

7.9 Seasonal Occurrence of *Candidatus Liberibacter asiaticus* in Asian Citrus Psyllids in Florida.

Ebert T.A., Rogers M.E. and Brlansky R.H.

University of Florida, IFAS, Citrus Research and Education Center, Lake Alfred, FL, USA

Control of Asian citrus psyllid (*Diaphorina citri*), the vector of the pathogen *Candidatus Liberibacter asiaticus* (Las), is one of several components of Huanglongbing (HLB) management programs employed worldwide. Following the discovery of HLB in Florida, citrus pest management programs have shifted from an IPM-based approach using primarily petroleum oil applications for pest management to the widespread use of multiple broad-spectrum insecticide applications primarily for psyllid control. Currently, citrus growers in Florida may apply as many as six foliar insecticide applications per season to mature groves and even more insecticide applications (including use of the soil-applied systemic insecticide imidacloprid) to solid plantings of young trees that produce greater amounts of new leaf growth, which is attractive to adult psyllids. Such increased use of insecticides is not sustainable in the long-term due to the economic and environmental constraints of the current Florida citrus production system. To date, no studies have demonstrated a clear economic benefit of increased insecticide use in reducing HLB incidence under the large scale citrus growing conditions typical of Florida and Brazil. Furthermore, the time of year and number of insecticide applications required for reducing psyllid populations, and thus disease incidence, are undetermined. Therefore, the purpose of this study is to determine if there are certain times of the year when pathogen spread by *D. citri* is most likely to occur. Such knowledge would allow for more judicious use of insecticide applications to control psyllid populations when the risk of pathogen spread is most likely to occur.

Seven citrus groves were selected in central Florida to examine the seasonal rates of *Las* presence in *D. citri* populations. On a monthly basis, two approaches were used to estimate *Las* presence in *D. citri* at each study site. Collections of natural psyllid populations were made at random throughout each grove using a sweep net and/or aspirator to collect adult psyllids resulting in the capture of 12,000 psyllids. Psyllids were analyzed using real-time PCR to determine percent *Las* infection rate in *D. citri* populations on a grove by grove basis. In many cases, overall psyllid populations were too low to collect meaningful numbers of psyllids due to intensive psyllid management programs in these commercial citrus operations. Thus, at three study sites, adult psyllids from a laboratory colony known to be *Las*(-) were caged on individual branches to determine acquisition rates by adult and nymphal *D. citri*. These tests yielded 8,000 psyllids.

Real-time PCR has shown that the overall number of field collected *D. citri* carrying *Las* in central Florida citrus groves was much lower than what we have previously observed under laboratory conditions. Less than 1% of the overall psyllid population was infected. In many groves, no *Las*(+) psyllids were collected. The highest levels of *Las*(+) *D. citri* were collected in the months of March and August. However, these findings are the result of only one year's data. This work will continue to determine if trends for higher infection rates during certain periods are indeed present from year to year.

In caging experiments where adult *D. citri* were confined on branches of *Las*(+) trees, less than 10% of those adults tested *Las*(+) after a feeding period of fourteen days. When *Las*(-) adult *D.*

citri were confined to new leaf growth and allowed to lay eggs, an average of 79% of the individuals in the resulting generation reared on Las(+) plants acquired the pathogen by the time they reached the adult stage. These results clearly indicate that *D. citri* completing their development on Las(+) plants are more likely to acquire the pathogen compared to those individuals that feed on Las(+) plants as adults only. Therefore, the presence of Las(+) trees on which psyllids can complete development is an important factor in the overall spread of HLB within a grove.