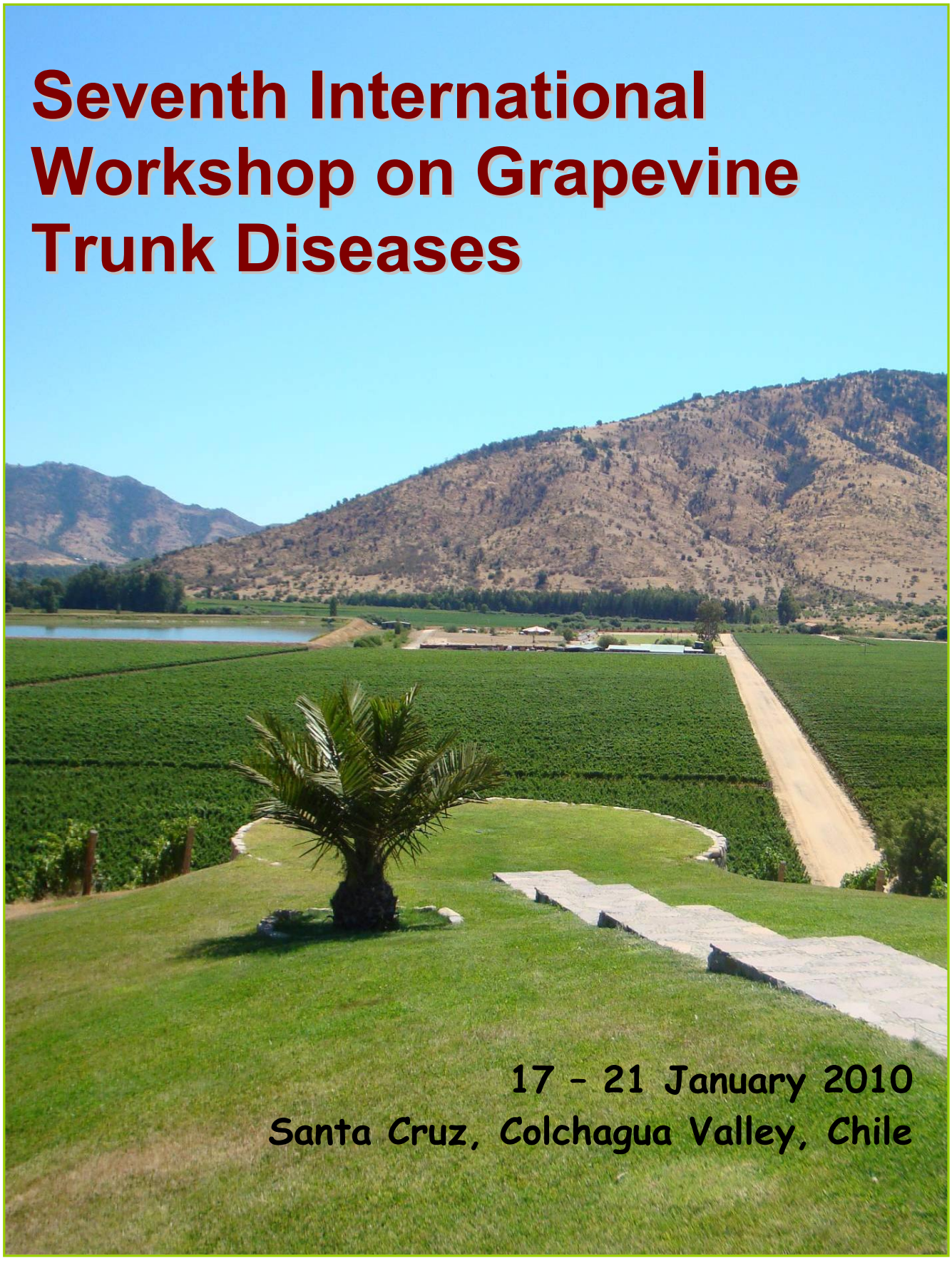
Seventh International Workshop on Grapevine Trunk Diseases



17 – 21 January 2010

Santa Cruz, Colchagua Valley, Chile

Normally, this conference is held every 2 years, with the last one being in Italy in August 2008 in Florence. There were concerns that there would not be enough time between these workshops to generate sufficient new work to run a full workshop. As it turned out, there was more than enough new work reported, with new emphases on certain aspects of trunk diseases world wide.

Santa Cruz is around 200km south of Santiago, in the Colchaqua valley, a major wine- producing area of central Chile. The town is a small and rural, about the size of Ashburton with its infrastructure very much focused on serving the surrounding agriculture. What it does have is a luxury hotel taking up one side of the town square, and this is where the workshop was held. However, the contingent from Lincoln (there were 6 of us and 2 accompanied persons) stayed in a small rural village 8km from the venue. This proved to be a most pleasant experience as each day we retreated to our adobe hacienda in the country, with good wines, beautiful swimming pool and wonderful hospitality.

