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Title of the Thesis	:	**Development of resistance to some insecticides in diamondback moth, *Plutella xylostella* (L.)**
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Admission No.	:	**A-98-40-04**
Major subject	:	**Entomology**
Minor subject(s)	:	**(i) Plant Pathology (ii) Chemistry**
Degree	:	**Ph.D.**
Month and year of submission of thesis	:	**May, 2003**
Total pages in the thesis	:	**180**
Number of words in abstract	:	**353**
Major advisor	:	**Dr. Jitender Kumar sharma**

ABSTRACT

Toxicity of malathion, endosulfan and fenvalerate to third instar larvae of diamondback moth, *Plutella xylostella* (L.) collected from thirteen different vegetable growing localities of Himachal Pradesh during April-May, 2000 was determined by using direct spray method of bioassay. Comparison of LC_{50} values of malathion, endosulfan and fenvalerate to different populations of *P. xylostella* showed that these populations did not differ significantly among themselves for their susceptibility to these insecticides. The LC_{50} values of malathion, endosulfan and fenvalerate varied from 0.0231 to 0.0491, 0.0252 to 0.0386 and 0.00708 to 0.01070 per cent, respectively. The average LC_{50} values of malathion, endosulfan and fenvalerate to the 3rd instar larvae were 0.0377, 0.0310 and 0.00807 per cent, respectively. Resistance ratios calculated on the basis of LC_{99} value and recommended field doses (0.05% for both malathion and endosulfan, 0.01% for fenvalerate) showed that these ratios for malathion, endosulfan and fenvalerate varied from 13.72 to 29.72, 07.76 to 21.08 and 20.20 to 36.20 when tested against 3rd instar larvae.

Selection of 3rd instar larvae of *P. xylostella* for resistance to malathion, endosulfan and fenvalerate by applying a selection pressure of 60-80% kill in every generation, resulted into 27.32, 29.96 19.06 times resistance to respective insecticides after 14th generation (parental, G_1 to G_{13}) of selection in comparison to the non-selected strain. The rate of development of resistance to all the three test insecticides was found to be little slower in the initial generations of selection.

The resistant strain exhibiting 27.32 times resistance to malathion vis-a-vis the susceptible strain showed cross- resistance which was of the order of: fenvalerate (2.15x), endosulfan (3.61x), monocrotophos (2.30x) cypermethrin (1.37x) and lambda-cyhalothrin (1.43).

Cross-resistance shown by endosulfan-resistant strain (29.96x) was: malathion (2.26x), cypermethrin (1.07x), fenvalerate (1.71x), monocrotophos (1.38x) and lambda-cyhalothrin (1.15x). Cross-resistance shown by fenvalerate-resistant strain (19.06x) was: malathion (1.68x), cypermethrin (2.28x), monocrotophos (1.15x), endosulfan (2.91x) and lambda-cyhalothrin (1.29x).

Comparison of biological characteristics of the strains resistant to malathion, endosulfan and fenvalerate vis-a-vis susceptible strain (without selection pressure) showed that resistant strains had become biologically superior by having shorter developmental period and with no adverse affect on fecundity and survival of eggs, larvae and pupae.

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