Abstracts of Ph. D. Thesis

Incidence Bioefficacy Serology and Genomic Characterization of *Heliothis Baculovirus* Isolates

Submmited to G. B. Pant University of Agriculature & Technology, Pantnagar, Nainital

Student
H. G. Vyas

Major Guide
B. D. Lakhchaura

Department of Plant Pathology, Gujarat Agricultural University Anand Campus, Anand

Heliothis armigera Hubner (Lepidoptera: Noctuidae) is one of the most devastating insect pest among the borers and attacks cotton, tomato, lucerne and many legumes. In *Tarai* belt of North-Eastern UP, the damage to chickpea has been estimated to be as high as 58%. Attempts to control the pest solely by chemical pesticides creates enormous problems. They destroy the natural biocontrol agents and raise severe ecological problems by environmental pollution and leave the residual contamination in food and fiber. A programme of Integrated Pest Management (IPM) is currently being advocated to fight the pest menace.

The present investigation was undertaken with a view to initiate systematic work on incidence and bioefficacy of microbial agents associated with *Heliothis armigera* in chickpea. No attempt has been made so far on the serological and genotypic relation of various geographic isolates of *Heliothis* baculovirus in India. Conventional serological and modern genetic techniques of restriction analysis have been employed for the comparison of variation in these isolates.

The natural incidence of parasites and pathogens associated with *Heliothis armigera* on chickpea during Feb.-March, 1988 indicated that parasite population was highest during first week of February and subsequently decreased to zero level by third week of April and showed a negative correlation with temperature. The gross mortality due to pathogens including bacteria, protozoa and viruses did not show any specific trend. The Nuclear Polyhedrosis Virus (NPV) appeared in third week of March and caused as high as 90% mortality during third week of April and showed a positive correlation with field temperature and total mortality.

The efficacy test on chickpea showed that 250 LE/ha NPV (3 rounds) reduced the larval population and pod damage. An increase in mortality due to virus and grain yield was observed in NPV treated plots. However, two applications of 0.07% endosulfan performed slightly better than NPV application. The combination of NPV + insecticides at 50% reduced dosese, though, showed significant reduction in pod damage and increase in yield, did not prove better than NPV or insecticide alone.

An attempt was made to study the serological homology amongst various isolates of *Heliothis baculovirus* from five different geographic locations of India. Cross reaction studies indicated that all the isolates are homologous. The attempts with fractionated antigens (alkaline digest containing polyhedron protein, purified polyhedron protein and purified virions) suggested that these isolates had homologous polyhedron matrix, however, virions may be antigenically different.

The genomic characterization revealed that the fragmentation profiles produced by EcoRI, SalI and HindIII digestion had similar patterns, however, minor genotypic variations were observed. FRD and PNT isolates showed identical patterns with HindIII enzyme. Studies of methylated sites on DNA using HPaII and MspI clearly indicated that out five fragments produced by MspI, two fragments corresponded with HpaII digestion products. The three unidentical bands suggested possible methylated sites.

(Received on 28th Febru. 1992)