



Efficacy of NPV (Nucleopolyhedrosis virus) against *C. partellus* in Maize crop

Mrityunjay Kumar Sinha¹✉ and M. Mohan²

Received:12.10.2013

Revised: 15.02.2014

Accepted: 21.04.2014

Abstract

Indiscriminate use of pesticides for the past 40 years has almost eliminated natural enemies from many crop ecosystems. An experiment has been carried out in the laboratory to determine the efficacy of NPV (Nucleopolyhedrosis virus) against *C. partellus* in the stalk borer, *Chilo partellus* (Swinhoe) pest management during 2004-2006. The *C. partellus* larvae were found maximum infection at 400-500 ppm concentration and the mortality were observed 80 to 90%.

Keywords: Bio-control, maize crop

Introduction

In recent years the problem of resistance to chemical has worsened, resulting in 20-30% crop loss due to pests in India (Bhargava *et al.*, 2008) and causing widespread hardship especially amongst poor farmers.

Thus, considerable emphasis is being laid on the use of nuclear polyhedrosis virus (NPV) as a microbial pesticide which is species specific and ecologically safe and under certain situations they cause epizootics in the field which provide added control of pests in nature (Caballero *et al.*, 1992; Cory *et al.*, 1997). Use of several biopesticides increases the agricultural production but extensive and discriminate use of synthetic pesticides is likely to affect non target animals' i.e. beneficial entomofauna. Nucleopolyhedrosis virus is the most commonly used for insect pest control. When viral biocide is sprayed in the field, the viral particles get attached to the foliage and the insect larvae feed and in turn ingest the polyhedral inclusion bodies (PIB). The PIB in turn multiply inside the midgut and bring about larval mortality. These protein crystals are insoluble in water and are produced in geometrical proportions and after killing the insect, get released into the surrounding atmosphere. The crystals can reinfect live insects and retain their infectivity even after long storage outside the living tissue.

Author's Address

¹ Deptt. of Zoology, Govt. P. G. College, Lansdowne, Pauri

². Department of Zoology, Patna University, Patna

E-mail: mrityunjaysinha0917@gmail.com

Material and Methods

NPV Viruses invade an insect's body via the gut. They replicate in many tissues and can disrupt components of an insect's physiology, interfering with feeding, egg laying, and movement.. NPV infected larvae may initially turn white and granular or very dark. Some may climb to the top of the crop canopy, stop feeding, become limp, and hang from the upper leaves or stems, hence the common name "caterpillar wilt" or "tree top" disease. Victims of a granulosis virus may turn milky white and stop feeding. In both cases, the body contents of the dead larvae are liquefied and the cuticle ruptures easily to release infectious viral particles. Death from a virus infection usually occurs within three to eight days. Different dosages of NPV (in ppm) i.e. 50, 100, 200, 400, 500 & 1000 ppm has been investigated against *C. partellus* mortality in the laboratory.

Results and Discussion

Table-1, showed the effect of viral (NPV) rate on mortality of *C. partellus*. The high mortality was observed at 500 ppm and the least at 50 ppm. Table-1, showed the efficacy of NPV (pathogens) at different dilutions and found high mortality rate at 500 ppm and the least at 50 ppm. Lewis and Adams (1979) also working with the black cutworm observed the highest mortality rate at 500 ppm of NPV. Vast areas of our country are under-developed and general economy of farmers is at a

very low level. Even though chemical control methods are of proven economic value, they are not extensively used carefully due to lack of expertise and cost involved, which expose the limitations in

their use and efficacy. In this situation biocontrol may have considerable and long lasting value in giving a fair degree of control.

Table-1, Efficacy of NPV (Nucleo polyhedrosis virus against *C.partellus*

NPV dosages (in ppm)	Total No. of <i>C.partellus</i> larvae	No, of NPV infected larvae of <i>C.partellus</i>	% Mortality of <i>C.partellus</i>
50	50	10	20%
100	50	15	30%
200	50	20	40%
400	50	40	80%
500	50	45	90%
1000	50	45	90%

References

- Bhargava, M. C., Choudhary, R. K. and Jain, P. C. 2008. *Genetic Engineering of plants for insect resistance. In: Entomology: Novel Approaches* (Jain, P.C. and Bhargava, M. C. eds.). New India Publishing, New Delhi, India. 133-144 **PP**.
- Caballero, P., Aldebis, H. K., Varga Osuna, E. and Santiago-Alvarez, C. 1992. Epizootics caused by a nuclear polyhedrosis virus in populations of *Spodoptera litura* in southern Spain. *Biological Science and Technology*, 2: 35-38.
- Cory, J. S., Hails, R. S. and Sait, S.M. 1997. *Baculovirus ecology. In: The Baculoviruses* (Miller L. K. ed.). Plenum Press, New York. 301-339 **PP**.
- Lewis, L.C. and J.R. Adams. 1979. Pathogenicity of a nuclear polyhedrosis virus on to *Agrotis ipsilon*. *J. Invert. Path.* 33:253-256.

