

*Occurrence of Citrus Virus Diseases in the
State of São Paulo*

A BUDWOOD CERTIFICATION PROGRAM for the state of São Paulo, is now being drafted to provide for budwood free from exocortis, psorosis, and xyloporosis viruses. To lay a basis for this program, a survey of conditions in the citrus orchards in the state of São Paulo was made, giving special attention to bud-transmitted virus diseases. The present paper is a report of the data collected on a survey carried out during the months of July and August, 1960.

Field Survey

The survey included 4 regions of the state, which are the main citrus producing areas both for local markets and exportation. The first region—Limeira—is the oldest citrus-growing area. In the Bebedouro and Araraquara areas, citriculture was intensified some years after World War II. The Sorocaba region, which had been a very important citrus growing area before the tristeza disaster, is now being replanted with citrus. In each one of these 4 regions, a certain number of farms were chosen, in which the orchards, of different sizes, could be considered as a representative sample for each area. In Limeira, the number of trees in the farms selected varied from 8,600 to 102,400; in Bebedouro, from 14,300 to 180,000; in Araraquara, from 1,500 to 68,000; and in Sorocaba, from 4,500 to 120,000. Together, these orchards constitute approximately 10 per cent of the total population of the 14 million citrus trees in the state of São Paulo. In each farm, the orchards were classified according to scion variety, stock variety, and age. In each orchard se-

lected, 100 trees were taken at random along 2 converging diagonals and were examined for symptoms of exocortis, psorosis, and xyloporosis.

IDENTIFICATION OF EXOCORTIS.—Cracks in the outer bark and scaling of the bark on the trunk of Rangpur lime stock were considered to be diagnostic symptoms. Only plants grafted on Rangpur lime, older than 4 years, were examined for exocortis.

IDENTIFICATION OF PSOROSIS.—The chlorotic flecks and characteristic leaf patterns on young and half-mature leaves on trees of any age, and scaling of the bark of the trunk and large branches on older trees were considered to be diagnostic symptoms. Observations were made during winter months and new flushes of growth were not always satisfactory.

IDENTIFICATION OF XYLOPOROSIS.—Pitting of the wood and gumming in the bark were observed by removing a piece of bark from the rootstock at two levels, just below the bud union and at the crown near the roots. This disease was observed only on plants of the Barão orange variety when grafted on Rangpur lime.

Results

In the state of São Paulo the main varieties used commercially as rootstocks are Rangpur lime and sweet orange seedlings (Caipira).

EXOCORTIS AND PSOROSIS.—The calculated incidences of exocortis in varieties of citrus trees on Rangpur lime rootstock and the calculated incidences of psorosis on all trees in the orchards of the state of São Paulo are in Table 1. Bark, trunk, and branch symptoms of different strains of psorosis, such as scaling of the bark, concave gum, and blind pocket were observed on trees ranging from 11 to 30 years of age and, in less frequent cases, on younger trees.

XYLOPOROSIS.—In Limeira, symptoms were observed on 50 per cent of the trees in two orchards totaling 8,000 trees of the Barão orange variety grafted on Rangpur lime. In Bebedouro, 90 per cent of 1,224 trees of the same stock-scion combination showed characteristic pitting symptoms of xyloporosis.

PERA ORANGE [*CITRUS SINENSIS* (L.) OSBECK].—Trees with and without exocortis and psorosis were found throughout the state of São Paulo, pointing to different sources of budwood. In the region of Limeira, the severe strain of tristeza is affecting the Pera variety more con-

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TABLE 1. MEAN PERCENTAGE OF TREES ON RANGPUR LIME ROOTSTOCK WITH SYMPTOMS OF EXOCORTIS AND MEAN PERCENTAGE OF TREES WITH SYMPTOMS OF PSOROSIS IN THE ORCHARDS OF THE STATE OF SÃO PAULO

Variety	Exocortis	Psorosis	Thousands of trees
Pera orange	5%	5%	485
Bahianinha	90	95	181
Bahia	0	77	65
Hamlin	77	0	218
Lima	11	50	70
Barao	0	0	25
Natal	8	18	71
Valencia	0	50	13
Pineapple	100	50	4
Cravo tangerine	1	7	101
Ponkan tangerine	7	0	13
Mexerica	0	100	14
Grapefruit	68	100	39
West Indian lime	16	0	13
Tahiti lime	36	0	42
Eureka lemon	56	0	36

spicuously than in other areas, reducing significantly the production in some orchards. In the other citrus areas, symptoms and typical small-sized fruit can be found on one or two branches of some affected trees, but it is not a general rule.

BAHIANINHA ORANGE (C. SINENSIS (L.) OSBECK).—Both psorosis and exocortis can be found in practically all the trees of this variety.

BAHIA ORANGE (C. SINENSIS).—Practically all the trees are affected with psorosis but they were never found to be exocortis infected.

HAMLIN ORANGE (C. SINENSIS).—Psorosis was not found in this variety. Practically all trees are infected with exocortis, which is to be expected, since they all have originated from the same budwood source.

LIMA ORANGE AND NATAL ORANGE (C. SINENSIS).—Infected and non-infected trees with both exocortis and psorosis were found, pointing to different budwood sources.

BARÃO ORANGE (C. SINENSIS).—This variety was found to be infected with xyloporosis but no symptoms of exocortis nor psorosis were found.

VALENCIA ORANGE (C. SINENSIS).—No exocortis symptoms were detected on this variety; psorosis-infected and noninfected trees were found.

ROSSETTI and SALIBE

CRAVO AND MEXERICA TANGERINES (*C. RETICULATA* BLANCO).—Low occurrence of bud transmitted diseases was observed on these varieties, due to the fact that they have been frequently propagated by seeds. Exceptionally, blind-pocket psorosis was found in several trees of only one orchard of the Mexerica variety.

GRAPEFRUIT (*C. PARADISI* MACFAD.).—Generally the grapefruit orchards are new and the trees still young. Most of the older trees show symptoms of exocortis. The variety is sensitive to tristeza, and stem pitting was frequently found.

WEST INDIAN LIME [*C. AURANTIFOLIA* (CHRISTM.) SWINGLE].—Exocortis and psorosis were observed in some orchards and not in others, pointing to different sources of budwood. The variety is highly susceptible to tristeza, which was found causing stem pitting. Surprisingly though, many orchards were found in good conditions, probably due to the selection of the budwood from trees infected by the mild strain of tristeza virus.

TAHITI LIME (*C. AURANTIFOLIA*) AND **EUREKA LEMON** [*C. LIMON* (L.) BURM.].—Psorosis was not observed on these varieties. Both exocortis-infected and healthy trees were observed.

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