[Remarkable differences in pathogenicity between grapevine chrome mosaic and tomato black ring viruses in herbaceous test plants] Kertgazdasag **23***(6):*49-54.
Keywords :grapevine; grapevine chrome mosaic virus; tomato black ring virus; nepovirus; herbaceous hosts; comparison; symptoms; Hungary;

893. **Lehoczky, J., D. Boscia, J. Burgyan, M.A. Castellano, L. Beczner, and G. Farkas.** 1989. Line pattern, a novel virus disease of grapevine in Hungary, p. 23-30. In E. Tanne (ed.), Proceedings of the 9th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG), Kiryat Anavim, Israel, September 1987. The Volcani Center, P.O. Box 6, Bet Dagan , Israel.
Keywords :grapevine; line pattern; grapevine line pattern virus; mechanical transmission; host range; ilarvirus; immunoassay; ELISA; purification; symptoms; Hungary; Italy; meeting; ICVG;

894. **Lehoczky, J., D. Boscia, G.P. Martelli, J. Burgyan, M.A. Castellano, L. Beczner, and G. Farkas.** 1987. [Line pattern, occurrence of a disease hitherto unknown in Hungary]. Kertgazdasag **19***(6):*61-79.
Keywords :grapevine; line pattern; grapevine line pattern virus; symptoms; Hungary;
Notes : In Hungarian, Eng. sum.

895. **Lehoczky, J. and J. Burgyan.** 1986.[Occurrence of tomato black ring virus in grapevines in Hungary]. Kertgazdasag **18***(4):*47-57.
Keywords :grapevine; tomato black ring virus; nepovirus; ELISA; immunoassay; detection; occurrence; mechanical transmission; transmission; Hungary; virus;
Notes : In Hungarian, Eng.sum. Mechanical transmission to 20 herbaceous indicators.Detection by ELISA.

896. **Lehoczky, J., J. Burgyan, L. Beczner, and G. Farkas.** 1989. Line pattern, a novel virus disease of grapevine in Hungary. Phytoparasitica **17**:59-60.

Keywords :grapevine; line pattern; mechanical transmission; bacilliform particles; new virus; Hungary; meeting; ICVG;
Notes : Apparently a new virus disease of grapevine. This paper appears in full in the Proceedings of the 9th meeting of ICVG, Kiryat Anavim, Israel, 1987, 23-30 (1989).

897. **Lehoczky, J., G. Farkas, and J. Lazar.** 1986. [Detection of vein necrosis virus (GVNV) in the vines of cultivated grape varieties]. Kertgazdasag **18***(4):*59-65.
Keywords :grapevine; vein necrosis; detection; indexing; Hungary;
Notes : In Hungarian, Eng. sum. The presence of the virus is deduced from the symptoms on the indicator 110R. The disease is widespread in Hungarian vineyards, but it induces no symptom on *V.vinifera* cultivars.

898. **Lehoczky, J., M. Kölber, G. Farkas, J. Lazar, and S. Szönyegi.** 1991. Certification scheme for production of virus-free grape propagation material in Hungary, p. 115. In Vigne et environnement / Grapevine and environment - Résumé des communications / Abstracts. Moët Hennessy . Louis Vuitton, Paris.
Keywords :grapevine; selection; clonal selection; Hungary;

899. **Lehoczky, J., M. Kölber, J. Lazar, and G. Farkas.** 1992. [Preliminary report of the occurrence of grapevine leafroll associated clostero-viruses in Hungary], p. 492-496. In Extended abstracts of the "Lippay Janos" Researcher Meeting of the University of Horticulture and Food Industries, 4-5 November 1992. University of Horticulture and Food Industries, Budapest.
Keywords :grapevine; closterovirus; occurrence; leafroll; associated; Hungary;
Notes : In Hungarian, Eng. sum. Book chapter.

900. **Lehoczky, J., M. Kölber, J. Lazar, G. Farkas, and P. Gugerli.** 1993. Preliminary results on the occurrence of grapevine leafroll associated viruses (GLRaV's) in Hungary, p. 119-120. In P. Gugerli (ed.), Extended abstracts 11th Meeting ICVG, Montreux, Switzerland, 6-9 September 1993. Federal Agricultural Research Station of Changins, CH-1260 Nyon, Switzerland.
Keywords :grapevine; leafroll; indexing; immunoassay; detection; ELISA; comparison; GLRaV-1; GLRaV-2; GLRaV-3; GLRaV-4; closterovirus; GVA; vitivirus; Hungary; meeting; ICVG;
Notes : Plant material from vines indexing positive for leafroll in various parts of Hungary was tested by DAS-ELISA. Following closteroviruses were detected: GLRaV-I, II, III, IV and GVA. GLRaV-III was most frequently recorded, followed by GLRaV-I. The other viruses mentioned above were observed rarely. Cane shavings gave better results than leaf extracts. Indexing with Pinot noir did not detect all vines that were positive for GLRaV with ELISA. Conversely, a vine which induced strong leafroll symptoms when indexed on Pinot noir was ELISA negative for all GLRaV's mentioned above.

901. **Lehoczky, J., O. Luntz, J. Lazar, G. Farkas, S. Szönyegi, and M. Kölber.** 1993. Certification scheme for production of virus-free grape propagation material and its results in Hungary, p. 169-170. In P. Gugerli (ed.), Extended abstracts 11th Meeting ICVG, Montreux, Switzerland, 6-9 September 1993. Federal Agricultural Research Station of Changins, CH-1260 Nyon, Switzerland.
Keywords :grapevine; certification; legislation; virus-free material; indexing; virus elimination; Hungary; meeting; ICVG;
Notes : Description of the system of certification of grapevine in Hungary.

902. **Lehoczky, J., O. Luntz, J. Lazar, M. Kölber, J. Mikulas, and G. Farkas.** 1992. Production of virus-free grape propagation material in Hungary. Meded. Fac. Landbouwwetenschappen Rijksuniversiteit Gent **57/2a**:333-339.
Keywords :grapevine; virus-free material; selection; indexing; ELISA; propagation; certification; meeting; Hungary;
Notes : Proceedings of the 44th International Symposium on Crop Protection, Gent, Belgium, 5 May 1992. Inventory of the virus-free cvs. available in Hungary, description of the system for indexing, ELISA tests, multiplication fields, certification.

903. **Lehoczky, J., G.P. Martelli, and J. Lazar.** 1992. Seed transmission of grapevine line pattern virus. Phytopath. medit. **31**:115-116.
Keywords :grapevine; grapevine line pattern virus; ilarvirus; seed transmission; Hungary;

904. **Lenzi, R., F. Mannini, and M. Conti.** 1994. Presenza di virus in 'Moscato bianco' con diversa conformazione del grappolo (Presence of virus in White Muscat showing diverse cluster structure). Quad. Vitic. Enol. Univ. Torino **18**:73-79.
Keywords :grapevine; GLRaV-1; GLRaV-3; closterovirus; GVA; vitivirus; fanleaf; grapevine fanleaf virus; nepovirus; occurrence; performance; Italy;
Notes : In Italian, Eng. sum. The White muscat grapevine cultivated in the Loazzolo area (Asti, northern Italy) produces a typical wine made with clusters dried before fermentation. Three types of grapes can be observed, tight (C), shot berry (AC) and loose (S). A study of viruses present in these different types of vines by means of ELISA serological tests showed that GVA, GLRaV-1 and GLRaV-3 was almost equally represented in all three types, whereas GFLV was found much more frequently in vines with AC-type clusters (93%) or S-type (65%) than in vine with C-type clusters. The AC and S type of clusters seems therefore to be correlated with GFLV infection.

905. **Lenzi, R., P. Roggero, F. Mannini, and M. Conti.** 1993. ELISA detection of viruses in 'Moscato Bianco' grapevines showing differing cluster morphology, p. 66-67. In P. Gugerli (ed.), Extended abstracts 11th Meeting ICVG, Montreux, Switzerland, 6-9 September 1993. Federal Agricultural Research Station of Changins, CH-1260 Nyon, Switzerland.
Keywords :grapevine; nepovirus; fanleaf; grapevine fanleaf virus; closterovirus; GLRaV-1; GLRaV-3; leafroll; ELISA; detection; immunoassay; cluster; morphology; quality; performance; Italy; meeting; ICVG;
Notes : In order to determine the origin of the cluster morphology of Moscato Bianco (White Muscat), 30 vines of each ot three types of cluster considered (tight, shot berry and loose morphology) were tested by ELISA for following viruses: GFLV, GLRaV-I and III. The shot berry or loose types that give superior wine quality are clearly correlated with the GFLV infection.

906. **Levanony, U., P. Spiegel-Roy, and E. Tanne.** 1989. Effect of light intensity on growth of grapevines *in vitro*. Phytoparasitica **17**:74.
Keywords :grapevine; light; Israel; growth; meeting; ICVG;
Notes : Abstract. This paper appears in full in the Proceedings of the 9th meeting of ICVG, Kiryat Anavim, Israel, 1987, 169-171 (1989).

907. **Levanony, U., P. Spiegel-Roy, and E. Tanne.** 1989. The effect of light intensity on *in vitro* growth of *Vitis vinifera* L, p. 169-171. In E. Tanne (ed.), Proceedings of the 9th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG), Kiryat Anavim, Israel, September 1987. The Volcani Center, P.O. Box 6, Bet Dagan , Israel.
Keywords :grapevine; light; growth; physiology; Israel; meeting; ICVG;

908. **Levy, L., I.M. Lee, and A. Hadidi.** 1994. Simple and rapid preparation of infected plant tissue extracts for PCR amplification of virus, viroid, and MLO nucleic acids. J. Virol. Methods **49**:295-304.
Keywords :grapevine; detection; reverse transcription; PCR; GVB; vitivirus; nucleic acid assay; GLRaV-3; closterovirus; phytoplasma disease; viroid; nucleic acid; method; California; USA;
Notes :A rapid, simple method for preparing plant tissues infected with viruses, viroids, or MLOs in view of PCR amplification is described. It is based on the use of a commercial product, Gene Releaser (TM), which can produce plant extracts without the use of organic solvents, ethanol precipitation, or additional nucleic acid purification techniques. It was used with success with grapevine virus B, GLRaV-3, several MLOs and viroids. About 20 samples can be prepared for PCR or RT-PCR in 1-2 hours versus 1-3 days with the presently existing methods.

909. **Lherminier, J. and E. Boudon-Padieu.** 1996. *In situ* detection of grapevine flavescence dorée phytoplasmas and their infection cycle in experimental and natural host plants, p. 245-255. In M. Nicole and

V. Gianinazzi-Pearson (ed.), Histology, Ultrastructure and Molecular Cytology of Plant-Microorganism Interactions. Kluwer Academic Publishers, P.O.Box 322, 3300 AH Doordrecht, The Netherlands.
Keywords :grapevine; flavescence dorée; phytoplasma; phytoplasma disease; detection; immunoassay; immunocytochemistry; immunolabelling; France;
Notes : Immunolabelling of flavescence dorée (FD) phytoplasmas made it possible to follow the movement of the agent in broadbean host infected by *Euscelidius variegatus*. Whereas the delay for the appearance of symptoms is at least 28 days in greenhouse, the first labelled phytoplasma cells were detected in roots 17 days after the beginning of inoculation. The infection was found a few days later in basal axillary shoots and petioles of lower leaves. Immunocytological detection of FD in grapevine proved much more difficult. Some positive results were obtained recently using gold immunolabelling amplified by the silver enhancement technique.

910. **Lherminier, J., E. Boudon-Padieu, and A. Caudwell.** 1990. Immunochemistry, a tool for MLO detection in the vector. IOM Letters **1**:219-220.
Keywords :grapevine; flavescence dorée; phytoplasma; detection; immunoassay; vector; *Euscelidius variegatus;* France;
Notes :8th International Congress IOM, Istanbul, 8-12 July 1990.

911. **Lherminier, J., E. Boudon-Padieu, R. Meignoz, A. Caudwell, and R.G. Milne.** 1990. Immunological detection and localization of mycoplasma-like organisms (MLOs) in plants and insects by light and electron microscopy, p. 177-184. In K. Mendgen and E. Lesemann (ed.), Electron Microscopy of Plant Pathogens. Springer, Berlin, Heidelberg, New-York, Tokyo.
Keywords :grapevine; phytoplasma; detection; leafhopper; immunoassay; electron microscopy; immunofluorescence; immunogold labelling; immunolabelling; ISEM; phytoplasma disease; flavescence dorée; *Euscelidius variegatus;* France;
Notes : Review on the use of light and electron microscopy for detecting and identifying MLOs. Immunosorbent electron microscopy, *in situ* indirect immunofluorescence, immunogoldlabelling are the main points discussed. The paper includes 38 references. Book chapter.

912. **Lherminier, J., M. Courtois, and A. Caudwell.** 1993. Identification and *in situ* detection of FD-MLOs in *Vicia faba* by light and electron microscope immunocytochemistry. Phytopath. medit. **32**:73-74.
Keywords :grapevine; phytoplasma disease; flavescence dorée; broadbean; phytoplasma; detection; immunoassay; immunocytochemistry; France;
Notes : Abstract of a paper presented at a Workshop on Fruit and Grapevine Mycoplasma Diseases, Bologna, Italy, September 1992.

913. **Lherminier, J., M. Courtois, and A. Caudwell.** 1994. Determination of the distribution and multiplication sites of Flavescence Dorée mycoplasma-like organisms in the host plant *Vicia faba* by ELISA and immunocytochemistry. Physiological and Molecular Plant Pathology **45**:125-138.
Keywords :grapevine; phytoplasma disease; flavescence dorée; phytoplasma; *Euscelidius variegatus;* multiplication; broadbean; immunogold labelling; ELISA; electron microscopy; France;
Notes : The distribution of FD MLO's in the host *Vicia faba* after infection by *Euscelidius variegatus* was determined by indirect ELISA and immunogold labelling of electron microscope sections.

914. **Lherminier, J., G. Prensier, E. Boudon-Padieu, and A. Caudwell.** 1990. Immunolabeling of grapevine flavescence dorée MLO in salivary glands of *Euscelidius variegatus*: a light and electron microscopy study. J. Histochemistry and Cytochemistry **38**:79-85.
Keywords :grapevine; phytoplasma disease; flavescence dorée; phytoplasma; immuno electron microscopy; immunogold labelling; immunoassay; electron microscopy; detection; *Euscelidius variegatus;* leafhopper; France;
Notes : Use of a colloidal gold indirect immunolabelling technique on thin or semi-thin sections. Observation in light and electron microscope. MLOs of flavescence dorée were easily distinguished from other membrane-limited bodies in the cell.

915. **Lherminier, J., T. Terwisscha Van Scheltinga, E. Boudon-Padieu, and A. Caudwell.** 1989. Rapid immunofluorescent detection of the grapevine flavescence dorée mycoplasmalike organism in the salivary glands of the leafhopper *Euscelidius variegatus* Kbm. J. Phytopathol. **125**:353-360.
Keywords :grapevine; immunoassay; phytoplasma; phytoplasma disease; flavescence dorée; immunofluorescence; detection; leafhopper; *Euscelidius variegatus;* France;

916. **Li, S.F., S. Onodera, T. Sano, K. Yoshida, G.P. Wang, and E. Shikata.** 1995. Gene diagnosis of viroids: comparisons of return-PAGE and hybridization using DIG-labeled DNA and RNA probes for practical diagnosis of hop stunt, Citrus exocortis and apple scar skin viroids in their natural hosts plants. Ann. Phytopathol. Soc. Japan **61**:381-390.
Keywords :grapevine; DNA probe; RNA probe; viroid; detection; nucleic acid assay; chemiluminescence; dot blot hybridization; SDS-PAGE; comparison; hop stunt viroid; citrus exocortis viroid; HSVd-g; CEVd-g; Japan;
Notes : Return polyacrylamide gel electrophoresis or two-dimensional gel electrophoresis (Return-PAGE or 2D-PAGE) was successful for detecting hop stunt viroid (HSVd) in hop, citrus exocortis viroid (CEVd) in citron and apple scar skin viroid (ASSVd) in apple, but was not reliable for HSVd in grapevine and citron, or for ASSVd in pear, because of a too low concentration of the viroids in these hosts. Digoxigenin-labeled RNA probes were 625 time more sensitive than return-PAGE for detecting HSVd in hop, and sensitive enough for detecting this viroid in about 2 mg of grapevine tissue. Digoxigenin-labeled DNA probes were less sensitive than digoxigenin-labeled RNA probes and were hardly more sensitive than return-PAGE. Detection with digoxigenin-labeled RNA probes appears therefore as the most suitable method because it is cheap, sensitive and less dangerous than the use of probes with radioactive chemicals. The recommended amounts and types of tissue for each method are given. Reverse transcriptase-PCR is probably more sensitive, but it was not included in this experiment.

917. **Li, Z., D.Y. Guo, Z.N. Guo, G.F. Feng, and C.H. Kuai.** 1993. Electron microscope observation of grapevine leafroll virus, p. 50. In P. Gugerli (ed.), Extended abstracts 11th Meeting ICVG, Montreux, Switzerland, 6-9 September 1993. Federal Agricultural Research Station of Changins, CH-1260 Nyon, Switzerland.
Keywords :grapevine; leafroll; closterovirus; electron microscopy; China; meeting; ICVG;

918. **Li, Z., Z. Guo, G.X. Feng, D.Y. Guo, C.H. Kuai, and Q.Y. Zhang.** 1991. The influence of heat treatment on grapevine cultivars, p. 324. In I. C. Rumbos, R. Bovey, D. Gonsalves, W. B. Hewitt, and G. P. Martelli (ed.), Proceedings of the 10th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG). Plant Protection Institute, P.O. Box 303, 38001 Volos, Greece.
Keywords :grapevine; heat therapy; virus elimination; China; meeting; ICVG;
Notes : Abstract. Heat therapy according to the Davis method was used for obtaining healthy vines: heating potted plants for 2-4 months at 38^{O} C. and rooting of shoot tips *in vitro.*

919. **Li, Z., G.P. Martelli, and U. Prota.** 1989. A preliminary account of virus and virus-like diseases of grapevines in the People's Republic of China. Phytoparasitica **17**:60-61.
eywords : grapevine; survey; fanleaf; leafroll; rugose wood; fleck; China; meeting; ICVG;
Notes : Abstract. This paper appears in full under a different title in the Proceedings of the 9th meeting of ICVG, Kiryat Anavim, Israel, 1987, 31-34 (1989).

920. **Li, Z., G.P. Martelli, and U. Prota.** 1989. Virus and virus-like diseases of the grapevine in the People's Republic of China, a preliminary account, p. 31-34. In E. Tanne (ed.), Proceedings of the 9th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG), Kiryat Anavim, Israel, September 1987. The Volcani Center, P.O. Box 6, Bet Dagan , Israel.
Keywords :grapevine; fanleaf; leafroll; rugose wood; fleck; virus-like diseases; survey; China; Italy; meeting; ICVG;
Notes : Fanleaf, leafroll, rugose wood and fleck were found in Chinese vineyards. The incidence of these diseases was in general higher in varieties imported from Japan or Europe than in local varieties.

921. **Lider, L.A. and A. C. Goheen.** 1986. Field resistance to the grapevine fanleaf virus-*Xiphinema index* complex in interspecific hybrids of *Vitis*. Vignevini **13** *(suppl.):*166-169.
Keywords :grapevine; nepovirus; fanleaf; grapevine fanleaf virus; resistance; nematode; Longidoridae; *Xiphinema index;* transmission; California; USA;

922. **Ling, K., H.F. Alvizo-Villasana, J. Hu, and D. Gonsalves.** 1993. Molecular cloning of dsRNA isolated from tissue infected with grapevine leafroll virus type III, p. 21-22. In P. Gugerli (ed.), Extended abstracts 11th Meeting ICVG, Montreux, Switzerland, 6-9 September 1993. Federal Agricultural Research Station of Changins, CH-1260 Nyon, Switzerland.
Keywords :grapevine; leafroll; GLRaV-3; NY-1; associated; closterovirus; nucleic acid assay; detection; cloning; dsRNA; USA; meeting; ICVG;
Notes : Nucleic acid probes reacting to portions of the genome that have homology among several GLRaV types were used for detecting a range of GLRaV types.

923. **Ling, K., J. Hu, and D. Gonsalves.** 1993. Molecular cloning and detection of grapevine leafroll virus by nucleic acid hybridization and polymerase chain reaction. Phytopathology **83**:245.
Keywords :grapevine; leafroll; GLRaV-3; closterovirus; detection; cloning; nucleic acid assay; reverse transcription; PCR; northern blot; New York; USA;
Notes : The strain NY-1 of GLRaV-3 was detected by reverse transcription, PCR and Northern blot.

924. **Ling, K.S., R.F. Drong, J.L. Slightom, and D. Gonsalves.** 1994. Identification of coat protein gene and partial genome organization of grapevine leafroll-associated closterovirus type III. Phytopathology **84**:1372.
Keywords :grapevine; GLRaV-3; leafroll; closterovirus; coat protein; gene; sequence analysis; cloning; cDNA; dsRNA; USA;
Notes :A phage lambda ZAP II library of GLRaV-III RNA genome was made by cloning the cDNA from a GLRaV-specific ds-RNA. About 50% of the 20 kb genome was sequenced. This part of the genome is closely related to the genome of beet yellows virus.

925. **Ling, K.S., R.F. Drong, J.L. Slightom, and D. Gonsalves.** 1995. Partial genome organization of grapevine leafroll-associated closterovirus 3 (Abstract 305). Phytopathology **85**:1152.
Keywords :grapevine; leafroll; GLRaV-3; closterovirus; sequence analysis; genome; organization; comparison; citrus tristeza virus; USA;
Notes : Abstract. About 70% of GLRaV-3 genome was sequenced. There is a close similarity with beet yellows and citrus tristeza viruses.

926. **Ling, K.S. and D. Gonsalves.** 1997. Recent information on the molecular characterization of grapevine leafroll virus-3, p. 11-18. In P. L. Monette (ed.), Filamentous viruses of woody plants. Research Signpost, Trivandrum, India.
Keywords :grapevine; leafroll; closterovirus; GLRaV-3; properties; sequence analysis; genome; detection; USA;

927. **Ling, K.S., H.Y. Zhu, H. Alvizo, J.S. Hu, R.F. Drong, J. L. Slightom, and D. Gonsalves.** 1997. The coat protein gene of grapevine leafroll associated closterovirus-3: cloning, nucleotide sequencing and expression in transgenic plants. Arch. Virol. **142**:1101-1116.
Keywords :grapevine; leafroll; closterovirus; GLRaV-3; nucleotide sequence; cloning; coat protein; protein; gene; transgenic; New York; USA;
Notes :A cDNA library was made by cloning cDNA prepared from a high mw. double-stranded RNA isolated from grapevine tissues infected with leafroll-associated closterovirus-3 (GLRaV-3). The nucleotide sequence analysis from three clones revealed an open reading frame (ORF) which was interrupted at the 3' end; the rest of this ORF was obtained by sequencing a fourth clone that overlapped with one of the three clones. A total of 2028 bp was sequenced. The putative GLRaV-3 coat protein ORF, 939 bp, codes for a protein (called p35) with a calculated M(r) of 34 866. Multiple alignment of the p35 amino acid sequence with coat protein sequences from other closteroviruses revealed that the consensus amino acid residues (R

and D) of filamentous plant viruses are preserved in the expected locations. The GLRaV-3 coat protein gene was then prepared for sense and antisense expression in transgenic plants. Transgenic *Nicotiana benthamiana* plants that contained the sense GLRaV-3 coat protein gene produced a 35 kDa protein that reacted in Western blot with GLRaV-3 antibody.

928. **Ling, K.S., H. Y. Zhu, R. F. Drong, J. L. Slightom, and D. Gonsalves.** 1996. Grapevine leafroll-associated closterovirus 3: nucleotide sequence analysis and its gene expression strategy, p. 89. In Xth International Congress of Virology, Jerusalem, Israel, 11-16 August, 1996.
Keywords :grapevine; leafroll; closterovirus; GLRaV-3; sequence analysis; nucleotide sequence; USA;
Notes : Abstracts of the meeting. See next reference.

929. **Ling, K.S., H. Y. Zhu, R. F. Drong, J. L. Slightom, and D. Gonsalves.** 1997. Nucleotide sequencing and genome organization of grapevine leafroll associated closterovirus 3 and development of transgenic plants expressing its coat protein and other genes, p. 18. In O. A. Sequeira,de, J. C. Sequeira, and M. T. Santos (ed.), Extended abstracts 12th Meeting ICVG, Lisbon, Portugal, 29 September-2 October 1997. Dept.Plant Pathology, Estação Agronomica Nacional, Oeiras, Portugal.
Keywords :grapevine; leafroll; GLRaV-3; closterovirus; transgenic; nucleotide sequence; genome; USA; New York; meeting; ICVG;
Notes : GLRaV-3 consists of a ssRNA and a coat protein of 43 kDa. A high molecular weight dsRNA of about 18 kb was observed in infected plants. This dsRNA was cloned and a segment of 16038 nucleotides of the genome was sequenced. The caracteristics of this genomic segment were described, and analogies with other viruses were noted. The general genome organization of GLRaV-3 was similar to that of citrus tristeza virus. Several versions of the GLRaV-3 coat protein gene were used for preparing transgenic grapevine rootstocks, including Riparia Gloire, 3309 C, 110 Richter, MGT 101-14, and SO4, with a view to obtaining a resistance to this virus.

930. **Ling, K.S., H.Y. Zhu, Z.Y. Jiang, J.R. McFerson, and D. Gonsalves.** 1997. Using antibodies developed against recombinant coat protein to detect grapevine leafroll-associated closterovirus-3. Phytopathology **87***(suppl.):*S58.
Keywords :grapevine; leafroll; closterovirus; GLRaV-3; ELISA; immunoassay; antigen; recombination; USA;
Notes :A fusion coat protein containing a sequence of GLRaV-3 coat protein was produced by *E.coli* and used after purification with a SDS-polyacrylamide gel as antigen for production of antiserum. The polyclonal antibody was shown to be virus specific by Western blot and ISEM. It was most useful as a coating antibody with a monoclonal antibody conjugate. Large quantities of highly effective antibody can be produced in this way.

931. **Ling, K.S., H.Y. Zhu, Z.Y. Jiang, J.R. McFerson, and D. Gonsalves.** 1997. Application of ELISA for virus detection using a polyclonal antibody produced from a recombinant coat protein of grapevine leafroll virus 3 expressed in *Escherichia coli*, p. 89. In O. A. Sequeira,de, J. C. Sequeira, and M. T. Santos (ed.), Extended abstracts 12th Meeting ICVG, Lisbon, Portugal, 29 September-2 October 1997. Dept.Plant Pathology, Estação Agronomica Nacional, Oeiras, Portugal.
Keywords :grapevine; leafroll; closterovirus; GLRaV-3; detection; immunoassay; coat protein; ELISA; New York; USA; meeting; ICVG;
Notes : The advantage of this method for obtaining polyclonal antibody to GLRaV-3 is the easy and unlimited avalability of antigen from *E.coli* cultures.

932. **Ling, K.S., H.Y. Zhu, N. Petrovic, J.R. McFerson, and D. Gonsalves.** 1997. Comparative effectiveness of ELISA and PCR for detection of grapevine leafroll associated closterovirus 3, p. 90. In O. A. Sequeira,de, J. C. Sequeira, and M. T. Santos (ed.), Extended abstracts 12th Meeting ICVG, Lisbon, Portugal, 29 September-2 October 1997. Dept.Plant Protection, Estação Agronomica Nacional, Oeiras, Portugal.
Keywords :grapevine; leafroll; closterovirus; GLRaV-3; detection; immunoassay; nucleic acid assay; ELISA; PCR; comparison; method; New York; USA; meeting; ICVG;

Notes : ELISA and PCR were compared by testing more than 1000 samples taken from different tissues of three vines showing leafoll symptoms and three symptomless vines in the field, throughout the year. PCR proved more sensitive than ELISA and could detect GLRaV-3 earlier than ELISA in the season. PCR was more costly than ELISA and sometimes PCR results were not consistent, especially with leaf samples. For large scale application, ELISA remains more convenient than PCR, which can be used as a complementary method.

933. **Liskova, M.** 1997. Nematodes of the family Longidoridae in the rhizosphere of grapevines in the Slovak Republic. Helminthologia **34**:87-95.
Keywords :grapevine; nematode; Longidoridae; *Longidorus; Xiphinema;* survey; Slovakia;
Notes : Thirteen species of ectoparasitic nematodes of the family Longidoridae (genera *Longidorus, Paralongidorus* and *Xiphinema*) have been identified in the rhizosphere of grapevine in Slovakian vineyards: six *Longidorus* species, one *Paralongidorus* species and six *Xiphinema* species *(X.diversicaudatum, X.italiae, X.pachtaicum, X.simile, X.taylori and X.vuittenezi)*. Four of them are known as vectors of virus diseases of grapevine: *L.elongatus, P.maximus, X.diversicaudatum and X.italiae.*) [Note: *X.italiae* is a doubtful vector of GFLV].

934. **Liskova, M.** 1997. [Nematodes of the family Longidoridae in the vineyards of Slovakia - Geographical distribution]. Ochrana Rostlin **33**:151-158.
Keywords :grapevine; nematode; vector; Longidoridae; survey; *Xiphinema diversicaudatum; Xiphinema italiae; Longidorus elongatus; Paralongidorus maximus;* Slovakia;
Notes : In Slovak, Eng.sum. In 133 vineyard sites of Slovakia, a total of 13 nematode species of the family Longidoridae were detected. The same paper appears in English in Helminthologia 34, 87-95, 1997 (ref.933).

935. **Liskova, M., L. Smrcka, M. Sabova, and B. Valocka.** 1994. [Nematodes of the family Longidoridae and occurrence of viral diseases of grapevine at selected localities of viticultural areas in Slovakia]. Ochrana Rostlin **30***(1):*23-28.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; arabis mosaic virus; Longidoridae; nematode; *Xiphinema italiae; Xiphinema pachtaicum; Xiphinema vuittenezi; Longidorus juvenilis;* vector; occurrence; Slovakia;
Notes : In Slovak,Eng.sum. In 8 viticultural areas of Slovakia the occurrence of Longidorid nematodes, including virus vectors, and incidence of virus diseases were studied. Four species were identified in all localities: *Xiphinema italiae, X.pachtaicum, X.vuittenezi* and *Longidorus juvenilis. X.italiae* was determined as virus vector, the other spp. are still studied for their role in virus transmission. In 4 localities, the occurrence of GFLV and ArMV was confirmed by ELISA.

936. **Litvak, L.** 1993. Grapevine fanleaf -- Ultrastructural investigations, p. 189-190. In P. Gugerli (ed.), Extended abstracts 11th Meeting ICVG, Montreux, Switzerland, 6-9 September 1993. Federal Agricultural Research Station of Changins, CH-1260 Nyon, Switzerland.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; ultrastructure; cytopathology; electron microscopy; Moldavia; meeting; ICVG;

937. **Lopes, M.S., D. Mendonça, M. Laimer Da Camara Machado, and A. da Camara Machado.** 1997. Occurrence of grapevine fanleaf virus (GFLV) and grapevine leafroll associated virus 3 (GLRaV 3) in the Azorean islands Pico and Terceira, p. 114. In O. A. Sequeira,de, J. C. Sequeira, and M. T. Santos (ed.), Extended abstracts 12th Meeting ICVG, Lisbon, Portugal, 29 September-2 October 1997. Dept.Plant Pathology, Estação Agronomica Nacional, Oeiras, Portugal.
Keywords :grapevine; virus diseases; survey; occurrence; nepovirus; grapevine fanleaf virus; closterovirus; leafroll; GLRaV-3; Azores; Portugal; meeting; ICVG;
Notes : Grapevine fanleaf virus and grapevine leafroll-associated virus 3 were detected in vineyards of the Azorean islands of Pico and Terceira. *Xiphinema* vectors of GFLV were also present.

938. **Lorelle, V.** 1988. Halte à l'épidémie de flavescence dorée. (Let us put a stop to the epidemics of flavescence dorée). Phytoma - La Défense des Végétaux *(397):*31-33.
Keywords :grapevine; phytoplasma disease; flavescence dorée; control; leafhopper; epidemiology; insecticide; *Scaphoideus littoralis;* France;
Notes : In French. The epidemiology of flavescence dorée and the biology of the vector *Scaphoideus titanus* are described, as well as the measures of control of the vector by insecticide sprays and other control measures. The necessity of a coordinated spray programme on a regional basis is stressed.

939. **Lorrain, R.** 1997. Les nématodes vecteurs de la dégénérescence infectieuse de la vigne. De l'utilité d'une analyse nématologique (Nematode vectors of grapevine infectious degeneration. On the usefulness of nematological analysis). Progr. Agric. Vitic. **114**:338-342.
Keywords :grapevine; court-noué; nepovirus; grapevine fanleaf virus; arabis mosaic virus; vector; *Xiphinema index; Xiphinema diversicaudatum;* nematode; Longidoridae; biology; transmission; control; France;
Notes : In French. This paper presents an information intended for viticulturists on the vectors of the two main viruses involved in the infectious degeneration in France, grapevine fanleaf virus (GFLV) and arabis mosaic virus (ArMV): respectively *Xiphinema index* and *X.diversicaudatum*. Description, development, reproduction, nutrition, host range, resistance to drought, survival in absence of hosts, geographic distribution. The methods of control by chemical treatment of soil and the need for nematological analysis of the soils are discussed.

940. **Loudes, A.M., C. Ritzenthaler, M. Pinck, M. A. Serghini, and L. Pinck.** 1995. The 119 kDa and 124 kDa polyproteins of arabis mosaic nepovirus (isolate S) are encoded by two distinct RNA2 species. J. Gen. Virol. **76**:899-906.
Keywords :grapevine; arabis mosaic virus; nepovirus; isolate; RNA; gene; nucleotide sequence; coat protein; genome; cloning; organization; comparison; grapevine fanleaf virus; France;
Notes : Several arabis mosaic (ArMV) isolates produce by *in vitro* translation of RNA2 a polyprotein named P2 that forms a double band in polyacrylamide gels. An isolate of ArMV, called ARMV-S was shown to contain two RNA2s of different length, called RNA2-U and RNA-L. The two species of RNA were difficult to separate by electrophoresis of the virion RNA under denaturing conditions, but they could be distinguished by analysis of primer extension and *in vitro* translation products. The two RNA2 differ in size mostly in their coding regions. The two polyproteins P2' and P2", coded respectively by the 124 kDa RNA and the 119 kDa RNA and which correspond to the upper and lower polyprotein bands mentioned above, were more than 95% identical. The difference occurs in the N-terminal region.

941. **Lozzia, G.C.** 1992. Distribuzione, biologia e controllo di *Scaphoideus titanus* Ball (Distribution, biology and control of *Scaphoideus titanus* Ball), p. 173-182. In Atti Giornate Fitopatologiche 1992, Copanello (CZ), 21-24 aprile 1992, vol.1. Cooperativa Libraria Universitaria Editrice Bologna (CLUEB), Bologna, Italy.
Keywords :grapevine; phytoplasma disease; *Scaphoideus titanus;* occurrence; biology; control; leafhopper; Italy;
Notes : In Italian, Eng. sum. Atti, CLUEB.

942. **Luntz, O., G. Farkas, J. Lazar, J. Lehoczky, S. Szönyegi, and M. Kölber.** 1991. Results of virological screening and heat therapy of grapevine varieties in Hungary, p. 117. In Abstracts, Conference for Grapevine and Environment, LVMH, Budapest, 29th September-1st October 1991.
Keywords :grapevine; virus elimination; selection; heat therapy; virus-free material; meeting; Hungary;
Notes : Conference Grapevine and Environment, Budapest 1991.

943. **Lupo, R., G. P. Martelli, M.A. Castellano, D. Boscia, and V. Savino.** 1994. *Agrobacterium rhizogenes*-transformed plant roots as a source of grapevine viruses for purification. Plant Cell,Tissue and Organ Culture **36**:291-301.
Keywords :grapevine; vitivirus; purification; grapevine fleck virus; GVA; GVB; method; *Agrobacterium;* Italy;

Notes : Several species of *Vitis* and *Nicotiana* infected by various phloem-limited viruses were transformed by means of *Agrobacterium rhizogenes* in order to obtain root cultures for virus purification. Several clones were multiplied and grown in liquid culture. Comparison of virus yields from normal plant tissues and from roots of transformed grapevines showed that in many cases, transformed roots could provide a better source of virus for purification than leaves of normal plants. The viruses (GFkV, GVA, GVB) multiplied well in root cultures and persisted.

944. **MacKenzie, D.J., R.C. Johnson, and C. Warner.** 1996. Incidence of four important viral pathogens in Canadian vineyards. Plant Disease **80**:955-958.
Keywords :grapevine; arabis mosaic virus; grapevine fanleaf virus; nepovirus; GLRaV-1; GLRaV-3; leafroll; closterovirus; occurrence; survey; quarantine; Canada;
Notes : The incidence of four viruses of grapevine that are submitted to quarantine regulations in Canada was determined in the main viticutural area of this country by a survey involving serological tests of 2.5 samples per hectare, altogether 11417 samples in 637 field sites. The incidence of ArMV and GFLV was very low, respectvely 0.53% and 0.25% on a national average. The two closteroviruses tested were more widespread, with an incidence of 1.67% for GLRaV-1 and 10.8% for GLRaV-3. According to the authors, the relatively high incidence of GLRaV-1 and 3 in Canadian vineyards do not support the continued regulation of these viruses as quarantine pathogens.

945. **MacKenzie, D.J., M.A. McLean, S. Mukerji, and M. Green.** 1997. Improved RNA extraction from woody plants for the detection of viral pathogens by reverse transcription-polymerase chain reaction. Plant Disease **81**:222-226.
Keywords :grapevine; RNA; purification; method; PCR; nepovirus; grapevine fanleaf virus; arabis mosaic virus; closterovirus; GLRaV-3; Canada;
Notes : Description of an efficient method for extraction of high-quality RNA from woody plants without the use of phenol, organic solvents, or alcohol. The method employs commercially available spin-column matrices and reduces the inhibitory action of plant polysaccharides and phenolic compounds on PCR when conventional extraction methods are applied to woody plant species. It is sold as a kit called RNeasy, by Qiagen Inc., Chatsworth, California, USA. It was applied successfully for RNA preparation from GFLV, ArMV and GLRaV-3 in grapevine.

946. **Macquaire, G., T. Candresse, and J. Dunez.** 1993. Detection of viruses and viroids by molecular hybridization, p. 225-237. In G.P. Martelli (ed.), Graft-transmissible diseases of grapevines. Handbook for detection and diagnosis. FAO, Rome.
Keywords :grapevine; virus; viroid; detection; identification; nucleic acid assay; France;

947. **Madden, E.G., F. Zee, and D. Gonsalves.** 1987. Production of monoclonal antibodies to closterovirus-like particles associated with grapevine leaf roll disease. Phytopathology **77**:120.
Keywords :grapevine; closterovirus; ELISA; monoclonal antibodies; NY-1; GLRaV-3; leafroll; New York; USA;

948. **Maekawa, A., I. Namba, Y. Tanaka, and H. Yamashita.** 1993. [Elimination of viruses by meristem culture. 2. Elimination of grapevine leafroll virus]. Res. Bull. Pl. Prot. Serv. Japan **29**:57-61.
Keywords :grapevine; leafroll; virus elimination; *in vitro*; meristem tip culture; Japan;
Notes : In Japanese, Eng.sum. Meristem tips were excised (0.2-0.5 mm) and cultured on half strength nitrogen Murashige Skoog (1/2N-MS) medium supplemented with 1 mg/l 6-benzylaminopurine, 1 g/l polyvinylpyrrolidone, 15 mg/l glucose and 8 mg/l agar. Elongated shoots from the subculture were rooted in a 1/2N-MS medium supplemented with 0.05 mg/l of 3-indolebutyric acid, 15 g/l glucose and 8 g/l agar. Rooted shoots were acclimatized on a 1/2N-MS medium and a 1:1 mixture of vermiculite and perlite instead of agar. Rooted shoots were later transplanted in soil and tested by green-grafting and ELISA.

949. **Maekawa, A., Y. Umemoto, H. Yamashita, and H. Yamashita.** 1995. [Elimination of viruses by meristem culture. 3.Elimination of grapevine fanleaf virus]. Res. Bull. Pl. Prot. Serv. Japan **31**:113-115.

Keywords :grapevine; nepovirus; grapevine fanleaf virus; virus elimination; meristem tip culture; heat therapy; *in vitro*; Japan;
Notes : In Japanese, Eng.sum. *In vitro* cultured meristems of GFLV-infected grapevine were subcultured after excision at 5-10 mm and heat treated *in vitro* with a daily program of 16 hours at 40^{o} C under illumination followed by 8 hours at 30^{o} C in darkness (program 40/30^{o} C or also 35/25^{o} C). The duration of the treatment was of 20, 40 or 40 days. GFLV was eliminated but some damage was caused by heat treatment in the case of the treatment with the combination 40/30^{o} C. (See abstr. 2H16 in Vitis 36(2), p.38, 1997).

950. **Magalhães, N., A. Oliveira, J.B. Carvalho, E. Toscano, M.J. Correia, A.M. Pereira, L.C. Carneiro, and A. Martins.** 1997. Evolution of leafroll (GLRaV-3) effect on grapevine yield and potential ethanol, p. 175-176. In O. A. Sequeira,de, J. C. Sequeira, and M. T. Santos (ed.), Extended abstracts 12th Meeting ICVG, Lisbon, Portugal, 29 September-2 October 1997. Dept.Plant Pathology, Estação Agronomica Nacional, Oeiras, Portugal .
Keywords :grapevine; leafroll; closterovirus; GLRaV-3; performance; economic importance; Portugal; meeting; ICVG;
Notes : The most prevalent leafroll agent in Portugal is GLRaV-3. Its symptoms differ according to the regions and the climate. The same infected clones of cv. Periquita showed clear leafroll symptoms in the western region with a mild climate, but remained symptomless in the eastern part of the country, with a warmer and dryer climate. In a study camparing the performances of healthy and GLRaV-3 infected clones of two cvs., Tinto Cão and Touriga Nacional, growing in the Douro region, in a warm and dry climate, no differences were noted in yield and sugar content of the berries between healthy and GLRaV-3 infected vines.

951. **Magarey, P.A.** 1986. Grape-vine yellows - Aetiology, epidemiology, and diagnosis. South Afr. J. Enol. Vitic. **7**:90-100.
Keywords :grapevine; phytoplasma; Australian grapevine yellows; phytoplasma disease; flavescence dorée; bois noir; Vergilbungskrankheit; symptoms; etiology; epidemiology; diagnosis; review; Australia;
Notes : Description of Australian grapevine yellows, review of knowledge on grapevine yellows diseases in other countries, especially flavescence dorée and bois noir in France, Vergilbungskrankheit in Germany.

952. **Magarey, P.A.** 1988. Grapevine yellows diseases, p. 67-105. In S. P. Raychaudhuri and N. Rishi (ed.), Mycoplasma Diseases of Woody Plants. Malhotra Publishing House, New Dehli, India.
Keywords :grapevine; phytoplasma disease; phytoplasma; Australian grapevine yellows; flavescence dorée; bois noir; Vergilbungskrankheit; review; Australia;

953. **Magarey, P.A.** 1988. Grapevine Yellows - A literature review. Department of Agriculture South Australia, Adelaide, South Australia.
Keywords :grapevine; phytoplasma disease; Australian grapevine yellows; flavescence dorée; bois noir; Vergilbungskrankheit; review; bibliography; Australia;
Notes : Technical paper No. 19, April 1988. The paper reviews the literature on grapevine yellows, with 126 references up to 1988, and sums up the knowledge on grapevine yellows in Australia and in the rest of the world. 13 photographs, most in colour, show the main symptoms of grapevine yellows in Australia and Europe.

954. **Magarey, P.A., B. Plavsic, and M.F. Wachtel.** 1988. MLO associated with Australian grapevine yellows-diseased phloem cells. International Journal of Tropical Plant Diseases **6**:175-179.
Keywords :grapevine; phytoplasma disease; Australian grapevine yellows; phytoplasma; Australia;

955. **Magarey, P.A., B. Plavsic, and M.F. Wachtel.** 1988. Mycoplasmalike organisms associated with Australian grapevine yellows. Plant Disease **72**:363.
Keywords :grapevine; phytoplasma disease; phytoplasma; Australian grapevine yellows; etiology; electron microscopy; Australia;

Notes : MLOs were observed in leaf veins and petioles of yellows-affected Riesling with the electron microscope (140-510 nm in diam.). They were surrounded by a triple layered membrane. Hypothesis of a similarity with FD.

956. **Magarey, P.A. and M.F. Wachtel.** 1985. A review of the present status of Australian grapevine yellows. Agr. Rec. **12***(17):*12-18.
Keywords :grapevine; Australian grapevine yellows; phytoplasma disease; chemotherapy; tetracycline; fluorescence; phytoplasma; review; symptoms; Australia;
Notes :A yellows disease was first observed in 1976 in grapevine recent plantings of cvs. Riesling and Chardonnay in South Australia, New South Wales and Victoria, causing considerable losses. It was called Rhine Riesling problem in South Australia and Chardonany decline in Victoria. A description of symptoms is given, and a comparison with similar diseases elsewhere in the world is made. The phloem of diseased vines fluoresces under UV-light, and tetracycline treatment by pressure injection on dormant vines causes a significant reduction of symptoms next year. This suggests that the disease is caused by mycoplasma-like organisms (MLO).

957. **Magarey, P.A. and M.F. Wachtel.** 1986. Grapevine yellows, a widespread, apparently new disease in Australia. Plant Disease **70**:694.
Keywords :grapevine; Australian grapevine yellows; phytoplasma disease; detection; symptoms; fluorescence; phytoplasma; control; tetracycline; Chardonnay; Riesling; DeChaunac; Australia;
Notes : The first record of the disease was made in 1975 on Chardonnay, Riesling, and DeChaunac. Oxytetracycline-HCl (0.05 g/vine) pressure injected in dormant vines reduced the incidence next year by 97% ($P<0.001$) and remained effective for five seasons (0.005 g/vine was also effective). Penicillin 0.7 g/vine did not produce any effect. A strong fluorescence of phloem cells was observed in epifluorescence microscopy. Australian grapevine yellows is the proposed name for this disease.

958. **Magarey, P.A. and M.F. Wachtel.** 1986. Australian grapevine yellows. International Journal of Tropical Plant Diseases **4**:1-14.
Keywords :grapevine; phytoplasma disease; Australian grapevine yellows; symptoms; etiology; control; Australia;

959. **Magarey, P.A. and M.F. Wachtel.** 1988. Australian Grapevine Yellows - new findings. The Australian Grapegrower and Winemaker **25***(292):*25-26.
Keywords :grapevine; Australian grapevine yellows; phytoplasma disease; phytoplasma; Australia;

960. **Magarey, P.A. and M.F. Wachtel.** 1989. Australian Grapevine Yellows - a review. The Australian Grapegrower and Winemaker **26***(309):*39.
Keywords :grapevine; Australian grapevine yellows; phytoplasma disease; review; Australia;

961. **Maixner, M.** 1991. 10. Tagung des International Council for the Study of Viruses and Virus Diseases of Grapevine in Volos, Griechenland, vom 3. bis 7. September 1990. (Tenth meeting of the ICVG, Volos, Greece, 3-7th September 1990). Nachrichtenbl. deut. Pflanzenschutzd. **43**:58-61.
Keywords :grapevine; virus diseases; virus-like diseases; meeting; ICVG;
Notes : This is a short account of the 10th ICVG meeting in Volos, Greece.

962. **Maixner, M.** 1992. Untersuchungen zur Epidemiologie der Vergilbungskrankheit der Rebe (Investigations on the epidemiology on German grapevine yellows) (Abstract). Mitt. Biol. Bundesanstalt. f. Land- u. Forstwirtschaft Berlin-Dahlem *(283):*304.
Keywords :grapevine; Vergilbungskrankheit; phytoplasma disease; epidemiology; Germany;

963. **Maixner, M.** 1993. Spatial pattern analysis for epidemiological sudies on grapevine diseases, p. 121. In P. Gugerli (ed.), Extended abstracts 11th Meeting ICVG, Montreux, Switzerland, 6-9 September 1993. Federal Agricultural Research Station of Changins, CH-1260 Nyon, Switzerland.

Keywords :grapevine; phytoplasma disease; Vergilbungskrankheit; epidemiology; spread; distribution; method; Germany; meeting; ICVG;
Notes : The use of a statistical technique after mapping the whole vineyard and recording diseased plants makes it possible to determine with a computer program if the spatial pattern of diseased vines is random or not. The method was applied to the yellows disease "Vergilbungskrankheit" and showed a non-random distribution of the disease, suggesting a probable transmission from grape to grape or from weeds to grapes in the field.

964. **Maixner, M.** 1993. PATCHY - Ein Programm zur Analyse räumlicher Verteilungsmuster von Rebkrankheiten (PATCHY - A program for spatial distribution analysis of grape diseases). Nachrichtenbl. deut. Pflanzenschutzd. **45**:157-164.
Keywords :grapevine; virus diseases; virus-like diseases; distribution; analysis; method; Germany;
Notes : Description of a computer programme for determining if the spatial distribution of diseased plants indicates a contamination from neighbouring plants or from outside crops.

965. **Maixner, M.** 1993. Leafhoppers (Homoptera: Auchenorrhyncha) in German vineyards - Search for possible vectors of German grapevine yellows, B. Dubos (ed.), Proceedings of the IOBC working group "Integrated control in viticulture". INRA, Bordeaux, France.
Keywords :grapevine; Vergilbungskrankheit; phytoplasma disease; leafhopper; vector; survey; Germany;

966. **Maixner, M.** 1993. Occurrence of Grapevine yellows in Germany. Phytopath. medit. **32**:69-70.
Keywords :grapevine; phytoplasma; phytoplasma disease; Vergilbungskrankheit; occurrence; dodder; transmission; leafhopper; Germany;
Notes : Abstract of a paper presented at a Workshop on Fruit and Grapevine Mycoplasma Diseases, Bologna, Italy, September 1992. The "Vergilbungskrankheit" (VK) is common in the Mosel and Rhine viticultural areas. A MLO was transmitted from grapevine to periwinkle by dodder *(Cuscuta odorata). Scaphoideus titanus*, vector of FD in France, is not present in Germany. It is suggested that other leafhoppers, with low vector efficiency or preference for other hosts act as vectors for VK.

967. **Maixner, M.** 1994. Transmission of German grapevine yellows (Vergilbungskrankheit) by the planthopper *Hyalesthes obsoletus* (Auchenorrhyncha: Cixiidae). Vitis **33**:103-104.
Keywords :grapevine; phytoplasma disease; Vergilbungskrankheit; transmission; leafhopper; *Hyalesthes obsoletus;* Germany;
Notes : Leafhoppers of the species *Hyalesthes obsoletus* were collected in vineyards from grapevine, and from bindweed *(Convolvulus arvensis)* and *Solanum nigrum* showing symptoms of stunting and/or virescence. They were transferred to grape seedlings (4-15 insects) for a feeding period of 14 days. Four out of 10 grapevine seedlings developed symptoms of MLO infection of the Vergilbungskrankheit type. DNA extraction from planthoppers, source plants and inoculated vines and PCR analysis showed that a MLO had been transmitted by *H. obsoletus.*

968. **Maixner, M.** 1994. Übertragung der Vergilbungskrankheit von Weinbergsunkräutern auf Reben durch Zikaden (Transmission of Vergilbungskrankheit from vineyard weeds to grapevine by leafhoppers). Mitt. Biol. Bundesanstalt. f. Land- u. Forstwirtschaft Berlin-Dahlem *(301):*147.
Keywords :grapevine; Vergilbungskrankheit; phytoplasma disease; phytoplasma; detection; PCR; leafhopper; *Hyalesthes obsoletus;* vector; weeds; epidemiology; Germany;
Notes : In German. Abstract of a paper presented at the 49th "Pflanzenschutztagung" held in Heidelberg in September 1994. The phytoplasma associated with the "Vergilbungskrankheit" was detected by PCR in the vector *Hyalesthes obsoletus* and transmitted by this insect to *Vicia faba* and to grapevine seedlings. Other leafhoppers species gave negative results. *H.obsoletus* lives mostly on *Convolvulus arvensis, Urtica dioica* and *Solanum nigrum. Convolvulus arvensis* is probably the main reservoir of infection.

969. **Maixner, M.** 1995. Monitoring of *Hyalesthes obsoletus* (Auchenorrhyncha: Cixiidae) in vineyards and its significance as a vector of "Vergilbungskrankheit" (German Grapevine Yellows) (Abstract), G. Schruft

(ed.), Proceedings of the IOBC working group "Integrated control in viticulture". Staatliches Weinbauinstitut, 79000 Freiburg i.Br., Germany.
Keywords :grapevine; phytoplasma disease; Vergilbungskrankheit; leafhopper; vector; *Hyalesthes obsoletus;* survey; Germany;

970. **Maixner, M.** 1996. Vergilbungskrankheit der Rebe (Grapevine yellows disease). Der Deutsche Weinbau *(8):*14-17.
Keywords :grapevine; phytoplasma disease; Vergilbungskrankheit; symptoms; transmission; control; Germany;
Notes : In German. This paper intended for vinegrowers summs up the situation concerning grapevine yellows diseases in the world, and more precisely in Germany. The symptoms of the "Vegilbungskrankheit", its mode of transmission by the leafhopper *Hyalesthes obsoletus* and the possibilities of control are described.

971. **Maixner, M.** 1996. Zeitliche und räumliche Aspekte des Auftretens vergilbungskranker Reben in befallenen Weinbergen (Temporal and spatial aspects of German grapevine yellows in affected vineyards). Mitt. Biol. Bundesanstalt. f. Land- u. Forstwirtschaft Berlin-Dahlem *(321):*111.
Keywords :grapevine; Vergilbungskrankheit; phytoplasma disease; distribution; epidemiology; Germany;
Notes : The programme PATCHY was used from 1990 to 1995 in 28 vineyards in order to analyze the dissemination of the German yellows disease or "Vergilbungskrankheit". The level of infection varied from 5.4 to 44.2%. In seven cases out of 12, there was an increase of disease occurrence, in two cases no change and in three cases a decrease. The rate of increase varied from 4 to 24% per year. In 23-63% of cases, symptoms were recorded only during one season on the same vine. Latent infections seem likely to occur. Visual inspection therefore cannot guarantee freedom of infection.

972. **Maixner, M.** 1997. Untersuchungen zum Auftreten latenter Infektionen mit Phytoplasmen (Investigations on the occurrence of latent infection by phytoplasmas), p. 89. In Biologische Bundesanstalt für Land- und Forstwirtschaft Berlin und Braunschweig (BBA). Jahresbericht 1996. Bundesministerium für Ernährung, Landwirtschaft und Forsten.
Keywords :grapevine; phytoplasma disease; Vergilbungskrankheit; latency; symptoms; *Hyalesthes obsoletus;* transmission; Germany;
Notes : Transmission experiments with *Hyalesthes obsoletus* showed that grapevines infected with the "Vergilbungskrankheit" develop symptoms in the vegetation period during the year following the inoculation. Recently infected vines may not be recognized as infected in the field and may not be excluded from propagation in nurseries. Observations made in the vineyards confirm the existence of latent infections. It is therefore necessary to make sure that a vine was symptomless during at least two consecutive years before propagating planting material from it.

973. **Maixner, M. and U. Ahrens.** 1993. Studies on grapevine yellows (Vergilbungskrankheit) in Germany -- Detection of MLOs in grapevines and search for possible vectors, p. 101-102. In P. Gugerli (ed.), Extended abstracts 11th Meeting ICVG, Montreux, Switzerland, 6-9 September 1993. Federal Agricultural Research Station of Changins, CH-1260 Nyon, Switzerland.
Keywords :grapevine; phytoplasma disease; Vergilbungskrankheit; phytoplasma; associated; detection; nucleic acid assay; leafhopper; PCR; RFLP; aster yellows; stolbur; Germany; ICVG; meeting;
Notes : Vergilbungskrankheit (VK) is a yellows disease different from flavescence dorée (FD) and present in the Mosel and Middle-Rhine Valley. *Scaphoideus titanus,* the vector of FD, is not present in these areas. 36 other leafhopper species were collected in the vineyards under study. So far no vector of VK is known. Using PCR method for amplification of the MLO 16S RNA gene and RFLP analysis of AluI digestion products, the authors detected MLOs in VK-affected vines. RFLP profiles of these MLOs suggest that they are related to stolbur MLO. This confirms the fact that VK differs from FD, which is related to Elm yellows, Ash yellows and X-disease. Dodder transmission to periwinkle produced symptoms of virescence and phyllody on some of the plants. MLOs were also detected in these periwinkles, but this isolate differed from the grapevine isolates by the size of one restriction fragment. Its restriction pattern is similar to that of aster

yellows. It is not yet clear whether it is a double infection. Some of the leafhoppers collected in the vineyard are known to be vectors of stolbur.

974. **Maixner, M., U. Ahrens, and E. Seemüller.** 1994. Detection of mycoplasmalike organisms associated with a yellows disease of grapevine in Germany. J. Phytopathol. **142**:1-10.
Keywords :grapevine; phytoplasma disease; Vergilbungskrankheit; flavescence dorée; detection; PCR; nucleic acid assay; dodder; RFLP; sequence analysis; aster yellows; stolbur; phytoplasma; Germany;
Notes :A yellows disease of grapevine that is frequent in some German vineyards, called 'Vergilbungskrankheit' (VK), causes considerable yield loss and decline of infected vines. Mycoplasmalike organisms (now called phytoplasmas) were transmitted from a vine with VK symptoms to periwinkle by means of *Cuscuta odorata*. Phytoplasmas were detected in tissue of symptomatic grapevines by a polymerase chain reaction that amplified a sequence of the 16S rRNA gene. Digestion of the amplification products by AluI restriction endonuclease revealed a restriction fragment length polymorphism (RFLP) relationship between DNA samples obtained from grapevine and periwinkle. On the basis of RFLP the phytoplasmas detected in symptomatic grapevine appear to be similar to the organism causing stolbur in solanaceous plants while the organism transmitted to periwinkle is similar to aster yellows.

975. **Maixner, M., U. Ahrens, and E. Seemüller.** 1995. Detection of the German grapevine yellows (Vergilbungskrankheit) MLO in grapevine, alternative hosts and a vector by a specific PCR procedure. Eur. J. Plant Pathology **101**:241-250.
Keywords :grapevine; Vergilbungskrankheit; phytoplasma disease; phytoplasma; detection; nucleic acid assay; leafhopper; vector; *Hyalesthes obsoletus;* PCR; aster yellows; stolbur; DNA probe; gene; sequence analysis; classification; Germany;
Notes :A polymerase chain reaction (PCR) method was developed for amplifying a ribosomal sequence from the mycoplasma-like organism (phytoplasma) associated with the "Vergilbungskrankheit" (VK), a yellows disease of grapevine common in Germany. The same procedure also amplified ribosomal sequences from phytoplasmas of stolbur-related diseases of solanaceous plants. Amplification was also realized with DNA from naturally infected weeds present in vineyards with VK, such as *Convolvulus arvensis* or *Solanum nigrum*, and from the planthopper *Hyalesthes obsoletus* collected in vineyards affected with VK. Feeding *H.obsoletus* collected in these vineyards on healthy grape seedlings resulted in infection of these seedlings with VK. *H.obsoletus* is therefore considered as a vector of VK.

976. **Maixner, M., X. Daire, E. Boudon-Padieu, A. Laviña, A. Batlle, and W. Reinert.** 1997. Phytoplasmas, p. 183-195. In B. Walter (ed.), Sanitary selection of the grapevine. Protocols for detection of viruses and virus-like diseases (Les Colloques no 86). INRA Editions, Paris.
Keywords :grapevine; phytoplasma; phytoplasma disease; review; detection; identification; relationship; transmission; vector; Germany; France; Spain;
Notes :A description is given of the phytoplasma diseases of grapevine recorded so far and of the state of knowledge on the disease agents, their relationships with phytoplasmas affecting other plants, their vectors, the methods of detection and identification. The ELISA technique was the first detection method available at the end of the eighties. More recently the use of nucleic acid assays opened a new era in the study of phytoplasma diseases. The different methods available are described and discussed. A first table sums up the results of detection and identification of grapevine yellows phytoplasmas by PCR-RFLP of 16S rDNA in different countries, and a second one compares the detection methods available for grapevine yellows-associated phytoplasmas.

977. **Maixner, M. and R. Pearson.** 1990. Untersuchungen zur Bedeutug der Zikade *Scaphoideus titanus* as vektor der Grapevine Yellows Disease in östlichen Nordamerika (Research on the role of the leafhopper *Scaphoideus titanus* as vector of grapevine yellows disease in eastern North America). Mitt. Biol. Bundesanstalt. f. Land- u. Forstwirtschaft Berlin-Dahlem *(266):*236.
Keywords :grapevine; phytoplasma disease; flavescence dorée; relationship; transmission; broadbean; immunoassay; ELISA; leafhopper; *Scaphoideus titanus;* USA;
Notes : In German. Grapevine yellows disease (GYD) symptoms were recorded in the eighties on European grapevine varieties in eastern USA. So far the vector is unknown. *Scaphoideus titanus* is very

common in this region, especially on *Vitis riparia*. Batches of *S.titanus* collected on *V.riparia* and *V.vinifera* were fed on *Vicia faba* plants. About a third of the inoculated plants developed symptoms of MLO disease. In ELISA tests, the extracts of infected *S.titanus* and *V.faba* appear to be serologically related with flavescence dorée of France.

978. **Maixner, M. and R.C. Pearson.** 1990. *Scaphoideus titanus* Ball,a possible vector of Grapevine Yellows Disease in New York. Phytopathology **80**:1013.
Keywords :grapevine; phytoplasma disease; vector; leafhopper; *Scaphoideus titanus;* phytoplasma; immunoassay; ELISA; ISEM; USA;
Notes :*Scaphoideus titanus* collected in NewYork vineyards affected with yellows disease, and on adjecent symptomless *Vitis riparia* were put for feeding on *Vicia faba* in greenhouse. 29 % of host plants *V. faba* developed symptoms of MLO disease within 3-4 weeks. No symptoms appeared on potted grapevines fed with these leafhoppers. Positive reactions were recorded in ELISA and ISEM with antisera from Mrs Boudon-Padieu.

979. **Maixner, M. and R.C. Pearson.** 1991. Studies on *Scaphoideus titanus* Ball, a possible vector of grapevine yellows in New York, p. 193-201. In I. C. Rumbos, R. Bovey, D. Gonsalves, W. B. Hewitt, and G. P. Martelli (ed.), Proceedings of the 10th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG). Plant Protection Institute, P.O. Box 303, 38001 Volos, Greece.
Keywords :grapevine; phytoplasma disease; flavescence dorée; *Scaphoideus titanus;* leafhopper; vector; transmission; USA; New York; meeting; ICVG;
Notes :*Scaphoideus titanus*, known as the vector of flavescence dorée (FD) in France, was found on wild and cultivated grapes in New York, quite often on *Vitis riparia* which was the most common wild host. From there, the adults migrated to adjacent vineyards. *Vitis riparia* never showed symptoms of FD in the field, but can be a latent carrier of the agent of this disease. The possibility that *S. titanus* is a vector for FD in New York is discussed.

980. **Maixner, M., R.C. Pearson, E. Boudon-Padieu, and A. Caudwell.** 1993. *Scaphoideus titanus*, a possible vector of grapevine yellows in New York. Plant Disease **77**:408-413.
Keywords :grapevine; phytoplasma; phytoplasma disease; flavescence dorée; *Scaphoideus titanus;* leafhopper; vector; transmission; broadbean; New York; USA;
Notes :*Scaphoideus titanus* is common in New York State, especially on *Vitis riparia*, but also on *V.vinifera* cultivars. Adult leafhoppers migrate from wild grapevines to the peripheral part of vineyards, where they transmit the disease. Infected wild *V. riparia* are apparently symptomless carriers. *S.titanus* leafhoppers collected in vineyards and fed on *Vicia faba* infected 29% of these plants with yellows MLO (phytoplasmas). Potted Chardonnay put under screen with similar batches of *S.titanus* collected in the field did not show symptoms after one year. 13% of 371 *S.titanus* collected on *V.riparia* or *V.vinifera* reacted positively in ELISA with polyclonal antibodies against FD, or in immunosorbent EM with the same antibodies. These results support the hypothesis that FD and its vector *S.titanus* have a common North American origin.

981. **Maixner, M. and W. Reinert.** 1997. Heisswasserbehandlung von Rebholz zur Eliminierung der Vergilbungskrankheit (Elimination of grapevine yellows from dormant grapevine cuttings by hot water treatment), p. 88. In Biologische Bundesanstalt für Land- und Forstwirtschaft Berlin und Braunschweig (BBA). Jahresbericht 1996. Bundesministerium für Ernährung, Landwirtschaft und Forsten,
Keywords :grapevine; phytoplasma disease; control; hot water treatment; Vergilbungskrankheit; Germany;
Notes : The authors applied the hot water treatment, developed in France in order to eliminate the phytoplasmas of flavescence dorée (FD) from dormant wood, to the distinct phytoplasma disease "Vergilbungskrankheit".The first results show that a treatment of 50^{o} C for 60 minutes provides a good control and a very small loss in growth of the cuttings.

982. **Maixner, M. and W. Reinert.** 1997. Verbreitung verschiedener Typen der Vergilbungskrankheit der Rebe im deutschen Weinbau (Occurrence of different types of grapevine yellows in Germany), p. 87. In

Biologische Bundesanstalt für Land- und Forstwirtschaft Berlin und Braunschweig (BBA). Jahresbericht 1996. Bundesministerium für Ernährung, Landwirtschaft und Forsten.
Keywords :grapevine; phytoplasma disease; Vergilbungskrankheit; flavescence dorée; detection; PCR; Germany;
Notes : Beside the "Vergilbungskrankheit" (VK), first described in 1965 by Gärtel (Weinberg und Keller 12, 347-376) and which is similar to the Bois noir described in France, a second type of yellows or phytoplasma disease of grapevine occurs in the Palatinate. It was first discovered in 1994 and was shown to be more closely related to the flavescence dorée (FD) that occurs in southern France than to the "Vergilbungskrankheit". It was named provisionally FD type Palatinate. Its occurrence is so far less important than that of VK.

983. **Maixner, M. and W. Reinert.** 1997. Spatio-temporal analysis of the distribution of grapevine yellows in Germany, p. 75-76. In O. A. Sequeira,de, J. C. Sequeira, and M. T. Santos (ed.), Extended abstracts 12th Meeting ICVG, Lisbon, Portugal, 29 September-2 October 1997. Dept.Plant Pathology, Estação Agronomica Nacional, Oeiras, Portugal.
Keywords :grapevine; phytoplasma disease; Vergilbungskrankheit; *Hyalesthes obsoletus;* vector; spread; Germany; meeting; ICVG;
Notes : The spatial distribution of yellows-diseased vines (Vergilungkrankheit, VK) and its evolution in time was studied in 28 vineyards of the Moselle region (Germany). The programme PATCHY was used (see ref. 964 and 971). The proportion of VK-infected vines increased from 18% in 1990 to 26% in 1995. The disease incidence per vineyard varied from 5% to 65%. It increased during the period considered in 7 out of 12 vineyards investigated and decreased in 3 vineyards. The increase was especially important and damaging in young vineyards, where the infection often caused the death of young vines which had to be replaced. Almost one third of infected vines recovered and remained symptom-free for at least two years.

984. **Maixner, M., M. Rüdel, X. Daire, and E. Boudon-Padieu.** 1995. Diversity of grapevine yellows in Germany. Vitis **34**:235-236.
Keywords :grapevine; phytoplasma; phytoplasma disease; Vergilbungskrankheit; flavescence dorée; stolbur; symptoms; occurrence; nucleic acid assay; immunoassay; detection; diagnosis; PCR; ELISA; Germany;
Notes : So far, "Vergilbungskrankheit" (VK) a yellows disease that is widespread in Germany was the only type of yellows detected in this country. A recent study made with material from the Palatinate viticultural area and from one location in Rheinhessen showed that at least two types of yellows were present. They could be discerned already by careful observation in vineyards. Type I was typical for VK with symptoms expressed only on some shoots, the others appearing healthy. Symptomatic shoots did not lignify, and leaves showed discoloration patterns, sometimes necroses. Type II was mainly observed on cv. Scheurebe, with systemic expression of symptoms and severe rolling of uniformly discolored leaves. PCR amplification of DNA with primers U3/U5 ("Universal" phytoplasma detection primers) gave a positive reaction with all samples from symptomatic vines. VK was detected with primers fStol/rStol in 11 vines assigned to type I and one vine of cv. Kerner with type II symptoms. FD9 specific primer for flavescence dorée gave positive results with 10 of 11 vines with type II symptoms and one vine of type I. Results concerning FD were confirmed by ELISA with FD specific antibodies. The results confirm that a second type of yellows is present in German vineyards, and that it is similar or very close to flavescence dorée. As *Scaphoideus titanus* is not present in these areas, the question of another vector is raised.

985. **Maixner, M., A. Weber, and A. Seitz.** 1997. Die Biologie des Vektors *Hyalesthes obsoletus* und ihr Einfluss auf die Epidemiologie der Vergilbungskrankheit der Rebe (Biology of the vector *Hyalesthes obsoletus*, and its influence on the epidemiology of the Vergilbungskrankheit), p. 88-89. In Biologische Bundesanstalt für Land- und Forstwirtschaft Berlin und Braunschweig (BBA). Bundesministerium für Ernährung, Landwirtschaft und Forsten.
Keywords :grapevine; phytoplasma disease; transmission; Vergilbungskrankheit; *Hyalesthes obsoletus;* leafhopper; vector; biology; host range; epidemiology; Germany;
Notes : In German. The "Vergilbungskrankheit" of grapevine is increasingly widespread in Germany, especially in the Mosel and Middle Rhine regions. It is transmitted by the Cixiid leafhopper *Hyalesthes*

obsoletus. This leafhopper has one generation per year in Germany. All development stages occur on roots of weed hosts. Adult leafhoppers leave the soil and live from mid-June until beginning of August mostly on the weed foliage. The species prefers warm and dry microclimates on steep slopes oriented south, for instance vineyards. The soil structure is important. Compact soils are not favourable. The most important weed hosts are *Convolvulus arvensis, Urtica dioica, Aretmisia vulgaris, Senecio erucifolius* and *Ranunculus bulbosus*. Grapevine is only an occasional host. The most important reservoir of infection in vineyards is *Convolvulus arvensis*. Up to 30% of *H.obsoletus* collected in vineyards where this weed was predominant were infectious. Adults *H.obsoletus* were found up to 2.5 m above soil level on the grapevine foliage in cases of heavy infestation. Elimination of host plants and mechanical soil working seems to lower the rate of development of *H.obsoletus.*

986. **Malan, A.P. and A.J. Meyer.** 1992. Transmission of grapevine fan leaf virus by a South African population of *Xiphinema index.* Phytophylactica **24**:217-219.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; transmission; immunoassay; ELISA; detection; nematode; *Xiphinema index;* Longidoridae; vector; South Africa;
Notes : Transmission on *V. rupestris* St.George, detection of virus in grapevine by ELISA.

987. **Malan, A.P. and A. J. Meyer.** 1993. Interaction between a South African population of *Xiphinema index* and different grapevine rootstocks. South Afr. J. Enol. Vitic. **14**:11-15.
Keywords :grapevine; nepovirus; fanleaf; grapevine fanleaf virus; transmission; nematode; *Xiphinema index;* Longidoridae; resistance; South Africa;
Notes :31 grapevine rootstocks were used to test reproduction, root feeding, symptoms on roots, and transmission of GFLV by a South African population of *Xiphinema index.* GFLV was transmitted to the roots within 4 months, and spread systemically within 6 months to the leaves of all rootstocks tested. No root damage was observed and there was a low reproduction rate of *X. index* in the rootstocks Harmony, Freedom and 1613 C. None of these rootstocks was immune to GFLV transmission. A high reproduction rate was recorded in Grézot 1 and SO4.

988. **Malan, A.P. and A. J. Meyer.** 1994. Distribution of Longidoridae in the viticultural regions of the Cape Province. South Afr. J. Enol. Vitic. **15**:12-16.
Keywords :grapevine; nematode; Longidoridae; *Xiphinema; Xiphinema index; Xiphinema italiae; Xiphinema americanum;* vector; nepovirus; grapevine fanleaf virus; economic importance; South Africa;
Notes :*Xiphinema index* is present in the Cape coastal region, where most nurseries participating in grape improvement and selection are located. *X.italiae* was also recorded, but its capacity of vectoring grapevine fanleaf virus is doubtful and discussed. *X.americanum* is a vector of several nepoviruses, but it is now considered as a complex species which has been splitted by taxonomists into several distinct species or subspecies.

