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Virus Diseases of Citrus in the Philippines

THIS PAPER reports the occurrence of certain virus diseases of citrus in the Philippines, and the research with these diseases that is presently being undertaken by the College of Agriculture.

Geographical Range and Verification Method Employed

TRISTEZA.—A number of citrus varieties such as Key lime [*Citrus aurantifolia* (Christm.) Swing.], Tahiti lime (*C. latifolia* Tanaka), calamondin (*C. madurensis* Loureiro), pummelo (*C. grandis* Osbeck), Valencia sweet orange [*C. sinensis* (L.) Osbeck], and Ladu mandarin (*C. reticulata* Blanco) and Szinkom mandarin in citrus plantations in different localities of the country especially in Batangas and the Bicol where large citrus orchards are located, were observed to have symptoms of tristeza. Field observations of the presence of tristeza in different plantations were confirmed by bud transmission to Key lime seedlings. Insect transmission studies were also carried out using *Aphis gossypii* Glover and *Toxoptera citricidus* (Kirkaldy) as vectors.

PSOROSIS.—Psorosis has been observed to be present in all citrus varieties grown in the Philippines. Ladu and Szinkom mandarin and pummelo are particularly susceptible. The disease has been frequently encountered on trees affected by foot rot and oftentimes the symptoms of the two diseases are complex and tend to confuse the observer.

XYLOPOROSIS.—The disease is prevalent in most of the citrus plantations in the Philippines. It has been commonly observed in combination with other virus diseases.

CORKY VEIN ENATION.—The occurrence of this disease in the Philip-

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pines was not known until after leaf-graft transmission tests were performed on Key lime and Ladu mandarin. Leaf samples taken from infected trees with symptoms of tristeza were grafted to one-year-old seedlings of Key lime and Ladu mandarin and after 50 days corky vein enations on the upper surface were observed. After some time, the leaves turned yellow and growth was unthrifty. Whether corky vein enation is due to a strain of tristeza virus or to an entirely different virus is yet to be determined. In no instance was this type of symptom observed in the field.

CRINKLY LEAF.—This disease was observed on the Ladu variety but on such a small scale that it does not seem to have economic significance. This disease was often observed with psorosis-infected plants.

VEIN ENATION.—Plants of the Ladu and Szinkom varieties suspected of being infected with this disease were observed in Batangas. Transmission experiments have not yet been performed.

Discussion

One or another of these virus diseases is present in every citrus orchard in the Philippines. The surveys showed that many citrus plants harbored one or more of the virus diseases that are known to occur on citrus.

The rapid spread of these diseases in the Philippines was probably brought about by the inadequate knowledge of the symptomatology of the diseases, mismanagement of orchards by the owners, the lack of a bud certification program, and possibly the laxity of quarantine measures governing introduction of planting materials.

It is highly probable that tristeza and other virus diseases of citrus have been here for a long time but have not spread rapidly because the native stocks have been resistant to the disease. At present, the problem that confronts citrus farmers is getting virus-free stock for replanting. Hence, the researches in the College of Agriculture are geared towards the production of resistant stock-scion combinations, a bud certification program, and proper orchard management.

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