ABSTRACT

Investigations on the Population Fluctuations, Economic Importance and Chemical Control of Citrus Root Weevils Exophthalmus vittatus Linne and Pachnaeus citri Marshall (Coleoptera: Curculionidae).

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Field studies on the fluctuations in the population of different colour morphs of *E. vittatus* and adult *P. citri* revealed continuous emergence of adults between May and November, the peak being in May. Adult emergence is correlated with rainfall (*P < 0.05*). The ratio of colour morphs of *E. vittatus* was 1:2:2:165:2:2 for beetles with green dorsal, brown lateral stripes; green dorsal, red lateral stripes; orange dorsal and lateral stripes; red dorsal and lateral stripes; red and brown dorsal and lateral stripes and red dorsal, orange lateral stripes respectively.

The weevils inflicted 16.65 ± 6.59 % loss to the young one year old *Citrus aurantium* seedlings.

The burrowing behaviour of neonate larvae of weevils studied in three soil types (Sydenham Clay Loam - SCL, Luidas Gravelly Sandy Loam - LGSL and Linstead Clay Loam - LCL) at 5, 10, 15, 20 and 25% moisture levels revealed that the optimum moisture for burrowing was 15% and least favourable were 5 and 10%. Burrowing success was significantly different between the two larval species in SCL at 10 and 25% moisture levels, in LCL at 10, 15, 20 and 25%, and in LGSL at moisture levels of 5, 10, 15, 20 and 25%.

The LC 50 values (ppm) of different insecticides to the eggs of *E. vittatus* were chlorpyrifos (0.14) > mevinphos (1.93) > fenthion (3.37) > malathion (49.77) > MK 139 (62.52) > dichlorvos (82.04) >
diazinon (191.87) > monocrotophos (522.7), as
determined by dipping technique. *P. citri* eggs were
27 to 342-fold more susceptible to MK 139 and
dichlorvos and 1.4 to 6-fold more tolerant to
diazinon and chlorpyrifos respectively.

The LC 50 (ppm) values of different insecticides
to the neonate larvae of *E. vittatus*, were fenthion
(0.43) > chlorpyrifos (2.46) > mevinphos (10.72) >
diazinon (20.65) > malathion (29.99) > endosulfan
(74.47) > dieldrin 20 EC (110.41), as determined by
exposure to pre-treated filter paper. The larvae of *P. citri*
were somewhat more susceptible than *E. vittatus*
to malathion (LC 50 = 1.73) > mevinphos (LC
50 = 1.33) > chlorpyrifos (LC 50 = 0.62) > dieldrin
20 EC (LC 50 = 86.69 and less susceptible than *E. vittatus*
to fenthion (LC 50 = 2.06) and diazinon (LC
50 = 51.76).

Adult males were 4 to 13-fold more susceptible
to the test insecticides than the females
particularly to carbamates.

Insecticides in soil were less toxic than on
filter paper. The LC 50 values of chlorpyrifos in
SCL, LCL and LGSL for *E. vittatus* were only 0.46 to
0.62 times those on filter paper. The LC 50 values
for *P. citri* were 2.7 to 20.6 times higher than for
*E. vittatus*. Other insecticides except endosulfan
were about 1 to 6.9-fold less toxic to *P. citri* when
mixed with SCL. Similar differences, but of less
magnitude were obtained in LCL and LGSL.

Dieldrin applied to soil by spraying, persisted
only for about three months as the residue levels
dropped by about 95%. After three months, 49 - 97
ppm of dieldrin was recovered from the treated soils.
During the next nine months those levels ranged
between 3.3 and 11.4 ppm. The pulp and peel of
fruits had 0.009 to 0.15 ppm of residues, presumably
due to volatilization from the soil.