There were around 100 participants from almost all grape-growing areas of the world. The papers were presented in either English or Spanish with instant translations provided into these two languages through very competent interpreters. All participants were provided with a wireless receiver and head set for this purpose. The papers, as normal, were presented as either oral or poster presentation, with posters being introduced by their authors in two sessions of the conference. There were 4 consecutive sessions – Pathogen identification and characterisation: Disease detection and losses (which was much as the first!); Host-pathogen interaction; Disease management.

Recognition of wood-invading pathogens

There are a plethora of wood-invading pathogens of grapevines identified from around the world and these are recognised as causing a range of symptoms in young and mature plants. These range from the traditional Esca of mature vines (where leaves develop characteristic chlorotic and necrotic patterns and are caused mainly by

basidiomycetes that invade the old wood of the vines) through to shoot die-back and stunting in new growth in spring and summer. These wood-invading pathogens can also cause death of newly planted grafted vines.

The first two sessions were dominated by papers on the characterisation of fungi in the Botryosphaeriaceae that are invariably found associated with trunk disease, dying arm and shoot stunting in vines throughout the world. Workers in California have identified 10 species in the group and now recognise these fungi as being more important pathogens in vineyards than the traditionally considered *Eutypa* species. However, surprisingly, they contend that these fungi in the Botryosphearíaceae are never found in asymptomatic vines, whereas almost all other areas of the world recognise these fungi as being both invading pathogens and endophytes capable of colonising wood without causing direct disease symptoms Nevertheless, much effort being taken in characterising the epidemiology and pathogenicity of these fungi, with much work being done here in New Zealand under the supervision of Dr Marlene Jaspers at Lincoln University. Her group have shown that not only is the nursery mother and scion stock a major source of the pathogens (in asymptomatic, endophytic guise), but can infect pruning wounds and graft unions through rain-splashed and water-borne spores (conidia).

In the early workshops on vine trunk diseases, there was a marked emphasis on the so-called Black Goo or Petri disease, caused by species of fungi in the genera *Phaeomoniella* and *Phaeoacremonium*. However, although many workers mention these pathogens in passing as being present in vines in their wine-growing areas, there were few presentations specifically on these fungi at this conference (9 papers). By contrast there were over 20 on the fungi in the Botryosphaeriaceae. The other two major pathogen groups covered in the workshop were the *Eutypa* spp. that cause vine decline and shoot stunting and the group of soil-borne fungi (mostly *Cylindrocarpon* spp.) that invade wood through the roots and cause the so-called black-foot disease of vines. It was of interest to many that vineyards in Chile have never reported the presence of *Eutypa* spp. causing wood necrosis and typical stunted shoot growth in the spring. Almost all other grape growing areas of the world record the presence of these pathogens, and it is surprising that with the movement of nursery wood both for rootstocks and scions that this disease has either never been introduced or not been able to establish.

One group of organisms on which papers were presented for the first time at this workshop were the bacteria. Some papers mentioned that they were located in routine sampling of grape wood tissue, but only two mentioned them as possible pathogens (one in passing). However, the paper that I was presented with my colleagues Mark Braithwaite and Penny Turpin at Lincoln reported several instances in the Marlborough area where there was obvious suppression of shoot growth and lack of vine vigour where the only causal organism detected was a bacterium. We also reported that this bacterium (identified as a species of *Paenibacillus*) was able to readily re-infect young vine tissue, but not so readily older (one and two year old) wood.

Disease management and control:
There is still some controversy surrounding the efficacy of species of *Trichoderma* in the protection of pruning wounds from the ingress and infection of these wood-invading pathogens. In South Africa, workers at Stellenbosch have found the *Trichoderma* spp. used to protect pruning

wounds penetrated the wood most effectively when co-inoculated with pathogens such as *Eutypa lata* and *Phaeomoniella chlamydospora* while at the same time suppressing these fungal pathogens. Moreover, they have also found that when the wounded wood of eight different cultivars of grapes were inoculated at pruning with three strains of *Trichoderma*, the incidence of re-isolation of these bio-control fungi and naturally occurring pathogens 8 months after application varied between cultivars. Thus, they are contending that although wound protection with *Trichoderma* spp. works well in some grape cultivars, it cannot be expected to work well in others. For instance, they found that Chenin Blanc allowed excellent *Trichoderma* colonisation whereas those such as Sauvignon Blanc and Cabernet Sauvignon were not so well colonised. However, with at least one stain of *Trichoderma* in all cultivars they found a positive correlation between incidence of the fungus in the wood and pathogen reduction (except for the cultivar Pinotage). This now begs the question: do *Trichoderma*-containing products on the market in New Zealand for wound protection in grapes (e.g. Vinevax) contain strains that are the most effective in colonising and protecting the main grape cultivars grown here? With the BioProteciton group at Lincoln University claiming to have numerous stains of species in this genus in their collection that can be tailored to any specified need, maybe there is a place for checking that the ones that are being used are the best for the job. Although a product like Vinevax contains a range of *Trichoderma* strains, are they the best for use on the major cultivars we grow.

