

## *Testing Citrus Trees for Viruses*

**I**N RECENT YEARS at the Limeira Experiment Station, a great amount of testing for virus diseases has been carried out in search of healthy budwood. The present paper summarizes some of the findings of these tests and reports some observations on the efficiency of the method used.

### *Exocortis*

The quick test for exocortis virus developed by Moreira (1), which utilizes vigorously growing Rangpur lime (*Citrus limonia* Osbeck) seedlings, was first used in 1957. Since then more than 2,000 citrus trees have been tested, in the course of which the efficiency and reliability of the quick test have been demonstrated. Under normal growing conditions, conclusions about the presence or absence of exocortis virus derived during the first year's growth of the test plant were unchanged by observations in subsequent years. Many stunted trees on Rangpur lime and trifoliolate orange [*Poncirus trifoliata* (L.) Raf.] rootstocks were shown to be infected with a mild strain of exocortis virus, the mildness of which was evidenced by mild symptoms on the Rangpur lime sprouts and a relatively long incubation period (not more than 12 months).

Of 232 trees of various citrus varieties, species, and relatives that were tested, 86 were found to be infected with exocortis virus; some of these were carrying a mild strain.

The Rangpur lime test for exocortis virus was found not to be affected by the presence of other known viruses. Presence of a severe strain of tristeza virus hastened, however, the appearance of exocortis symptoms.

When Rangpur lime seedlings were not available, testing was carried

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out by using a vigorously growing seedling of any citrus variety, budding it with a bud from the tree to be tested and with a bud from a nucellar Rangpur lime tree, and allowing only the sprout from the Rangpur lime to grow.

### *Xyloporosis*

The Orlando tangelo (*C. reticulata* Blanco x *C. paradisi* Macf.) quick field test (2) for xyloporosis (cachexia) virus has revealed the presence of the virus in many different citrus varieties. In a series of tests, the method was used to test for xyloporosis virus when exocortis virus, psorosis virus, or a combination of the two viruses were present and when they were absent. Presence of exocortis virus apparently delayed appearance of xyloporosis symptoms (wood pitting and gummy-pegs) in the indicator plants. Neither exocortis virus nor psorosis virus, alone or in combination, induced wood pitting and gummy-pegs in Orlando tangelo sprouts.

Generally, the quick test for xyloporosis virus permitted indexing to be completed within two years, under vigorous growing conditions.

### *Psorosis*

Psorosis has never been an important problem in the state of São Paulo. The virus is present, however, in its different forms in most of the varieties grown commercially in the area.

Testing for psorosis virus was carried out by the standard method of budding sweet orange [*C. sinensis* (L.) Osbeck] seedlings, pruning severely, and searching for young leaf symptoms. When sweet orange seedlings were not available, a vigorously growing seedling of any variety was budded with a bud from a nucellar sweet orange seedling and with a bud from the tree to be indexed, and then young leaf symptoms were sought in the sprouts from the nucellar sweet orange bud. Trees of most of the varieties of citrus grown commercially in the state were found to carry psorosis virus. The trees of Do Céu (Heaven) sweet orange were found to display typical psorosis young leaf symptoms in all new flushes the year round.

### *Conclusions*

Establishment of budwood programs in many citrus-growing areas has created a need for fast and reliable methods of testing trees for

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presence of virus. All programs are concerned with four viruses: those of tristeza, psorosis, exocortis, and xyloporosis. The standard methods of testing for tristeza and psorosis viruses meet the requirements for rapidity and reliability. On the basis of experience during recent years, the authors recommend the use of the Rangpur lime quick test for exocortis virus and the Orlando tangelo quick field test for xyloporosis virus. If these recommendations are followed, a tree that is a candidate for certification can be indexed for all four viruses within two years.

### *Literature Cited*

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