13.2 Susceptibility of some local mandarins to a Japanese isolate of Candidatus Liberibacter asiaticus

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Citrus greening is a serious disease which limits production in many parts of Asia and Africa. The Asian causal agent is designated Candidatus Liberibacter asiaticus (Las). In Japan, Asian citrus psyllid (Diaphorina citri), a vector of Las, is common in subtropical islands which stretch between Taiwan and Kyushu (3). The first finding of citrus greening in Japan was made in 1988 on an island which is close to Taiwan in 1988 (2), and the disease has spread northward to near Amami island (Fig. 1). There is growing concern about damage on local citrus production. Presumably due to warmer climate, the psyllid has recently invaded the Kyushu main island (Fig. 1). Fortunately, the disease is not yet found in this main island, which is a major citrus production area. However, it is very likely that the outbreak of greening follows the invasion of psyllid in a new area, as observed in Florida recently, and local citrus growers are greatly concerned.

Several local mandarins including Shikuwasha (Citrus depressa Hayata), Kabuchii (C. keraji hort. ex Tanaka var. kabuchii hort. ex Tanaka), and Unzoki (C. keraji hort. ex Tanaka var. unzoki hort. ex Tanaka) are grown in these sub-tropical islands. Recently, Shikuwasha has become a very profitable cash crop, and local growers try to produce more fruit. On this backdrop, the occurrence of greening on these local mandarins is greatly feared. In this study, pathogenecity of Las in 30 lines of Shikuwasha, one line of Kabuchii and another line of Unzoki were examined. Two twenty-month-old nucellar seedlings from all lines were side-grafted with a rough lemon source plant that was infected with Las. After grafting, the seedlings were cut back to force new growth, and trained to one shoot from each of the receptor plants and the grafted plants. The inoculated seedlings were grown in an air-conditioned greenhouse with temperature conditions of 32°C at day and 25°C at night. After nine months, systemic infection was confirmed by PCR detection of Las from the new shoot of the inoculated seedlings, using a common primer set of MHO353 and MHO354 (1), and symptoms on the shoots of the inoculated seedlings were observed. Severe mottling, yellowing and interveinal chlorosis appeared on leaves of all lines of Shikuwasha and Kabuchii. Most of affected seedlings showed very poor growth. In contrast, only faint yellowing appeared on shoots of both of the two Unzoki seedlings. The Unzoki seedlings grew as vigorously as healthy ones nine months after graft-inoculation. Since Las was constantly detected from leaves of Unzoki by PCR, it was considered that Unzoki is not immune to Las. The results suggested that most lines of Shikuwasha and some lines of Kabuchii are highly susceptible, whereas some lines of Unzoki are tolerant to Las. Difference in susceptibility between Kabuchii and Unzoki is interesting, because these two varieties are morphologically very similar. Further investigation on tolerance of Unzoki in fields should be made before practical implications are explored.
Fig. 1. Occurrence of citrus greening disease in sub-tropical islands in Japan since 1988. Arrows indicate location and year of the first recognition of the disease in each island. The thick line shows the northern limit of spread of the insect vector, *Diaphorina citri*.

**Citations**