The French have also been testing *Trichoderma* spp. against *Eutya lata* infection and report poor results. Likewise, the Australians have reported variable results with similar tests. They feel that since results cannot always be guaranteed, they recommend the use of products such as paints, pastes and fungicides when protecting large pruning wounds from wood-invading fungi. However, they make this statement largely in relation to *Eutypa* spp., and much work from around the world and in New Zealand has conclusively shown that they usefully afford good protection against a range of other wood-invading pathogens.

The Chileans have tested a large range of fungicides as wound protectants and found that a mixture of a carbendazim and prochloraz was the most effective against the widest range of wood infecting pathogens. In Australia, work on the use of hot water treatment (HWT) to rid rootstock and scion wood material of infection has had a breakthrough with the combination of HWT with subsequent cooling to 2 – 3^{o}C and storage in perforated bags. This is reported to avoid the risks associated with prolonged anoxia. Conversely, some anoxia can assist in the breaking of dormancy and stimulates subsequent bud growth.

In California, much is being made of the so-called “Double Pruning” for disease management where post harvest, a rough cut and clean up of the vines is made and left for several months. Then later in the early spring the final cuts are made. The theory is that the first cuts can be infected by wood invading fungi but these are cut out and cleaned up in the spring when there is less likelihood of infection with sap-flow from the wounds not allowing infection to take place. They also report that there is less inoculum about at this time and that the subsequent treatment of wounds with a mixture of an MBC fungicide (thiophanate methyl) and the chlorobutinol gave 100% protection from wood-infecting pathogens. This method is championed by Prof. Doug Gubler from Davis.

One novel approach to the control of the black-foot soil-borne pathogen complex (viz. *Cylindrocarpon* spp.) was bio-fumigation using mustard (*Brassica juncea*) which gave useful reductions in disease when calloused rootstock cuttings were planted into artificially inoculated soil. It appears that mustard meal incorporated into infested soil is as good as growing the plants (especially twice) and incorporating the plant into the soil. This may give a valuable control tool for growers who replant into a pathogen-contaminated site after the removal of infected plants in an established vineyard.

Other important papers reported on the climatic and edaphic factors that elicit symptom reactions in infected vines and the chemistry of the toxins that cause the characteristic reactions in infected plant leaves (eg. Esca), shoots and cordon die-back.

Field Trip:
This was to the Vina Santa Cruz in the Lolol area about 30km towards the coast from Santa Cruz. This is a recently established vineyard, with first planting in 2003. It is situated in a valley were the afternoon south westerly winds cool the vineyard and allow the culture of grapes that have distinctive flavours. Much was made of the integration of soil-types, airflow, aspect and cultivar to produce distinctive wine flavours. There was a tour of a number of sites around the vineyard where disease-demonstrations on poster boards were presented. However, as with all good field pathologists, many wanted to chop up sick-looking vines to discover what symptoms were lurking in the wood. However, the owner of the vineyard assured us that there were few diseases in the vineyard and he would not want anyone cutting up his perfectly good plants. Despite this, diseased plants were readily spotted by vigilant internationals and great pleasure was had in sawing into vines with a trusty Swiss Army knife. As the photograph shows, well developed internal wood necrosis was soon exposed. What this was caused by was never revealed or explored, but we were assured that it was an infection by a species of *Botryosphaeria*. Many thought it looked suspiciously like *Eutypa* infection, but as mentioned we were assured that this pathogen does not exist in Chile.

As this was a grape disease workshop, much was made by the Chileans of the types of wine that were produced in the region. Thus, at every lunch and every evening function, a local winemaker presented a range of his wines from his vineyard for our tasting. And there were some very nice offerings, with one Sauvignon Blanc from a cool coastal region getting worryingly close to a good Marlborough SB. The speciality wine of the area, however, was the

Carmenere red variety that has been lost in Europe over the years, but maintained and nurtured in the region to become a signature wine of Chile.

From a personal perspective, it was a great opportunity to maintain contacts with grape pathologist from around the world and to present an aspect of grape wood pathology that has had little exposure up until now. The feed back was very positive on the possibility of bacteria being more involved in the disease complex than previously considered, and there have been positive international reactions and enquiries resulting from the presentation of our work in this area. Chile is an experience that I would not have missed, having wanted to visit the country ever since I studied it in geography 50 years ago at primary school. We took the opportunity after the conference to have a long weekend in the Atacama desert area where my wife and I were fascinated by the combination of climate (extreme dryness) geology (mountains made of almost pure salt), wild life (flamingos, foxes and vicunas) and culture (with the local Indians still using the same terraced growing systems for maize and quinoa that has been used for centuries). Easter Is (Rapa Nui) was also visited on our return journey, but another whole story could be told of this experience, even from just a 2 day stopover.

Footnote: According to accounts on the web and correspondence with our hostess, Santa Cruz was particularly hard hit by the recent earthquake. Below left is a picture I took of the church in the square adjacent to the hotel where we had the workshop. The accompany photo on the right from the web shows that the whole roof of the church has collapsed. Wineries were badly hit with millions of litres being lost from split tanks, damage barrels and broken bottles. The damage is said to seriously affect the international supply of Chilean wine. It is so sad to see this damage to such a lovely part of the world.

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