

Histopathology and study of the MbNPV effect on different larval instars of Beet armyworm, *Spodoptera exigua* Hb. (Lep., Noctuidae)

S. MANZARI ; M. H. SAFAR-ALIZADEH ; A. KHARAZI-PAKDEL and

A. A. POURMIRZA

Plant Pests & Diseases Research Institute ; Agricultural Faculty of Urmia University ;

Agricultural College of University of Tehran, Karaj

ABSTRACT

The MbNPV (*Mamestra brassicae* Nuclear Polyhedrosis Virus) has high virulence against *Spodoptera exigua* larvae and can be considered as an important agent in control of this pest. Contaminating egg surfaces, all larvae died issued from them three days after hatching. The LC_{50} value for the second instar larvae fed on artificial medium, contaminated with different doses of virus, was calculated 12.58 PIB/ mm^2 , and LT_{50} value for the same larvae with 63.10 PIB/ mm^2 dose, was 6.12 days. The mortality of the first instar larvae with the latter dose was approximately ten times of the fifth instar ones. There was no significant difference between the mean weight of male and female pupae issued from infected larvae and normal ones.

The light microscopic histopathological study showed that no remarkable change in tissues was observed 24 and 48 hours after treatment. Hypertrophy of nucleus of epidermal cells and adipose tissues, and also remarkable changes induced in chromatin (virogenic stroma formation) could be seen three days after treatment. With development of disease, complete occupation of cell nucleus by polyhedrosis virus and

consequently cell and nucleus wall rupture occurred.

Key words: *Spodoptera exigua*, NbNPV, Histopathology, LC₅₀.

References

- DAOUST, R. A., and R. E. ROOME, 1974. Bioassay of a nuclear-polyhedrosis virus and *Bacillus thuringiensis* against the American bollworm, *Heliothis armigera*, in Botswana. J. Invertebr. Pathol. 23: 318-324.
- DAVID, W. A. L. 1975. The status of viruses pathogenic for insects and mites. Annu. Rev. Entomol. 20: 97-117.
- ENGELHARD, E. K., KAM-MORGAN, L. N. W., WASHBURN, J. O., and L. E. VOLKMAN 1994. The insect tracheal system: a conduit for the systemic spread of *Autographa californica* M nuclear polyhedrosis virus. Proc. Natl. Acad. Sci. U.S.A. Washington, D.C. Vol. 91, 8: 3224-3227.
- IGNOFFO, C. M., and C. GARCIA 1968. Formalin inactivation of nuclear polyhedrosis virus. J. Invertebr. Pathol. 10: 430-432.
- KHAYRI, M. 1989. An inventory of pests attacking sugar-beet in Iran. Ent. Phyt. Appliq. Vol. 56, 1 & 2: 75-91. (in Farsi).
- MARAMOROSCH, K., and K. E. SHERMAN 1985. Viral insecticides for biological control. Academic Press. INC.
- SHOREY, H. H., and R. L. Hale 1965. Mass-Rearing of the larvae of nine noctuid species on a simple artificial medium. J. Econ. Entomol. Vol. 58, 3: 322-524.
- TINSLEY, T. W. 1977. Properties and replication of insect baculoviruses. In "Beltsville symposia in agriculture research, [I] virology in Agriculture". Academic Press. 117-133.
- TINSELY, T. W. 1979. The potential of insect pathogenic viruses as pesticidal agents. Annu. Rev. Entomol. 24: 63-87.

- VAGO, G., and A. AMARGIER 1963. Coloration histologique pour la differenciation des corps d'inclusion polyedriques de virus d'insectes. Ann. Epiphyties, Vol. 14, 3: 269-274.
- Volkman, L. E. 1986. Molecular basis for infectivity differences of *Autographa californica* nuclear polyhedrosis virus budded and occluded phenotypes, In "Fundamental and applied aspects of invertebrate pathology". 4th Intern. Colloq. of Invertebr. Pathol. 47-48.

Addresses of the authors: Eng. Sh. Manzari, Plant Pests and Diseases Research Institute, P. O. Box 1454-19395 Tehran, Iran.; Dr. M. H. Safar-Alizadeh and Dr. A. A. Pourmirza, Department of Plant Protection, Agricultural Faculty, Urmia University, Urmia, Iran.; Dr. A. Kharazi-Pakdel, Department of Plant Protection, College of Agriculture, University of Tehran, Karaj 31584, Iran.