SHORT COMMUNICATIONS

Survey of Tristeza Disease in Lime in Nepal

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ABSTRACT. A survey of citrus orchards in 18 districts in Nepal was carried out from 1988 to 1991 to determine the distribution of citrus tristeza virus (CTV). Branches of lime and lemon trees were collected and examined for stem pitting and leaf vein clearing. The presence of CTV was confirmed by indexing on Mexican lime, Hill lemon and Seti Jamir. CTV was found to be widespread, occurring in nine districts.

Nepal lies in the subtropical belt and the geo-climatic conditions of those areas between 1000 and 1500 m in the hill region are generally suitable for growing citrus. The area under cultivation is now 15,000 ha with an annual production of approximately 80,000 tonnes. The most popular cultivars are mandarins, Junar sweet orange, lime, Hill lemon (Nepalese oblong), sour orange, sweet lime, rough lemon and citron. Rootstocks used are trifoliate

TABLE 1
CTV DISTRIBUTION IN LIME IN VARIOUS DISTRICTS OF NEPAL

District	Zone (Location)	Cultivar	No. plants examined	Stem pitting rating[z] 0	1	2	3
1. Illam	Mechi (Illam)	lime	5	0	2	3	0
	Mechi (Phickal)	lime	5	0	1	2	2
2. Dhankuta	Koshi (Chhintang)	lime	5	1	0	1	3
	Koshi (Khoku)	lime	5	0	1	1	3
3. Sunsari	Koshi (Itahari)	lemon	5	5	0	0	0
4. Morang	Koshi (Biratnager)	lime	5	5	0	0	0
5. Siraha	Sagermatha (Mushaharnia)	lime	5	5	0	0	0
6. Dhanusa	Janakpur (Naktajhij)	lime	5	5	0	0	0
7. Sindhuli	Janakpur (Bijayachhap)	lime	5	5	0	0	0
	Janakpur (Sindhulimadi)	lemon	5	5	0	0	0
8. Kathmandu	Bagmati (Sanothimi)	lime	5	0	1	0	4
9. Dhading	Bagmati (Dhunibesi)	lime	5	0	1	2	2
	Bagmati (Syadul)	lime	5	1	1	0	3
10. Gorakha	Gandaki (Mankamana)	lime	5	1	0	0	4
11. Kaski	Gandaki (Malepatan)	lime	20	0	5	8	7
	Gandaki (Heimja)	lime	10	0	2	4	4
	Gandaki (Batulechour)	lime	6	1	2	0	3
12. Parbat	Dhaulagiri (Deupur)	lime	5	1	1	3	0
13. Baglung	Dhaulagiri (Pala)	lime	5	0	2	2	1
14. Myagdi	Dhaulagiri (Rakhu)	lime	5	5	0	0	0
	Dhaulagiri (Tatopani)	lime	5	5	0	0	0
	Dhaulagiri (Dana)	lime	10	10	0	0	0
15. Palpa	Lumbini (Kushuskhola)	lime	5	1	2	2	0
16. Pyuthan	Rapti (Bijwar)	lime	5	5	0	0	0
17. Dang	Rapti (Tulsipur)	lime	5	5	0	0	0
18. Salyan	Rapti (Khalanga)	lime	10	10	0	0	0

[z]0= no stem pitting; 1, 2, 3= mild, moderate, and severe stem pitting, respectively.

orange, Rangpur lime and local rough lemon.

Citrus tristeza virus (CTV) is known to exist in Nepal where it is naturally transmitted by the aphid *Toxoptera citricidus* (1). Actual data on losses caused by CTV are not available, although it is generally believed that much of the decline of lime is caused by it. Surveys were therefore conducted in 18 districts to determine the extent of CTV infection.

Five to twenty plants, depending on the orchard size, were selected, and samples consisting of 2-3 yr-old branches were collected from all sides of each tree. Bark was removed, and stem pitting was rated on a scale of 0 to 3, where 0 = no symptoms and 1, 2 and 3 = mild, moderate and severe pitting, respectively. The results of the survey are shown in Table 1. The lime orchards of Illam, Dhankuta, Kathmandu, Dhading, Yorakha, Kashi, Parbat, Baglung and Palpa districts exhibited slight to severe stem pitting and vein clearing. Complete decline of trees was observed in some of these locations. The orchards of Myagdi, Pyuthan, Dang and Salyan districts did not show any symptoms of tristeza. Aphid vectors were observed in all the districts.

In the Teraen district, and the lower part of Sindhuli, where limited numbers of pummelo, lemon and Bearss-type lime are grown mainly in home gardens, no tristeza symptoms were observed.

To confirm the presence of CTV, indexing was performed in the glasshouse at the Horticulture Research Station, Pokhara, using Mexican lime, Hill lemon and Seti Jamir as indicators. Indexing was done in June and July, and each indicator was graft-inoculated with two side-grafts. The plants were cut back, and the new growth was observed for symptoms. After 5 months, a branch from each indicator was examined for pitting. Results showed that the field trees sampled in the survey were indeed infected with CTV. Mexican lime plants showed the most severe stem pitting, and Seti Jamir the mildest.

Results of this survey indicate thak tristeza is widespread in Nepalese lime orchards.

LITERATURE CITED

1. Knorr, L. C. and S. M. Shah
1971. World citrus problems V. Nepal. FAO Plant Prot. Bull, 19: 73-79.