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Survey of Greening Disease of Mandarin Orange in the Northeastern States of India

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ABSTRACT. A survey of Khasi mandarin for citrus greening disease in the Northeastern States of India by indexing on Mosambi sweet orange showed that the disease is present in almost all the orchards, except at Digaru, Assam. The psylla vector, *Diaphorina citri*, was similarly present in all areas except Digaru.

The Northeastern States of India grow mostly Khasi mandarin from seed except for some budded or grafted plants at experimental stations. Extremely limited information is available on the presence of the greening disease in citrus in this region, though it was thought to be the original home of citrus (2, 3). Therefore, a survey of and indexing for

citrus greening disease in this region was carried out at the Citrus Research Station, Tinsukia, Assam. This is a major activity under the All India Co-ordinated Research Project on Citrus Die-back. The survey of various citrus growing areas were undertaken up to 1990, and the results are recorded in Table 1.

TABLE 1
RESULTS OF INDEXING BUDWOOD FOR GREENING COLLECTED FROM THE
NORTHEASTERN STATES OF INDIA

Locality	Source plant	Intensity of disease symptom on indicator plants ^a	Presence (+)/absence (-) of psylla
ASSAM			
Tinsukia	Khasi mandarin	+++	+
Pabhajan		++	+
Dhelakhat		++	+
Borgoan		++	+
Dourmara		++	+
Tara		++++	+
Dhulijan		++	+
Dumdooma		+++	+
Pholubari		+++	+
Margherita		+++	+
Nagajanka		+++	+
Boko		+++	+
Burnihat		++++	+
Digaru		(-)	(-)
MEGHALAYA			
Burnihat	<i>Citrus indica</i> <i>Citrus macroptera</i>	++++	+
Shella		++++	+
Cherapunji		+++	+
Sasatgiri		++	+
		(-)	+
		(-)	+
Rongram		++	+
ARUNACHAL PRADESH			
Basar		+++	+
Along		+++	+
MANIPUR			
Chura-chanpur		+++	+

^a(-) = no symptoms, + = moderate symptoms, ++ = moderately severe symptoms, +++ = severe symptoms, ++++ = highly severe symptoms.

Budwood was collected from some representative trees in Assam, Meghalaya, Manipur and Arunachal Pradesh and brought to the Citrus Research Station, Tinsukia for indexing on Mosambi orange indicator plants by wedge grafting under insect proof conditions. Four or six indicator plants were used for each test.

Typical symptoms of greening on the inoculated plants developed 120-150 days after inoculation.

Citrus plants growing wild especially the variety Satkara (*C. macroptera* Mont.) and wild citrus (*C. indica* Tanaka) at Sasatgiri in the Garo Hills of Meg-

halaya did not show a positive greening reaction.

The psylla vector of greening disease, *D. citri* Kew. was present on most of the trees during survey, except at Digaru in Assam. This may be due to the isolated orchards located at Digaru are surrounded by natural hills as barrier and receives high rainfall during summer.

As evident from the results, greening disease is present in Khasi mandarin in Northeastern States of India except from Digaru, confirming the presence of the disease reported earlier by Nariani *et al.* (3) and Bhagabati *et al.* (1).

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