

## Aqueous formulation of *Spodoptera frugiperda* nucleopolyhedrovirus Spfr NPV NBAIR 1 strain for the management of FAW



FAW infected *Spodoptera frugiperda* nucleopolyhedrovirus NBAIR-1 (SpfrNPV NBAIR-1)

### Technology Description

Indigenous virulent *Spodoptera frugiperda* nucleopolyhedrovirus NBAIR-1 (SpfrNPV NBAIR-1) was isolated from the naturally infected larvae which were collected from Chikkaballapur, Karnataka. All the three instars of FAW larvae equally susceptible. Electron microscopy studies revealed the tetrahedral shaped occlusion bodies. Since nucleopolyhedroviruses survives in water the SpfrNPV is formulated in water by adding jaggery 5% and glycerol 10%. Field experiment data revealed that prophylactic spray of aqueous suspension of SpfrNPV NBAIR-1 strain @ 4 ml per litre twice with the

concentration of  $1.5 \times 10^{12}$  POBs/ ha at 20 and 35 days after sowing was found effective in reducing the FAW population by 69 to 83 % during Kharif and Rabi seasons. General growth and yield of maize plants was also improved due to the application of NPV. The bioefficacy was tested under different locations under All India Coordinated Research Project on Biological Control.

### Background

The fall armyworm (FAW), *Spodoptera frugiperda* (J.E.Smith) (Lepidoptera: Noctuidae) has been reported as a devastating invasive insect pest of maize in India. Maximum incidence (62.5%) of the pest was reported from Hassan district, Karnataka. *Spodoptera frugiperda* nucleopolyhedrovirus (SpfrNPV) belongs to the Baculoviridae virus family and is recognized as an alternative method for managing insect pests effectively and in an environmentally sustainable manner. Globally, different geographical isolates of SpfrNPV have been identified and used as potential (>80% efficacies) biological control agents against FAW. SpfrNPV is specific to FAW larvae, and 86.6–100% mortality of the larvae was recorded both in laboratory and field experiments.

### Benefits /Utility

This product is ecofriendly and environmentally safe. It is easy to apply. The product could be stored for longer period in an ordinary water. *Spodoptera frugiperda*

## Technologies Ready for Agribusiness

nucleopolyhedrovirus is very host specific and effective only against FAW larvae. It is very safe to mammals. Higher efficacy of 100% was documented against FAW larvae. It suppresses the FAW larvae in many crops. It reduces the insecticide consumption. Increases the percapita income of the farmers. This technology plays an important role in organic production of maize.

### Scalability

It can be scaled up to large quantities using live FAW larvae

### Business and commercial potential

Since FAW is a polyphagous invasive insect pest, this technology has a great demand and market potential for the management of FAW.

### Financial requirement

Initial capital requirement for the equipment would be around 8 lakhs and recurring cost Rs 50000/- for the production of 100 litres.



A) Liquid formulation of *Spodoptera frugiperda nucleopolyhedrovirus* NBAIR-1 (SpfrNPV NBAIR-1) B) Field view of maize treated with SpfrNPV NBAIR-1 C) EM image of SpfrNPV NBAIR-1.

### Target Market/Customer

Department of Agriculture and Horticulture, Biopesticide industries, non-Governmental organizations, Krishi Vigyan Kendras, State biocontrol laboratories, commodity boards, Maize growers, poultry feed industries. This technology already commercialized for demonstration purposes only to two firms.

### Social Impact of the Technology

- This technology will take care of plant, soil and human health. Dependence of chemical insecticides will be highly reduced through the adoption of this eco-friendly technology. 40% reduction in insecticide consumption is noticed through the adoption of *Spodoptera frugiperda* nucleopolyhedrovirus for FAW management. Standard of living of farmer will be improved.

### Toxicology data

- Toxicology data for primary culture will be generated as per CIBRC guidelines.