

Potential entomopathogenic fungus *Isaria fumosorosea* (ICAR-NBAIR Pfu-5) for management of rugose spiraling whitefly *Aleurodicus rugioperculatus* in coconut and oil palm

Technology Description

Promising entomopathogenic fungus strain of *Isaria fumosorosea* (ICAR-NBAIR Pfu-5) has been identified and evaluated against invasive rugose spiraling whitefly (RSW) *Aleurodicus rugioperculatus* in coconut and oil palm. Primary culture and talc/ rice grain formulation of *I. fumosorosea* (ICAR-NBAIR Pfu-5) were screened against RSW under laboratory conditions. The primary culture showed per cent mortality / hatching inhibition of 37.25-99.57; 48.83-91.81, 36.91-86.13 and 28.57-80.83 on eggs, first, third and fourth instar nymphs at concentrations of 1×10^4 and 1×10^8 spores/ ml, respectively.

In field experiments, 72.20-80.10% mortality in overall population of RSW was observed in *I. fumosorosea* treated palm with two sprays at 15 days interval in Karnataka and it was 74.26 to 75.83% and 71.05-76.84% at Andhra Pradesh and Tamil Nadu, respectively. Mass production for *I. fumosorosea* was developed for the first time for longer persistence, bio-efficacy and higher virulence under field conditions and long shelf-life. Shelf-life for about 90, 180, 210 days, talc, oil and rice grain-based formulations, respectively. The technology has been developed for management of rugose spiraling whitefly *A. rugioperculatus* in coconut and oil palm.

Background

Rugose spiraling whitefly is highly polyphagous and invasive pest in India causing severe damage to several horticultural, agricultural and ornamental plants and prefers to feed on plants under Arecaceae family. *Isaria fumosorosea* has been extensively used for management of RSW and Bondar's nesting whitefly on coconut in Florida. ICAR-NBAIR-Pfu-5 strain was found highly effective against all the life stages including adults of RSW and equally effective with chemical insecticide under field conditions.

Benefits /Utility

Microbial biocontrol technology using *Isaria fumosorosea* (ICAR-NBAIR Pfu-5) for management of RSW in coconut is eco-friendly, safe and do not have significant adverse effects on potential parasitoids, *Encarsia guadeloupae* of RSW and paraitoid, *Goniozus nephantidis* of coconut black headed caterpillar and predator, *Apertochrysa* (= *Pseudomalla*) *astur* in coconut ecosystem. Besides, this fungus is safer to silk

worm, *Bombyx mori* and other living organisms in the environment. Apart from this, the technology is as effective as chemical insecticides and cheaper than chemical insecticides.

Scalability

It can be scaled up to large quantities using large-scale fermentors of 500-1000 litres capacity depending on the need.

Business and commercial potential

This technology has a wide scope of commercialization and there is a high demand for biocontrol agents for management of RSW in coconut and oil palm. At present, very small quantities of microbial BCAs are produced in the country against very high demand. There is scope for label expansion of this technology for management of RSW in other crops.

Financial requirement

The cost of production of this product may around 100/- per kg and it can be sold at 200-250/kg. An investment of 15-20 lakhs for equipment's, other infrastructure etc. is required to produce 100 tonnes/ annum.



Infection and mycosis of *Isaria fumosorosea* NBAIR Pfu5 in rugose spiraling whitefly nymphs and adults

Target Market/Customer

Coconut and oil palm growing farmers in Karnataka, Tamil Nadu, Andhra Pradesh, Kerala, Telangana, West Bengal, Odisha, Maharashtra; Coconut Development Board; National Horticultural Board; Department of Agriculture & Horticulture; State Agricultural University, KVKs, FPOs; Coconut and Oil palm industries; Bio-control agent suppliers. This technology already commercialized for demonstration purposes only to three firms.

Social Impact of the Technology

- Use of *I. fumosorosea* strain ICAR-NBAIR-Pfu-5 helps to reduce the pesticide use which directly conserve the biodiversity in coconut and oil palm ecosystem. The present technology is equally effective to chemical insecticides & ecofriendly strategy for obtaining healthy crop which can reduce the usage of chemical insecticides for RSW infested crops and reduce crop protection cost. Results minimize the risks associated with insecticides on environment and non-target organisms in coconut and oil palm ecosystem including human beings.

Toxicology data

- Toxicology data for primary culture and wettable powder (2%) formulation of *Isaria fumosorosea* (strain ICAR-NBAIR Pfu-5) has to be generated as per CIBRC guidelines.