

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.

Diieldrin 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 diieldrin 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.