989. **Malgarini, E.** 1992. Culture *in vitro* de la vigne; mise au point de techniques nouvelles de régénération. Culture de protoplastes de vigne et contribution à la mise au point d'un protocole d'infection de protoplastes par les ARN du Grapevine Fanleaf Virus, agent du court-noué de la vigne (*In vitro* culture of grapevine. Development of new techniques of regeneration. Culture of grapevine protoplasts and contribution to the development of a method for infecting protoplasts by RNAs of grapevine fanleaf virus, agent of grapevine court-noué). University Louis Pasteur, Strasbourg, France.
Keywords :grapevine; nepovirus; *in vitro;* grapevine fanleaf virus; infection; somatic embryogenesis; protoplast; RNA; thesis; France;
Notes : PhD thesis, University Louis Pasteur, Strasbourg, France. In French.

990. **Maningas, M., D.A. Golino, B. Kirkpatrick, A. Rowhani, and D. Gonsalves.** 1993. The development of nucleic acid-based probe for the rapid detection of grapevine corky bark disease (CB). Amer. J. Enol. Vitic. **44**:351.
Keywords :grapevine; corky bark; rugose wood; detection; immunoassay; ELISA; nucleic acid assay; cDNA probe; dot blot hybridization; California; USA;

Notes : Abstract. Serological detection of corky bark (CB) using polyclonal antisera has shown a variation in the specificity of the CB antisera to different CB isolates. In order to overcome this difficulty, molecular cloning techniques were used at the Department of Plant Pathology of the University of California, Davis. Using cDNA clones that hybridized to dsRNA from CB-infected tissue, but not to dsRNA from healthy tissue, serologically diverse CB isolates could be identified by dot blot hybridization. This detection method could be useful for improving control of corky bark.

991. **Maningas, M.A., D.A. Golino, D. Kirkpatrick, A. Rowhani, and D. Gonsalves.** 1993. The development of a nucleic acid-based probe for the rapid detection of grapevine corky bark disease, p. 154-155. In P. Gugerli (ed.), Extended abstracts 11th Meeting ICVG, Montreux, Switzerland, 6-9 September 1993. Federal Agricultural Research Station of Changins, CH-1260 Nyon, Switzerland.
Keywords :grapevine; rugose wood; corky bark; detection; nucleic acid assay; cDNA; ELISA; mealybug; vector; *Pseudococcus longispinus;* USA; California; meeting; ICVG;
Notes :A cDNA probe was developed using dsRNA extracted from corky bark- infected tissue as a template for reverse transcriptase. Corky bark agent was successfully transmitted by *Pseudococcus longispinus* from corky-bark infected grapevines to healthy LN33 vines. The transmission was corroborated by ELISA using CB antiserum. The hypothesis that different CB isolates may be serologically distinct is put forward.

992. **Mannini, F.** 1994. Nuovi orientamenti nella selezione clonale e sanitaria (New trends in clonal and sanitary selection). Vignevini **21***(12):*71-76.
Keywords :grapevine; virus elimination; clonal selection; sanitary selection; performance; grapevine fanleaf virus; nepovirus; GLRaV-1; GLRaV-3; closterovirus; heat therapy; Italy;
Notes : Is it necessary to obtain a clonal material for grapevine propagation that is perfectly healthy ? Or is it possible to recommend a material that is improved by sanitary selection, but not necessarily optimum ? The answer, according to the author, should come from a serene discussion between grape selectors.

993. **Mannini, F.** 1995. Grapevine clonal selection in Piedmont (Northwest Italy): Focus on Nebbiolo and Barbera, p. 20-32. In J. M. Rantz (ed.), Proceedings of the International Symposium on Clonal Selection, Portland, Oregon, USA, June 1995. The American Society for Enology and Viticulture, Portland, Oregon, USA.
Keywords :grapevine; clonal selection; sanitary selection; performance; Italy;
Notes : Virological aspects and genetic caracteristics of selected clones are discussed. The necessity of adapting cultural methods to the increased vigour of virus-free material in order to maintain a reasonable level of productivity compatible with quality of the wine is stressed. In tasting experiments, the wine made with the mixture of 3 clones of the same cv. gave a better ranking than each of the clones taken separately.

994. **Mannini, F., N. Argamante, and R. Credi.** 1995. Virus sanitation to optimize grape quality of 'Nebbiolo' clones, p. --. In C. Giulivo (ed.), International Workshop "Strategies to optimize wine grape quality", July 1995, Conegliano, Veneto, Italy (Program & Abstracts). Istituto Coltivazioni Arboree, University of Padova, I-35131 Padova, Italia.
Keywords :grapevine; sanitary selection; virus elimination; heat therapy; performance; comparison; GLRaV-1; GLRaV-3; leafroll; closterovirus; GVA; vitivirus; Italy;
Notes : Eliminating GVA, GLRaV-1 and -3 by heat therapy resulted in an important increase in vigour, but yield was not much affected. The ^{o}Brix of must increased by about 1.2% and 2.2 % in clones A and B in comparison with the same, non heat treated clones, whereas the total flavonoid content of the must increased by 9.4% and 31.2% respectively. The leaf physiological activity was improved, and the quality of Nebbiolo grapes was also improved by heat therapy. Vineyard management, however, must be adapted to the increased vigour (The document, which is an abstract distributed with the programme of the International Workshop on Strategies to optimize Winegrape Quality, held at Conegliano July 9-12 1995, has two pages, not numbered. This paper was published extensively in Acta Horticulturae (427), 319-324, 1996, see next reference).

995. **Mannini, F., N. Argamante, and R. Credi.** 1996. Improvements in the quality of grapevine "Nebbiolo" clones obtained by sanitation. Acta Horticulturae *(427):*319-324.
Keywords :grapevine; leafroll; GLRaV-1; GLRaV-3; closterovirus; GVA; vitivirus; performance; comparison; virus-free material; yield; quality; Italy;
Notes : The influence of grapevine leafroll-associated viruses 1 and 3 (GLRaV-1 and 3) and GVA on performance of Nebbiolo clones was studied over a 4-year period, by comparing virus-infected clones and the same clones after virus elimination by heat therapy. Virus elimination resulted in a considerable incrase in vigour, but yield increase was not so evident, depending on clones. Soluble solids and berry skin phenolic compounds of the grapes were higher in healthy clones. Veraison occurred earlier than on infected controls, and on the whole the quality of grapes and wine was definitely better. The growers should be aware that increased vigour makes an adaptation of vineyard management necessary in some cases (row spacing, winter and summer pruning, etc.). This paper was presented at the International Workshop on Strategies to optimize wine grape quality, July 9-12, 1995, Conegliano, Italy. The Proceedings were edited by S.Poni, E.Peterlunger, I.Iacono, C.J. Intrieri.

996. **Mannini, F., R. Credi, and N. Argamante.** 1993. Effect of heat therapy on agronomical and enological aptitudes of grapevine clones, p. 68-69. In P. Gugerli (ed.), Extended abstracts 11th Meeting ICVG, Montreux, Switzerland, 6-9 September 1993. Federal Agricultural Research Station of Changins, CH-1260 Nyon, Switzerland.
Keywords :grapevine; virus elimination; heat therapy; nepovirus; grapevine fanleaf virus; closterovirus; leafroll; GLRaV-1; GLRaV-3; performance; yield; quality; economic importance; Italy; meeting; ICVG;
Notes : Heat treated clones of Dolcetto, Nebbiolo and Nebbiolo Michet, indexed and tested by ELISA for freedom of fanleaf and leafroll were compared with the original material that had been infected with fanleaf- and/or leafroll in a randomized block design experiment. Elimination of fanleaf virus greatly increased yield and vigour in Nebbiolo Michet, whereas sugar content of must was not significantly affected. Leafroll elimination had less effect on yield and vigour.

997. **Mannini, F., R. Credi, and N. Argamante.** 1994. Changes in field performances of clones of the grapevine cv Nebbiolo after virus elimination by heat therapy, p. 117-122. In VIth International Symposium on Grape Breeding, Yalta, Crimea, Ukraine, 4-10 September 1994. Office International de la Vigne et du Vin (OIV), Paris, France.
Keywords :grapevine; virus elimination; performance; morphology; quality; fanleaf; grapevine fanleaf virus; nepovirus; grapevine fleck virus; leafroll; GLRaV-1; GLRaV-3; closterovirus; heat therapy; clonal selection; Italy; meeting;
Notes : Book chapter. Symposium Grape Breeding, Yalta, Ukraine, 1994. Oral presentations. The elimination of GVA and GLRaVs by heat therapy had little influence on yield parameters in the case of Nebbiolo, except for phenolic compounds, which were more abundant in treated clones. Elimination of GFLV (and GFkV) as in the case of Nebbiolo Michet resulted in a dramatic increase in yield (about 30% more) and vigour. Despite the increased yield, the soluble solids of must (^{o}Brix) were not significantly different, whereas the titrable acidity was increased in heat treated clones and the pH slightly lowered.

998. **Mannini, F., R. Credi, V. Gerbi, N. Argamante, and G. Zeppa.** 1994. Il punto della selezione clonale in Piemonte: risultati e prospettive future (Clonal selection in Piedmont: results and perspectives). Quad. Vitic. Enol. Univ. Torino **18**:29-53.
Keywords :grapevine; clonal selection; sanitary selection; Italy;
Notes : Report on the results of twenty years of genetic and sanitary clonal selection in Piedmont. The current methodology of selection is critically discussed and some suggestions are made in order to reduce the time needed for selecting valuable clones.

999. **Mannini, F., R. Credi, V. Gerbi, A. Lisa, J.L. Minati, and N. Argamante.** 1994. Ruolo di infezioni virali sul comportamento in campo e sulle attitudini enologiche di cloni delle cultivar 'Ruché' e 'Dolcetto' (Role of viral infections on the field performance and on enological properties of clones of cvs. Ruché and Dolcetto). Quad. Vitic. Enol. Univ. Torino **18**:55-71.

Keywords :grapevine; virus elimination; virus-free material; performance; comparison; fanleaf; leafroll; rupestris stem pitting; rugose wood; grapevine fanleaf virus; nepovirus; GLRaV-1; GLRaV-3; closterovirus; GVA; vitivirus; heat therapy; Italy;
Notes : Agronomical and enological performances of clones of two grape cultivars grown in Piedmont (Italy) were compared in relation to their virological state. A clone of the cv. 'Ruché' infected with grapevine fanleaf virus (GFLV) and two virus-tested clones free of GFLV, GLRaV I, GLRaV III and GVA were planted in 1983, with 24 vines for each clone. Observations made from 1988 to 1992 showed that GFLV infection caused a severe vigour and yield reduction, as compared with the two healthy clones, but increased sugar content by 1-1.6^{o}Brix and improved the quality of wine. The authors are conscious, however, that the price of this better wine quality is too high. In a second experiment, three clones of the cv. 'Dulcetto', all free of GFLV but showing symptoms of leafroll, rupestris stem pitting or rupestris stem pitting and vein mosaic when indexed with *Vitis* indicators were heat treated and freed of these viruses. Performances of vines made with heat treated and original untreated material grafted onto certified rootstocks were observed in a field trial as above. Results show that the elimination of these viruses had so far little significant effect on field vine behaviour and on wine composition.

1000. **Mannini, F., S. Guidoni, A. Ferrandino, N. Argamante, and R. Credi.** 1997. Photosynthesis and grape composition of a *Vitis vinifera* clone after virus sanitation, p. 155-156. In O. A. Sequeira,de, J. C. Sequeira, and M. T. Santos (ed.), Extended abstracts 12th Meeting ICVG, Lisbon, Portugal, 29 September-2 October 1997. Dept.Plant Pathology, Estação Agronomica Nacional, Oeiras, Portugal.
Keywords :grapevine; leafroll; closterovirus; GLRaV-3; virus elimination; performance; comparison; Italy; meeting; ICVG;
Notes : The influence of GLRaV-3 and GVA on leaf and berry phenolic composition and on some performance parameters of cv. Nebbiolo was studied in a vineyard of northeastern Italy established in 1988, by comparing data concerning healthy (heat treated clones) and infected vines. The virological status of all the vines was checked repeatedly by ELISA. The association of GLRaV-3 and GVA had no influence on the yield but reduced vegetative vigour, juice soluble compounds (^{o}Brix) and acidity. Photosynthesis measurements showed a reduction of leaf photosynthesis already before the appearance of leaf reddening. This reduction was much greater when leafroll symptoms appeared. The anthocyanin content of leaf blades was higher in infected vines than in healthy ones already before the onset of symptoms, and the difference increased with the development of leaf rolling and reddening. The anthocyanin level was lower in leafroll-affected berries than in healthy ones. After heat treatment clones were recovered that had a more efficient canopy and were able to produce grapes of better maturity and quality than the original vines.

1001. **Marc-Martin, S., M.E. Ramel, P. Gugerli, S. Krastanova, and A. Spielmann.** 1995. Resistance to nepoviruses in grapevine: expression of several putative resistance genes in transgenic plants. Experientia **51**:A12 (Abstract).
Keywords :grapevine; grapevine fanleaf virus; arabis mosaic virus; raspberry ringspot virus; nepovirus; transgenic; cross-protection; gene; coat protein; replicase; Switzerland;
Notes : Abstract SO4-11, 27th Annual Meeting of the Swiss Society for Experimental Biology.

1002. **Marcone, C., A. Ragozzino, R. Credi, and E. Seemüller.** 1996. Detection and characterization of phytoplasmas infecting grapevine in southern Italy and their genetic relatedness to other grapevine yellows phytoplasmas. Phytopath. medit. **35**:207-213.
Keywords :grapevine; phytoplasma disease; identification; detection; diagnosis; PCR; RFLP; Vergilbungskrankheit; stolbur; aster yellows; classification; Italy;
Notes : Diseased grapevines showing symptoms of yellows in Campania (southern Italy) were examined for phytoplasma infection using PCR technique. All affected vines tested positively. The detected phytoplasmas were all identified as belonging to the stolbur group. RFLP analysis showed that the phytoplasmas infecting grapevine in Campania were genetically uniform and similar to the agents of the "Vergilbungskrankheit" described in Germany. Also several other phytoplasmas, which were transmitted from grapevines of the Emilia Romagna region to periwinkle by dodder and were previously classified as members of the aster yellows group were identified as stolbur phytoplasmas.

1003. **Marcone, C., A. Ragozzino, and E. Seemüller.** 1997. Identification and characterization of the phytoplasma associated with elm yellows in southern Italy and its relatedness to other phytoplasmas of the elm yellows group. Eur. J. Forest Pathol. **27**:45-54.
Keywords :grapevine; phytoplasma; phytoplasma disease; elm yellows; relationship; flavescence dorée; Italy;
Notes : In southern Italy (regions of Basilicata, Campania and Calabria) many diseased trees of the European field elm (*Ulmus minor*) were examined for phytoplasmal infection with PCR technology. All affected trees examined gave positive reactions. Using a primer pair specific for the elm yellows phytoplasma group and restriction fragment length polymorphism (RFLP) analysis of PCR-amplified ribosomal DNA, the organism detected was identified as the elm yellows (EY) phytoplasma. RFLP analysis of PCR-amplified ribosomal DNA was also employed in an attempt to establish a differentiation within the EY group. Three different restriction profiles were detected among the EY-group phytoplasmas. They represented, respectively, (1) the EY phytoplasma (2) the phytoplasmas causing rubus stunt and associated with alder yellows, spartium witches' broom, and eucalyptus little leaf, and (3) the flavescence doree phytoplasma.

1004. **Marcone, C., G. Scaglione, M. Nicotina, N. De Florio, and A. Ragozzino.** 1997. Presenza d'infezioni fitoplasmatiche della vite e relativi possibili vettori in Campania (Presence of phytoplasma infections of grapevines and possible vectors in Campania). Inform. Fitopatol. **47***(10)*:49-52.
Keywords :grapevine; phytoplasma; phytoplasma disease; stolbur; occurrence; Italy;
Notes : In Italian, Eng.sum. Symptoms of a yellows disease of grapevine occurring in Campania are described. PCR and RFLP analysis showed that all symptomatic grapevines were infected with phytoplasmas belonging to the stolbur group and similar to the agents of the "Verglibungskrankheit" described in Germany. So far no vector has been identified. Two leafhoppers were found in some vineyards: *Macrosteles* sp. and *Neoaliturus fenestratus*. The latter is a vector of stolbur.

1005. **Margis, R., F. Hans, and L. Pinck.** 1993. VPg Northern-immunoblots as a means for detection of viral RNAs in protoplasts or plants infected with grapevine fanleaf nepovirus (Brief report). Arch. Virol. **131**:225-232.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; detection; nucleic acid; RNA; immuno-blot; northern blot; method; France;
Notes : Antibodies specific to the genome-linked viral protein (anti-VPg) were produced from a synthetic peptide corresponding to the total VPg sequence of grapevine fanleaf virus (GFLV) strain F13. These antibodies made it possible to detect viral VPg and RNAs in total RNA extracts of protoplasts of plant tissues during virus synthesis, using Northern blot. RNAs from two GFLV strains were recognized, but RNA from ArMV was not recognized.

1006. **Margis, R. and L. Pinck.** 1992. Effects of site-directed mutagenesis on the presumed catalytic triad and substrate-binding pocket of grapevine fanleaf nepovirus 24-kDa proteinase. Virology **190**:884-888.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; protein; sequence analysis; France;
Notes : The GFLV 24-kDa proteinase presents sequence similarities with other nepovirus and comovirus proteinases.

1007. **Margis, R., C. Ritzenthaler, J. Reinbolt, M. Pinck, and L. Pinck.** 1993. Genome organization of grapevine fanleaf nepovirus RNA2 deduced from the 122K polyprotein P2 *in vitro* cleavage products. J. Gen. Virol. **74**:1919-1926.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; genome; RNA; organization; coat protein; France;
Notes : The polyprotein P2 encoded by RNA2 of GFLV strain F13 is sequentially processed *in vitro* by the viral proteinase to yield an N-teminal 28K protein, a 38K protein and the C-terminal 56 K CP (coat protein) as the final cleavage products. A 66K protein is also produced as intermediate product, but it is processed by the viral proteinase to yield 28K and 38K proteins.

1008. **Margis, R., M. Viry, M. Pinck, N. Bardonnet, and L. Pinck.** 1994. Differential proteolytic activities of precursor and mature forms of the 24K proteinase of grapevine fanleaf nepovirus. Virology **200**:79-86.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; protein; synthesis; France;
Notes : The two RNAs of GFLV, RNA1 and RNA2 (single stranded positive sense RNAs), code for proteins that are sequentially processed by a chymotrypsin-like cysteine proteinase coded by RNA1. RNA1 codes for polyprotein P1 of 253 K, RNA2 for polyprotein P2 of 122 K, producing structural and non structural proteins.

1009. **Margis, R., M. Viry, M. Pinck, and L. Pinck.** 1991. Cloning and *in vitro* characterization of the grapevine fanleaf virus proteinase cistron. Virology **185**:779-787.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; cloning; sequence analysis; genome; France;

1010. **Marinesku, V.G., Y.A. Kalashyan, and T.D. Verderevskaya.** 1991. Grapevine yellows in Moladvian SSR, p. 218. In I. C. Rumbos, R. Bovey, D. Gonsalves, W. B. Hewitt, and G. P. Martelli (ed.), Proceedings of the 10th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG). Plant Protection Institute, P.O. Box 303, 38001 Volos, Greece.
Keywords :grapevine; phytoplasma disease; symptoms; occurrence; Moldavia; meeting; ICVG;
Notes : Abstract. Grapevine yellows was found in 1984 on one Chardonnay vine in Moldavia. In 1989, 110 vines showed symptoms. The distribution of the disease suggests the presence of a vector, although *Scaphoideus titanus* is not present. Description of symptoms.

1011. **Martelli, G.P.** 1986. Virus and virus-like diseases of the grapevine in the Mediterranean area. FAO Pl. Prot. Bull. **34**:25-42.
Keywords :grapevine; virus diseases; virus-like diseases; general; review; fanleaf; leafroll; rugose wood; stem pitting; corky bark; enation; fleck; vein necrosis; nepovirus; Mediterranean area; symptoms; detection; control; Italy;
Notes : Good review of the main virus and virus-like diseases of grapevine in the area, symptoms (8 colour plates), transmission, detection methods, control.

1012. **Martelli, G.P.** 1986. Aspetti sanitari relativi all' utilizzazione dei portinnesti della vite in Italia: stato attuale, problemi e prospettive (Sanitari aspects resulting from the use of rootstocks in Italy: present state, problems and prospects). Riv. Vitic. Enol. **39**:253-263.
Keywords :grapevine; virus elimination; rootstock; health; resistance; nepovirus; control; grapevine fanleaf virus; heat therapy; *in vitro*; meristem tip culture; *Xiphinema index;* vector; Longidoridae; nematode; fanleaf; review; Italy;
Notes : In Italian, Eng., Fr. sum.

1013. **Martelli, G.P.** 1986. Grapevine diseases induced by phloem- or xylem-limited prokaryotes in Europe, with special reference to Italy, p. 35-43. In R. A. Cappelini and J. M. Wells (ed.), Fastidious Plant Prokaryotes: Cultivation, Detection, and Associated Economic Problems. Rutgers University Press, New Brunswick, NJ, USA.
Keywords :grapevine; Pierce's disease; phytoplasma disease; flavescence dorée; symptoms; detection; control; Italy;
Notes : Book chapter.

1014. **Martelli, G.P.** 1989. Infectious diseases of grapevines: nature, detection, sanitation and situation in the Arab countries. Arab J. Plant Protect. **7**:210-219.
Keywords :grapevine; diseases; virus diseases; virus-like diseases; review; detection; control; Italy;

1015. **Martelli, G.P.** 1991. Novel viruses and virus diseases of the grapevines, new data on known viruses, p. 89-103. In I. C. Rumbos, R. Bovey, D. Gonsalves, W. B. Hewitt, and G. P. Martelli (ed.), Proceedings of the 10th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG). Plant Protection Institute, P.O. Box 303, 38001 Volos, Greece.

Keywords :grapevine; virus; bushy stunt; roditis leaf discoloration; grapevine stunt virus; ajinashika disease; young leaf mosaic; Kerner disease; nematode; Longidoridae; review; Italy; meeting; ICVG;
Notes : Review on recent research work on grapevine viruses other than closteroviruses, as an introductory lecture to session 1b of the 10th meeting of ICVG at Volos, Greece, 1990.

1016. **Martelli, G.P.** 1991. Group Nepoviruses, p. 368-371. In R. I. B. Francki, C. M. Fauquet, D. L. Kundson, and F. Brown (ed.), Classification and nomenclature of viruses. Fifth Report of the International Committee on Taxonomy of Viruses. Springer, New York.
Keywords :nepovirus; classification; Italy;
Notes : Book chapter. Supplement 2, Archives of Virology.

1017. **Martelli, G.P.** 1992. Grapevine certification in EEC countries: background and scope of the meeting, p. 11-14. In G. P. Martelli (ed.), Grapevine Viruses and Certification in EEC Countries: State of the Art. Quaderno No 3,Istituto Agronomico Mediterraneo (I.A.M.), Bari, Italy.
Keywords :grapevine; certification; meeting; virus; legislation; EEC;
Notes : Critical examination of current EEC legislation leads to the conclusion that certification schemes adopted in EEC States require revision and harmonization.

1018. **Martelli, G.P.** 1992. Classification and nomenclature of plant viruses: State of the art. Plant Disease **76**:436-442.
Keywords :general; classification; nomenclature; virus; Italy;
Notes : Definition, history and present trend in classification and nomenclature of plant viruses. Discussion on possible classification in the future. 31 references.

1019. **Martelli, G.P.** 1993. Advances in grapevine virology:1991-1993, p. 13-18. In P. Gugerli (ed.), Extended abstracts 11th Meeting ICVG, Montreux, Switzerland, 6-9 September 1993. Federal Agricultural Research Station of Changins, CH-1260 Nyon, Switzerland.
Keywords :grapevine; virus; ultrastructure; dsRNA; diagnosis; Italy; meeting; ICVG;
Notes :A review on recent progress, introductory lecture.

1020. **Martelli, G.P.** 1993. The new classification of plant viruses. Petria **3**:131-140.
Keywords :grapevine; virus; classification; Italy;
Notes : The outlines of the new classification of viruses in families, genera and species as approved by the International Committee on Classification of Viruses (ICTV) are described. A list of current taxa of plant viruses with examples is given.

1021. **Martelli, G.P.** 1993. Leafroll, p. 37-44. In G. P. Martelli (ed.), Graft transmissible diseases of grapevines. Handbook for detection and diagnosis. FAO, Rome.
Keywords :grapevine; leafroll; closterovirus; symptoms; detection; diagnosis; Italy;

1022. **Martelli, G.P.** 1993. Fleck, p. 63-65. In G. P. Martelli (ed.), Graft-transmissible diseases of grapevines. Handbook for detection and diagnosis. FAO, Rome.
Keywords :grapevine; fleck; grapevine fleck virus; symptoms; detection; diagnosis; Italy;

1023. **Martelli, G.P.** 1993. Yellow speckle, p. 79-82. In G. P. Martelli (ed.), Graft-transmissible diseases of grapevines. Handbook for detection and diagnosis. FAO, Rome.
Keywords :grapevine; viroid; yellow speckle; GYSVd-1; GYSVd-2; symptoms; detection; diagnosis; Italy;

1024. **Martelli, G.P.** 1993. Vein necrosis, p. 87-89. In G. P. Martelli (ed.), Graft-transmissible diseases of grapevines. Handbook for detection and diagnosis. FAO, Rome.
Keywords :grapevine; vein necrosis; symptoms; detection; diagnosis; Italy;

1025. **Martelli, G.P.** 1993. Asteroid mosaic, p. 95-96. In G. P. Martelli (ed.), Graft-transmissible diseases of grapevines. Handbook for detection and diagnosis. FAO, Rome.

Keywords :grapevine; asteroid mosaic; symptoms; detection; diagnosis; Italy;

1026. **Martelli, G.P.** 1993. Immunoprecipitation, p. 165-167. In G. P. Martelli (ed.), Graft-transmissible diseases of grapevines. Handbook for detection and diagnosis. FAO, Rome.
Keywords :grapevine; immunoassay; immunoprecipitation; Italy;

1027. **Martelli, G.P.** 1993. Immunosorbent electron microscopy (ISEM) and antibody coating, p. 193-198. In G. P. Martelli (ed.), Graft-transmissible diseases of grapevines. Handbook for detection and diagnosis. FAO, Rome.
Keywords :grapevine; virus; immunoassay; ISEM; Italy;

1028. **Martelli, G.P.** 1993. Grapevine degeneration - fanleaf, p. 9-18. In G. P. Martelli (ed.), Graft-transmissible diseases of grapevines. Handbook for detection and diagnosis. FAO, Rome.
Keywords :grapevine; grapevine fanleaf virus; nepovirus; fanleaf; symptoms; detection; diagnosis; Italy;

1029. **Martelli, G.P.** 1993. Grapevine decline - American nepoviruses, p. 29-36. In G. P. Martelli (ed.), Graft-transmissible diseases of grapevines. Handbook for detection and diagnosis. FAO, Rome.
Keywords :grapevine; nepovirus; tomato ringspot virus; tobacco ringspot virus; peach rosette mosaic virus; blueberry leaf mottle virus; symptoms; detection; diagnosis; Italy;

1030. **Martelli, G.P.** 1993. Rugose wood complex, p. 45-53. In G. P. Martelli (ed.), Graft-transmissible diseases of grapevines. Handbook for detection and diagnosis. FAO, Rome.
Keywords :grapevine; rugose wood; rupestris stem pitting; corky bark; Kober stem grooving; LN 33 stem grooving; symptoms; detection; diagnosis; Italy;

1031. **Martelli, G.P.** 1993. Enation disease, p. 83-85. In G. P. Martelli (ed.), Graft-transmissible diseases of grapevines. Handbook for detection and diagnosis. FAO, Rome.
Keywords :grapevine; enation; symptoms; detection; diagnosis; Italy;

1032. **Martelli, G.P.** 1993. Vein mosaic and summer mottle, p. 91-93. In G. P. Martelli (ed.), Graft-transmissible diseases of grapevines. Handbook for detection and diagnosis. FAO, Rome.
Keywords :grapevine; vein mosaic; summer mottle; symptoms; detection; diagnosis; Italy;

1033. **Martelli, G.P.** 1993. Use of herbaceous hosts, p. 157-162. In G. P. Martelli (ed.), Graft-transmissible diseases of grapevines. Handbook for detection and diagnosis. FAO, Rome.
Keywords :grapevine; indexing; herbaceous hosts; method; Italy;

1034. **Martelli, G.P.** 1994. Inquadramento sistematico dei virus della vite (Taxonomic arrangement of grapevine viruses), p. 245-254. In Atti Giornate Fitopatologiche 1994, Montesilvano Lido (Pescara), 9-12 maggio 1995, Vol.2. Cooperativa Libraria Universitaria Editrice Bologna (CLUEB), Bologna, Italy.
Keywords :grapevine; virus; classification; meeting; Italy;
Notes : In Italian. Book chapter. Meeting at Montesilvano Lido, Italy, May 1994. Atti, CLUEB.

1035. **Martelli, G.P.** 1995. Production and distribution of certified propagative material with special reference to fruit crops: the European and Mediterranean experience. Arab J. Plant Protect. **13**:28-35.
Keywords :grapevine; sanitary selection; certification; Italy;
Notes :A review of certification procedures and requirements and their implementation in Europe, North Africa and Near East.

1036. **Martelli, G.P.** 1997. Plant virus taxa: Properties and epidemiological characteristics. Journal of Plant Pathology **79**:151-171.
Keywords :grapevine; virus; classification; general; Italy;
Notes : This paper describes the principles of the classification and nomenclature of plant viruses as adopted by the 9th International Virology congress in Glasgow in 1993. Plant viruses, like animal and

bacterial viruses have been classified in families, genera and species, on the basis of a better knowledge of the various constituents of the viruses. It is an up to date information on the classification of plant viruses and on the main properties of the groups, including, of course, grapevine viruses.

1037. **Martelli, G.P.** 1997. Grapevine virology highlights 1994-1997, p. 7-14. In O. A. Sequeira,de, J. C. Sequeira, and M. T. Santos (ed.), Extended abstracts 12th Meeting ICVG, Lisbon, Portugal, 29 September-2 October 1997. Dept.Plant Pathology, Estação Agronomica Nacional, Oeiras, Portugal.
Keywords :grapevine; virus; virus diseases; virus-like diseases; nomenclature; etiology; epidemiology; review; Italy; meeting; ICVG;
Notes : Since the last meeting of ICVG in 1993, three filamentous viruses have been discovered in grapevine, and now the list of viruses affecting this plant includes 44 virus species, belonging to 16 genera and 5 families. Five viruses are not assigned taxonomically. The problem raised by the multiplicity of leafroll-associated viruses is discussed. In particular, is it now time to abandon the term "associated" for some of them? The aetiology of several grapevine virus diseases is still unclear, especially for leafroll and rugose wood. The question of the origin of closteroviruses is discussed. Progress has been made in the epidemiology of several viruses, especially those transmitted by mealybugs. Finally, the author mentions the new knowledge in the molecular biology of several viruses and the hopes raised by genetic engeenering for the control of some dangerous viroses of grapevine.

1038. **Martelli, G.P., A.D. Avgelis, D. Boscia, M. Cambra, T. Candresse, A. Caudwell, J. Dunez, S.M. Garnsey, D.A. Golino, R.F. Lee, J. Lehoczky, G. Macquaire, S. Namba, C.N. Roistacher, I.C. Rumbos, V. Savino, J.S. Semancik, and B. Walter.** 1993. Graft transmissible diseases of grapevines. Handbook for detection and diagnosis.[Introduction (Anonymous). Grapevine degeneration-fanleaf (Martelli). Grapevine degeneration-European nepoviruses (Martelli, Walter). Grapevine decline-American nepoviruses; leafroll; rugose wood complex (Martelli). Yellow mottle; line pattern (Martelli, Lehoczky). Fleck (Martelli). Ajinashika disease; grapevine stunt (Namba, Martelli). Roditis leaf discoloration (Rumbos, Avgelis, Martelli). Yellow speckle; enation disease; vein necrosis; vein mosaic and summer mottle; asteroid mosaic (Martelli). Flavescence dorée (Caudwell, Martelli). Grapevine yellows (Martelli, Caudwell). Pierce's disease (Golino). Facilities for growing indicator plants (Roistacher). Indexing on *Vitis* indicators (Martelli, Savino, Walter). Use of herbaceous hosts; immunoprecipitation (Martelli). Enzyme-linked immunosorbent assay (ELISA) (Garnsey, Cambra). Immunosorbent electron microscopy (ISEM) and antibody coating (Martelli). Detection and identification of viroids (Semancik). Isolation and analysis of double-stranded RNAs (Boscia). Western blot (Boscia, Martelli). Detection of viruses and viroids by molecular hybridization (Macquaire, Candresse, Dunez). Extraction of closteroviruses from grapevine tissues (Savino). Extraction of phloem-limited isometric viruses from grapevine tissues (Martelli). Isolation and culture of *Xylella fastidiosa* (Golino). Laboratory equipment needed for selected diagnostic procedures (Lee). Glossary], p. 1-263. In G. P. Martelli (ed.), . FAO Publication Division, Rome.
Keywords :grapevine; review; detection; diagnosis; indexing; graft transmission; virus diseases; virus-like diseases; viroid; phytoplasma disease; Pierce's disease; *Xylella fastidiosa;* handbook; method; nucleic acid assay; immunoassay; general; grapevine fanleaf virus; arabis mosaic virus; raspberry ringspot virus; strawberry latent ringspot virus; tomato black ring virus; tomato ringspot virus; tobacco ringspot virus; rugose wood; yellow mottle; line pattern; fleck; ajinashika disease; grapevine stunt virus; roditis leaf discoloration; yellow speckle; enation; vein necrosis; vein mosaic; summer mottle; asteroid mosaic; flavescence dorée; closterovirus; nepovirus; leafroll;
Notes : Joint publication, International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG) and Food and Agricultural Organization of the United Nations (FAO). The book is illustrated with 345 figures. The essential bibliography is mentioned for each chapter. This handbook was compiled by G.P.Martelli. The different chapters are mentioned in the title. Most of them also appear as separate references in the database.

1039. **Martelli, G.P. and M. Bar-Joseph.** 1991. Closterovirus, p. 345-347. In R. I. B. Francki, C. M. Fauquet, D. L. Kundson, and F. Brown (ed.), Classification and Nomenclature of Viruses. Fifth Report of the International Committee on Taxonomy of Viruses. Springer-Verlag, New York and Vienna .
Keywords :grapevine; closterovirus; classification; nomenclature; Italy;

1040. **Martelli, G.P., D. Boscia, E. Choueiri, M. Digiaro, M.A. Castellano, and V. Savino.** 1993. Rugose wood of grapevine in Yemen, p. 51. In P. Gugerli (ed.), Extended abstracts 11th Meeting ICVG, Montreux, Switzerland, 6-9 September 1993. Federal Agricultural Research Station of Changins, CH-1260 Nyon, Switzerland.
Keywords :grapevine; stem grooving; rugose wood; leafroll; GLRaV-3; closterovirus; GVA; vitivirus; Yemen; Italy; meeting; ICVG;
Notes : Grapevine is grown in Yemen since time immemorial. All grapes are self rooted and quite probably any virus present has been there for many centuries. Canes and leaves collected in the viticultural region near Saana were tested in Bari. ELISA and mechanical transmission were negative for GFLV, GFkV and GLRaV-I. GLRaV-III was found in a few vines. All vines of cv. Asimi with stem grooving were found infected with GVA. These findings confirm the association of GVA with rugose wood, and point to a very old origin of this virus and GLRaV-III.

1041. **Martelli, G.P., D. Boscia, E. Choueiri, M. Digiaro, M.A. Castellano, and V. Savino.** 1994. Occurrence of filamentous viruses and rugose wood of grapevine in Yemen. Phytopath. medit. **33**:146-151.
Keywords :grapevine; rugose wood; vitivirus; GVA; leafroll; GLRaV-1; GLRaV-3; closterovirus; Yemen; Italy;
Notes : Canes and leaves from over 130 vines of 9 local grapevine cultivars grown in Yemen were collected and analyzed for virus presence at the University and the Mediterranean Agronomic Institute of Bari, Italy, using mechanical transmission to herbaceous hosts, serology and electron microscopy. Among the 18 native grapevine cultivars grown in this country, the only symptom suggesting the presence of a virus disease was rugose wood in a single variety (Asimi). Fanleaf and fleck viruses were never detected. Grapevine leafroll-associated virus I and III (GLRaV I, III) were found occasionally. All vines of cv. Asimi with stem grooving contained grapevine virus A (GVA), alone or, in two instances, in mixed infections with GLRaV I. GVA was also found occasionally in two other symptomless cultivars. The results of this study confirm the hypothesis of a relationship between GVA and rugose wood, and suggest that this virus had a long-lasting association with *Vitis vinifera.*

1042. **Martelli, G.P., D. Boscia, and M. Digiaro.** 1995. Disease and pest outbreaks. Yemen. Occurrence of filamentous viruses and rugose wood in grapevine in Yemen. Arab and Near East Plant Protection Newsletter *(21):*33.
Keywords :grapevine; rugose wood; vitivirus; GVA; leafroll; closterovirus; GLRaV-1; GLRaV-2; etiology; Yemen; Italy;
Notes : Rugose wood symptoms were observed in a single grapevine variety grown in Yemen. Diseased vines were infected with GVA, and some were also infected with GLRaV-1 or 2. This confirms the relationship of GVA with rugose wood.

1043. **Martelli, G.P., T. Candresse, and S. Namba.** 1994. *Trichovirus*, a new genus of plant viruses. Arch. Virol. **134**:451-455.
Keywords :grapevine; vitivirus; classification; GVA; GVB; genome; Italy; France; Japan;
Notes : Trichovirus is a new genus of plant viruses which presently includes five viruses with filamentous particles of similar morphological, physicochemical, ultrastructural and biological properties. There are two definitive (apple chlorotic leaf spot and potato virus T) and three tentative entities (among them GVA and GVB). The virus replicates probably in the cytoplasm. The genome is a single-stranded positive-sense RNA of 7.5-8.7 kb.

1044. **Martelli, G.P. and A. Caudwell.** 1993. Grapevine yellows, p. 103-105. In G. P. Martelli (ed.), Graft-transmissible diseases of grapevines. Handbook for detection and diagnosis. FAO, Rome.
Keywords :grapevine; phytoplasma disease; Vergilbungskrankheit; bois noir; France; Italy;

1045. **Martelli, G.P., H. Galea Souchet, D. Boscia, and V. Savino.** 1992. Viruses of grapevine in Malta. Bulletin OEPP/EPPO Bulletin **22**:607-612.

Keywords :grapevine; virus; virus-like diseases; grapevine fanleaf virus; nepovirus; fleck; grapevine fleck virus; GLRaV-1; GLRaV-3; closterovirus; leafroll; rugose wood; GVA; vitivirus; vein necrosis; occurrence; survey; Malta;
Notes : Virus and virus-like diseases found: fanleaf, leafroll, rugose wood, fleck, vein necrosis. Viruses identified: GFLV, GFkV, GVA, GLRaV I and III. 86% of 322 vines indexed were infected by one or more viruses.

1046. **Martelli, G.P., A. Graniti, and G.L. Ercolani.** 1986. Nature and physiological effects of grapevine diseases. Experientia **42**:933-942.
Keywords :virus diseases; grapevine; symptoms; physiology; bacterium; fungus; review; Italy;
Notes : Review of grapevine diseases caused by fungi, bacteria and viruses.

1047. **Martelli, G.P. and J. Lehoczky.** 1993. Yellow mottle, p. 55-57. In G. P. Martelli (ed.), Graft-transmissible diseases of grapevines. Handbook for detection and diagnosis. FAO, Rome.
Keywords :grapevine; yellow mottle; alfalfa mosaic virus; symptoms; detection; diagnosis; Italy; Greece;

1048. **Martelli, G.P. and J. Lehoczky.** 1993. Line pattern, p. 59-62. In G. P. Martelli (ed.), Graft-transmissible diseases of grapevines. Handbook for detection and diagnosis. FAO, Rome.
Keywords :grapevine; line pattern; grapevine line pattern virus; symptoms; detection; diagnosis; Italy; Greece;

1049. **Martelli, G.P., A. Minafra, and P. Saldarelli.** 1997. *Vitivirus*, a new genus of plant viruses. Arch. Virol. **142**:1929-1932.
Keywords :grapevine; new genus; vitivirus; trichovirus; GVA; GVB; GVD; classification; Italy;
Notes : A new genus of plant viruses, *Vitivirus*, is characterized by filamentous flexuous particles, and includes five viruses which belonged formerly to the genus *Trichovirus*. The main properties of *vitiviruses* and *trichoviruses* are similar, but they differ in several biological properties, in tissue tropism, in their mode of transmission, in their genome structure and composition in a way that justify their separation in two genera. In comparison with apple chlorotic leaf spot (ACLSV) and potato virus T (PVT) trichoviruses, the genome of grapevine viruses A (GVA) and B (GVB), the two *vitiviruses* which have been sequenced to date, contains two extra cistrons which code for polypeptides that are not produced by ACLSV and PVT. The type species of the genus Vitivirus is grapevine virus A. Other species in the genus: grapevine virus B, grapevine virus D, Heracleum latent virus. Grapevine virus C (GVC) is tentatively included in the new genus *Vitivirus.*

1050. **Martelli, G.P. and U. Prota.** 1985. Virosi delle vite. (Virus diseases of grapevines). Italia Agricola **122** *(2):*201-228.
Keywords :grapevine; virus diseases; review; general; Italy;

1051. **Martelli, G.P., U. Prota, A. Quacquarelli, and E. Refatti.** 1994. Il punto sulla lotta ai virus e la certificazione delle vite (Present knowledge on grapevine virus control and certification), p. 267-280. In Atti Giornate Fitopatologiche 1994, Montesilvano Lido (Pescara), 9-12 maggio 1994, Vol 2. Cooperativa Libraria Universitaria Editrice Bologna (CLUEB), Bologna, Italy.
Keywords :grapevine; virus diseases; virus-like diseases; control; virus elimination; indexing; certification; Italy;
Notes : In Italian, Eng. sum. Book chapter. Meeting at Montesilvano Lido, Italy, May 1994. Atti, CLUEB.

1052. **Martelli, G.P., P. Saldarelli, and D. Boscia.** 1997. Filamentous viruses of the grapevine: Closteroviruses, p. 1-9. In P. L. Monette (ed.), Filamentous viruses of the grapevine. Research Signpost, Trivandrum, India.
Keywords :grapevine; closterovirus; leafroll; GLRaV-1; GLRaV-2; GLRaV-3; GLRaV-4; GLRaV-5; GLRaV-6; GLRaV-7; GLRaV-8; classification; properties; Italy;

1053. **Martelli, G.P., P. Saldarelli, and A. Minafra.** 1997. A critical appraisal of the taxonomic position of grapevine virus A, B, and D, and their assignement to a new genus, p. 23-24. In O. A. Sequeira,de, J. C. Sequeira, and M. T. Santos (ed.), Extended abstracts 12th Meeting ICVG, Lisbon, Portugal, 29 September-2 October 1997. Dept.Plant Pathology, Estação Agronomica Nacional, Oeiras, Portugal.
Keywords :grapevine; GVA; GVB; GVD; vitivirus; new genus; classification; nomenclature; genome; sequence analysis; Italy; meeting; ICVG;
Notes : The authors discuss the taxonomic position of grapevine virus A, B, and D, in relation with the creation of a new genus, *Vitivirus*, and show the reasons why these three virus have been withdrawn from the *Trichovirus* genus and attributed to the new genus *Vitivirus*.

1054. **Martelli, G.P. and V. Savino.** 1995. Il punto sul miglioramento della vite in Puglia (Information on the improvement of grapevine in Apulia), p. 37-42. In Atti del Convegno sulla ricerca e la sperimentazione nell'enologia e nella viticoltura dell'Italia centro-meridionale. Barletta (Bari), novembre 1995.
Keywords : grapevine; virus; virus-like diseases; economic importance; performance; Italy;

1055. **Martelli, G.P., V. Savino, and B. Walter.** 1993. Indexing on *Vitis* indicators, p. 137-155. In G. P. Martelli (ed.), Graft-transmissible diseases of grapevines. Handbook for detection and diagnosis. FAO, Rome.
Keywords :grapevine; indexing; *Vitis;* indicator; graft; green grafting; method; Italy;

1056. **Martelli, G.P., O.A. Sequeira,de, H.H. Kassemeyer, V. Padilla, U. Prota, A. Quacquarelli, E. Refatti, M. Rüdel, I.C. Rumbos, V. Savino, and B. Walter.** 1993. A scheme for grapevine certification in the European Economic Community, p. 279-284. In D. Ebbels (ed.), Plant Heatlh and the European Single Market. British Crop Protection Council, Monograph No.54.
Keywords :grapevine; certification; legislation; EEC;

1057. **Martelli, G.P. and C.E. Taylor.** 1990. Distribution of viruses and their nematode vectors, p. 151-189. In K. F. Harris (ed.), Advances in Disease Vector Research (Vol. 6). Springer-Verlag, New York.
Keywords :virus; nepovirus; nematode; Longidoridae; vector; distribution; properties; classification; Italy; England;

1058. **Martelli, G.P. and B. Walter.** 1993. Grapevine degeneration - European nepoviruses, p. 19-27. In G. P. Martelli (ed.), Graft-transmissible diseases of grapevines. Handbook for detection and diagnosis. FAO, Rome.
Keywords :grapevine; nepovirus; tomato black ring virus; arabis mosaic virus; raspberry ringspot virus; strawberry latent ringspot virus; grapevine chrome mosaic virus; grapevine Bulgarian latent virus; artichoke Italian latent virus; detection; diagnosis; symptoms; Italy; France;

1059. **Martin, C. and A. Collas.** 1992. De la culture *in vitro* à la production de greffés-soudés issus du greffage herbacé de la vigne (From *in vitro* culture to the production of green-grafted grapevine plants). Progr. Agric. Vitic. **109**:61-68.
Keywords :grapevine; virus elimination; *in vitro;* meristem tip culture; green grafting; performance; France;
Notes : A new for producing
Virus-free material was obtained by meristem tip culture. The healthy material was first multiplied *in vitro* an then grafted with a grafting machine (not *in vitro*). Results and performances. Green-grafted vines are better than classical bench-grafted ones. No morphological anomalies were observed.

1060. **Martin, C., R. Vernoy, M. Carré, G. Vesselle, A. Collas, and C. Bougerey.** 1987. Vignes et techniques de cultures *"in vitro"*. Quelques résultats d'une collaboration entre recherche publique et entreprise privée (Grapevines and techniques of *"in vitro"* culture. Some results of a collaboration between public research and private enterprise). Bull. OIV **60**:447-458.
Keywords :grapevine; meristem tip culture; green grafting; micropropagation; virus elimination; multiplication; *in vitro;* results; research; France;

Notes : Meristem tip culture produces more vigourous vines. No abnormality observed when using *in vitro* multiplication of grapevine.

1061. **Martinez, M.C. and J.L.G. Mantilla.** 1995. Morphological and yield comparison between *Vitis vinifera* L. cv. Albariño grown from cuttings and from *in vitro* propagation. Amer. J. Enol. Vitic. **46**:195-203.
Keywords :grapevine; *in vitro;* micropropagation; morphology; performance; Spain;
Notes : Comparison of own-rooted vines from cuttings of old vines and from *in vitro* propagation, planted in soil, and pruned according to the Sylvoz system. Plants from the *in vitro* propagation had marked juvenile characteristics: high density of erect hairs, high content of antocyanin, leaves with deep sinuses and very low or even non-existent fertility both due to a low number and weight of clusters. There is an indirect interest for grape virology because of therapy methods involving *in vitro* culture.

1062. **Martino, L.** 1992. Il microinnesto *in vitro* della vite. (*In vitro* micrografting of grapevine). Petria **2***(suppl.1):*17-25.
Keywords :grapevine; indexing; micrografting; *in vitro;* Italy;
Notes : In Italian, Eng.sum. Description of the techniques developed at the Plant Pathology Institute of Rome for micrografting grapevines *in vitro* in order to obtain a quicker response in indexing trials for viruses and virus-like diseases.

1063. **Martins, A.** 1985. Les travaux de sélection massale et clonale des cépages et leur rôle dans l'amélioration de la viticulture portugaise (Mass- and clonal selection of grapevine and its role in improving viticulture in Portugal). Bull. OIV **58**:352-361.
Keywords :grapevine; clonal selection; performance; Portugal;
Notes : In French.

1064. **Martins, A. and L.C. Carneiro.** 1997. Methods for the evaluation of virus effects on grapevines, p. 159-160. In O. A. Sequeira,de, J. C. Sequeira, and M. T. Santos (ed.), Extended abstracts 12th Meeting ICVG, Lisbon, Portugal, 29 September-2 October 1997. Dept.Plant Pathology, Estação Agronomica Nacional, Oeiras, Portugal.
Keywords :grapevine; virus diseases; performance; economic importance; leafroll; closterovirus; GLRaV-3; Portugal; meeting; ICVG;
Notes : This is a discussion on the possible methods for evaluating the economic importance of a particular virus (in the present case GLRaV-3 in the cv. Camarate): 1. Comparison of clones naturally infected and healthy clones, whose sanitary state has been determined by indexing and/or serology; 2. Comparison between clones naturally infected and the same clones after elimination of virus(es) by heat therapy, meristem culture, etc. ; 3. Comparison of healthy clones with the same clones infected by graft or vectors with a given virus. The three methods have drawbacks. The authors propose to use a large number of clones, healthy and virus-infected , and to compare the mean values of performance parameters.

1065. **Martins, A., L.C. Carneiro, and J.S. Ladeira.** 1995. Ocorrência e efeitos do virus do enrolamento foliar da videira (GLRaV-3) sobre o rendimento e a qualidade (Occurrence and effect of leafroll virus (GLRaV-3) on yield and quality), p. 39-48. In Actas 3o Simposio de Vitivinicultura do Alentejo (Vol. 1). Assoçiacão Técnica dos Viticultores do Alentejo, Apartado 498, P-7000 Evora .
Keywords :grapevine; leafroll; closterovirus; GLRaV-3; occurrence; economic importance; performance; yield; quality; Portugal;
Notes : In Portuguese. In the course of grapevine selection carried out by the authors since 1978, tests were made by ELISA for detecting GLRaV-3 in about 4000 clones grown in various viticultural regions of Portugal. The percentage of infected clones varied from 5.7% to 97.9% with an average of 48.3%. The effect of infection on yield and quality was determined by comparing clones which gave positive versus negative results in ELISA. In some cases, yield of GLRaV-3 infected clones was lower, in other cases it was higher than that of GLRaV-3 free clones. In an average, the loss due to virus infection was 4.9%, with a variation from - 62.8% to +10.1%. The cases where leafroll-infected (GLRaV-3) clones gave higher yields than healthy ones occurred in zones of high temperature with large thermic amplitudes, whereas the reverse

situation, with a lower yield in leafroll-infected clones, occurred in more temperate zones with low thermic amplitude. The reduction of sugar content of berries due to leafroll infection (expressed as degrees of probable alcohol) varied from 0.4 to 12.4 %), with an average of 4.3%. Leafroll infection caused an average increase of 4.1% in the total acidity (variation from -0.3% to 13.7%). In their conclusions, the authors state that their results don't support the currently admitted idea that leafroll infection by GLRaV-3 is necessarily harmful, and that this virus is an ennemy to be inconditionally combatted. "On the contrary, a cohabitation of the virus with some genotypes could lead to a result that could be biologically equilibrated and useful from the point of view of the final users of these plants i.e. the wine growers."

1066. **Martins, A., L.C. Carneiro, A.M. Pereira, J. Eiras-Dias, N. Magalhães, I. Ramadas, A. Antunes, D. Madeira, K. Teixeira, and J. Banza.** 1997. Effect of leafroll-associated GLRaV-3 on yield of grapevines: new results, new perspectives, p. 177-178. In O. A. Sequeira,de, J. C. Sequeira, and M. T. Santos (ed.), Extended abstracts 12th Meeting ICVG, Lisbon, Portugal, 29 September-2 October 1997. Dept.Plant Pathology, Estação Agronomica Nacional, Oeiras, Portugal.
Keywords :grapevine; leafroll; closterovirus; GLRaV-3; performance; economic importance; yield; Portugal; meeting; ICVG;
Notes : An experimental vineyard including several clones of six cultivars, with four blocks of four vines each was used for determining the effect of grapevine leafroll associated virus 3 (GLRaV-3). The sanitary status was determined by DAS-ELISA. It is not indicated which antisera were used and if other virus(es) than GLRaV-3 were involved, nor if the healthy controls resulted from heat therapy, meristem culture or visual selection. The evaluation was based on yields of 2-3 years, depending on the cultivars. The differences between healthy and GLRaV-3 infected clones were much less important than usually reported in other similar experiments in other countries, and even nil for some varieties. The authors believe that too much emphasis has been laid on sanitary selection in recent years, to the detriment of genetic selection.

1067. **Mauro, M.C., S. Krastanova, S. Toutain, M. Perrin, P. Barbier, G. Demangeat, P. Cornuet, N. Bardonnet, P. Coutos-Thevenot, A. Deloire, M. Boulay, L. Otten, L. Pinck, and B. Walter.** 1994. Five grapevine (*Vitis* sp.) genotypes transformed with the coat protein gene of the grapevine fanleaf virus (GFLV), p. 26-27. In VIth International Symposium on Grape Breeding, Yalta, Crimea, Ukraine, 4-10 September 1994. Abstracts. Office International de la Vigne et di Vin (OIV), Paris.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; coat protein; gene; transgenic; cross-protection; France; meeting;
Notes : Symposium Grape Breeding, Yalta, Ukraine, 1994. Abstract. Four rootstocks (41B, 110Richter, SO4, *Vitis rupestris*), and *Vitis vinifera* cv. Chardonnay were transformed by introducing the coat protein gene of GFLV. Transformed clones are being multiplied *in vitro* and acclimatized in the greenhouse.

1068. **Mauro, M.C., S. Toutain, B. Walter, L. Pinck, L. Otten, P. Coutos-Thevenot, A. Deloire, and P. Barbier.** 1995. High efficiency regeneration of grapevine plants transformed with the GFLV coat protein gene. Plant Sci. **112**:97-106.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; transgenic; coat protein; cross-protection; France;
Notes : Genetically transformed grapevines were obtained through co-cultivation of embryogenic cell suspensions with an engineered *Agrobacterium tumefaciens* strain. Rootstocks 41B and SO4 and scion cv. Chardonnay were regenerated. A chimaeric coat protein gene of GFLV was integrated in order to protect grapevine against this virus.

1069. **Mayo, M.A. and G.P. Martelli.** 1993. New families and genera of plant viruses. Arch. Virol. **133**:496-498.
Keywords :virus; classification; general; England; Italy;

1070. **McCarthy, M.G.** 1988. Response of a Muscadelle clone to thermotherapy, p. 93-94. In R. Smart, R. Thornton, S. Rodriguez, and J. Young (ed.), Proceedings of the 2nd International Symposium for Cool Climate Viticulture and Oenology, Auckland, New Zealand, January 1988.
Keywords :grapevine; heat therapy; leafroll; performance; virus elimination; comparison; Australia;

Notes : A leafroll-infected Muscadelle selection was treated with heat therapy, and single internode cuttings were taken and rooted under mist. The plants were grown in a glasshouse and later planted in the field, with untreated plants as controls. After 4 years in the field, the heat treated clone had a significantly higher yield, but a slightly lower ^{o}Brix, pH and titrable acidity. The pruning weight of heat treated clone was significantly higher than that of control.

1071. **McCarthy, M.G., R.M. Cirami, and R.J. Van Velsen.** 1989. Virus thermotherapy effects on the performance of a Muscadelle selection. Vitis **28**:13-19.
Keywords :grapevine; leafroll; heat therapy; virus elimination; performance; Australia;
Notes : Clones with leafroll were heat treated, and compared with untreated material from the same source. A greater yield and vegetative growth, more berries per bunch and heavier bunches characterized the heat treated clones. There was no difference in maturity.

1072. **McCoy, R.E., A. Caudwell, C.J. Chang, T.A. Chen, L.N. Chiykowski, M.T. Cousin, J.L. Dale, G.T.N. De Leeuw, D.A. Golino, K.J. Hackett, B.C. Kirkpatrick, R. Marwitz, H. Petzold, R.C. Sinha, M. Sugiura, R.F. Whitcomb, I.L. Yang, B.M. Zhu, and E. Seemüller.** 1989. Plant diseases associated with mycoplasma-like organisms, p. 546-640. In R. F. Whitcomb and J. G. Tully (ed.), Spiroplasmas, Acheloplasmas, and Mycoplasmas of Plants and Arthropods. Vol. V: The Mycoplasmas.Academic Press, San Diego, California 92101, USA.
Keywords :grapevine; phytoplasma; phytoplasma disease; flavescence dorée; bois noir; Vergilbungskrankheit; handbook; general;
Notes : Book chapter. This is a general report on the subject, with following chapters: Introduction - Discovery and confirmation of MLO etiology - Criteria for distinguishing MLOs - Range and occurrence of MLOs - Future directions - Appendix 1. Partial listing of plants infected with mycoplasma-like organisms, grouped by plant family - Appendix2. Experimental hosts of seven MLOs - References. There are only few mentions to grapevine phytoplasmas.

1073. **Meignoz, R., E. Boudon-Padieu, J. Larrue, and A. Caudwell.** 1992. Flavescence dorée de la vigne. Présence de MLO et effets cytopathogènes associés, dans le liber de la vigne (Grapevine flavescence dorée. Presence of MLO and associated cytopathogenic effects in grapevine phloem). J. Phytopathol. **134**:1-9.
Keywords :grapevine; flavescence dorée; phytoplasma disease; phytoplasma; cytopathology; ultrastructure; electron microscopy; France;
Notes : Grapevine flavescence dorée MLOs (phytoplasmas) are rarely observed in tissues of infected grapevines from the field. But in glasshouse-grown vines, the situation is different. Many phytoplasmas were observed in the sieve tubes of grapevine LN33 glasshouse-grown cuttings which had been infected with *Scaphoideus titanus* collected in an infected vineyard. The cytopathological disorders due to MLO infection are described, as observed in thin sections with the electron microscope.

1074. **Meignoz, R., C. Kuszala, A. Seddas, and E. Boudon-Padieu.** 1997. Serological relationship and differences between phytoplasmas of the elm yellows group observed with polyclonal and monoclonal antibodies to flavescence dorée phytoplasma, p. 83-84. In O. A. Sequeira,de, J. C. Sequeira, and M. T. Santos (ed.), Extended abstracts 12th Meeting ICVG, Lisbon, Portugal, 29 September-2 October 1997. Dept.Plant Pathology, Estação Agronomica Nacional, Oeiras, Portugal.
Keywords :grapevine; phytoplasma disease; phytoplasma; elm yellows; relationship; flavescence dorée; strain; immunoassay; ELISA; western blot; France; meeting; ICVG;
Notes : Southern blot analysis of total DNA of flavescence dorée (FD) mycoplasmas as well as RFLP analysis of ribosomal and non-ribosomal DNA fragments have shown that flavescence dorée phytoplasma is related to the elm yellows (EY) phytoplasma. However, ELISA showed no serological relation between FD and EY. Recently, EY-group phytoplasmas were found in the Palatinate, Germany. They were different from

FD in DNA analyses. *Scaphoideus titanus* is not present in the region. The present study was aimed at clarifying the serological relationshps between FD and other grapevine and non-grapevine phytoplasmas. Following isolates were included in this study: Two FD *sensu stricto* from grapevine, two grapevine isolates from Palatinate and three non-grapevine isolates maintained in periwinkle, American elm yellows, French elm witches' broom and HD1 (Griffiths et al., 1994, IOM letters, 3, 259-260). The results showed that these strains are differently related and that the serological relationships between these isolates will need further study.

1075. **Meng, B., P. Forsline, and D. Gonsalves.** 1997. *Rupestris* stem pitting of grapevines: nucleotide sequence, RT-PCR detection, and viral origin of associated DsRNA, p. 35-36. In O. A. Sequeira,de, J. C. Sequeira, and M. T. Santos (ed.), Extended abstracts 12th Meeting ICVG, Lisbon, Portugal, 29 September-2 October 1997. Dept.Plant Pathology, Estação Agronomica Nacional, Oeiras, Portugal.
Keywords :grapevine; rupestris stem pitting; RSPaV; nucleotide sequence; detection; PCR; dsRNA; USA; New York; meeting; ICVG;
Notes : Double stranded RNA (dsRNA) was detected in rupestris stem pitting (RSP)-affected grapevines and is assumed to be involved in the replication of RSP. Two cDNA probes derived from RSP-dsRNA were selected as RSP specific and can be used for diagnosis. The nucleotide sequence of this viral agent associated with RSP was established. The genome is similar to that of apple stem pitting virus and of potexviruses. It is proposed to name this virus Rupestris stem pitting associated virus (RSPaV).

1076. **Meng, B. and D. Gonsalves.** 1997. Nucleotide sequence and genomic organization of grapevine *Rupestris* stem pitting-associated virus and its detection by RT-PCR. Phytopathology **87***(Suppl.):*S65.
Keywords :grapevine; rupestris stem pitting; RSPaV; genome; detection; RT-PCR; nucleic acid assay; USA;
Notes :A dsRNA of about 8 kb was isolated from Rupestris stem pitting (RSP)-infected grapevines and sequenced. It consists of 8726 nucleotides excluding the poly-A tail. The structure is similar to that of apple stem pitting virus and potexviruses and consists of five open reading frames. The authors propose to call this virus Rupestris stem pitting-associated virus (RSPaV). A RT-PCR method for detecting the virus in grapevine was developed.

1077. **Merkuri, J., D. Boscia, and V. Savino.** 1993. Grapevine fanleaf virus in Albania. Phytopath. medit. **32**:48-50.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; occurrence; symptoms; Albania; Italy;

1078. **Merkuri, J., G.P. Martelli, D. Boscia, and V. Savino.** 1993. Viruses and virus diseases of the grapevine in Albania, p. 115. In P. Gugerli (ed.), Extended abstracts 11th Meeting ICVG, Montreux, Switzerland, 6-9 September 1993. Federal Agricultural Research Station of Changins, CH-1260 Nyon, Switzerland.
Keywords :grapevine; virus; virus-like diseases; survey; nepovirus; grapevine fanleaf virus; fleck; leafroll; rugose wood; enation; GVA; vitivirus; GLRaV-1; GLRaV-3; closterovirus; viroid; Albania; Italy; meeting; ICVG;
Notes :A survey of virus diseases in Albania revealed the presence of fanleaf, leafroll, rugose wood, enations and fleck. Fanleaf and fleck were less frequent in native cultivars than in imported ones. The other diseases were in about similar proportions in both types of cvs.

1079. **Merkuri, J., G.P. Martelli, D. Boscia, and V. Savino.** 1994. Viruses of grapevine in Albania. Bulletin OEPP/EPPO Bulletin **24**:215-220.
Keywords :grapevine; fanleaf; grapevine fanleaf virus; nepovirus; vitivirus; closterovirus; leafroll; rugose wood; fleck; enation; GVA; GLRaV-1; GLRaV-3; nematode; *Xiphinema index;* Longidoridae; occurrence; economic importance; Albania; Italy;

Notes : Following viruses and virus-like diseases were found in Albania: GFLV, leafroll, rugose wood, fleck, enation, GVA, GLRaV I and III. *Xiphinema index* was present. 83.5% of 530 vines of *Vitis vinifera* examined and 46 % of American rootstocks were infected by at least one virus.

1080. **Mescalchin, E., F. Michelotti, and M.E. Vindimian.** 1986. Riscontra in alcuni vigneti del Basso Sarca Flavescenza dorata della vite (Occurrence of flavescence dorée in some vineyards of Basso Sarca Valley). Terra Trentina **32***(9):*36-38.
Keywords :grapevine; phytoplasma disease; flavescence dorée; occurrence; Italy;
Notes : In Italian. Basso Sarca is the lower part of the Sarca Valley, in Trentino.

1081. **Miele, A., G.B. Kuhn, J. Tonnietto, and S.J. Volkweiss.** 1987. Efeito do virus-do-enrolamento-da-folha na composição mineral do peciolo e do limbo da videira "Cabernet franc" (Effect of the leafroll virus on the mineral composition of leaf petiole and blade of cv. Cabernet franc). Pesc. agropec. bras. ,Brasilia **22**:1151-1155.
Keywords :grapevine; leafroll; mineral content; leaves; comparison; Brazil;
Notes : The experiment on which this paper is based was made during the 1979-80 vegetative period at Bento Gonçalves, Brazil.The rootstock was *Vitis rupestris x V. riparia* 101-14 Mgt. Severely infected vines had a lower petiole content in total N, P, Ca, Mg, Mn, Cu, Fe and Zn than healthy controls. The K content was higher. Leaf blade and petiole analyses gave generally similar results.

1082. **Milkus, B., V. Kartuzova, N. Muljukina, and B. Feld.** 1991. Detection of virus diseases of grapevine in Ukraina, p. 390-395. In I. C. Rumbos, R. Bovey, D. Gonsalves, W. B. Hewitt, and G. P. Martelli (ed.), Proceedings of the 10th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG). Plant Protection Institute, P.O. Box 303, 38001 Volos, Greece.
Keywords :grapevine; leafroll; closterovirus; GLRaV-3; nepovirus; grapevine fanleaf virus; rugose wood; vein mosaic; ELISA; detection; immunoassay; Ukraine; meeting; ICVG;
Notes : Detection of GFLV and GLRaV-III by indirect ELISA and Dot-ELISA, which were both more sensitive that DAS-ELISA. dsRNA was obtained from grapevine affected by leafroll, rugose wood and vein mosaic.

1083. **Milkus, B.N., S. A. Sticko, V.S. Tschisnikov, and N.A. Muljukina.** 1997. The production of certified planting material of grapevine in the Ukraine, p. 179-180. In O. A. Sequeira,de, J. C. Sequeira, and M. T. Santos (ed.), Extended abstracts 12th Meeting ICVG, Lisbon, Portugal, 29 September-2 October 1997. Dept.Plant Pathology, Estação Agonomica Nacional, Oeiras, Portugal.
Keywords :grapevine; clonal selection; dsRNA; heat therapy; virus elimination; Ukraine; meeting; ICVG;
Notes : A description is given of the programme of sanitary selection and certification of grapevine planting material in Ukraine. Indexing, ELISA and dsRNA were used for detecting viruses. If no healthy material can be found in nature, heat therapy at 38ºC of whole plants followed by apex cultivation *in vitro* is used. *In vitro* culture is also used for a rapid multiplication of selected material.

1084. **Minafra, A.** 1989. Viroidi della vite: primi risultati di un' indagine in corso in Puglia. (Grapevine viroids: first results of a survey in Apulia). Inform. Fitopatol. **39***(11):*55-59.
Keywords :grapevine; viroid; results; survey; HSVd-g; GYSVd-1; GYSVd-2; Italy;
Notes : The author reports on the occurrence of three viroids in grapevines in Apulia, i.e. HSVd-g (hop stunt viroid of grapevine), grapevine viroid 2 (GYSVd-2) and grapevine yellow speckle viroid (GYSVd-1). HSVd-g and GYSVd-1 were present in almost all samples, whereas GYSVd-2 was less frequent. GYSVd-1 was associated with yellow speckle symptoms. The two other viroids don't cause any apparent disease.

1085. **Minafra, A., R. Gölles, A. da Camara Machado, P. Saldarelli, V. Savino, H. Katinger, M. Laimer Da Camara Machado, and G. P. Martelli.** 1997. Coat protein-mediated resistance against grapevine virus A and grapevine virus B in *Nicotiana benthamian a* and *Nicotiana occidentalis*, p. 140. In O. A. Sequeira,de, J. C. Sequeira, and M. T. Santos (ed.), Extended abstracts 12th Meeting ICVG, Lisbon, Portugal, 29 September-2 October 1997. Dept.Plant Pathology, Estação Agronomica Nacional, Oeiras, Portugal.

Keywords :grapevine; vitivirus; GVA; GVB; transgenic; *Nicotiana;* coat protein gene; Italy; Austria; Portugal; meeting; ICVG;
Notes : Preliminary experiments suggest that partial resistance to GVA and GVB infection, probably mediated by the expression of mRNAs, can be obtained in *Nicotiana* by the insertion of the coat protein genes of these viruses. Transformation of *Vitis* is now being attempted.

1086. **Minafra, A., C. Greif, and J. Romero.** 1997. Molecular tools for the detection of grapevine viruses, p. 157-170. In B. Walter (ed.), Sanitary selection of the grapevine. Protocols for detection of viruses and virus-like diseases (Les Colloques no 86). INRA Editions, Paris.
Keywords :grapevine; virus; virus-like diseases; detection; nucleic acid assay; review; method; Italy; France; Spain;
Notes : The application of molecular techniques for detecting grapevine viruses represents an easy, rapid and very sensitive tool for diagnosis. The authors review recent publications on the subject and the prospects of further improvements, especially the possibilities of automation and the use of these techniques for large scale certification and sanitary selection. 51 references.

1087. **Minafra, A., F. Grieco, D. Gallitelli, and G.P. Martelli.** 1995. Improved PCR procedures for multiple identification of some artichoke and grapevine viruses. Bulletin OEPP/EPPO Bulletin **25**:283-287.
Keywords :grapevine; mealybug; *Pseudococcus longispinus;* leafroll; GLRaV-3; closterovirus; nucleic acid assay; GVA; GVB; vitivirus; detection; method; reverse transcription; PCR; immunocapture; Italy;
Notes : Two grapevine viruses, grapevine virus B (GVB), grapevine leafroll-associated virus 3 (GLRaV-3), and three viruses of artichoke were successfully detected and identified in grapevine and artichoke plant tissues by improved procedures of reverse transcription polymerase chain reaction (RT- PCR). The multiplex RT PCR allowed detection of several viruses in mixed infections. The identification of amplification products was confirmed by Southern hybridization with virus-specific probes. The detection limit for GVB viral RNA, diluted in healthy grapevine extract, was 500 fg. GLRaV-3 and GVB could be detected in single or mixed infections in extracts from leaf petioles or dormant phloem, diluted 1:50. No specific products were amplified from healthy controls. Grapevine virus A (GVA) was detected in macerated extracts of viruliferous mealybugs of the vector species *Pseudococcus longispinus* by immunocapture RT-PCR. 40% of extracts from single viruliferous mealybugs and 75% of extracts from groups of three insects gave positive reactions. The respective advantages of multiplex RT-PCR and immunocapture RT-PCR are discussed.

1088. **Minafra, A. and A. Hadidi.** 1993. Detection of grapevine virus A in single mealybugs by immunocapture - reverse transcription - polymerase chain reaction, p. 139. In P. Gugerli (ed.), Extended abstracts 11th Meeting ICVG, Montreux, Switzerland, 6-9 September 1993. Federal Agricultural Research Station of Changins, CH-1260 Nyon, Switzerland.
Keywords :grapevine; vitivirus; GVA; detection; vector; *Pseudococcus longispinus;* mealybug; immunocapture; reverse transcription; nucleic acid assay; cDNA; PCR; Italy; meeting; ICVG;
Notes : Grapevine virus A (GVA) was detected in single individuals of the vector *Pseudococcus longispinus* by a method combining immunocapture of the virus particles by the homologous antibodies, release of viral RNA by treatment with 1% Triton X 100 at 65^{o} C, reverse transcription of GVA RNA by reverse transcriptase, amplification of GVA cDNA by PCR and analysis of amplified products by electrophoresis in 6% polyacrylamide gel followed by silver staining (see ref.1090) .

