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Journal of Citrus Pathology

Title

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Journal

Journal of Citrus Pathology, 1(1)

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Publication Date

2014

DOI

10.5070/C411025122

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***Candidatus* Liberibacter asiaticus causes damage to citrus fibrous roots before visual decline of Huanglongbing-infected citrus trees**Graham, J.H.¹, Johnson, E.G.¹, Gottwald, T.R.², and Ireby, M.S.³¹Univ. Florida, CREC, Lake Alfred, FL, USA²USDA-ARS, Fort Pierce, FL, USA³US Sugar Corp., Clewiston FL, USA

Huanglongbing (HLB), associated with *Candidatus* *Liberibacter asiaticus* (*Las*), was first detected in Florida in late 2005 and is now widely distributed throughout the commercial citrus-growing regions. In recent seasons, concurrent with freeze and drought episodes, symptomatic HLB-infected trees were much more affected by the extremes of temperature and moisture than trees without HLB. Symptoms exhibited by the stressed trees were excessive leaf loss and premature fruit drop even when HLB-infected trees were managed with good nutritional and irrigation practices recommended to support health of HLB-affected trees. This stress intolerance may be due to a loss of fibrous roots. To assess root status of HLB-infected trees on Swingle citrumelo rootstock (*Citrus paradisi* × *Poncirus trifoliata*), blocks of 2,307 three-yr-old Hamlin orange trees and 2,693 four-yr-old Valencia orange trees were surveyed visually and with a real time polymerase chain reaction (PCR) assay to determine *Las* infection status. The incidence of *Las*-infected trees (pre-symptomatic: *Las*+, visually negative, and symptomatic: *Las*+, visually positive) trees was 89% for the Hamlin block and 88% for the Valencia block. *Las*+ trees had 30 and 37% lower fibrous root mass density for pre-symptomatic and symptomatic trees, respectively, compared to *Las*- trees. In a second survey, 10- to 25-yr-old Valencia trees on 'Swingle' citrumelo or 'Carrizo' citrange (*C. sinensis* (L.) × *P. trifoliata*) rootstock were sampled within 3-6 months after identification of visual HLB status as symptomatic (*Las*+, visually positive) or non-symptomatic (*Las*-, visually negative) in orchards located in the central ridge, south-central and southwest flatwoods. Pairs of HLB symptomatic and non-symptomatic trees were evaluated for PCR status, fibrous root mass density and *Phytophthora nicotianae* propagules in the rhizosphere soil. *Las*+ trees had 27-40% lower fibrous root mass density and in one location higher *P. nicotianae* per root but *Phytophthora* populations per cm³ soil were high on both *Las*+ and *Las*- trees. Fibrous root loss from HLB damage interacted with *P. nicotianae* depending on orchard location and time of year.

References

Graham, J. H., Johnson, E. G., Gottwald, T. R., and Ireby, M. S. 2013. Pre-symptomatic Fibrous Root Decline in Citrus Trees Caused by Huanglongbing and Potential Interaction with *Phytophthora* spp. Plant Dis. In press.