

Preliminary Results on the Observation of Virus and Virus-Like Diseases of Citrus in the Mekong Delta Region of Vietnam

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ABSTRACT. A survey of citrus in the Mekong Delta area of Vietnam was conducted in 1994-95. Visual symptoms of huanglongbing (HLB) (greening) was observed in 55% of the fields surveyed. The psyllid vector of HLB, *Diaphorina citri*, was found in all areas. In addition, symptoms of citrus tristeza virus stem pitting of lime was found in all areas. Other diseases observed in some orchards included concave gum, cristicortis and psorosis.

Citrus huanglongbing (HLB) (greening), known locally as yellow tea leaf disease, has apparently been present in Vietnam for many years, and by the 1970s, it had become a serious problem. The pathogen was later confirmed as HLB using indicator plants (2), and more recently by electron microscopy and PCR (1). It is present in the northern, central and southern parts of the country. HLB and other diseases are becoming a major threat to commercial citrus production in the Mekong Delta area of southern Vietnam. A survey was, therefore, conducted to record field symptoms of virus and virus-like symptoms in the area.

HLB symptoms were observed in 55% of the total citrus areas, and it was estimated that 37%, 17% and 1% were severely, moderately and lightly infected respectively (Fig. 1). The root systems of HLB-infected trees were found to have reduced root dry weight in comparison to the disease-free control (Fig. 2). The psyllid vector of HLB, *Diaphorina citri* Kuwayama, was found in all areas, and it, along with the use of HLB-infected budwood, has helped spread the disease throughout Vietnam. Two parasitoids of psylla nymphs, *Diaphorencytus aligarhensis* Shafee et al. and *Tamarixia radiata* Webber were found to be present

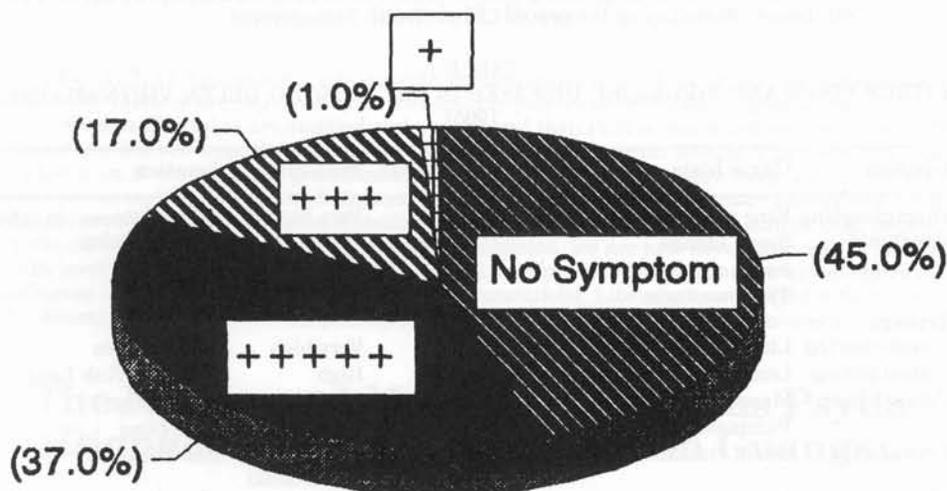


Fig. 1. Incidence and severity of huanglongbing in the Mekong Delta, Vietnam. + = light infection level; +++ = moderate infection level; +++++ = severe infection level.

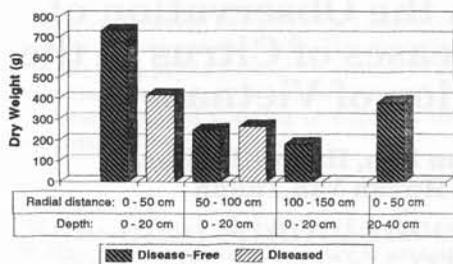


Fig. 2. Comparison of root growth of huanglongbing-affected and disease-free Tieu mandarin.

causing varying degrees of parasitism (Fig. 3).

In addition to HLB, citrus tristeza virus stem pitting symptoms of lime were found in all provinces, and concave gum of mandarin and pummelo, cristacortis-like symptoms in mandarin and psorosis bark scaling in sweet orange, pummelo and mandarin were observed in some areas (Table 1).

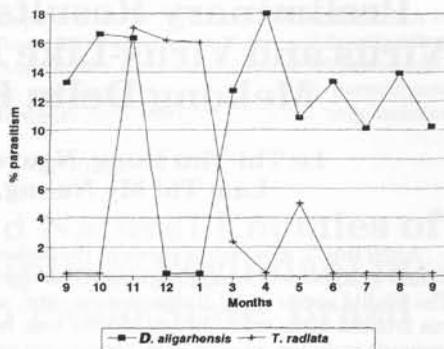


Fig. 3. Percent parasitism of the psyllid, *Diaphorina citri*, by *Diaphorencytus aligarhensis* and *Tamarixia radiata* observed at Chauthanh-Tiengiang, Vietnam.

The presence of these diseases highlights the urgent need for a citrus rehabilitation program in Vietnam.

LITERATURE CITED

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TABLE 1
CITRUS VIRUS AND VIRUS-LIKE DISEASES IN THE MEKONG DELTA, VIETNAM (1994-1995)

Diseases	Citrus hosts	Age of orchard (yr)	Frequency	Location
Huanglongbing (greening)	King mandarin Sweet orange Sweet mandarin Tieu mandarin	2 to 20	Very high	All provinces in the Mekong Delta
Tristeza				
vein clearing	Lime	2 to 12	Very high	All provinces
stem pitting	Lemon and Kumquat	2 to 12	High	Can Tho, Vinh Long
Concave gum	Mandarin	6 to 8	1 orchard	Tien Giang
	Pummelo		1 orchard	Vinh Long
Cristacortis	Sweet mandarin	3 to 10	30/130 trees (5 orchards)	Can Tho
Psorosis	Sweet orange	3 to 10	2/5 trees	Tien Giang
	Sen orange		6/6 trees	Can Tho
	Pummelo		1 tree	Can Tho
	Sweet mandarin		5/15 trees	Can Tho