1089. **Minafra, A. and A. Hadidi.** 1994. Sensitive detection of grapevine virus A, B, or leafroll-associated III from viruliferous mealybugs and infected tissue by cDNA amplification. J. Virol. Methods **47**:175-187.
Keywords :grapevine; GVA; GVB; vitivirus; GLRaV-3; closterovirus; *Pseudococcus longispinus;* mealybug; detection; identification; cDNA; PCR; nucleic acid assay; Italy;
Notes : Reverse transcription-polymerase chain reaction (RT-PCR), immunocapture-RT-PCR (IC-RT-PCR) and/or multiplex-RT-PCR (M-RT-PCR) were used for an accurate and sensitive detection of three phloem-limited viruses, GVA, GVB and/or GLRaV-3 from viruliferous insect vectors or infected grapevine tissues. GLRaV-3 was easily detected from infected leaf or bark tissue of grapevine by IC-RT-PCR or M-RT-PCR. M-RT-PCR allowed simultaneous detection of GLRaV-3 and GVB in a single sample of

grapevine tissue extract. M-RT-PCR was easier and faster than IC-RT-PCR for detecting GLRaV-3, because there is no incubation and no need for an antiserum. It allowed the sensitive detection of GVB for which there is no high titre antiserum available so far. GVA was also detected in extracts of mealybugs fed on infected grapevines by IC-RT-PCR, which gave better results than RT-PCR.

1090. **Minafra, A., A. Hadidi, and G.P. Martelli.** 1992. Detection of grapevine closterovirus A in infected grapevine tissue by reverse transcription-polymerase chain reaction. Vitis **31**:221-227.
Keywords :grapevine; GVA; detection; vitivirus; cDNA; nucleic acid assay; reverse transcription; PCR; Italy;
Notes : Grapevine virus A (GVA) RNA was detected with a high sensitivity in nucleic acid extracts of infected grapevine tissues by reverse transcription polymerase chain reaction (RT-PCR). A synthesized DNA primer set prepared for amplifying a GVA cDNA fragment of 430 base pairs was used to detect the virus RNA in extracts from infected grapevine tissues (leaves from *in vitro*-grown plants or greenhouse-grown cuttings, bark scrapings of mature canes from the vineyard). The detection sensitivity of GVA by RT-PCR was about 200 times higher than with molecular hybridization or ELISA.

1091. **Minafra, A., A. Hadidi, and G.P. Martelli.** 1992. Detection of grapevine closterovirus A by polymerase chain reaction amplification. Phytopathology **82**:1086.
Keywords :grapevine; GVA; vitivirus; detection; nucleic acid assay; PCR; cDNA; Italy;
Notes :A nucleotide sequence cloned from RNA of grapevine virus A (GVA) was used to form a 430 bp cDNA by PCR amplification. This fragment made it possible to detect GVA RNA in extracts from infected grapevine tissues with a high sensitivity.

1092. **Minafra, A., A. Hadidi, and P. Saldarelli.** 1993. Sensitive immunocapture and multiplex reverse transcription- polymerase chain reaction for the detection of grapevine leafroll associated virus III and grapevine virus B, p. 137-138. In P. Gugerli (ed.), Extended abstracts 11th Meeting ICVG, Montreux, Switzerland, 6-9 September 1993. Federal Agricultural Research Station of Changins, CH-1260 Nyon, Switzerland.
Keywords :grapevine; leafroll; GLRaV-3; closterovirus; GVB; vitivirus; cDNA; detection; PCR; molecular probe; nucleic acid assay; immunocapture; Italy; meeting; ICVG;
Notes :GLRaV-3 and GVB were detected in grapevine extracts by immunocapture of virus particles in wells of ELISA plates coated with antigen. cDNA complementary to viral genome(s) was synthesized by using reverse transcriptase and amplified by PCR. Amplified PCR products were analyzed by electrophoresis through 6% polyacrylamide slab gels and Southern hybridization using labelled GLRaV-3 cRNA and GVB cRNA probes.

1093. **Minafra, A., D. J. MacKenzie, P. Casati, P. A. Bianco, P. Saldarelli, and G.P. Martelli.** 1997. Detection of an unusual RNA in grapevines indexing positive for rupestris stem pitting, p. 43. In O. A. Sequeira,de, J. C. Sequeira, and M. T. Santos (ed.), Extended abstracts 12th Meeting ICVG, Lisbon, Portugal, 29 September-2 October 1997. Dept.Plant Pathology, Estação Agronomica Nacional, Oeiras, Portugal.
Keywords :grapevine; rupestris stem pitting; RNA; associated; etiology; indexing; Italy; Canada; meeting; ICVG;
Notes : In the course of the preparation of a cDNA library from GLRaV-1 RNA for diagnostic and sequencing purposes, dsRNA was extracted from vines of cvs. Chiavennasca and Cortese thought to be infected with GLRaV-1 only. Some of the nucleotide sequences recovered were shown to have no homology with GLRaV-1 or any other known closterovirus. One of the synthesized cDNA clone, p48 (716 bp in size) was used for designing primers which showed a specific homology with an unusual RNA present in rupestris stem pitting affected vines. The present results suggest that beside GLRaV-1, the vines used as dsRNA source for molecular cloning contained also a graft transmissible agent, probably a virus, whose dsRNA was inadvertently used as a template for cDNA production. The nature of this virus is unknown and its involvement in rupestris stem pitting will need further research.

1094. **Minafra, A., G.P. Martelli, and V. Savino.** 1990. Viroids of grapevines in Italy. Vitis **29**:173-182.

Keywords :grapevine; viroid; HSVd-g; GYSVd-1; GYSVd-2; Italy;
Notes : A study aimed at recording the presence of viroids in Italy showed the occurrence of low molecular weight RNAs in 48 *V. vinifera* accessions and 15 American *Vitis* sp. and hybrids from various origins. No such RNAs were found in seedlings of 2 cvs. These RNAs are identified as grapevine yellow speckle viroid (GYSVd-1) grapevine viroid 2 (GVd-2 = GVd-1B = GYSVd-2) and hop stunt viroid (HSVd). HSVd produced symptoms on tomato and cucumber after artificial inoculation. None of the accessions tested was viroid-free, except the 2 seedlings. Most of the infection were due to GYSVd-1 plus HSVd.

1095. **Minafra, A., G.P. Martelli, and V. Savino.** 1991. Viroids in a grapevine collection of southern Italy, p. 298-305. In I. C. Rumbos, R. Bovey, D. Gonsalves, W. B. Hewitt, and G. P. Martelli (ed.), Proceedings of the 10th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG). Plant Protection Institute, P.O. Box 303, 38001 Volos, Greece.
Keywords :grapevine; viroid; GYSVd-1; GYSVd-2; HSVd-g; occurrence; Italy; meeting; ICVG;
Notes :A large collection of grapevines originating from 24 countries and four continents was examined for the presence of viroids. 79 accessions of *Vitis vinifera*, 1 of *V.labrusca*, 1 of LN 33 and two wild species were tested by polyacrylamide gel electrophoresis. All samples were found positive for viroids, except one of the wild species. The viroids present were identified as GYSVd-1 and GYSVd-2 (yellow speckle viroids) and hop stunt viroid. This is the widest information on the presence of viroids in grapevine cultivars in Europe, Asia and Africa.

1096. **Minafra, A., A. Russo, and G.P. Martelli.** 1991. A cloned probe for the detection of grapevine closterovirus A, p. 417-424. In I. C. Rumbos, R. Bovey, D. Gonsalves, W. B. Hewitt, and G. P. Martelli (ed.), Proceedings of the 10th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG). Plant Protection Institute, P.O. Box 303, 38001 Volos, Greece.
Keywords :grapevine; GVA; vitivirus; cDNA; nucleic acid assay; detection; Italy; meeting; ICVG;
Notes : Description of the synthesis of complementary DNA (cDNA) probes obtained by random priming and by polyadenylation of 3' end of genomic GVA RNA, and their use on herbaceous hosts. The genomic RNA molecule of GVA has about 7800 nucleotides. The longest clone was of about 2900 base pairs, i.e. about 37 % of the genome.

1097. **Minafra, A., M. Russo, and G.P. Martelli.** 1992. Further studies on the use of molecular probes to grapevine closterovirus A. Vitis **31**:87-93.
Keywords :grapevine; vitivirus; GVA; detection; diagnosis; nucleic acid assay; cDNA; sequence analysis; RNA; Nicotiana; Italy;
Notes : Two molecular probes were cloned as cDNA to genomic RNA of grapevine virus A (GVA) and were used for detecting this virus in infected *Nicotiana benthamiana* and grapevine. One of them, pGA240, proved to be specific for GVA and gave positive results only with infected material. It can be used for GVA detection, but the preparation of samples for routine testing needs further improvements.

1098. **Minafra, A., P. Saldarelli, F. Grieco, and G.P. Martelli.** 1994. Nucleotide sequence of the 3' terminal region of the RNA of two filamentous grapevine viruses. Arch. Virol. **137**:249-261.
Keywords :grapevine; GVA; GVB; vitivirus; nucleotide sequence; comparison; capillovirus; closterovirus; protein; coding region; classification; Italy;
Notes : Grapevine virus A (GVA) and grapevine virus B (GVB) have many similarities in biological, epidemiological, morphological, and physicochemical properties, but they are serologically and molecularly distinct from one another. The sequencing of the 3' terminal region of both viruses is reported in the present paper, and their possible taxonomic allocation is discussed. The sequenced segments of the two viruses encompassed respectively 1883 and 2136 nucleotides. Three putative open reding frames (ORF) were identified in both genomic viral RNAs, and were designated as ORF1 to 3 in the 5'-3' direction. ORF1 encoded a polypeptide showing similarities with the putative movement proteins of trichoviruses and capilloviruses. ORF2 corresponds to the coat protein cistron. The coat proteins of GVA and GVB have sequence homologies with one another and also with coat proteins of trichoviruses and capilloviruses, but not with those of closteroviruses. ORF3 potentially coded for two small polypeptides. In comparison with

trichoviruses and capilloviruses, ORF3 is an extra open reading frame. The results of these observations justify a provisional inclusion of GVA and GVB in the trichovirus group.

1099. **Minafra, A., P. Saldarelli, and G.P. Martelli.** 1997. Grapevine virus A: nucleotide sequence, genome organization, and relationship in the *Trichovirus* genus. Arch. Virol. **142**:417-423.
Keywords :grapevine; vitivirus; GVA; GVB; genome; nucleotide sequence; Italy;
Notes : The nucleotide sequence of the 5' terminal region of grapevine virus A (GVA), encompassing 5466 nucleotides, was established and the genome organization of this virus described. GVA shows many similarities with grapevine virus B (GVB), but both viruses, so far tentatively included in the trichovirus group, show differences with the definitive members of this group (apple chlorotic leaf spot, potato virus T) on the biological, epidemiological and molecular point of view to an extent that justify a revision of their taxonomic position. (GVA and GVB were included in the new genus Vitivirus in 1997).

1100. **Minsavage, G.V., C.M. Thompson, D.L. Hopkins, R.M.V.B.C. Leite, and R.E. Stall.** 1994. Development of a polymerase chain reaction protocol for detection of *Xylella fastidiosa* in plant tissue. Phytopathology **84**:456-461.
Keywords :grapevine; Pierce's disease; *Xylella fastidiosa;* detection; ELISA; PCR; nucleic acid assay; comparison; USA;
Notes :A 7.4-kb EcoRI segment of genomic DNA of *Xylella fastidiosa* was used as a probe and was conserved in 18 strains of *Xylella*. The nucleotide sequence of a 1.0 kb internal EcoRV portion of the fragment was determined, and oligonucleotides were selected for primers that amplified genomic DNA specific to *X.fastidiosa* in 33 strains tested by the polymerase chain reaction (PCR). Detection of *X.fastidiosa* by PCR was 100-fold more sensitive than by ELISA.

1101. **Minucci, C., G. Boccardo, and M. Conti.** 1994. A severe disease of grapevines in the Italian Riviera associated with mycoplasma-like organisms, p. 429-431. In Proceedings 9th Congress of the Mediterranean Phytopathological Union, September 1994, Kusadasi-Aydin, Turkey.
Keywords :grapevine; phytoplasma; phytoplasma disease; etiology; nucleic acid assay; dot blot hybridization; PCR; RFLP; aster yellows; *Scaphoideus titanus;* meeting; Italy;
Notes : Book chapter. Mediterranean Phytopathological Union. A disease closely resembling flavescence dorée was observed over the last few years in vineyards of the Italian Riviera (Liguria). Positive reactions were obtained by dot blot hybridization using a probe specific for European aster yellows (EAY-MLO), whereas the healthy control did not react. PCR and RFLP analysis suggest that the MLO from Liguria is closely related to EAY-MLO. No transmission of the disease was obtained with *Scaphoideus titanus*, vector of FD. The possible existence of another vector is suggested.

1102. **Minucci, C., P. Del Serrone, M. Barba, M. Conti, and G. Boccardo.** 1994. Molecular hybridization and polymerase chain reaction for diagnosis of MLOs causing grapevine yellows in Italy, p. 102. In Proceedings 10th International Congress of I.O.M., Bordeaux, France, July 1994 (Vol.3). International Organization for Mycoplasmalogy (I.O.M), Bordeaux, France.
Keywords :grapevine; phytoplasma disease; etiology; aster yellows; detection; nucleic acid assay; dot blot hybridization; PCR; phytoplasma; Italy;
Notes : Dot blot hybridization assay and polymerase chain reaction (PCR) were used for detecting phytoplasmas responsible for a yellows disease of grapevine (GY) in northern and central Italy. A probe (EAY 352) specific for aster yellows and related phytoplasmas reacted positively with crude sap and purified DNAs of several GY affected vines, and did not react with healthy samples. PCR amplification and RFLP allowed to distinguish healthy and GY-infected grapevines in crude sap of grapevines. The method can be used for screening in vineyards and for certification. Meeting I.O.M.

1103. **Monette, P.L.** 1985. Use of grapevine shoot tip cultures for detection of fanleaf virus by enzyme-linked immunosorbent assay. Can. J. Pl. Sci. **65**:977-980.
Keywords :grapevine; immunoassay; nepovirus; *in vitro;* shoot tip culture; ELISA; detection; grapevine fanleaf virus; Canada;

1104. **Monette, P.L.** 1986. Elimination *in vitro* of two grapevine nepoviruses by an alternating temperature regime. J. Phytopathol. **116**:88-91.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; arabis mosaic virus; virus elimination; heat therapy; shoot tip culture; *in vitro;* Canada;
Notes : The heat treatment lasted 40 days, with alternating periods of 6 h. at 39° C and 18 h. at 22° C. It was done on *in vitro* growing shoot tips of 2 mm. Longer treatments with 12 h. at 35° C and 12 h. at 22° C gave satisfactory results for GFLV but not for ArMV.

1105. **Monette, P.L.** 1988. Grapevine (*Vitis vinifera* L.), p. 3-37. In Y. P. S. Bajaj (ed.), Biotechnology in Agriculture and Forestry (Vol.6). Springer Verlag, Berlin, Heidelberg.
Keywords :grapevine; biotechnology; review; diseases; *in vitro;* shoot tip culture; micropropagation; meristem tip culture; virus elimination; method; germplasm; Canada;
Notes : Good review on the impact of the techniques of tissue culture on grapevine improvement. Methods, media, genetic stability of micropropagated plants obtained from shoot tip or meristem culture, culture of ovules, anthers, protoplasts. Practical applications. A protocol for grapevine micropropagation by shoot tip culture, based on practical experience of the author and his collaborators and on literature, is given. 165 references. Book chapter.

1106. **Monette, P.L.** 1992. A closteroviruslike particle from grapevines with corky bark disease (Abstract). Can. J. Pl. Pathol. **14**:246.
Keywords :grapevine; rugose wood; corky bark; closterovirus-like particles; associated; comparison; GVA; vitivirus; ultrastructure; cytopathology; immunoassay; properties; Canada;
Notes : Short closterovirus-like particles of about 725 nm. were found to be associated with corky bark of grapevines. This virus differs from GVA by symptoms and cytopathology on *N. benthamiana,* size of viral capsid protein, serological properties.

1107. **Monette, P.L. and S.E. Godkin.** 1992. Ultrastructure of grapevine virus A-infected *Nicotiana benthamiana* leaves. Can. J. Pl. Pathol. **14**:1-9.
Keywords :grapevine; vitivirus; GVA; ultrastructure; cytopathology; electron microscopy; Canada;

1108. **Monette, P.L. and S.E. Godkin.** 1993. Mechanical transmission of closterovirus-like particles from a corky bark-affected grapevine to an herbaceous species. Plant Pathology (Trends in Agric. Sci.) **1**:7-12.
Keywords :grapevine; rugose wood; corky bark; trichovirus; vitivirus; closterovirus; GVB; GVC; GCBaV; GLRaV-2; GLRaV-IIb; GLRaV-3; mechanical transmission; shoot tip culture; herbaceous hosts; *in vitro;* Canada;
Notes : Mechanical transmission from *in vitro* growing Semillon vines obtained by shoot tip culture to *Nicotiana benthamiana* resulted in infection with several viruses, which were determined by ISEM: GCBaV, GLRaV-3, GLRaV-IIb (Gugerli and Ramel, 1993), identical with GLRaV-2 and also with GCBaV (see Boscia et al., 1995), GVB, GVC. Cytopathic effects of these infections are described.

1109. **Monette, P.L. and S.E. Godkin.** 1995. Detection of capillovirus-like particles in a grapevine affected with rugose wood. Vitis **34**:241-242.
Keywords :grapevine; new virus; capillovirus; rugose wood; etiology; rupestris stem pitting; LN 33 stem grooving; indexing; Canada;
Notes :A virus with particles of the capillovirus type was detected in the tissues of a vine of *Vitis vinifera* cv.Sauvignon blanc affected with rugose wood disease. This vine was free of GFLV, TBRV, ArMV, TRSV. Indexing revealed that it had no leafroll, no Kober stem grooving, but was affected by rupestris stem pitting (indexing on St-George). Severe stem grooving developed on LN33, but leaves of the indicator did not develop the typical reddening of LN33 stem grooving associated with corky bark. EM revealed the presence of filamentous particles of about 600-700 nm long, less flexuous than closteroviruses, and apparently belonging to the capillovirus group. Antisera prepared against GVA, GVB and GVC did not decorate them, nor did antisera to ASPV (apple stem pitting virus), ACLSV (apple chlorotic leaf spot virus), PVT (potato virus T) and LCLV (lilac chlorotic leafspot). The relation with ASGV (apple stem grooving virus) needs further study. This virus seems to be a new grapevine virus, and the first of its type in grapevine.

1110. **Monette, P.L., S.E. Godkin, and D. James.** 1990. Mechanical sap transmission of a closterovirus from *in vitro* shoot tip cultures of a leafroll-affected grapevine to *Nicotiana benthamiana*. Vitis **29**:49-55.
Keywords :grapevine; leafroll; closterovirus; shoot tip culture; *Nicotiana;* mechanical transmission; symptoms; vitivirus; GVA; *in vitro;* hypothesis; ELISA; ISEM; Canada;
Notes :*In vitro* plants of cv. Limberger infected with leafroll were used as an infection source for mechanical sap transmission of virus. The tissue was ground in nicotine + buffer, and the sap was inoculated onto *Nicotiana benthamiana* and 6 other herbaceous plants. Symptoms appeared (after 3 weeks) only on *N. benthamiana*: systemic dwarfing, vein clearing followed by interveinal chlorosis. GVA was identified in test plants. Hypothesis of an association of GVA with leafroll. The advantages of using shoot tip cultures as inoculum source for mechanical transmission of grapevine viruses are discussed.

1111. **Monette, P.L. and M.J. Green.** 1992. Molecular weight and serological comparisons of capsid proteins of grapevine virus A and a grapevine corky bark-associated virus. Can. J. Pl. Pathol. **14**:267-270.
Keywords :grapevine; rugose wood; GVA; GVC; corky bark; vitivirus; trichovirus; leafroll; associated; electrophoresis; immunoassay; western blot; SDS-PAGE; tissue culture; Canada;
Notes : Filamentous flexuous particles shorter than 800 nm were isolated and purified from two cvs. of *Vitis vinifera* showing symptoms of corky bark. The properties of their capsid proteins were compared to those of three isolates of grapevine virus A (GVA) from leafroll-affected grapevine cultivars. The molecular weight of the capsid proteins of the particles from the corky bark-affected vines was 25.7 kDa, whereas that of the GVA capsid proteins was 27 kDa. The two types of capsid proteins were serologically different in Western analysis. (According to a more recent paper by Monette and Green, Plant Pathology, Trends in Agric. Sci. 1, 7-12, 1993, the corky bark-associated virus mentioned in the present paper is grapevine virus C, GVC).

1112. **Monette, P.L., M.J. Green, and P. Gugerli.** 1993. A revised estimate of the size of the capsid protein of GVA, p. 29-30. In P. Gugerli (ed.), Extended abstracts 11th Meeting ICVG, Montreux, Switzerland, 6-9 September 1993. Federal Agricultural Research Station of Changins, CH-1260 Nyon, Switzerland.
Keywords :grapevine; vitivirus; GVA; coat protein; properties; Canada; Switzerland; meeting; ICVG;
Notes : The MW of GVA capsid protein was 26.4 -26.5 kd, somewhat higher than that determined by Boccardo and D'Aquilio (J.Gen.Virol. 53, 179-182). Discussion on this discrepancy.

1113. **Monette, P.L. and D. James.** 1990. The use of *Nicotiana benthamiana* as an herbaceous receptor host for closteroviruses from leafroll-affected grapevines. Amer. J. Enol. Vitic. **41**:201-203.
Keywords :grapevine; leafroll; vitivirus; GVA; *in vitro;* shoot tip culture; mechanical transmission; herbaceous hosts; Nicotiana; Canada;
Notes :*In vitro* shoot tip cultures from four leafroll-affected grapevines were ground in a nicotine-containing buffer and the extracts inoculated into *Nicotiana benthamiana.* Only GVA (now a vitivirus) was identified by ISEM in these plants.

1114. **Monette, P.L. and D. James.** 1990. Use of *in vitro* cultures of *Nicotiana benthamiana* for the purification of grapevine virus A. Plant Cell,Tissue and Organ Culture **23**:131-134.
Keywords :grapevine; *in vitro; Nicotiana;* purification; vitivirus; GVA; method; Canada;
Notes : Seedlings of *Nicotiana benthamiana* were inoculated with GVA. 3 weeks later, single nodes of these plants were cultured *in vitro* and used later as source for GVA purification.

1115. **Monette, P.L. and D. James.** 1990. Detection of two strains of grapevine virus A. Plant Disease **74**:898-900.
Keywords :grapevine; GVA; shoot tip culture; *Nicotiana;* purification; vitivirus; detection; symptoms; strain; isolate; leafroll; *in vitro;* Canada;
Notes : Two isolates of GVA were isolated from *Vitis vinifera* Limberger and Müller- Thurgau with leafroll symptoms, but free of corky bark and rupestris stem pitting. The virus was transmitted from shoot tip cultures by mechanical inoculation to *Nicotiana benthamiana,* and was purified from *in vitro* node

cultures of *N. benthamiana*. The two strains differed in symptoms on *N. benthamiana,* but did not differ serologically.

1116. **Monette, P.L. and D. James.** 1991. Detection of a closteroviruslike particle from a corky bark-affected grapevine cultivar. Vitis **30**:37-43.
Keywords :grapevine; rugose wood; corky bark; trichovirus; GVC; detection; immunoassay; ISEM; Nicotiana; symptoms; Canada;
Notes : Particles of 725 nm were found in sap of *Nicotiana benthamiana* inoculated from corky bark-affected Semillon tissue cultures. The infection killed the *N. benthamiana* plants. No reaction was found in ISEM decoration with NY-1 (= GLRaV III), CA-4, GLRaV I, GLRaV III, apple stem pitting virus, potato virus T, apple chlototic leaf spot. According to a later publication (Monette and Godkin, Plant Pathology, Trends in Agric. Sci. 1, 7-12, 1993), the virus described in the present paper is grapevine virus C (GVC).

1117. **Monette, P.L. and D. James.** 1991. Plant tissue culture as a tool for grapevine virus research, p. 490-492. In I. C. Rumbos, R. Bovey, D. Gonsalves, W. B. Hewitt, and G. P. Martelli (ed.), Proceedings of the 10th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG). Plant Protection Institute, P.O. Box 303, 38001 Volos, Greece.
Keywords :grapevine; tissue culture; method; *in vitro;* purification; shoot tip culture; mechanical transmission; leafroll; rugose wood; corky bark; vitivirus; GVA; Canada; meeting; ICVG;
Notes : As a source for mechanical transmission of viruses, grapevine plantlets raised *in vitro* were much better than vines grown in the glasshouse. The same was true when *in vitro* node cultures of *Nicotiana benthamiana* infected with GVA were used as source plants for virus purification, in comparison with glasshouse-grown plants.

1118. **Monette, P.L., D. James, and S.E. Godkin.** 1989. Comparison of RNA extracts from *in vitro* shoot tip cultures of leafroll-affected and leafroll-free grapevine cultivars. Vitis **28**:229-235.
Keywords :grapevine; dsRNA; RNA; *in vitro;* leafroll; etiology; shoot tip culture; control; Canada;
Notes :11 out of 17 grapevines with leafroll had ssRNA of low MW, and 6 had not. The five controls free from leafroll were also devoid of low MW ssRNA. Several dsRNA of high molecular weight were also observed. They differed in intensity and mobility from a variety to another, but were constant inside each variety. Hypothesis that leafroll could be caused by several agents.

1119. **Monette, P.L., D. James, and S.E. Godkin.** 1989. Double-stranded RNA from rupestris stem pitting-affected grapevines. Vitis **28**:137-144.
Keywords :grapevine; rugose wood; rupestris stem pitting; *in vitro;* dsRNA; etiology; Canada; RNA; stem pitting; negative; viroid; closterovirus; associated;
Notes : Of 31 rupestris stem pitting (RSP) positive origins, 21 had dsRNA and 10 had not. All 10 RSP negative origins had no similar dsRNA. This dsRNA is too small for a viroid and too large for a closterovirus. The authors suggest that it is associated with RSP.

1120. **Monette, P.L. and M. Maixner.** 1993. Disease symptom expression in LN 33 and SO4 rootstocks grafted with a corky bark-affected 'Semillon' interstem and a 'Cabernet Sauvignon' scion, p. 52-53. In P. Gugerli (ed.), Extended abstracts 11th Meeting ICVG, Montreux, Switzerland, 6-9 September 1993. Federal Agricultural Research Station of Changins, CH-1260 Nyon, Switzerland.
Keywords :grapevine; rugose wood; corky bark; symptoms; graft transmission; Canada; meeting; ICVG;

1121. **Monette, P.L. and M. Maixner.** 1994. Symptom Ausprägung von Grapevine Corky Bark an infizierten Propfreben (Symptom expression of grapevine corky bark on infected grafted grapevines). Mitt. Biol. Bundesanstalt. f. Land- u. Forstwirtschaft Berlin-Dahlem *(301):*244.
Keywords :grapevine; corky bark; rugose wood; indexing; green grafting; Canada; Germany;
Notes : In German. Abstract of a paper presented at the 49th "Pflanzenschutztagung" held in Heidelberg in September 1994. Green grafting was performed by assembling three parts: 1. Top with virus free Cabernet Sauvignon; 2. intermediate with Semillon infected with corky bark; 3. virus-free LN33 or SO4 as rootstock.

Typical symptoms appeared after 2 months on the stem of LN33. SO4 gave a reddening of the leaves, but no symptoms on the stem.

1122. **Monis, J., B. Berger, and R. K. Bestwick.** 1996. Production of antibodies specific to a 37 kD polypeptide associated with grapevine leafroll associated virus. Amer. J. Enol. Vitic. **47**:351.
Keywords :grapevine; leafroll; detection; immunoassay; ELISA; USA;
Notes : Abstract of a paper presented at the 47th annual meeting of ASEV, Reno, Nevada, 26-28 June 1996. A new polypeptide of ca. 37 kD (p37) was found to be associated with leafroll disease in a mixed virus infection. It was separated from the 38 kD polypeptide associated with GLRaV-1 by SDS-PAGE. Preparations from SDS-PAGE were used to immunize mice for the production of monoclonal and polyclonal antibodies. The availability of a p37 monoclonal antibody will facilitate the screening of nursery plants for the presence of this new virus.

1123. **Monis, J., B. Berger, and R. K. Bestwick.** 1996. Serological characterisation of grapevine associated closteroviruses, p. PW61-3. In Xth International Congress of Virology, Jerusalem,Israel,11-16 August, 1996.
Keywords :grapevine; leafroll; GLRaV; GCBaV; GLRaV-2; detection; western blot; USA;
Notes : Abstract.

1124. **Monis, J., B. Berger, and R. K. Bestwick.** 1996. Serological characterization of grapevine-associated closteroviruses. Proceedings of the Xth International Congress of Virology, Jerusalem, Israel, 11-16 August, 1996.
Keywords :grapevine; closterovirus; GLRaV; immunoassay; ELISA; western blot; USA;

1125. **Monis, J. and R. Bestwick.** 1995. Characterization of grapevine associated closteroviruses by Western blot. Phytopathology **85**:1184.
Keywords :grapevine; closterovirus; leafroll; associated; GCBaV; western blot; immunoassay; California; USA;
Notes : Abstract. Description of a simple method for detecting GLRaVs and GCBaV.

1126. **Monis, J. and R. K. Bestwick.** 1996. Detection and localization of grapevine leafroll associated closteroviruses in greenhouse and tissue culture grown plants. Amer. J. Enol. Vitic. **47**:199-205.
Keywords :grapevine; leafroll; closterovirus; GLRaV-1; GLRaV-2; GLRaV-3; detection; diagnosis; *in vitro*; tissue culture; immunoassay; ELISA; California; USA;
Notes :A study was made in order to determine the most suitable plant tissues and the best time of the year for detecting grapevine leafroll-associated viruses (GLRaV-1, -2 and -3) by ELISA in grapevines grown in greenhouse or in tissue culture. The highest concentration of virus was found in the bottom portions of actively growing stems and petioles. Old leaves with symptoms had more virus than young leaves. The distribution of the three viruses in the plant was uneven, but generally speaking the highest titre of the virus was found near the lower part of the vines. The virus was detected by ELISA throughout the year except at the beginning of the growing season in stem and petiole tissues from the basal part of plants. Explants from individual nodes grown *in vitro* provided good virus sources for detection, even when the virus titre of the original part of the vine was low.

1127. **Monis, J. and R. K. Bestwick.** 1997. Relationship between grapevine leafroll associated virus-2, grapevine corky bark associated virus, and the rootstock-scion incompatibility syndrome. Amer. J. Enol. Vitic. **48**:393.
Keywords :grapevine; leafroll; rugose wood; corky bark; incompatibility; closterovirus; GLRaV-2; GCBaV; GLRaV-1; GLRaV-4; GLRaV-5; GLRaV-8; western blot; USA;
Notes : Abstract. A polyclonal antibody against a mixed virus infection called GLRaV-2US reacted weakly to the 24 kD polypeptide associated with GLRaV-2, strongly with GLRaV-1 and a newly characterized GLRaV-8, and weakly against GLRaV-4 and -5. In addition, a polyclonal antiserum raised against the French isolate of GLRaV-2 reacted with leafroll and corky bark and to grapevine plants showing rootstock-scion incompatibility (RSI) symptoms. In Western blot assays, the GCBaV and RSI polyclonal

antibodies and the monoclonal antibodies to GCBaV-2b (GLRaV-2b ?) detected the same molecular weight protein (24 kD).

1128. **Monis, J. and R. K. Bestwick.** 1997. Serological detection of grapevine associated closteroviruses in infected grapevine cultivars. Plant Disease **81**:802-808.
Keywords :grapevine; closterovirus; GLRaV-1; GLRaV-2; GLRaV-3; GLRaV-4; GCBaV; incompatibility; detection; immunoassay; ELISA; western blot; comparison; method; USA;
Notes : Using monoclonal antibodies (MAb) and polyclonal antisera (PA) in Western blot (WB) and enzyme-linked immunosorbent assay (ELISA), the authors detected mixed infections with several grapevine leafroll associated viruses (GLRaVs) and grapevine corky bark associated virus (GCBaV) in 16 grapevine isolates of various cultivars and infection status, showing symptoms of leafroll (LR), corky bark(CB) and/or rootstock-scion incompatibillity (RSI). The MAbs and some of the PA were obtained from commercial sources or from other laboratories, whereas three PA were prepared by the authors: an anti-GLRaV-1 38kDa polypeptide, an anti-RSI 24kDa polypeptide, and a negative control PA prepared with healthy Riparia Gloire. Comparison of biological indexing, WB and ELISA shows that only in one case biological indexing failed to reveal a LR infection (GLRaV-1, French Colombard) that was detected by WB and ELISA.

1129. **Monis, J. and R. K. Bestwick.** 1997. Production of monoclonal antibodies specific to grapevine associated closteroviruses, p. 105. In O. A. Sequeira,de, J. C. Sequeira, and M. T. Santos (ed.), Extended abstracts 12th Meeting ICVG, Lisbon, Portugal, 29 September-2 October 1997. Dept.Plant Palthology, Estação Agronomica Nacional, Oeiras, Portugal.
Keywords :grapevine; closterovirus; GLRaV-1; GLRaV-2; GLRaV-3; GLRaV-4; GLRaV-5; GLRaV-8; monoclonal antibodies; ELISA; western blot; USA; meeting; ICVG;

1130. **Monis, J., R.K. Bestwick, and J.A. Stamp.** 1994. Seasonal detection of grapevine leafroll associated viruses in greenhouse and tissue culture grown grapevines. Phytopathology **84**:1154.
Keywords :grapevine; leafroll; GLRaV-1; GLRaV-2; GLRaV-3; closterovirus; detection; tissue culture; distribution; infection; USA;
Notes : The 3 closteroviruses GLRaV I, II and III are unevenly distributed in tissues. The highest level of virus concentration is in the lower parts of the plant. Leaves with symptoms are better sources of virus than young leaves.

1131. **Monis, J., R.K. Bestwick, and J.A. Stamp.** 1994. Studies on the sampling and distribution of grapevine leafroll-associated viruses in greenhouse-grown grapevines. Amer. J. Enol. Vitic. **45**:357.
Keywords :grapevine; leafroll; GLRaV; detection; ELISA; method; sampling; USA;
Notes : Abstract. The aim of these studies was to determine the best tissue, time, and method for sampling grapevine leafroll-associated viruses (GLRaV) infected material. ELISA using GLRaV-1,2 and 3-specific antibodies showed that the bottom portion of vegetatively growing stems and petioles had the highest concentration of virus. Older and symptomatic leaves had higher titers of virus than younger leaves. Leaf borers were used for collecting disks from leaves, and mixing several samples from the same vine was tested. Results indicate that several (at least three) samples from each mother plant should be tested separately in order to obtain relevant results in the testing of GLRaV infected material.

1132. **Monis, J., R.K. Bestwick, and J.A. Stamp.** 1995. Detection of grapevine associated closteroviruses by a sensitive Western blot immunoassay. Amer. J. Enol. Vitic. **46**:404.
Keywords :grapevine; leafroll; closterovirus; GLRaV-1; GLRaV-2; GLRaV-3; GLRaV-4; GCBaV; rugose wood; corky bark; detection; immunoassay; western blot; California; USA;
Notes : Abstract. A western blot immunoassay method has been developed for detecting grapevine leafroll and grapevine corky bark associated viruses.

1133. **Morrell, A.M. and R.L. Wample.** 1995. Thermotolerance of dormant and actively growing Cabernet Sauvignon is improved by heat shock. Amer. J. Enol. Vitic. **46**:243-249.
Keywords :grapevine; heat therapy; method; USA;

Notes : The thermotolerance of grapevines of cv. Cabernet Sauvignon was significantly increased after the plants had been submitted to a short heat shock period of four hours at 40°C followed by a four hour period at 25° C. Similar results were obtained when cuttings stored at 3° C were removed and heat shocked for 30 minutes at 45° C. The interest of these results in relation with heat therapy for eliminating viruses or phytoplasmas is discussed.

1134. **Mortensen, J.A. and L.H. Stover.** 1990. Best combiners during 40 years of breeding *Vitis* cultivars resistant to Pierce's disease, p. 271-277. In G. Alleweldt (ed.), Proceedings of the 5th International Symposium on Grape Breeding, September 1989. St.Martin/Pfalz, Germany. Bundesforschungsanstalt für Rebenzüchtung Geilweilerhof, D-76833 Siebeldingen, BRD.
Keywords :grapevine; Pierce's disease; resistance; germplasm; breeding; USA; meeting;
Notes : Special issue of Vitis. Book chapter. Several sources of resistance to Pierce's disease were found in *Vitis* species growing naturally in the woodlands of Florida and were collected in 1942-1943. Several years of breeding led to the creation of a few high-quality cultivars that are resistant to Pierce's disease.

1135. **Moser, O.** 1990. Etude de deux protéines non structurales de deux virus de plantes: le virus de la mosaïque du tabac et le virus du court-noué de la vigne (Study of two non stuctural proteins of two plant viruses: tobacco mosaic virus and grapevine fanleaf virus). Université Louis Pasteur, Strasbourg, France.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; protein; properties; molecular analysis; France; thesis;
Notes : PhD thesis, University Louis Pasteur, Strasbourg, France.

1136. **Moser, O., M. Fuchs, L. Pinck, and C. Stussi-Garaud.** 1992. Immunodetection of grapevine fanleaf virus satellite RNA-encoded protein in infected *Chenopodium quinoa.* J. Gen. Virol. **73**:3033-3038.
Keywords :grapevine; detection; nepovirus; grapevine fanleaf virus; satellite RNA; protein; immunoassay; *Chenopodium quinoa;* France;

1137. **Mossop, D.W., D.R. Elliott, and K.D. Richards.** 1985. Association of closterovirus-like particles and high molecular weight double-stranded RNA with grapevines affected by leafroll disease. N. Z. J. Agric. Res. **28**:419-425.
Keywords :grapevine; leafroll; closterovirus; dsRNA; corky bark; rugose wood; New Zealand;
Notes : Filamentous particles of about 1400 nm, dsRNA with MW of about 8000 kD were found in phloem of leafroll-affected grapevines. Plants with corky bark had also a dsRNA of high molecular weight, similar to that of leafroll associated particles in electrophoretic mobility. No specific identification of the virus(es) was made by serology.

1138. **Moutous, G. and M. Hévin.** 1986. Transmission expérimentale de la maladie de l'écorce liégeuse de la vigne, "corky bark", par la cicadelle *Scaphoideus littoralis* Ball (Homoptera Jassidae) (Experimental transmission of grapevine corky bark by the leafhopper *Scaphoideus littoralis* Ball (Homoptera Jassidae)). Agronomie **6**:387-392.
Keywords :grapevine; rugose wood; corky bark; transmission; leafhopper; vector; *Scaphoideus littoralis;* France;
Notes : Two types of experiments were made. 1. In the field, caged healthy LN 33 plants received *Scaphoideus littoralis* from a healthy stock, previously fed for 7-34 days on corky bark (CB)-diseased plants, and left for 21-128 days on LN 33 (15-125 leafhoppers per transmission). 2. In the glasshouse, groups of two plants, one healthy LN 33 and one CB-diseased vine, were put in an insect-proof cage. Healthy *S. littoralis* leafhoppers were introduced and left to feed on the vines for periods from 11-86 days. Afterwards, test plants were sprayed with insecticide and planted in the field. 50% transmission was recorded on LN 33, no symptom occured on healthy controls.

1139. **Murant, A.F., A.T. Jones, G.P. Martelli, and R. Stace-Smith.** 1996. Nepoviruses: General properties, diseases, and virus identification, p. 99-137. In B. D. Harrison and A. F. Murant (ed.), Plant Viruses, Vol 5. Plenum Press, London and New York.
Keywords :nepovirus; classification; properties; identification; general; handbook;

1140. **Murari, E., A. Bertaccini, M. Vibio, and G. Posenato.** 1996. Presenza di fitoplasmi in un vigneto del Soave (Presence of phytoplasmas in a Soave vineyard). L'Informatore Agrario **52***(20):*66-68.
Keywords :grapevine; phytoplasma; phytoplasma disease; flavescence dorée; bois noir; detection; molecular analysis; nucleic acid assay; PCR; aster yellows; elm yellows; apple proliferation; Italy;
Notes : In Italian. A molecular analysis of nucleic acid from leaf veins of vines showing symptoms of yellows was performed. PCR analysis showed the presence of several types of phytoplasmas, alone or sometimes in mixed infections: Aster yellows subgroup B, aster yellows subgroup G (bois noir), elm yellows (FD), apple proliferation. The presence of phytoplasmas as detected by molecular analysis is not always correlated with symptoms of yellows, but tests made on asymptomatic vines never showed the presence of specific phytoplasmas, except for apple proliferation (or witches' broom) disease phytoplasma. These infections seem to appear in a transient way and mainly in the month of May.

1141. **Murari, E., M. Borgo, M. Vibio, E. Sartori, and A. Bertaccini.** 1997. Thermotherapy trials to eliminate phytoplasmas from Prosecco, Chardonnay and Incrocio Manzoni 6.0.13 grapevine cultivars: preliminary results, p. 85-86. In O. A. Sequeira,de, J. C. Sequeira, and M. T. Santos (ed.), Extended abstracts 12th Meeting ICVG, Lisbon, Portugal, 29 September-2 October 1997. Dept.Plant Pathology, Estação Agronomica Nacional, Oeiras, Portugal.
Keywords :grapevine; phytoplasma disease; hot water treatment; control; Italy; meeting; ICVG;
Notes : Hot water treatment was performed on mature canes of cvs. Prosecco, Chardonnay and Oncrocio Manzoni 6.0.13 in order to control yellows diseases. Phytoplasma occurrence in diseased material was assessed by molecular analysis before and after treatment. All diseased plants were singly or doubly infected with phytoplasmas belonging to the aster yellows and/or elm yellows phytoplasma group. The treatment was made at 45^{o}C for 3 hours or 50^{o}C for 40 minutes. After the treatment, the canes were rooted and planted in an insect-proof screenhouse. Both treatments were efficient for eliminating phytoplasmas of both types, but the mortality of the 50^{o}C treatment was rather high. These results are preliminary, as more time is necessary for phytoplasma symptom expression in the field. (The 4th author is noted Sartori S. in the original text, but this is probably a misprint.)

1142. **Mushegian, A.R.** 1994. The putative movement domain encoded by nepovirus RNA-2 is conserved in all sequenced nepoviruses. Arch. Virol. **135**:437-441.
Keywords :grapevine; nepovirus; grapevine chrome mosaic virus; tomato black ring virus; raspberry ringspot virus; arabis mosaic virus; grapevine fanleaf virus; tomato ringspot virus; sequence analysis; genome;
Notes : Among viruses infecting grapevine, this study includes GCMV, TBRV, RRV, ArMV, GFLV, TomRSV.

1143. **Namba, S., D. Boscia, O. Azzam, M. Maixner, J. S. Hu, D. Golino, and D. Gonsalves.** 1990. Purification and properties of closterovirus-like particles isolated from a corky bark diseased grapevine. Phytopathology **80**:1022.
Keywords :grapevine; rugose wood; corky bark; closterovirus-like particles; purification; properties; USA; Italy; Japan;
Notes : Closterovirus-like particles 14nm x 1400-2000 nm, with a helical pitch of 3.4 nm were observed in the electron microscope. The mol. weight of the coat protein was about 24 x 10^3, the mw of ds RNA molecule about 10.4 x 10^6. No serological reaction was obtained with GLRaV I, II, III, IV, nor with GVA.

1144. **Namba, S., D. Boscia, O. Azzam, M. Maixner, J.S. Hu, D. Golino, and D. Gonsalves.** 1991. Purification and properties of closteroviruslike particles associated with grapevine corky bark disease. Phytopathology **81**:964-970.
Keywords :grapevine; rugose wood; corky bark; etiology; GCBaV; closterovirus; citrus tristeza virus; purification; properties; immunoassay; Japan; USA; Germany; Italy;
Notes : Flexuous closterovirus-like particles were purified from mature leaves and stem phloem tissue of a corky bark-affected grapevine that had given negative results on indexing for other grapevine viruses. They were designated as corky bark-associated virus (GCBaV). The particles were about 13 nm in diameter

with a helical pitch of about 3.4 nm and were 1400 to 2000 nm long. The particles were much ess stable than GLRaV in purified preparations. Their coat protein had a mw. of 24 000. A large dsRNA molecule of about 15.3 kbp, along with smaller molecules of dsRNA was detected in diseased tissues, not in healthy ones. Polyclonal antisera against GCBaV did not react with GLRaV I and III in ELISA, nor with GVA. GCBaV is considered as the causal agent of corky bark disease. Its inclusion in the Citrus tristeza group of closteroviruses is proposed.

1145. **Namba, S., D. Boscia, O. Azzam, M. Maixner, J.S. Hu, D. Golino, and D. Gonsalves.** 1991. Purification and properties of closterovirus-like particles isolated from a corky bark diseased grapevine, p. 61. In I. C. Rumbos, R. Bovey, D. Gonsalves, W. B. Hewitt, and G. P. Martelli (ed.), Proceedings of the 10th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG).
Plant Protection Institute, P.O.Box 303, 38001 Volos, Greece.
Keywords :grapevine; purification; properties; closterovirus; rugose wood; corky bark; virus; virus diseases; coat protein; relationship; GCBaV; meeting; ICVG; Japan; Italy; Germany; USA;
Notes : Abstract. Closterovirus-like particles of a virus called grapevine corky bark associated virus (GCBaV) were purified from petioles of cv. Semillon showing symptoms of corky bark disease. They were 1400-2000 nm in length, 13 nm in diameter, and showed a helical pitch of 3.4 nm. The coat protein mol. weight is 24 kD. A dsRNA of mw ca.10.4 x 10^6 was isolated from bark phloem of corky bark infected Semillon. There is no serological relationship between GCBaV and GVA, GLRaV-I,II or III. See also from the same authors: Phytopathology 81, 964-970, 1991 (ref. 1144).

1146. **Namba, S., D. Boscia, S. Yamashita, T. Tsuchizaki, and D. Gonsalves.** 1991. Purification and properties of spherical virus particles associated with grapevine ajinashika disease. Plant Disease **75**:1249-1253.
Keywords :grapevine; ajinashika disease; etiology; GAaV; grapevine ajinashika associated virus; grapevine fleck virus; relationship; properties; immunoassay; ISEM; purification; Japan; Italy; USA;
Notes : The properties of grapevine ajinashika associated virus (GAaV), purified from ajinashika-affected berries are described. The virus has isometric particles about 25 nm in diameter, which sediment in a single component of about 110S. The buoyant density in CsCl is about 1.38 g/cm3 and the nucleic acid content is about 30%, with a single-stranded RNA of about 6.8 kb and a coat protein of 28000 Da. These properties are similar to those of the luteovirus group. The virus can be detected in extracts of shoots and berries by IEM and ELISA. GAaV has no serological relationship with barley yellow dwarf and potato leafroll viruses. The relationships between GAaV and GPLIV (Grapevine phloem limited isometric virus or grapevine fleck virus) are not clear: both are phloem-limited. GPLIV-antiserum reacts with GAaV in protein-A gold labelling ISEM, but no reaction occurs in reciprocal tests.

1147. **Namba, S., T. Iwanami, S. Yamashita, Y. Doi, and M. Hatamoto.** 1986. Three phloem-limited viruses of grapevine: Diagnosis by direct fluorescence detection, p. 109-126. In Taipeh Food and Fertilizer Technology Center for the Asian and Pacific Region,Taiwan. (ed.), Plant Virus Diseases of Horticultural Crops in the Tropics and Subtropics. FFTC Book Series No. 33, Taipeh, Taiwan.
Keywords :grapevine; grapevine ajinashika virus; grapevine stunt virus; leafroll; ajinashika disease; transmission; leafhopper; detection; *Arboridia apicalis;* mealybug; vector; ELISA; immunoassay; virus; fluorescence; Japan;
Notes : In English, Jap. and Chin. sum. Ajinashika virus has isometric particles, no vector is known. The virus was purified and used for ELISA serology. Grapevine stunt has spherical particles and the vector is the leafhopper *Arboridia apicalis*. Leafroll has filamentous particles, which are transmitted by mealybugs. All three viruses can be detected by direct fluorescence. FFTC, Taipeh, Taiwan. Book chapter. Technical Bulletin No 92.

1148. **Namba, S. and G.P. Martelli.** 1993. Grapevine stunt, p. 71-73. In G. P. Martelli (ed.), Graft-transmissible diseases of grapevines. Handbook for detection and diagnosis. FAO, Rome.
Keywords :grapevine; grapevine stunt; grapevine stunt virus; *Arboridia apicalis;* symptoms; detection; diagnosis; Japan; Italy;

1149. **Namba, S. and G.P. Martelli.** 1993. Ajinashika disease, p. 67-69. In G. P. Martelli (ed.), Graft-transmissible diseases of grapevines. Handbook for detection and diagnosis. FAO, Rome.
Keywords :grapevine; ajinashika disease; grapevine ajinashika virus; symptoms; detection; diagnosis; Japan; Italy;

1150. **Namba, S., S. Yamashita, T. Tsuchizaki, D. Boscia, and D. Gonsalves.** 1991. Purification and properties of spherical virus particles associated with grapevine ajinashika disease, p. 130. In I. C. Rumbos, R. Bovey, D. Gonsalves, W. B. Hewitt, and G. P. Martelli (ed.), Proceedings of the 10th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG). Plant Protection Institute, P.O. Box 303, 38001 Volos, Greece.
Keywords :grapevine; ajinashika disease; virus; isometric; grapevine ajinashika associated virus; purification; Japan; Italy; USA; meeting; ICVG;
Notes : Abstract. A virus with isometric particles called grapevine associated ajinashika virus (GAaV) was found to be asssociated with ajinashika disease of cv. Koshu in Japan.

1151. **Navas, A. and M. Arias.** 1986. On the distribution and ecology of *Xiphinema index* and *Xiphinema italiae* in Spain. Nematol. medit. **14**:207-215.
Keywords :grapevine; nematode; *Xiphinema index; Xiphinema italiae;* Longidoridae; occurrence; distribution; Spain;
Notes : Samples of soil (1230 samples altogether, 732 from arable soil, 502 from uncultivated areas) were collected in Central Region and Rioja, in order to study the distribution of both species. *Xiphinema italiae* was found in arable soil, but more often in uncultivated soil. *X.index* was found mostly in arable soil, and especially in vineyards.

1152. **Nelson-Kluk, S. and A. Rowhani.** 1991. Evaluation by ELISA and dsRNA of two tissue techniques for the elimination of grapevine leafroll virus from *Vitis vinifera* cv. Italia, p. 373. In I. C. Rumbos, R. Bovey, D. Gonsalves, W. B. Hewitt, and G. P. Martelli (ed.), Proceedings of the 10th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG). Plant Protection Institute, P.O. Box 303, 38001 Volos, Greece.
Keywords :grapevine; leafroll; comparison; closterovirus; GLRaV-3; immunoassay; nucleic acid assay; virus elimination; *in vitro*; shoot tip culture; fragmented shoot apex culture; ELISA; dsRNA; USA; California; meeting; ICVG;
Notes : Both shoot tip culture and fragmented shoot tip culture were successful in eliminating leafroll from Italia infected grapevine material. Tests were made by ELISA with antiserum against GLRaV-III, and with dsRNA analysis.

1153. **Nolasco, G., C. De Blas, and O.A. Sequeira.** 1994. Molecular typification of plant viruses by the use of aleatory cDNA synthesis in immunocapture reverse transcriptional polymerase chain reaction, p. 5-7. In Proceedings 9th Congress of the Mediterranean Phytopathological Union, September 1994, Kusadasi-Aydin, Turkey.
Keywords :grapevine; virus; detection; immunocapture; reverse transcription; PCR; nucleic acid assay; method; meeting; Portugal;
Notes : Book chapter. Mediterranean Phytopathological Union.

1154. **Nolasco, G., C. De Blas, V. Torres, and F. Ponz.** 1993. A method combining immunocapture and PCR amplification in a microtiter plate for the detection of plant viruses and subviral pathogens. J. Virol. Methods **45**:201-218.
Keywords :grapevine; nepovirus; viroid; grapevine fanleaf virus; detection; immunocapture; PCR; fluorescence; nucleic acid assay; reverse transcription; Portugal;
Notes : This is the describtion of a method for detecting plant viruses and virus-like pathogens by immunocapture and amplification of nucleic acid of fixed virions by PCR. The reverse transcription of the RNA was made directly on the retained material in a microtiter plate. The amplified products were evaluated by fluorescence. Virus-specific antibodies can be replaced by monoclonal antibodies against ds-

RNA. The method described has the high sensitivity of detection assays with PCR. It is as easy as ELISA, and a similar degree of automation can be acheieved. It was used for detecting grapevine fanleaf virus.

1155. **Nolasco, G. and O.A. Sequeira.** 1994. Immunocapture reverse transcriptional polymerase chain reaction (IC/RT-PCR) in the detection of satellite RNA of grapevine fanleaf virus, p. 59-61. In Proceedings 9th Congress of the Mediterranean Phytopathological Union, September 1994, Kusadasi-Aydin, Turkey.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; satellite RNA; detection; immunocapture; nucleic acid assay; reverse transcription; PCR; meeting; Portugal;
Notes : Book chapter. Mediterranean Phytopathological Union.

1156. **Nolasco, G. and O.A. Sequeira,de.** 1985. The dynamics and performing conditions of ELISA in the detection of grapevine fanleaf virus in grapevine. Garcia de Orta,Sér. Est. Agron. **12***(1/2):*273-280.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; detection; immunoassay; ELISA; method; Portugal;
Notes : This work is part of a thesis presented by one of the authors (Nolasco,1982) to obtain de degree of Agronomist at the Instituto Superior de Agronomia, University of Lisbon.

1157. **Nolasco, G. and O.A. Sequeira,de.** 1993. Genome diversity of field isolates of grapevine fanleaf virus (GFLV) analyzed by single stranded conformation (SSCP) and restriction fragment length (RFLP) polymorphisms, p. 31-32. In P. Gugerli (ed.), Extended abstracts 11th Meeting ICVG, Montreux, Switzerland, 6-9 September 1993. Federal Agricultural Research Station of Changins, CH-1260 Nyon, Switzerland.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; genome; diversity; strain; Portugal; meeting; ICVG;
Notes : Each GFLV infected grapevine appears to harbour a distinct strain and only this one, but there is a surprising variability among strains isolated from different vines in the same vineyard.

1158. **Nolasco, G. and O.A. Sequeira,de.** 1993. Immunocapture polymerase chain reaction (IC/PCR) in the diagnosis of grapevine fanleaf virus (GFLV) in grapevine field samples, p. 158-159. In P. Gugerli (ed.), Extended abstracts 11th Meeting ICVG, Montreux, Switzerland, 6-9 September 1993. Federal Agricultural Research Station of Changins, CH-1260 Nyon, Switzerland.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; detection; cDNA; PCR; nucleic acid assay; diagnosis; Portugal; meeting; ICVG;
Notes :A method for the detection of GFLV by IC/PCR was developed. Microtiter plates were coated with IgG, the plant tissue to be tested was added and the plates were incubated and washed as in the case of ELISA. A mixture containing the reagents for cDNA synthesis was added to each well. After reverse transcription, the liquid containing the cDNA was transferred to a tube containing the remaining reagents for amplification. The thermal amplification cycling was then applied, and the amplification products were analysed by electrophoresis and viewed under UV light after ethidium bromide staining. The sensitivity of IC/PCR is much higher than that of ELISA (maximum dilution with positive readings 1/800000 versus 1/3200). In comparative tests with 109 samples, six out of 22 ELISA negative were IC/PCR positive. But from 85 ELISA positive samples, 5 were IC/PCR negative. This may be explained by the genetic diversity of virus nucleic acid. According to the authors, the method does not involve more work in the preparation of samples than ELISA. It could be applied to large scale surveys.

1159. **Nolasco, G., Z. Sequeira, M.T. Santos, J.C. Sequeira, and O.A. Sequeira.** 1997. IC/RT-PCR coupled to exonuclease fluorescent assay. Early-spring detection of GLRaV-3 in leaf petioles, p. 91-92. In O. A. Sequeira,de, J. C. Sequeira, and M. T. Santos (ed.), Extended abstracts 12th Meeting ICVG, Lisbon, Portugal, 29 September-2 October 1997. Dept.Plant Pathology, Estação Agronomica Nacional, Oeiras, Portugal.
Keywords :grapevine; leafroll; closterovirus; GLRaV-3; immunocapture; PCR; nucleic acid assay; immunoassay; ELISA; detection; comparison; method; Portugal; meeting; ICVG;
Notes : A molecular detection method based on IC-RT-PCR and coupled with fluorescence assay was used to detect GLRaV-3 in infected grapevines. In comparison with ELISA, the method made it possible to

detect GLRaV-3 one to three weeks earlier in the spring, and also later in the season. However, the agreement between ELISA and the molecular assay was not always satisfactory. This aspect needs further clarification.

1160. **Novoa, D.** 1989. Cicadelle de la flavescence dorée. Description d'une technique de piégeage. (Leafhopper vector of flavescence dorée. Description of a sampling technique). Progr. Agric. Vitic. **106**:472-473.
Keywords :grapevine; phytoplasma disease; flavescence dorée; leafhopper; vector; *Scaphoideus titanus;* control; France;
Notes : Colour sticky traps "Soveurode" initially designed for the study of whiteflies were used successfully for sampling the leafhopper vector of flavescence dorée, *Scaphoideus titanus.*

1161. **Oliveira, A.R., J. Vega, H. Kuniyuki, C.R. Baptista, G.W. Muller, and A.S. Costa.** 1988. Detecçao de virus serologicamente identico ao da tristeza dos citros em calos de videira Seibel 2 com enrolamento da folha atraves de MEIAD (Detection of a closterovirus serologically identical to citrus tristeza virus in callus from leafroll infected grapevine Seibel 2 through ISEM). Fitopatologia Brasileira **13**:133.
Keywords :grapevine; leafroll; tissue culture; *in vitro;* closterovirus; immunoassay; ISEM; citrus tristeza virus; Brazil;
Notes : In Portuguese. Calluses with three months of development grown *in vitro* from explants of cv. Seibel 2 with symptoms of leafroll were macerated in phosphate buffer containing 1% polyethylene glycol and tested against three antisera. Flexuous particles typical of closteroviruses were observed in the EM. They were decorated by antibodies against citrus tristeza virus. (Abstract of a paper presented at the 21st annual meeting of the Brazilian Phytopathological Society).

1162. **Oncino, C., O. Hemmer, and C. Fritsch.** 1995. Specificity in the association of tomato black ring virus satellite RNA with helper virus. Virology **213**:87-96.
Keywords :grapevine; tomato black ring virus; nepovirus; satellite RNA; helper virus; France;
Notes : Some isolates of tomato black ring virus (TBRV) have a satellite RNA (sat-RNA) consisting of a single stranded molecule of about 1375 nucleotides, which encode a nonstructural protein of 48K which is involved in the replication of the sat-RNA. The TBRV sat-RNAs need the presence of a helper virus for their replication and encapsidation. Using two strains of TBRV and also grapevine chrome mosaic virus, a nepovirus very close to TBRV, the authors studied the mechanism of the replication of TBRV and the role of the diverse genetic determinants of this virus.

ONIVINS, 1996. La certification des plants de vigne (Certification of grapevine planting material). Progr. Agric. Vitic. **113**:158-160.
Keywords :grapevine; certification; selection; indexing; France;
Notes : In French. Description of the scheme for certification of grapevine planting material as it is applied in France.

1164. **ONIVINS,** 1996. Viroses de la vigne et tests sanitaires (Grapevine virus diseases and health tests). Progr. Agric. Vitic. **113**:161-162.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; arabis mosaic virus; closterovirus; leafroll; GLRaV; detection; indexing; immunoassay; identification; control; France;
Notes :A description is given of the main viruses of grapevine occurring in France: GFLV, ArMV, GLRAV's. The current techniques for detection and diagnosis by indexing and serology are outlined. Information is given on the sanitation measures to be taken once an infection has been detected.

1165. **Osler, R., A. Arzone, R. Credi, B. Di Terlizzi, and P. Del Serrone.** 1993. Trasmissione sperimentale dell'agente della malattia (Experimental transmission of the disease agent), p. 31-37. In E. Refatti (ed.), Extended Abstracts, Convegno "La flavescenza dorata ed altri giallumi della vite, stato attuale delle conoscenze e problemi di lotta". Eurovite '93, Gorizia, Italy.

Keywords :grapevine; phytoplasma; phytoplasma disease; flavescence dorée; epidemiology; transmission; *Scaphoideus titanus;* leafhopper; Auchenorrhyncha; dodder; graft transmission; Italy;
Notes : In Italian. Extended abstracts of papers presented at a meeting on flavescence dorée (FD) and other grapevine yellows at Gorizia, Italy, in December 1993. Summary of research on transmission of FD in various Institutes of Italy. Transmission by insects, by cuscuta, by graft and by lymph transfusion. 25 references.

1166. **Osler, R., E. Boudon-Padieu, L. Carraro, A. Caudwell, and E. Refatti.** 1992. First results on the trials in progress to identify the vector of the agent of a Grapevine yellows in Italy. Phytopath. medit. **31**:175-181.
Keywords :grapevine; phytoplasma; phytoplasma disease; flavescence dorée; vector; *Scaphoideus titanus;* leafhopper; immunoassay; ELISA; western blot; Italy; France;
Notes : An epidemic grapevine yellows disease (GYD) in the Friuli-Venezia Giuliana region in northern Italy has symptoms very similar to those of flavescence dorée (FD). Attempts were made during 4 years to transmit it with *Scaphoideus titanus*, vector of FD in France, a leafhopper which occurs in vineyards in northern Italy. Results were almost entirely negative (1 transmission out of about 100 attempts using more than 2000 leafhoppers). However, serological tests showed without doubt that leafhoppers fed on GYD-infected vines had acquired antigens closely related to those of FD-MLO specific antigens. *S. titanus* appears to be able to ingest from GYD-infected vines a factor that is serolgically related to FD-MLO and could be the agent of GYD, but it is unable to transmit it efficiently to grapevine.

1167. **Osler, R., L. Carraro, N. Loi, and E. Refatti.** 1993. Symptom expression and disease occurrence of a yellows disease of grapevine in northeastern Italy. Plant Disease **77**:496-498.
Keywords :grapevine; phytoplasma disease; epidemiology; transmission; *Scaphoideus titanus;* vector; Italy;
Notes :A severe yellows disease of grapevine (GYD) has been spreading in northeastern Italy since 1982. Chardonnay is the most susceptible cultivar. Symptoms are similar to those of FD, but spread is not correlated with the density of populations of *Scaphoideus titanus*. Young healthy Chardonnay plants were exposed to natural infection, together with sources of GYD. Some of the healthy plants were protected under plastic screen. During 6 years of experimentation, 30 exposed plants developed symptoms, whereas none of the screened vines became infected. The minimum incubation period was about 5 months. Infected plants protected by a screen showed transitory recovery.

1168. **Osler, R., M.E. Vindimian, L. Carraro, C. Frausin, and E. Refatti.** 1997. On the transmission of grapevine yellows disease by bench-grafting, p. 63-64. In O. A. Sequeira,de, J. C. Sequeira, and M. T. Santos (ed.), Extended abstracts 12th Meeting ICVG, Lisbon, Portugal, 29 September-2 October 1997. Dept.Plant Pathology, Estação Agronomica Nacional, Oeiras, Portugal.
Keywords :grapevine; phytoplasma disease; flavescence dorée; bois noir; graft transmission; Italy; meeting; ICVG;
Notes : An experiment aimed at determining the importance of bench-grafting in the propagation of grapevine yellows disease was set up in the Trento and Friuli provinces in northern Italy. Three types of grapevine budwood were bench-grafted onto healthy rootstocks:
a. standard material, collected from asymptomatic vines in vineyads, with a low percentage (about 5%) of infected plants : 1686 plants
b. healthy controls originating from virus-free and phytoplasma-free vines: 204 plants.
c. infected controls originating from yellows affected plants (bois noir): 206 plants.
After bench grafting, the plants were rooted as usual and planted in two insect-proof screenhouses for five years. Grapevines of groups a, b and c were also planted in several vineyards of northern Italy and observed for 7 years. The influence of phytoplasmas on successful graft take is interesting an may partly explain the low level of propagation of the disease by graft. Graft take was 55% for the standard scions (a), 90% for healthy scions (b) and 25% for bois noir-infected scions (c). Results show that bois noir is poorly propagated by bench grafting. The percentages of diseased vines after five years in the screenhouses were on an average 0.12% for the standard scions (a), 0% for healthy scions (b) and 2.4% and 0% respectively in the glasshouses of Trentino and Friuli for bois noir scions (c). In contrast, healthy vines (b) planted in two

vineyards in Friuli and exposed to natural contamination had 12 and 68% of yellows diseased plants whereas standard vines (a) planted in two vineyards in Trentino and one in Friuli showed respectively 21.2, 0.3 and 1.8% yellows infected vines. (see also next reference).

1169. **Osler, R., M.E. Vindimian, M. Filippi, L. Carraro, and E. Refatti.** 1997. Possibilità di propagazione del giallume della vite (legno nero) a mezzo del materiale vivaistico (Possibility of transmission of grapevine blackwood through nursery material). Inform. Fitopatol. **47***(11)*:61-63.
Keywords :grapevine; phytoplasma disease; bois noir; graft transmission; Italy;
Notes : In Italian, Eng.sum. An experiment was set up in spring 1988 in Trentino (Italy) in order to assess the risk of transmission of blackwood (bois noir) by graft. Grafts were made with healthy Teleki 3C and 8B as rootstock and either healthy or blackwood-affected graftwood. They were grown for five years in an insect-proof screenhouse. Results showed that the disease is poorly propagated through bench-grafting. Even when using graftwood from symptomatic vines, the rate of transmission did not exceed 2.8%. The success of grafting was highly affected by the sanitary state of scionwood. Infected scionwood had a lower rate of successful grafts (perhaps providing a partial self-elimination of blackwood). The minimum incubation period of blackwood in screenhouse was about 5 months, and the maximum one did not exceed two years.

1170. **Osman, F., M.A. Maningas, A. Rowhani, and D. Golino.** 1994. Detection, distribution, and host range of grapevine fanleaf virus (GFLV) and its satellite RNA. Amer. J. Enol. Vitic. **45**:357.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; satellite RNA; nucleic acid assay; PCR; detection; California; USA;
Notes : Abstract. The California GFLV stain was shown to contain an additional small RNA that is apparently dependent on GFLV for its replication and packaging. This RNA molecule is believed to be a satellite RNA of 1115 Kb in size, a type of sub-viral RNA associated with the GFLV genome.

1171. **Osmelak, J.A., R.W. Emmett, and M. Pywell.** 1989. Monitoring for potential leafhopper vectors (Hemiptera: Cicadelloidea and Fulgoroidea) of the causal agent of Australian grapevine yellows. Pl. Prot. Quarterly **4**:8-10.
Keywords :grapevine; Australian grapevine yellows; phytoplasma disease; vector; leafhopper; survey; Australia;
Notes : Results of leafhopper captures in vineyards and lucerne fields in Victoria, Australia, 1982-1985.

1172. **Ouertani, R., V. Savino, A. Minafra, D. Boscia, M.A. Castellano, G.P. Martelli, and N. Greco.** 1991. A new mechanically transmissible virus from Tunisian grapevines, p. 129. In I. C. Rumbos, R. Bovey, D. Gonsalves, W. B. Hewitt, and G. P. Martelli (ed.), Proceedings of the 10th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG). Plant Protection Institute, P.O. Box 303, 38001 Volos, Greece.
Keywords :grapevine; grapevine Tunisian ringspot virus; nepovirus; new virus; Tunisia; meeting; ICVG;
Notes : Description of an apparently new nepovirus found in grapevines with virus-like symptoms in Tunisia. The virus has isometric particles ca. 30 nm in diameter and can be transmitted to herbaceous hosts. Density gradient sedimentation separates three components: top (empty shells), middle and bottom. Although physico-chemical and ultrastructural characteristics of this virus are similar to those of the nepovirus group, it showed no serological relationships with any of 19 members of this group. The name of grapevine Tunisian ringspot virus (GTRV) is proposed (see also next reference).

1173. **Ouertani, R., V. Savino, A. Minafra, D. Boscia, M.A. Castellano, G.P. Martelli, and N. Greco.** 1992. Properties of a previously undescribed grapevine nepovirus from Tunisia. Arch. Virol. **126**:107-117.
Keywords :grapevine; nepovirus; grapevine Tunisian ringspot virus; new virus; isometric; properties; electron microscopy; host range; cytopathology; Tunisia; Italy;
Notes :A virus with isometric particles of about 30 nm in diameter was isolated by mechanical inoculation from a grapevine of unknown variety in Tunisia. The source vine had only a very faint mottling, and carried no other mechanically transmissible virus. The name grapevine Tunisian ringspot virus (GTRV) is proposed. GTRV appears to belong to the Nepovirus group, and has properties typical of the tomato

ringspot subgroup, but none of the known members of this subgroup was serologically related with GTRV, nor any other know nepovirus. The properties of the virus as well as its cytopathological effects on its herbaceous hosts are described *(Cucumis sativus, Nicotiana clevelandii).*

----- **Özaslan**, M. *et al.* See end of list, references 1669 and 1670.

1174. **Padilla, V.** 1987. Considérations au sujet de la sélection clonale-sanitaire du cv. de raisin de table D.Mariano (Napoléon noir) dans le sud-est de l'Espagne (Considerations on clonal and sanitary selection of table grape cv. D.Mariano [Napoléon noir] in south-eastern Spain). Schw. landw. Forschung/La Recherche agronomique en Suisse **26**:326-327.
Keywords :grapevine; leafroll; stem pitting; performance; Spain;
Notes : The cv. Napoléon noir appears to be infected with leafroll and stem pitting. The effect of leafroll alone on yield and quality is not very severe, but leafroll and stem pitting cause more important damage.

1175. **Padilla, V.** 1990. El sindrome de la madera rizada de la vid en el cv. Don Mariano (Napoleon negra) en la region de Murcia (The rugose wood syndrome of grapevine on the variety Don Mariano [Black Napoleon] in the Murcia region). Universidad Politecnica de Madrid, Madrid (Spain).
Keywords :grapevine; rugose wood; symptoms; occurrence; economic importance; performance; Spain; thesis;
Notes : In Spanish. PhD thesis, Escuela Técnica Superior de Ingenieros Agronomos, Universidad Politecnica de Madrid (Departamento Fitotecnica III: Arboricultura Frutal). Limited number of copies. A summary of this work appeared in VitiVinicultura 1993 (7-8) 33-36.

1176. **Padilla, V.** 1992. Clonal and sanitary selection of grapevine in Spain, p. 85-90. In G. P. Martelli (ed.), Grapevine Viruses and Certification in EEC Countries: State of the Art. Quaderno No 3, Istituto Agronomico Mediterraneo (I.A.M.), Bari, Italy.
Keywords :grapevine; certification; sanitary selection; clonal selection; legislation; Spain; meeting; EEC;

1177. **Padilla, V.** 1992. Enrolado (leafroll), p. 234-235. In Los parasitos de la vid. Estratégias de proteccion razonada (Grapevine parasites. Strategy of reasoned protection). Edition Mundi-Prensa, Madrid.
Keywords :grapevine; leafroll; symptoms; occurrence; control; Spain;
Notes : in Spanish.

1178. **Padilla, V.** 1993. Influencia del complejo de la madera rizada en el cv. Napoléon negra (Influence of the rugose wood complex on the cv. Black Napoleon). Vitivinicultura **4***(7-8):*33-36.
Keywords :grapevine; rugose wood; occurrence; symptoms; economic importance; Spain;
Notes : In Spanish. Symptoms of the rugose wood complex on the variety Black Napoleon (Don Mariano) in the Murcia region.

1179. **Padilla, V., F. Benayas, I. Hita, and A. Ibanez.** 1991. Sanitary state of some grapevine Spanish cultivars, p. 488-489. In I. C. Rumbos, R. Bovey, D. Gonsalves, W. B. Hewitt, and G. P. Martelli (ed.), Proceeding of the 10th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG). Plant Protection Institute, P.O. Box 303, 38001 Volos, Greece.
Keywords :grapevine; sanitary selection; Spain; meeting; ICVG;

1180. **Padilla, V., G. Garcia, I. Hita, and F. Benayas.** 1997. Grapevine enations disease of grapevine in Murcia (Spain), p. 48. In O. A. Sequeira,de, J. C. Sequeira, and M. T. Santos (ed.), Extended abstracts 12th Meeting ICVG, Lisbon, Portugal, 29 September-2 October 1997. Dept.Plant Pathology, Estação Agronomica Nacional, Oeiras, Portugal.
Keywords :grapevine; enation; occurrence; Spain; meeting; ICVG;
Notes : Enation symptoms were observed on grapevines of cv. Italia in the region of Murcia (Spain). Symptoms did not appear every year. The economic importance of the disease is limited.

