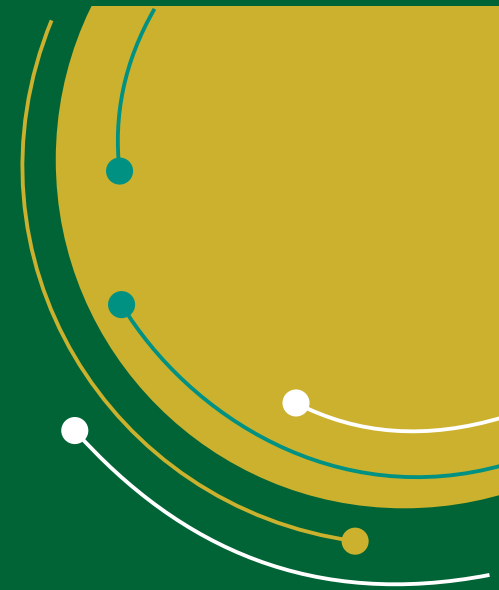


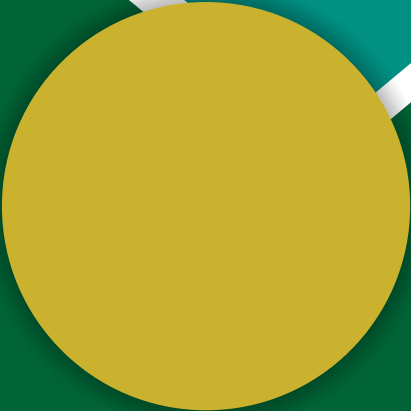
Development of Biopesticides
from DNA Based Identified
Nucleo Polyhedro Viruses (NPVs)
for the Management of
Insect Pest of Major Crops



**Jam Nazeer Ahmad, Rashid Mushtaq, Samina Jam Nazeer Ahmad
and Mubasher Ahmad Malik**

¹Intergrated Genomics Cellular Developmental and Biotechnology Lab,
PARS Campus, Department of Entomology,
University of Agriculture Faisalabad, Pakistan

²Plant Stress Physiology and Molecular Biology Lab,
PARS Campus, Department of Botany,
University of Agriculture Faisalabad



The chewing insect pests commonly known as armyworm (*Spodoptera litura*), American bollworm (*Helicoverpa armigera*), pink bollworm (*Pectinophora gossypiella*), spotted bollworm (*Earias insulana*), diamond back (*Plutella xylostilla*) moth and cabbage butterfly (*Pieris brassicae*) causes significant damage to important crops in Pakistan. Most of them are damaging pests for the cotton, vegetables and oilseed crops by feeding on leaves, squares, flowers and bolls. The insect pest management is mainly dominated by the use of broad-spectrum insecticides, which disrupt the beneficial insect fauna, leading to pest resurgence and outbreaks of secondary pests, as well as risk to human health and environment. The use of biocontrol agents like baculoviruses (BVs) especially against the important agricultural and forest pests is a pesticide alternative control method, which is completely eco-friendly and environmentally benign. The Baculoviridae comprises 600 viruses, including two genera, the nucleopolyhedroviruses (NPVs) and the granuloviruses (GVs). The cuboidal shaped Nucleopolyhedrosis virus (NPV) is host specific and used as a safe microbial pesticide. Under favourable conditions, it multiplies in the field and reduces the natural pest population. NPVs have great potential against lepidoptera's insects. Due to the deposition of occluded viruses (OVs), infected larvae die, become pale in colour and rise to the highest part of the crop. Therefore, keeping in view the importance of NPVs and insect parasitoids, we have recently identified and isolated Lepidoptera's specific Baculoviruses (NPVs) in our Integrated, Genomics, Cellular, Developmental and Biotechnology Laboratory at PARS campus, UAF, for the control of Lepidoptera insect pests and developed bio pesticides against them (Fig. 1-2). We have also identified some very important native lepidopterous specific parasitoids to control these pests.

