G. S. REDDY and P. GOVINDA RAO

Is There Tristeza in Andhra Pradesh, India

TRISTEZA or quick decline virus of citrus enjoys world-wide distribution. It has been present in South Africa since 1900 or earlier. The general belief is that tristeza virus originated in South Africa. On the other hand, Oberholzer (2) has indicated that this virus, along with its vector, *Toxoptera citricidus* (Kirk.), reached South Africa from India as early as 1652. Nevertheless, tristeza was actually found in India only recently. Vasudeva and Capoor (5) noticed symptoms similar to tristeza on Mosambi [*Citrus sinensis* (Linn) Osbeck], grapefruit (*C. paradisi* Macf.), and Sangtra (*C. reticulata* Blanco) in the State of Bombay in 1955-56. They transmitted the disease by budding or grafting to seedlings of sour orange and West Indian lime. Nagpal (1) reported the presence of tristeza in Mosambi oranges [*C. sinensis* (Linn) Osbeck] on Jamberi [*C. Limon* (Linn) Burn] in the State of Bombay, which is contiguous to the State of Andhra Pradesh. Vasudeva (4) and Vasudeva *et al.* (6) reported that *Toxoptera citricidus* acts as a vector for tristeza under Indian conditions. Reddy and Rao (3) indicated the possible existence of tristeza in Andhra Pradesh.

Materials and Methods

Buds obtained from various citrus varieties were inserted into the stems of acid lime plants [*Citrus aurantifolia* (Christm.) Swingle] aged 1-1½ years by the shield budding technique. For each series of tests, suitable controls without budding were maintained. In the absence of

an insectproof cage, necessary precautions were taken to keep off insects from the experimental plants by periodical sprinkling of neem (*Azadirachta indica* A. Juss.) cake solution, which is quite effective and popular with all commercial citrus nursery agencies in the tract. During 1959 and 1960, when transmission tests were in progress, no aphid infestation was noticed in the experimental plants in the pot culture yard or in the local orchards round about.

Experimental Results

Hundreds of acid lime and sweet orange seedlings in the Government Fruit Nursery, Anantharajupet, and in commercial nurseries in the Kodur area in this State showed no vein clearing or stem pitting of tristeza virus under field conditions. Bearing acid lime and Gajanimma (*C. pennivesiculata* Tanaka) trees on the Fruit Research Station, Anatharajupet, and in the neighbouring orchards, on the other hand, showed distinct vein clearing in leaves and stem pitting in twigs and roots under field conditions. Detailed examination of several of the healthy or declining sweet orange seedling trees did not reveal the presence of stem or bark pitting. Sweet orange seedlings or budling trees on their own stock, though symptomless, carried tristeza virus in them as revealed by the transmission tests. However, stray stem pitting and severe bark pitting were noticed on Jamberi, Pummelo [*C. grandis* (Linn) Osbeck], and Gabbuchinee (*Citrus* sp.) and severe bark pitting alone on the Herale (*C. aurantium* Linn) rootstock portion. Acid lime, Kichili (*C. maderaspatana* Tanaka) and Gajanimma rootstocks showed distinct and severe stem pitting (Fig. 1).

During February, 1960, severe aphid infestation was noticed in the sweet orange and acid lime plantation in Cuddapah District. The aphids feeding on sweet orange were identified as *Toxoptera citricidus* Kirk while those on acid lime were identified as *T. aurantii* B. d. Fonscolombe.

Transmission tests were conducted by inserting shield buds from 48 citrus varieties or stock-scion combinations into stems of acid lime indicator plants. In 23 of them, vein clearing and stem pitting were produced in 27-95 days and 75-155 days, respectively, after budding. The nonbudded acid lime plants kept as controls remained free of vein-clearing or stem-pitting symptoms throughout.

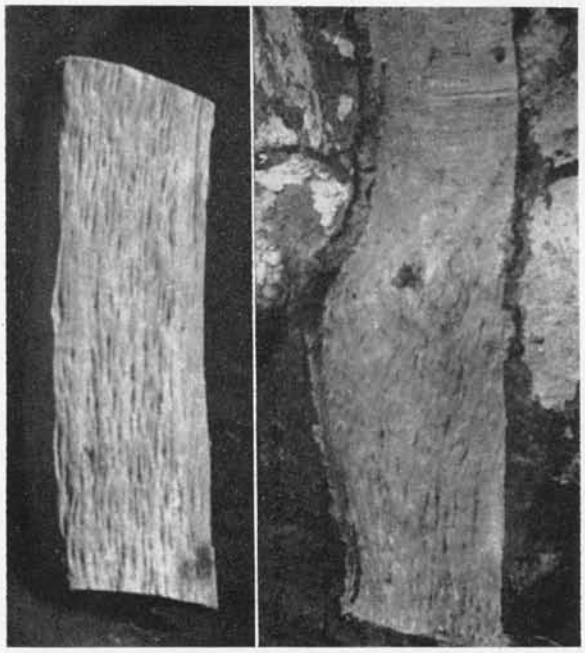

FIGURE 1. *Pitting in Gajanimma (C. pennivesiculata) used as an understock for sweet orange. Left: portion on main root. Right: bark removed at bud union; pits do not extend into the sweet orange top.*

Discussion

The positive results of the transmission tests coupled with the common occurrence of *T. citricidus* in this State confirm the existence of tristeza. Further, the occurrence of vein clearing and stem pitting in the acid lime trees and stem pitting in several of the rootstocks under field conditions at Anatharajupet provide additional proof of the existence of tristeza in Andhra Pradesh.

But it is not clear whether the bark pitting noticed in some of the rootstocks is caused by a separate virus or is a symptom at times associated with tristeza virus complex. Pending further investigations on the subject, it may be appropriate for the present to consider that tristeza virus complex exists in the citrus plant material in Andhra Pradesh.

Acknowledgments

The information given in this paper forms part of work done in the citrus root rot scheme sponsored jointly by the Indian Council of Agricultural Research, New Delhi, and the government of Andhra Pradesh. The authors are grateful to them and to Dr. Syed Vaheeduddin, the then government Plant Pathologist, for guidance and encouragement throughout. Our sincere thanks are also due to Dr. S. Kanakaraj David, Reader in Entomology, Agricultural College and Research Institute, Coimbatore, India, for the identification of the aphid samples. The assistance rendered by Sri A. Papa Rao in some of the studies is acknowledged with thanks.

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