

Incidence and spread of Huanglongbing (HLB) or citrus greening disease in relation to the distribution and fluctuations of *Diaphorina citri* Kuwayama (Hemiptera: Psyllidae) population in a citrus orchard in Sarawak, Malaysia

ABSTRACT

Diaphorina citri Kuwayama is a very prolific and most efficient vector for the fast huanglongbing (HLB) transmission which has destroyed nearly all citrus orchards with the economic deficit of RM 6.5 million or USD 1.6 million in Malaysia. *D. citri* coupled with HLB is therefore the greatest obstacle to the financial development of a sustainable and viable citrus industry in Malaysia. The study was aimed to evaluate the spread of HLB disease vectored by *D. citri* in relation to its spatial distribution and flight activity in response to flush cycles in a healthy orchard. Four types of yellow traps used to monitor for flight activity of this disease vector were evaluated monthly between June 2011 and December 2012. Both vector populations and HLB disease symptoms were monitored regularly between 2011 and 2014. A molecular diagnostic technique, Polymerase chain reaction (PCR) procedures was used to confirm the presence of the bacterium in diseased trees. *D. citri* adult populations expanded exponentially amid durations of cyclic production of new flush growths. The highest number of adult *D. citri* was captured by Rebel brown-yellow traps followed by Bamboo pole and yellow sticky traps with significant differences during the rainy months with monthly rainfall between 581-919 mm from October 2011 to March 2012 while higher catches were obtained by Bamboo pole traps during the dry months with monthly rainfall from 374-458 mm between May – September 2012. Yellow traps provided an indication of adult abundance and flight activity. It took about 21 months for *D. citri* population to spread all over the entire citrus garden. Rates of HLB transmission were related to high vector populations and spread was related to dispersing adults. Levels of HLB infected trees as determined by PCR increased progressively from 2.4% to 19.3% and 42.2% within four years after planting. The activity of infective *D. citri* is the key to HLB disease spread in a citrus orchard.

Keyword: Citrus; *Diaphorina citri*; Incidence; Spread; Huanglongbing; Malaysia