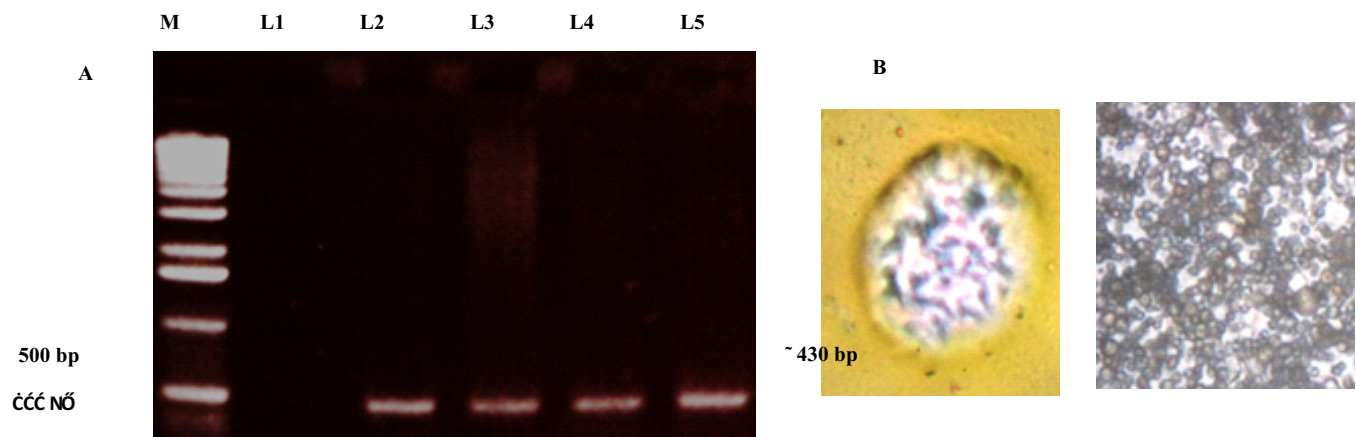


Fig. 1. Infected samples from different Geographical regions of Pakistan by using NPV specific primers: L1 Non infected *Spodoptera litura* Larva, L2- NPV infected *Spodoptera litura* larva (RY Khan strain), L3-NPV infected *Spodoptera litura* larva (Multan Strain), L4- NPV infected *Spodoptera litura* larva (Faisalabad strain), L5- +NPV *Spodoptera litura* DNA, M- 1 kb DNA Marker (Invitrogen). **B.** Microscopic NPVs presence in insect body

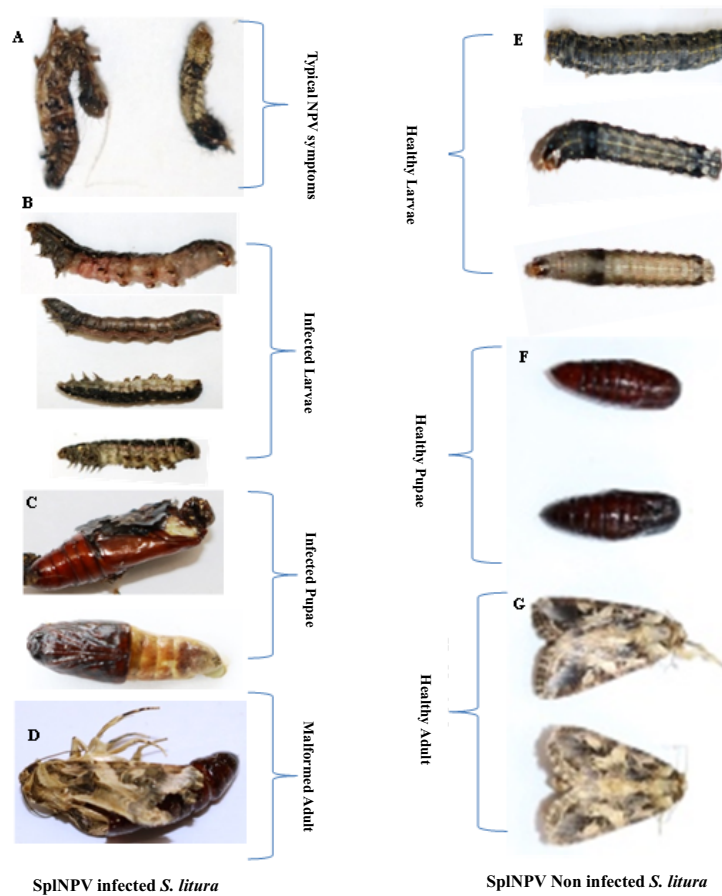


Fig.2. Different stages of Healthy and NPV infected *Spodoptera litura* . **A-** typical NPV symptom as attached with walls of vials downward. **B-** Different NPV infected dead instars. **C-** NPV infected pupae. **D-** Malformed NPV infected Adults. **E.** Healthy larvae. **F-** Healthy pupae. **G-** Healthy Adults.