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**THE POPULATION FLUCTUATION AND HOST PLANT
PREFERENCES OF *TOXOPTERA CITRICIDA* (KIRKALDY)
[HOMOPTERA : APHIDIDAE] AND ITS RELATIONSHIP WITH THE
CITRUS TRISTEZA VIRUS (CTV).**

**A Thesis
Submitted in Fulfilment of the Requirement for the Degree of
Doctor of Philosophy in Entomology**

**of
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ABSTRACT

**The Population Fluctuation and Host Plant Preferences
of *Toxoptera citricida* (Kirkaldy) (Homoptera: Aphididae) and the
Relationship with the Citrus Tristeza Virus (CTV).**

Grace-Ann Elizabeth Allen

Population fluctuation of *T. citricida* was investigated as well as its citrus host preferences. The presence and persistence of CTV among different citrus varieties and performance of trees in the presence of the aphid were also examined.

Five instars were determined using measurements of flagellar segment(s) and hind tibia. Percentage accuracies for instar determination in the field were 77.5, 78.8, 83.8, 56.2 and 78.9 respectively for instars I through V ($p \leq 0.05$). The levels of accuracy for determining colony sizes with 1-50 and 51-100 aphids were 94.5%, 81.1% for colonies with 101-150 aphids and 98.5% for colonies > 151 insects ($p \leq 0.05$).

Comparison of population of *T. citricida* at three locations yielded similar trends, where peaks were observed twice in any one year - February to April and July to October. Immediate and delayed impact of rainfall on aphid population was examined. Up to 79% of the population increase could be attributed to the positive impact of rainfall.

Varieties were preferred in the order Ortanique $>$ Valencia $>$ Parson Brown $>$ Pineapple $>$ Marsh Grapefruit $>$ Hamlin. Order of preference for rootstocks was Swingle Citrumelo $>$ Smooth Flat Seville $>$ Cleopatra Mandarin $>$ Carrizo Citrange $>$ Hog Shaddock $>$ Gou Tou $>$ Bitter Orange $>$ Rangpur Lime.

After two years, citrus varieties with the least CTV via ELISA analysis were Marsh Grapefruit $>$ Hamlin $>$ Parson Brown $>$ Valencia $>$ Pineapple $>$ Ortanique. Citrus rootstocks with the least CTV were Rangpur Lime $>$ Carrizo Citrange $>$ Gou Tou $>$ Smooth Flat Seville $>$ Hog Shaddock $>$ Cleopatra Mandarin and Swingle Citrumelo $>$ Bitter Orange. Percentage of trees with severe CTV in outdoor QMB increased from 0.02 at 7 months to 35.46 after 22 months. Trends in total height and foliage volume as well as impact of tree condition and CTV status on girth and fruit production for citrus varieties and rootstocks, were examined for five years.

Keywords:

instar determination, colony sizes, rainfall, host preference, citrus varieties, citrus rootstocks, ELISA analysis, QMB, total height, foliage volume, girth, production.