


SURVEY OF SIX ROSE VIRUSES IN A ROSE VIRUS COLLECTION

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UCDAVIS FPS

NCPN National Clean Plant Network ROSE

Start clean, stay clean NCPN National Clean Plant Network

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Rose viruses

- More than 25 viruses have reported
- Most common:
  - Rose mosaic virus
  - Caused by Apple mosaic virus, Prunus necrotic ringspot virus, and/or Arabis mosaic virus
- Rose rosette virus: uncommon in California; big problem in other parts of the country

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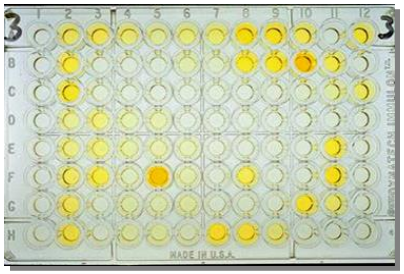
Virus Testing



Lab Tests – ELISA, qPCR

PNRSV
ApMV

Field Tests - Graft indexing

Shirofugen cherry
Rosa multiflora 'Burr'

Rose virus collection (RVC)

- Over 18 years, we identified 600 roses to maintain a collection for further evaluation
- None of these roses qualify as foundation material

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Survey of six viruses

- Apple mosaic virus (ApMV)
- Prunus necrotic ringspot virus (PNRSV)
- Rose spring dwarf-associated virus (RSDaV)
- Rose rosette virus (RRV)
- Rose yellow vein virus (RYVV)
- Blackberry chlorotic ringspot virus (BCRV)

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Prior to survey testing

Leaf, petiole, and stem assay

- Leaves, petioles, and stems were obtained from 2 ApMV-positive and 2 PNRSV-positive rose plants
- RNA tested by:
  - Qubit for RNA quantity
  - Agilent 2100 Bioanalyzer Plant RNA Nano Kit for RNA integrity number
  - RT-qPCR for ApMV and PNRSV
- Healthy multiflora rose for negative control

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Comparison of leaf, petiole, and stem tissue for RNA quantity, purity, and virus detectability

Sample Name	Qubit Results	Bioanalyzer RIN	Ct Values
Multiflora neg control- Leaf	37.2 ng/µL	4.1	0
Multiflora neg control- Petiole	12.7 ng/µL	6.2	0
Multiflora neg control- Stem	24.7 ng/µL	8.6	0
ApMV Plant 1 - Leaf	45.1 ng/µL	7.2	15.901
ApMV Plant 1 - Petiole	17.7 ng/µL	7.2	19.039
ApMV Plant 1 - Stem	10.6 ng/µL	9.3	18.845
ApMV Plant 2 - Leaf	31.0 ng/µL	5.6	23.209
ApMV Plant 2 - Petiole	16.3 ng/µL	7.4	24.533
ApMV Plant 2 - Stem	3.36 ng/µL	N/A Conc. Too Low	24.040
PNRSV Plant 1 - Leaf	33.2 ng/µL	5.4	26.605
PNRSV Plant 1 - Petiole	9.87 ng/µL	7.6	22.661
PNRSV Plant 1 - Stem	4.50 ng/µL	N/A Conc. Too Low	20.533
PNRSV Plant 2 - Leaf	42.3 ng/µL	5.5	14.641
PNRSV Plant 2 - Petiole	13.6 ng/µL	7.9	21.296
PNRSV Plant 2 - Stem	15.7 ng/µL	8.2	16.985

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Result: use leaf tissue

RVC testing… work in progress

- Up to 254 samples tested as individuals or composite samples of up to 20 bushes of the same genotype
- Testing was conducted in the fall and spring to consider potential seasonal differences

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Survey results - ApMV

Season	Total # samples*	Single	Composite
Fall 2016	243	(31/92) 33.7%	(24/151) 15.9%
Spring 2017	254	(40/103) 38.8%	(23/151) 15.2%

***Total number of samples is variable - this is working field, plants die and new plants are added**

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Survey results - PNRSV

Season	Total # samples	Single	Composite
Fall 2016	243	(45/92) 48.9%	(44/151) 29.1%
Spring 2017	254	(63/103) 61.1%	(47/151) 31.1%

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Survey results - RSDaV

Season	Total # samples	Single	Composite
Fall 2016	243	(27/92) 29.3%	(36/151) 23.8%
Spring 2017	254	(40/103) 38.8%	(52/151) 34.4%

- **There may be some seasonal variation with Rose spring dwarf-associated virus… (~ 10% difference in detection)**
- **Needs to be repeated**

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Additional results

- Two samples were positive for RYVV
- One positive for BCRV for one testing period
- No RRV was found

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Rose yellow vein virus

- Characterized in 2013 by Mollov et al.
- Member of Caulimoviridae
- Reported in US and New Zealand
- This is the first report in California

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Survey results

- The RVC is heavily infected with ApMV, PNRSV, and RSDaV


Thank you