1181. **Padilla, V., I. Hita, and F. Benayas.** 1993. Problems of ELISA diagnosis of grapevine leafroll associated viruses, p. 160. In P. Gugerli (ed.), Extended abstracts 11th Meeting ICVG, Montreux, Switzerland, 6-9 September 1993. Federal Agricultural Research Station of Changins, CH-1260 Nyon, Switzerland.
Keywords :grapevine; closterovirus; GLRaV-3; leafroll; indexing; detection; diagnosis; immunoassay; ELISA; Spain; meeting; ICVG;
Notes : Only GLRaV-III was detected in 24 of the 654 clones tested by ELISA with GLRaV-I, II, III and IV antisera (3.7%). Indexing on Cabernet Sauvignon was positive for leafroll in 15 clones out of 192 clones indexed (7.8%).

1182. **Padovan, A.C., K.S. Gibb, A. Bertaccini, M. Vibio, R.G. Bonfiglioli, P.A. Magarey, and B.B. Sears.** 1995. Molecular detection of the Australian grapevine yellows phytoplasma and comparison with grapevine yellows phytoplasmas from Italy. Austral. J. Grape and Wine Res. **1**:25-31.
Keywords :grapevine; phytoplasma disease; Australian grapevine yellows; etiology; elm yellows; aster yellows; phytoplasma; detection; identification; nucleic acid assay; molecular probe; PCR; Australia; Italy;
Notes : A diagnostic test using the polymerase chain reaction is described for the detection of phytoplasma DNA in grapevines collected from South Australia and Victoria. Grapevines with Australian yellows disease tested positively for a phytoplasma but those with a "restricted spring growth syndrome" (formerly called"grapevine decline") tested negatively. RFLP analyses were completed to determine the relationship between phytoplasmas of the Australian grapevine yellows and of representatives from both the aster yellows group and the elm yellows group. Australian grapevine yellows is associated with a unique phytoplasma that is more closely related to the phytoplasmas of the aster yellows group than to those of the elm yellows group. (R.G.Bonfiglioli is mistakenly quoted in the title page of the paper as R.E. Bonfiglioli).

1183. **Padovan, A.C., K.S. Gibb, X. Daire, and E. Boudon-Padieu.** 1996. A comparison of the phytoplasma associated with Australian grapevine yellows to other phytoplasmas in grapevine. Vitis **35**:189-194.
Keywords :grapevine; Australian grapevine yellows; phytoplasma disease; phytoplasma; etiology; detection; nucleic acid assay; RFLP; PCR; stolbur; aster yellows; Australia;
Notes : Australian grapevine yellows (AGY) has symptoms similar to those of flavescence dorée (FD), but is etiologically distinct from all known yellows diseases of grapevine. Using the polymerase chain reaction (PCR) and restriction length polymorphism (RFLP) analysis, the authors showed that only one type of phytoplasma is associated with AGY. It is different from the other phytoplasmas recorded so far in Australia. RFLP profiles obtained after PCR amplification of the 16S rRNA gene or of the *tuf* gene of AGY phytoplasma suggest that the latter is genetically related to, but distinct from phytoplasmas associated with European grapevine yellows in the stolbur subgroup G of the aster yellows cluster, for instance bois noir in France, Vergilbungskrankheit in Germany or some of the Italian non-FD yellows. These results were confirmed by sequence analysis of the 16S rRNA gene. It is not clear whether AGY originates from European grapevines imported in Australia or from phytoplasmas within Australia. The phytoplasma that is genetically closest to AGY phytoplasma is the agent of *Phormium* yellow leaf, with 99.5 % homology. This disease is present in New Zealand.

1184. **Padovan, A.C., K.S. Gibb, P.A. Magarey, and M.F. Wachtel.** 1995. Detection of the phytoplasma associated with Australian Grapevine Yellows disease. The Australian Grapegrower and Winemaker **32***(378a):*97-98.
Keywords :grapevine; Australian grapevine yellows; phytoplasma disease; phytoplasma; detection; nucleic acid assay; PCR; Australia;

1185. **Padovan, A.C., K. S. Gibb, P. A. Magarey, and M. F. Wachtel.** 1996. Detection of the phytoplasma associated with Australian grapevine yellows disease (Abstract of a poster), p. 194. In C. S. Stockley, A. N. Sas, R. S. Johnstone, and T. H. Lee (ed.), Proceedings Ninth Australian Wine Industry Technical Conference, Adelaide S.A. 16-19 July 1995. Australian Wine Research Institute, Urrbrae, South Australia.

Keywords :grapevine; Australian grapevine yellows; phytoplasma disease; phytoplasma; detection; nucleic acid assay; PCR; Australia;

1186. **Pandeliev, S., S. Krostanova, V. Kovachev, A. Atanasov, M. Yankulova, L. Dorosiev, and R. Ruserva.** 1988. Virus-free planting material by means of tissue culture. (In Bulgarian). Lozarstvo i Vinarstvo,Sofia **37***(6):*4-7.
Keywords :grapevine; virus elimination; tissue culture; *in vitro;* meristem tip culture; ELISA; Bulgaria;

1187. **Papp, E., L. Bodor, and G. Tökes.** 1996. [Virological testing of vineyard inoculated with GLRaV-III and statistical evaluation of the detectability of the virus], p. 125. In G. Saringer, K. Balazs, and A. Szemessy (ed.), 42nd Plant Protection Days, 27-28 February 1996, Budapest (Hungary).
Keywords :grapevine; leafroll; closterovirus; GLRaV-3; immunoassay; ELISA; detection; Hungary;
Notes : In Hungarian.

1188. **Parente, A.M., I. Abreu, and R. Salema.** 1994. Mycoplasma-like organisms associated with phloem cells of diseased grapevines in northern Portugal. Z. Pfl. Krankh. Pfl. Schutz **101**:124-127.
Keywords :grapevine; phytoplasma disease; phytoplasma; electron microscopy; occurrence; symptoms; Portugal;
Notes : Description of the symptoms of a yellows disease occurring in northern Portugal, and characterized by yellowing and rolling down of the leaves, premature leaf abscission, dark spots in the stems and decline. EM thin sectioning reveals the presence of pleomorphic bodies similar to mycoplasma-like organisms (MLOs) in the phloem tissue of the petioles of diseased plants.

1189. **Pavan, F.** 1989. Possibilità di controllo dei potenziali vettori dell'agente della flavescenza dorata (Possibility of control of potential vectors of flavescence dorée). L'Informatore Agrario **45***(41):*55-61.
Keywords :grapevine; phytoplasma disease; flavescence dorée; vector; control; insecticide; Italy;

1190. **Pavan, F., L. Carraro, G. Vettorello, E. Pavanetto, V. Girolami, and R. Osler.** 1997. Flavescenza dorata nei vigneti delle colline trevigiane (Flavescence dorée in vineyards of the Trevigiane hills). L'Informatore Agrario **53***(10):*73-78.
Keywords :grapevine; flavescence dorée; phytoplasma disease; occurrence; spread; Italy;
Notes : In Italian. Study on the incidence and spread of grapevine flavescence dorée (FD) in the Trevigiane hills, near Treviso, Veneto, Italy, during the period 1988-1896. Up to 1992, the disease affected mainly the cv. Perrera, and occurred only sporadically on cv. Prosecco. In 1993-1996, there has been an increase of FD on Perrera and a rapid spread of the disease to Prosecco and other cvs. Contol measures recommended are severe pruning, eradication of affected vines, insecticide sprays agains *Scaphoideus titanus.*

1191. **Pavan, F., E. Pavanetto, and C. Duso.** 1987. Dinamica di popolazione di *Scaphoideus titanus* Ball nelle Venezie. (Population dynamics of *Scaphoideus titanus* Ball in northeastern Italy), p. 149-155. In S. Ruini (ed.), Atti del Convegno sulla Flavescenza Dorata della Vite, Vicenza-Verona, Maggio 1987. Fondazione Sergio Bolla, Verona.
Keywords :grapevine; flavescence dorée; phytoplasma disease; *Scaphoideus titanus;* vector; leafhopper; biology; Italy; meeting;
Notes : In Italian, Fr. Eng. sum. Flavescenza dorata, Vicenza-Verona meeting.

1192. **Pavan, F., A. Villani, F. Fornasier, and V. Girolami.** 1997. Ruolo del vivaismo nella diffusione della flavescenza dorata (Role of nurseries in the spread of grapevine flavescence dorée). L'Informatore Agrario **53***(10):*69-71.
Keywords :grapevine; flavescence dorée; phytoplasma disease; spread; epidemiology; graft transmission; vector; *Scaphoideus titanus;* leafhopper; Italy;
Notes : In a study made in Italy to quantify the role of grafting in the spread of flavescence dorée (FD), cuttings of cv.Perera were produced from vines with and without symptoms in a vineyard near Treviso. Results showed that FD was transmitted by grafting, and that nursery activity could be responsible for the

spead of the disease into a vineyard or a new area. However, the incidence of FD was greater than expected from graft transmission alone, and it is suggested that nursery contamination by infectious *Scaphoideus titanus* may have played a role. Nurseries should be placed in areas where *S.titanus* is absent or of low incidence and cuttings should be treated with insecticide even when the presence of FD is not certain.

1193. **Pearson, R.C., T.J. Burr, and D. Gonsalves.** 1985. Progress in controlling grape diseases. Food and Life Sciences Quarterly **16***(1):*18-20.
Keywords :grapevine; review; virus diseases; fungus; bacterium; detection; indexing; certification; quarantine; germplasm transfer; USA;

1194. **Pedroso, E.I.** 1987. Detecção e caracterização de agentes causais de viroses e doenças afins, no âmbito da selecção sanitaria da videira em Portugal (Detection and characterization of agents of virus and virus-like diseases of grapevine in Portugal, with the aim of sanitary selection). Instituto Superior de Agricultura, Universitade Técnica de Lisboa , Lisbon, Portugal.
Keywords :grapevine; virus diseases; virus-like diseases; virus; sanitary selection; Portugal;
Notes : Ph.D. thesis. In Portuguese.

1195. **Pedroso, E.I.** 1989. Ultrastructural alterations induced by Casca encortiçada (Corky bark) disease of grapevine, p. 497-505. In R. Cavalloro (ed.), Plant-Protection Problems and Prospects of Integrated Control in Viticulture. Proceedings of the CEC / IOBC International Symposium, Lisboa-Vila Real, Portugal, June 1988. Commission of the European Communities, L-2920 Luxembourg.
Keywords :grapevine; rugose wood; corky bark; symptoms; ultrastructure; cytopathology; electron microscopy; Portugal;
Notes : Corky bark is frequent in Portugal, and affects mostly the cv. Vinhão. Symptoms and EM ultrastructure. Book chapter.

1196. **Pedroso, E.I., O.A. Sequeira, M.E.G. Pinto, and V. Simões.** 1991. Ensaios de transmissão de virus de videira por cochonillas (Attempts to transmit grapevine viruses with mealybugs). Ciência Téc. Vitiv. **10***(2):*39-46.
Keywords :grapevine; vitivirus; closterovirus; GVA; GLRaV-3; transmission; mealybug; *Planococcus citri;* Portugal;
Notes : In Portuguese, Eng. and Fr. sum. Grapevine virus A (GVA) and GLRaV-3 were transmitted experimentally by *Planococcus citri* Risso, with apparently a high efficiency.

1197. **Pedroso, E.I., O.A. Sequeira,de, and J.C. Sequeira.** 1991. Virus-like particles and vesiculated bodies in leafroll and corky bark diseased grapevines. Ciência Téc. Vitiv. **10***(1):*5-14.
Keywords :grapevine; leafroll; GLRaV-3; closterovirus; rugose wood; corky bark; cytopathology; ultrastructure; Portugal;
Notes : In Engl., Pt. and Fr. sum. Grapevine material of the cvs. Rufete and Pinot noir, showing reddening and downrolling of the leaves, gave positive reaction in ELISA with anti GLRaV-3 antiserum. Ultrastructural investigations on the tissues from these plants showed the presence of rod-shaped virus-like particles of the closterovirus type in sieve elements. Clusters of vesiculated inclusions, sometimes containing numerous thread-like fibrils of unknown nature were observed in phloem cells. Small isometric particles, possibly of virus nature, were observed in the lumen of mature sieve tubes.

1198. **Peña-Iglesias, A.** 1989. Virus and transmissible diseases of the grapevine, p. 459-472. In R. Cavalloro (ed.), Plant-Protection Problems and Prospects of Integrated Control in Viticulture. Proceedings of the CEC/IOBC International Symposium, Lisboa-Vila Real, Portugal, June 1988. Commission of the European Communities, L-2920 Luxembourg.
Keywords :grapevine; virus diseases; virus-like diseases; general; review; Spain;
Notes : Book chapter.

1199. **Peña-Iglesias, A. and B. Vecino.** 1987. Cytological studies of grapevine leafroll infected tissue: Further evidence of viroid etiology and improvement of diagnosis. Vitis **26**:37-41.

Keywords :grapevine; leafroll; viroid; etiology; hypothesis; Spain;
Notes : Presence of two types of inclusions, cytoplasmic and nuclear, in leafroll-infected grapevine leaves. Hypothesis of viroid nature of leafroll agent, by analogy with Citrus exocortis. The author suggests to use the inclusions for detecting leafroll.

1200. **Peressini, S., D. Mucignat, G.L. Bianchi, and G. Colussi.** 1991. Utilizzazione del test ELISA per la valutazione dello stato sanitario nell'ambito della selezione clonale in viticoltura (Use of ELISA for determining sanitary state of grapevines in the course of clonal selection in viticulture). Riv. Vitic. Enol. **44***(3):*27-33.
Keywords :grapevine; clonal selection; sanitary selection; symptoms; immunoassay; ELISA; comparison; method; grapevine fanleaf virus; leafroll; GLRaV-1; GLRaV-3; arabis mosaic virus; GVA; nepovirus; vitivirus; closterovirus; detection; Italy;
Notes : Comparison of visual selection in the field and ELISA on bark scrapings. 74% of visually selected grapevines considered as healthy were free of ELISA detectable GFLV, ArMV, GVA, GLRaV-I and III. In ELISA positive vines, 59% had GFLV, 37% GLRaV-I, 9.8% GLRaV-III, 1.4% ArMV. No GVA was detected. Bark scrapings proved to be a good source of tissue extract for ELISA detection of GLRaVs.

1201. **Peressini, S., D. Mucignat, G.L. Bianchi, G. Colussi, R. Ecoretti, R. Forti, and M. Borgo.** 1994. La selezione clonale della vite in Friuli-Venezia Giulia con particolare riferimento agli aspetti fitopatologici (Clonal selection of grapevine in Friuli and Venezia Giulia with particular reference to the phytopathological aspects). Notiziario ERSA **N.S.7** *(2):*6-12.
Keywords :grapevine; virus; virus-like diseases; clonal selection; indexing; immunoassay; ELISA; leafroll; GLRaV-1; GLRaV-3; closterovirus; arabis mosaic virus; grapevine fanleaf virus; nepovirus; GVA; rugose wood; vitivirus; rupestris stem pitting; Kober stem grooving; corky bark; vein mosaic; vein necrosis; grapevine fleck virus; Italy;
Notes : In Italian. Summary of the program of clonal selection in Friuli-Venezia Giulia. Eight virus and virus-like diseases were included in indexing tests: fanleaf, fleck, leafroll, corky bark, Kober stem grooving, rupestris stem pitting, vein necrosis, vein mosaic. Serological tests with DAS-ELISA were made for ArMV, GFLV, GVA, GLRaV-1 and -3. The proportion of vines that could be considered healthy after visual selection, serological tests and indexing was less that 30 % on average. This proportion varied from a variety to another. Rupestris stem pitting and vein necrosis were the most widespread diseases. ELISA tests for fanleaf and leafroll diseases are considered as most important for selection. Kober stem grooving was not detected in the various steps of selection. This absence is attributed to the work of mass and clonal selection made previously.

1202. **Peruzzo, E.L., E.R. Andrade,De, O.A. Crestani, and P.J. Piccoli.** 1993. Análise do plantio de videira livre de virus (Analysis of planting grapevine material free from viruses). Agropecuaria Catarinense **6***(3):*14-16.
Keywords :grapevine; virus; virus-like diseases; sanitary selection; performance; Brazil;
Notes : In Portuguese. Ref.1769 from Rev.Pl.Pathol., 1994. Discussion on the advantages of using healthy grapevine planting material.

1203. **Petersen, C.** 1996. Epidemiology of grapevine leafroll disease within New Zealand vineyards. University of Auckland, Auckland, New Zealand.
Keywords :grapevine; leafroll; closterovirus; GLRaV-1; GLRaV-3; detection; immunoassay; ELISA; transmission; spread; epidemiology; mealybug; *Pseudococcus longispinus; Pseudococcus calceolariae;* New Zealand;
Notes : MsThesis in Biological Sciences. Grapevine leafroll is an important disease in New Zealand vineyards. It reduces the sugar content of berries, the colour in red varieties, the growth of vines and the grafting success rate. GLRaV-1 and GLRaV-3 closteroviruses were found to be predominantly associated with leafroll in New Zealand. As there was evidence of spread of leafroll in some parts of this country, a study was undertaken in order to determine the epidemiology of the disease in these regions. Natural spread of leafroll appeared to be localized within the northern and north-eastern regions of the North Island, and concerned only GLRaV-3. Using ELISA as a detection tool, the author showed that GLRaV-3 accumulated

mainly in basal leaves during the growing season 1993-94. A visual inspection of Pinot noir grapevines for leafroll symptoms during 5 years showed an increase from 11% in 1991 to over 90% in 1995. Spread was higher within the row than between adjacent rows. Transmission experiments with mealybugs showed that 1st instar larvae of both *Pseudococcus longispinus* and *P.calceolariae* were able to transmit GLRaV-3. Third instars did not transmit GLRaV-3 and GLRaV-1 was not transmitted by either species or instar. An amplified ELISA technique (Ampak) allowed to detect GLRaV-3 in as few as four *P.longispinus* first instars, and in individual third instars. The sensitivity of this method was about five times higher than the conventional ELISA for detecting GLRaV-3 in grapevine extracts.

1204. **Petersen, C. and J. Charles.** 1995. Grapevine leafroll virus epidemiology within New Zealand vineyards, p. 45-47. In G. F. Steans (ed.), Proceedings of the New Zealand Grape and Wine Symposium, Auckland, 2-4 November 1995 (Vol.10). New Zealand Society for Viticulture and Oenology.
Keywords :grapevine; leafroll; GLRaV-1; GLRaV-3; transmission; leafhopper; vector; *Pseudococcus calceolariae; Pseudococcus longispinus; Pulvinaria vitis;* occurrence; New Zealand;
Notes :GLRaV-1 and -3 are the predominant leafroll viruses in New Zealand. The rate of spread of the disease is high in vineyards. Observations in the Auckland region showed and increase of incidence from 11% in 1991 to over 90% in 1995. It was shown that the probability of infection of a healthy vine is higher if it is adjacent to a leafroll-infected one. The transmission is mostly within the row, occasionally between rows. So far, only GLRaV-3 has been involved in this spread. There has been no report so far of spread of GLRaV-1 in the field. Transmission experiments showed that both *P.longispinus* and *P.calceolariae* first instar nymphs were able to transmit GLRaV-3. Third instar nymphs were not able to transmit this virus, and GLRaV-1 was not transmitted by either species or instar. *Pulvinaria vitis* is not present in New Zealand. Attempts to transmit leafroll by means of nematodes or phylloxera failed.

1205. **Petersen, C. and D. Jordan.** 1992. ELISA works well for the identification of leafroll, p. 54-55. In D. T. Jordan (ed.), Proceedings of the New Zealand Grape and Wine Symposium, Christchurch, 7-9 November 1992. New Zealand Society of Viticulture and Oenology,
Keywords :grapevine; leafroll; closterovirus; GLRaV-1; GLRaV-3; detection; immunoassay; ELISA; New Zealand;
Notes :ELISA proved accurate, efficient and rapid for detecting leafroll in New Zealand vineyards. Of the 685 samples tested, 35% were positive for leafroll. Among them, 93% were of the type GLRaV-3, only 3.5% were of the type GLRaV-1, and 3.5 % of both types.

1206. **Petersen, C. and D. Jordan.** 1993. ELISA shows leafroll spreads within New Zealand vineyards, p. 28-30. In D. T. Jordan (ed.), Proceedings of the New Zealand Grape and Wine Symposium, Auckland, 3-6 November 1993. New Zealand Society of Viticulture and Oenology,
Keywords :grapevine; leafroll; closterovirus; detection; survey; epidemiology; immunoassay; ELISA; New Zealand;
Notes : Grapevine leafroll is a serious disease in New Zealand vineyards, causing a reduction in wine production of 20-30%, delaying maturity and causing a colour decrease in red varieties. Recent observations showed that the disease spreads naturally within New Zealand vineyards. Over the 1992-1993 growing season two vineyards were monitored for leafroll spread using ELISA. The method proved useful for epidemiological studies on the disease.

1207. **Petersen, C. and D. Jordan.** 1994. Best time and best leaves for ELISA leafroll testing, p. 29-31. In G. F. Steans (ed.), Proceedings of the New Zealand Grape and Wine Symposium, Wellington, 4-7 November. New Zealand Society of Viticulture and Oenology, Auckland, New Zealand.
Keywords :grapevine; leafroll; closterovirus; detection; immunoassay; ELISA; New Zealand;

1208. **Petersen, C.L. and J.G. Charles.** 1997. Transmission of grapevine leafroll-associated closteroviruses by *Pseudococcus longispinus* and *P. calceolariae*. Plant Pathology **46**:509-515.
Keywords :grapevine; leafroll; transmission; *Pseudococcus longispinus; Pseudococcus calceolariae;* vector; mealybug; closterovirus; GLRaV-3; New Zealand;

Notes : In New Zealand, GLRaV-3 is the most common agent of leafroll, occurring in 96.5 of GLR-infected vines tested. GLRaV-1 was found in only 3.5% of all GLR-infected vines. Controlled transmission experiments using first and third instars of the mealybugs *Pseudococcus longispinus* and *P.calceolariae* showed that GLRaV-3 was transmitted by first instar larvae of both species. GLRaV-1 was not transmitted by either of these mealybug species. This is the first report of transmission of GLRaV-3 by *P.calceolariae.*

1209. **Petit, P.** 1990. Contribution à la connaissance de la biologie et de l'éthologie de *Scaphoideus titanus*, cicadelle vectrice de la flavescence dorée de la vigne, méthodes de lutte (Contribution to the knowledge of biology and ethology of *Scaphoideus titanus*, leafhopper vector of flavescence dorée of grapevine, control). CIVAM de la région corse, Lupino, F-20600 Bastia (Corse) France.
Keywords :grapevine; phytoplasma disease; flavescence dorée; leafhopper; vector; *Scaphoideus titanus;* biology; control; insecticide; Corsica; France;
Notes : Publication of the "Centre d'Information et de Vulgarisation pour l'Agriculture et le Milieu Rural de la Région Corse (CIVAM)". Bibliography, biology of *Scaphoideus titanus*, control of the vector.

1210. **Philis, J.** 1993. Distribution and ecology of *Xiphinema index* in Cyprus. Nematol. medit. **21**:139-142.
Keywords :grapevine; nematode; Longidoridae; *Xiphinema index;* occurrence; Cyprus;
Notes :*Xiphinema index* is present in 22.2 % of the soil samples collected in grape growing areas of Cyprus. There is no correlation with soil type, pH, organic matter, calcium carbonate, elevation. Correlation with grapevine presence.

1211. **Phillips, P.A. and C. J. Sherk.** 1991. To control mealybugs, stop honeydew-seeking ants. California Agriculture **45***(2):*26-28.
Keywords :grapevine; mealybug; *Pseudococcus affinis;* control; California; USA;
Notes : This paper does not concern directly closterovirus transmission by mealybugs. In California, *Pseudococcus affinis* Mask is transferred from one plant to another by the Argentine ant (*Iridomyrmex* Mayr). Chemical control of ants by spraying the trunk of grapevines with an insecticide lowers the contamination.

1212. **Pietersen, G. and G.G.F. Kasdorf.** 1993. Use of IEM for the detection of the viruses of the grapevine leafroll complex in South Africa, p. 140-141. In P. Gugerli (ed.), Extended abstracts 11th Meeting ICVG, Montreux, Switzerland, 6-9 September 1993. Federal Agricultural Research Station of Changins, CH-1260 Nyon, Switzerland.
Keywords :grapevine; detection; leafroll; etiology; GLRaV-1; GLRaV-2; GLRaV-3; GLRaV-4; GLRaV-5; closterovirus; GVA; vitivirus; fleck; rugose wood; corky bark; ISEM; immunoassay; South Africa; meeting; ICVG;
Notes : Immuno- electron microscope (IEM) trapping was made using a complex antiserum made from a Black Spanish *Vitis vinifera* vine with multiple infection and containing antibodies against a spherical virus, GLRaV-I,II,III, and GVA. Specific antisera were used for decoration. Most of the vines tested had multiple infections. One sample had a single infection with GLRaV-I. Only one sample out of 57 had GLRaV-V, unfortunately in a multiple infection. In 3 samples, all particles were decorated in IEM tests with an antiserum to GLRaV-II and with CB, an antiserum against a closterovirus isolated from a grapevine with corky bark, obtained from Dr Monette, Canada, suggesting that the two viruses were serologically related. GLRaV-IV was found only occasionally.

1213. **Pinck, L., M. Fuchs, M. Pinck, M. Ravelonandro, and B. Walter.** 1988. A satellite RNA in grapevine fanleaf virus strain F 13. J. Gen. Virol. **69**:233-239.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; satellite RNA; F 13; France;
Notes : Strain F 13 of GFV, which was isolated by Vuittenez, produced severe symptoms on *Chenopodium quinoa*. It has a tripartite genome with a satellite RNA.

1214. **Pinck, L., M. Pinck, M.A. Serghini, C. Ritzenthaler, M. Fuchs, and B. Walter.** 1991. Genome organization of grapevine fanleaf virus, p. 112-119. In I. C. Rumbos, R. Bovey, D. Gonsalves, W. B. Hewitt, and G. P. Martelli (ed.), Proceedings of the 10th Meeting of the International Council for the Study of

Viruses and Virus Diseases of the Grapevine (ICVG). Plant Protection Institute, P.O. Box 303, 38001 Volos, Grece.
Keywords :grapevine; grapevine fanleaf virus; RNA; structure; genome; grapevine chrome mosaic virus; tomato black ring virus; nepovirus; France; meeting; ICVG;
Notes : The genome organization of grapevine fanleaf virus is described and compared with that of tomato black ring virus, Hungarian grapevine chrome mosaic virus and cowpea mosaic virus.

1215. **Pinck, L., C. Ritzenthaler, F. Gaire, R. Margis, N. Bardonnet, and B. Walter.** 1997. Protection against grapevine fanleaf nepovirus in transgenic tobacco expressing the VGP-proteinase or the viral replicase gene, p. 135-136. In O. A. Sequeira,de, J. C. Sequeira, and M. T. Santos (ed.), Extended abstracts 12th Meeting ICVG, Lisbon, Portugal, 29 September-2 October 1997. Dept.Plant Pathology, Estação Agronomica Nacional, Oeiras, Portugal.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; transgenic; *Nicotiana;* France; meeting; ICVG;
Notes : An attempt was made to obtain a protective effect against grapevine fanleaf virus in transgenic tobacco *(Nicotiana benthamiana)* expressing the VPg-proteinase gene or the replicase gene of grapevine GFLV. In the first case, the degree of virus replication was only decreased. In the second case (replicase) a complete resistance was obtained in some transgenic vines, even with a GFLV inoculum of 20 µg/ml. Whether this degree of protection will be obtained in grapevine with nematode feeding inoculation is so far unknown.

1216. **Pinck, M., J. Reinbolt, A.M. Loudes, M. Le Ret, and L. Pinck.** 1991. Primary structure and location of the genome-linked protein (VPg) of grapevine fanleaf nepovirus. FEBS Letters **284***(1):*117-119.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; genome; organization; primary structure; sequence analysis; RNA; France;
Notes : The protein VPg which is linked to the RNAs of grapevine fanleaf nepovirus has been sequenced. The VPg has a M(r) of 2931 and is composed of 24 residues. It is linked by its N-terminal Ser beta-OH group to the viral RNAs. The part of the VPg protein that has been mapped from residues 1218 to 1241 of the 253K polyprotein is coded by the RNA1 of GFLV.

1217. **Pinochet, J. and T. Cisneros.** 1986. Seasonal fluctuation of nematode populations in three Spanish vineyards. Journal of Nematology **9**:391-398.
Keywords :grapevine; nematode; survey; *Xiphinema index;* grapevine fanleaf virus; Longidoridae; biology; Spain;
Notes : The study includes *Xiphinema index* vector of grapevine fanleaf virus. The populations of this nematode are generally low in Spain, but irrigation tends to increase them.

1218. **Planas, R.** 1987. Expérience de lutte contre la flavescence dorée dans le vignoble audois. (Experiments on control of flavescence dorée in the viticultural area of Aude), p. 237-247. In S. Ruini (ed.), Atti del Convegno sulla Flavescenza Dorata della Vite, Vicenza-Verona, Maggio 1987. Fondazione Sergio Bolla, Verona.
Keywords :grapevine; phytoplasma disease; flavescence dorée; control; *Scaphoideus titanus;* leafhopper; vector; insecticide; Aude; France; meeting;
Notes : In French, It. Eng. sum. Flavescenza dorata, Vicenza-Verona meeting.

1219. **Pocsai, E., K. Nyerges, J. Horvath, S. Kobza, and G. Farkas.** 1989. Results of heat-treatment of virus-infected grapevine varieties. (In Czech and English), p. 153-154. In J. Polak, J. Chod, V. Rimsa, J. Vacke, and A. Ryvova (ed.), Plant Virology. Proceedings of the 10th Conference of the Czechoslovak Plant Virologists 1989, Prague, 1989. Vyzkumny Ustav Rostlinné Viroby, 161 06 Prague 6-Ruzyné, Drnostova 507.
Keywords :grapevine; virus; virus-like diseases; virus elimination; heat therapy; shoot tip culture; *in vitro*; Hungary; meeting;
Notes :*In vitro* shoot tip culture after heat treatment at 38^{o} C for 3 months. Book chapter.

1220. **Podleckis, E.V. and M.K. Corbett.** 1986. Detection of grapevine viruses by immunosorbent electron microscopy (Abstract). Phytopathology **76**:565.
Keywords :grapevine; nepovirus; tobacco ringspot virus; tomato ringspot virus; closterovirus-like particles; vitivirus; GVA; immuno electron microscopy; immunoassay; detection; USA;

1221. **Podleckis, E.V. and M.K. Corbett.** 1987. Detection of tomato ringspot nepovirus and a clostero-like virus in French hybrid Vidal 256 grapevines. J. Phytopathol. **120**:235-244.
Keywords :grapevine; tomato ringspot virus; nepovirus; closterovirus; detection; immunoassay; immuno electron microscopy; USA;
Notes : This nepovirus was found to differ from the type strain of TomRSV by not being able to infect tomato, bean or petunia, that are susceptible to the type strain. It caused no other symptom in Vidal 256 than a reduction in berry size by about 1/3. The closterovirus did not react with antisera to GVA, to Gugerli's 2200 nm closterovirus, to apple chlorotic leafspot virus or to apple stem grooving virus.

1222. **Poggi Pollini, C., L. Giunchedi, and R. Credi.** 1993. A chemiluminescent immunoassay for the diagnosis of grapevine closteroviruses on nitrocellulose membrane. J. Virol. Methods **42**:107-116.
Keywords :grapevine; closterovirus; detection; immunoassay; chemiluminescence; immuno-blot; diagnosis; method; Italy;
Notes :A chemiluminescent dot-immunobinding assay was developed for the detection of GLRaV-1 and 3 (DIBA-ECL). It uses luminol as substrate for horseradish peroxidase conjugated with a secondary antibody. This method is about 30 times more sensitive than DAS-ELISA.The advantages of this method are discussed.

1223. **Polivka, H., U. Staub, and H.J. Gross.** 1996. Variation of viroid profiles in individual grapevine plants: novel grapevine yellow speckle viroid 1 mutants show alterations of hairpin I. J. Gen. Virol. **77**:155-161.
Keywords :grapevine; viroid; genome; GYSVd-1; HSVd-g; structure; Germany;
Notes :A 20 year-old German vineyard with grapevines of the cultivars 'Bacchus' and 'Kerner' was analyzed for viroid infections. Grapevine yellow speckle viroid 1 (GYSVd1) and the grapevine isolate of hop stunt viroid (HSVdg) were detected. Both viroids occur in several sequence variations. Eighteen novel GYSVd1 variants and two previously published HSVdg main variants with six new minor variants were found. They were randomly spread in the vineyard. The distributions of GYSVd1 and HSVdg main variants and their accompanying subvariants differed even in neighbouring plants. The authors conclude that these individual viroid variant profiles are the result of 20 years of independent evolution, i.e. mutation and selection, in each single plant. Four of the nine GYSVd1 main variants were mutated in the inverted repeats bordering the central conserved region. These base substitutions decreased the thermodynamic stability of a metastable structure called hairpin I.

1224. **Pop, I.** 1991. Results regarding detection of grapevine fan leaf virus by indirect enzyme-linked immunosorbent assay, p. 259. In I. C. Rumbos, R. Bovey, D. Gonsalves, W. B. Hewitt, and G. P. Martelli (ed.), Proceedings of the 10th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG). Plant Protection Institute, P.O. Box 303, 38001 Volos, Greece.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; detection; ELISA; immunoassay; Rumania; meeting; ICVG;

1225. **Pop, I., A. Brezeanu, I. Voiculescu, E. Banu, A. Rosu, and I. Coman.** 1989. Preliminary experimental results concerning the possibility of liberating plants from grapevine fanleaf virus by means of meristematic cultures. Anal. Institutul Cercetari pentru Viticultura si Vinificatie,Valea Calugareasca **12**:221-232.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; *in vitro*; meristem tip culture; virus elimination; Rumania;
Notes : In Rumanian. Meristem 0.2-0.5 mm, MS + 2 mg/l benzylaminopurine. Tests on *Chenopodium quinoa* indicate that 60% of treated plants became virus-free.

1226. **Pop, I., P. Gugerli, E. Banu, and L. Tomoioaga.** 1993. Results regarding the identification of closteroviruses associated with the leafroll disease on some grapevine varieties grown in Romania, p. 123-124. In P. Gugerli (ed.), Extended abstracts 11th Meeting ICVG, Montreux, Switzerland, 6-9 September 1993. Federal Agricultural Research Station of Changins, CH-1260 Nyon, Switzerland.
Keywords :grapevine; leafroll; closterovirus; detection; immunoassay; ELISA; Rumania; ICVG; meeting;
Notes : First results of a serological study of closteroviruses associated with leafroll in Romania.

1227. **Pop, I.V.** 1986. Resultate obtinute in cercetarile provind termoterapia unor viroze ale vitei de vie (Results of research on heat treatment of some virus diseases of grapevine). An. Inst. Cercet. Prot. Pl. **19**:27-34.
Keywords :grapevine; heat therapy; virus elimination; nepovirus; fanleaf; yellow mosaic; vein mosaic; Rumania; results; research; virus; virus diseases; diseases;
Notes : In Rumanian, Eng. sum. Elimination of vein mosaic from the whole plant, of yellow mosaic only from terminal buds.

1228. **Pop, I.V.** 1991. Long-term investigations of the epidemiology and control of the grapevine yellow mosaic in Romania, p. 458-464. In I. C. Rumbos, R. Bovey, D. Gonsalves, W. B. Hewitt, and G. P. Martelli (ed.), Proceedings of the 10th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG). Plant Protection Institute, P.O. Box 303, 38001 Volos, Greece.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; yellow mosaic; epidemiology; spread; Rumania; meeting; ICVG;
Notes : Study of the spread of yellow mosaic in a vineyard of cv. Feteasca alba in Rumania, during a period of 12 years. The diseased vines were recorded on the basis of symptoms. Patches were elliptical, and increased by about 0.1 - 1 meter per year.

1229. **Pop, I.V.** 1995. Schemes and methods for production and certification of virus-free grapevine planting material. Bulletin OEPP/EPPO Bulletin **25**:403-409.
Keywords :grapevine; certification; detection; virus; virus-like diseases; diagnosis; sanitary selection; clonal selection; Rumania;
Notes :A scheme for certification of grapevine planting material is presented on the basis of Rumanian experience and of data from literature.

1230. **Posenato, G., R. Consolaro, and N. Mori.** 1996. *Scaphoideus titanus* (Ball) e altre cicaline nel Veneto orientale (*Scaphoideus titanus* (Ball) and other leafhoppers in oriental Veneto). L'Informatore Agrario **52***(20):*69-71.
Keywords :grapevine; phytoplasma disease; leafhopper; *Scaphoideus titanus;* vector; flavescence dorée; survey; Italy;
Notes : In Italian. This paper reports on a survey of the leafhoppers present in the vineyards of the oriental part of the Veneto. The insect were caught on sticky yellow traps placed horizontally at the level of canopy, and were determined in the laboratory. Beside *Scaphoideus titanus*, vector of FD, several other leafhopper species were found, some of which are known vectors of phytoplasmas. The bibliography is published in the reprints.

1231. **Posenato, G., R. Consolaro, N. Mori, and V. Girolami.** 1996. La flavescenza dorata nell'area del Soave (Flavescence dorée in the Soave area). L'Informatore Agrario **52***(20):*61-65.
Keywords :grapevine; phytoplasma disease; flavescence dorée; control; *Scaphoideus titanus;* leafhopper; insecticide; Italy;
Notes : In Italian. Flavescence dorée and its vector *Scaphoideus titanus* Ball are both present in all the area of the river Soave. Insecticide sprays reduce the population of the vector. Pollarding (pruning 30-60 cm above the graft union) is not economically useful with the pergola training system of grapevine that is used in this region, although it delays the reappearance of the disease.

1232. **Posenato, G. and V. Girolami.** 1994. Diffusione ed evoluzione della flavescenza dorata della vite nell'area orientale del Soave (Diffusion and evolution of grapevine flavescence dorée in the eastern part of Soave). L'Informatore Agrario **50***(22):*57-60.
Keywords :grapevine; flavescence dorée; phytoplasma disease; occurrence; Italy;
Notes : In Italian.

1233. **Pospisilova, D.** 1992. [Clonal selection of grapevine combined with testing for virus diseases]. Vinohrad,Bratislava **30** *(11):*163.
Keywords :grapevine; clonal selection; nepovirus; raspberry ringspot virus; arabis mosaic virus; detection; occurrence; Slovakia;
Notes : In Slovak. Short account on screening grapevines for raspberry ringspot virus and arabis mosaic virus in the course of clonal selection in Slovakia.

1234. **Powell, C.A., J.L. Longenecker, and L.B. Forer.** 1990. Incidence of tomato ringspot virus and tobacco ringspot virus in grapevines in Pennsylvania. Plant Disease **74**:702-704.
Keywords :grapevine; nepovirus; tomato ringspot virus; tobacco ringspot virus; occurrence; immunoassay; ELISA; Pennsylvania; USA;
Notes : The occurrence of these two viruses (TomRSV / TobRSV), as determined by DAS-ELISA, is as follows in the main varieties grown in the two regions concerned: Southern Pennsylvania: Cascade +/+; Seyval +/+; Chancelor +/+. Erie: Niagara -/-; Chelois -/-; Seyval -/+; Cascade +(2)/+(1)* (*respectively only two and one case altogether).

1235. **Prince, J.P., R.E. Davis, T.K. Wolf, I.M. Lee, and E.L. Dally.** 1994. Genomic diversity and possible wild plant sources of mycoplasma-like organisms (MLOs) infecting grapevines: implications for epidemiology. IOM Letters **3**:288-289.
Keywords :grapevine; phytoplasma; phytoplasma disease; epidemiology; weeds; USA;

1236. **Prince, J.P., R.E. Davis, T.K. Wolf, I.M. Lee, B.D. Mogen, and E.L. Dally.** 1993. Molecular detection and identification of a mycoplasmalike organism (MLO) in naturally diseased Chardonnay grapevine in Virginia. Phytopathology **83**:696.
Keywords :grapevine; X-disease; phytoplasma disease; detection; identification; phytoplasma; PCR; nucleic acid assay; RFLP; Virginia; USA;
Notes : Mycoplasmalike organisms (MLO) were detected in Chardonnay grapevines infected by natural contamination, using a probe specific for 16s ribosomal RNA in PCR followed by RFLP analysis of amplified nucleic acid. This Virginia strain MLO (str. FDVA1) is affiliated with MLOs of X-disease strain cluster.

1237. **Prince, J.P., R.E. Davis, T.K. Wolf, I.M. Lee, B.D. Mogen, E.L. Dally, A. Bertaccini, R. Credi, and M. Barba.** 1993. Molecular detection of diverse mycoplasmalike organisms (MLOs) associated with grapevine yellows and their classification with aster yellows, X-disease, and elm yellows MLOs. Phytopathology **83**:1130-1137.
Keywords :grapevine; phytoplasma; phytoplasma disease; flavescence dorée; detection; identification; PCR; classification; nucleic acid assay; RFLP; aster yellows; elm yellows; X-disease; USA; Italy;
Notes :PCR and RFLP analysis of PCR-amplified DNA were used to identify strains of MLOs (phytoplasmas) associated with grapevine yellows in naturally diseased vines in USA and Italy:
1) FDVA1 (Virginia) and FDU (Udine, Friuli, northern Italy) are related with X-disease.
2) FDG (Germany) CA1, CH1, SAN1, SAN2 (northern Italy) FDB and FDR (southern Italy) are related with Aster yellows.
3) FDF (Flavescence dorée, France) is related with Elm yellows. The data confirm the idea that grapevine yellows is a complex of several diseases of diverse etiologies.

1238. **Prins, B.H. and M.A. Walker.** 1994. Resistance to the dagger nematode, *Xiphinema index*, in *Vitis* and *Muscadinia* species. Amer. J. Enol. Vitic. **45**:372.

Keywords :grapevine; *Xiphinema index;* Longidoridae; nematode; resistance; *Vitis; Muscadinia;* California; USA;
Notes : Several *Vitis* and *Muscadinia* species were tested for their resistance to *Xiphinema index* by inoculating up to five replicates several times with a total of 230 nematodes. Six months after the last inoculation root symptoms were rated, nematode numbers were counted, and the roots were tested by ELISA to detect GFLV. Resistance was widespread in *Muscadinia*, and some *Vitis aestivalis* and *V.longii* selections showed resistance to nematode feeding and development. Nothing is said about resistance to GFLV infection.

1239. **Prota, U.** 1996. Il legno riccio della vite (Rugose wood complex of the grapevine), p. 41-62. In G. P. Martelli, V. Savino, and M. Digiaro (ed.), Virus floematici e malattie della vite.
Keywords :grapevine; rugose wood; research; review; Italy;
Notes : In Italian, Eng. sum. Summary of the work done on rugose wood within the frame of the RAISA research project.

1240. **Provedo Gonzalez, J., T. Vicente Renedo, J. Martinez Garcia, T. Martinez Martinez, and J.M. Gonzalez Viton.** 1996. Seleccion clonal y sanitaria de variedades de vid cultivadas en la Rioja (Clonal and sanitary selection of grapevine varieties cultivated in Rioja). Centro de Investigacion Agraria, Apartado 1056, 26080 Logroño, Spain.
Keywords :grapevine; clonal selection; sanitary selection; Spain;
Notes : In Spanish. A short description is given of the development of clonal and sanitary selection of grapevine in the Rioja viticultural region. Several points in relation with clonal selection are discussed: legal basis, advantages and disadvantages of using clonal material, selection and certification schemes, first results of experimentation with new clones.

1241. **Prudencio, S.** 1985. Comparative effects of corky bark and Rupestris stem pitting diseases on selected germplasm lines of grapes. M.S.Thesis,Plant Pathology Department, University of California, Davis, California 95616, USA.
Keywords :grapevine; rugose wood; corky bark; rupestris stem pitting; symptoms; graft transmission; thesis; California; USA; stem pitting; diseases; germplasm;

1242. **Puchta, H., K. Ramm, R. Luckinger, K. Freimüller, and H. L. Sänger.** 1989. Nucleotide sequence of a hop stunt viroid (HSVd) isolate from the German grapevine rootstock 5BB as determined by PCR-mediated sequence analysis. Nucleic Acids Research **17**:5841.
Keywords :grapevine; viroid; HSVd-g; nucleic acid assay; nucleotide sequence; PCR; Germany;

1243. **Puchta, H., K. Ramm, and H. L. Sänger.** 1988. Nucleotide sequence of a hop stunt viroid isolate from the German grapevine cultivar 'Riesling'. Nucleic Acids Research **16**:2730.
Keywords :grapevine; HSVd-g; nucleotide sequence; viroid; Germany;

1244. **Puig Vayreda, E.** 1997. Alerta por la aparicion de la flavescencia dorada en algunos viñedos ampurdanes (Look out for the occurrence of flavescence dorée in some vineyards of the Ampurdan region). La Semana Vitivinicola **52***(2630):*18-19.
Keywords :grapevine; flavescence dorée; occurrence; control; insecticide; eradication; Spain;
Notes : In Spanish. The recent occurrence of flavescence dorée in the Ampurdan region (Northern part of Catalonia, Spain) has prompted the Department of Agriculture of Catalonia to require that following control measures be taken: Sprays against the vector are compulsory in vineyards of the regions where the disease occurs. Vineyards where more than 20% of the vines show symptoms of flavescence dorée must be eradicated. Abandoned vineyards and isolated vines growing in thickets or waste land must be destroyed. The problems raised by applying these control measures are discussed.

1245. **Purcell, A.H.** 1990. Homopteran transmission of xylem-inhabiting bacteria, p. 243-266. In K. F. Harris (ed.), Advances in Disease Vector Research (Vol.6). Springer Verlag, New York.

Keywords :grapevine; Pierce's disease; *Xylella fastidiosa;* transmission; insect; leafhopper; froghopper; vector; epidemiology; USA; California;
Notes : The ecological and evolutionary implications of insect transmission of xylem-limited bacteria are rviewed with reference to the epidemiology of these diseases, including Pierce's disease, caused by *Xylella fastidiosa.*

1246. **Purcell, A.H.** 1991. 'Vectorless' pathogens with undiscovered vectors, p. 139-164. In K. Maramorosch (ed.), Plant Diseases of Viral, Viroid, Mycoplasma and Uncertain Etiology. Vedam Press, New Dehli, India (190 pp.).
Keywords :grapevine; virus; virus-like diseases; phytoplasma disease; California; epidemiology; review; USA;
Notes : This chapter of a book devoted to plant diseases of uncertain etiology reviews the cases of virus and virus-like diseases whose vectors are not yet known, especially in viticulture and fruit tree culture.

1247. **Purcell, A.H.** 1993. Pierce's disease. Part I. History and current status. Practical Winery & Vineyard **13***(8)March/April:*13-16.
Keywords :grapevine; Pierce's disease; history; *Xylella fastidiosa;* review; occurrence; geographical distribution; control; USA;
Notes : Historical account of Pierce's disease since its discovery in the 1880s, causal agent and its extension in the world, prospects for future measures of control.

1248. **Purcell, A.H.** 1993. Pierce's disease. Part II. Epidemiology and control. Practical Winery & Vineyard **13***(9)May/June:*50-76.
Keywords :grapevine; Pierce's disease; epidemiology; review; *Xylella fastidiosa;* symptoms; leafhopper; vector; control; geographical distribution; transmission; USA;
Notes : Symptoms, bacterial multipication, vectors, geographic distribution of the disease, control.

1249. **Purcell, A.H.** 1994. Pierce's disease. Part III. Practical Winery & Vineyard **14***(6)March/April:*14-16.
Keywords :grapevine; Pierce's disease; review; leafhopper; vector; control; USA;
Notes : Questions of readers and answers of the author concerning part I and II of this series on Pierce's disease, mostly on control measures.

1250. **Purcell, A.H.** 1995. *Xylella fastidiosa* and associated diseases. Transmission and epidemiology. Plant Diagnostics Quarterly **16**:110-114.
Keywords :grapevine; Pierce's disease; *Xylella fastidiosa;* leafhopper; transmission; vector; epidemiology; control; USA;
Notes : Vector transmission, fate of the bacteria in host plants, symptomless carriers, environmental influence, control.

1251. **Purcell, A.H.** 1997. *Xylella fastidiosa*, a regional problem or global threat? Journal of Plant Pathology **79**:99-105.
Keywords :grapevine; Pierce's disease; *Xylella fastidiosa;* review; leafhopper; froghopper; detection; vector; epidemiology; quarantine; California; USA;
Notes : Review on the risk presented by Pierce's diseases in other countries than the Americas and Taiwan, where it has been found in 1993 in pear. The role of climatic conditions is essential. The quarantine vigilance should be maintained. Molecular detection methods are more suitable than serological ones. The problem raised in Europe by the discovery of *Xylella fastidiosa* (Berisha et al.,1996) is discussed in a note added in proof.

1252. **Purcell, A.H. and N. W. Frazier.** 1985. Habitats and dispersal of the principal leafhopper vectors of Pierce's disease bacterium in the San Joaquin Valley. Hilgardia **53** *(4):*1-32.
Keywords :grapevine; Pierce's disease; vector; leafhopper; froghopper; California; USA;

Notes :*Cynodon dactylon* and *Echinochloa crus-galli* are the favourite hosts of the leafhopper vectors *Draeculacephala minerva* and *Carneocephala fulgida*. Importance of irrigation, which favour these weeds, and weed control.

1253. **Purcell, A.H. and D.L. Hopkins.** 1996. Fastidious xylem-limited bacterial plant pathogens. Annu. Rev. Phytopathol. **34**:131-151.
Keywords :grapevine; Pierce's disease; *Xylella fastidiosa;* review; detection; biology; transmission; vector; epidemiology; USA;
Notes : Review on *Xylella fastidiosa* and a few other xylem-limited bacteria (XLB). Appearance and movement of these pathogens in plants, detection methods, genetic engineering for their control, vector transmission and epidemiology are discussed.

1254. **Purcell, A.H. and S. Saunders.** 1995. Harvested grape clusters as inoculum for Pierce's disease. Plant Disease **79**:190-192.
Keywords :grapevine; Pierce's disease; *Xylella fastidiosa;* leafhopper; vector; cluster; transmission; USA;
Notes :*Xylella fastidiosa* bacteria can survive in stem of harvested grape clusters stored in cold rooms for about three weeks. However, the concentration of the bacterium in harvested clusters was 10-100 times lower that typical concentrations before harvest or in leaf veins, and decreased rapidly. Vectors (blue green sharpshooter *Graphocephala atropunctata* and green sharpshooter *Draeculacephala minerva*) survived on harvested grapes, but did not transmit the bacterium when transferred from infected clusters to healthy grapevines. It appears therefore that clusters harvested on grapevines affected with Pierce's disease do not constitute a dangerous source of contamination.

1255. **Quacquarelli, A.** 1990. La Flavescenza Dorata della vite. (Grapevine flavescence dorée). Agricoltura *(209/210):*20-27.
Keywords :grapevine; phytoplasma disease; flavescence dorée; research; organization; symptoms; transmission; leafhopper; vector; *Scaphoideus titanus;* control; Italy;

1256. **Quacquarelli, A.** 1991. "Flavescence dorée" in Italy: A national research program, p. 444-445. In I. C. Rumbos, R. Bovey, D. Gonsalves, W. B. Hewitt, and G. P. Martelli (ed.), Proceedings of the 10th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG). Plant Protection Institute, P.O. Box 303, 38001 Volos, Greece.
Keywords :grapevine; phytoplasma disease; flavescence dorée; research; Italy; meeting; ICVG;
Notes : Description of a national program of research on flavescence dorée in Italy and first results. Brief history of research on flavescence dorée and other phytoplasma disease.

1257. **Quacquarelli, A.** 1993. Projetto di ricerca MAAF "La flavescenza dorata della vite" (Research project MAAF "Golden flavescence of grapevine"), p. 9-12. In E. Refatti (ed.), Extended Abstracts, Convegno "La flavescenza dorata ed altri giallumi della vite, stato attuale delle conoscenze e problemi di lotta". Eurovite'93, Gorizia, Italy.
Keywords :grapevine; phytoplasma disease; flavescence dorée; phytoplasma; control; organization; research; Italy;
Notes : In Italian. Extended abstracts of papers presented at a meeting on flavescence dorée (FD) and other grapevine yellows at Gorizia, Italy, in December 1993. Research project of the Ministry of Agriculture and Forestry of Italy on FD. List of all research Institutes concerned, areas of interest and type of studies of each Institute. Foreign Institutes collaborating with this project are also mentioned.

1258. **Quacquarelli, A. and M. Barba.** 1992. Flavescence dorée and other yellows of grapevine in EEC countries, p. 41-47. In G. P. Martelli (ed.), Grapevine Viruses and Certification in EEC countries: State of the Art. Quaderno No 3, Istituto Agronomico Mediterraneo (I.A.M.), Bari, Italy.
Keywords :grapevine; flavescence dorée; phytoplasma disease; symptoms; epidemiology; Europe; review; Italy; meeting; EEC;
Notes : Distribution of flavescence dorée and other grapevine yellows in EEC viticultural countries. Symptomatology and epidemiology. Situation in Italy.

1259. **Quaroni, S., M. Saracchi, A. Fortusini, and G. Belli.** 1988. Osservazioni mediante microscopia elettronica a scansione su viti affette da "Flavescenza dorata" (Observation of grapevines affected with flavescence dorée by means of scanning electron microscopy). Riv. Pat. Veg. ,S. IV **24**:71-79.
Keywords :grapevine; phytoplasma; phytoplasma disease; flavescence dorée; diagnosis; scanning electron microscopy; ultrastructure; virescence; periwinkle; Italy;
Notes : Petiolar phloem tissues with flavescence dorée were compared with stem phloem tissues of *Vinca rosea* affected by virescence by using a scanning electron microscope.

1260. **Quaroni, S., M. Saracchi, A. Fortusini, and G. Belli.** 1991. Investigations by scanning electron microscopy on grapevines affected by "flavescence dorée", p. 446-449. In I. C. Rumbos, R. Bovey, D. Gonsalves, W. B. Hewitt, and G. P. Martelli (ed.), Proceedings of the 10th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG). Plant Protection Institute, P.O. Box 303, 38001 Volos, Greece.
Keywords :grapevine; phytoplasma disease; flavescence dorée; detection; phytoplasma; scanning electron microscopy; cytopathology; ultrastructure; Italy; meeting; ICVG;
Notes : Scanning electron microscopy makes it possible to detect MLOs (phytoplasmas) in phloem tissues of grapevines affected with flavescence dorée about three months before the symptoms of the disease appear on the leaves.

1261. **Radian-Sade, S., O. Edelbaum, Y. Rubinstein, R. Gafny, I. Sela, and E. Tanne.** 1997. Transgenic *Nicotiana benthamiana* plants resistant to grapevine virus A, p. 141-142. In O. A. Sequeira,de, J. C. Sequeira, and M. T. Santos (ed.), Extended abstracts 12th Meeting ICVG, Lisbon, Portugal, 29 September-2 October 1997. Dept.Plant Pathology, Estação Agronomica Nacional, Oeiras, Portugal.
Keywords :grapevine; vitivirus; GVA; resistance; transgenic; coat protein gene; Israel; meeting; ICVG;
Notes : *Nicotiana benthamiana* plants were transformed by introducing the gene of the coat protein of grapevine virus A (GVA) in order to see if transgenic plant could offer resistance to GVA infection by mechanical inoculation. Transformation of grapevine with the same gene is in progress.

1262. **Raju, B.C. and J.M. Wells.** 1986. Diseases caused by fastidious xylem-limited bacteria and strategies for management. Plant Disease **70**:182-186.
Keywords :grapevine; Pierce's disease; phony peach; symptoms; bacterium; detection; epidemiology; leafhopper; vector; control; review; USA;

1263. **Ramel, M.E., P. Serrant, P. Külling, and P. Gugerli.** 1993. Monoclonal and polyclonal antibodies for the detection of grapevine fleck associated virus, p. 161-162. In P. Gugerli (ed.), Extended abstracts 11th Meeting ICVG, Montreux, Switzerland, 6-9 September 1993. Federal Agricultural Research Station of Changins, CH-1260 Nyon, Switzerland.
Keywords :grapevine; grapevine fleck virus; detection; diagnosis; immunoassay; ELISA; immuno electron microscopy; electrophoresis; western blot; comparison; Switzerland; meeting; ICVG;
Notes : Improved antisera and monoclonal antibodies were prepared against the agent of fleck. Description of the method. DAS-ELISA proved most appropriate for large scale testing of grapevine.The best results were obtained when a polyclonal rabbit immunoglobulin was used for coating plates and a monoclonal antibody for the second reaction. Electron microscopy of immuno- precipitated virus particles was also useful for small samples. SDS-PAGE of partially purified leaf extracts followed by immunostaining of the protein bands (Western analysis) was used for determinig the coat protein molecular weight and later to detect the virus.

1264. **Ramsdell, D.C., J.M. Gillett, and G.W. Bird.** 1995. Susceptibility of American grapevine scion cultivars and French hybrid rootstock and scion cultivars to infection by peach rosette mosaic nepovirus. Plant Disease **79**:154-157.
Keywords :grapevine; peach rosette mosaic virus; susceptibility; resistance; field; nematode; nepovirus; *Xiphinema americanum*; Longidoridae; control; performance; USA;

Notes :A field trial was set up in 1986 with a view to determine the susceptibility of various American grapevine scion cultivars and French hybrid rootstock and scion cultivars to peach rosette mosaic nepovirus (PRMV). 44 vines of each cultivar were planted in a soil more or less uniformly contaminated by PRMV and its vector *Xiphinema americanum*. Each vine was tested by ELISA from 1988 to 1991 for PRMV infection. By 1991, the infection level was less than 5% on Chancelor and Couderc 1616, 7% on Foch and Couderc 1202, 18.2% on Niagara and Delaware, 20% on Teleki 5C, 50% or more on Teleki 5A, Vignoles and Concord. Seyval remained uninfected throughout the whole duration of the experiment.

1265. **Ramsdell, D.C., V. Rhein, and J.M. Gillett.** 1991. Relative field resistance among French hybrid and American grape scions and rootstock cultivars to peach rosette mosaic virus (PRMV), p. 367-368. In I. C. Rumbos, R. Bovey, D. Gonsalves, W. B. Hewitt, and G. P. Martelli (ed.), Proceedings of the 10th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG). Plant Protection Institute, P.O. Box 303, 38001 Volos, Greece.
Keywords :grapevine; nepovirus; peach rosette mosaic virus; resistance; *Xiphinema americanum;* Longidoridae; nematode; vector; biology; USA; meeting; ICVG;
Notes : Abstract. In 1986, 11 French hybrids and American scion and rootstock cvs. (44 vines of each) were planted in a field uniformly infected/infested with PRMV/*Xiphinema americanum.* Clear differences in the percentage of infected plants appeared after 3 years of growth, as detected by ELISA. Concord had 45.4% of infected vines, whereas Couderc 1202 and Seyval blanc had only 2.3% and C.1616 still less. These differences can be related to differences in survival rate of nematode populations when reared in potted plants of these cultivars: within 138 days, initially identical populations of *Xiphinema americanum* increased by 8.2% on Concord, but decreased by 20% and 64.4%, respectively, on Couderc 1202 and C.1616.

1266. **Randles, J.W. and M.A. Rezaian.** 1991. Viroids, p. 403-404. In R. I. B. Francki, C. M. Fauquet, D. L. Kundson, and F. Brown (ed.), Classification and Nomenclature of Viruses. Fifth Report of the International Committee on Taxonomy of Viruses. Springer, New York.
Keywords :viroid; classification;
Notes : Book chapter.

1267. **Raski, D.J. and A.C. Goheen.** 1988. Comparison of 1,3-dichloropropene and methyl bromide for control of *Xiphinema index* and grapevine fanleaf degeneration complex. Amer. J. Enol. Vitic. **39**:334-336.
Keywords :grapevine; grapevine fanleaf virus; *Xiphinema index;* nematode; nepovirus; Longidoridae; vector; control; 1,3-dichloropropene; methyl bromide; California;
Notes : No definitive eradication of *Xiphinema index* can be obtained by soil fumigation with 1,2 dichloropropene or methyl bromide. Vineyards planted in disinfected soil produce higher yields for about 4 years.

1268. **Redl, H., W. Ruckenbauer, and J. Traxler.** 1996. Weinbau heute. Handbuch für Beratung, Schule und Praxis (Viticulture today. Handbook for advisory work, school and practice). Stocker, Graz, Austria.
Keywords :grapevine; virus; virus-like diseases; viroid; phytoplasma disease; handbook; Germany;
Notes : In German. A chapter of this book is devoted to virus diseases, viroids, virus-like diseases and phytoplasma diseases of grapevine. A table summs up the properties of these diseases, their agents, their vectors, and the methods of detection.

1269. **Refatti, E.** 1993. Stato attuale delle conosenze sulla presenza, difffusione e gravità della flavescenza dorata e di altri giallumi della vite in Italia e in altri Paesi del Mondo (Present state of knwoledge on occurrence, diffusion and severity of flavescence dorée and other grapevine yellows in Italy and other countries of the world), p. 13-17. In E. Refatti (ed.), Extended Abstracts, Convegno "La flavescenza dorata ed altri giallumi della vite, stato attuale delle conoscenze e problemi di lotta". Eurovite'93, Gorizia, Italy.
Keywords :grapevine; phytoplasma disease; flavescence dorée; phytoplasma; review; Italy;
Notes : In Italian. Extended abstracts of papers presented at a meeting on flavescence dorée (FD) and other grapevine yellows at Gorizia, Italy, in December 1993. Review on the present knowledge on grapevine yellows. 30 references.

1270. **Refatti, E., L. Carraro, and R. Osler.** 1993. Epidemiology of a yellows disease of grapevine in northern Italy, p. 103-104. In P. Gugerli (ed.), Extended abstracts 11th Meeting ICVG, Montreux, Switzerland, 6-9 September 1993. Federal Agricultural Research Station of Changins, CH-1260 Nyon, Switzerland.
Keywords :grapevine; phytoplasma disease; flavescence dorée; *Scaphoideus titanus;* ELISA; western blot; immunoassay; etiology; epidemiology; transmission; leafhopper; vector; Friuli; Italy; meeting; ICVG;
Notes : Review on the research made in the Friuli-Venetia Giulia region in northern Italy on the epidemiology of a yellows disease of grapevine similar to flavescence dorée (FD), affecting mainly the cvs. Chardonnay, Perrera and Garganega. The disease is spreading and affected vines may recover spontaneously, as it is the case for FD in France. Transmission experiments with *Scaphoideus titanus* gave only few positive results, but MLOs closely related to FD70 strain of France were detected by ELISA and western blot in leafhoppers fed on grapevines with symptoms. Comparing field infection of exposed and screened Chardonnay vines clearly shows that the disease is transmitted by an aerial vector. It is not clear whether *S.titanus*, which is present in the area, is the main vector.

1271. **Refatti, E., L. Carraro, F. Pavan, R. Osler, and V. Girolami.** 1988. La flavescenza dorata della vite (Grapevine flavescence dorée or golden flavescence). Notiziario ERSA **N.S. 1***(2):*1-16.
Keywords :grapevine; phytoplasma disease; flavescence dorée; occurrence; symptoms; control; Italy;
Notes :ERSA means "Ente Regionale per lo Sviluppo Agricolo" (Regional committee for the agricultural development).

1272. **Refatti, E., R. Osler, L. Carraro, and F. Pavan.** 1991. Natural diffusion of a flavescence dorée-like disease of grapevine in northeastern Italy, p. 164-172. In I. C. Rumbos, R. Bovey, D. Gonsalves, W. B. Hewitt, and G. P. Martelli (ed.), Proceedings of the 10th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG). Plant Protection Institute, P.O. Box 303, 38001 Volos, Greece.
Keywords :grapevine; phytoplasma disease; flavescence dorée; spread; epidemiology; leafhopper; vector; *Scaphoideus titanus;* Italy; meeting; ICVG;
Notes :A flavescence dorée-like disease has been present in all grape areas of the Friuli-Venezia Giulia region since the early eighties, affecting mostly Chardonnay, White Pinot, Perera, and to a lesser extent Grey Pinot. A survey of the evolution of the disease in several vineyards showed that typical recovery occurred in about 20% of affected grapes. *Scaphoideus titanus* was detected in all vineyards checked. Chemical sprays to control the vector did not decrease the rate of spread of the disease. However, the disease clearly appeared to be transmitted by at least one airborne vector.

1273. **Regner, F., S. Brandt, H. Romann, and A. Stadlhuber.** 1995. *In vitro*-Viruseliminierung bei Reben (*Vitis* sp.) (*In vitro* elimination of viruses in grapevine). Mitt. Klosterneuburg **45**:67-74.
Keywords :grapevine; virus elimination; sanitary selection; heat therapy; *in vitro;* meristem tip culture; nepovirus; closterovirus; GLRaV-1; Austria;
Notes : In German, Fr. Eng. sum. The method involved a combination of *in vitro* culture and meristem tip culture. The initial material was first established as an *in vitro* culture of apical meristem, green cuttings or bud meristem. After a first *in vitro* multiplication, the clones thus formed were tested by ELISA for GFLV, ArMV, GCMV, GLRaV-1 and 3. They were then submited to heat therapy *(in vitro),* and at the end of heat treatment, meristems were excised (0.1 mm). Grapevines were grown from these meristems, tested again by ELISA, and checked for their ampelographic properties. So far, 23 scion and 10 rootstock varieties have been treated. All nepoviruses and most closteroviruses were eliminated easily. The advantages of using virus-free material are discussed.

1274. **Regner, F. and A. Stadlhuber.** 1997. Virus elimination by thermotherapy - early screening and improved diagnosis with IC-PCR, p. 151. In O. A. Sequeira,de, J. C. Sequeira, and M. T. Santos (ed.), Extended abstracts 12th Meeting ICVG, Lisbon, Portugal, 29 September-2 October 1997. Dept.Plant Pathology, Estação Agronomica Nacional, Oeiras, Portugal.

Keywords :grapevine; leafroll; closterovirus; GLRaV-3; heat therapy; meristem tip culture; diagnosis; immunocapture PCR; Austria; meeting; ICVG;
Notes : Immunocapture-polymerase chain reaction (IC-PCR) was used for the detection of several grapevine viruses and was compared with ELISA. The specimens were prepared in the same way for both assays. IC-PCR was more sensitive than ELISA. It is convenient in cases where infection levels are low.

1275. **Regner, F., A. Stadlhuber, and H. Romann.** 1996. Somatische Embryogenese bei Weinreben *(Vitis vinifera)* (Somatic embryogenesis of grapevines *(Vitis vinifera)*. Mitt. Klosterneuburg **46**:105-113.
Keywords :grapevine; somatic embryogenesis; *in vitro;* Austria;
Notes : In German, Fr., Eng.sum. Regeneration of grapevine plants was obtained from anthers, ovaries or the whole flowers of cvs. Grüner Veltliner, Rheinriesling, Blaufränkisch, Zweigelt and Rösler in *in vitro* culture. Embryogenic cells developed only from non-zygotic tissues.

1276. **Reinert, W. and M. Maixner.** 1996. Untersuchungen zum Nachweis der Erreger der Vergilbungskrankheiten der Rebe (Research on detection of the agents of the yellows diseases of grapevine). Mitt. Biol. Bundesanstalt. f. Land- u. Forstwirtschaft Berlin-Dahlem *(321):*77.
Keywords :grapevine; phytoplasma disease; Vergilbungskrankheit; detection; PCR; nucleic acid assay; Germany;
Notes : Detection of phytoplasmas of the "Vergilbungskrankheit" in grapevine was possible already at the end of May in young shoots using PCR amplification techniques. It was also possible later in the season using leaf veins or wood scrapings.

1277. **Reinert, W. and M. Maixner.** 1997. Epidemiological studies on a new grapevine yellows in Germany, p. 65-66. In O. A. Sequeira,de, J. C. Sequeira, and M. T. Santos (ed.), Extended abstracts 12th Meeting ICVG, Lisbon, Portugal, 29 September-2 October 1997. Dept.Plant Pathology, Estação Agronomica Nacional, Oeiras, Portugal.
Keywords :grapevine; epidemiology; phytoplasma disease; elm yellows; PCR; RFLP; host range; vector; Germany; meeting; ICVG;
Notes : A new type of grapevine yellows (GY) has been detected in Germany. Most of the vines affected by this disease belong to the cv. Scheurebe and are grown in the Palatinate. It is distinct from the "Vergilbungskrankheit", which is the most common grapevine yellows disease in Germany and belongs to the stolbur subgroup of phytoplasmas. The new GY disease is related to the elm yellows group, of which flavescence dorée (FD) is also a member. However, *Scaphoideus titanus*, vector of FD, is not present in Germany, and the two diseases are not indentical. Samples were collected from various species of plants in and around two vineyards affected with GY, and the presence of phytoplasmas was tested with PCR. Positive samples were further investigated by RFLP. Profiles of the elm yellows type were detected in *Alnus glutinosa* (alder), *Rubus* sp.(blackberry), and *Prunus amygdalus* (almond). Many individuals of the psyllid *Psylla alni* collected on alder trees in the vicinity of affected grapevine plots were shown to exhibit the same RFLP profile as GY grapevine or alder extracts after PCR processing. This suggests the hypothesis that *Alnus glutinosa* and perhaps other plants may play the role of reservoir hosts and *Psylla alni* that of an occasional vector to grapevine.

1278. **Reynolds, A.G., W.S. Lanterman, and D.A. Wardle.** 1997. Yield and berry composition of five *Vitis* cultivars as affected by *Rupestris* stem pitting virus. Amer. J. Enol. Vitic. **48**:449-458.
Keywords :grapevine; rupestris stem pitting; performance; economic importance; yield; quality; Canada;
Notes : In order to compare the performances of virus-free vines and vines infected with rupestris stem pitting virus, a field trial was set up in 1987 in a radomized block at Summerland, BC, Canada, in an arid continental climate. A similar experiment was established at the Saanichton Plant Quarantine Station, Sidney,BC, Canada, in a cool maritime climate. The varieties were, in Summerland: Kerner, Michurinetz and Okanogan Riesling; and in Sidney: Madeleine Sylvaner and Ortega. Yield components were not influenced by the infection in Summerland, but yield and number of clusters per vine were slighty lower in infected vines in Sidney. The titratable acidity of berries was lower at harvest in both sites. The were also

some differences in the weight of pruning wood, but on the whole, rupestris stem pitting did not seem to have much influence on growth and yield of grapevine.

1279. **Rezaian, M.A.** 1990. Australian grapevine viroid - evidence for extensive recombination between viroids. Nucleic Acids Research **18**:1813-1818.
Keywords :grapevine; AGVd; nucleotide sequence; viroid; structure; Australia;
Notes : Australian grapevine viroid (AGVd) consists of 369 residues, has less than 50% sequence similarity with any other known viroid, and produces no symptom on grapevine. It can be grown on cucumber, after mechanical inoculation, and can be purified from fresh or frozen leaves. The complete sequence was determined. AGVd contains several segments that are identical with segments of following viroids: citrus exocortis viroid, potato spindle tuber viroid, apple scar skin viroid, grapevine viroid 1 and 2. As the central region of AGVd is typical of the apple scar skin viroid group, the author proposes to include AGVd in this group.

1280. **Rezaian, M.A., N. Habili, L.R. Krake, and N.S. Scott.** 1992. Viruses, viroids and grapevine. The Australian Grapegrower and Winemaker 37-41.
Keywords :grapevine; virus; viroid; leafroll; yellow speckle; Australia;
Notes : Review on the situation concerning grapevine viroids in Australia.

1281. **Rezaian, M.A., A.M. Koltunow, and L.R. Krake.** 1988. Isolation of three viroids and a circular RNA from grapevines. J. Gen. Virol. **69**:413-422.
Keywords :grapevine; HSVd-g; CEVd-g; AGVd; viroid; Australia;

1282. **Rezaian, M.A., A.M. Koltunow, and L.R. Krake.** 1988. Viroids in grapevine: detection and isolation, p. 9-11. In E. Shikata (ed.), Proceedings 2nd Meeting of the International Viroid Working Group, Yamanashi, Japan, 1988.
Keywords :grapevine; viroid; detection; nucleic acid assay; Australia; meeting;
Notes : Book chapter.

