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Incidence of Different Types of Psorosis in Citrus Varieties in the State of São Paulo

A SURVEY for virus diseases was carried out by the authors during 1960 in the five main citrus areas of the state of São Paulo (2,3). Trees of 174 groves were examined for symptoms of different types of psorosis: young-leaf symptoms, psorosis A, blind pocket, concave gum, and other types of disorders such as "finger-marks" and "pop-corn," which may be related to psorosis. Table 1 shows the total number of orchards of each citrus variety in which the trees were examined for psorosis symptoms and the number of orchards in which each type of symptom was observed. Besides the varieties mentioned in Table 1, trees of 21 groves of Cravo tangerine (*Citrus tangerina* Hort. ex Tanaka), Ponkan tangerine (*C. reticulata* Blanco), West Indian lime [*C. aurantifolia* (Christm.) Swing.], and Eureka lemon [*C. limon* (L.) Burm. f.] were also inspected but no psorosis symptoms were found.

The orchards to be inspected were chosen at random: 50 orchards in Limeira, 34 in Araras, 24 in Araraquara, 55 in Bebedouro, and 11 in Sorocaba.

YOUNG-LEAF SYMPTOMS.—Young-leaf mottle and oak-leaf pattern symptoms were found on trees of Baianinha orange [*C. sinensis* (L.) Osbeck] in all the citrus-growing regions, except in Sorocaba, on trees of Pera orange at Araraquara and Bebedouro, on Valencia orange trees at Limeira and Bebedouro, on Baia Navel orange trees at Araras and Sorocaba, on Lima and Piralima orange trees in all regions except Araras, on Natal orange trees at Limeira, and on grapefruit (*C. paradisi* Macf.) trees at Bebedouro.

PSOROSIS A.—Symptoms of eruptive psorosis A were found on 10-

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TABLE 1. NUMBER OF GROVES INSPECTED IN 1960, IN WHICH DIFFERENT TYPES OF PSOROSIS SYMPTOMS WERE OBSERVED

| Varieties | No. of groves inspected | No. of groves where trees were found showing: | | | | | |
|------------------|-------------------------|---|------------|--------------|-------------|--------------|----------|
| | | leaf symptoms | psorosis A | blind-pocket | concave gum | finger-marks | pop-corn |
| Baianinha orange | 28 | 21 | 4 | 2 | | 1 | |
| Pera | 53 | 5 | 2 | | | 1 | |
| Valencia | 5 | 1 | 1 | | 1 | | |
| Hamlin | 14 | | | | | 1 | |
| Natal | 12 | 2 | | | | | |
| Barão | 8 | | | 1 | | | |
| Baía | 10 | 3 | 3 | | | | |
| Lima | 17 | 3 | 1 | | | | 4 |
| Pineapple | 1 | | 1 | | | | 1 |
| Grapefruit | 4 | 3 | 1 | | | | |
| Mexerica mand. | 1 | | | 1 | 1 | 1 | |
| Other varieties | 21 | | | | | | |
| Total | 174 | 38 | 13 | 4 | 2 | 4 | 5 |

to 13-year-old Baianinha orange trees at Limeira and Araras; on 10- to 30-year-old Baía and Pera orange trees at Limeira; on 10-year-old Piralima orange trees at Araraquara; on 14-year-old Valencia orange trees at Araras. This type of psorosis, which is by far the most common of the bark-lesion-forming types in our orchards, was not observed on the trees examined in Bebedouro and Sorocaba.

BLIND POCKET.—Symptoms of this type were found on 10- to 20-year-old Baianinha orange trees at Limeira and Bebedouro; on 11-year-old Barão orange trees at Bebedouro; on 12-year-old trees of Mexerica mandarin (*C. reticulata* Blanco) at Sorocaba.

CONCAVE GUM.—Symptoms of concave gum were found on 12-year-old trees of Mexerica mandarin in only one orchard in the Sorocaba area and on isolated Valencia orange trees in the Araras area.

FINGER-MARKS.—This malformation of the branches suggests finger-marks left on soft material by finger pressure (Fig. 1,a). It has been found in old branches measuring 5-8 cm in diameter on Baianinha, Pera, and Hamlin orange trees ranging from 5 to 14 years old in the Bebedouro area, and on Mexerica mandarin trees at Sorocaba. In Florida this malformation apparently is considered to be related to psorosis.

POP-CORN.—(The term "pop-corn" was suggested simultaneously by J. F. L. Childs in Florida and the authors in Brazil to identify similar

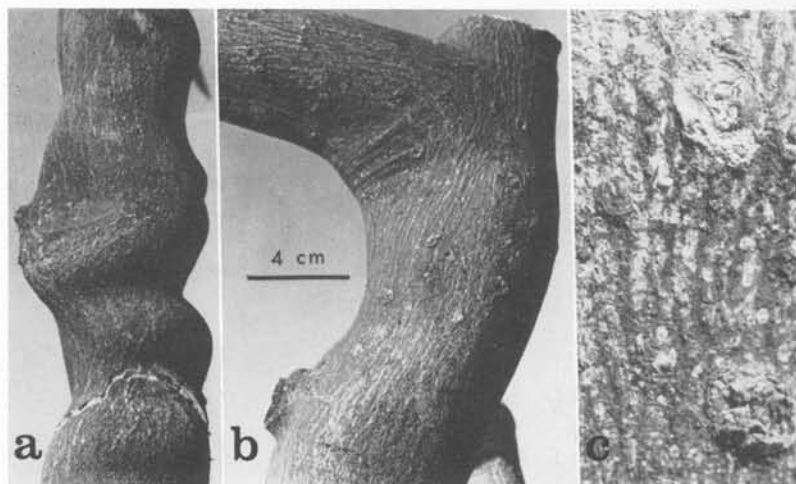


FIGURE 1. *a.* "Finger-mark" symptoms on a branch of Baianinha orange tree. *b.* Portion of an old branch of a Pineapple orange tree showing "pop-corn" symptoms. *c.* Portion of (b) enlarged about eight times.

types of symptoms in both countries.) Numerous small pustules, which become eruptive on the bark of the trunk of sweet orange trees, were found on 5-, 8-, and 10-year-old Lima orange trees at Sorocaba and on 18-year-old Lima orange trees and 14-year-old Pineapple orange trees at Limeira. In the Lima orange orchards of Sorocaba, the percentage of diseased trees was higher among the older ones.

Symptoms of pop-corn were observed by J. F. L. Childs on sweet orange trees in Florida (personal communication) and by Rossetti on sweet orange trees at the Setubal Citrus Experiment Station in Portugal. (Relatório de viagem empreendida a vários países citricolas—Arquivo da Seccção de Fitopatologia Geral—Instituto Biológico—1961.)

Small scales or flakes of the outer bark loosen, break away, and finally drop, leaving the small pustules uncovered (Fig. 1, a and b). Although the pustules are reminiscent of the eruptive forms of psoriasis A and circular-spot corky bark described by Fawcett and Bitancourt (1), they are smaller, rarely measuring more than 1 cm in diameter, and do not enlarge. Gum exudation may be frequently observed in this type of lesions.

Propagation of the last two types of symptoms was attempted by grafting budwood from affected trees onto healthy rootstocks.

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