

ABSTRACT

Investigations on the Potentials of Biological and Cultural Methods in the Integrated Management of Citrus Root Weevils in Jamaica

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Two species of citrus root weevils (CRW), *Exophthalmus vittatus* and *E. similis*, were found feeding on, besides Citrus, *Gliricidia sepium*, *Carica papaya*, *Pimenta officinalis*, *Terminalia catappa*, *Cecropia peltata*, *Hibiscus elatus* and *H. sabdariffa*, the last three being recorded for the first time as alternate hosts of the weevils. In greenhouse experiments, the relative preference of *E. similis* for the alternate hosts was *C. peltata* > *G. sepium* > *C. papaya* > *T. catappa*, *P. officinalis*, *Ficus* spp. and *H. elatus* > *H. sabdariffa*. Larval survival however, was significantly ($P < 0.05$) higher on Citrus (30.0%) than on *C. papaya* (16.3%); survival on *T. catappa* (5.9%), *Theobroma cacao* (3.4%), and *P. officinalis* (1.3%) was significantly ($P < 0.05$) less than on *C. papaya*.

Population studies indicated that the peak emergence of *E. similis* at Greenwood Farms (GF) and *E. vittatus* at United Estates (UE) was significantly ($P < 0.05$) higher in April than in July/August. Correlation between adult population and rainfall was not significant ($P > 0.05$) at UE but was significant ($P = 0.0128$) at GF. Spatial distribution of CRW egg masses and adults showed no bias for inner versus peripheral trees.

Both *E. similis* and *E. vittatus* were found to have common natural enemies of their egg masses. The predators were six coccinellid species, one chrysopid, formicids and one species from the order Scolopendramorpha, while the parasitoids were *Fidiobia citri* (Platygastridae), *Aprostocetus haitiensis*, *A. gala*, *Eutetrastichus fennahi* (Eulophidae) and an unidentified

species. Parasitism of field collected egg masses between October 1990 and July 1993 was 93.5% and 78.6% at UE and GF respectively. Augmentation of field populations of parasites with laboratory reared parasites significantly ($P < 0.05$) increased parasitism rates during periods of low parasite population in the field.

The embryos of the parasitoid *F. citri* were significantly ($P < 0.001$) more susceptible to test insecticides than those of *A. haitiensis*. The order of embryonic toxicity of different pesticides to both species was pirimicid > malathion > diazinon > or < sevin > kocide. Diazinon > sevin > kocide significantly reduced the fecundity of *A. haitiensis* ($P < 0.001$) but not of *F. citri* ($P > 0.05$).

Integration of biological and cultural control methods into the IPM model for CRW is discussed.