1283. **Rezaian, M.A., A.M. Koltunow, L.R. Krake, and K.G. Skene.** 1991. Grapevine viroids, p. 297. In I. C. Rumbos, R. Bovey, D. Gonsalves, W. B. Hewitt, and G. P. Martelli (ed.), Proceedings of the 10th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG). Plant Protection Institute, P.O. Box 303, 38001 Volos, Greece.
Keywords :grapevine; viroid; AGVd; GYSVd-1; GYSVd-2; CEVd-g; HSVd-g; occurrence; Australia; ICVG; meeting;
Notes : Abstract. Five distinct viroids are present in commercial varieties:1) Hop stunt, 2) Citrus exocortis, 3) grapevine yellow speckle viroid, 4) grapevine viroid 1B and 5) Australian grapevine viroid. The viroids 3) and 4) cause yellow speckle.

1284. **Rezaian, M.A. and L.R. Krake.** 1987. Nucleic acid extraction and virus detection in grapevine. J. Virol. Methods **17**:277-285.
Keywords :grapevine; nucleic acid assay; detection; nepovirus; method; Australia;

1285. **Rezaian, M.A., L.R. Krake, Q. Cunying, and C.A. Hazzalin.** 1991. Detection of virus-associated dsRNA from leafroll infected grapevines. J. Virol. Methods **31**:325-334.
Keywords :grapevine; virus elimination; fragmented shoot apex culture; leafroll; dsRNA; associated; detection; method; Australia;
Notes : A virus-associated dsRNAs was detected in extracts from leaves or green cortex of leafroll infected grapevines, with a size of 1 to above 5 kbp. No similar dsRNAs were detected in healthy vines. They disappeared after virus elimination by fragmented shoot apex culture. They reappeared together with the disease after graft inoculation of healthy vines with leafroll. The authors conclude that the dsRNAs are of viral origin and discuss the value of the method for checking the sanitary state of grapevines.

1286. **Rezaian, M.A., L.R. Krake, Q.Cunying, and C.A. Hazzalin.** 1991. Detection of double-stranded RNA associated with grapevine leafroll disease. Application in disease elimination, p. 410. In I. C. Rumbos, R. Bovey, D. Gonsalves, W. B. Hewitt, and G. P. Martelli (ed.), Proceedings of the 10th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG). Plant Protection Institute, P.O. Box 303, 38001 Volos, Greece.
Keywords :grapevine; leafroll; virus; detection; dsRNA; sanitary selection; Australia; meeting; ICVG;
Notes : Abstract. The authors describe a simple technique for detecting leafroll-associated viruses in grapevine by dsRNA analysis.

1287. **Rezaian, M.A., L.R. Krake, and D.A. Golino.** 1992. Common identity of grapevine viroids from USA and Australia revealed by PCR analysis. Intervirology **34**:38-43.
Keywords :grapevine; viroid; AGVd; GYSVd-1; GYSVd-2; HSVd-g; CEVd-g; PCR; nucleic acid assay; detection; Australia; California; USA;
Notes : Viroids from USA and Australia were compared using a new method based on reverse transcription and polymerase chain reaction (RT-PCR). Viroid RNA was first transcribed into corresponding DNA, and amplified by PCR. ^{32}P-dATP incorporated during the reaction allowed rapid detection of the the products in polyacrylamide gels by autoradiograpphy. Probe hybridizations were also used for viroid comparisons.The results of this study confirm the adequacy of the nomenclature adopted at the last ICVG meeting in Greece in 1990. There are 5 viroids in grapevine: Hop stunt viroid (HSVd), Citrus exocortis viroid (CEVd), Grapevine yellow speckle viroid 1 (GYSVd-1), Grapevine yellow speckle viroid 2 (GYSVd-d) and Australian grapevine viroid. PCR-based approach is more sensitive and specific that probe hybridization, and takes less time. The test can be achieved in a working day. However, some plant extracts may contain compounds that are inhibitory to the enzymes involved.

1288. **Ribaille, S.** 1990. La flavescence dorée de la vigne (Grapevine flavescence dorée). Phytoma - La Défense des Végétaux *(422):*57-58.
Keywords :grapevine; phytoplasma disease; flavescence dorée; symptoms; leafhopper; vector; *Scaphoideus titanus*; occurrence; France;
Notes : The vector of FD, *Scaphoideus titanus* Ball, has been recorded in 1989 in the Loire Valley and in Maine et Loire.

1289. **Ries, R.** 1987. Résultats de la sélection clonale à Geisenheim. Tests virologiques chez le sélectionneur, possibilités et limites du contrôle des virus (Results of clonal selection at Geisenheim. Virological tests during clonal selection, possibilities and limitations of virus detection). Schw. landw. Forschung/La Recherche agronomique en Suisse **26**:332-335.
Keywords :grapevine; fanleaf; leafroll; nepovirus; detection; *Xiphinema;* nematode; Longidoridae; clonal selection; sanitary selection; yield; quality; performance; indexing; Germany;
Notes : In French. A description is given of the methods of clonal selection of Riesling and several other cvs. at the Institute of grapevine selection of Geisenheim, Germany. Clonal selection has greatly improved yield, but it is difficult to improve sugar content of grapes. There are serious problems with soil contamination by *Xiphinema* and nepoviruses.

1290. **Rigden, J.E. and M.A. Rezaian.** 1993. Analysis of sequence variation in grapevine yellow speckle viroid 1 reveals two distinct alternative structures for the pathogenic domain. Virology **193**:474-477.
Keywords :grapevine; viroid; GYSVd-1; cDNA; nucleotide sequence; nucleic acid; structure; Australia;
Notes : Nucleotide sequence analysis of 24 full length cDNA clones prepared from a field isolate of grapevine yellow speckle viroid 1 (GYSVd-1) reveals a large number of sequence variations in the pathogenic domain. Two main groups are characterized by distinct secondary structures.

1291. **Rio, D.** 1996. Effet du virus de l'enroulement foliaire, GLRaV-3, sur les caractéristiques de la vigne (Effect of grapevine leafroll, GLRaV-3, on grapevine characteristics). Universidade Técnica de Lisboa, Instituto Superior de Agronomia, Lisbon, Portugal.
Keywords :grapevine; leafroll; closterovirus; GLRaV-3; performance; yield; quality; Portugal;

Notes : In French, Eng. & Port. sum. This work is a "mémoire de fin d'études" at the Superior Institute of Agronomy of the Technical University of Lisbon. The sanitary state of grapevine in relation with leafroll caused by GLRaV-3 and the effect of this virus on the characteristics of the main Portuguese grapevine cultivars were studied as part of the certification programme. The virus appeared to be largely disseminated in Portuguese vineyards, and was present in 51.2% of tested clones. Some varieties were infected over 90%. The symptom intensity varied according to clones, varieties, and years. The effect of virus infection was not significant for all varieties. It depressed yield slightly, with an average loss of 4.6%, and this effect was more intense in varieties cultivated in coastal zones. In general, the virus lowered the degree of probable alcohol, increased the acidity of the must and produced a weak variation in pH. No significant effect was noted on total polyphenols and anthocyanins. Finally, the effects of virus infection were not aggravated with time.

1292. **Ritzenthaler, C., M. Pinck, and L. Pinck.** 1995. Grapevine fanleaf nepovirus P38 putative movement protein is not transiently expressed and is a stable final maturation product *in vivo*. J. Gen. Virol. **76**:907-915.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; protoplast; protein; France;
Notes : The protein P 38, a 38 kDa putative movement protein coded by a gene situated on the RNA2 of GFLV, was detected by serology 18 hours after mechanical inoculation of *Chenopodium quinoa* with the virus. P38 accumulated in the protoplasts of this host until late in the course of infection. It is not a transient protein.

1293. **Ritzenthaler, C., A. C. Schmit, P. Michler, C. Stussi-Garaud, and L. Pinck.** 1995. Grapevine fanleaf nepovirus P38 putative movement protein is located on tubules in vivo. Molecular Plant-Microbe Interactions **8**:379-387.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; cell wall; protein; cytopathology; electron microscopy; light microscopy; immunolabelling; tubules; France;
Notes : Tubular structures were observed by electron microscopy in *Chenopodium quinoa* cells infected with grapevine fanleaf virus (GFLV). They measure 40-60 nm in diameter and up to 30 microns in length. Virus particles were often observed inside them. They penetrate cell walls and are thought to be involved in cell to cell movement of virus particles. The P38 putative movement protein was shown by immunogold cytochemistry to be located in or near these tubules. It is also abundant in protoplasts of infected cells.

1294. **Ritzenthaler, C., M. Viry, M. Pinck, R. Margis, M. Fuchs, and L. Pinck.** 1991. Complete nucleotide sequence and genetic organization of grapevine fanleaf nepovirus RNA1. J. Gen. Virol. **72**:2357-2365.
Keywords :grapevine; grapevine fanleaf virus; nepovirus; RNA; cDNA; nucleotide sequence; France;
Notes : The RNA1 nucleotide sequence of grapevine fanleaf virus strain F13 (GFLV-F13) (7342 nucleotides) was determined using cDNA clones. There is only one open reading frame (ORF) of 6852 nucleotides, from nucleotide 243 to 7101. The genetic organization of this segment is described and compared to that of other picorna-like viruses.

1295. **Ritzenthaler, C., M. Viry, M. Pinck, R. Margis, F. Hans, and L. Pinck.** 1991. Structure and expression of the genomic RNAs of grapevine fanleaf nepovirus (Abstract 868). Phytopathology **81**:1248.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; RNA; sequence analysis; genome; structure; France;

1296. **Rivenez, M.O. and S. Bonjotin.** 1997. Jaunisses de la vigne:flavescence dorée, bois noir? (Yellows diseases of grapevine: golden flavescence or blackwood ?). Phytoma - La Défense des Végétaux *(496):*17-19.
Keywords :grapevine; phytoplasma disease; control; survey; flavescence dorée; bois noir; insecticide; *Scaphoideus titanus; Hyalesthes obsoletus;* France;
Notes : In French, Eng.sum. his paper summs up the history of flavescence dorée and the present situation in France. The legislation related with the compulsory measures associated with the control are described.

1297. **Rivera-Bustamante, R., R. Gin, and J. S. Semancik.** 1986. Enhanced resolution of circular and linear molecular forms of viroid and viroid-like RNA by electrophoresis in a discontinuous- pH system. Anal. Biochem. **156**:91-95.
Keywords :method; viroid; RNA; analysis; USA;

1298. **Roca, F., F. Lamberti, and A. Agostinelli.** 1985. I Longidoridae (Nematoda, Dorylaimida) delle regione italiane II. La Basilicata (The Longidoridae {Nematoda, Dorylaimida} of the Italian regions. II. Basilicata). Nematol. medit. **13**:161-175.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; nematode; Longidoridae; *Longidorus; Xiphinema italiae;* occurrence; description; Italy;
Notes : Three species of *Longidorus* and four species of *Xiphinema* were found in Basilicate. The authors report that several attempts made by Roca (unpublished) to transmit GFLV with *Xiphinema italiae* collected from the rhizosphere of grapevines clearly infected with fanleaf always gave negative results.

1299. **Roca, F., F. Lamberti, F. P. D'Errico, and L. Catalano.** 1991. I nematodi Longidoridae nei vigneti della Basilicata e considerazioni sui portinnesti resistenti ai nematodi vettori di virus (The Longidorid nematodes in vineyards of Basilicata and considerations on rootstocks resistant to nematodes vectors of viruses). p. 571-576. In Atti del III Convegno sui "Portinnesti della vite", Potenza Novembre 1988. Della Torre, Portici, Italy.
Keywords :grapevine; Longidoridae; *Xiphinema;* nematode; vector; nepovirus; occurrence; Italy;
Notes : In Italian, Fr., Eng. sum. *Xiphinema pachtaicum* is the most common species of the genus *Xiphinema* in vineyards of Basilicate. *X.index* is also frequent. *X.italiae* is less frequent. Book chapter.

1300. **Rosciglione, B.** 1985. Il "legno riccio" della vite nell' isola di Pantelleria (Legno riccio/stem pitting of grapevine in the island of Pantelleria). Vignevini **12** *(1-2):*38-40.
Keywords :grapevine; legno riccio; stem pitting; rugose wood; occurrence; Pantelleria; Italy;
Notes : In Italian. Report on a PhD thesis of 1960-1961 describing the "legno riccio" (stem pitting) in the island of Pantelleria. The disease was probably introduced with American rootstocks.

1301. **Rosciglione, B. and P. Gugerli.** 1986. Maladies de l'enroulement et du bois strié de la vigne: analyse microscopique et sérologique. (Leafroll and stem pitting of grapevine: microscopical and serological analysis). Rev. suisse vitic. arboric. hortic. **18**:207-211.
Keywords :grapevine; leafroll; stem pitting; rugose wood; etiology; closterovirus; GLRaV-1; GLRaV-2; vitivirus; GVA; immunoassay; electron microscopy; ELISA; ISEM; *Pseudococcus longispinus;* mealybug; vector; Sicily; Italy; Switzerland;
Notes : In French, Eng., Germ, Ital. sum.

1302. **Rosciglione, B. and P. Gugerli.** 1989. Transmission of grapevine leafroll disease and an associated closterovirus to healthy grapevine by the mealybug *Planococcus ficus* Signoret, p. 67-69. In E. Tanne (ed.), Proceedings of the 9th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG), Kiryat Anavim, Israel, September 1987. The Volcani Center, P.O. Box 6, Bet Dagan , Israel.
Keywords :grapevine; leafroll; GLRaV-3; NY-1; closterovirus; transmission; mealybug; *Planococcus ficus;* vector; Italy; Switzerland; meeting; ICVG;
Notes: : In the summer of 1985, leaves and young shoots of Italia and Nero d'Avola grapevines with leafroll symptoms, that were heavily infested by the mealybug *Planococcus ficus* were collected in a vineyard in Sicily and brought to Nyon, Switzerland. They were laid onto the foliage of healthy plants of cv. Gamay Rouge de la Loire kept in an insect-proof chamber. After six months, symptoms of leafroll begun to appear on all the six inoculated vines. Electron microscope revealed the presence of filamentous particles of up to 2200 nm, typical of closteroviruses. They were identified by serology as GLRaV-III.

1303. **Rosciglione, B. and P. Gugerli.** 1989. Transmission of grapevine leafroll disease and an associated closterovirus to healthy grapevine by the mealybug *Planococcus ficus.* Phytoparasitica **17**:63.

Keywords :grapevine; leafroll; closterovirus; transmission; mealybug; *Planococcus ficus;* GLRaV-3; Italy; Switzerland; meeting; ICVG;
Notes : This paper appears in full in the Proceedings of the 9th meeting of ICVG, Kiryat Anavim, Israel, 1987, 67-69 (1989).

1304. **Rousseau, J.** 1997. Flavescenza dorata: che fare in bio? (Flavescence dorée: what can be done organically?). Agricoltura Biologica *(11, suppl.4):*20-23.
Keywords :grapevine; phytoplasma disease; flavescence dorée; control; biological agriculture; Italy; France;
Notes : In Italian. The author discusses the prospects for the control of flavescence dorée transmitted by *Scaphoideus titanus* in organically-cultivated vines. Proposed measures for reducing the populations of the vector include burning pruned wood, winter treatment with oil. These measures reduced the populations of *S.titanus* by about 50% in experiments. Trials with natural insecticides (rotenone and pinolene) gave variable results. Prospects of biological control are discussed.

1305. **Rouzet, J., P. Bernard, G. Du Fretay, and M. Tissot.** 1989. Flavescence dorée: Une maladie sous surveillance. (Flavescence dorée, a disease under supervision). Phytoma - La Défense des Végétaux *(412):*18-24.
Keywords :grapevine; phytoplasma disease; flavescence dorée; biology; epidemiology; economic importance; performance; control; leafhopper; vector; *Scaphoideus titanus;* insecticide; varietal sensitivity; France;
Notes : Summary of present knowledge on FD , spread, different types, evolution of symptoms, biology of *Scaphoideus titanus*, control measures against the vector, recommended insecticides and spray schedules. Yield losses in heavily infected areas were about 60-80 % . The sensitivity of some varieties is listed.

1306. **Rowhani, A.** 1992. Use of F(ab')2 antibody fragment in ELISA for detection of grapevine viruses. Amer. J. Enol. Vitic. **43**:38-40.
Keywords :grapevine; virus; detection; immunoassay; ELISA; F(ab')2; method; California; USA;

1307. **Rowhani, A., C. Chay, D.A. Golino, and B.W. Falk.** 1993. Development of a polymerase chain reaction technique for the detection of grapevine fanleaf virus in grapevine tissue. Phytopathology **83**:749-753.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; detection; PCR; nucleic acid assay; California; USA;
Notes :A polymerase chain reaction (PCR) method was developed for the detection of GFLV in infected grapevine tissue. Four different extraction methods were compared. All of them were suitable for PCR detection of GFLV in infected *Gomphrena globosa*, but only one of these methods was suitable for the detection of GFLV in grapevine tissues. The three others caused inhibition of PCR. Dilution of infected grape leaf tissue extract by a 200-fold excess of healthy leaf tissue extract did not prevent GFLV detection with method 4. The detection limit for virus RNA was 128 fg (0.128 pg). One infected vine could be detected among 200 healthy ones in a mixed sample. The method was used successfully with infected leaves, shoots, roots and bark scrapings, and with *Vitis vinifera* as well as with *V. rupestris.*

1308. **Rowhani, A. and D.A. Golino.** 1995. ELISA test reveals new information about leafroll disease. California Agriculture **49***(1):*26-29.
Keywords :grapevine; leafroll; indexing; ELISA; GLRaV-1; GLRaV-2; GLRaV-3; GLRaV-5; closterovirus; sanitary selection; California; USA;
Notes : The grapevine collection of the Foundation Plant Materials Service (FPMS) was entirely tested by ELISA for leafroll, with antisera against GLRaV-1,-2,-3,-5. The results of indexing and ELISA were compared. A proportion of 0.8% of vines with leafroll was found in rootstock collections, 15.8% in scion cvs. material. The "Old Foundation" collection had 29.2 % of leafroll.

1309. **Rowhani, A. and D.A. Golino.** 1995. Comparison of ELISA and bioassay on field indicators for detection of grapevine leafroll associated viruses. Amer. J. Enol. Vitic. **46**:415.

Keywords :grapevine; leafroll; closterovirus; GLRaV-2; GLRaV-3; GLRaV-4; indexing; immunoassay; ELISA; comparison; California; USA;
Notes : Abstract. Comparing the results of indexing grapevine sources infected with GLRaV-2, 3, and 4 with those of ELISA for these viruses showed that ELISA was a reliable method for detecting grapevine leafroll-associated viruses. The indicator vine used was Cabernet Franc.

1310. **Rowhani, A., D.A. Golino, and M. Cunningham.** 1992. Comparison of bioassay and ELISA for the detection of grapevine leafroll virus in grapevine selections. Phytopathology **82**:1148.
Keywords :grapevine; leafroll; closterovirus; GLRaV-2; GLRaV-3; indexing; detection; woody indicators; immunoassay; ELISA; comparison; method; California; USA;
Notes : In 1989-1990, 100 selections were indexed on Cabernet franc and tested for GLRaV II and III by ELISA. 46 proved to be LR positive. 5 were ELISA + / Indexing - ; 22 were ELISA + / Indexing + ; 19 were ELISA - / Indexing +. In 1990-1991, 91 selections were indexed and tested with ELISA in the same way. 36 were LR positive. 4 were ELISA + / Indexing - ; 29 were ELISA + / Indexing + ; 3 were ELISA - / Indexing + . The authors suggest that more work is necessary in order to assess the value of both tests.

1311. **Rowhani, A., D.A. Golino, and M. Cunningham.** 1993. Comparison of bioassay indexing and ELISA for the detection of grapevine leafroll associated virus. Amer. J. Enol. Vitic. **44**:351.
Keywords :grapevine; leafroll; closterovirus; GLRaV-2; GLRaV-3; detection; immunoassay; ELISA; indexing; comparison; California; USA;
Notes : Abstract. Results of field indexing for grapevine leafroll on *Vitis vinifera* cv. Cabernet franc was compared with ELISA test for GLRaV-2 and 3. Discrepancies were observed between the two detection methods, some vines giving positive results only with ELISA, some only with indexing, some with both detection methods.

1312. **Rowhani, A., D.A. Golino, M. Cunningham, and J.K. Uyemoto.** 1996. A comparison between ELISA and bioassay indexing on Cabernet franc indicator for detecting grapevine leafroll associated viruses. Amer. J. Enol. Vitic. **47**:349-350.
Keywords :grapevine; closterovirus; GLRaV-1; GLRaV-2; GLRaV-3; GLRaV-4; leafroll; detection; indexing; immunoassay; ELISA; comparison; method; California; USA;
Notes : Abstract of a paper presented at the 47th annual meeting of ASEV, Reno, Nevada, 26-28 June 1996. The efficiency of ELISA for detecting leafroll associated viruses was compared with indexing on Cabernet franc. GLRaV-1, 2, 3 and 4 were tested with ELISA. Results for GLRaV-1, 2 and 4 were identical with both methods. For GLRaV-3, 44 vines were positive with ELISA, and only 36 with indexing. All 71 healthy controls were negative with ELISA, but 7 of them were positive with indexing. The distribution of GLRaV among the canes of the same infected vine varied considerably. These results suggest that the inconsistency between the results of both methods may be due to this uneven distribution or to the presence of other leafroll associated virus(es) than those considered in this experiment (GLRaV-1 to 4), suggesting the presence of other leafroll associated viruses than GLRaV-1 to 4.

1313. **Rowhani, A., L. Jia, and D.A. Golino.** 1997. Detection of grapevine viruses using colorimetric PCR, p. 98. In O. A. Sequeira,de, J. C. Sequeira, and M. T. Santos (ed.), Extended abstracts 12th Meeting ICVG, Lisbon, Portugal, 29 September-2 October 1997. Dept.Plant Pathology, Estação Agronomica Nacional, Oeiras, Portugal.
Keywords :grapevine; nepovirus; closterovirus; vitivirus; grapevine fanleaf virus; GLRaV-3; GVA; GVB; detection; immunocapture PCR; method; California; USA; meeting; ICVG;
Notes : Although IC-PCR is more sensitive than ELISA, it is substantially more time consuming because it requires gel electrophoresis for the analysis of results. The authors propose a colorimetric method, in which digoxigenin is incorporated in amplified DNA. The DNA molecules are fixed onto the walls of streptavidin-coated ELISA plates through oligonucleotide probes complementary to a sequence of the amplified segment and biotinilated. The reaction is visualized by an antidigoxigenine antibody conjugated to an enzyme as in ELISA (peroxidase or alcaline phosphatase). The method was successfully applied to GFLV, GLRaV-3, GVA and GVB. It proved more sensitive than PCR with gel analysis of PCR products for the detection of these viruses.

1314. **Rowhani, A., M.A. Maningas, and D.A. Golino.** 1994. The development of tube immunocapture-polymerase chain reaction assays for the detection of grapevine fanleaf virus in grapevine tissue. Amer. J. Enol. Vitic. **45**:356.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; detection; nucleic acid assay; immunocapture PCR; PCR; California; USA;
Notes :A sensitive immunocapture-polymerase chain reaction (IC-PCR) has been developed at the Department of plant pathology of the University of California in Davis for the detection of GFLV in grapevine. The procedure is performed without viral disruption prior to reverse transcription. The entire procedure is carried out in polypropylene microcentrifuge tubes, using either purified virus preparations or crude plant extracts. The IC-PCR amplification product, 341 bp in size, was detected in GFLV-infected grapevine tissue, not in healthy controls. The IC-PCR was able to detect viral RNA until dilution 1:1250. When using purified viral preparations, IC-PCR was able to detect as little as 2 pg of virion particles.

1315. **Rowhani, A., M.A. Maningas, L.S. Lile, S.D. Daubert, and D.A. Golino.** 1995. Development of a detection system for viruses of woody plants based on PCR analysis of immobilized virions. Phytopathology **85**:347-352.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; detection; nucleic acid; reverse transcription; nucleic acid assay; PCR; California; USA;
Notes :A method for detection of viruses of woody plants was developed. The particles were immobilized onto polypropylene surfaces and components of the crude sap were washed away, thus avoiding the inhibitory effect of sap. The immobilized virions were then assayed by RT-PCR without any disruption treatment of the coat protein. Although the sensitivity of this method is lower than of the standard RT-PCR (by a factor of 1000 for GFLV) it is still about five times higher than that of ELISA for GFLV.

1316. **Rowhani, A., J.K. Uyemoto, and D.A. Golino.** 1997. A comparison between serological and biological assays in detecting grapevine leafroll associated viruses. Plant Disease **81**:799-801.
Keywords :grapevine; leafroll; closterovirus; ELISA; immunoassay; indexing; PCR; immunocapture PCR; comparison; GLRaV-1; GLRaV-2; GLRaV-3; GLRaV-4; California; USA;
Notes : The respective efficacy of ELISA and indexing on *Vitis vinifera* cv. Cabernet Franc were compared for grapevine leafroll (GLRaV-1, -2, -3, and -4). All grapevine with positive ELISA results for GLRaV-1, GLRaV-2, and GLRaV-4 (9, 14 and 14 sources respectively) were also positive in indexing, and all 75 healthy negative controls were also negative in indexing. For GLRaV-3, among 57 sources that tested positive with ELISA, 8 were negative with Cabernet Franc indexing. They were all positive when tested by IC-RT-PCR. One source with multiple infections was also negative by indexing. Unfortunately, it was no more available for retesting. Testing 20 to 40 local samples for each of the 36 plants infected by any of the four GLRaVs showed that the viruses were unevenly distributed in chronically infected grapevines.

1317. **Rowhani, A., M.A. Walker, and S. Rokni.** 1992. Sampling strategies for the detection of grapevine fanleaf virus and the grapevine strain of tomato ringspot virus. Vitis **31**:35-44.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; tomato ringspot virus; yellow vein; strain; detection; immunoassay; ELISA; USA;
Notes : Three isolates of grapevine fanleaf virus (GFLV), causing respectively fanleaf deformation, vein-banding and yellow mosaic, but serologically identical were studied for their possibility of detection by ELISA in relation with their host, sample tissue, and the season of sampling. They were maintained in *Vitis rupestris* Scheele and in three cultivars of *Vitis vinifera* L. Tomato ringspot virus (TomRSV) was also examined in cv. Carignane of *V.vinifera*. The tissues tested were shoot tips, mature leaves and cambial scrapings during the growth of the vines, and also, for GFLV- infected dormant canes, sawdust of cane bundles, cambial scrapings, dormant buds, and induced shoots, roots and callus. No significant difference was observed in GFLV ELISA results between different sources of virus and cultivars. There were clear seasonal differences for GFLV, the highest OD450 nm being recorded in May and the lowest in September for shoot tip values and mature leaves. The ELISA values from cambial scrapings were relatively constant throughout the season, but moderately high. The highest ELISA values from GFLV infected dormant canes

were obtained with new shoots or roots developed. TomRSV-infected vines gave relatively constant ELISA values during the season, with little variation from one type of tissue to another.

1318. **Rowland, G.F., D.J. Engelbrecht, E.J. Pool, E.C. Schmollgruber, G.J Thompson, and K.J. Van der Merwe.** 1989. The use of peroxidase anti-peroxidase (PAP) complexes in the detection of plant viruses by ELISA. J. Virol. Methods **25**:259-269.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; vitivirus; GVA; detection; immunoassay; peroxidase; ELISA; method; comparison; South Africa;
Notes : The advantages of this method are a better sensitivity than DAS-ELISA, no background problems in the outer rows of microplates and an easier visualization with the naked eye when no plate reader is available.

1319. **Rubinson, E., N. Galiakparov, S. Radian, I. Sela, E. Tanne, and R. Gafny.** 1997. Serological detection of grapevine virus A using antiserum to a non structural protein, the putative movement protein. Phytopathology **87**:1041-1045.
Keywords :grapevine; vitivirus; rugose wood; GVA; detection; immunoassay; immuno-blot; ELISA; Israel;
Notes : The genes coding for the coat protein (CP) and the putative movement protein (MP) of GVA were cloned and expressed in *Escherichia coli*. The resulting proteins were used as antigens for producing antisera. The coat protein and movement protein were detected in GVA-infected *Nicotiana benthamiana*, using these antisera, respectively 2-3 days after inoculation (CP) and only 6-12 h. (MP) after inoculation. Both proteins were detected in rugose wood affected grapevines by the immunoblot technique. With ELISA, the movement protein provided a more sensitive way of detecting GVA in grapevine than coat protein.

1320. **Rubinson, E., N. Galiakparov, S. Radian, I. Sela, E. Tanne, and R. Gafny.** 1997. Detection of grapevine virus A using antiserum to the putative movement protein, p. 93-94. In O. A. Sequeira,de, J. C. Sequeira, and M. T. Santos (ed.), Extended abstracts 12th Meeting ICVG, Lisbon, Portugal, 29 September-2 October 1997. Dept.Plant Pathology, Estação Agronomica Nacional, Oeiras, Portugal.
Keywords :grapevine; rugose wood; vitivirus; GVA; detection; immunoassay; western blot; method; Israel; meeting; ICVG;
Notes : The information given in this paper is similar to that of the previous reference.

1321. **Rui, D., G. Belli, A. Fortusini, L. Pizzoli, and G. C. Torresin.** 1987. Ulteriore contributo conoscitivo sulla flavescenza dorata della vite nel Veneto. (Further contribution to knowledge of grapevine "flavescence dorée" in the Veneto), p. 35-56. In S. Ruini (ed.), Atti del Convegno sulla Flavescenza Dorata della Vite, Vicenza-Verona, Maggio 1987. Fondazione Sergio Bolla, Verona.
Keywords :grapevine; flavescence dorée; occurrence; phytoplasma disease; symptoms; vector; *Scaphoideus littoralis;* leafhopper; control; Veneto; Italy; meeting;
Notes : In Italian, Fr. Eng. sum. Flavescenza dorata, Vicenza-Verona meeting.

1322. **Rumbos, I.C.** 1985. [Contribution to the Study of Virus-Diseases of Grapevine in Greece]. Geotechnical Chamber of Greece, Thessaloniki.
Keywords :grapevine; virus diseases; virus-like diseases; general; Greece;
Notes : In Greek, legends in English. Description of the most important virus and virus-like diseases that occur in Greece, illustrated with colour photographs. Book.

1323. **Rumbos, I.C.** 1989. Vein necrosis, fleck and leafroll in *Vitis vinifera* and grapevine rootstocks in Central Greece, p. 35-39. In E. Tanne (ed.), Proceedings of the 9th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG), Kiryat Anavim, Israel, September 1987. The Volcani Center, P.O. Box 6, Bet Dagan , Israel.
Keywords :grapevine; vein necrosis; fleck; leafroll; indexing; scion; rootstock; survey; Greece; meeting; ICVG;

Notes : Vein necrosis, fleck and leafroll were detected in Central Greece by indexing. The incidence of fleck was 38% among the scion cvs. and 44% among the rootstocks. Vein necrosis occurred in 65% of the clones investigated and 75% of the rootstocks. 47% of the cvs. indexed were positive for leafroll.

1324. **Rumbos, I.C.** 1989. Present knowledge on the yellows diseases of grapevine, p. 473-482. In R. Cavalloro (ed.), Plant-Protection Problems and Prospects of Integrated Control in Viticulture. Proceedings of the CEC/IOBC International Symposium, Lisboa- Vila Real, Portugal, June 1988. Commission of the European Communities, L-2920 Luxembourg.
Keywords :grapevine; phytoplasma disease; review; Greece;
Notes : Book chapter

1325. **Rumbos, I.C.** 1992. Virological problems and certification of grapevine in Greece, p. 75-83. In G. P. Martelli (ed.), Grapevine Viruses and Certification in EEC Countries: State of the Art. Quaderno No 3, Istituto Agronomico Mediterraneo (I.A.M.), Bari, Italy.
Keywords :grapevine; certification; legislation; Greece; meeting; EEC;
Notes : The main virological problems occurring in Greece are discussed in relation with sanitary selection and certification.

1326. **Rumbos, I.C. and A.D. Avgelis.** 1989. Roditis leaf discoloration -- a new virus disease of grapevine: symptomatology and transmission to indicator plants. J. Phytopathol. **125**:274-278.
Keywords :grapevine; roditis leaf discoloration; symptoms; transmission; indicator; Greece;
Notes : An apparently new disease of grapevine affecting the variety Roditis in Central Greece was characterized by yellow and reddish discolorations along the veins and the interveinal areas, or affecting variously extended sectors of the leaf blade, which was deformed, usually in correspondence to discolored sectors. Bunches were reduced in number and had a low sugar content. Grapevine fanleaf virus and carnation mottle virus were recovered from diseased vines through mechanical inoculation to herbaceous hosts. However, it is not proved that they are the agents of the disease, which was named *Roditis leaf discoloration* disease.

1327. **Rumbos, I.C. and A.D. Avgelis.** 1993. Further investigations on 'Roditis leaf discoloration' disease, p. 76. In P. Gugerli (ed.), Extended abstracts 11th Meeting ICVG, Montreux, Switzerland, 6-9 September 1993. Federal Agricultural Research Station of Changins, CH-1260 Nyon, Switzerland.
Keywords :grapevine; roditis leaf discoloration; Greece; meeting; ICVG;
Notes : Roditis leaf discoloration disease was found for the first time on 1981 on cv. Roditis in the region of Magnesia in Central Greece. Carnation mottle virus and grapevine fanleaf virus were isolated from infected vines after transmission by mechanical inoculation to herbaceous hosts. The disease was transmitted by grafting to cv. Mission. The original diseased plants were pulled out and destroyed, but two vines were kept at the Institute of plant pathology of Volos and at that of Heraklion. Several other vineyards showed symptoms similar to the original Roditis leaf discoloration disease. A survey made from 1982 to 1992 showed a tendency of the disease to spread. New transmissions were made regularly to herbaceous hosts from the original vines kept at Volos and Heraklion, and from newly diseased vines. Carnation mosaic virus and grapevine fanleaf virus were transmitted from original vines, but not from the newly affected vines. It is concluded that the recent cases that appeared similar to the original disease are not related to Roditis leaf discoloration disease..

1328. **Rumbos, I.C., A.D. Avgelis, and G.P. Martelli.** 1993. Roditis leaf discoloration, p. 75-77. In G. P. Martelli (ed.), Graft-transmissible diseases of grapevines. Handbook for detection and diagnosis. FAO, Rome.
Keywords :grapevine; roditis leaf discoloration; symptoms; detection; diagnosis; Greece; Italy;

1329. **Rumbos, J.** 1989. Vein necrosis, fleck and leafroll in *Vitis vinifera* and rootstocks in central Greece. Phytoparasitica **17**:61.
Keywords :grapevine; vein necrosis; fleck; leafroll; indexing; rootstock; survey; Greece; meeting; ICVG;

Notes : This paper appears in full in the Proceedings of the 9th meeting of ICVG, Kiryat Anavim, Israel, 1987, 35-39 (1989) (author I.C. Rumbos = J.Rumbos).

1330. **Rüdel, M.** 1987. Bekämpfung von Rebvirosen: notwendig und durchführbar ? (Control of grapevine virus diseases: is it necessary and possible ?). Rebe und Wein,Weinsberg **40**:344-346.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; Kerner disease; Reisigkrankheit; leafroll; arabis mosaic virus; control; soil fumigation; Germany;
Notes : In German. The most important virus diseases occurring in German vineyards are described. The Reisigkrankheit is caused by several nepoviruses and transmitted by nematodes. The cv.Kerner is very sensitive to arabis mosaic virus when the rootstock is infected. Leafroll is relatively rare, but mixed infections with nepoviruses and leafroll cause severe symptoms. The economic importance of these diseases is discussed. Control is difficult as treatments with soil fumigants are now prohibited for environmental reasons. Other control methods for nematode vectors are discussed.

1331. **Rüdel, M.** 1989. Schadnematoden im Weinbau und ihre Bakämpfung. (Noxious nematodes in viticulture and their control). Rebe und Wein,Weinsberg **42**:29-31.
Keywords :grapevine; nematode; control; vector; soil fumigation; fallow; *Xiphinema diversicaudatum; Xiphinema index;* Longidoridae; Germany;
Notes : In German. Soil fumigation is now strongly restricted in Germany. Long term fallow, about 5 years is recommended. Cultivation of non-hosts, addition of organic conditioner, selection of resistant rootstocks and scion cvs., elimination of roots of old vines before replanting are among several proposed measures.

1332. **Rüdel, M.** 1992. Nepoviruses of grapevine and their nematode vectors in the EEC, p. 23-29. In G. P. Martelli (ed.), Grapevine Viruses and Certification in EEC Countries: State of the Art. Quaderno No 3. Istituto Agronomico Mediterraneo (I.A.M.), Bari, Italy.
Keywords :grapevine; nepovirus; Europe; grapevine fanleaf virus; arabis mosaic virus; strawberry latent ringspot virus; raspberry ringspot virus; grapevine Bulgarian latent virus; tomato black ring virus; symptoms; detection; transmission; vector; *Xiphinema; Longidorus;* Longidoridae; nematode; control; review; Germany; meeting; EEC;
Notes : Six nepoviruses have been detected in EEC countries: GFLV, ArMV, SLRV, RRV, GBLV, TBRV. Properties of the viruses, transmission, detection, control.

1333. **Rüdel, M.** 1995. Vorkommen von Nepo-Viren und Vektoren in pfälzischen Weinbaugebieten in Beziehung zu früherem Bewuchs (Occurrence of nepoviruses and vectors in the viticultural regions of the Palatinate in relation to the previous vegetation). Deutsches Weinbau-Jahrbuch **46**:93-100.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; arabis mosaic virus; raspberry ringspot virus; *Xiphinema index; Xiphinema diversicaudatum; Paralongidorus maximus;* Longidoridae; nematode; Germany;
Notes : In German. Grapevine fanleaf virus is frequently found in vineyards of the northern Palatinate. Its distribution is wider than that of its vector *Xiphinema index*. Arabis mosaic virus and its vector *X.diversicaudatum* are most frequent in southern Palatinate. *Paralongidorus maximus* is mainly found in the central part of Palatinate, associated with rapsberry ringspot virus.

1334. **Rüdel, M.** 1996. Vergilbungskrankheiten (Yellows diseases). Das Deutsche Weinmagazin *(11):*28-30.
Keywords :grapevine; Vergilbungskrankheit; flavescence dorée; bois noir; stolbur; leafhopper; *Hyalesthes obsoletus;* Germany; phytoplasma disease;
Notes : In German. This is an information for growers on the two yellows diseases that have been recorded so far in Germany. The "Vergilbungskrankheit" has been described already in 1959 by Gärtel. It is now known to be caused a phytoplasma belonging to the stolbur group, as it is the case for the "Bois noir" in northeastern France. It is transmitted by the leafhopper *Hyalesthes obsoletus*. The source of infection is probably in weeds. The second symptom has been found in Palatinate on the cv. Scheurebe. It is caused by a phytoplasma belonging to the same group as the flavescence dorée in France. So far, the economic

importance of these two diseases is limited, as cases are not very frequent. However, the potential damage that could be caused by their extension justifies a careful vigilance.

1335. **Rüdel, M., F. Dechet, and K.W. Eichhorn.** 1992. Feindpflanzen virusübertragender Nematoden. Möglichkeiten für den Weinbau? (Ennemy plants of virus-transmitting nematodes. A chance for viticulture). Rebe und Wein,Weinsberg **45**:190-194.
Keywords :grapevine; nematode; vector; nepovirus; control; *Xiphinema index; Xiphinema vuittenezi;* Longidoridae; Germany;
Notes : In German. Several plants prevent nematode vector multiplication and in addition can provide nematicidal substances. In greenhouse tests *Allium sativum, Tanacetum vulgare, Lupinus albus, Hordeum murinum, Calendula officinalis* and *Raphanus oleiferus* prevented the multiplication of *Xiphinema index* and reduced the initial number of adults. Similar results were observed in a field with *X.vuittenezi* and low numbers of *X.index. Allium sativum, Calendula officinalis, Thymum serpyllum* and *Amaranthus retroflexus* reduced the populations of both species.

1336. **Rüdel, M. and L. Kling.** 1985. Einige Erfahrungen aus der Virustestung 1982-1984 (Some results of virus indexing 1982-1984). Wein-Wiss. **40**:425-429.
Keywords :grapevine; indexing; ELISA; results; grapevine fanleaf virus; Reisigkrankheit; nepovirus; leafroll; fleck; Germany;
Notes : In German, Eng. sum. Results of indexing and serological tests made in West Germany vineyards as a survey for detecting viruses and virus-like diseases during the period 1982-1984 are reported. ELISA tests are recommended for GFLV, ArMV, RRV, TBRV. Indexing is recommended for leafroll on Pinot noir, for GFLV on Siegfriedrebe and for fleck on St George. The results of these tests showed a proportion of 61.8 % healthy plants in *Vitis vinifera*, 79.4 % in rootstocks and 95.2 % in new varieties. Leafroll occurred mainly in rootstocks, Reisigkrankheit in *Vitis vinifera*. In some cases GFLV or other nepoviruses were detected by indexing and not by ELISA. Tomato black ring virus was never found.

1337. **Rüdel, M. and L. Kling.** 1995. Nematoden an Unterlagsreben (Nematodes on grapevine rootstocks). Das Deutsche Weinmagazin *(13/14):*83-85.
Keywords :grapevine; nepovirus; nematode; vector; grapevine fanleaf virus; arabis mosaic virus; *Xiphinema index;* Longidoridae; resistance; Germany;
Notes : In German. Paper presented at the 18th International Meeting of Grape Breeders, Geisenheim, 7-8 July 1994.

1338. **Rühl, E.H. and P.R. Clingeleffer.** 1993. Effect of minimal pruning and virus inoculation on the carbohydrate and nitrogen accumulation in Cabernet franc vines. Amer. J. Enol. Vitic. **44**:81-85.
Keywords :grapevine; performance; yield; economic importance; leafroll; yellow speckle; viroid; Cabernet franc; pruning; Australia;
Notes : This is a continuation of a paper by Clingeleffer and Krake, ibidem 1992, **43**, 31-37 (ref. 365). The experiment was designed as a split plot, with pruning as the main plot, and virus infection with leafroll + yellow speckle (sources H4 and H5 from Sultana) as subplot. The diseased vines were infected by graft. Material: Cabernet franc own rooted and virus-tested. H4 infection lowered sugar in the berries by 21.5 %, H5 by 30 %.

1339. **Saayman, D. and J.J.N. Lambrechts.** 1993. The possible cause of red leaf disease and its effect on Barlinka table grapes. South Afr. J. Enol. Vitic. **14**:26-32.
Keywords :grapevine; red leaf; leafroll; symptoms; South Africa;
Notes : Reddening of the leaves, similarities with symptoms of leafroll, but also differences. Graft transmissible, probably similar to leafroll.

1340. **Sabanadzovic, S., N. Abou-Ghanem, P. Saldarelli, and G.P. Martelli.** 1997. Physico-chemical and molecular characterization of grapevine fleck virus, p. 25-26. In O. A. Sequeira,de, J. C. Sequeira, and M. T. Santos (ed.), Extended abstracts 12th Meeting ICVG, Lisbon, Portugal, 29 september-2 October 1997. Dept.Plant Pathology, Estação Agronomica Nacional, Oeiras, Portugal.

Keywords :grapevine; fleck; grapevine fleck virus; properties; molecular analysis; detection; dot blot hybridization; PCR; Italy; meeting; ICVG;
Notes : The physico-chemical properties of four isolates of grapevine fleck virus (GFkV) from different origins (Italy, Bulgaria, Russia, USA) were compared among themselves and with those of a strain of eggplant mosaic tymovirus (EMV). The four GFkV isolates were identical, and their properties differed from those of EMV. The molecular structure of the genome of GFkV was partially investigated and compared to that of EMV. Differences in biological, physicochemical and structural properties are considered wide enough to justify the conclusion that GFkV is distinct from tymoviruses and worth a txonomic position of its own.

1341. **Sabanadzovic, S., P. Saldarelli, and V. Savino.** 1996. Molecular diagnosis of grapevine fleck virus. Vitis **35**:137-140.
Keywords :grapevine; grapevine fleck virus; diagnosis; detection; nucleic acid assay; molecular probe; chemiluminescence; dot blot hybridization; Italy;
Notes : Grapevine fleck virus (GFkV) was detected and identified in infected tissues of grapevines (leaves, canes and roots), by means of a digoxigenin-labelled riboprobe. The probe was used for dot spot assays, with alkali-treated crude sap, or tissue blot assays, with cross or longitudinal sections of leaf petioles. Primers prepared for the amplification by RT-PCR of a fragment of the viral genome of 243 nucleotides gave also positive and consistent results. The advantage of these methods lie in the fact that the material to be tested needs a minimal manipulation: crude sap extraction for dot spot or RT-PCR, hand made sections of leaf tissue for tissue blots.

1342. **Salati, R., D. Golino, A. Rowhani, N. Willits, and D. Gonsalves.** 1993. Detection of grapevine closterovirus associated with leafroll and corky bark *in vitro* using F(ab')2 ELISA, p. 142-143. In P. Gugerli (ed.), Extended abstracts 11th Meeting ICVG, Montreux, Switzerland, 6-9 September 1993. Federal Agricultural Research Station of Changins, CH-1260 Nyon, Switzerland.
Keywords :grapevine; leafroll; corky bark; rugose wood; closterovirus; GCBaV; GLRaV-2; GLRaV-3; GLRaV-4; detection; immunoassay; ELISA; F(ab')2; method; *in vitro*; USA; California; meeting; ICVG;
Notes : An enzyme-linked immunosorbent assay using F(ab')2 fragments of virus-specific antibodies was used to detect closteroviruses associated with leafroll and corky bark in *in vitro* cultures of *Vitis vinifera* cv. Cabernet Sauvignon. The ABs corresponded to GLRaV-2, -3 and -4, and GCBaV (corky bark- associated virus, Namba *et al.* 1991, see ref. 1144 and 1145).

1343. **Salati, R., D.A. Golino, and A. Rowhani.** 1994. Detection of grapevine viruses associated with leafroll, corky bark, and rupestris stem pitting using F(ab')-ELISA and dsRNA techniques. Amer. J. Enol. Vitic. **45**:372.
Keywords :grapevine; leafroll; corky bark; rupestris stem pitting; rugose wood; detection; indexing; F(ab')2; ELISA; dsRNA; immunoassay; nucleic acid assay; California; USA;
Notes : Abstract. The two techniques mentioned in the title were used to assay 20 different grapevine varieties for viruses associated with leafroll, corky bark, and rupestris stem pitting diseases. The results were compared with those of the traditional woody indexing. F(ab') ELISA was performed using three antisera against GLRaV-2, 3, 4, and one antiserum against CB 100. The authors recommend to use in practice woody indexing with *Vitis* indicators, F(ab')ELISA with multiple antiserum, and dsRNA technique to make sure that material to be distributed is free of viruses.

1344. **Salati, R., D.A. Golino, A. Rowhani, N. Willits, and D. Gonsalves.** 1993. Detection of grapevine closterovirus associated with leafroll and corky bark *in vitro* using F(ab')2 ELISA. Amer. J. Enol. Vitic. **44**:351.
Keywords :grapevine; leafroll; rugose wood; corky bark; closterovirus; GLRaV; GCBaV; detection; ELISA; immunoassay; *in vitro;* F(ab')2; California; USA;
Notes : Abstract. Leafroll (GLRaV)- and corky bark (GCBaV)- infected *Vitis vinfera* L. cv. Cabernet Sauvignon were tested *in vitro* using F(ab')2 ELISA. Different parts of the plant from first cultures and from two subsequent subcultures were assayed using the homologous polyclonal antiserum. Callus tissue was also tested for all isolates. The results show differences between subcultures, organs tested and isolates.

Roots samples consistently had the lowest titres. Only two isolates were detected in callus cultures. The use of *in vitro* grown plantlets for ELISA testing seems promising.

1345. **Saldarelli, P., H. Guglielmi Montano, and G. P. Martelli.** 1993. Detection of three grapevine closterolike viruses by non radioactive molecular probes, p. 136. In P. Gugerli (ed.), Extended abstracts 11th Meeting ICVG, Montreux, Switzerland, 6-9 September 1993. Federal Agricultural Research Station of Changins, CH-1260 Nyon, Switzerland.
Keywords :grapevine; closterovirus; vitivirus; detection; nucleic acid assay; molecular probe; cDNA; chemiluminescence; GVA; GVB; GLRaV-3; Italy; meeting; ICVG;
Notes : Non radioactive or "cold" probes were produced to three major closterolike viruses, GVA, GVB and GLRaV-III. The probes were cRNAs transcribed from cDNA templates to viral genomic RNA. They were labelled with digoxigenin-II-UTP. Chemiluminescent detection of GVA, GVB and GLRaV-III in extracts of as little as 250 mg of tissue was in complete agreement with other methods such as sap inoculation (GVB) or ELISA (GVA and GLRaV-III).

1346. **Saldarelli, P., H. Guglielmi Montano, and G.P. Martelli.** 1994. Non-radioactive molecular probes for the detection of three filamentous viruses of the grapevine. Vitis **33**:157-160.
Keywords :grapevine; detection; nucleic acid assay; molecular probe; chemiluminescence; ELISA; GLRaV-3; closterovirus; GVA; GVB; vitivirus; Italy;
Notes : Digoxigenin-labelled RNA probes were used for detecting GVA, GVB and GLRaV-3 in infected tissue with a molecular hybridization chemiluminescent assay. GVA and GVB were detected easily in sap expressed from infected *Nicotiana* species, and the same viruses plus GLRaV-3 were detected in total nucleic extracts from infected grapevines. The efficiency of detection was the same as with ELISA in the case of GLRaV-3, or slightly lower in the case of GVA. The advantages of using a non-radioactive probe are discussed. Results show that the sensitivity is the same as that of methods using radioactive cDNA probes.

1347. **Saldarelli, P., A. Minafra, R. Garau, and G.P. Martelli.** 1993. A cloned probe to grapevine virus B. Riv. Pat. Veg., S.V, **3**:15-22.
Keywords :grapevine; GVB; vitivirus; detection; cDNA; nucleic acid assay; molecular probe; Italy;
Notes :A 1070 bp cDNA fragment was synthesized by random priming on the genomic RNA of grapevine virus B (GVB) and cloned in *Escherischia coli* DH5a. The probe was found to be specific for GVB detection in *N. occidentalis* and with a lower sensitivity in grapevine extracts. It did not react with GVA nor with healthy controls.

1348. **Saldarelli, P., A. Minafra, and P. La Notte.** 1997. Improvements in the molecular diagnosis of grapevine clostero- and trichoviruses, p. 95-96. In O. A. Sequeira,de, J. C. Sequeira, and M. T. Santos (ed.), Extended abstracts 12th Meeting ICVG, Lisbon, Portugal, 29 September-2 October 1997. Dept.Plant Pathology, Estação Agronomica Nacional, Oeiras, Portugal.
Keywords :grapevine; closterovirus; vitivirus; detection; nucleic acid assay; PCR; GVA; GVB; GLRaV-3; method; Italy; meeting; ICVG;
Notes : In view of simplifying the sample preparation and multiple virus detection required for grapevine certification, two methods were developed and described.
1. *Spot - polymerase reaction (spot-PCR)*: A drop of unbuffered sap expressed from grapevine leaf petioles was deposited on a nylon membrane prewetted with NaOH. This can be done in the field, and as many drops can be deposited as there is space on the membrane. The spots can be left to dry, the membrane can be shipped in places far away from the vineyard and processed after extended periods (up to one month) without any apparent loss in sensitivity. Small pieces of the spotted membrane were cut away and incubated in glycine buffer in order to release the nucleic acids, that were used as templates for RT-PCR amplification in the usual way. GVA, GVB and GLRaV-3 were amplified and detected with the same sensitivity as in the normal RT-PCR procedure. Multiplex PCR can also be done by using a mixture of several primers in the same reaction.

2. *Degenerate PCR:* Degenerate oligonucleotide primers were targeted to conserved sequences of certain viral genes. They were be used with PCR for amplifying and detecting several viral nucleic acids in one operation.

1349. **Saldarelli, P., A. Minafra, and G. P. Martelli.** 1996. The nucleotide sequence and genomic organization of grapevine virus B. J. Gen. Virol. **77**:2645-2652.
Keywords :grapevine; GVB; vitivirus; nucleotide sequence; genome; organization; Italy;
Notes : Grapevine virus B (GVB) has been considered as a member of the genus Trichovirus.[However, it was recently attributed to a new genus, Vitivirus (Martelli *et al.* Extended abstracts 12th ICVG meeting Lisbon 1997, p.23-24), ref. 1049]. The 5'-terminal region of the RNA genome of this virus includes 5437 nucleotides. It has been sequenced by the dideoxynucleotide chain termination method. There is evidence that the RNA is capped. Two putative open reading frames (ORFs) have been identified. ORF 1 was shown to code for a 194.7 kDa polypeptide. ORF 2 encoded a 20 kDa polypeptide that has no sequence homology with known protein sequences from the databases. The biological function of this polypeptide is not clear. The GVB genome has the same size as that of apple chlorotic leaf spot virus (ACLSV), the type species of the genus Trichovirus, but differs substantially in the number, size and order of genes. Differences appeared also in the amount of sequence homology between polymerases.The results of this study show that definitive and tentative trichovirus species differ molecularly to an extent that may justify a revision of the taxonomic situation of the genus.

1350. **Saldarelli, P., A. Minafra, G.P. Martelli, and B. Walter.** 1994. Detection of grapevine leafroll-associated closterovirus III by molecular hybridization. Plant Pathology **43**:91-96.
Keywords :grapevine; leafroll; GLRaV-3; closterovirus; detection; cDNA; northern blot; nucleic acid assay; Italy; France;
Notes :dsRNA was purified from cortical scrapings of mature canes of GLRaV-3 infected vines, using phenol-chloroform extraction, chromatography on cellulose columns and enzymatic digestion. cDNA fragments of various lengths were obtained from denatured dsRNA, and were cloned in *Escherischia coli*. Two of the clones were labelled with ^{32}P and used successfully as probes for the detection of GLRaV-3.

1351. **Saldarelli, P., A. Minafra, L. Martinelli, D. Costa, M.A. Castellano, and E. Poznanski.** 1997. Putative movement proteins of grapevine viruses A and B: immunodetection *in vivo* and use for transformation of *Nicotiana* plants, p. 145. In O. A. Sequeira,de, J. C. Sequeira, and M. T. Santos (ed.), Extended abstracts 12th Meeting ICVG, Lisbon, Portugal, 29 September-2 October 1997. Dept.Plant Pathology, Estação Agronomica Nacional, Oeiras, Portugal.
Keywords :grapevine; vitivirus; transgenic; *Nicotiana*; resistance; Italy; meeting; ICVG;
Notes : The movement protein gene of GVA and GVB was introduced by genetic engineering into the cells of *Nicotiana benthamiana* and *N. occidentalis* with a view to obtain resistance to infection by these viruses.

1352. **Saldarelli, P., A. Minafra, and B. Walter.** 1993. A survey of grapevine fanleaf nepovirus isolates for the presence of satellite RNA. Vitis **32**:99-102.
Keywords :grapevine; grapevine fanleaf virus; nepovirus; isolate; satellite RNA; F 13; comparison; survey; nucleic acid assay; molecular probe; Italy;
Notes : Molecular hybridization assays of 34 isolates of grapevine fanleaf virus (GFLV) from various geographical origins were carried out in order to detect the presence of satellite RNA. Results showed that five of them supported the multiplication of such a satellite, both in *Chenopodium quinoa* and in grapevine. These satellite RNAs molecules have the same size as the satellite RNA of GFLV-F13 strain studied in France and a high degree of sequence homology with it.

1353. **Sancassani, G.P. and P. Turco.** 1996. Regione Veneto e flavescenza dorata (The Venetian region and flavescence dorée). L'Informatore Agrario **52***(20):*53-54.
Keywords :grapevine; phytoplasma disease; flavescence dorée; control; Veneto; Italy;

Notes : In Italian. In view of the increasing incidence of FD in the region, the local administration authority is leading a joint project with research institutes in order to be able to give practical advice to vinegrowers for the control of the disease.

1354. **Sancassani, P. and G. Posenato.** 1995. Flavescenza dorata nel Veneto (Flavescence dorée in the Venetian region). L'Informatnore Agrario **51***(20):*109-110.
Keywords :grapevine; flavescence dorée; phytoplasma disease; leafhopper; *Scaphoideus titanus;* occurrence; Italy;
Notes : In Italian. Serious manifestations of the yellows type were recorded in various grape growing areas in Veneto, Italy. The causal agent is in many cases the flavescence dorée phytoplasma transmitted by the leafhopper *Scaphoideus titanus*. But other types of yellows diseases are present in the area, for instance black wood (bois noir), and still other types which are distinct from both FD and black wood. The importance of distinguishing between flavescence dorée and black wood, which is not transmitted by *S.titanus* and occurs mainly on Chardonnay, is stressed. Control measures for safeguarding the health of grapevine collections are recommended.

1355. **Sancassani, P., G. Posenato, and N. Mori.** 1997. La flavescenza dorata nel Veneto (Flavescence dorée in Veneto). L'Informatore Agrario **53***(10):*65-66.
Keywords :grapevine; phytoplasma disease; flavescence dorée; bois noir; *Scaphoideus titanus;* Italy;
Notes : Flavescence dorée (FD) was discovered first in the 1990s in the area of Soave and Vicenza, later in the provinces of Treviso and Padova. Beside FD, the bois noir also occurs in Veneto. *Scaphoideus titanus*, vector of FD is present. The regional phytosanitary service recommends to spray against tortricids with insecticides that are also effective against *S.titanus.*

1356. **Sanchez, F., C. Chay, M.J. Borja, A. Rowhani, J. Romero, G. Bruening, and F. Ponz.** 1991. cDNA sequence of the capsid protein gene and 3' untranslated region of a fanleaf isolate of grapevine fanleaf virus. Nucleic Acids Research **19**:5440.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; cDNA; sequence analysis; coat protein; USA;
Notes : The cDNA sequence of the gene of the capsid protein and of the 3' untranslated region of a grapevine fanleaf virus isolate is described. The cDNA was 2304 bp long, without the poly(A) tail, and corresponds approximately to the 3' 2/3 of the viral RNA2. It contains a single open reading frame and 211 nucleotides of untranslated region preceding a poly(A) tail of about 75 adenine.

1357. **Sandoval, C. and Y. Moreno.** 1997. Virus diseases affecting cultivated grapevines in Chile, p. 110. In O. A. Sequeira,de, J. C. Sequeira, and M. T. Santos (ed.), Extended abstracts 12th Meeting ICVG, Lisbon, Portugal, 29 September-2 October 1997. Dept.Plant Pathology, Estação Agronomica Nacional, Oeiras, Portugal.
Keywords :grapevine; nepovirus; closterovirus; vitivirus; virus diseases; survey; grapevine fanleaf virus; leafroll; GVA; Chile; meeting; ICVG;
Notes : A survey was made in some vineyards in Chile in order to record the occurrence of virus diseases of grapevine. 58 samples of leaves or shoots were collected on plants showing virus symptoms in eight different localities, on a viticultural area of 1200 ha. ELISA and mechanical inoculation to herbaceous hosts were used for detecting 10 different viruses. Samples of soil were taken for nematode identification. The majority of vines tested were affected by at least one of the viruses investigated. *Xiphinema* nematodes were found in soil around the vines infected with nepoviruses.

1358. **Sano, T., H. Kudo, T. Sugimoto, and E. Shikata.** 1988. Synthetic oligonucleotide hybrization probes to diagnose hop stunt viroid strains and citrus exocortis viroid. J. Virol. Methods **19**:109-120.
Keywords :grapevine; hop stunt viroid; citrus exocortis viroid; HSVd-g; CEVd-g; viroid; detection; nucleic acid assay; Japan;
Notes : The synthetic probes can be used for grapevine viroids too (HSVd-g and CEVd-g).

1359. **Sano, T., K. Ohshima, T. Hataya, I. Uyeda, E. Shikata, T.G. Chou, T. Meshi, and Y. Okada.** 1986. A viroid resembling hop stunt viroid in grapevines from Europe, the United States and Japan. J. Gen. Virol. **67**:1673-1678.
Keywords :grapevine; viroid; HSVd-g; hop stunt viroid; Japan;

1360. **Sano, T., K. Ohshima, I. Uyeda, E. Shikata, T. Meshi, and Y. Okada.** 1985. Nucleotide sequence of grapevine viroid: a grapevine isolate of hop stunt viroid. Proc. Jap. Acad. **61, Ser.B**:265-268.
Keywords :grapevine; hop stunt viroid; HSVd-g; viroid; RNA; nucleotide sequence; Japan;
Notes : In English. Hop stunt "grapevine" viroid was isolated from a *Vitis vinifera* vine cv. Zenkoji, affected with leafroll and fleck, and free of fanleaf, collected in the Yamanashi Prefecture. It was propagated in cucumber and purified. The complete sequence of HSVg (Hop stunt "grapevine" viroid) was established. It consists of 297 nucleotides, and has 99% and 95% sequence homology with HSV (hop) and HSVc (cucumber) respectively.

1361. **Sano, T., I. Uyeda, E. Shikata, T. Meshi, T. Ohno, and Y. Okada.** 1985. A viroid-like RNA isolated from grapevine has a high sequence homology with hop stunt viroid. J. Gen. Virol. **66**:333-338.
Keywords :grapevine; HSVd-g; hop stunt viroid; viroid; nucleotide sequence; RNA; Japan;

1362. **Saracchi, M., S. Quaroni, and A. Fortusini.** 1990. Ulteriori indagini sull'eziologia della flavescenza dorata della vite mediante microscopia elettronia a scansione (Further research on etiology of grapevine flavescence dorée by means of scanning electron microscopy). Riv. Pat. Veg. ,S. IV **26**:69-77.
Keywords :grapevine; phytoplasma disease; flavescence dorée; etiology; IPVR; phytoplasma; scanning electron microscopy; detection; Italy;
Notes : Healthy periwinkle potted plants were placed in a vineyard in northern Italy where yellows symptoms were observed on grape. Virescence and yellows symptoms developed on periwinkle, and could be transmitted by grafting to healthy periwinkles. DNA probes from infected periwinkles that reacted with nucleic acid from infected periwinkle were used in dot and Southern hybridization. Results showed that part of the probes reacted with a MLO that is genetically related to FD, but distinct. It is not yet clear if it infects grapevines.

1363. **Saracchi, M., S. Quaroni, and A. Fortusini.** 1993. Scanning electron microscopy observations on flavescence dorée transmission by dodder, p. 105-106. In P. Gugerli (ed.), Extended abstracts 11th Meeting ICVG, Montreux, Switzerland, 6-9 September 1993. Federal Agricultural Research Station of Changins, CH-1260 Nyon, Switzerland.
Keywords :grapevine; phytoplasma; phytoplasma disease; flavescence dorée; detection; scanning electron microscopy; ultrastructure; dodder; transmission; Italy; meeting; ICVG;
Notes : Scanning electron microscopy (SEM) was used to follow the transmission of flavescencd dorée (FD) by the dodder species *Cuscuta campestris*. A few phloem cells of dodder containing MLOs could be observed 3 weeks after connection with the donor plant, and in the receiving grapevine (Chardonnay) already 2 weeks after connection. Symptoms appeared in the inoculated vines only 3 months after dodder connection. This confirms the results obtained with transmission of FD MLOs with *Scaphoideus titanus*, showing that SEM is a very early detector of MLO infection.

1364. **Saracchi, M., S. Quaroni, A. Fortusini, and G. Belli.** 1989. Scanning electron microscopy investigations on petiolar phloem in leaves of grapes affected by "Flavescence dorée", p. 129. In Abstracts of the International Symposium on Electron Microscopy Applied in Plant Pathology, Konstanz, Germany.
Keywords :grapevine; phytoplasma; phytoplasma disease; flavescence dorée; cytopathology; ultrastructure; scanning electron microscopy; Italy;

1365. **Saric, A. and Z. Korosec-Koruza.** 1991. Occurrence and spread of viruses associated with grapevine leafroll (GLR) and stem pitting (GSP) diseases in the north- western part of Yugoslavia, p. 416. In I. C. Rumbos, R. Bovey, D. Gonsalves, W. B. Hewitt, and G. P. Martelli (ed.), Proceedings of the 10th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG). Plant Protection Institute, P.O. Box 303, 38001 Volos, Greece.

Keywords :grapevine; leafroll; rugose wood; stem pitting; nepovirus; grapevine fanleaf virus; closterovirus; GLRaV-1; GLRaV-3; occurrence; Croatia; Slovenia; meeting; ICVG;

1366. **Saric, A., D. Skoric, A. Bertaccini, M. Vibio, and E. Murari.** 1997. Molecular detection of phytoplasmas infecting grapevines in Slovenia and Croatia, p. 77-78. In O. A. Sequeira,de, J. C. Sequeira, and M. T. Santos (ed.), Extended abstracts 12th Meeting ICVG, Lisbon, Portugal, 29 September-2 October 1997. Dept.Plant Pathology, Estação Agronomica Nacional, Oeiras, Portugal.
Keywords :grapevine; phytoplasma disease; aster yellows; occurrence; Croatia; Slovenia; meeting; ICVG;
Notes : Samples of phloem from winter cuttings of grapevine cvs. Chardonnay and Rebolla from Slovenia, and of cvs. Chardonnay and Pinot gris from Croatia were analysed by nested PCR for the presence of phytoplasmas. Positive amplification was obtained using primers specific for the aster yellows group. Negative results were obtained with the other group specific primer pairs as well as with primers specific for stolbur. These results demonstrated the presence of phytoplasmas of the aster yellows group in Slovenia and Croatia.

1367. **Savino, V.** 1992. Certification of grapevine in Italy, p. 55-65. In G. P. Martelli (ed.), Grapevine Viruses and Certification in EEC countries: State of the Art. Quaderno No 3, Istituto Agronomico Mediterraneo (I.A.M.), Bari, Italy.
Keywords :grapevine; certification; legislation; Italy; meeting; EEC;

1368. **Savino, V.** 1996. Unità di ricerca RAISA "Correlazioni tra virus floematici ed il complesso dell'accartocciamento fogliare e del legno riccio della vite": attività svolta e risultati conseguiti (Activity and achievements of the Research Unit RAISA denoted "Relationships between phloem-limited viruses and leafroll and rugose wood of the grapevine"), p. 1-25. In G. P. Martelli, V. Savino, and M. Digiaro (ed.), Virus floematici e malattie della vite.
Keywords :grapevine; leafroll; rugose wood; research; review; Italy;
Notes : In Italian, Eng. sum. This is a panorama of the main results of the work done in Italy in the framework of the project RAISA (Relationships between phloem-limited viruses and leafroll and rugose wood of the grapevine).

1369. **Savino, V., D. Boscia, A. M. D'Onghia, and G.P. Martelli.** 1991. Effect of heat therapy and meristem tip culture on the elimination of grapevine leafroll-associated closterovirus type III, p. 433-436. In I. C. Rumbos, R. Bovey, D. Gonsalves, W. B. Hewitt, and G. P. Martelli (ed.), Proceedings of the 10th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG). Plant Protection Institute, P.O. Box 303, 38001 Volos, Greece.
Keywords :grapevine; leafroll; GLRaV-3; closterovirus; virus elimination; heat therapy; *in vitro;* meristem tip culture; comparison; Italy; meeting; ICVG;
Notes : Two methods were used in order to eliminate leafroll-associated virus III (GLRaV-III) in southern Italy: 1) Heat therapy of potted plants at 38^{o} C for 60 to 270 days. Shoot tips 0.5-1 cm in length were rooted under mist every 30 days (Davis classical method). 2) Meristem tip culture was made with explants 0.4 - 0.6 mm long grown on standard Murashige and Skoog medium with vitamins and benzylaminopurine. The original source plants were infected with GLRaV-III. Of 91 plantlets obtained by heat therapy, only 20 % were free of GLRaV-III. All 64 explants developed into plantlets from meristem tip culture were free of GLRaV-III. Meristem tip culture is definitely more efficient than heat therapy.

1370. **Savino, V., D. Boscia, and G.P. Martelli.** 1989. Rugose wood complex of grapevine: can grafting to *Vitis* indicators discriminate between diseases? p. 91-94. In E. Tanne (ed.), Proceedings of the 9th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG), Kiryat Anavim, Israel, September 1987. The Volcani Center, P.O. Box 6, Bet Dagan , Israel.
Keywords :grapevine; rugose wood; legno riccio; etiology; graft transmission; rupestris stem pitting; corky bark; Kober stem grooving; symptoms; indicator; Italy; meeting; ICVG;
Notes : The rugose wood complex appears to be made of at least three different components, as shown by differential reaction of *Vitis* indicators: rupestris stem pitting on *Vitis rupestris*, Corky bark on LN33 and

Kober stem grooving on Kober 5BB. Field grown grapevines can be infected with rugose wood without showing symptoms.

1371. **Savino, V., D. Boscia, and G.P. Martelli.** 1989. Rugose wood complex of grapevine: can grafting to *Vitis* indicators discriminate between diseases? Phytoparasitica **17**:70-71.
Keywords :grapevine; rugose wood; graft transmission; rupestris stem pitting; corky bark; Kober stem grooving; indicator; Italy; meeting; ICVG;
Notes : This paper appears in full in the Proceedings of the 9th meeting of ICVG, Kiryat Anavim, Israel, 1987, 91-94 (1989).

1372. **Savino, V., B. Di Terlizzi, D. Boscia, and G.P. Martelli.** 1991. Presenza in portinnesti clonali di un fattore che induce nanismo e cespugliamento in *Vitis vinifera.* (Presence in clonal rootstocks of a factor which induces bushy stunt in *Vitis vinifera*), p. 43-48. In Atti del III Convegno sui "Portinnesti della vite", 4-5 Novembre 1988, Potenza, Italia.
Keywords :grapevine; bushy stunt; symptoms; graft transmission; rootstock; meeting; Italy;
Notes : In Italian, Eng. and Fr. sum. A new disease affecting the growth of young grapevines is described here under the name of "bushy stunt". It was observed in Apulia (southern Italy) on several *Vitis vinifera* cvs. grafted on rootstock hybrids 125 A, 34 EM, 140 Ru, 775 P and 1103 P. Growth was reduced and had a bushy appearance, due to the simultaneous development of the main and secondary buds. The yield was much lowered, although symptoms decreased with the passing years. No virus has been found that could be considered as responsible for this disorder. Meeting on grapevine rootstocks, Potenza 1988. Book chapter.

1373. **Savino, V., B. Di Terlizzi, S. Rivieccio, and F. Di Silvio.** 1991. Presence in clonal rootstocks of a graft-transmissible factor that induces stunting and bushy growth in European grapevines, p. 202-210. In I. C. Rumbos, R. Bovey, D. Gonsalves, W. B. Hewitt, and G. P. Martelli (ed.), Proceedings of the 10th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG). Plant Protection Institute, P.O. Box 303, 38001 Volos, Greece.
Keywords :grapevine; bushy stunt; graft transmission; heat therapy; symptoms; virus-like diseases; virus elimination; Italy; meeting; ICVG;
Notes : Description of a virus-like disease of grapevine characterized by stunted and bushy vegetation, drooping shoots and low yield. The agent of the disease is graft-transmissible and appears to be quite widespread in certified selections of the American rootstock 140 Ru. None of the known viruses occasionally found in affected vines seems to be the cause of the disease. The agent can be eliminated by heat therapy.

1374. **Savino, V., G.P. Martelli, and D. Boscia.** 1991. Obtaining virus disease-free grapevines and almonds in southern Italy. Phytoparasitica **19**:250.
Keywords :grapevine; nepovirus; rugose wood; leafroll; vein necrosis; fleck; closterovirus; GLRaV-3; heat therapy; shoot tip culture; *in vitro;* Italy;
Notes : Abstract. Heat therapy was applied to grapevines and almonds by treating whole plants at 38^{o} C and rooting shoot tips under mist in the greenhous or by *in vitro* culture. A good recovery of virus-free material was obtained.

1375. **Savino, V., G.P. Martelli, A.M. D'Onghia, and M.A. Yilmaz.** 1987. Turkey. Strawberry latent ringspot virus in grapevine. FAO Pl. Prot. Bull. **35**:102-104.
Keywords :grapevine; nepovirus; strawberry latent ringspot virus; occurrence; Turkey; strain; Italy;
Notes : The occurrence of SLRV in grapevine cv. Alicante Boushet was recorded in a collection in Turkey. The symptoms consisted of a severe leafroll, a mild leaf deformation, and a reduced growth. Isometric particles 40-45 nm were detected in infected tissues. The strain differed from the type strain and from the SLRV from grapevine in Italy. *Xiphinema diversicaudatum* has not been recorded in Turkey so far. The virus is likely to originate from abroad, and to have been introduced with grapevine planting material.

1376. **Scagliusi, S.M.M.** 1995. Virus do enrolamento da folha da videira no Brazil: caracterização atraves de estudos serologicos e de microscopia eletrônica (Grapevine leafroll virus: characterization by serological

studies and electron microscopy). State University of Campinas, Institute of Biology, Campinas, Sao Paulo, Brazil.
Keywords :grapevine; leafroll; closterovirus; GLRaV; GLRaV-1; GLRaV-2; GLRaV-3; *in vitro;* citrus tristeza virus; electron microscopy; immunoassay; ISEM; thesis; Brazil;
Notes :MS thesis at the Institute of Plant Biology of the State University of Campinas. Tissues from callus cultivated *in vitro* were useful for studying GLRaVs, and provided the greatest concentration of particles for observation in the electron microscope. It was also very useful for keeping isolates of the viruses involved in leafroll. The predominant type was GLRaV-3. ISEM with antisera to GLRaV-1 and 2 gave positive reactions only in decoration. There is evidence that one component of the leafroll complex has serological relationship with Citrus Tristeza virus.

1377. **Schaefers, R.K., R.M. Pool, and D. Gonsalves.** 1994. Somatic embryogenesis from nucellar tissue for the elimination of viruses from grapevines. Amer. J. Enol. Vitic. **45**:373.
Keywords :grapevine; *in vitro*; virus elimination; somatic embryogenesis; USA;
Notes : Virus-free vines were obtained from callus originating from nucellar tissue of flowers from *Vitis vinifera* varieties. Flowers were collected approximately 15 days before bloom and chilled for 72 hours at 4^{o}C. Ovules were excised aseptically and cultured in media consisting of Nitsch and Nitsch basal salts and different combinations of 2,4-D, beta-naphtoxyacetic acid, 6-benzylaminopurine, and N-(2-chloro-4pyridyl)-N'-phenylurea (The same abstract appears in the Amer.J.Enol.Vitic. 45,472,1994).

1378. **Schieber, O.** 1997. Contribution à la caractérisation et au dépistage du virus de la marbrure de la vigne (GFkV) (Contribution to the characterization and detection of grapevine fleck virus). University Louis Pasteur, Strasbourg, France.
Keywords :grapevine; grapevine fleck virus; detection; properties; thesis; France;
Notes : PhD thesis, University Louis Pasteur, Strasbourg, France.

1379. **Schieber, O., A. Seddas, C. Belin, and B. Walter.** 1997. Monoclonal antibodies for detection, serological characterization and immunopurification of grapevine fleck virus. Eur. J. Plant Pathology **103**:767-774.
Keywords :grapevine; fleck; grapevine fleck virus; immunoassay; monoclonal antibodies; ELISA; immunopurification; coat protein; France;
Notes : Ten monoclonal antobodies (MAb) were made to grapevine fleck virus (GFkV). All reacted positively in ELISA with leaf extracts from 50 GFkV-infected grapevines from different geographical origins. The monoclonal antibody MAb 2B5 was used for routine detection of GFkV and was more sensitive than polyclonal antibodies. This antibody was sucessfully used for immunopurifcation of GFkV coat protein.

1380. **Schmid, J., R. Ries, and E.H. Rühl.** 1995. Aims and achievements of clonal selection at Geisenheim, p. 70-73. In J. M. Rantz (ed.), Proceedings of the International Symposium on Clonal Selection, Portland, Oregon, USA, June 1995. The American Society for Enology and Viticulture, Portland, Oregon, USA.
Keywords :grapevine; leafroll; fanleaf; selection; clonal selection; sanitary selection; indexing; ELISA; immunoassay; Germany;
Notes : Clonal selection was initiated in 1921 at the Institute for Viticulture and Grape Breeding of Geisenheim, Germany. It played an important role in the German viticulture by providing the viticulture industry with high performing virus free propagation material. The methods of clonal and sanitary selection are described. Beside the genetic selection aimed at preserving diversity and selecting hig quality clones, virus tests are conducted at every propagation step in order to prevent the multiplication of fanleaf- or leafroll-infected budwood.

1381. **Schöffling, H. and J.G. Deroo.** 1991. Methodology of clonal selection in Germany. J. Int. Sci. Vigne et Vin **25**:203-227.
Keywords :grapevine; clonal selection; method; Germany;

1382. **Schöffling, H. and G. Stellmach.** 1993. Klonzüchtung bei Reben in Deutschland (Clonal selection of grapevine in Germany). Waldkircher Verlag, D-79183 Waldkirch (Germany).
Keywords :grapevine; clonal selection; handbook; Germany;
Notes : This interesting book first relates the history of viticulture from the origin to modern times and the various ways of growing grapevine all around the world. The main part is devoted to grapevine clonal selection in Germany which started some 200 years ago and developed into a very efficient system. The present methods of clonal selection, based on sophisticated statistical analysis of production parameters of grapevine and of sanitary selection for virus and virus-like diseases are described in detail as well as the results and economic impact for German viticulture. Book.

1383. **Schöffling, H. and G. Stellmach.** 1996. Clone selection of grape vine varieties in Germany. Fruit Varieties Journal **50**:235-247.
Keywords :grapevine; clonal selection; performance; virus elimination; certification; Germany;
Notes : This paper describes the German system of clonal selection for performance, which is a 200 year-old tradition and was developed in a few Institutes, namely in recent years at the Central Office for Clonal Selection at Trier under the leadership of the senior author. Although the main selection effort is aimed at performance improvement, a great care is taken to eliminate viruses and virus-like diseases from selected clones or candidate clones. The statistical methods used for selection, the results and costs of clonal selection are indicated as well as the legal basis for certification.

1384. **Schwartz, Y.** 1989. La flavescence dorée de la vigne, obtention et caractérisation d'anticorps monoclonaux spécifiques de l'agent pathogène (Grapevine flavescence dorée, obtaining and characterizing monoclonal antobodies specific for the pathogen). Université de Dijon, Dijon, France.
Keywords :grapevine; phytoplasma; phytoplasma disease; flavescence dorée; immunoassay; ELISA; monoclonal antibodies; thesis; France;
Notes : PhD thesis, University of Dijon, France. In French.

1385. **Schwartz, Y., E. Boudon-Padieu, J. Grange, R. Meignoz, and A. Caudwell.** 1989. Obtention d'anticorps monoclonaux spécifiques de l'agent pathogène de type mycoplasme (MLO) de la flavescence dorée de la vigne. (Obtaining clonal antobodies specific for the MLO agent of flavescence dorée of grapevine). Research in Microbiology **140**:311-324.
Keywords :grapevine; phytoplasma disease; flavescence dorée; phytoplasma; monoclonal antibodies; immunoassay; ELISA; France;
Notes : In French, Eng. sum.

1386. **Scortichini, M.** 1991. Aspetti sintomatologici, diagnostici e di prevenzione della "Malattia di Pierce"(Symptoms, diagnosis and control of Pierce's disease). L'Informatore Agrario **47***(20):*73-79.
Keywords :grapevine; Pierce's disease; symptoms; diagnosis; control; quarantine; Italy;
Notes : Information on symptoms, diagnostic methods and control of Pierce's disease. Importance of quarantine measures in order to avoid importing the disease in Europe.

1387. **Scortichini, M. and C.J. Chang.** 1991. Attuali conoscenze su *Xylella fastidiosa* (Current knowledge on *Xylella fastidiosa*). Inform. Fitopatol. **41***(7/8):*28-33.
Keywords :grapevine; Pierce's disease; *Xylella fastidiosa;* review; Italy;
Notes :A review on the biology of the bacterium *Xylella fastidiosa*, agent of Pierce's disease.

1388. **Scorza, R., J.M. Cordts, D.J. Gray, D. Gonsalves, R.L. Emershad, and D.W. Ramming.** 1996. Producing transgenic 'Thompson Seedless' grape *(Vitis vinifera* L) plants. J. Amer. Soc. Hort. Sci. **121**:616-619.
Keywords :grapevine; transgenic; PCR; coat protein gene; Shiva-1 gene; tomato ringspot virus; *in vitro;* USA;
Notes : Transgenic Thompson seedless grapevines *(Vitis vinifera)* were regenerated from somatic embryonic tissues derived from leaves of *in vitro*-grown plants. Transformation was mediated by *Agrobacterium tumefaciens* either by direct exposure to the engineered bacterium or after bombardment

with gold particles. Introduced genes were either the lytic peptide Shiva-1 gene or the tomato ringspot virus coat protein gene. The introduction of these foreign genes was verified by growing grapevine plantlets in the presence of kanamycin, by PCR assay and by positive beta-glucuronidase (GUS) assay.

1389. **Seddas, A.** 1994. Purification du Mycoplasma-like organism (MLO) de la flavescence dorée de la vigne par immunoaffinité. Intégrité physique et biologique. Etude des principaux constituants (Purification of the mycoplasma-like organism (MLO) of grapevine flavescence dorée by immunoaffinity. Physical and biological integrity. Study of the main constituents) Université de Bourgogne, Dijon, France.
Keywords :grapevine; phytoplasma disease; phytoplasma; flavescence dorée; purification; immunoaffinity; France;
Notes : In French. PhD thesis, University of Bourgogne, Dijon, France.

1390. **Seddas, A., F. Marty, R. Meignoz, and E. Boudon-Padieu.** 1994. Preparation of a MLO-enriched fraction from flavescence dorée infected plants suitable for subsequent purification of MLO by immunoaffinity. IOM Letters **3**:295-296.
Keywords :grapevine; flavescence dorée; phytoplasma; purification; immunoaffinity; France;
Notes :10th International Congress IOM, Bordeaux, 1994.

1391. **Seddas, A., R. Meignoz, X. Daire, and E. Boudon-Padieu.** 1996. Generation and characterization of monoclonal antibodies to Flavescence doree phytoplasma: Serological relationships and differences in electroblot immunoassay profiles of Flavescence doree and Elm yellows phytoplasmas. Eur. J. Plant Pathology **102**:757-764.
Keywords :grapevine; flavescence dorée; monoclonal antibodies; phytoplasma; immunoassay; diagnosis; leafhopper; immunoaffinity; immuno-blot; ELISA; elm yellows; stolbur; western blot; France;
Notes : Eleven monoclonal antibodies specific for flavescence dorée (FD) phytolasmas were produced. Six of them were found to react with elm yellows phytoplasma in immunoblotting or ELISA. None of these antibodies reacted in ELISA or western blot with extracts from periwinkles infected with the phytoplasmas that cause Udine grapevine yellows, apple proliferation, European aster yellows or stolbur (France). Two of these lines are now used routinely for the diagnosis of FD in diseased vines.

1392. **Seddas, A., R. Meignoz, X. Daire, E. Boudon-Padieu, and A. Caudwell.** 1993. Purification of grapevine flavescence doree MLO (Mycoplasma-like organism) by immunoaffinity. Curr. Microbiol. **27**:229-236.
Keywords :grapevine; phytoplasma disease; flavescence dorée; purification; leafhopper; phytoplasma; extracts; monoclonal antibodies; epitopes; analysis; France;
Notes : Flavescence dorée (FD) MLOs (phytoplasmas) were purified from infected hosts (plant or leafhopper vectors) by immunoaffinity, using IgG molecules of an anti-FD monoclonal antibody previously obtained. The antigens were eluted in alkaline conditions. The two main antigenic components that were detected by rabbit polyclonal anti-FD phytoplasma antibodies in purified FD phytoplasma material were different proteins and contained different epitopes (see also next reference).

1393. **Seddas, A., R. Meignoz, C. Kuszala, and E. Boudon-Padieu.** 1995. Evidence for the physical integrity of flavescence dorée phytoplasmas purified by immunoaffinity from infected plants or leafhoppers and the plant pathogenicity of phytoplasmas from leafhoppers. Plant Pathology **44**:971-978.
Keywords :grapevine; phytoplasma; phytoplasma disease; flavescence dorée; infectivity; broadbean; leafhopper; immunoaffinity; immunolabelling; France;
Notes : Phytoplasmas extracted from flavescence dorée (FD)-infected broadbean *(Vicia faba)* plants or purified by immunoaffinity from infected leafhoppers were observed in the electron microscope after immunolabelling. The infectivity of FD phytoplasmas purified from leafhoppers was checked by injection into healthy leafhopper vectors which were later allowed to feed on healthy broadbean seedlings. The results of these experiments prove that the phytoplasmas recovered from infected lefhoppers and purified by immunoaffinity are well preserved and have retained their infectivity.

1394. **Seddas, A., R. Meignoz, C. Kuszala, E. Boudon-Padieu, and A. Caudwell.** 1993. Two procedures for immunopurification of flavescence dorée mycoplasma-like organism (FD-MLO), and evidence of the pathogenicity of purified MLO, p. 107. In P. Gugerli (ed.), Extended abstracts 11th Meeting ICVG, Montreux, Switzerland, 6-9 September 1993. Federal Agricultural Research Station of Changins, CH-1260 Nyon, Switzerland.
Keywords :grapevine; phytoplasma disease; flavescence dorée; phytoplasma; purification; monoclonal antibodies; western blot; France; meeting; ICVG;
Notes : Two methods were described for purifying FD MLOs using monoclonal antibodies bound to a synthetic gel via the Fc region of the antibody. One of the methods provided purified MLOs that remained infective. Healthy leafhoppers infected artificially with these MLOs by infection were able to transmit FD to *Vicia faba*.

1395. **Segura, A., M.L. Gonzalez, and C. Cabaleiro.** 1993. Presence of grapevine leafroll in North West of Spain, p. 125-126. In P. Gugerli (ed.), Extended abstracts 11th Meeting ICVG, Montreux, Switzerland, 6-9 September 1993. Federal Agricultural Research Station of Changins, CH-1260 Nyon, Switzerland.
Keywords :grapevine; leafroll; GLRaV-1; GLRaV-3; closterovirus; economic importance; detection; immunoassay; performance; Spain; meeting; ICVG;
Notes : Leafroll-associated viruses were detected by ELISA in vineyards of Galicia, Spain. GLRaV-III was widespread: 46 % of the vines and 86 % of the vineyards were affected. GLRaV-I was rare. GLRaV-III caused a loss of 30 % in yield per vine, and of 1.1 ^{o}Brix in sugar content of berries (cv. Albariño, white).

1396. **Semancik, J.S.** 1986. Separation of viroid RNAs by cellulose chromatography indicating conformational distinctions. Virology **155**:39-45.
Keywords :grapevine; viroid; RNA; analysis; California; USA;
Notes : Viroids and viroid-like RNAs extracted from citron, grapevine (GV1) and avocado differ in their binding capacities to cellulose in the presence of ethanol. Magnesium ions influence this phenomenon. These differences, which indicate conformational distinctions, can be used for subclassification of viroid-like molecules.

1397. **Semancik, J.S.** 1991. Progress and perspectives in grapevine viroid research 1985-1990, p. 260-269. In I. C. Rumbos, R. Bovey, D. Gonsalves, W. B. Hewitt, and G. P. Martelli (ed.), Proceedings of the 10th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG). Plant Protection Institute, P.O. Box 303, 38001 Volos, Greece.
Keywords :grapevine; viroid; review; USA; meeting; ICVG;
Notes : Review on recent research work on grapevine viroids. This was the introductory lecture to session 4 of the 10th Meeting of ICVG.

1398. **Semancik, J.S.** 1993. Current status of research on grapevine viroids, p. 34-36. In P. Gugerli (ed.), Extended abstracts 11th Meeting ICVG, Montreux, Switzerland, 6-9 September 1993. Federal Agricultural Research Station of Changins, CH-1260 Nyon, Switzerland.
Keywords :grapevine; viroid; review; meeting; ICVG; USA;
Notes : Review on recent progress on grapevine viroid research. Introductory lecture.

1399. **Semancik, J.S.** 1993. Detection and identification of viroids, p. 199-215. In G. P. Martelli (ed.), Graft-transmissible diseases of grapevines. Handbook for detection and diagnosis. FAO, Rome.
Keywords :grapevine; viroid; detection; identification; method; USA;

1400. **Semancik, J.S., A.C. Goheen, and J. Szychowski.** 1989. Viroids in grapevine: causal agents of disease and/or clonal variation? p. 75. In E. Tanne (ed.), Proceedings of the 9th International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG) Kiryat Anavim, Israel, September 1987. The Volcani Center, P.O. Box 6, Bet Dagan, Israel.
Keywords :grapevine; viroid; GYSVd-1; GYSVd-2; HSVd-g; California; USA; meeting; ICVG;
Notes : Abstract. The problem of viroids in viticulture is discussed. There are presently three viroids known to occur in commercial plantings and in grapevine collections in California, GV-1, -2 and -3. They

are widespread in all varieties, mostly in mixed infection of GV-1 and GV-3. They are easily transmitted by mechanical inoculation. No specific disease could be associated with these viroids so far, and their possible economic importance could not be determined in the absence of any viroid-free vines as controls. The same abstract appears in Phytoparasitica 17, 64-65, 1989.

1401. **Semancik, J.S., A.C. Goheen, and J. Szychowski.** 1989. Viroids in grapevine: Causal agents of disease and/or clonal variation ? (Abstract). Phytoparasitica **17**:64-65 (Abstract).
Keywords :grapevine; viroid; GYSVd-1; GYSVd-2; HSVd-g; California; USA; diseases; general; survey; meeting; ICVG;
Notes : General survey of the problem of viroids in viticulture. The same abstract appears in the Proceedings of the 9th meeting of ICVG, Kiryat Anavim, Israel, 1987, 75 (1989).

1402. **Semancik, J.S., R. Rivera-Bustamante, and A.C. Goheen.** 1987. Widespread occurrence of viroid-like RNAs in grapevines. Amer. J. Enol. Vitic. **38**:35-40.
Keywords :grapevine; viroid; GYSVd-1; GYSVd-2; HSVd-g; occurrence; RNA; California; USA;
Notes : The viroid-like RNAs that occur in all or most grapevines have 300-370 nucleotides. They have no relation with any known disease. The viroids detected are GV1, GV2, GV3 of the original nomenclature of the authors. These viroids correspond respectively to GYSVd-1, GYSVd-2 and HSVd-g in the nomenclature adopted in 1990 (see Semancik and Szychowski, 1991, next reference).

1403. **Semancik, J.S. and J.A. Szychowski.** 1991. Comparative properties of viroids of grapevine origin isolated from grapevines and alternate hosts, p. 270-278. In I. C. Rumbos, R. Bovey, D. Gonsalves, W. B. Hewitt, and G. P. Martelli (ed.), Proceedings of the 10th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG). Plant Protection Institute, P.O. Box 303, 38001 Volos, Greece.
Keywords :grapevine; viroid; CEVd-g; AGVd; GYSVd-1; GYSVd-2; HSVd-g; nomenclature; classification; USA; review; meeting; ICVG;
Notes : Two groups of viroids are distinguished: apparent viroids, which can be readily isolated from grapevine, and enhanced viroids, which require an amplification in an alternate host. The authors propose a classification of known viroids affecting grapevine in these two groups. The nomenclature adopted during the ICVG meeting of 1990 and the synonyms are given p.276. 1. Citrus exocortis viroid (CEVd-g); 2. Australian grapevine viroid (AGVd); 3. Grapevine yellow speckle 1 (GYSVd-1); Grapevine yellow speckle 2 (GYSVd-2); Hop stunt viroid (HSVd).

1404. **Semancik, J.S. and J.A. Szychowski.** 1992. Relationships among the viroids derived from grapevines. J. Gen. Virol. **73**:1465-1469.
Keywords :grapevine; viroid; AGVd; CEVd-g; GYSVd-1; GYSVd-2; HSVd-g; GVd-c; relationship; classification; USA; California;
Notes : Four major groups of viroids infecting grapevine have been defined: 1. CEVd-g: a grapevine isolate of citrus exocortis viroid; 2. GVd-c: a grapevine viroid recovered from cucumber, and AGVd, Australian grapevine viroid; 3. GYSVd-1 and GYSVd-2: two viroids inducing yellow speckle disease. 4. HSVd-g: a grapevine isolate of hop stunt viroid.

1405. **Semancik, J.S., J.A. Szychowski, R. Credi, G. I. Mink, M. McKenry, and J.A. Wolpert.** 1993. The role of grapevine viroids in yellow speckle and vein banding diseases, p. 39-40. In P. Gugerli (ed.), Extended abstracts 11th Meeting ICVG, Montreux, Switzerland, 6-9 September 1993. Federal Agricultural Research Station of Changins, CH-1260 Nyon, Switzerland.
Keywords :grapevine; veinbanding; yellow speckle; viroid; GYSVd-1; GYSVd-2; HSVd-g; etiology; USA; Italy; meeting; ICVG;
Notes : Experiments on the role of viroids in the etiology of yellow speckle and vein banding. GFLV was transmitted by *X.index* to viroid-free grapevines (Cabernet Sauvignon and Sauvignon blanc) and to identical vines infected with various combinations of the three main grapevine viroids, GYSVd-1, GYSVd-2 and HSVd-g. The preliminary results show that the problem is probably more complicated than previously thought.

1406. **Semancik, J.S., J.A. Szychowski, M.A. Walker, J.A. Wolpert, and E. Weber.** 1997. The mystery disease: emergence of yellow speckle-vein banding syndrome in California? p. 49-50. In O. A. Sequeira,de, J. C. Sequeira, and M. T. Santos (ed.), Extended abstracts 12th Meeting ICVG, Lisbon, Portugal, 29 September-2 October 1997. Dept.Plant Pathology, Estação Agronomica Nacional, Oeiras, Portugal.
Keywords :grapevine; yellow speckle; veinbanding; viroid; California; USA; meeting; ICVG;
Notes : A disorder of grapevine called "Mystery disease" was reported in 1993 in Napa Valley, California. It has similarities with yellow speckle and vein banding diseases. Viroid analysis revealed the presence of grapevine yellow speckle viroid 1 (GYSVd-1) in all vines with "mystery disease" symptoms. It is suggested that the recent appearance of this disease in California may be due to stress factors enhancing symptom expression of the GYSVd-1 and GFLV complex.

1407. **Semancik, J.S., J. A. Szychowski, and J. A. Wolpert.** 1992. Viroids in grapevine, a threat or opportunity ? Practical Winery & Vineyard **13***(3):*39-43.
Keywords :grapevine; viroid; general; review; economic importance; performance; California; USA;

1408. **Sequeira, O.A.,de and A. Mendonça,de.** 1992. Certification of grapevine in Portugal, p. 91-100. In G. P. Martelli (ed.), Grapevine Viruses and Certification in EEC Countries: State of the Art. Quaderno No 3, Istituto Agronomico Mediterraneo (I.A.M.), Bari,Italia.
Keywords :grapevine; certification; Portugal; meeting; EEC;

1409. **Sequeira, O.A.,de, A. Mendonça,de, and E. Martins.** 1991. Contribuição do sector privado na selecção de castas de videira portuguesas (Contribution of private sector to selection of Portuguese grapevine varieties). Vida Rural **40***(22):*6-9.
Keywords :grapevine; sanitary selection; clonal selection; detection; indexing; immunoassay; ELISA; immuno electron microscopy; Portugal;

1410. **Sequeira, O.A.,de and J. Vasconcelos-Costa.** 1985. An immunoradiometric assay for the titration of a Portuguese strain of grapevine Bulgarian latent virus (GBLV). A preliminary report. Garcia de Orta, Sér. Est. Agron. **12***(1/2):*269-272.
Keywords :grapevine; nepovirus; grapevine Bulgarian latent virus; immunoassay; Portugal;

1411. **Serghini, M.A., M. Fuchs, M. Pinck, J. Reinbolt, B. Walter, and L. Pinck.** 1990. RNA2 of grapevine fanleaf virus: sequence analysis and coat protein cistron location. J. Gen. Virol. **71**:1433-1441.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; sequence analysis; coat protein; France;
Notes : The strain F13 of GFLV has a genome of 3555 nucleotides (184 codons). There are strong similarities between non coding 3' regions of RNA2 of GFLV/F13 and those of RNAs2 of TBRV or GCMV, but less similarities in 5' end non coding segments than reported for other nepovirus RNAs.

1412. **Serghini, M.A., M. Pinck, and L. Pinck.** 1991. *In vitro* expression of a chimeric coat protein gene from grapevine fanleaf virus (strain F13). Arch. Virol. **117**:297-304.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; strain; France;

1413. **Sforza, R., D. Clair, X. Daire, J. Larrue, and E. Boudon-Padieu.** 1997. Study of bois noir epidemiology in France: search and biology of a vector species, p. 107-108. In O. A. Sequeira,de, J. C. Sequeira, and M. T. Santos (ed.), Extended abstracts 12th Meeting ICVG, Lisbon, Portugal, 29 September-2 October 1997. Dept.Plant Pathology, Estação Agronomica Nacional, Oeiras, Portugal.
Keywords :grapevine; bois noir; phytoplasma disease; epidemiology; vector; leafhopper; *Hyalesthes obsoletus;* France; meeting; ICVG;
Notes : A search for potential vectors of bois noir, a phytoplasma disease related to stolbur and present in northeastern France, Germany (Vergilbungskranheit) and several other European countries, was made in France during 1995 and 1996. PCR and nested PCR assays were made on many leafhopper species collected in nature in order to detect stolbur phytoplasmas. 40000 specimens of Euhemiptera, belonging to 7 genera and 103 species were collected and identified. So far *Hyalesthes obsoletus* was the species with the

highest stolbur natural infection. Stolbur phytoplasmas were also found in two other leafhopper species, *Mocydia crocea* and *Euscelidius lineolatus*. However, only *H.obsoletus* transmitted stolbur phytoplasmas to grapevine.

1414. **Shi, C.L., J.M. Wells, and T.A. Chen.** 1986. Screening for monoclonal antibodies against strains of the fastidious bacterium causing Pierce's disease of grape (Abstract). Phytopathology **76**:658.
Keywords :grapevine; Pierce's disease; detection; ELISA; immunoassay; monoclonal antibodies; USA;

1415. **Silva Passos, I.R., M.R. Sondahl, I.Y.A. Ribeiro, M.M. Terra, and E.J.P. Pires.** 1985. Cultura *in vitro* de meristemas de videira; 1. Concentrações do hormonio 6-BA em meio primario (*In vitro* culture of grapevine meristems. 1. Concentration of the hormone 6-BA in primary medium). Bragantia **44**:472-479.
Keywords :grapevine; virus elimination; *in vitro*; meristem tip culture; Portugal;
Notes : In Portuguese, Eng. Pt. sum.

1416. **Silva, J.F., O.A. Sequeira, M.A. Bravo, and M.A. Matos.** 1989. Some ecological aspects of the relationship between grapevine fanleaf virus and its nematode vector *Xiphinema index*, p. 507-516. In R. Cavalloro (ed.), Plant-Protection Problems and Prospects of Integrated Control in Viticulture. Proceedings of the CEC/IOBC International Symposium, Lisboa-Vila Real, Portugal, June 1988. Commission of the European Communities, L-2920 Luxembourg.
Keywords :grapevine; grapevine fanleaf virus; nepovirus; detection; nematode; *Xiphinema index;* Longidoridae; vector; immunoassay; method; ELISA; biology; Portugal;
Notes : Grapevine fanleaf virus (GFLV) was detected in *Xiphinema index* and in grapevine roots by ELISA. 25 nematodes were sufficient for the detection of GFLV. *X. index* was present together with grapevine roots at a considerable depth, down to 120 cm. The infection level of *X. index* batches varied locally, but infectious nematodes were found in some cases at a depth of 120 cm. This makes chemical control very difficult or even impossible. Book chapter.

1417. **Sim, S.T., D. A. Golino, and A. Rowhani.** 1994. Correlation of positive ELISA results with latent virus symptoms. Amer. J. Enol. Vitic. **45**:373.
Keywords :grapevine; leafroll; closterovirus; GLRaV-2; GLRaV-3; GCBaV; rugose wood; corky bark; ELISA; detection; immunoassay; California; USA;
Notes : Severe virus infections were detected in some recently planted vineyards in California. Symptoms included severe stunting, internode shortening, leaf discoloration, leafrolling, disorders of the graft union, and death. Twenty-six samples collected throughout the state were ELISA-tested for grapevine corky bark-associated virus (GCBaV), GLRaV-2, -3, and -4, GFLV, and TomRSV. 14 samples out of 26 tested positive for more than one virus. 18 samples out of 26 tested strongly positive for GCBaV, 12 were positive for GLRaV-2 and 2 for GLRaV-3. No samples tested positive for GLRaV-4.

1418. **Simon, J.L. and J.J. Brugger.** 1987. Contrôle et amélioration des matériels de multiplication de la vigne en Suisse (Supervision and improvement of grapevine propagation material in Switzerland). Schw. landw. Forschung/La Recherche agronomique en Suisse **26**:378-381.
Keywords :grapevine; sanitary selection; certification; Switzerland;

1419. **Simon, J.L. and M. Leguay.** 1991. Colloque de Colmar (France) 26-27 juin 1991. Vers l'harmonisation de la certification des bois et plants de vigne dans la CEE. (Conference of Colmar (France) 26-27 June 1991. Harmonizing the certification of grapevine propagation material within EEC). Progr. Agric. Vitic. **108**:359-366.
Keywords :grapevine; certification; legislation; Europe;
Notes : In French. Report on a round table held at Colmar on grapevine certification in the European Economic Community.

1420. **Simon, M.C.** 1992. Le point sur le flavescence dorée (The situation concerning flavescence dorée). Phytoma - La Défense des Végétaux *(437):*47-49.
Keywords :grapevine; flavescence dorée; phytoplasma disease; review; France;

Notes : In French, Eng. sum. This review on the situation concerning flavescence dorée in France describes the symptoms of the disease, the biology of the mycoplasma-leafhopper complex causing the disease, the means of detection and identification. The control measures, the insecticides available, spray scheme (3 sprays per year) are described.

1421. **Singh, J.P., S. Sharma, and J.P. Verma.** 1985. Occurrence of a new virus like disease of grapevine in Haryana. Indian J. of Virology **1***(1):*73-75.
Keywords :grapevine; virus diseases; graft transmission; symptoms; India;
Notes :A new disease, resembling fanleaf, graft transmissible but not transmissible by mechanical inoculation was observed in the grapevine orchard of the Department of horticulture of the Haryana Agricultural University, at Hisar, India. The number of affected plants increased from 7 to 31 between 1977 and 1983. The diseases reduced the yield practically to zero. It is graft transmissible, but it was not transmitted to *Chenopodium amaranticolor, C.quinoa, C. murale.* (However, the leaf tissue was crushed in distilled water, without buffer nor nicotine). Observations made on 83 cvs. showed that only 19 of them were susceptible.

1422. **Sivolap, J., V. Petrashevich, B. Milkus, N. Muljukina, and N. Rusin.** 1993. Use of double stranded RNA for detection of virus diseases of grapevine, p. 156-157. In P. Gugerli (ed.), Extended abstracts 11th Meeting ICVG, Montreux, Switzerland, 6-9 September 1993. Federal Agricultural Research Station of Changins, CH-1260 Nyon, Switzerland.
Keywords :grapevine; detection; dsRNA; nucleic acid assay; Ukraine; meeting; ICVG;
Notes : Probes made with ds-RNA from virus-infected grapevine and labelled with Iodine-125 showed low specificity. Their possible use for detecting grapevine viruses is discussed.

1423. **Sivolap, J.M., V.P. Petrashevich, B.N. Milkus, N.A. Muljukina, and A.A. Rusin.** 1992. [The use of labelled double-stranded RNA for detection of virus diseases of grapes]. Biotekhnologiya **8***(6):*55-58.
Keywords :grapevine; virus; detection; dsRNA; nucleic acid assay; Ukraine;
Notes : In Russian, Eng.sum. The dsRNA of grapevine vein mosaic virus and grapevine stem pitting (associated) closterovirus were isolated from leaves and shoots of grapevine and purified using preparative electrophoresis. Radioactive isotope-labelled dsRNA was used as a probe in cross-hybridization tests to detect various viruses. The method is proposed as a rapid but non-specific diagnosis method of virus infection in grapevine for viruses that are not transmitted through sap.

1424. **Sivolap, J.M., V.P. Petrashevich, B.N. Milkus, N.A. Muljukina, and A.A. Rusin.** 1992. The use of labelled double-stranded RNA for detecting grape virus diseases. Soviet Biotechnology *(6):*74-79.
Keywords :grapevine; virus; detection; dsRNA; molecular probe; nucleic acid assay; Ukraine;
Notes : The dsRNA of grapevine vein mosaic virus isolated from leaves and shoots of a Muscat cv. and of stem pitting-associated closterovirus isolated from another cv. was extracted and purified by preparative electrophoresis in agarose. Labelled dsRNA preparations were used as probes in cross hybridization tests to detect various viruses. The method is recommended for large scale and rapid diagnosis of non specific viruses of grapevine which are not transmissible through sap.

1425. **Sivolap, J.M., V.P. Petrashevich, N.A. Muljukina, and B.N. Milkus.** 1995. Use of dsRNA probes for the detection of grapevine virus diseases, p. 88-89. In P. G. Goussard, E. Archer, D. Saayman, A. Tromp, and J. Van Wyk (ed.), Proceedings of the first SASEV International Congress, November 1995, Cape Town, South Africa. South African Society for Enology and Viticulture, PO Box 2092, Dennesig 7601, South Africa.
Keywords :grapevine; nucleic acid assay; virus diseases; detection; diagnosis; dsRNA; RNA probe; Ukraine;

1426. **Smart, R., R. Bonfiglioli, and P. Magarey.** 1996. Grapevine yellows disease: Avoiding a potential threat to Australian Chardonnay production? The Australian Grapegrower and Winemaker **33***(384):*11-17.
Keywords :grapevine; phytoplasma; phytoplasma disease; epidemiology; control; symptoms; vector; leafhopper; Australia;

Notes : This paper, intended primarily for grape growers and nurserymen, reviews the present situation concerning grapevine phytoplasma infections and epidemiology in Europe in comparison with the current situation in Australia. A detailed description of symptoms of yellows as they appeared in vineyards of several states of Australia since 1975 is given, together with data on phytoplasma epidemiology, including a list of potential weed host reservoirs and leafhopper vectors. Although Australian vines are presently affected to a small extent, more and more highly susceptible cultivars such as Riesling and Chardonnay are planted, representing now 13% of total acreage. Possible measures to control the disease or reduce its impact are discussed.

1427. **Smart, R. and M. Fletcher.** 1996. Potential insect vectors of grapevine yellows in Australian vineyards. The Australian Grapegrower and Winemaker **33***(395):*20-22.
Keywords :grapevine; phytoplasma disease; leafhopper; vector; survey; Australia;
Notes : The leafhopper *Orosius argentatus*, known as vector of tomato big bud, was found to be widespread in several wine-growing regions of Australia. The potential vector capacity of this leafhopper for grapevine phytoplasma diseases has still to be demonstrated.

1428. **Smith, R.J., J.A. Wolpert, and M.A. Walker.** 1993. Cabernet Sauvignon vine performance on VR rootstocks in a fanleaf degeneration site. Amer. J. Enol. Vitic. **44**:347.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; *Xiphinema index;* rootstock; resistance; performance; hybrid; *Muscadinia*; California; USA;
Notes : Abstract. In 1988, a field trial was established in a portion of an infected 13-year-old vineyard after removal of the vines at the end of the previous growth season. Two *Vitis vinifera x V.(Muscadinia) rotundifolia* (VR) hybrids were used as rootstocks, as well as AxR#1 as control, and healthy Cabernet Sauvignon #8 as scion, in a randomized block design. Berry and pruning weights per vine were significantly higher in VR vines than in controls in 1991 and 1992. Maturity indices in juice from berry samples showed no response to rootstock. Dormant cane pieces collected in March 1992, and analyzed by ELISA indicated severe infection throughout the trial.

1429. **Sopp, E.** 1994. Untersuchungen zur Resistenz von Unterlagsreben gegenüber virusübertragenden Nematoden unter besonderer Berücksichtigung der Nematodenzönose in Weinbersgböden (Studies on the resistance of grapevine rootstocks to virus-transmitting nematodes with particular reference to the nematode biocenose in vineyard soils). Gesellschaft zur Förderung der Forschungsanstalt, Geisenheim, Germany.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; arabis mosaic virus; tomato black ring virus; raspberry ringspot virus; *Xiphinema index; Xiphinema vuittenezi; Xiphinema pachtaicum; Xiphinema diversicaudatum; Longidorus attenuatus; Paralongidorus;* Longidoridae; transmission; nematode; vector; Germany;
Notes : PhD thesis, Technical High School of Darmstadt, Biology Branch, Germany. This very thorough study includes work in the field and in the laboratory and glasshouse in order to detect possible resistance mechanisms in the rootstocks used for grape growing in Germany. The author studied also the biocenose of nematodes in vineyard soils with special reference to virus vectors. The field study was made in 7 vineyards of different vine growing regions of the Rhine Valley. Altogether 25 species of nematodes were recorded in vineyard soils of this region. Four nepoviruses were detected by serology: GFLV, ArMV, RRV, TBRV. The most common virus/vector combination was GFLV and *Xiphinema index*. In 1988, the nematode population in the Darmstadt-Griesheim vineyard included 70% of saprophage, 17% of zoophage, and 13% of phytophage nematodes. The vector species *Longidorus attenuatus* represented only 3% of the phytophage population. TBRV infection was detected in several rootstocks. Differences in virus infection in rootstocks were quite clear. Rootstocks with *Vitis rupestris, V.riparia* or *V.vinifera* as a parent were the most frequently infected and had the most severe root damage. The rootstocks with *V.cinerea* as a parent, and especially the cross *V.riparia* 183 G x *V.cinerea* Arnold showed a relatively good growth and health in nematode- and virus-infected vineyards. Laboratory and glasshouse studies confirmed field observations. *X.index* multiplied best on the rootstock 5C Geisenheim. A clear inhibition of *X.index* multiplication was recorded only with *V.cinerea* and *V.rotundifolia.* In pot experiments, the *X.index* population increase was lower on Kober 5BB (429%) and Rupestris du Lot (331 %) than on 5C (1100%).The cytological alterations were also studied, as well as changes in the peroxidase activity.

1430. **Sotes, V., J.R. Lissarague, and M.A. Mendiola.** 1987. Situation actuelle de la production et de la certification des plants de vigne de pépinière en Espagne. (Present situation conerning production and certification of grapevine planting material in Spain). Schw. landw. Forschung/La Recherche agronomique en Suisse **26**:374-377.
Keywords :grapevine; clonal selection; sanitary selection; certification; legislation; Spain;

1431. **Sottile, I., R. Di Lorenzo, G. Occorso, M. G. Barbagallo, and B. Rosciglione.** 1987. Ulteriori risultati della selezione clonale e sanitaria di alcuni vitigni ad uva da vino in Sicilia. (Further results of clonal and sanitary selection of some grapevine cultivars in Sicily). Schw. landw. Forschung/La Recherche agronomique en Suisse **26**:360-363.
Keywords :grapevine; virus diseases; virus-like diseases; leafroll; fanleaf; fleck; rugose wood; legno riccio; clonal selection; sanitary selection; indexing; certification; Italy; Sicily;
Notes : Leafroll is the most widespread virus disease of grapes in Sicily, followed by the fanleaf complex (fanleaf virus and other nepoviruses), legno riccio, fleck. Corky bark was not recorded. Following percentages were found by indexing for these diseases: leafroll 83%, fanleaf 67%, legno riccio 46%, fleck 13%, corky bark 0%. Only 6 % of the clones indexed were found virus-free.

1432. **Spielmann, A., S. Krastanova, V. Douet-Ohrant, S. Marc-Martin, M. H. Prince-Sigrist, and P. Gugerli.** 1997. Resistance to nepoviruses in grapevine: expression of several putative resistance genes in transgenic plants, p. 143-144. In O. A. Sequeira,de, J. C. Sequeira, and M. T. Santos (ed.), Extended abstracts 12th Meeting ICVG, Lisbon, Portugal, 29 September-2 October 1997. Dept.Plant Pathology, Estação Agronomica Nacional, Oeiras, Portugal.
Keywords :grapevine; nepovirus; resistance; transgenic; *Nicotiana; Vitis;* Switzerland; USA; meeting; ICVG;
Notes : Transgenic *Nicotiana benthamiana* transformed with a grapevine fanleaf virus (GFLV) or arabis mosaic virus (ArMV) coat protein gene were obtained as a first step to grapevine rootstock transformation for resistance to these viruses. *N.benthamiana* transformed with GFLV contained no coat protein particles detectable by serology, but showed a delay in symptom expression after sap inoculation with this virus. Plants transformed with ArMV, in contrast, developed at a very high level the ArMV coat protein, and formed even in some cases isometric particles, mostly empty shells. All plants showed a delay in symptom expression after inoculation. Transgenic grapevine rootstocks cv. Rupestris du Lot St George and 3309 Couderc were also transformed by incorporation of the coat protein gene of GFLV and ArMV. None of the transformed vines accumulated coat proteins. So far, none of the transformed vines showed resistance to GFLV infection when grafted onto infected rootstock. Experiments for testing transmission of the virus by *Xiphinema index* are under way. Two *Vitis rupestris* vines were transformed with the GFLV replicase gene. Resistance to graft transmission of GFLV was observed in one case, and was maintained one year after grafting.

1433. **Spielmann, A., S. Marc-Martin, M. E. Ramel, and P. Gugerli.** 1993. Expression of several modified grapevine fanleaf nepovirus coat protein genes in transgenic tobacco plants, p. 173-174. In P. Gugerli (ed.), Extended abstracts 11th Meeting ICVG, Montreux, Switzerland, 6-9 September 1993. Federal Agricultural Research Station of Changins, CH-1260 Nyon, Switzerland.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; coat protein; cross-protection; transgenic; Switzerland; meeting; ICVG;

1434. **Spreeth, N.A., C. J. Orffer, and E. E. Beukman.** 1989. Fleck-like symptoms observed on R99 in South Africa. Phytoparasitica **17**:77-78.
Keywords :grapevine; fleck-like disease; symptoms; graft transmission; South Africa; R99; meeting; ICVG;
Notes : This paper appears in full in the Proceedings of the 9th meeting of ICVG, Kiryat Anavim, Israel, 1987, 217-225 (1989).

1435. **Spreeth, N.A., C. J. Orffer, and E. E. Beukman.** 1989. Fleck (marbrure)-like symptoms observed on R99 in South Africa, p. 217-225. In E. Tanne (ed.), Proceedings of the 9th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG), Kiryat Anavim, Israel, September 1987. The Volcani Center, P.O. Box 6, Bet Dagan , Israel.
Keywords :grapevine; fleck-like disease; fleck; symptoms; R99; rootstock; South Africa; meeting; ICVG;
Notes : Fleck-like symptoms observed on the leaves of the rootstock R99 in South Africa differed from the symptoms described so far for fleck or marbrure. In contrast to the "classical" fleck disease, fleck-like disease of South Africa developed symptoms on Kober 5BB, R99 and Rupestris St.George. On these three indicators, the symptoms stayed visible throughout the growing season and they caused stunting and leaf deformation.

1436. **Stace-Smith, R. and D. C. Ramsdell.** 1987. Nepoviruses in the Americas, p. 131-166. In K. F. Harris (ed.), Current topics in vector research (Vol.3). Springer-Verlag, New York, USA.
Keywords :grapevine; nepovirus; classification; vector; research; USA; Canada;

1437. **Staub, U., H. Polivka, and H. J. Gross.** 1995. Two rapid microscale procedures for isolation of total RNA from leaves rich in polyphenols and polysaccharides: application for sensitive detection of grapevine viroids. J. Virol. Methods **52**:209-218.
Keywords :grapevine; viroid; detection; RNA; reverse transcription; PCR; northern blot; nucleic acid assay; GYSVd-1; Germany;
Notes : Two methods for extracting and isolating total RNA from grapevine leaf tissue are described. Frozen leaves were ground in liquid nitrogen and the resulting powder was submitted to an extraction procedure with phenol-chloroform-isoamyl alcohol. In the first method, polyphenols and polysaccharides were removed by an aequous two-phase system, followed by DEAE-cellulose chromatography. In the second method, nucleic acids were recovered and purified by differential precipitation with 2-butoxy-ethanol. The resulting RNA was used for reverse transcription followed by polymerase chain reaction (PCR) or northern blot analysis. The time necessary for the RNA isolation in 12 samples was 6-7 hours, and 12-24 samples could be fully analyzed in a day, including reverse transcription and PCR amplification. The use of these procedures led to the first detection of grapevine yellow speckle viroid 1 (GYSVd-1) in German grapevines.

1438. **Staub, U., H. Polivka, J. V. Herrmann, and H. J. Gross.** 1995. Transmission of grapevine viroids is not likely to occur mechanically by normal pruning. Vitis **34**:119-123.
Keywords :grapevine; viroid; HSVd-g; GYSVd-1; northern blot; detection; nucleic acid assay; PCR; survey; occurrence; transmission; Germany;
Notes : A survey for the presence of viroids was made in two vineyards in Germany, and also in rootstock material produced in northern Italy, which is widely used in Germany. Detection of viroids was possible throuhout the vegetation season by northern blot analysis and/or reverse transcription followed by PCR amplification. The distribution patterns of infection in two vineyards showed that viroid transmission did not occur via the regular pruning, but through systemic transmission upon grafting. The origin of viroids did not appear to lie in the rootstocks, but in the scions. Hop stunt viroid was found in almost every sample from local vineyards, whereas GYSVd-1 was found in about 50% of the samples. GYSVd-2 was not found. There was no correlation between symptoms and viroid infection.

1439. **Staudt, G.** 1991. Spreading of grapevine fanleaf virus in grapevines after inoculation by *Xiphinema index*, p. 138-142. In I. C. Rumbos, R. Bovey, D. Gonsalves, W. B. Hewitt, and G. P. Martelli (ed.), Proceedings of the 10th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG). Plant Protection Institute, P.O. Box 303, 38001 Volos, Greece.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; nematode; *Xiphinema index;* Longidoridae; transmission; Germany; meeting; ICVG;
Notes :GFLV-infected *Xiphinema index* were fed on roots of potted grapevines cv. Siegfried. The virus was detected by ELISA in the roots already 2-4 weeks after inoculation, but further spread took several months.

1440. **Staudt, G.** 1993. Resistance to transmission of grapevine fanleaf virus by *Xiphinema index,* p. 57-58. In P. Gugerli (ed.), Extended abstracts 11th Meeting ICVG, Montreux, Switzerland, 6-9 September 1993. Federal Agricultural Research Station of Changins, CH-1260 Nyon, Switzerland.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; resistance; transmission; nematode; *Xiphinema index;* Longidoridae; Germany; meeting; ICVG;
Notes :120 accessions were tested for resistance to GFLV transmission by *Xiphinema index.* On an average 20 plants were tested for each accession, with 200 *Xiphinema index* per pot at the beginning of the experiment. 13 accessions of *Vitis rotundifolia* and *V.munsoniana* showed a high degree of resistance to nematodes and to virus transmission. Other *Vitis* species and hybrids showed interesting resistance.

1441. **Staudt, G.** 1997. A quick-test for screening resistance to transmission of grapevine fanleaf virus by *Xiphinema index.* Vitis **36**:155-156.
Keywords :grapevine; grapevine fanleaf virus; resistance; transmission; method; *Xiphinema index;* immunoassay; ELISA; Germany;
Notes : Batches of about 200 adults *Xiphinema index* reared on the roots of GFLV-infected vines for at least 3 months were introduced in the soil of healthy vines to be tested for virus resistance. Temperature was maintained at 20-25^{o} C. Infection of the roots was tested by ELISA about three months after inoculation. It took at least 5 months until the virus had spread into the shoot and leaves, but symptoms were not yet visible. Testing infection on the roots was therefore more suitable. Infection of the root system was observed already 2 weeks after inoculation, but it was better to wait until the concentration of virus was higher. The average transmission rate was about 80% with cv.Siegfried, but in some cases it was considerably lower. It is advised to use batches of at least 20 plants.

1442. **Staudt, G. and H. H. Kassemeyer.** 1990. Elimination of virus diseases by *in vitro* culture, p. 465. In G. Alleweldt (ed.), Proceedings of the 5th International Symposium on Grape Breeding, September 1989. St.Martin/Pfalz, Germany. Bundesanstalt für Rebenzüchtung, D-76833 Siebeldingen, BRD.
Keywords :grapevine; nepovirus; arabis mosaic virus; raspberry ringspot virus; virus elimination; *in vitro;* Germany; meeting;
Notes : Special issue of Vitis. Book chapter. Arabis mosaic virus and raspberry ringspot virus was eliminated in grapevines by *in vitro* propagation of single nodes without heat therapy. The two viruses were eliminated successfully after three subcultures within 18 months.

1443. **Staudt, G. and H. H. Kassemeyer.** 1990. Resistance to transmission of grapevine fanleaf virus by *Xiphinema index* in some *Vitis* species and hybrids, p. 223-227. In G. Alleweldt (ed.), Proceedings of the 5th International Symposium on Grape Breeding, September 1989. St.Martin/Pfalz, Germany. Bundesforschungsanstalt für Rebenzüchtung Geilweilerhof, D-76833 Siebeldingen, BRD.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; resistance; transmission; nematode; vector; *Xiphinema index;* Longidoridae; Germany; meeting;
Notes : Special issue of Vitis. Book chapter. A method was developed for testing breeding stocks for resistance to feeding by *Xiphinema index* and to transmission of nepoviruses affecting grapevine.

1444. **Staudt, G. and H. H. Kassemeyer.** 1994. Elimination of grapevine leafroll associated virus type I in *Vitis vinifera* cv. Lemberger. Vitis **33**:179-180.
Keywords :grapevine; leafroll; virus elimination; grapevine fanleaf virus; raspberry ringspot virus; nepovirus; GLRaV-1; closterovirus; heat therapy; *in vitro;* shoot tip culture; Germany;
Notes : Leafroll (GLRaV-1) was eliminated from cv.Lemberger by *in vitro* culture for 6 weeks of shoot tips (up to 3 mm) or axillary buds, collected from potted vines that had been heat treated for 60 days at an initial temperature of 25^{o}C, progressively raised to 38^{o}C with 16 h. illumination by fluorescent light. GFLV and RRV were eliminated by *in vitro* culture at 25^{o}C of shoot tips or axillary buds (as above) during 6 weeks, but without prior heat treatment of the mother plants. The temperature was not high enough for heat therapy, and the explants were too large for meristem culture. Whereas this treatment was successful with nepoviruses, it did not eliminate GLRaV-1 from a Rauschling clone, in spite of an *in vitro* culture at 25^{o}C for 8 years and 34 subcultures.

1445. **Staudt, G. and B. Weischer.** 1992. Resistance to transmission of grapevine fanleaf virus by *Xiphinema index* in *Vitis rotundifolia* and *Vitis munsoniana*. Wein-Wiss. **47**:56-61.
Keywords :grapevine; grapevine fanleaf virus; nepovirus; nematode; vector; *Xiphinema index;* Longidoridae; feeding; resistance; *Vitis;* rootstock; Germany;
Notes : Thirteen accessions of *Vitis rotundifolia* and *V.munsoniana* were tested for transmission of GFLV by *Xiphinema index.* The rate of multiplication of the nematode was much lower on these two species than on *V. vinifera* cv. Siegfriedrebe. On an average, the transmission rate of GFV was only 3.6 %. This seems to be due to the fact that *X.index* does not multiply efficiently on these hosts, does not feed much on their roots, and produces necrotic reactions at the rare feeding points.

1446. **Steinkellner, H., A. da Camara Machado, M. Laimer Da Camara Machado, R. Gölles, and H. Katinger.** 1993. Studies on coat protein mediated cross protection of nepoviruses, p. 175. In P. Gugerli (ed.), Extended abstracts 11th Meeting ICVG, Montreux, Switzerland, 6-9 September 1993. Federal Agricultural Research Station of Changins, CH-1260 Nyon, Switzerland.
Keywords :grapevine; nepovirus; arabis mosaic virus; grapevine fanleaf virus; coat protein; cross-protection; transgenic; Austria; meeting; ICVG;
Notes : Transformation of *Nicotiana tabacum* with the coat protein gene of GFLV and ArMV. No data on the results concerning possible resistance to these viruses is available so far.

1447. **Steinkellner, H., G. Himmler, M. Laimer, D. Mattanovich, G. Bisztray, and H. Katinger.** 1989. Konstruktion von cDNA von Arabis Mosaik Virus und deren Anwendung für Diagnose. (Construction of cDNA from arabis mosaic virus and its use for diagnosis). Mitt. Klosterneuburg **39**:242-246.
Keywords :grapevine; arabis mosaic virus; nepovirus; nucleic acid assay; dot blot hybridization; cDNA; detection; diagnosis; Austria;
Notes : In German. The arabis mosaic virus genome consists of 2 linear RNA molecules. The viral RNA was extracted from *Chenopodium quinoa.* A recombinant cDNA was constructed as a tool for diagnostic purposes. It was used in dot blot assays. The sensitivity was about 2 pg with purified virus. It was about the same as that of ELISA in routine tests with crude plant sap. The specificity was good.

1448. **Steinkellner, H., G. Himmler, R. Sagl, D. Mattanovich, and H. Katinger.** 1992. Amino-acid sequence comparison of nepovirus coat proteins. Virus Genes **6**:197-202.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; arabis mosaic virus; grapevine chrome mosaic virus; tomato black ring virus; coat protein; nucleic acid; amino acid sequence; nucleotide sequence; classification; Austria;
Notes :A comparison of the aminoacid sequence of the coat protein of several nepoviruses (GFLV, ArMV, TBRV, GCMV) showed that this group may be divided into several subgroups.

1449. **Stellmach, G.** 1985. Die Virusdiagnose auf Nepoviren mittels ELISA am Sägemehl gebündelter Reben (Virus diagnosis with nepoviruses using ELISA on sawdust from bundles of canes). Gesunde Pflanzen **37**:454-460.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; ELISA; immunoassay; detection; diagnosis; Germany;
Notes :ELISA was successfully used with extracts of dormant canes obtained by macerating sawdust from bundles of canes.

1450. **Stellmach, G.** 1987. Die Kerner Krankheit: Theoretische und praktische Aspekte einer tödlichen Rebvirose. (Kerner disease: theoretical and practical aspects of a deadly disease). Wein-Wiss. **42**:421-427.
Keywords :grapevine; Kerner disease; etiology; nepovirus; arabis mosaic virus; incompatibility; Germany;

1451. **Stellmach, G.** 1987. Die neue Rebenpflanzgutverordnung aus der Sicht des Pflanzenschutzes (The new German regulations on grapevine planting material in the point of view of plant protection). Deutsches Weinbau-Jahrbuch **38**:39-48.
Keywords :grapevine; certification; sanitary selection; diseases; diagnosis; Germany;
Notes : In German. Discussion of the various phytopathological aspects of this new set of rules.

1452. **Stellmach, G.** 1988. Phytopathologische Probleme bei der Rebenpflanzgut-Erzeugung. Neue Erkenntnisse und Forschungsschwerpunkte (Phytopathological problems in producing grapevine planting material.New knowledge and main research fields). Nachrichtenbl. deut. Pflanzenschutzd. **40**:113-116.
Keywords :grapevine; Kerner disease; *Agrobacterium;* viroid; virus-free material; performance; Germany;
Notes : In German, Eng. sum. This paper gives a short account of three diseases affecting grapevine nurseries in Germany: The Kerner disease, which is caused by the high sensitivity of the cv. Kerner towards arabis mosaic virus when the rootstock is infected. Crown gall caused by *Agrobacterium tumefaciens.* Viroids, whose economic importance is not yet established.

1453. **Stellmach, G.** 1988. Austin C.Goheen - 30 Jahre konsquenter und erfolgreicher Kampf gegen die pfropfübertragbaren Krankheiten der Reben (Austin C.Goheen - 30 years of valuable and successful fight against graft-transmissible dieseases of grapevine). Deutsches Weinbau-Jahrbuch **39**:179-190.
Keywords :grapevine; virus diseases; control; history; indexing; research; Germany;

1454. **Stellmach, G.** 1991. Die sterile *in-vitro*-Kultur von Reben - ein Weg in die Zukunft ? (*In vitro* culture of grapevines - a solution for the future ?). Der Deutsche Weinbau **46**:342-343.
Keywords :grapevine; sanitary selection; micropropagation; virus elimination; *in vitro;* fallow; soil fumigation; Germany;
Notes : Soil disinfection with fumigants has been prohibited in Germany. The resulting situation is particularly difficult for grapevine nurserymen, as they cannot be sure of the health of nursery soils. *In vitro* sterile culture could be a solution. One grapevine shoot can give a vegetative offspring of 10'000 vines per year, and there is no risk of contamination by viruses. Discussion on soil fallowing, danger of quick multiplication of a little number of clones, risk of incompatibility phenomena.

1455. **Stellmach, G.** 1991. Latent infections by *Agrobacterium tumefaciens* (Smith and Townsend) -- a serious problem problem with the selection of healthy grapevine plants, p. 363-365. In I. C. Rumbos, R. Bovey, D. Gonsalves, W. B. Hewitt, and G. P. Martelli (ed.), Proceedings of the 10th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG). Plant Protection Institute, P.O. Box 303, 38001 Volos, Greece.
Keywords :grapevine; crown gall; *Agrobacterium;* detection; sanitary selection; certification; Germany; meeting; ICVG;
Notes : Crown gall of grapes, caused by *Agrabacterium tumefaciens*, is a serious problem as it can contaminate propagating material without symptoms. The problem of detecting this bacterium in certified grape material and obtaining bacterium-free plants is discussed.

1456. **Stellmach, G.** 1992. Heilende Vermehrung von Grünholz-Reben (Curative multiplication of greenwood-grapevines). Der Deutsche Weinbau **47**:987-990.
Keywords :grapevine; virus elimination; hot water treatment; heat therapy; grapevine fanleaf virus; leafroll; nepovirus; closterovirus; Pierce's disease; *Agrobacterium;* Germany;
Notes : In German. The author recommends, as a way to avoid several persistent diseases of grapevine: 1. To treat dormant cuttings in warm water at 50^{o} C for 45 minutes, in order to inactivate *Agrobacterium tumefaciens*, phytoplasma diseases, *Phomopsis viticola*, eggs of *Scaphoideus titanus*, *Xylella fastidiosa*, etc. 2. To root these cuttings and cultivate green shoots taken from them in aerated water until roots develop. 3. To plant the rooted plantlets in sterile potting compost and grow them at 30^{o} C. This method also eliminates GFLV and leafroll viruses.

1457. **Stellmach, G.** 1993. Lush growth combined with continued green cutting propagation -- an effective means of eliminating viruses from grapevine shoot tips, p. 176-177. In P. Gugerli (ed.), Extended abstracts 11th Meeting ICVG, Montreux, Switzerland, 6-9 September 1993. Federal Agricultural Research Station of Changins, CH-1260 Nyon, Switzerland.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; arabis mosaic virus; raspberry ringspot virus; virus elimination; Germany; meeting; ICVG;

1458. **Stellmach, G.** 1993. Alle Viren entfernt? (Can all viruses be eliminated?). Das Deutsche Weinmagazin *(2):*27-30.
Keywords :grapevine; sanitary selection; indexing; virus elimination; heat therapy; immunoassay; ELISA; certification; control; review; Germany;

1459. **Stellmach, G.** 1993. Neue Techniken in Klon-Züchtung und Pflanzguterzeugung (New methods for clonal selection and obtention of planting material). Das Deutsche Weinmagazin *(32):*17-19.
Keywords :grapevine; clonal selection; *in vitro;* virus elimination; micropropagation; Germany;
Notes : Discussion on new methods of grapevine propagation: *in vitro* culture, elimination of pathogens, biotechnology. The second part of this paper appears in the same journal, *(2)* 31-32, 1994.

1460. **Stellmach, G.** 1993. Verseuchte Reben (Teil 1). Diagnose ist gut und teuer ... Das Deutsche Weinmagazin *(16):*24-26.
Keywords :grapevine; virus; virus-like diseases; diagnosis; indexing; immunoassay; certification; Germany;
Notes : In German. Description of the methods for diagnosis of virus and bacterial diseases in grape planting material. The author insists on the necessity to indicate what kind of tests have been made, and on the fact that negative results do not necessarily mean that the material is healthy.

1461. **Stellmach, G.** 1993. Reben-Pflanzgut-Verkehr in der EWG - noch viele offene Fragen (The trade of grapevine planting material in the EEC - still many open questions). Deutsches Weinbau-Jahrbuch **44**:73-80.
Keywords :grapevine; certification; indexing; quarantine; Europe; Germany;
Notes : In German. Discussion on the problems resulting from the trade of grapevine propagation material in the European Economic Community (Now European Union).

1462. **Stellmach, G.** 1993. Verseuchte Reben (Teil 2). Heilen statt testen. Das Deutsche Weinmagazin *(19):*25-27.
Keywords :grapevine; virus elimination; virus-like diseases; selection; *in vitro*; meristem tip culture; Germany;
Notes : In German. As indexing and laboratory tests for selection are very expensive, the use of meristem culture for obtaining healthy material for propagation of planting grapevine material may be considered as a cheaper solution.

1463. **Stellmach, G.** 1994. Mit den "richtigen" Worten zur Sache kommen (coming to the facts with the right words). Das Deutsche Weinmagazin *(33):*27-28.
Keywords :grapevine; selection; clonal selection; sanitary selection; description; Germany;
Notes : The author stresses the importance of clearly defining the terms used in grape selection, such as clone, clonal selection, sanitary selection etc.

1464. **Stellmach, G.** 1994. Mit den richtigen Worten zur Sache kommen (2.Teil). Viroide - Gefahr oder chance ? (To come to the point with the right words (2nd Part). Viroids, danger or luck ?). Das Deutsche Weinmagazin *(34/35):*26-27.
Keywords :grapevine; viroid; performance; yield; Germany;
Notes : This paper raises the question of the harmfulness or usefulness of viroids for grapevine. The 1st part of this paper appears in the same Journal vol.33, 27-28.

1465. **Stellmach, G.** 1994. Pflanzreben: Erstklassige Qualität muss unmissverständlich dargestellt sein (Grapevine planting material: the first grade material must be clearly described). Deutsches Weinbau-Jahrbuch **45**:81-90.
Keywords :grapevine; virus diseases; virus-like diseases; virus elimination; virus multiplication; virus-free material; certification; terminology; Germany;
Notes : The author insists on the necessity of making a clear description of the properties of the planting material of grapevine varieties that is offered to the growers. The paper contains a short description of the meaning of 65 German terms used in the publications on grapevine selection and virus or virus-like diseases.

1466. **Stellmach, G.** 1995. "Zufriedenstellende Untersuchungen" an pflanzenpasspflichtigen Amerikanerreben ? (Are the investigations on American grapevines requiring a certificate satisfactory ?). Deutsches Weinbau-Jahrbuch **46**:159-166.
Keywords :grapevine; phytoplasma disease; quarantine; diseases; detection; diagnosis; flavescence dorée; Pierce's disease; Germany;
Notes : After summing up the German and EEC regulations on the subject, the author discusses the efficiency of these measures in practice. The interest of warm water treatment against flavescence dorée and Pierce's disease is discussed.

1467. **Stellmach, G.** 1997. Occurrence of healthy green shoot tips from virus-infected indicator vines, p. 149-150. In O. A. Sequeira,de, J. C. Sequeira, and M. T. Santos (ed.), Extended abstracts 12th Meeting ICVG, Lisbon, Portugal, 29 September-2 October 1997. Dept.Plant Pathology, Estação Agronomica Nacional, Oeiras, Portugal.
Keywords :grapevine; virus elimination; growth; Germany; meeting; ICVG;
Notes : Potted plants of grapevine cvs. Sigfriedrebe infected with raspberry ringspot virus, Blauer Spätburgunder (Pinot noir) infected with GLRaV-1 or -3, LN33 with symptoms of corky bark were forced to quick growth in chambers at 30^{o}C. After several months shoot tips were collected and rooted in warm aerated water (30^{o}C). After rooting (2-3 weeks), the plants were planted in perlite, and later grown in containers in the greenhouse. All plant thus obtained remained symptomless (they were self-indexing) for three years for GLRaVs and seven years for GFLV. ELISA did not detect GFLV during this period of seven years. The possibility of using this method in nurseries is discussed.

1468. **Stellmach, G.** 1997. Elimination of viruses and *Agrobacterium vitis* from grapevines by propagation of tip cuttings. Vitic. Enol. Sci. **52**:100-102.
Keywords :grapevine; virus elimination; shoot tip culture; closterovirus; GLRaV-1; GLRaV-3; corky bark; rugose wood; Germany;
Notes :(This journal is the continuation of Wein-Wissenschaft, Wiesbaden). Infected grapevines were forced to a rapid growth in growth chambers at 30^{o} C for three months, then placed for a week in a normal greenhouse. The shoot tips were cut (in non-sterile conditions) and rooted in aerated water containing silver ions at low concentration in order to avoid bacterial proliferation. Raspberry ringspot virus, corky bark, GLRaV-1 and -3 as well as *Agrobacterium tumefaciens* were eliminated by this treatment. (See also previous reference).

1469. **Stellmach, G. and R. E. Berres.** 1986. Begrenzte Infektionsanfälligkeit der *Vitis vinifera*-Sorte "Kerner" gegenüber dem Arabismosaik-Virus? (Is susceptibility of the *Vitis vinifera* cv. Kerner to infection by arabis mosaic virus limited?). Z. Pfl. Krankh. Pfl. Schutz **93**:356-360.
Keywords :grapevine; Kerner disease; arabis mosaic virus; nepovirus; susceptibility; infection; etiology; Germany;
Notes : In German, Eng.sum. ELISA was used to detect viruses present in scion and rootstocks of vines of cv. Kerner affected with Kerner disease. The results showed that the rootstocks of most of declining Kerner vines (natural infection) appeared infected with ArMV, whereas scions were free of this virus. Similar results were obtained when healthy Kerner scions were grafted onto ArMV-infected rootstocks. But 1-year-old healthy Kerner grafted on ArMV-infected rootstock had detectable ArMV in rootstock and scion. Apparently, Kerner can be infected with ArMV only for a limited time.

1470. **Stellmach, G. and R. E. Berres.** 1986. Sind mit Nepoviren infizierte Pfropfreben immer Quellen der Virus-Kontamination von Rebschulen ? (Is grapevine graftwood infected with nepoviruses always a source of contamination for grape nurseries?). Wein-Wiss. **41**:418-423.
Keywords :grapevine fanleaf virus; arabis mosaic virus; raspberry ringspot virus; graft transmission; nursery; contamination; roots; grapevine; rootstock; nepovirus; Germany;
Notes :GFV, ArMV and RRV contaminate the roots of grapevines infected from scions. Even in a short culture of young plants grafted on healthy rootstocks, the virus from scion has time to go down to the roots and contaminate the soil: 6 months are sufficient.

1471. **Stellmach, G. and R. E. Berres.** 1987. Adventiv-Wurzeln an absterbenden Pfropfreben -- Beobachtungen und Virustests im Gewächshaus (Adventitious roots on dying back grafted grapevines -- Observations and virological tests in glasshouse). Z. Pfl. Krankh. Pfl. Schutz **94**:353-359.
Keywords :grapevine; grapevine fanleaf virus; arabis mosaic virus; tomato black ring virus; nepovirus; leafroll; symptoms; roots; Germany;
Notes : In German, German and English sum.

1472. **Stellmach, G. and R. E. Berres.** 1988. Virusdiagnose mittels ELISA am Sägemehl gebündelter Reben. (Virus diagnosis with ELISA using sawdust of bound grapevine shoots). Der Deutsche Weinbau **43**:70-71.
Keywords :grapevine; ELISA; detection; immunoassay; diagnosis; sawdust; Germany;
Notes :A bundle of dormant canes to be tested with ELISA was sawn and sawdust was collected and macerated in an appropriate buffer. The liquid was used for successful ELISA detection of viruses.

1473. **Stobbs, L.W. and A. B. Broadbent.** 1993. Susceptibility of grapevine cultivars to tomato spotted wilt virus in southern Ontario, Canada. Plant Disease **77**:318.
Keywords :grapevine; tomato spotted wilt virus; transmission; negative; Canada;
Notes : Attempts to infect 8 *Vitis vinifera* cvs, 34 *Vitis* hybrids, 7 *Vitis labrusca* and 3 *Vitis rupestris* by exposition to viruliferous thrips (*Frankliniella occidentalis* (Pergunda) or by mechanical inoculation with lettuce strain of Tomato spotted wilt virus failed entirely.

1474. **Stobbs, L.W., J. W. Potter, R. Killins, and J. G. Van Schagen.** 1988. Influence of grapevine understock in infection of DeChaunac scion by tomato ringspot virus. Can. J. Pl. Pathol. **10**:228-231.
Keywords :grapevine; DeChaunac; nepovirus; infection; tomato ringspot virus; rootstock; growth; yield; performance; Canada;
Notes : DeChaunac scions grafted onto Sonona, SO4, 5BB, 3309, 4453, Concord and DeChaunac rootstock (i.e. in the latter case DeChaunac on DeChaunac) were planted together with own-rooted DeChaunac vines in a commercial vineyard soil heavily infected with tomato ringspot. Grafted vines remained healthy over seven growing seasons, while own-rooted DeChaunac became infected during the second growth season. The virus was undetectable in all grafted understocks including DeChaunac. It appears that the graft union prevents infection of susceptible scions, at least for some time. Yield was reduced in DeChaunac grafted onto Concord, SO4 and 4453, but total sugar, acidity and pH were not affected.

1475. **Stobbs, L.W. and J. G. Van Schagen.** 1985. Relationship between grapevine Joannes-Seyve virus and tomato blackring virus. Can. J. Pl. Pathol. **7**:37-40.
Keywords :grapevine; grapevine Joannes-Seyve virus; tomato black ring virus; nepovirus; immunoassay; relationship; Canada;
Notes : The two viruses produced similar symptoms in grapes and in herbaceous hosts. They showed a strong serological cross reaction , no difference in proteins, but differences in molecular weight of RNA-2. Pseudorecombinants of RNA-1 of one of the two viruses and RNA-2 of the other virus showed no differences in infectivity. Grapevine Joannes-Seyve virus can be considered as a strain of tomato black ring virus.

1476. **Stobbs, L.W. and J. G. Van Schagen.** 1995. Survey for rupestris stem-pitting and corky bark diseases of grapevine in the Niagara peinisula, Ontario. Canadian Plant Disease Survey **75***(1):*19-21.
Keywords :grapevine; rugose wood; rupestris stem pitting; corky bark; occurrence; survey; Ontario; Canada;
Notes : Dormant wood was collected from 10 susceptible grape varieties from 350 vineyards across the Niagara peninsula, Ontario, Canada, in order to determine the incidence of rupestris stem pitting (RSP) and corky bark (CB) in grapevines. Chipbuds taken from 20 vines of each cultivar were grafted onto *Vitis rupestris* St George and LN33. No signs of any infection with RSP or CB were detected in the tested area.

1477. **Stobbs, L.W. and J. G. Van Schagen.** 1996. Occurrence of peach rosette mosaic virus on grapevine in Southern Ontario. Plant Disease **80**:105.
Keywords :grapevine; peach rosette mosaic virus; nepovirus; occurrence; Longidoridae; nematode; *Xiphinema rivesi*; Ontario; Canada;
Notes : Peach rosette mosaic virus was identified in the Niagara Peninsula. *Xiphinema rivesi*, vector of PRMV, was present in the vineyards. Description of the symptoms. Identification of the virus by ELISA and host range.

1478. **Subikova, V.** 1991. Resveratrol accumulation in grapevine infected with grapevine vein necrosis disease. Biologia Plantarum (Praha) **33**:287-290.
Keywords :grapevine; vein necrosis; resveratrol; phytoalexin; Slovakia;
Notes : Trans-reservatrol (4,3',5'-trishydroxystilbene) was identified in grapevine leaves with vein necrosis symptoms. The compound accumulated at a rate from 10 to 60 micrograms per g of fresh mass in infected leaves.

1479. **Subikova, V., A. Srobarova, and G. Vanek.** 1988. A study of the grapevine leafroll, p. 117-127. In A. Blahutiak (ed.), Works of the Institute of Experimental Phytopathology and Entomology (Vol.3). Institute of Experimental Phytopathology and Entomology, Ivanka pri Dunaji, Slovakia.
Keywords :grapevine; leafroll; etiology; closterovirus-like particles; cytopathology; electron microscopy; ultrastructure; Slovakia;
Notes : Grapevine leafroll is widespread in Slovakian vineyards. Mechanical transmission from infected leaves of Cabernet Sauvignon to *Chenopodium quinoa* and *Nicotiana megalosiphon* resulted in systemic infection. Changes induced in infected grapevines were studied in ultra-thin sections by electron microscopy. The observations made support the virus etiology of grapevine leafroll.

1480. **Subikova, V. and G. Vanek.** 1989. Identification of grapevine leafroll virus and grapevine virus A in the Czechoslovakian vineyards, p. 193-194. In J. Polak, J. Chod, V. Rimsa, J. Vacke, and A. Ryvova (ed.), Plant Virology. Proceedings of the 10th Conference of the Czechoslovak Plant Virologists, Prague, 1989. Vyzkumny Ustav Rostlinné Vyroby, 161 06 Prague 6-Ruzyné, Drnovska 507, Czechoslovakia.
Keywords :grapevine; leafroll; GLRaV; GVA; detection; identification; ultrastructure; closterovirus; vitivirus; immunoassay; ELISA; Slovakia; meeting;
Notes : Book chapter. (In Czech and English). Closteroviruse-like particles were seen in electron microscope sections of tissues of grapevine infected with leafroll. Similar particles were seen in partially purified extracts of infected tissues. Serological tests with ELISA confirmed the presence of GLRaV, and also of GVA in vineyards of Slovakia.

1481. **Sultan, S.A. and H. Ferris.** 1991. The effect of soil moisture and soil particle size on the survival and population increase of *Xiphinema index*. Revue de Nématologie **14**:345-351.
Keywords :grapevine; nematode; *Xiphinema index;* Longidoridae; biology; multiplication; California; USA;
Notes : Glasshouse study of the reproduction rate of *Xiphinema index* in various conditions of soil texture and moisture. In the absence of host-plants, less than 10% of nematodes survived beyond 60 days. Survival was very low in dry or water-saturated soil. In the presence of host-plants, the population increased very little in coarse sandy soil, the maximum increase rate was in sandy-silty soil or in sand with particles of about 250 micrometers.

1482. **Szychowski, J.A., R. Credi, and J. S. Semancik.** 1997. Characterization of yellow speckle viroid variants, p. 51-52. In O. A. Sequeira,de, J. C. Sequeira, and M. T. Santos (ed.), Extended abstracts 12th Meeting ICVG, Lisbon, Portugal, 29 September-2 October 1997. Dept.Plant Pathology, Estação Agronomica Nacional, Oeiras, Portugal.
Keywords :grapevine; yellow speckle; viroid; GYSVd-1; GYSVd-2; HSVd-g; AGVd; sequence analysis; variation; California; USA; meeting; ICVG;
Notes : The variability in nuleotide sequence of grapevine yellow speckle viroid 1 (GYSVd-1) was studied. Sequence analysis showed that cv. Mission harboured a variant type II and Zinfandel a variant of

type I according to Rigden and Rezaian, 1993 (reference 1290). No clear correlation could be established with symptoms.

1483. **Szychowski, J.A., J. P. Doazan, P. Leclair, M. Garnier, R. Credi, A. Minafra, N. Duran-Vila, J. A. Wolpert, and J. S. Semancik.** 1991. Relationship and patterns of distribution among grapevine viroids from California and Europe. Vitis **30**:25-36.
Keywords :grapevine; viroid; California; Europe; GYSVd-1; GYSVd-2; HSVd-g; RNA; USA;
Notes :GV-1 (=GYSVd-1, yellow specle viroid 1) + GV-3 (=HSVd, hop stunt viroid "grapevine") was the most common viroid combination in cultivated grapes in California and Europe. Only 2 samples from Europe (Cot and Merlot) had only GV-3. Some samples had the 3 viroids GV-1,2,3. The only viroid-free vine found so far was *Vitis californica.*

1484. **Szychowski, J.A., J. P. Doazan, P. Leclair, M. Garnier, R. Credi, A. Minafra, N. Duran-Vila, J. A. Wolpert, and J. S. Semancik.** 1991. Relationships among grapevine viroids from sources maintained in California and Europe, p. 287-288. In I. C. Rumbos, R. Bovey, D. Gonsalves, W. B. Hewitt, and G. P. Martelli (ed.), Proceedings of the 10th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG). Plant Protection Institute, P.O. Box 303, 38001 Volos, Greece.
Keywords :grapevine; viroid; GYSVd-1; GYSVd-2; HSVd-g; occurrence; Europe; California; meeting; ICVG;
Notes :GV-1 + GV-3 was the predominant combination of viroids in sources from Europe. Only 2 European selections had only GV-3. There was a greater variation in Californian vines. Analysis of viroid profiles in adjacent vines suggests that there is little spread of viroids in the field.

1485. **Szychowski, J.A., A. C. Goheen, and J. S. Semancik.** 1988. Mechanical transmission and rootstock reservoirs as factors in the widespread distribution of viroids in grapevines. Amer. J. Enol. Vitic. **39**:213-216.
Keywords :grapevine; GYSVd-1; GYSVd-2; HSVd-g; viroid; mechanical transmission; transmission; rootstock; California; USA;
Notes : The infection of grapevine with viroids requires a 1.7 to 4 months incubation period. GV-1 and GV-3 are the most widespread viorids. GV-2 was found in only 2 recently released rootstocks from Davis. Rootstocks are probably the main reservoirs. The transmission occurs probably in three possible ways: 1. Mechanical inoculation by contact in vineyard, 2. Graft transmission , 3. By means of contaminated pruning or grafting tools.

1486. **Szychowski, J.A., M. V. McKenry, M. A. Walker, J. A. Wolpert, R. Credi, and J. S. Semancik.** 1995. The vein-banding disease syndrome: A synergistic reaction between grapevine viroids and fanleaf virus. Vitis **34**:229-232.
Keywords :grapevine; grapevine fanleaf virus; nepovirus; yellow speckle; viroid; GYSVd-1; GYSVd-2; HSVd-g; synergism; veinbanding; symptoms; California; USA; Italy;
Notes : Viroid-free and viroid-infected cultivars Cabernet Sauvignon and Sauvignon blanc were planted in 1992 in a field trial in California to evaluate the relationship between grapevine viroids and fanleaf virus in inducing the vein-banding disease. Shortly after planting, grapevine fanleaf virus was introduced into two plots of viroid-free and of viroid-infected vines by means of soil containing infected nematode vectors, *Xiphinema index.* Vein-banding symptoms were observed only on vines which contained the three principal grapevine viroids, grapevine yellow speckle viroids (GYSVd-1, GYSVd-2), and hop stunt viroid (HSVd-g), and also grapevine fanleaf virus (GFLV). Sauvignon blanc vines which contained the single viroid, HSVd-g, and GFLV were non-symptomatic indicating an absence of correlation between HSVd-g and the vein-banding disease. The intensity of vein-banding symptoms was directly correlated with an enhanced titer of GYSVd-1 and GYSVd-2. Vein-banding and yellow speckle symptomatic as well as non-symptomatic vines in Italy contained two viroids, GYSVd-1 and HSVd-g. However, symptomatic vines displayed a higher titer of GYSVd-1 than non-symptomatic materials and vein-banding symptomatic vines were GFLV infected. These results demonstrate that expression of the vein- banding disease is induced by an unique synergistic reaction between a viroid, GYSVd- 1 and a virus, grapevine fanleaf virus.

1487. **Szychowski, J.A., J. A. Wolpert, M. A. Walker, E. A. Weber, M. V. McKenry, G. I. Mink, and J. S. Semancik.** 1996. "Mystery disease": Evidence for a stress-related viroid complex. Amer. J. Enol. Vitic. **47**:346-347.
Keywords :grapevine; viroid; yellow speckle; GYSVd-1; fanleaf; symptoms; temperature; light; California; USA;
Notes : Abstract of a paper presented at the 47th meeting of the ASEV, Reno, Nevada, 26-28 June 1996. The "mystery disease" recently observed in Napa Valley, California, USA, appears to be similar to yellow speckle disease common in Australian vineyards. GYSVd-1 was detected in every vine from field sources showing the "mystery disease". Shot berry and veinbanding were found in vines which tested positive for fanleaf and viroids. By exposing asymptomatic vines with GYSVd alone or GYSVd + fanleaf virus to high temperature and continuous light, symptoms of yellow speckle developed in 68% of vines, whereas vines with fanleaf alone showed no symptoms in similar environment conditions. Yellow speckle disease expression appears to be related to a stress complex of biotic, climatic, and cultural factors.

1488. **Tacconi, R. and G. Mancini.** 1987. I nematodi associat alla vite (Nematodes associated with grapevine). L'Informatore Agrario **43***(49):*69-75.
Keywords :grapevine; nepovirus; vector; nematode; *Xiphinema; Longidorus*; control; Italy;
Notes : In Italian. This paper deals mainly with the problems raised by direct damage caused by nematodes, but there are also interesting data in relation with virus transmission by *Xiphinema* and *Longidorus* species. A table of host plants of *X.index* is presented, and also of vectors of viruses harmful to grapevine. The bibliography is not given in the Journal, a note mentions that it will be added to the reprints.

1489. **Tanaka, H.** 1985. [Rapid indexing of grapevine corky bark by greenwood grafting]. Bull. Fruit Tree Research Station (Yamanashi) **12**:125-132.
Keywords :grapevine; rugose wood; corky bark; indexing; green grafting; Japan;
Notes : In Japanese, Eng. sum. LN33 was used as rootstock, the tested variety as scion. The vines were grown at an alternating regime (day/night) of 28/23°C first, later 20/17°C. Symptoms developed on leaves and on stems.

1490. **Tanaka, H.** 1988. [Virus infection of grapevine rootstock varieties in Japan]. Bull. Fruit Tree Research Station,A (Yatabe) **15**:83-91.
Keywords :grapevine; leafroll; fleck; rootstock; survey; indexing; green grafting; Japan;
Notes : In Japanese, Eng. sum. Indexing was done by green grafting, and also by mechanical inoculation on herbaceous indicators. A few cases of leafroll were detected. No corky bark nor fanleaf were detected. Fleck was found in 6 cvs. Altogether 17 different rootstocks were tested (75 clones).

1491. **Tanaka, H.** 1988. [Influence of environmental factors on symptom expression of leafroll and fleck of grapevine]. Bull. Fruit Tree Research Station,A (Yatabe) **15**:93-104.
Keywords :grapevine; leafroll; fleck; symptoms; temperature; indexing; ajinashika disease; Japan;
Notes : In Japanese, Eng. sum. Ajinashika disease is supposed to be due to the synergistic action of leafroll and fleck. Indexing was made with Pinot noir, Merlot, Mission for leafroll, St- George for fleck. The best conditions for leafroll and fleck indexing were 20^{o} C by day/17^{o} C by night. They produced severe symptoms. An alternating temperature of 28^{o} /23^{o} C caused an inhibition of symptoms. Shade also inhibited symptom expression.

1492. **Tanaka, H.** 1988. [Occurrence of mosaic symptoms on young leaves of grapevines in Japan.]. Bull. Fruit Tree Research Station,A (Yatabe) **15**:105-116.
Keywords :grapevine; leaf mosaic; symptoms; Japan;
Notes : In Japanese, Eng.sum. A graft-transmissible mosaic was observed on 11 cvs. in Kanto and Tohoku districts. The disease was transmitted by graft to *Vitis rupestris* St.- George. Chlorotic to yellowish leaf mottling, malformation (bending of mid-vein, asymmetrical or curled leaf blade), yellowish narrow line pattern, short internodes, zig-zag growth, necrotic streaks on canes were the main symptoms on the vegetation. Dark brown spots appeared on young berries. Some berries remained small. The agent of the disease was not identified.

1493. **Tanne, E.** 1988. Evidence for the transmission by mealybugs to healthy grapevines of a closter-like particle associated with grapevine leafroll disease (Abstract). Phytoparasitica **16**:288.
Keywords :grapevine; leafroll; closterovirus; vector; transmission; mealybug; NY-1; *Pseudococcus longispinus;* Israel;
Notes : Transmission from grape to grape by *Pseudococcus longispinus*, GLRaV-3 (NY-1). Virus presence checked by ISEM and ELISA.

1494. **Tanne, E.** 1990. [New developments in grapevine virus research]. Hassadeh **70**:562-563.
Keywords :grapevine; virus diseases; virus-like diseases; review; Israel;
Notes : In Hebrew.

1495. **Tanne, E.** 1997. The use of tissue culture in the control of grapevine viruses, p. 147-148. In O. A. Sequeira,de, J. C. Sequeira, and M. T. Santos (ed.), Extended abstracts 12th Meeting ICVG, Lisbon, Portugal, 29 September-2 October 1997. dept.Plant Pathology, Estação Agronomica Nacional, Oeiras, Portugal.
Keywords :grapevine; virus; control; tissue culture; review; general; Israel; meeting; ICVG;
Notes : This is a review on the use of tissue culture for controlling grapevine virus and virus-like diseases.

1496. **Tanne, E.** 1997. Tissue culture in the control of grapevine virus diseases, p. 59-73. In P. L. Monette (ed.), Filamentous viruses of woody plants. Research Signpost, Trivandrum, India.
Keywords :grapevine; *in vitro*; tissue culture; micropropagation; virus elimination; detection; germplasm; review; Israel;

1497. **Tanne, E. and D. Baum.** 1985. [Grapevine yellow mosaic virus disease spreading in Samaria vineyards]. Hassadeh **55**:2030-2031.
Keywords :grapevine; grapevine fanleaf virus; nepovirus; yellow mosaic; epidemiology; spread; Israel;
Notes : In Hebrew.

1498. **Tanne, E. and D. Baum.** 1992. [Spread restriction of grapevine yellow mosaic virus by nematode population restriction]. Hassadeh **72**:1488.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; yellow mosaic; epidemiology; spread; nematode; vector; *Xiphinema index;* Longidoridae; control; Israel;
Notes : In Hebrew.

1499. **Tanne, E., H. Bazak, and E. Dubitzky.** 1997. Epidemiology, spread, rootstock sensitivity and economical impact of corky-bark disease in grapevines, p. 127-128. In O. A. Sequeira,de, J. C. Sequeira, and M. T. Santos (ed.), Extended abstracts 12th Meeting ICVG, Lisbon, Portugal, 29 September-2 October 1997. Dept.Plant Pathology, Estação Agronomica Nacional, Oeiras, Portugal.
Keywords :grapevine; corky bark; rugose wood; symptoms; epidemiology; spread; rootstock; economic importance; Israel; meeting; ICVG;
Notes : The spread of corky bark in natural vineyard conditions was studied in an experimental plot planted with healthy Thompson seedless vines grafted onto healthy rootstocks of following varieties: Paulsen 1103, 41B, 16-13. Corky-bark-infected Thompson seedless vines grafted on the same range of rootstocks were inter-planted at random in the same plot as infectious source of virus. Indicator vines (*Vitis rupestris* St.George, LN33, Mission and Baco 22A) were also inter-planted in the experiment. These indicators were monitored for symptoms and tested by ELISA, as well as the Thompson seedless scions. The most sensitive combination was Thompson seedless on 16-13, which showed symptoms on a few vines already one year after planting. Some of the plants died 2-3 years later. A considerable reduction in yield was recorded, especially on 16-13 rootstock. Corky bark is clearly epidemic in Israel, and has an important impact on grapevine performance.

1500. **Tanne, E., Y. Ben-Dov, and B. Raccah.** 1989. Transmission of closterolike particles associated with grapevine leafroll by mealybugs (Pseudococcidae) in Israel, p. 71-73. In E. Tanne (ed.), Proceedings of the 9th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG), Kiryat Anavim, Israel, September 1987. The Volcani Center, P.O. Box 6, Bet Dagan , Israel.
Keywords :grapevine; GLRaV-3; closterovirus; leafroll; transmission; mealybug; *Pseudococcus longispinus;* vector; Israel; meeting; ICVG;
Notes : The New York strain of grapevine leafroll associated virus III (NY-1 = GLRaV-III) was transmitted from grapevine to grapevine by *Pseudococcus longispinus.*

1501. **Tanne, E., Y. Ben-Dov, and B. Raccah.** 1989. Transmission of the corky-bark disease by the mealybug *Planococcus ficus*. Phytoparasitica **17**:55.
Keywords :grapevine; rugose wood; corky bark; transmission; mealybug; *Planococcus ficus;* Israel;
Notes : First evidence of a transmission of corky-bark by mealybugs. Acquisition feeding period was 5 days. Inoculation feeding period was also 5 days. Symptoms appeared after 13 months.

1502. **Tanne, E., Y. Ben-Dov, and B. Raccah.** 1989. Transmission of closterovirus-like particles by mealybugs (Pseudococcidea) in Israel. Phytoparasitica **17**:63-64.
Keywords :grapevine; leafroll; transmission; mealybug; vector; *Pseudococcus longispinus;* GLRaV-3; NY-1; closterovirus; closterovirus-like particles; Israel; meeting; ICVG;
Notes : This paper appears in full in the Proceedings of the 9th meeting of ICVG, Kiryat Anavim, Israel, 1987, 71-73 (1989).

1503. **Tanne, E., Y. Ben-Dov, and B. Raccah.** 1993. Transmission of grapevine virus diseases by mealybugs (Abstract). Phytoparasitica **21**:153.
Keywords :grapevine; closterovirus; leafroll; rugose wood; corky bark; transmission; mealybug; *Pseudococcus longispinus; Planococcus ficus;* vector; Israel;
Notes : Leafroll and corky bark. *Pseudococcus longispinus, Planococcus ficus.*

1504. **Tanne, E., Y. Ben-Dov, and B. Raccah.** 1993. Mealybug transmission of corky bark disease and an associated virus to healthy grapevine, p. 59-60. In P. Gugerli (ed.), Extended abstracts 11th Meeting ICVG, Montreux, Switzerland, 6-9 September 1993. Federal Agricultural Research Station of Changins, CH-1260 Nyon, Switzerland.
Keywords :grapevine; rugose wood; corky bark; transmission; epidemiology; mealybug; vector; *Pseudococcus longispinus; Planococcus ficus;* closterovirus; Israel; meeting; ICVG;
Notes : In controlled transmission trials, the mealybugs *Pseudococcus longispinus* and *Planococcus ficus* were shown to be vectors of corky bark disease and also of a closterovirus serologically related to a corky bark-associated virus described by Namba *et al.* (Phytopathology 81, 964-970,1991). The spread of the disease in the vineyard was also confirmed experimentally.

1505. **Tanne, E., E. Dubitsky, and H. Bazak.** 1991. Preliminary data on the effect of corky bark disease on Thompson seedless vines grafted on various rootstocks, p. 386-389. In I. C. Rumbos, R. Bovey, D. Gonsalves, W. B. Hewitt, and G. P. Martelli (ed.), Proceedings of the 10th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG). Plant Protection Institute, P.O. Box 303, 38001 Volos, Greece.
Keywords :grapevine; rugose wood; corky bark; symptoms; yield; performance; Israel; meeting; ICVG;
Notes : The importance of symptoms depends on the rootstock on which Thompson Seedless is grafted. Yield reduction caused by the disease varied from 32.5 % (41B) to 93.3% (Couderc 16-13), and was proportional to the severity of symptoms.

1506. **Tanne, E. and E. Dubitzki.** 1993. Susceptibility to the corky bark disease in combinations of Sultanina and various rootstocks. Phytoparasitica **21**:138.
Keywords :grapevine; rugose wood; corky bark; susceptibility; symptoms; varietal sensitivity; performance; economic importance; Israel;

Notes : Yield reduction of 50% was recored on rootstock Paulsen 1103 or Richter 110, only 30 % on 41 B. The quality of grapes was also reduced.

1507. **Tanne, E. and E. Dubitzky.** 1985. [Corky bark: a new grapevine disease in Israel transmitted by propagation material]. Hassadeh **56**:177-178.
Keywords :grapevine; rugose wood; corky bark; symptoms; spread; Israel;
Notes : In Hebrew. (Dubitzki and Dubitzky are the same).

1508. **Tanne, E., U. Levanoni, and P. Spiegel-Roy.** 1991. Elimination of some grapevine viruses by meristem culture, p. 432. In I. C. Rumbos, R. Bovey, D. Gonsalves, W. B. Hewitt, and G. P. Martelli (ed.), Proceedings of the 10th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG). Plant Protection Institute, P.O. Box 303, 38001 Volos, Greece.
Keywords :grapevine; leafroll; virus elimination; *in vitro;* meristem tip culture; Israel; meeting; ICVG;
Notes : Abstract. Culture of meristem tips of 0.3-0.4 mm in a 1/2 Murashige Skoog medium, and transfer to a medium with auxin. ELISA was negtive for GLRaV-III.

1509. **Tanne, E., R. Marcus, E. Dubitzky, and B. Raccah.** 1996. Analysis of progress and spatial pattern of corky bark in grapes. Plant Disease **80**:34-38.
Keywords :grapevine; corky bark; rugose wood; distribution; epidemiology; Israel;
Notes : The progression and spatial distribution of corky bark in an infected vineyard of cv. Thompson seedless (= Sultanina) was studied in the Lakkish region in southern Israel from 1983 to 1990. The number of diseased vines increased during this period from 45 to 193. The spatial distribution of the diseased plants was studied by statistical analysis. The infection was clustered during the first three years of monitoring. As the incidence of infection increased, the pattern became random. Biological explanations of these results are discussed.

1510. **Tanne, E., R. Markus, B. Raccah, and E. Dubitzky.** 1990. A model for the spread of grapevine corky-bark in a vineyard of cv. Thompson seedless (Abstract). Phytoparasitica **18**:67.
Keywords :grapevine; rugose wood; corky bark; epidemiology; spread; Israel;
Notes : Survey of spread of corky bark 1983-1987. The disease occurs in clusters from 1983 to 1985, but later the distribution is random.

1511. **Tanne, E. and E. Meir.** 1991. The detection of disease specific double-stranded RNA in corky bark affected grapevine, p. 247-250. In I. C. Rumbos, R. Bovey, D. Gonsalves, W. B. Hewitt, and G. P. Martelli (ed.), Proceedings of the 10th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG). Plant Protection Institute, P.O. Box 303, 38001 Volos, Greece.
Keywords :grapevine; rugose wood; corky bark; dsRNA; detection; Israel; meeting; ICVG;
Notes : A high molecular weight dsRNA was detected in three sources of corky bark- affected grapevines. No similar dsRNA was found in healthy plants. The bark tissue is a better source than leaf tissue for dsRNA extraction

1512. **Tanne, E., L. Naveh, and I. Sela.** 1989. Dot-blot detection of grapevine potyvirus sequences in leafroll- diseased vines and evidence for the complexity of the leafroll syndrome, p. 119-123. In E. Tanne (ed.), Proceedings of the 9th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG), Kiryat Anavim, Israel, September 1987. The Volcani Center, P.O. Box 6, Bet Dagan , Israel.
Keywords :grapevine; leafroll; nucleic acid assay; etiology; potyvirus; vitivirus; closterovirus; NY-1; detection; GLRaV-3; GVA; Israel; meeting; ICVG;
Notes : Hypothesis of a complex etiology for leafroll involving closterovirus(es) and a potyvirus.

1513. **Tanne, E., L. Naveh, and I. Sela.** 1989. Molecular-hybridization evidence for the presence of a potyvirus in leafroll-infected grapevines. Phytoparasitica **17**:69.
Keywords :grapevine; leafroll; potyvirus; nucleic acid assay; RNA; cDNA; Israel; meeting; ICVG;

Notes : Isolation of RNA from the grapevine potyvirus (GPV), obtention of labeled cDNA, positive reaction with sap from leafroll- affected grapevine. The same paper appears in full under a different title in the Proceedings of the 9th meeting of ICVG, Kiryat Anavim, Israel, 1987, 119-123 (1989).

1514. **Tanne, E., L. Naveh, and I. Sela.** 1989. Serological and molecular evidence for the complexity of the leafroll disease of grapevine. Plant Pathology **38**:183-189.
Keywords :grapevine; leafroll; etiology; closterovirus; ELISA; dot blot hybridization; NY-1; GLRaV-3; vitivirus; GVA; potyvirus; Israel;
Notes : Several sources of LR-infected grapes from Israel and abroad were tested by ELISA against antisera to GVA, NY-1 (GLRaV-III), and GPV (Grapevine potyvirus). Many samples reacted positively with more than one antiserum, some with the three. Positive reactions with GPV antiserum were corroborated by molecular dot-blot hybridization. GVA was isolated from a stem-pitting- affected grapevine. A SP-affected grapevine reacted positively with all 3 antisera and also with a potyvirus probe by dot-blot hybridization. All the leafroll-affected vines reacted at least in some tests, with one or more of the antisera.

1515. **Tanne, E. and S. Orenstein.** 1997. Identification and typing of grapevine phytoplasma amplified by graft transmission to periwinkle. Vitis **36**:35-38.
Keywords :grapevine; phytoplasma disease; phytoplasma; detection; identification; PCR; periwinkle; Israel;
Notes : Various phytoplasmas transmitted by graft from grapevine to periwinkle were compared by PCR analysis to the original grapevine phytoplasmas. The results show that the various phytoplasma types in periwinkle faithfully match the types in the donor grape, with the advantage of an amplification due to better development conditions for phytoplasmas in periwinkle.

1516. **Tanne, E. and S. Orenstein.** 1997. Molecular detection of phytoplasmas associated with grapevine yellow disease in Israel, p. 79-80. In O. A. Sequeira,de, J. C. Sequeira, and M. T. Santos (ed.), Extended abstracts 12th Meeting ICVG, Lisbon, Portugal, 29 September-2 October 1997. Dept.Plant Pathology, Estação Agronomica Nacional, Oeiras, Portugal.
Keywords :grapevine; phytoplasma disease; PCR; RFLP; aster yellows; western X disease; Israel; meeting; ICVG;
Notes : PCR and RFLP analysis showed that phytoplasmas of the aster yellows and western-X type are associated with yellows diseases of grapevine in Israel. Phytoplasmas transmitted by graft from grapevine to periwinke provide a better source for grapevine phytoplasma studies.

1517. **Tanne, E., B. Raccah, and R. Markus.** 1989. Natural spread of corky-bark disease in vineyards in Israel. Phytoparasitica **17**:151.
Keywords :grapevine; rugose wood; corky bark; epidemiology; spread; Israel;

1518. **Tanne, E. and N. Shalamovitz.** 1994. *In vitro* indexing of grapevine virus diseases (Abstract). Phytoparasitica **22**:178.
Keywords :grapevine; virus diseases; detection; indexing; *in vitro;* method; micrografting; rugose wood; corky bark; leafroll; Israel;
Notes : Micrografting *in vitro* shortens considerably the time necessary to get symptoms. Typical corky bark symptoms on LN33 or leafroll on Cabernet franc are visible after 12 weeks instead of 1-2 years.

1519. **Tanne, E., N. Shlamovitz, and P. Spiegel-Roy.** 1993. Rapidly diagnosing grapevine corky-bark by *in vitro* micrografting. HortScience **28**:667-668.
Keywords :grapevine; rugose wood; corky bark; *in vitro*; indexing; micrografting; method; Israel;
Notes : Grapevine shoots from plants indexing positive for corky-bark and rootstocks from healthy LN33 indicator plants were sterilized and maintained *in vitro*. Infected shoot tips were micrografted onto LN33 healthy shoots. Typical corky-bark symptoms appeared within 8 to 12 weeks. The authors suggest that this method could replace the usual indexing procedure, which takes about 2 years and a lot of field space.

1520. **Tanne, E., P. Spiegel-Roy, and N. Schlomovitz.** 1993. Rapid diagnosis of grapevine corky-bark and leafroll diseases by *in vitro* micrografting, p. 144-145. In P. Gugerli (ed.), Extended abstracts 11th Meeting ICVG, Montreux, Switzerland, 6-9 September 1993. Federal Agricultural Research Station of Changins, CH-1260 Nyon, Switzerland.
Keywords :grapevine; rugose wood; leafroll; corky bark; indexing; *in vitro;* diagnosis; micrografting; Israel; meeting; ICVG;
Notes :*In vitro* aseptical micrografts in test tubes or Magenta boxes were made with *in vitro*-grown scions of the variety to be tested micrografted onto *in vitro*-grown rootstocks as indicators for corky bark (LN33) or leafroll (Mission and Cabernet franc). Corky bark symptoms appeared on LN33 eight to twelve weeks after grafting. Leafroll symptoms appeared on Mission and Cabernet franc three months after grafting.

1521. **Tanne, E., P. Spiegel-Roy, and N. Shlamovitz.** 1996. Rapid *in vitro* indexing of grapevine viral diseases: The effect of stress-inducing agents on the diagnosis of leafroll. Plant Disease **80**:972-974.
Keywords :grapevine; indexing; *in vitro;* leafroll; diagnosis; detection; method; Israel;
Notes :A method enabling rapid *in vitro* indexing of grapevine leafroll is described. Diseased explants poorly express symptoms when placed in culture. However, when placed under mild stress conditions (4% sorbitol), a variety of distinct symptoms appear within 4 to 8 weeks. This method could potentially replace the conventional indexing procedure.

1522. **Taylor, C.E. and D.J.F. Brown.** 1997. Nematode vectors of plant viruses. CAB International, Wallingford, OX10 8DE, England.
Keywords :grapevine; nematode; vector; nepovirus; general; England;

1523. **Teliz, D., D. Gonsalves, J. Hu, and D. K. Hummer.** 1989. Detection of grapevine leafroll-associated closterovirus in recently infected tissues in New York and spread of the disease in Mexico, p. 109-115. In E. Tanne (ed.), Proceedings of the 9th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG), Kiryat Anavim, Israel, September 1987. The Volcani Center, P.O. Box 6, Bet Dagan , Israel.
Keywords :grapevine; immunoassay; leafroll; closterovirus; detection; epidemiology; spread; mealybug; *Pseudococcus longispinus;* ELISA; Mexico; USA; meeting; ICVG;
Notes : Healthy Cabernet franc vines were chip-budded with buds of leafroll-diseased vines and subsequently tested by direct ELISA. Viral antigens were first detected 50 days after grafting in extracts from root tissues, but not from basal leaf samples. They were later detected in leaf samples and moved from the basal to the top leaves in 15 days, with an average speed of 2 nodes per day. The epidemiology of leafroll, stem pitting and corky bark is still undetermined in the state of Aguascalientes, Mexico. Tests with nematodes, aphids and phylloxera were negative. Mealybugs *(Pseudococcus longispinus)* were found on weeds around vineyards. Ants were found carrying them. The mealybug host plants were *Sphaerelcea angustifolia* (Malvaceae) and *Reseda luteola* (Resedaceae)

1524. **Teliz, D., D. Gonsalves, J. S. Hu, and D. K. Hummer.** 1989. Detection of a grapevine leafroll-associated closterovirus in recently infected tissues in New York and spread of the disease in Mexico (Abstract). Phytoparasitica **17**:68-69 (Abstract).
Keywords :grapevine; immunoassay; rugose wood; leafroll; closterovirus; ELISA; stem pitting; corky bark; epidemiology; spread; detection; *Pseudococcus longispinus*; mealybug; New York; USA; Mexico; meeting; ICVG;
Notes : Leafroll, stem pitting and corky bark are spreading in the State of Aguascalientes, Mexico. *Pseudococcus longispinus* was found on weeds around diseased vineyards. Study of the dynamics of viral antigens in recently infected vines. This paper appears in full in the Proceedings of the 9th meeting of ICVG, Kiryat Anavim, Israel, 1987, 109-115 (1989). (Reference above).

1525. **Teliz, D., E. Tanne, D. Gonsalves, and F. Zee.** 1987. Field serological detection of viral antigens associated with grapevine leafroll disease. Plant Disease **71**:704-709.
Keywords :grapevine; leafroll; immunoassay; ELISA; GLRaV-3; closterovirus; detection; storage; leaves; roots; USA; Mexico;

Notes : Field detection of GLRaV III (NY-1) was done with polyclonal antiserum in 8-yr- old Pinot noir with direct ELISA. 1. Dormant canes: results positive after 6 months storage at 6^{o} C (Shavings of phloem tissue). 2. Flowers: positive 15 days after bud break. 3. Basal leaves: positive from bloom onwards. 4. Most leaves: positive 28 days after bud break. 5. Also positive results with roots, fruit, fruit peduncles, tendrils, bark tissues. 6. The virus was evenly distributed in shoots arising from basal, middle or apical portions of 1-yr-old shoots.

1526. **Teliz, D., E. Tanne, D. Gonsalves, and F. Zee.** 1987. Field serological detection of closterovirus-like particles associated with grapevine leafroll disease. Phytopathology **77**:122.
Keywords :grapevine; leafroll; closterovirus; associated; immunoassay; ELISA; detection; New York; USA;
Notes : Polyclonal antiserum, direct ELISA. Virus detected in flower clusters, leaves, roots, fruits, fruit peduncles, tendrils and bark tissues.

1527. **Teliz, D., E. Tanne, D. Gonsalves, and F. Zee.** 1989. Field serological detection of viral antigens associated with grapevine leafroll disease, p. 107. In E. Tanne (ed.), Proceedings of the 9th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG), Kiryat Anavim, Israel, September 1987. The Volcani Center, P.O. Box 6, Bet Dagan , Israel.
Keywords :grapevine; immunoassay; leafroll; ELISA; closterovirus; detection; New York; USA; Mexico; meeting; ICVG;
Notes : Abstract. Antigens associated with grapevine leafroll disease were detected in leaves, flowers, roots, fruits, fruit peduncles, tendrils, bark tissue. Dynamics of virus progression. The same abstract appears in Phytoparasitica 17, 68, 1989. See also the same title in Pl. Dis. 71, 704-709, 1989.

1528. **Teliz, D., E. Tanne, D. Gonsalves, and F. Zee.** 1989. Field serological detection of viral antigens associated with grapevine leafroll disease. Phytoparasitica **17**:68.
Keywords :grapevine; immunoassay; leafroll; closterovirus; ELISA; virus progression; detection; meeting; ICVG; Mexico; USA;
Notes : Viral antigens were detected in leaves, flowers, roots, fruits, fruit peduncles, tendrils, bark tissue. Dynamics of viral progression. The same abstract appears in the Proceedings of the 9th meeting of ICVG, Kiryat Anavim 1987, 107 (1989). See also the same title in Pl. Dis. 71, 704-709, 1987.

1529. **Terai, Y.** 1991. Ajinashika disease: A combined effect of grapevine leafroll and grapevine fleck viruses on sugar content in the Japanese grape cultivar Koshu, p. 67-70. In I. C. Rumbos, R. Bovey, D. Gonsalves, W. B. Hewitt, and G. P. Martelli (ed.), Proceedings of the 10th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG). Plant Protection Institute, P.O. Box 303, 38001 Volos, Greece.
Keywords :grapevine; ajinashika disease; etiology; leafroll; fleck; symptoms; Japan; meeting; ICVG;
Notes : The hypothesis that Ajinashika disease is due to the combined effect of grapevine leafroll and fleck viruses is put forward. Description of the disease and its effects on yield and quality in the cv. Koshu.

1530. **Terai, Y., Y. Kunugi, and H. Yanase.** 1993. A new virus disease, grapevine berry inner necrosis with natural spread in Japan, p. 77-78. In P. Gugerli (ed.), Extended abstracts 11th Meeting ICVG, Montreux, Switzerland, 6-9 September 1993. Federal Agricultural Research Station of Changins, CH-1260 Nyon, Switzerland.
Keywords :grapevine; grapevine berry inner necrosis; symptoms; filamentous; trichovirus; Japan; meeting; ICVG;
Notes : The disease was described first in 1982-84 and renamed grapevine berry inner necrosis in 1992. The causal agent is a filamentous virus 740 nm long and 12 nm wide. It can be transmitted to *Chenopodium quinoa* and *C. amaranticolor* by mechanical inoculation. Natural spread occurs, but the vector is not known. The varieties Kyoho, Takao, Pione and Campbell early are susceptible.

1531. **Terai, Y. and H. Yanase.** 1992. Induction of berry inner necrosis in Kyoho back-inoculated with the virus isolate from grapevine mosaic diseased clones and renaming to grapevine berry inner necrosis. Ann. Phytopathol. Soc. Japan **58**:617-618.
Keywords :grapevine; grapevine berry inner necrosis; graft transmission; symptoms; leaves; Japan;
Notes : In Japanese. In 1987, the authors reported that Kyoho seedlings inoculated by graft from a clone of Kyoho showing symptoms of mosaic also developed symptoms of mosaic similar to those of the diseased clone. In May 1987, virus- and viroid-free 3 years old vines of cv. Kyoho were chip budded with buds from the infected Kyoho seedlings mentioned above. Typical mosaic symptoms appeared in 1989 and 1990 on the leaves, and also symptoms on the canes, and in June 1991, symptoms of necrosis appeared in the berries. As the name of grapevine mosaic is not satisfactory, the authors propose the name of "grapevine berry inner necrosis" (In Japanese esoka). (Summary kindly provided by Dr Terai).

1532. **Terwey, D.** 1991. Nachweis und Verbreitung der virösen Blattrollkrankheit der Weinrebe an Ertrags- und Unterlagereben in badischen und rheinpfälzischen Anbaugebieten (Dissertation)(Detection and distribution of grapevine leafroll in grape and rootstock production vineyards of Palatinate and Baden regions). Universität Hohenheim, Fakultät für Agrarwissenschaften, Stuttgart, Germany.
Keywords :grapevine; leafroll; detection; distribution; occurrence; Germany;

1533. **Tobias, I.** 1993. Serological comparison of some arabis mosaic virus and grapevine fanleaf virus isolates, p. 33. In P. Gugerli (ed.), Extended abstracts 11th Meeting ICVG, Montreux, Switzerland, 6-9 September 1993. Federal Agricultural Research Station of Changins, CH-1260 Nyon, Switzerland.
Keywords :grapevine; arabis mosaic virus; grapevine fanleaf virus; nepovirus; immunoassay; immuno-diffusion; ELISA; comparison; isolate; Hungary; meeting; ICVG;
Notes : Several isolates of the two closely related viruses ArMV and GFLV were compared by using various serological methods: immuno- diffusion, DAS-ELISA (Clark and Adams, 1977) and PAS-ELISA (Edwards and Cooper, 1985).

1534. **Tobias, I. and J. Lazar.** 1996. Etiology of birthwort yellow mosaic and grapevine yellow mosaic and decline. Acta Phytopathol. Entomol. Hung. **31**:1-4.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; host range; etiology; birthwort; yellow mosaic; *Aristolochia;* detection; indexing; immunoassay; immuno-diffusion; ELISA; fleck; vein necrosis; Hungary;
Notes : In an old vineyard near Lake Balaton, Hungary, patches of grapevines with yellow mosaic and decline were observed in the vicinity of birthwort plants *(Aristolochia clematitis L.)* showing also symptoms of leaf yellow spotting similar to the yellow mosaic symptoms on grapevine leaves. Grapevine fanleaf virus (GFLV), tomato blackring virus (TBRV), grapevine chrome mosaic virus (GCMV) were detected in infected grapevine or in sap from *Chenopodium quinoa* infected mechanically from grapevine, by serology (Ouchterlony's immunodiffusion and ELISA). Indexing on woody indicators showed also the presence of vein necrosis and fleck. GFLV was also detected in birthwort with yellow mosaic symptoms. The isolate from birthwort is seed transmitted in *C.quinoa* and its properties are very similar to those of the grapevine isolate.

1535. **Tobias, I., J. Lazar, M. Kölber, and E. Papp.** 1996. Production of polyclonal antibodies to grapevine leafroll associated virus isolated in Hungary and development of HRPO-based ELISA system. Acta Phytopathol. Entomol. Hung. **31**:5-10.
Keywords :grapevine; leafroll; detection; GLRaV-3; closterovirus; immunoassay; ELISA; peroxidase; method; comparison; Hungary;
Notes : An Hungarian isolate of GLRaV-3 was purified and an antiserum was produced. It was conjugated with horseradish peroxidase (HRPO) and used in DAS-ELISA in comparison with a Bioreba kit using polyclonal antibody for coating and monoclonal antibody conjugate coupled with alkaline phosphatase. Out of 309 compared grape samples, 287 gave the same results with both systems (93% agreement). Two samples were positive with the Bioreba kit and negative with the Hungarian HRPO system, whereas 20 samples were positive in HRPO system and negative with the Bioreba kit. It is not yet clear whether these differences result from serological differences between the Swiss and Hungarian GLRaV-3 isolates or from other factors.

1536. **Tobias, I., J. Lazar, M. Kölber, and E. Papp.** 1997. Production of polyclonal antibodies to grapevine leafroll associated virus isolated in Hungary and development of HRPO-based ELISA system, p. 103-104. In O. A. Sequeira,de, J. C. Sequeira, and M. T. Santos (ed.), Extended abstracts 12th Meeting ICVG, Lisbon, Portugal, 29 September-2 October 1997. Dept.Plant Pathology, Estação Agronomica Nacional, Oeiras, Portugal.
Keywords :grapevine; leafroll; closterovirus; GLRaV-3; immunoassay; detection; ELISA; Hungary; meeting; ICVG;
Notes : A polyclonal antiserum specific to grapevine leafroll-associated virus 3 (GLRaV-3) from Hungarian sources was obtained and used with horseradish peroxidase conjugate in HRPO ELISA for detecting infection with this virus. The sensitivity of this method, compared with that of the Bioreba kit with polyclonal-monoclonal antibodies and alkaline phosphatase conjugate, was definitely lower. This difference is attributed to the use of more sensitive monoclonal antibodies in the Bioreba kit and perhaps to a less suitable rabbit for preparing the Hungarian antiserum.

1537. **Togawa, H., T. Shinohara, M. Iri, and K. Ueno.** 1985. Elimination de virus d'enroulement de vigne par culture de méristèmes et son effect sur la vigne et le vin (Elimination of grapevine leafroll virus by meristem culture and its effect on grapevine and wine), p. 225. In Moët-Hennessy. Colloque Amélioration de la Vigne et Culture in Vitro. Moët-Hennessy, Paris.
Keywords :grapevine; *in vitro;* leafroll; virus elimination; meristem tip culture; performance; Japan;
Notes : In French and English. Meeting on the improvement of grapevine by *in vitro* cluture, organized by Moët-Hennessy. Leafroll-free vines obtained by meristem tip culture produced grapes with 25-26 % more sugar than diseased ones, more nitrogen compounds and less tannins. Maturity was better and the wine was excellent.

1538. **Tolba, M.A. and M. A. S. El-Kady.** 1991. Grapevine fanleaf virus disease in Egypt, p. 111. In I. C. Rumbos, R. Bovey, D. Gonsalves, W. B. Hewitt, and G. P. Martelli (ed.), Proceedings of the 10th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG). Plant Protection Institute, P.O. Box 303, 38001 Volos, Greece.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; symptoms; Egypt; meeting; ICVG;

1539. **Toledo Paños, J.** 1992. Malazo cochinilla algodonosa (*Pseudococcus citri* Russo), p. 58-61. In Los parasitos de la vid. Estrategias de proteccion razonada (Grapevine pests. Strategies of integrated control). Ediciones Mundi-Prensa, Castello,37, 28001 Madrid, Spain.
Keywords :grapevine; mealybug; *Pseudococcus citri*; biology; control; Spain;
Notes : In Spanish. Description of the annual cycle of the insect, influence of external factors, symptoms and damage, methods of control.

1540. **Torregrosa, L.** 1995. Culture *in vitro* et transformation génétique de la vigne: Mise au point de protocoles de micropropagation et de régénération par organogenèse et embryogenèse chez les hybrides *Vitis x Muscadinia*. Obtention chez deux porte-greffes de racines et de plantes transgéniques produisant la protéine capsidiale du virus de la mosaïque chromée de la vigne (GCMV) (*In vitro* culture and genetic transformation of grapevine: Development of methods for micropropagation and regeneration by organogenesis and embryogenesis in hybrid vines *Vitis x Muscadinia*. Obtaining in two rootstocks transgenic roots and plants producing the capsid protein of grapevine chrome mosaic virus [GCMV]). Progr. Agric. Vitic. **112**:127.
Keywords :grapevine; nepovirus; grapevine chrome mosaic virus; transgenic; resistance; *in vitro;* micropropagation; tissue culture; somatic embryogenesis; France; thesis;
Notes : Summary of a PhD thesis at the National Agronomic High School of Montpellier, France.

1541. **Torregrosa, L.** 1995. Biotechnologie de la vigne: *Les techniques de régénération in vitro (Synthèse)*(Grapevine biotechnology: The techniques of *in vitro* regeneration). Progr. Agric. Vitic. **112**:479-489.
Keywords :grapevine; *in vitro;* method; somatic embryogenesis; France;

Notes : Review on the techniques available for regenerating grapevine plants from organs, tissues or isolated cells.

1542. **Torregrosa, L. and A. Bouquet.** 1993. Culture *in vitro*: Apports actuels et perspectives pour la multiplication et l'amélioration de la vigne. (*In vitro* culture: present use and prospects for multiplication and improvement of grapevine)[Also pp. 127-134]. Progr. Agric. Vitic. **110**:113-118.
Keywords :grapevine; *in vitro;* micropropagation; virus elimination; sanitary selection; France;
Notes : History and review of grapevine *in vitro* culture, prospects for the future. 101 references The second part of this paper appeared in Progr. Agric. Vitic. 110:127-134 (1993).

1543. **Torregrosa, L. and A. Bouquet.** 1997. *Agrobacterium rhizogenes* and *A.tumefaciens* co-transformation to obtain grapevine hairy roots producing the coat protein of grapevine chrome mosaic nepovirus. Plant Cell,Tissue and Organ Culture **49**:53-62.
Keywords :grapevine; grapevine chrome mosaic virus; nepovirus; transgenic; control; coat protein gene; coat protein; *in vitro;* tissue culture; France;
Notes :*In vitro* cutures of hairy roots of grapevine were obtained from plantlets co-inoculated with virulent *Agrobacterium rhizogenes* and *A.tumefaciens* harbouring the gene encoding for the grapevine chrome mosaic virus (GCMV) coat protein with the aim at introducing resistance to GCMV infection. The possibility to graft *in vitro* transgenic roots to non transformed shoots should permit a rapid testing of the resistance induced by the presence of GCMV coat protein in roots.

1544. **Torregrosa, L., O. Le Gall, Y. Danglot, T. Candresse, and A. Bouquet.** 1994. Transformation génétique d'embryons somatiques de vigne par *Agrobacterium tumefaciens* et régénération de plants transgéniques produisant la protéine capsidiale du virus de la mosaïque chromée de la vigne (GCMV) (Genetic transformation of grapevine embryos by means of *Agrobacterium tumefaciens* and regeneration of transgenic plants producing the capsid protein of grapevine chrome mosaic virus, GCMV), p. 91-98. In VIth International Symposium on Grape Breeding, Yalta, Crimea, Ukraine, 4-10 Septembre 1994. Office International de la Vigne et du Vin (OIV), Paris, France.
Keywords :grapevine; nepovirus; grapevine chrome mosaic virus; transgenic; *in vitro;* coat protein; resistance; France; somatic embryogenesis;
Notes : In French. Book chapter. Symposium Grape Breeding, Yalta, Ukraine, 1994. Oral presentation. Transgenic plants of the rootstock variety 110 Richter were regenerated from embryogenic cals cocultivated with the strain of *A.tumefaciens* LBA 4404 pKVHG 2+ carrying a binary vector with the genes coding for resistance to hygromycin (HPT), to kanamycin (NPT H), to S-glucuronidase (GUS), as well as for capsidial protein of grapevine chrome mosaic virus. The highest transformation rate was obtained using a medium containing 16 micrograms/ml of hygromycin. High levels of GCMV coat protein production were detected by ELISA and Western blot in transformed embryos and regenerated plants. The presence of the genes carried by the plasmid pKVHG2+ in transformed plants was verified after amplification of their DNA by PCR, and their integration in the genome of the vines was confirmed by Southern blot. (A similar paper appears in English in Plant Science 102: 161-170, 1994, ref.877).

1545. **Triolo, E. and A. Materazzi.** 1987. La"Maculatura Infettiva" della vite: Influenza di isolati diversi sull'attitudine alla propagazione vegetativa di *Vitis rupestris* "St.George". (Fleck disease of grapevine: influence of various isolates on vegetative propagation of *Vitis rupestris* "St.George"). Schw. landw. Forschung/La Recherche agronomique en Suisse **26**:320-324.
Keywords :grapevine; fleck; symptoms; performance; economic importance; Italy;
Notes : In Italian. Although fleck infection may reduce the vigour of *Vitis rupestris* St.George, its effect is rather limited. However, the authors believe it is worth while eliminating this disease during sanitary selection.

1546. **Tsagris, M., G. Fragkiadakis, K. A. Roubelakis-Angelakis, and M. Tabler.** 1991. Viroids in grapevine cultivars in Greece, p. 477-483. In I. C. Rumbos, R. Bovey, D. Gonsalves, W. B. Hewitt, and G. P. Martelli (ed.), Proceedings of the 10th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG). Plant Protection Institute, P.O. Box 303, 38001 Volos, Greece.

Keywords :grapevine; viroid; HSVd-g; Greece; meeting; ICVG;
Notes : Grapevine cultivars grown in Greece are widely infected with a viroid which is closely related to hop stunt viroid.

1547. **Tsagris, M., E. Stylianou, and I. C. Rumbos.** 1993. Presence of HSVd-g and GYSVd in several grapevine cultivars in Greece, p. 42. In P. Gugerli (ed.), Extended abstracts 11th Meeting ICVG, Montreux, Switzerland, 6-9 September 1993. Federal Agricultural Research Station of Changins, CH-1260 Nyon, Switzerland.
Keywords :grapevine; viroid; GYSVd-1; GYSVd-2; HSVd-g; CEVd-g; Greece; meeting; ICVG;
Notes : GYSVd-1(85%) and HSVd-g (83%) were detected in Greek vineyards. The results concerning the other viroids tested for were not indicated.

1548. **Tyson, G.E., B. J. Stojanovic, R. F. Kuklinski, T. J. Di Vittorio, and M. L. Sullivan.** 1985. Scanning electron microscopy of Pierce's disease bacterium in petiolar xylem of grape leaves. Phytopathology **75**:264-269.
Keywords :grapevine; Pierce's disease; bacterium; electron microscopy; USA;

1549. **Tzeng, H.C., D. D. S. Tzeng, and A. C. Goheen.** 1993. Anatomical and tissue culture studies of rupestris stem pitting-affected grapevines. Botanical Bulletin of Academia Sinica **34**:73-82.
Keywords :grapevine; stem pitting; electron microscopy; closterovirus-like particles; ultrastructure; tissue culture; China;
Notes : Stem pitting-affected young shoots and leaves were studied by light and electron microscopy. Electron microscope studies revealed the presence of closterovirus-like particles in phloem parenchyma cells of young infected shoots. These particles had a width of 7-8 nm and were similar to closterovirus particles already described for leafroll and corky bark.

1550. **Tzeng, H.L.C., M. J. Chen, and D. D. S. Tzeng.** 1994. The occurrence of grapevine leafroll disease among the main grapevine cultivars and breeding stocks in Taiwan. Plant Pathology Bulletin **3**:156-167.
Keywords :grapevine; leafroll; indexing; ELISA; GLRaV-3; GLRaV-4; closterovirus; occurrence; survey; Taiwan;
Notes : In English, Chin.sum. A preliminary survey was made on leafroll disease occurrence in Taiwan. 50 grape cvs. were examined by indexing and ELISA. A high proportion of leafroll-infected vines was recorded. GLRaV-3 and -4 were detected by ELISA. Other GLRaVs seem to be present, as indexing revealed a higher number of leafroll-affected vines than ELISA. The symptoms of leafroll are described.

1551. **Tzeng, H.L.C., M. J. Chen, and D. D. S. Tzeng.** 1996. An improved method for isolating closteroviral dsRNA from leafroll affected grapevines. Plant Pathology Bulletin **5**:47-54.
Keywords :grapevine; GLRaV; leafroll; closterovirus; dsRNA; purification; method; Taiwan;
Notes : An improvement of the usual phenol-sodium dodecyl sulfate (SDS) method for extracting dsRNA from plant tissue for detection of leafroll-associated viruses or other closteroviruses is proposed. Cortical tissues collected from dormant canes were pulverized using a grinding machine in the presence of liquid mitrogen. 2 - 5% of SDS (W/V) in the Phenol-buffer extraction medium gave good results. The addition of insoluble polyvinyl polypyrrolidone slightly reduced the yield of dsRNA. The slight browning generally observed during homogeneization of the samples was easily removed, without affecting the dsRNA yield, during high speed centrifugation and continuous washing in the CF-cellulose column chromatography. With this method, between 10 and 20 ng of the genome dsRNA, with a molecular size estimated at 23 kb, were consistently obtained from one gram of fresh weight of cortical tissues of diseased Kyoho grapes. The method was ideal for citrus tristeza closterovirus.

1552. **Tzeng, H.L.C., D. D. S. Tzeng, and A. C. Goheen.** 1989. Electron microscopical studies on the leafroll- and corky bark-affected grapevines. Botanical Bulletin of Academia Sinica **30**:251-262.
Keywords :grapevine; leafroll; rugose wood; corky bark; ultrastructure; electron microscopy; China; USA;
Notes : In English, Chin. sum. Corky bark particles had a width of 7-8 nm, leafroll particles 10-11 nm.

1553. **Uyemoto, J.K., C. R. Krag, and A. Rowhani.** 1996. Grape leafroll closterovirus purification and antiserum production. Amer. J. Enol. Vitic. **47**:350.
Keywords :grapevine; leafroll; closterovirus; GLRaV-2; GLRaV-4; purification; method; immunoassay; ELISA; California; USA;
Notes : Abstract of a paper presented at the 47th annual meeting of ASEV, Reno, Nevada, 26-28 June 1996. In order to prepare antisera against grapevine leafroll associated viruses 2 and 4, bark scrapings were fragmented into a fine powder in liquid nitrogen and extracted in phosphate buffer containing 2-mercaptoethanol, urea, Na2SO3, Triton X-100, and polyvinyl pyrrolidone. After filtration through cheesecloth, the aqueous phase was given alternating cycles of centrifugation, and passage through a 20% sucrose cushion and a cesium sulfate gradient column. Fractions were tested by ELISA, and fractions 8 and 9, which gave high absorbance readings, were pooled, dialyzed, and virions concentrated by centrifugation. These were successfully used for preparing antisera.

1554. **Uyemoto, J.K., C. R. Krag, and A. Rowhani.** 1997. An improved purification procedure for grapevine leafroll associated viruses. Amer. J. Enol. Vitic. **48**:521-524.
Keywords :grapevine; leafroll; purification; method; closterovirus; GLRaV-1; GLRaV-2; GLRaV-3; immunoassay; ELISA; USA;
Notes : Grapevine leafroll associated viruses GLRaV-1 and -2 were extracted and purified from infected tissues in greater yield when an acidic extraction buffer consisting of 0.5 M potassium phosphate, pH 6.4, and 4% polyvinyl polypyrrolidone (PVPP), without bentonite, was used. The yield of purified viruses was lower when using 0.5 M Tris-HCl buffer, pH 8.2, PVPP, either with or without bentonite. Relative virus yields were checked by ELISA. The improvement in virus yields was probably due to increased activity of the polyphenol absorbent, PVPP, when it was suspended in a slightly acidic solution. For GLRaV-3, yields of purified virus were comparable irrespective of extraction buffer or bentonite.

1555. **Valat, C.** 1986. La vigne et les techniques de culture "in vitro". (Grapevine and "in vitro" culture methods). Progr. Agric. Vitic. **103**:286-287.
Keywords :grapevine; *in vitro;* micropropagation; virus elimination; performance; France;

1556. **Valat, C.** 1990. La sélection de la vigne en France (Grapevine selection in France). Progr. Agric. Vitic. **107**:258-261.
Keywords :grapevine; clonal selection; sanitary selection; certification; legislation; propagation; France;
Notes : In French. Description of the various steps of genetic and clonal selection of grapevine in France, and of the rules for premultiplication and multiplication of clones of grapevine cultivars (Lecture given at the Seminar of viticulture of Vinos verdes, Vina do Castelo, Portugal, June 1990).

1557. **Vallotton, R. and J. J. Perrier.** 1990. Les nématodes vecteurs de virus dans le vignoble de Suisse romande et du Tessin. (Nematode vectors of viruses in vineyards of the French and Italian speaking parts of Switzerland). Rev. suisse vitic. arboric. hortic. **22**:53-58.
Keywords :grapevine; nematode; vector; *Xiphinema; Xiphinema index; Xiphinema diversicaudatum; Xiphinema vuittenezi; Longidorus;* Longidoridae; occurrence; control; herbicide; resistance; Switzerland;
Notes : Occurrence in Switzerland (French and Italian speaking parts) of *Xiphinema index*, vector of fanleaf virus, *X.diversicaudatum*, vector of several other nepoviruses, *X.vuittenezi*, whose role as vector of virus is still unclear, *X.mediterraneum (=pachtaicum), X. brevicolle, Longidorus macrosoma*. The methods of sampling for nematode surveys are described, as well as control measures, resistance. Experiments with roundup for killing old vines down to the roots before pulling out gave results that seem promising.

1558. **Vanek, G.** 1992. [Epidemiology, diagnosis and control of grapevine virus diseases]. VEDA, Publishing House of the Slovak Academy of Sciences, Bratislava.
Keywords :grapevine; virus; virus-like diseases; handbook; description; symptoms; control; virus-free material; Slovakia;
Notes : In Slovak, Eng.sum. 48 different types of virus and virus-like dieases of grapevine are mentioned, and those occurring in the former Czechoslovakia are described. 29 viruses causing grapevine diseases are characterized and described in detail. The economic importance of the diseases is discussed. Control

measures recommended include the use of virus-free material and exclusion from the nursery market of any infected or not tested planting material.

1559. **Vanek, G., M. Nemeth, M. Kölber, and L. Szöke.** 1993. Negative influence of injured ecological factors on the resistance of plants against viroses, p. 87-97. In A. Blahutiak (ed.), Works of the Institute of Experimental Phytopathology and Entomology (Vol.4). Institute of Experimental Phytopatho-logy and Entomology, Bratislava, Slovakia.
Keywords :grapevine; leafroll; grapevine fanleaf virus; vein mosaic; arabis mosaic virus; tomato black ring virus; physiology; mineral nutrition; resistance; Slovakia;
Notes : The authors studied the effects of various concentrations of Ca, K and N in hydroponic cultures of myrobolan plum GF-31 on the concentration of plum pox virus (main part of the study). Field experiments were also made, taking account of immission of pollutants from the industry. The results show the importance of a good equilibrium between the main mineral parameters of the soil. The noxious influence of plum pox virus increased with manuring the rhizosphere with artificial fertilizers. The authors studied also the relation between calcium accumulation in the leaves of grapevine *(Vitis riparia)* and virus infection. All infected vines (Vein mosaic, leafroll, TRBV, GFLV, GCMV, ArMV) had a higher concentration of calcium than healthy vines, in some cases (GFLV yellow mosaic strain) about three times as much. The lack of calcium increased the severity of symptoms.

1560. **Varadi, G., B. Balo, E. Papp, B. Böddi, and D. Polyak.** 1995. Photosynthetic parameters of virus infected grapevine leaves, p. 917-920. In P. Mathis (ed.), Photosynthesis: from Light to Biosphere. Kluwer Academic Publisher, Dordrecht, The Netherlands.
Keywords :grapevine; virus; photosynthesis; physiology; Hungary;
Notes : Book chapter. Preliminary observations on photosynthesis of grapevines cv.Chardonnay infected artificially with GFLV were presented: chlorophyll fluorescence induction, net CO_2 assimilation, 77 K fluorescence spectra, spectrophotometry and HPLC of pigments.

1561. **Vega, E. and A. Worlock.** 1994. Virus de la vid (Viruses of grapevine). Boletin INTA - Centro Regional Cuyo *(8):*3-5.
Keywords :grapevine; virus; virus-like diseases; grapevine fanleaf virus; nepovirus; fanleaf; leafroll; general; occurrence; Argentina;
Notes : Grapevine fanleaf virus and grapevine leafroll-associated closteroviruses are the most important viruses affecting grapevine in Argentina. Description of grapevine viruses, transmission and methods of control.

1562. **Vega, J., A. R. Oliveira, H. Kuniyuki, C. R. Baptista, G. W. Muller, and A. S. Costa.** 1989. Comparaçao de antissoros para detecçao do virus do enrolamento da folha da videira por MEIAD: Reaçao cruzada com o virus da tristeza dos citros (Comparison of antisera for detection of grapevine leaf roll virus by ISEM: Cross reaction with Citrus tristeza virus). Summa Phytopathologica **15**:40.
Keywords :grapevine; leafroll; closterovirus; immunoassay; *in vitro*; ISEM; citrus tristeza virus; GLRaV-1; GLRaV-2; GLRaV-3; ELISA; Brazil;
Notes : In Portuguese. In a previous report (Oliveira et al., 1988, ref. 1161) a serological relationship was shown to exist between a virus detected in calluses of leafroll infected Seibel 2 plantlets grown *in vitro* and citrus tristeza virus. In the present paper, the authors compared samples of purified IgG from antisera against GFLaV-1, -2 and 3 obtained from Dr Gugerli in Nyon, Switzerland with the antiserum made against the Seibel 2 virus detected in callus, using the ISEM technique. The three Swiss antisera gave a positive, but weak reaction with citrus tristeza virus. With the Seibel 2 virus the reaction was also positive, but with different intensities. GLRaV-1 IgG (monoclonal AS) gave a weak reaction, GLRaV-2 IgG (polyclonal AS) reacted in the same way as the anti-tristeza AS, whereas GLRaV-3 IgG (polyclonal AS) gave a stronger reaction than anti-tristeza AS. These results are believed to reinforce the hypothesis of a serological relationship between citrus tristeza virus and viruses responsible for leafroll disease of grape. These results, however could not be confirmed with ELISA, which appears to be less sensitive for detecting serological relationships between viruses than ISEM.

1563. **Verderevskaja, T.D., E. Z. Zemtchik, and B. G. Marinesku.** 1987. Grapevine vein necrosis etiology. Arch. Gartenbau **35**:87-94.
Keywords :grapevine; vein necrosis; etiology; virus-like particles; isometric; associated; electron microscopy; cytopathology; USSR;
Notes : Attempts to transmit the agent of grapevine vein necrosis to herbaceous indicators by mechanical inoculation, and to *Catharanthus roseus* by grafting were unsucessful. Electron microscope examination of thin sections revealed the presence of isometric particles with a diameter of about 20 nm forming more or less cristalline aggregates in vacuoles or dispersed in the cytoplasm. The material examined consisted of young leaves of the indicator 110R infected with a source of vein necrosis considered as "pure". The authors suggest that the observed particles could be associated with the disease.

1564. **Verderevskaya, T.D., E. Z. Zemchik, and V. G. Marinesku.** 1987. Aetiology of grapevine vein necrosis. Mikrobiologicheskii Zhurnal **49** *(6):*67-70.
Keywords :grapevine; vein necrosis; etiology; USSR;
Notes : In Russian

1565. **Vibio, M., A. Bertaccini, I. M. Lee, R. E. Davis, and M. F. Clark.** 1996. Differentiation and classification of aster yellows and related European phytoplasmas. Phytopath. medit. **35**:33-42.
Keywords :grapevine; phytoplasma; survey; Vergilbungskrankheit; classification; Europe; aster yellows; stolbur; elm yellows; PCR; RFLP; Italy; United Kingdom; USA;
Notes : Thirty three phytoplasma isolates were collected from different infected plant species in Europe or in the US and studied with the PCR technique and RFLP of DNA fragments from amplified 16S rDNA. All the isolates belonged to the 16S rRNA group I. Nineteen of them belonged to the subgroup I-B and one to the subgroup I-C. Among the remaining isolates, 12 showed RFLP patterns identical to each other, but different from groups known so far. They were assigned to a new subgroup, called I-G (16SrI-G). They are close to stolbur of tomato or celery yellows. One isolate was different from all the other examined. Isolates from grapevine were from Germany (Vergilbungskrankheit GAY strain /I-C; Periwinkle yellows/I-G). Previous work showed that in Italy, phytoplasmas with RFLP patterns identical to I-G are often in mixed infections with phytoplasmas belonging to the elm yellows group.

1566. **Vidano, C., A. Arzone, A. Alma, and C. Arnò.** 1987. Auchenorrinchi e diffusione della flavescenza dorata della vite in Italia. (Auchenorrhyncha and diffusion of "flavescence dorée" of grapevine in Italy), p. 57-68. In S. Ruini (ed.), Atti del Convegno sulla Flavescenza Dorata della Vite, Vicenza-Verona, Maggio 1987. Fondazione Sergio Bolla, Verona.
Keywords :grapevine; flavescence dorée; bois noir; phytoplasma disease; *Scaphoideus titanus*; Auchenorrhyncha; leafhopper; epidemiology; survey; spread; Italy; meeting;
Notes : In Italian, Fr. Eng. sum. Flavescenza dorata, Vicenza-Verona meeting.

1567. **Vidano, C., A. Arzone, A. Alma, and C. Arnò.** 1988. Flavescenza dorata della vite e Auchenorrinchi probabili vettori del suo agente patogeno in Piemonte (Flavescence dorée of grapevine and probable Auchenorrynchid vectors of its pathogenic agent in Piedmont). Ann. Fac. Sci. Agr. Univ. Torino **15**:29-37.
Keywords :grapevine; flavescence dorée; phytoplasma; phytoplasma disease; vector; *Scaphoideus titanus; Euscelidius variegatus; Hyalesthes obsoletus; Euscelis incisus*; leafhopper; survey; occurrence; Italy;
Notes : In Italian, Eng. sum. Investigations were made in Piedmont on the leafhopper fauna present in vineyards of the variety Chardonnay, a cv. on which FD-like symptoms were found, together with other types of leafroll. *Scaphoideus titanus* has been found, but also *Hyalesthes obsoletus, Euscelidius variegatus* and *Euscelis incisus*, considered as potential vectors of FD.

1568. **Vidano, C., A. Arzone, A. Alma, and C. Arnò.** 1989. Auchenorryncha and mycoplasma diseases within the vineyard agro-ecosystem in Italy, p. 483-488. In R. Cavalloro (ed.), Plant-Protection Problems and Prospects of Integrated Control in Viticulture. Proceedings of the CEC/IOBC International Symposium, Lisboa-Vila Real, Portugal, June 1988. Commission of the European Communities, L-2920 Luxembourg.
Keywords :grapevine; phytoplasma disease; transmission; vector; leafhopper; Italy;
Notes : Book chapter

1569. **Vidano, C., A. Arzone, A. Alma, and C. Arnò.** 1989. Flavescenza dorata della vite in Piemonte. Indagini su sintomi fogliari, Auchenorrinchi vettori di MLO e piante erbacee affette da micoplasmosi (Grapevine golden flavescence in Piedmont. Research on leaf symptoms, Auchenorryncha vectors of MLOs and herbaceous plants with mycoplasma diseases). Ann. Fac. Sci. Agr. Univ. Torino **16**:31-44.
Keywords :grapevine; phytoplasma disease; flavescence dorée; survey; symptoms; weeds; leafhopper; vector; Auchenorrhyncha; phytoplasma; electron microscopy; Italy;
Notes : Several vineyards were surveyed every fortnight from May to October during three years from 1986 to 1988 for the presence of symptopms of the flavescence dorée (FD) type, of leafroll and of damage by *Empoasca vitis*. Leafroll was present in all vineyards examined. FD appeared mostly on cv. Chardonnay, but in a very fluctuating way. *Empoasca vitis* often caused symptoms that can lead to confusion with leafroll on red cvs. Several weeds were found with phyllody or other symptoms typical of MLO disease in vineyards, and were found to contain MLOs in electron microscope studies. *Convolvulus arvensis* appears to be the most severely diseased plant. Healthy *Cantharantus roseus* and *Vicia faba* placed from May to October in vineyards affected by grapevine yellows showed yellows symptoms at the end of summer. MLO-like bodies were found in salivary glands of leafhoppers and in sieve tubes of herbaceous plants collected in affected vineyards.

1570. **Vindimian, M.E., M. Dalri, L. Delaiti, and L. Capra.** 1997. Legno nero e presenza di *Scaphoideus titanus* Ball (Blackwood and the presence of *Scaphoideus titanus* Ball). L'Informatore Agrario **53***(28):*65-70.
Keywords :grapevine; phytoplasma disease; flavescence dorée; bois noir; *Scaphoideus titanus*; occurrence; Italy;
Notes : In Italian. A study on yellows diseases present in 10 young vineyards of cv. Chardonnay in the region of Valsugana (Trentino, Italy) showed that in spite of the presence of *Scaphoideus titanus*, flavescence dorée *sensu stricto* does not occur in the region. It is suggested that the few cases of yellows observed (less than 4% of samples studied) are due to blackwood phytoplasma transmitted by an unknown vector. *S.titanus* has spread rapidly from only a few hectares in 1988 to all the region. The danger of introducing flavescence dorée in a region where the vector is already present is emphasized.

1571. **Viry, M., M. A. Serghini, F. Hans, C. Ritzenthaler, M. Pinck, and L. Pinck.** 1993. Biologically active transcripts from cloned cDNA of genomic grapevine fanleaf nepovirus RNAs. J. Gen. Virol. **74**:169-174.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; cDNA; protoplast; electroporation; France;
Notes :A bacteriophage RNA polymerase promoter was used for cloning a full-length cDNA of RNA1 and RNA2 of grapevine fanleaf virus (GFLV), isolate F13. Transcripts were produced *in vitro* by transcription of this cDNA. These transcripts which differs slightly from the normal genome of GFLV can infect protoplasts of *Chenopodium quinoa* by electroporation, but synthetic RNA1 alone replicated in protoplasts. Inoculation of *C.quinoa* with synthetic RNA1+RNA2 produced symptoms similar but weaker than those produced by natural GFLV inoculation. The two RNAs were able to replicate and spread in the plant. RNA1 alone produced no symptom and was not systemic. This suggests that RNA2 is responsible for virus spread.

1572. **Voisin, R., J. C. Minot, and D. Esmenjaud.** 1997. Court-noué. Etudes épidémiologiques en Champagne (Court-noué. Epidemiological studies in Champagne). Le Vigneron Champenois **118***(6)*:15-19.
Keywords :grapevine; court-noué; nepovirus; Longidoridae; fanleaf; *Xiphinema index*; nematode; vector; epidemiology; control; resistance; transmission; France;
Notes :ELISA made it possible to detect grapevine fanleaf virus (GFLV) in batches of 10 viruliferous *Xiphinema index* nematodes. RT-PCR is sensitive enough for detecting this virus in a single nematode. The application of this method to the study of the infectivity of *X.index* maintained under controlled conditions at 20^{o} C showed that GFLV was still present in the nematode after 12 months without access to a virus source.

1573. **Vovlas, N. and A. Avgelis.** 1987. Presenza di *Xiphinema index* in vigneti affetti da giallume infettivo nell'isola di Creta. (Occurrence of *Xiphinema index* in vineyards affected with infectious yellow mosaic in Crete). Inform. Fitopatol. **37***(12):*54-56.
Keywords :grapevine; yellow mosaic; grapevine fanleaf virus; nepovirus; nematode; *Xiphinema index*; Longidoridae; Crete; Greece;
Notes : In Italian. Giallume infettivo refers to yellow mosaic, caused by grapevine fanleaf virus.

1574. **Vovlas, N. and A. Avgelis.** 1988. Occurrence and distribution of *Xiphinema* species in vineyards of the Heraklion province, Crete (Greece). Nematol. medit. **16**:197-200.
Keywords :grapevine; nematode; *Xiphinema index; Xiphinema italiae; Xiphinema pachtaicum*; Longidoridae; occurrence; Greece;
Notes : The paper is mostly on nematological aspects, with little reference to virus transmission. 130 vineyards were investigated. *Xiphinema pachtaicum* was found in 65% of samples, *X.index* in 27%, *X.italiae* in 8%.

1575. **Walker, M.A. and C. P. Meredith.** 1990. The genetics of resistance to grapevine fanleaf virus in *Vitis vinifera*, p. 228-238. In G. Alleweldt (ed.), Proceedings of the 5th International Symposium on Grape Breeding, September 1989. St.Martin/Pfalz, Germany. Bundesforschung für Rebenzüchtung Geilweilerhof, D-76833 Siebeldingen, BRD.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; transmission; resistance; nematode; *Xiphinema index*; Longidoridae; California; USA; meeting;
Notes : Special issue of Vitis. Book chapter. Two wild *Vitis vinifera* accessions from the Middle East previously found resistant to grapevine fanleaf virus (O30-44 and O30-51 of the P.Olmo collection respectively fron Iran and Afghanistan) were selfed and also crossed to a GFLV-susceptible cultivar. Resistance to GFLV appears to segregate as a recessive trait controlled by at least two genes.

1576. **Walker, M.A., C. P. Meredith, and A. C. Goheen.** 1985. Sources of resistance to grapevine fanleaf virus (GFV) in *Vitis* species. Vitis **24**:218-228.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; resistance; *Vitis*; California; USA;
Notes : Feeding resistance exists (Bouquet, 1980; Weischer, 1980; Bouquet and Danglot, 1983) but it is not certain to be sufficient. Resistance to fanleaf virus is necessary. Graft transmission of challenge virus (GFLV) were made and ELISA was used to check transmission on candidate cvs. Three sources of resistance were found out of 173 accessions: 1. Cv. Bountiful of *Muscadinia rotundifolia;* 2. Hybrid *Vitis vinifera x M. rotundifolia;* 3. A wild type of *V. vinifera* from Middle East. One hybrid *vinifera x rotundifolia* seems to combine resistance to GFLV and to *Xiphinema index.*

1577. **Walker, M.A., J. A. Wolpert, E. P. Vilas, A. C. Goheen, and L. A. Lider.** 1989. Resistant rootstocks may control fanleaf degeneration of grapevines. California Agriculture **43***(2):*13-14.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; resistance; nematode; vector; *Xiphinema index*; Longidoridae; California; USA;
Notes : Two rootstock selections derived from crossings *Vitis vinifera x V. rotundifolia* showed good resistance to infectious degeneration. Eight years after planting, selection 039-16 did not show any symptom of GFLV infection, although planted in infective soil. ELISA GFLV positive samples were found in only 1 case 9 years after planting (1988). Selection 043-43 showed veinbanding and other leaf symptoms, ELISA was positive, but yield was not reduced, suggesting tolerance to GFLV. Vines grafted on traditional rootstock showed heavy attack of GFLV and low yield.

1578. **Walker, M.A., J. A. Wolpert, and E. Weber.** 1994. Field screening of grape rootstock selections for resistance to fanleaf degeneration. Plant Disease **78**:134-136.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; rootstock; resistance; selection; USA; *Xiphinema index*; Longidoridae; ELISA; nematode; transmission; California;
Notes : A search for fanleaf-resistant rootstocks has been under way for several years in California. This paper reports on a field experiment designed to screen for fanleaf degeneration resistance and started in 1979 near Rutherford in Napa Valley. Fifty-five various hybrids selected by Lider for resistance to

Xiphinema index feeding, nine *Vitis vinifera x Muscadinia rotundifolia* hybrids bred by Olmo (VR hybrids) and three fanleaf-susceptible standard rootstocks were planted in June 1979 in a vineyard soil showing a fairly uniform presence of fanleaf degeneration, i.e. grapevine fanleaf virus (GFLV) and its vector *X.index*. They were field-budded the following autumn with healthy Cabernet Sauvignon. From 1981 to 1991, shoot tips from the scions were sampled every year and tested for GFLV by DAS-ELISA. Visual assessments of symptoms on foliage and fruits were also performed. One of the Olmo VR hybrids, O39-16, remained free of GFLV infection for 10 years and appears to have a high degree of resistance to this virus, although it is not entirely immune. It is also resistant to phylloxera feeding. The suggested recommendation for its use is restricted to fanleaf degeneration sites.

1579. **Walker, M.A., J. A. Wolpert, and E. Weber.** 1994. Viticultural characteristics of VR hybrid rootstocks in a vineyard site infected with grapevine fanleaf virus. Vitis **33**:19-23.
Keywords :grapevine; nepovirus; fanleaf; grapevine fanleaf virus; nematode; *Xiphinema index*; Longidoridae; transmission; resistance; rootstock; California; USA;
Notes : Two *Vitis vinifera x Muscadinia rotundifolia* (VR hybrids) O39-16 and O43-43 were tested in the field for a 12-year period in Napa Valley, Calif. in a vineyard site infected with the complex fanleaf virus - *Xiphinema index* for their resistance to this disease. They were compared with the susceptible rootstocks AXR#1, Harmony, St.George, and L 171-6. The scion cultivar was virus-tested Cabernet-Sauvignon. Both VR hybrids became infected with GFLV, but there was no yield reduction. O43-43 is probably susceptible to phylloxera. O39-16 is therefore the only rootstock that can be used where phylloxera is present.

1580. **Walter, B.** 1985. Culture *in vitro* pour l'étude et l'élimination de viroses de la vigne (*In vitro* culture for the study and elimination of grapevine virus diseases), p. 39-54. In Moël Hennessy. Colloque Amélioration de la Vigne et Culture in Vitro 1985. Moët-Hennessy, Paris.
Keywords :grapevine; *in vitro*; virus elimination; micrografting; indexing; micropropagation; method; France;
Notes : In French, Eng. sum. Meeting on the improvement of grapevine and *in vitro* culture, organized by Moët-Hennessy.

1581. **Walter, B.** 1987. Maladie de Pierce; mieux vaut prévenir que guérir. (Pierce's disease: better preventing than curing). Phytoma - La Défense des Végétaux *(390):*32-34.
Keywords :grapevine; immunoassay; Pierce's disease; control; symptoms; detection; transmission; resistance; quarantine; review; France;
Notes : In French. Pierce's disease bacterium was found by ELISA in some grapevines introduced in France from California. The main symptoms of the disease are described, as well as its vectors, the detection methods, and control measures. The danger of Pierce's disease for French viticulture is discussed.

1582. **Walter, B.** 1988. Quelques exemples de la réaction physiologique de la vigne en présence de virus. (Some examples of physiological reaction of grapevine in the presence of viruses). Bull. OIV **61**:383-390.
Keywords :grapevine; nepovirus; virus; grapevine fanleaf virus; grapevine fleck virus; arabis mosaic virus; rugose wood; stem pitting; corky bark; performance; symptoms; physiology; review; France;
Notes : In French, Eng. sum. Review of the subject.

1583. **Walter, B.** 1990. Les viroses de la vigne (Virus diseases of grapevine). Les Vins d'Alsace 209-212.
Keywords :grapevine; leafroll; closterovirus; fanleaf; grapevine fanleaf virus; arabis mosaic virus; nepovirus; France;

1584. **Walter, B.** 1990. 10e congrès de l'ICVG (10th meeting of ICVG). Progr. Agric. Vitic. **107**:462-464.
Keywords :grapevine; virus diseases; virus-like diseases; meeting; ICVG;
Notes : Report on the 10th meeting of the International Council for the Study of Viruses and Virus Diseases of Grapevine (ICVG), held in September 1990 at Volos, Greece .

1585. **Walter, B.** 1991. New or improved procedures for the detection and identification of viruses or agents of virus-like diseases of grapevine and for diagnosis, p. 226-238. In I. C. Rumbos, R. Bovey, D. Gonsalves, W. B. Hewitt, and G. P. Martelli (ed.), Proceedings of the 10th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG). Plant Protection Institute, P.O. Box 303, 38001 Volos, Greece.
Keywords :grapevine; virus; virus-like diseases; identification; diagnosis; detection; ELISA; immuno-blot; immuno electron microscopy; nucleic acid assay; immunoassay; indexing; review; France; meeting; ICVG;
Notes : This paper was given as introductory lecture to session 3 of the 10th meeting of ICVG at Volos, Greece, September 1990.

1586. **Walter, B.** 1991. Sélection de la vigne: le dépistage des maladies de la vigne transmissibles par les bois et plants (Selection of grapevine: Detection of grapevine diseases transmisible with grapevine canes or whole plants). Bull. OIV **64**:691-701.
Keywords :grapevine; clonal selection; sanitary selection; grapevine fanleaf virus; arabis mosaic virus; leafroll; nepovirus; closterovirus; immunoassay; nucleic acid assay; detection; indexing; viroid; phytoplasma; phytoplasma disease; bacterium; ELISA; ISEM; cDNA; France;
Notes : In French, Eng. sum. Review on the different methods of detection of viruses and virus-like diseases of grapevine.

1587. **Walter, B.** 1991. Génie génétique appliqué à la vigne (Genetic engineering applied to grapevine). Bull. OIV **64**:213-218.
Keywords :grapevine; grapevine fanleaf virus; fanleaf; nepovirus; virus diseases; resistance; cross-protection; transgenic; review; France;
Notes : Review of the problem of improving grapevine by genetic engineering. Resistance to GFLV by including the gene coding for the capsid protein in the genome of grapevine in order to induce a cross protection effect. Resistance to fungus diseases, improvement of varietal quality.

1588. **Walter, B.** 1991. Court-noué: la lutte génétique à l'horizon (Court-noué/fanleaf: the genetic control in sight). Viti *(150):*60-61.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; arabis mosaic virus; court-noué; control; soil fumigation; cross-protection; resistance; France;
Notes : In French. This short review is intended for growers. As the chemical control of fanleaf and the other nepoviruses by soil disinfection is limited by environmental restrictions, other methods must be found for preventing the infection of newly planted vines. Beside sanitary selection and the use of virus-tested material, two ways seem promising: premunition and resistance. There is some hope that this can be achieved by genetic engineering.

1589. **Walter, B.** 1992. Quick detection of virus and virus-like diseases of the grapevine, p. 15-22. In G. P. Martelli (ed.), Grapevine Viruses and Certification in EEC Countries: State of the Art. Quaderno No 3, Istituto Agronomico Mediterraneo (I.A.M.), Bari, Italy.
Keywords :grapevine; detection; method; virus-like diseases; green grafting; virus diseases; certification; symptoms; France; EEC;
Notes : Green-grafting technique and culture of grafted vines in glasshouse is a good solution for indexing grapevines for the presence of viruses and virus-like diseases. Symptoms appear within 4-12 weeks, depending on the disease. Grafting is made with a machine developed jointly by INRA and GCEV (Groupement Champenois d'Exploitation Viticole).

1590. **Walter, B.** 1992. The French certification of grapevine, p. 49-53. In G. P. Martelli (ed.), Grapevine Viruses and Certification in EEC countries: State of the Art. Quaderno No 3, Istituto Agronomico Mediterraneo (I.A.M.), Bari, Italy.
Keywords :grapevine; certification; legislation; France; meeting; EEC;

1591. **Walter, B.** 1992. Les maladies de la Vigne transmissibles par les bois et plants (Grapevine diseases transmissible through rootstocks and plants). Revue des oenologues et des techniques vitivinicoles et oenologiques *(66):*21-23.
Keywords :grapevine; diseases; quarantine; virus; viroid; phytoplasma; control; detection; general; France;
Notes : In French. This paper intended for technicians and vinegrowers reviews the main problems caused by grapevine diseases transmissible through graftwood, rootstocks and whole plants. Except for a few "external" pathogens that can be transmitted on the surface of various grapevine organs (arthropods, nematode, fungi), most dangerous pathogens are localized inside grape tissues. These are bacteria, mollicutes, viruses and viroids. The methods of detection and diagnosis, as well as the possibilities of control, are discussed.

1592. **Walter, B.** 1993. Advances in grapevine virus disease diagnosis since 1990, p. 127-130. In P. Gugerli (ed.), Extended abstracts 11th Meeting ICVG, Montreux, Switzerland, 6-9 September 1993. Federal Agricultural Research Station of Changins, CH-1260 Nyon, Switzerland.
Keywords :grapevine; virus; viroid; phytoplasma disease; detection; method; immunoassay; nucleic acid; nucleic acid assay; dsRNA; PCR; indexing; review; France; meeting; ICVG;
Notes : Review on progress in methods for detecting virus diseases of grapevine. Introductory lecture.

1593. **Walter, B.** 1993. Une enquête O.I.V. sur la quarantaine de la vigne (An O.I.V enquiry on grapevine quarantine). Bull. OIV **66**:533-537.
Keywords :grapevine; virus; virus-like diseases; quarantine; review; France;
Notes : In French, Eng.sum. 25 viruses, 2 mycoplasma diseases are considered for quarantine in various countries. This review results from an enquiry of an experts' group of OIV on grapevine selection.

1594. **Walter, B.** 1994. Le court-noué de la vigne. I. Avantages et limites de la détection par ELISA (Court-noué of grapevine. I. Advantages and limits of its detection by ELISA). Progr. Agric. Vitic. **111**:320-328.
Keywords :grapevine; court-noué; fanleaf; grapevine fanleaf virus; arabis mosaic virus; nepovirus; immunoassay; ELISA; method; detection; sanitary selection; sampling; France;
Notes : In France, the name court-noué refers to the diseases caused by fanleaf virus, alone or in association with other nepoviruses. Detection methods based on symptom expression on grapevines in the field, indexing on herbaceous hosts or *Vitis* indicators, serology by double diffusion, latex or PALLAS tests have been used in the past. The best method is now ELISA (Enzyme-linked immunosorbent assay). The basic principles of its application to the detection of the court-noué viruses in grapevine tissue extracts are described. The most suitable organs are apical leaves, and the best time for sampling is May and June. ELISA has many advantages: rapidity, possibility of automatization, low cost and reliability. It is possible to pool about 50 samples and mix their extracts for a single test, and still be able to detect the presence of only one infected sample among 49 healthy ones. The test is therefore well suited for checking the sanitary state of grape planting material during multiplication. The limits of its validity, which depend partly on its cost and also on the fact that the virus shows variations in symptom expression and is not always present in all parts of the plant, are discussed.

1595. **Walter, B.** 1995. Harmonisation dans l'Union Européenne des protocoles de dépistage des maladies virales de la vigne: les virologues sont à l'ouvrage (Harmonizing the planning of grapevine virus disease detection in European Union: the virologists are at work). Progr. Agric. Vitic. **112**:460-461.
Keywords :grapevine; virus diseases; virus-like diseases; detection; method; legislation; quarantine; certification; Europe;
Notes : Summary of the work of several meetings of experts from six viticultural countries of the Union with a wiew to set up a unified common procedure for the detection of virus and virus-like diseases of grapevine.

1596. **Walter, B.** 1996. Effets des viroses sur la vigne et ses produits. I. Généralités. (Effects of virus diseases on grapevine and its products. I. Generalities). Progr. Agric. Vitic. **113**:482-488.
Keywords :grapevine; virus diseases; virus-like diseases; general; detection; classification; economic importance; performance; sanitary selection; nepovirus; closterovirus; trichovirus; vitivirus; review; France;

Notes : In French. This is the first of a series of four papers reviewing the present knowledge on grapevine viruses and virus-like diseases and their effects on grapevine yield and on the quality of the grapes and wine. A table sums up the classification of 44 viruses known to occur in grapevines. Virus-like diseases are also mentioned. The methods and importance of sanitary selection are discussed. Parts II, III and IV of this series appear in the same Journal, vol. **114**, pp. 54-58, 79-86, and 199-204 (ref. 1598-1600)

1597. **Walter, B.** 1996. Lutte contre les virus du court-noué de la vigne: objectif résistance (Control of grapevine nepoviruses: the objective is resistance). Phytoma - La Défense des Végétaux *(486):*33-35.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; arabis mosaic virus; raspberry ringspot virus; court-noué; control; cross-protection; transgenic; France;
Notes : In French. There are two possible ways of controlling grapevine fanleaf virus and the other nepoviruses involved in the "court-noué" disease: the premunition with hypovirulent strains of GFLV or ArMV, or the use of transgenic clones including in their genome the code for the coat protein of the virus (GFLV) or other genes.

1598. **Walter, B.** 1997. Effets des viroses sur la vigne et ses produits. II. Le court-noué et les népovirus (Effects of virus diseases on grapevine and its products. II. The court-noué and the nepoviruses). Progr. Agric. Vitic. **114**:54-58.
Keywords :grapevine; nepovirus; court-noué; grapevine fanleaf virus; arabis mosaic virus; performance; economic importance; physiology; France;
Notes : In French. This is the second part of a review series on the effects of grapevine viruses on the physiology and performance of infected vines. Like "Reisigkrankheit", the "court-noué" disease includes infections with (usually) grapevine fanleaf virus and one or several other nepoviruses. (For the other papers of this series, see Progrès agricole et viticole **113**, 482-488, 1996; **114**, 79-86, 119-204, 1997).

1599. **Walter, B.** 1997. Effets des viroses sur la vigne et ses produits. III. L'enroulement et le complexe du bois strié (Effects of virus diseases on grapevine and on its products. III. Leafroll and rugose wood complex). Progr. Agric. Vitic. **114**:79-86.
Keywords :grapevine; leafroll; closterovirus; vitivirus; corky bark; rugose wood; rupestris stem pitting; Kober stem grooving; LN 33 stem grooving; *Pseudococcus affinis; Pseudococcus longispinus; Planococcus citri; Planococcus ficus; Pulvinaria vitis*; mealybug; coccid; vector; review; France;
Notes : In French. This paper completes a series of two previous papers in the same Journal (Progrès agricole et viticole **113***(22)*, 482-488, 1996; **114***(2)*, 54-58, 1997). It is especially devoted to leafroll and to the rugose wood complex. After a brief summary of the present knowledge on the viruses involved in these diseases and on their known vectors, the author reviews the data available in the literature on their effects on the yield and longevity of grapevine and on the quality of grapes and wine. In most cases, leafroll infection causes a reduction in yield and a lowering in the sugar content of must. As the viruses responsible for leafroll are often latent in rootstock varieties, their elimination from planting material is essential. The effect of the various types of rugose wood vary considerably according to both scion and rootstock cultivars. Some combinations may appear almost normal except for symptoms on wood and bark, and in other cases a considerable percentage of vines have a reduced yield or die prematurely. The delayed appearance of symptoms may lead to severe losses when a whole vineyard is planted with infected clones. As several of the viruses involved in these diseases are transmitted by mealybugs, the studies on the biology and control of these recently discovered vectors has become very important. There are 55 references. (see also next reference).

1600. **Walter, B.** 1997. Effets des viroses sur la vigne et ses produits. IV. Virus et viroses divers. Marbrure, incompatibilités au greffage, énation, etc. (Effects of virus diseases on grapevine and on its products. IV. Fleck, graft incompatibility, enation, etc.). Progr. Agric. Vitic. **114**:199-204.
Keywords :grapevine; performance; symptoms; virus; virus-like diseases; fleck; incompatibility; ajinashika disease; enation; bushy stunt; roditis leaf discoloration; vein necrosis; certification; sanitary selection; review; France;
Notes : In French. This is the fourth and last paper of a series on the effects of virus diseases on grapevine and its products (see Progr. agric. vitic. **113**, 482-488 and **114**, 54-58 and 79-86). It

deals with various viruses and virus-like diseases generally considered of secondary importance. Some of them, however, can be very harmful. The virus responsible for *fleck* or *marbrure* has been identified and isolated recently, and can be detected by serology. Although its pathogenicity for grapevine is low in most cases, it is taken into consideration in the French scheme of sanitary selection. *Graft incompatibilities* are a serious threat to viticulture, especially when symptoms develop after a delay of several years after planting. Some cases of graft incompatibility appear to be caused by viruses, and grapevine leafroll-associated virus 2 (GLRaV-2) has been recently implicated in cases of incompatibility on 5BB. *Enation* has been observed in several countries and continents for many years, but its agent is so far unknown. Symptoms are erratic, and yield losses can be considerable. *Bushy stunt* occurs in southern Italy on a limited number of cultivars, mainly Italia and Sangiovese, causing severe losses. The agent is so far unknown. The disease is graft transmissible and can be cured by heat therapy. *Roditis leaf discoloration* is a rather rare disease observed in Greece. *Vein necrosis* is a widespread virus-like disease, which can be latent in many cultivars. The agent is not known. Symptoms appear on 110R and a few other rootstocks. The author stresses the need for adapting the sanitary selection and certification guidelines of the European Union to the recent knowledge on grapevine viruses and on their effects.

1601. **Walter, B., P. Bass, P. Cornuet, and P. M. Guillaume.** 1993. Preliminary results of cross-protection experiments against grapevine fanleaf virus (GFLV) in the vineyards, p. 167-168. In P. Gugerli (ed.), Extended abstracts 11th Meeting ICVG, Montreux, Switzerland, 6-9 September 1993. Federal Agricultural Research Station of Changins, CH-1260 Nyon, Switzerland.
Keywords :grapevine; nepovirus; arabis mosaic virus; grapevine fanleaf virus; cross-protection; control; France; meeting; ICVG;
Notes : Chardonnay and Pinot noir vines were infected with hypovirulent isolates of ArMV and GFLV in an attempt to induce cross-protection against virulent strains of these viruses. So far, hypovirulent isolate ArMV A1 induced a delay in the infection process by GFLV in the field, as revealed by ELISA made 12-24 months after planting.

1602. **Walter, B., P. Bass, P. Cornuet, R. Legin, and M. Fuchs.** 1991. Interactions between arabis mosaic virus and grapevine fanleaf virus isolates, p. 120-128. In I. C. Rumbos, R. Bovey, D. Gonsalves, W. B. Hewitt, and G. P. Martelli (ed.), Proceedings of the 10th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG). Plant Protection Institute, P.O. Box 303, 38001 Volos, Greece.
Keywords :grapevine; grapevine fanleaf virus; arabis mosaic virus; nepovirus; cross-protection; control; France; meeting; ICVG;
Notes : The comparison of several isolates of arabis mosaic virus (ArMV) and fanleaf virus (GFLV) as to their effect on grapevine made it possible to distinguish mild and severe isolates. Plants initially infected with a mild isolate may be partially protected from a challenge inoculation with a severe strain. The possibility of using this cross-protection effect as a partial control measure is discussed.

1603. **Walter, B., P. Bass, and M. Fuchs.** 1988. Stratégie de lutte contre les virus du court-noué par prémunition (Strategies for the control of court-noué viruses by cross-protection), Les stratégies de sélection face aux technologies modernes. Moët Hennessy Louis Vuitton, Paris, France.
Keywords :grapevine; court-noué; grapevine fanleaf virus; arabis mosaic virus; nepovirus; control; cross-protection; France;
Notes : In French. One page, not numbered.

1604. **Walter, B., P. Bass, R. Legin, A. Collas, and G. Vesselle.** 1990. Amélioration du dépistage des maladies de type viral de la vigne. Indexage à l'aide de la méthode de la greffe-bouture herbacée (Improvement of detection of virus-like diseases of grapevine. Indexing with the method of green grafting). Progr. Agric. Vitic. **107**:367-370.
Keywords :grapevine; detection; virus-like diseases; indexing; method; green grafting; symptoms; France;
Notes : A green-grafting machine was developed jointly by INRA and the "Groupement Champenois d'Exploitation". Grafted cuttings were inserted on cubes of rock wool and rooted in moisture-saturated rooms. Symptoms appeared after 2-5 months instead of 2-3 years with the usual method of budding or

grafting with dormant canes. This paper also appears in English in the Journal of Phytopathology **128**, 137-145, 1990. (see next reference)

1605. **Walter, B., P. Bass, R. Legin, C. Martin, R. Vernoy, A. Collas, and G. Vesselle.** 1990. The use of a green-grafting technique for the detection of virus- like diseases of the grapevine. J. Phytopathol. **128**:137-145.
Keywords :grapevine; virus-like diseases; green grafting; detection; indexing; leafroll; fleck; rugose wood; corky bark; vein mosaic; vein necrosis; incompatibility; France;
Notes : This method is best suited for leafroll and vein mosaic, less effective for the other quoted diseases. Results in 20-70 days. The grafts were made with a machine developed jointly by INRA and a private company. They were inserted on cubes of rock wool and rooted in moisture-saturated rooms (see also ref. 1060: Martin et al., 1987: Bull. OIV 60, 447-458).

1606. **Walter, B. and R. Bernard.** 1991. Le point sur la sélection sanitaire de la vigne en France. Progr. Agric. Vitic. **108**:331-333.
Keywords :grapevine; sanitary selection; indexing; virus elimination; virus-free material; certification; France;

1607. **Walter, B. and P. Cornuet.** 1993. ELISA detection of grapevine fleck virus (GFkV). Agronomie **13**:651-657.
Keywords :grapevine; grapevine fleck virus; detection; ELISA; immunoassay; France;
Notes : Detection of GFkV by ELISA in extracts of leaves and cortical scrapings. The best time was June and July. The detection in top leaves and bottom leaves of *Vitis vinifera* gave identical results. With *Vitis rupestris*, detection was more sensitive in top leaves than in bottom leaves.

1608. **Walter, B. and G. Demangeat.** 1995. Les virus du court-noué de la vigne. II. Les voies de la contamination (Grapevine "court-noué" viruses. The ways of contamination). Progr. Agric. Vitic. **112**:295-303.
Keywords :grapevine; grapevine fanleaf virus; arabis mosaic virus; raspberry ringspot virus; nepovirus; Longidoridae; nematode; *Xiphinema index; Xiphinema diversicaudatum*; contamination; control; review; France;
Notes : In French. This is a review on grapevine fanleaf nepovirus (GFLV) and arabis mosaic virus (ArMV) and their respective nematode vectors, *Xiphinema index* and *X.diversicaudatum*. A table is given of the nepoviruses known to infect grapevines, with their vectors and geographical distribution. The host range of both viruses and the biology of the vectors are described, as well as routes of infection of young grapevines in practice and the possibilities of vector control.

1609. **Walter, B. and L. Etienne.** 1987. Detection of the grapevine fanleaf viruses away from the period of vegetation. J. Phytopathol. **120**:355-364.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; arabis mosaic virus; detection; immunoassay; ELISA; wood shavings; leaves; roots; France;
Notes : Leaf extracts made it possible to detect GFLV and ArMV from May to October. Wood shavings can be used all year round. Nicotine, whis is highly toxic, can be replaced by 0.1 M PBS or Tris-HCl buffer pH 8.2 + 0.8 % NaCl + 2 % polyvinyl pyrrolidone.

1610. **Walter, B., L. Etienne, and G. Cloquemin.** 1985. Détection des virus du court-noué dans des bois de vigne. (Detection of "court-noué" viruses in grapevine dormant shoots). Progr. Agric. Vitic. **102**:393-396.
Keywords :grapevine; court-noué; grapevine fanleaf virus; arabis mosaic virus; immunoassay; nepovirus; detection; dormant wood; wood shavings; ELISA; France;
Notes : In French. Scraping the surface of wood under the bark was found to be a suitable method for collecting GFLV and other nepoviruses of ELISA. The wood shavings were macerated in buffer. ELISA gave positive results even if only one infected sample was mixed with 20 healthy ones. This method worked well with "court-noué" viruses, i.e. fanleaf virus and arabis mosaic virus, often found together in "court-noué" infections.

1611. **Walter, B., C. Greif, and G. P. Martelli.** 1994. Recent progresses in the detection of viruses and phytoplasmas of the grapevine: application to sanitary selection, p. 141-144. In VIth International Symposium on Grape Breeding, Yalta, Crimea, Ukraine, 4-10 September 1994. Office International de la Vigne et du Vin (OIV), Paris, France.
Keywords :grapevine; clonal selection; sanitary selection; detection; virus; phytoplasma; general; France; Italy;
Notes : Book chapter. Symposium on Grape Breeding, Yalta, 1994. Oral presentation. This is a summary of the detection methods currently available for viruses and phytoplasmas affecting grapevine. Biological indexing, inoculation to herbaceous hosts, ELISA, detection of dsRNAs, PAGE and molecular hybridization, PCR were discussed. In spite of the development of quick laboratory methods, indexing remains mandatory in many cases, especially when the pathogen has not yet been isolated, or as a confirmation of the results of other methods, for instance in the case of mother plants of new clones.

1612. **Walter, B., S. Grenan, D. Esmenjaud, P. Cornuet, R. Boidron, and M. Leguay.** 1993. Use and limits of ELISA for routine detection of ArMV and GFLV in grapevines and in *Xiphinema index*, p. 146-147. In P. Gugerli (ed.), Extended abstracts 11th Meeting ICVG, Montreux, Switzerland, 6-9 September 1993. Federal Agricultural Research Station of Changins, CH-1260 Nyon, Switzerland.
Keywords :grapevine; grapevine fanleaf virus; arabis mosaic virus; nepovirus; detection; ELISA; immunoassay; *Xiphinema index*; nematode; Longidoridae; method; France; meeting; ICVG;
Notes : In May, ELISA test with leaves is more sensitive than with wood shavings (Field-grown Chardonnay and Kober 5BB, Colmar, infected with ArMV and GFLV). The two viruses were easily detected in upper leaves in June, July, September and October, but detection was also possible with leaves from middle and lower part of the shoots, although with less intense reaction. Detection of both viruses may be impossible in the hottest months of the year on *Vitis vinifera* cvs., but it is always reliable with rootstocks (Colmar conditions). Detection of GFLV in leaves of greenhouse-grown potted vines was no more possible after the end of July. A sensitive test also depends on the conservation of reagents and of leaf samples. ELISA detection of GFLV in *Xiphinema index* was possible with samples of 2, 4 and 8 individuals. Samples of at least 10-15 individuals are recommended. In the best conditions, a single infected leaf sample mixed with up to 49 virus-free samples can be detected in an ELISA test.

1613. **Walter, B., B. Huss, and L. Etienne.** 1987. Serological detection of grapevine viruses. Bulletin OEPP/EPPO Bulletin **17**:304.
Keywords :grapevine; immunoassay; ELISA; virus diseases; virus-like diseases; virus; detection; review; France;
Notes :31st Meeting of the French Phytopathological Society, Versailles, 13-14 November 1986.

1614. **Walter, B., B. Huss, and L. Etienne.** 1989. Improvements in the serological detection of ArMV and GFV. Phytoparasitica **17**:77.
Keywords :grapevine; nepovirus; arabis mosaic virus; grapevine fanleaf virus; immunoassay; ELISA; detection; France; meeting; ICVG;
Notes : This paper appears in full in the Proceedings of the 9th meeting of ICVG, Kiryat Anavim, Israel, 1987, 209-216 (1989).

1615. **Walter, B., B. Huss, and L. Etienne.** 1989. Improvements in the serological detection of ArMV and GFV, p. 209-216. In E. Tanne (ed.), Proceedings of the 9th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG), Kiryat Anavim, Israel, September 1987. The Volcani Center, P.O. Box 6, Bet Dagan , Israel.
Keywords :grapevine; nepovirus; arabis mosaic virus; grapevine fanleaf virus; detection; immunoassay; ELISA; sampling; wood shavings; monoclonal antibodies; France; meeting; ICVG;
Notes : Important progress has been made in the use of serology for detecting arabis mosaic and grapevine fanleaf viruses in grapevine with two different aims: 1. Diagnosis for sanitary selection; and 2. Study of relations and interactions between virus isolates. ELISA is well suited for large scale detection of viruses in the quarantine or in selection work, provided the conditions of the assay are well adjusted. This

method can be fruitful all the year round by using wood shavings as antigen samples in winter and early spring and leaves during the period of vegetation. Using sawdust from bundles of mature canes makes it possible to make a quick test on imported material at the border. Monoclonal antibodies were found to be very useful for detection and characterisation of isolates.

1616. **Walter, B., B. Huss, and M. Fuchs.** 1987. Comparaison de différentes méthodes de détection des virus du court-noué de la vigne. (Comparison between different methods for detecting grapevine court-noué viruses). Schw. landw. Forschung/La Recherche agronomique en Suisse **26**:307-309.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; arabis mosaic virus; detection; immunoassay; nucleic acid assay; ELISA; cDNA; comparison; France;
Notes : In French, Eng. sum. Comparison of ELISA and cDNA hybridization for detecting GFLV and ArMV in crude grapevine extracts.

1617. **Walter, B. and R. Legin.** 1986. Connaissances actuelles sur les viroses de l'enroulement de la vigne. (Present knowledge on leafroll virus diseases). Le Vigneron Champenois **107***(9)*:436-446.
Keywords :grapevine; leafroll; closterovirus; review; France;
Notes : In French. Review of recent developments in the knowledge on viruses causing leafroll symptoms of grapevine.

1618. **Walter, B. and G. P. Martelli.** 1996. Sélection clonale de la vigne: sélection sanitaire et sélection pomologique. Influence des viroses et qualité. 1ère partie: Effets des viroses sur la culture de la vigne et ses produits (Clonal selection of the vine: sanitary and pomological selection. Influence of viroses and quality. Part one: Effects of viroses on the culture of the vine and its products). Bull. OIV **69**:945-971.
Keywords :grapevine; virus; virus-like diseases; economic importance; performance; symptoms; leafroll; closterovirus; fanleaf; nepovirus; rugose wood; vitivirus; classification; clonal selection; sanitary selection; virus elimination; virus-free material; certification; review; France; Italy;
Notes : In French, Eng. sum. This review sums up the present situation concerning the virus and virus-like diseases of grapevine in the world. Fourty-four viruses have been recorded in grapevine so far, and about ten diseases are believed to be caused by yet undiscovered agents supposed to be viruses. The most dangerous are the nepoviruses, the closteroviruses responsible for leafroll and for some of the incompatibility phenomena, and the rugose wood complex with some of the trichoviruses implicated. The damage caused by the viruses is outlined, as well as the ways to avoid these infections. The review is based on 145 references.

1619. **Walter, B. and G. P. Martelli.** 1997. Sélection clonale de la vigne: sélection sanitaire et sélection pomologique. Influence des viroses et qualité. 2e Partie: Sélection sanitaire. Sélection pomologique (Clonal selection of the vine: sanitary and pomological selection. Influence of viroses on quality. Part two: Sanitary selection - Pomologial selection). Bull. OIV **70**:5-23.
Keywords :grapevine; clonal selection; sanitary selection; performance; economic importance; certification; France; Italy;
Notes : In French, Eng.sum. The second part of this comprehensive and interesting review on clonal selection of grapevine (see Bull. OIV **69**, 945-971, 1996, ref. 1618 above) deals mainly with the problems of sanitary selection in relation with the ordinary selection based on yield and quality of grapes, called here pomological selection. Whereas sanitary selection aims at eliminating pathogens such as viruses, mycoplasmas or viroids, pomological selection is a search for clones having the best genetic properties. After describing the methods for detecting and identifying the viruses and virus-like pathogens of grapevine, and the methods available for eliminating them from infected plants and obtaining healthy material for propagation, the authors discuss the possibility that sanitary selection could lead to a loss of genetic variability. They recommend to establish repositories where interesting genotypes and phenotypes of grapevine could be preserved from disappearance and loss. Anyhow, sanitary selection does not seem to be more restrictive than pomological selection in terms of genetic diversity. A third important point discussed is to determine which viruses or virus-like diseases should be taken into consideration in sanitary selection. A list of the most important virus and virus-like diseases of grapevine is given, including fanleaf and other nepoviruses, leafroll, rugose wood complex, and fleck. They can be detected by indexing on only four indicator varieties. Additional information can be obtained with serological or nucleic acid tests

(nepoviruses, closteroviruses, trichoviruses). The detection of phytoplasmas needs improvement. All these pathogens should be given priority in sanitary selection. Finally, the question of the order in which sanitary and pomological selection should be applied is discussed.

1620. **Walter, B. and G. P. Martelli.** 1997. Considerations on grapevine selection and certification, p. 161-162. In O. A. Sequeira,de, J. C. Sequeira, and M. T. Santos (ed.), Extended abstracts 12th Meeting ICVG, Lisbon, Portugal, 29 September-2 October 1997. Dept.Plant Pathology, Estação agronomica Nacional, Oeiras, Portugal.
Keywords :grapevine; selection; certification; method; review; France; Italy; meeting; ICVG;
Notes : This paper is a critical approach to the methods used for evaluating the effects of virus and virus-like diseases of grapevine on vineyard performance and for sanitary selection and certification. Determining the impact of a given virus or virus-like disease agent on grapevine production and development is difficult as there are many parameters involved. Another problem is the choice of the pathogens that should be considered in the selection and certification scheme. The risks of genetic erosion due to clonal selection are discussed. The techniques available for sanitary selection are evaluated and a list of recommended indexing procedures and ELISA tests is given. This paper also appears in a more detailed version in Vitis **37**, 87-90, 1998.

1621. **Walter, B. and G. P. Martelli.** 1997. Clonal and sanitary selection of the grapevine, p. 43-95. In B. Walter (ed.), Sanitary selection of the grapevine. Protocols for detection of viruses and virus-like diseases (Les Colloques no 86). INRA Editions, Paris, France.
Keywords :grapevine; virus; virus-like diseases; sanitary selection; method; performance; economic importance; review; France; Italy;
Notes : This paper is divided in two parts. Part I deals with the effects of virus diseases on the crop and its quality. Part II is a discussion on the methods of sanitary selection and their use for improving grapevine performance. This first paper of the book is preceeded by an introduction by B.Walter (in English, French, German, Spanish, Portuguese and Italian) describing the legal background for grapevine selection and certification in the European Union and summing up the work done in several meetings of specialists of grapevine virology and viticulture in order to set up a common set of rules (Network AIR).

1622. **Walter, B. and G. P. Martelli.** 1997. Selezione sanitaria e selezione genetica (Sanitary and genetic selection). Vignevini **24***(10):*53-59.
Keywords :grapevine; clonal selection; genetic selection; France; Italy;
Notes : In Italian. This is a translation and adaptation by C.Fregoni of a paper by B.Walter and G.P.Martelli published in the Bulletin of OIV (69, 945-971, 1996 and 70, 5-23, 1997)

1623. **Walter, B. and D. Zimmermann.** 1991. Further characterization of closterovirus-like particles associated with the grapevine leafroll disease, p. 62-66. In I. C. Rumbos, R. Bovey, D. Gonsalves, W. B. Hewitt, and G. P. Martelli (ed.), Proceedings of the 10th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG). Plant Protection Institute, P.O. Box 303, 38001 Volos, Greece.
Keywords :grapevine; leafroll; etiology; GLRaV-1; GLRaV-2; GLRaV-3; GLRaV-5; closterovirus; detection; immunoassay; ELISA; properties; France; meeting; ICVG;
Notes : Characterization of four closterovirus-like particles associated with leafroll (GLRaV-I,II,III, V) and serological relationships with GLRaV's found in other countries. Avidine-biotine amplification is advantageous for detection. Monoclonal antibodies for GLRaV-III were used for studying and comparing different isolates. MW of coat protein of GLRaV-II (26 Kd) is in agreement with data for closteroviruses, whereas those of the 3 other GLRaV's are atypical (GLRaV-I: 39 Kd, GLRaV-III: 43 Kd, GLRaV-V: 36 Kd).

1624. **Walter, M.H.** 1987. Double-stranded RNA isolated from grapevine affected by grapevine stem-pitting disease (Abstract). Phytopathology **77**:1242.
Keywords :grapevine; rugose wood; stem pitting; dsRNA; etiology; USA;

1625. **Walter, M.H. and H. R. Cameron.** 1991. Double-stranded RNA isolated from grapevines affected by rupestris stem pitting disease. Amer. J. Enol. Vitic. **42**:175-179.
Keywords :grapevine; rugose wood; rupestris stem pitting; detection; dsRNA; associated; etiology; USA;

1626. **Wan Chow Wah, Y.F. and R. H. Symons.** 1997. A high sensitivity RT-PCR assay for the diagnosis of grapevine viroids in field and tissue culture samples. J. Virol. Methods **63**:57-69.
Keywords :grapevine; RT-PCR; nucleic acid assay; detection; viroid; meristem tip culture; fragmented shoot apex culture; RNA extraction; seed transmission; HSVd-g; CEVd-g; AGVd; GYSVd-1; GYSVd-2; Australia;
Notes : An improved procedure for RNA extraction and a highly sensitive RT-PCR assay were developed for detecting five viroids occurring in grapevines, HSVd-g, AGVd, CEVd-g, GYSVd-1, GYSVd-2. These viroids were all found in the 10 different grape varieties tested so far. This assay has been used in conjunction with dot blot hybridization for detecting viroids in vines regenerated by meristem tip culture and fragmented shoot apex culture. The results show that these methods of regeneration produce a differential reduction of viroids, rather than a total viroid elimination. Transmission of viroids via grape seeds was also observed.

1627. **Watanabe, Y. and Y. Ikawa.** 1988. [Study on the detection method of grapevine leafroll (GLR) by grafting]. Res. Bull. Pl. Prot. Serv. Japan **24**:53-56.
Keywords :grapevine; leafroll; indexing; indicator; green grafting; Japan;
Notes : In Japanese, Eng.sum.Three sources of grapevine leafroll (GLR) causing severe, moderate and mild symptoms on grapevine varieties were inoculated onto six indicator varieties of grapevine (Cabernet franc, Cabernet Sauvignon, Pinot noir, Mission, LN33 and Baco 22A) by dormant grafting and green grafting. Symptoms were observed in the field until middle October. Cabernet franc and Pinot noir gave consistent symptoms with the three sources, but the other indicators were less sensitive with the moderate and mild sources. Cabernet franc and Pinot noir therefore appear as the best indicators for quick detection of GLR.

1628. **Watanabe, Y. and Y. Ikawa.** 1989. [Studies on the detection of grapevine corky bark (GCB) by the method of green grafting]. Res. Bull. Pl. Prot. Serv. Japan **25**:39-42.
Keywords :grapevine; rugose wood; corky bark; detection; indexing; green grafting; Japan;
Notes : In Japanese, Eng.sum. Grapevine corky bark (GCB) was inoculated onto healthy LN33 by green grafting in early June. Symptoms were observed on leaves in the field after 3 months, and on stems (stem pitting) after 5 months, in November of the same year.

1629. **Watanabe, Y., H. Yamashita, and Y. Ikawa.** 1986. [Quick detection of grapevine fleck by green-grafting]. Res. Bull. Pl. Prot. Serv. Japan **22**:101-103.
Keywords :grapevine; fleck; green grafting; indexing; detection; Japan;
Notes : In Japanese, Eng. sum. The best time for grafting was in June. On indicator St. George, symptoms developed in 14-23 days in glasshouse or in the field. Symptoms were masked in summer, and appeared again in September on new leaves. Grafting in July was less favourable.

1630. **Watanabe, Y., H. Yamashita, Y. Ikawa, M. Goto, S. Kimura, T. Takahashi, T. Nishio, and N. Nagao.** 1987. [Studies on the application of the direct fluorescence (DFD) method for routine diagnosis of grapevine leafroll]. Res. Bull. Pl. Prot. Serv. Japan **23**:79-82.
Keywords :grapevine; leafroll; detection; fluorescence; diagnosis; Japan;
Notes : In Japanese, Eng.sum. (Rev.Pl.Path.68,1989, ref. 5717).

1631. **Weber, A.** 1996. Untersuchungen zur Biologie der Zikade *Hyalesthes obsoletus* Signoret, 1865 (Auchenorryncha: Cixiidae) als Vektor der Vergilbungskrankheit der Rebe (Researech on the biology of the leafhopper *Hyalesthes obsoletus* Signoret (Auchenorrhyncha: Cixiidae) vector of the grapevine phytoplasma disease "Vergilbungskrankheit"). Johannes-Gutenberg-Universität, Mainz, Germany.
Keywords :grapevine; phytoplasma disease; Vergilbungskrankheit; leafhopper; *Hyalesthes obsoletus*; vector; biology; Germany;

Notes : Diplomarbeit (Diploma work).

1632. **Weber, A., M. Maixner, and W. Reinert.** 1997. Monitoring of field populations of the vector *Hyalesthes obsoletus* for infestation with "Vergilbungskrankheit", p. 67-68. In O. A. Sequeira,de, J. C. Sequeira, and M. T. Santos (ed.), Extended abstracts 12th Meeting ICVG, Lisbon, Portugal, 29 September-2 October 1997. Dept.Plant Pathology, Estação Agronomica Nacional, Oeiras, Portugal.
Keywords :grapevine; phytoplasma disease; Vergilbungskrankheit; vector; leafhopper; *Hyalesthes obsoletus*; survey; detection; phytoplasma; ELISA; PCR; Germany; meeting; ICVG;
Notes : The "Vergilbungskrankheit" (VK) is the most widespread phytoplasma disease of grapevine present in Germany. It is transmitted by the cixiid planthopper *Hyalesthes obsoletus* Sign. The phytoplasmas are not transmitted from grapevine to grapevine, but from wild plants, especially *Convolvulus arvensis* (bindweed), which act as reservoir of infection and host plant for the vector. Individual insects caught in vineyards were cut longitudinally and tested separately for VK phytoplasma by ELISA and PCR. More than 30% of *H.obsoletus* carried VK phytoplasmas. The fact the grapevine was not more havily infected resulted from the preference of this insect for other plants than grapevine. Female planthoppers gave higher OD readings in ELISA than males when infected, but also when they were not infected. *Ranunculus bulbosus*, another host of *H.obsoletus*, was never found infected with VK phytoplasmas. Planthoppers collected with a sweep-net had a higher proportion of infected individuals than those caught on yellow sticky traps.

1633. **Weber, A., M. Maixner, and A. Seitz.** 1996. Zur Biologie von *Hyalesthes obsoletus* Sign. (Auchenorrhyncha: Cixiidae) als Vektor der Vergilbungskrankheit der Rebe (On the biology of *Hyalesthes obsoletus* Sign. (Auchenorrhyncha: Cixiidae) vector of the "Verglibungskrankheit" of grapevine). Mitt. Biol. Bundesanstalt. f. Land- u. Forstwirtschaft Berlin-Dahlem *(321):*105.
Keywords :grapevine; phytoplasma disease; Vergilbungskrankheit; *Hyalesthes obsoletus*; vector; biology; host range; Germany;
Notes : The biology of *Hyalesthes obsoletus*, vector of the yellows disease of grapevine present in German vineyards and called "Vergilbungskrankheit" is described. Grapevine is only an occasional host. Usual hosts are *Convolvulus arvensis, Artemisia vulgaris, Senecio erucifolius, Ranunculus bulbosus*. Yellow traps fixed at 20 cm above ground provided a good monitoring system for the vector.

1634. **Weber, E., D. Golino, and A. Rowhani.** 1993. Leafroll disease of grapevine. Practical Winery & Vineyard *(March/April)*:21-25.
Keywords :grapevine; leafroll; closterovirus; GLRaV-1; GLRaV-2; GLRaV-3; GLRaV-4; detection; immunoassay; ELISA; California; USA;
Notes : Symptoms of leafroll and the effects on yield and quality are described, as well as possible confusion with other troubles, especially potasssium deficiency. The causal agents, the spread of the disease, detection and diagnostic methods are also discussed. Leafroll was detected by ELISA in 1992 in about 20% of certified selections of the Foundation Plant Material Service at Davis that had been previously considered as leafroll-free on the basis of indexing. Additional data on leafroll ELISA tests are given by G.Friebertshauser, of Agri-Analysis Associates, which operate in California. Results of about 18 months of ELISA tests reveal that leafroll was detected in about 21% of several thousand samples submitted. GLRaV-3 was the most frequent virus detected, followed by GLRaV-2 and 1. Type 4 has not yet been detected in wine grape selections, but is common in table grape selections.

1635. **Weber, E. and J. A. Wolpert.** 1993. Unknown disorder appears in Napa. Grape Grower **25** *(10):*4.
Keywords :grapevine; virus-like diseases; viroid; California; USA;
Notes : This is the first report of a disorder of grapevine called "Mystery disease" and possibly related to viroids.

1636. **Weibgen, U. and H. H. Kassemeyer.** 1993. Experiences with the detection of closteroviruses of the grapevine with a green-grafting method, p. 135. In P. Gugerli (ed.), Extended abstracts 11th Meeting ICVG, Montreux, Switzerland, 6-9 September 1993. Federal Agricultural Research Station of Changins, CH-1260 Nyon, Switzerland.

Keywords :grapevine; rugose wood; closterovirus; leafroll; corky bark; detection; indexing; green grafting; ELISA; immunoassay; comparison; Germany; meeting; ICVG;
Notes : Green grafting is a safe and efficient method for detecting corky bark. Symptoms were clearly visible after eight weeks at a temperature of 25^{o} C. The method was not found to be reliable for leafroll associated closteroviruses (GLRaV-I and III).

1637. **Weiland Ardaiz, C. and F. Perez-Camacho.** 1995. Nematodes vectors of viruses in the "Denominacion de origen Condado de Huelva", Spain. Acta Horticulturae *(388):*31-35.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; occurrence; nematode; Longidoridae; *Xiphinema index; Xiphinema italiae; Xiphinema pachtaicum; Xiphinema americanum;* Spain;
Notes : This paper was presented at the International symposium on viticulture and enology, Cordoba, Spain, 20-24 September 1993. No significant correlation was found between the occurrence of grapevine fanleaf virus in the vineyards of the Condado de Huelva in Spain and the presence of the nematodes of the species *Xiphinema index* and *X.italiae* in the soil. *X.pachtaicum* and *X.americanum* were also found.

1638. **Wells, J.M., B. C. Raju, H. Y. Hung, W. G. Weisburg, L. Mandelco-Paul, and D. J. Brenner.** 1987. *Xylella fastidiosa* gen. nov., sp. nov.: Gram-negative, xylem- limited, fastidious plant bacteria related to *Xanthomonas* spp. Internat. J. Systematic Bacteriol. **37**:136-143.
Keywords :grapevine; Pierce's disease; bacterium; *Xylella fastidiosa*; description; properties; USA;
Notes : This is the first complete description of *Xylella fastidiosa*, agent of Pierce's disease. The 4th author is Weisburg,W.G., not Weisberg as quoted sometimes.

1639. **Wiid, J. and P. G. Goussard.** 1995. Shoot apices as explants to induce somatic embryogenesis in *Vitis*, P. G. Goussard, E. Archer, D. Saayman, A. Tromp, and J. Van Wyk (ed.), Proceedings of the first SASEV International Congress, Cape Town, South Africa, November 1995. South African Society for Enology and Viticulture, P.O.Box 2092, Dennesig 7601, South Africa.
Keywords :grapevine; virus elimination; sanitary selection; *in vitro*; somatic embryogenesis; meristem tip culture; South Africa;
Notes : Virus-free somatic plantlets can be obtained from shoot apices excised from the vegetation of grapevine cuttings grown in greenhouse. Meristem tips 0.2-0.4 mm were excised about two weeks after bud break, sterilized and transferred to liquid culture medium. (Nitsch and Nitsch medium with specific growth regulators). Callus cultures were transferred onto the same medium without growth regulators, solidified with 0.9% agar in Petri dishes. Transfer to fresh medium was made on a monthly basis until mature embryos with cotyledons and roots were formed. Shoot tips were more easily excised than ovaries, and plantlets ready for transplantation were available after about 5 months. ISEM serological tests showed that virus elimination was as successful as with the method based on excision of ovaries.

1640. **Wilson, Y., F. Constable, P. Magarey, and M. Wachtel.** 1997. Australian grapevine yellows: a guide to symptoms. The Australian & New Zealand Wine Industry Journal **12**:277-278.
Keywords :grapevine; phytoplasma disease; Australian grapevine yellows; symptoms; Australia;
Notes : A description of the main symptoms of this disease is given: irregular yellowing and downward rolling of the leaves and death of bunches on some of the shoots, that remain stunted and rubbery. The disease affects mostly Riesling and Chardonnay.

1641. **Wilson, Y. and R. Hayes.** 1996. RSG and AGY - sorting facts from fiction. The Australian Grapegrower and Winemaker **33***(390a):*139-140.
Keywords :grapevine; phytoplasma disease; Australian grapevine yellows; economic importance; Australia;
Notes : Two grapevine disorders, Australian Grapevine Yellows (AGY) and Retarded Spring Growth (RSG) are the suspected cause of yield reduction of grapevine in some regions of Australia. The authors discuss the possible implication of these two diseases in the extremely wide fluctuation of yield between the seasons 1994/95 and 1995/96, and conclude that most of the damage must be attributed to RSG, not to AGY.

1642. **Wolf, T.K., J. P. Prince, and R. E. Davis.** 1993. Incidence of a grapevine yellows disease in Virginia vineyards. Amer. J. Enol. Vitic. **44**:474.
Keywords :grapevine; phytoplasma disease; phytoplasma; occurrence; PCR; RFLP; X-disease; USA;
Notes : Symptoms of a yellows disease have been observed since 1987 on Chardonnay and Riesling in Virginia. Seasonal surveys revealed a geographically wide incidence of infected vineyards, but a low incidence within affected vineyards (less than 1%) and a low rate of spread. PCR and RFLP analysis of a MLO-specific 16S ribosomal RNA showed that the disease was caused by a MLO that was affiliated with the X-disease MLO strain cluster.

1643. **Wolf, T.K., J. P. Prince, and R. E. Davis.** 1994. Occurrence of grapevine yellows in Virginia vineyards. Plant Disease **78**:208.
Keywords :grapevine; phytoplasma disease; occurrence; flavescence dorée; PCR; RFLP; nucleic acid assay; Virginia; USA;
Notes : First description of a yellows disease of grapevine in Virginia. The disease was observed on cvs. Chardonnay and Riesling. Symptoms are described. The incidence and rate of spread in a given vineyard was generally low. The DNA analyses and field observations indicated a possible similarity between the Virginia grapevine yellows and flavescence dorée reported in Europe.

1644. **Wolpert, J.A.** 1995. Evaluation of winegrape clones in coastal California: current activities and future prospects, p. 74-80. In J. M. Rantz (ed.), Proceedings of the International Symposium on Clonal Selection, Portland, Oregon, June 1995. The American Society for Enology and Viticulture, Portland, Oregon, USA.
Keywords :grapevine; clonal selection; heat therapy; performance; California; USA;
Notes : This paper presents the results of several years of field experimentation with grapevine clones in California. It includes an interesting discussion on clonal selection and on some misconceptions that are linked with the use of grapevine clones, and especially heat treated clones.

1645. **Wolpert, J.A., J. A. Szychowski, N. Duran-Vila, and J. S. Semancik.** 1993. Performance of viroid-free Cabernet Sauvignon vines, p. 37-38. In P. Gugerli (ed.), Extended abstract 11th Meeting ICVG, Montreux, Switzerland, 6-9 September 1993. Federal Agricultural Research Station of Changins, CH-1260 Nyon, Switzerland.
Keywords :grapevine; meristem tip culture; viroid; viroid elimination; performance; economic importance; GYSVd-1; GYSVd-2; HSVd-g; USA; meeting; ICVG;
Notes : Viroid-free vines of Cabernet Sauvignon obtained by (shoot) meristem tip (0.1- 0.2 mm) culture were compared with vines of the same cv. infected with different viroid profiles (GYSVd-1, GYSVd-2, HSVd-g, separately or in mixed infections) and grown own-rooted for six years. No significant differences in yield and juice maturity indices were recorded 4 years after planting.

1646. **Wolpert, J.A., J. A. Szychowski, A. C. Goheen, J. Juarez, J. M. Arregui, N. Duran-Vila, and J. S. Semancik.** 1991. Field testing of viroid-free grapevines, p. 396-398. In I. C. Rumbos, R. Bovey, D. Gonsalves, W. B. Hewitt, and G. P. Martelli (ed.), Proceedings of the 10th Meeting of the International Council for the Study of Viruses and Virus Diseases of the Grapevine (ICVG). Plant Protection Institute, P.O. Box 303, 38001 Volos, Greece.
Keywords :grapevine; viroid; GYSVd-1; GYSVd-2; HSVd-g; performance; comparison; USA; California; Spain; meeting; ICVG;
Notes : Description of an experiment aimed at testing the effect of viroids on performance (yield, growth, quality of wine) of Cabernet Sauvignon, and of other cvs. later, by comparing viroid-free material with vines infected with GV-1, -2 and -3 (GYSVd-1, GYSVd-2, HSVd-g), at Oakville, Napa Valley, California. Results were not yet available. (see next reference).

1647. **Wolpert, J.A., J. A. Szychowski, and J. S. Semancik.** 1996. Effect of viroids on growth, yield, and maturity indices of Cabernet Sauvignon grapevines. Amer. J. Enol. Vitic. **47**:21-24.
Keywords :grapevine; viroid; yield; growth; performance; meristem tip culture; comparison; GYSVd-1; GYSVd-2; HSVd-g; California; USA;

Notes : In order to determine the effects of viroid infection on grapevine performance, viroid-free Cabernet Sauvignon obtained by shoot tip culture (STC) and identical vines reinoculated with two grapevine yellow speckle viroids (GYSVd-1 and GYSVd-2) and hop stunt viroid (HSVd- g), as well as a commercial selection of Cabernet Sauvignon were compared in a field trial in the Napa Valley. Growth and yield were measured during a 3-year-period (1991-1993) on mature vines. On an average, vegetative growth was greater on viroid-free vines as a result of heavier shoots. Viroids did not affect yield but fruit of viroid-free vines was higher in titratable acidity and lower in pH than those of viroid-affected vines. In own-rooted vines, viroids do not appear to cause symptoms of any recognizable disease.

1648. **Wolpert, J.A. and E. P. Vilas.** 1992. Effect of mild leafroll disease on growth, yield, and fruit maturity indices of Riesling and Zinfandel. Amer. J. Enol. Vitic. **43**:367-369.
Keywords :grapevine; leafroll; yield; growth; quality; economic importance; performance; California; USA;
Notes : The effects of two isolates of mild grapevine leafroll disease on the performance of several grapevine cultivars (growth, yield components, and juice maturity indices) were evaluated in a field trial in California from 1986 to 1988. LR108-infected Riesling showed a delayed sugar accumulation corresponding to 1-1.6ºBrix throughout this period. In 1986, LR107-infected Zinfandel showed a 1.7ºBrix reduction compared to controls but was not affected in the other two years. Juice acidity and pH of both varieties were not affected by disease infection. The growth and yields were not significantly affected by leafroll infection.

1649. **Xue, B., S. V. Krastanova, K. S. Ling, M. E. Sekiya, H. Y. Zhu, N. Petrovic, C. L. Reid, I. M. Velazquez, T. J. Burr, and D. Gonsalves.** 1997. Transformation of grapevine rootstocks containing genes from grapevine fanleaf virus and grapevine leafroll associated virus 2 and 3, p. 137. In O. A. Sequeira,de, J. C. Sequeira, and M. T. Santos (ed.), Extended abstracts 12th Meeting ICVG, Lisbon, Portugal, 29 September-2 October 1997. Dept.Plant Pathology, Estação Agronomica Nacional, Oeiras, Portugal.
Keywords :grapevine; nepovirus; grapevine fanleaf virus; closterovirus; leafroll; GLRaV-2; GLRaV-3; transgenic; New York; USA; meeting; ICVG;

1650. **Yamakawa, Y.** 1988. [Seasonal changes in certain constituents of virus-free and virus- infected "Chardonnay" and "Cabernet Sauvignon" grapes]. J. Jap. Soc. Hort. Sci. **56**:470-478.
Keywords :grapevine; virus-free material; performance; Japan;
Notes : In Japanese, Eng.sum. The mean cluster weight of the two varieties included in the experiment were (healthy/infected), for Chardonnay: 220/160 g; for Cabernet Sauvignon: 230/160 g. The ºBrix was lower in infected grapes, the tartaric and malic acid higher. According to the summary of a previous paper by Yamakawa Y., Simizu H., Kushida T. in the same journal in 1982 (J.Jap. Soc.Hort.Sci. 50 (4), 454-460) the authors studied ajinashika disease. Whether the present paper also concerns this disease is likely, but not clear.

1651. **Yamakawa, Y.** 1989. [Virus reinfection of virus-free Cabernet Sauvignon and Cabernet Franc vines]. J. Jap. Soc. Hort. Sci. **58**:297-302.
Keywords :grapevine; leafroll; fleck; detection; diagnosis; epidemiology; performance; symptoms; Cabernet franc; Cabernet Sauvignon; Japan;
Notes : In Japanese, Eng. sum. Vines with leafroll and fleck were planted side by side with virus-free vines of Cabernet Franc and Sauvignon, 5 m x 5 m. Reinfection occurred by natural contamination with fleck and leafroll after 7 years, judged from the ºBrix of juice and tests of virus identification and detection. The symptoms were red leaves, low Brix, light-coloured fruits.

1652. **Yamakawa, Y., K. Koike, and Y. Kamino.** 1986. [Meristem tip culture of grapevines]. J. Inst. Enol. Vitic. ,Yamanashi Univ. **21**:7-15.
Keywords :grapevine; virus elimination; *in vitro*; meristem tip culture; Japan;
Notes : In Japanese, Eng. sum. Methodology of grapevine meristem tip culture.

1653. **Yang, I.L., T. C. Deng, and M. J. Chen.** 1986. Sap-transmissible viruses associated with grapevine yellow mottle disease in Taiwan. J. Agr. Res. China **35**:504-510.

Keywords :grapevine; nepovirus; yellow mottle; tomato ringspot virus; strain; Taiwan;
Notes : In Chinese, Eng. sum. The virus was transmitted to herbaceous hosts. It showed serological relationship with tomato ringspot virus. Spherical particles 26-30 nm were observed in the electron microscope. The virus is considered as a strain of tomato ringspot virus.

1654. **Yi, L., D. E. Lesemann, R. König, M. Rüdel, and E. Pfeilstetter.** 1992. Isometric plant viruses in ditches and streams in agricultural areas: Recovery of previously found viruses and identification of hitherto unrecorded carmo- and tombusviruses including grapevine Algerian latent virus. J. Phytopathol. **134**:121-122.
Keywords :grapevine; grapevine Algerian latent virus; occurrence; Germany;
Notes : Among 16 isolates of isometric viruses were found in ditches and streams in agricultural areas near Braunschweig (BRD), one of them was closely related serologically to grapevine Algerian latent virus. (Yi is the family name, Li the first name, initial L.).

1655. **Yilmaz, M.A., M. Yurtmen, I. Cigsar, and M. Ozaslan.** 1997. A survey of grapevine viruses in Turkey, p. 113. In O. A. Sequeira,de, J. C. Sequeira, and M. T. Santos (ed.), Extended abstracts 12th Meeting ICVG, Lisbon, Portugal, 29 September-2 October 1997. Dept.Plant Pathology, Estação Agronomica Nacional, Oeiras, Portugal.
Keywords :grapevine; virus diseases; survey; nepovirus; occurrence; grapevine fanleaf virus; closterovirus; leafroll; GLRaV-1; GLRaV-3; GLRaV-7; Turkey; meeting; ICVG;
Notes : A survey for the presence of grapevine fanleaf virus (GFLV), GLRaV-1, GLRAV-3 and GLRaV-7 was made in six viticultural areas of Turkey using DAS-ELISA on bark scrapings of mature canes or DASI-ELISA with biotinylated IgGs (GLRaV-1). No vineyard was free of infection. The heaviest infection was with GLRaV-1 (average 40%, maximum 100%), followed by GLRaV-3 (21%). GLRaV-7 was found in 5 vines (about 6% of the total). Multiple infections were frequent. Four out of the six vineyards studied had GFLV, with a relative incidence of 8.3 to 35%.

1656. **Yoshikawa, N., H. Iida, S. Goto, H. Magome, T. Takahashi, and Y. Terai.** 1997. Grapevine berry inner necrosis, a new trichovirus: comparative studies with several known trichoviruses. Arch. Virol. **142**:1351-1363.
Keywords :grapevine; grapevine berry inner necrosis; trichovirus; comparison; classification; properties; Japan;
Notes : Grapevine berry inner necrosis (GINV) is a virus disease of grapevine that was described in 1982-84 in Japan and renamed in 1992 (see ref.1531). It is caused by a filamentous virus 740 nm long and 12 nm wide. The authors of the present paper compared the properties of this virus with those of several trichoviruses. The host range of GINV and its particle size were similar to those of apple chlorotic leaf spot (ACLSV), the type virus of trichoviruses. GINV particles were observed by electron microscopy of thin sections as aggregates in the cytoplasm of vascular parenchyma and mesophyll cells. No inclusion bodies were observed. GINV was not related serologically with ACLSV, GVA or GVB. The genetic structure of the virus, the amino acid sequence of polymerase and coat protein were compared with those of nine trichovirus and capillovirus species. These comparisons suggest that GINV is a trichovirus rather close to ACLSV.

1657. **Zabalgogeazcoa, I., C. De Blas, C. Cabaleiro, A. Segura, and F. Ponz.** 1997. First report of grapevine virus A in Spain. Plant Disease **81**:830.
Keywords :grapevine; GVA; vitivirus; occurrence; Spain;
Notes :A field survey of diseased *Vitis vinifera* carried out in the region of Pontevedra (northwestern Spain) in autumn 1993 revealed the presence of GVA in vines showing leafroll symptoms. The virus was detected by immuno capture-reverse transcription-polymerase chain reaction (IC/RT/PCR) using GVA specific primers. This is the first report of GVA in Spain.

1658. **Zaccardelli, M., C. Bazzi, J. F. Chauveau, and S. Paillard.** 1993. Sero-diagnosis of *Xylella fastidiosa* in grapevine xylem extracts. Phytopath. medit. **32**:174-181.

Keywords :grapevine; Pierce's disease; *Xylella fastidiosa*; detection; method; immunoassay; quarantine; Italy; France;
Notes :A serological detection method is proposed for detecting *Xylella fastidiosa* in grapevine material imported from countries outside CEE where Pierce's disease is or may be present.

1659. **Zanuz, M.C., L. A. Rizzon, and G. B. Kuhn.** 1992. Efeito da virose do enrolamento da folha na composiçao quimica do vinho Cabernet franc (Effect of grapevine leafroll on the chemical composition of Cabernet franc Wine). Rev. Bras. Frutic. ,Cruz das Almas **14**:219-226.
Keywords :grapevine; leafroll; performance; economic importance; wine; comparison; Brazil;
Notes : Wines from healthy and leafroll infected Cabernet franc vines *(Vitis vinifera L.)* were compared in an experiment from 1986 to 1991, on the basis of the microvinification of 20 kg of grapes collected all over the vineyard. Leafroll was determined visually.The main effect of leafroll on wine was a decrease in alcohol (average about 15%), in pH, ashes, color intensity and polyphenols.

1660. **Zebeyou, M.G., A. Caudwell, E. Boudon-Padieu, J. Lherminier, and J. Larrue.** 1990. Immunological study of MLO development in a vector. IOM Letters **1**:582-583.
Keywords :grapevine; flavescence dorée; phytoplasma; *Euscelidius variegatus*; immunoassay; France;
Notes :8th International Congress IOM, Istanbul, July 8-12, 1990.

1661. **Zee, F., D. Gonsalves, A. Goheen, K. S. Kim, R. Pool, and R. F. Lee.** 1987. Cytopathology of leafroll-diseased grapevines and the purification and serology of associated closteroviruslike particles. Phytopathology **77**:1427-1434.
Keywords :grapevine; leafroll; closterovirus; purification; immunoassay; cytopathology; electron microscopy; ultrastructure; GLRaV-3; NY-1; CA isolates; USA; serology; associated; isolate;
Notes : Three isolates: NY-1 (=GLRaV-3) CA-1, CA-2 (CA=California).

1662. **Zee, F., D. Gonsalves, A. Goheen, R. Lee, and R. Pool.** 1985. Isolation of virus-like particles from leafroll-infected grapevines (Abstract). Phytopathology **75**:1323.
Keywords :grapevine; leafroll; closterovirus-like particles; USA;

1663. **Zhu, H.Y., K. S. Ling, and D. Gonsalves.** 1997. Nucleotide sequence and genome organization of grapevine leafroll associated closterovirus 2, p. 17. In O. A. Sequeira,de, J. C. Sequeira, and M. T. Santos (ed.), Extended abstracts 12th Meeting ICVG, Lisbon, Portugal, 29 September-2 October 1997. Dept.Plant Pathology, Estação Agronomica Nacional, Oeiras, Portugal.
Keywords :grapevine; leafroll; GLRaV-2; closterovirus; nucleotide sequence; genome; USA; New York; meeting; ICVG;
Notes : The nucleotide sequence and the genome organization of grapevine leafroll-associated virus 2 (GLRaV-2) was determined. The genome structure of GLRaV-2 shows a close relationship with that of other closteroviruses such as beet yellows virus (BYV), beet yellow stunt virus (BYSV) and citrus tristeza virus (CTV). It differs from that of GLRaV-3, and is most similar to beet yellows virus.

1664. **Zhu, H.Y., N. Petrovic, K. S. Ling, and D. Gonsalves.** 1997. Production and application of an antibody to the grapevine leafroll associated closterovirus 2 coat protein expressed in *Escherischia coli*, p. 97. In O. A. Sequeira,de, J. C. Sequeira, and M. T. Santos (ed.), Extended abstracts 12th Meeting ICVG, Lisbon, Portugal, 29 September-2 October 1997. Dept.Plant Pathology, Estação Agronomica Nacional, Oeiras, Portugal.
Keywords :grapevine; GLRaV-2; closterovirus; detection; immunoassay; coat protein; ELISA; western blot; method; New York; USA; meeting; ICVG;
Notes : A polyclonal antiserum was made using as antigen the coat protein of GLRaV-2 expressed in *Escherischia coli* after inclusion of the genome of this protein in the bacterium. Good results were obtained with this antiserum for detecting GLRaV-2 in field collected grapevine samples.

1665. **Zimmermann, D.** 1990. La maladie de l'enroulement de la vigne: caractérisation de quatre particules virales de type clostérovirus à l'aide d'anticorps polyclonaux et monoclonaux. (Grapevine leafroll disease:

characterization of four virus particles of the closterovirus type using polyclonal and monoclonal antibodies). Université Louis Pasteur, Strasourg, France.
Keywords :grapevine; leafroll; etiology; closterovirus; monoclonal antibodies; immunoassay; ELISA; GLRaV-1; GLRaV-2; GLRaV-3; GLRaV-5; France; thesis;
Notes : PhD thesis, University Louis Pasteur, Strasbourg, France. In French.

1666. **Zimmermann, D., P. Bass, R. Legin, and B. Walter.** 1990. Characterization and serological detection of four closterovirus- like particles associated with leafroll disease on grapevine. J. Phytopathol. **130**:205-218.
Keywords :grapevine; leafroll; detection; etiology; closterovirus; ELISA; immunoassay; properties; protein; capsid; GLRaV-1; GLRaV-2; GLRaV-3; GLRaV-4; France;
Notes : The four GLRaVs types were detected by ELISA with polyclonal antisera. The coat proteins of the four viruses consist of a single protein species with molecular weight of 29 Kd (GLRaV-1), 26 Kd (GLRaV-2), 43 Kd (GLRaV-3) and 36 Kd (GLRaV-4). The four viruses are serologically distinct from each other, in ELISA, ISEM or immunoblotting experiments. The association of these viruses with leafroll was confirmed by serological analysis of many grapevines from Europe and the Middle East. The most frequent antigens detected were GLRaV-1 and -3.

1667. **Zimmermann, D., G. Sommermeyer, B. Walter, and M. H. V. Van Regenmortel.** 1990. Production and characterization of monoclonal antibodies specific to closterovirus-like particles associated with grapevine leafroll disease. J. Phytopathol. **130**:277-288.
Keywords :grapevine; leafroll; closterovirus; GLRaV-3; ELISA; ISEM; monoclonal antibodies; France;

1668. **Zimmermann, D., B. Walter, and O. Le Gall.** 1988. Purification de particules virales associées à l'enroulement de la vigne et mise au point d'un protocole ELISA permettant leur détection. (Purification of virus particles associated with grapevine leafroll and development of an ELISA method for their detection). Agronomie **8**:731-740.
Keywords :grapevine; leafroll; closterovirus; purification; immunoassay; detection; ELISA; GLRaV-1; GLRaV-3; France; virus; associated; method; NY-1;
Notes : In French. Antisera were made against GLRaV-I , using rabbit and chickens. They were used for indirect ELISA assay. 50 leafroll-diseased grapes gave following reactions: 28 with GLRaV-I, 12 with NY-1 (=GLRaV-III), 4 with both, 6 no reaction.

1669. **Özaslan, M., S. Baloglu, M. E. Güldür, and M. A. Yilmaz.** 1993. Virus diseases of grapevine in southeastern Anatolian region in Turkey, p. 122. In P. Gugerli (ed.), Extended abstracts 11th Meeting ICVG, Montreux, Switzerland, 6-9 September 1993. Federal Agricultural Research Station of Changins, CH-1260 Nyon, Switzerland.
Keywords :grapevine; virus; virus-like diseases; detection; indexing; mechanical transmission; ELISA; immunoassay; fanleaf; arabis mosaic virus; nepovirus; fleck; leafroll; GLRaV-1; GLRaV-3; closterovirus; Turkey; meeting; ICVG;
Notes : Detection of viruses and virus-like diseases of grapevines by indexing on *Vitis* and herbaceous hosts and by ELISA. GFLV, GLRaV- I and III, ArMV and fleck were present in the southeastern region of Anatolia.

1670. **Özaslan, M., S. Baloglu, and M. A. Yilmaz.** 1993. The effect of virus diseases on grape production in Kahramanmaras region in Turkey, p. 70-71. In P. Gugerli (ed.), Extended abstracts 11th Meeting ICVG, Montreux, Switzerland, 6-9 September 1993. Federal Agricultural Research Station of Changins, CH-1260 Nyon, Switzerland.
Keywords :grapevine; fanleaf; leafroll; fleck; arabis mosaic virus; nepovirus; GLRaV-1; GLRaV-3; closterovirus; performance; economic importance; Turkey; meeting; ICVG;
Notes : Viruses caused losses of about 45 % in the surveyed areas. Viruses detected were GFLV, fleck, ArMV, GLRaV-I and III.