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Research Note

Pathogenicity of *Metarhizium anisopliae* (Metsch.) Sorokin to rice leaf folder, *Cnaphalocrocis medinalis* (Guenee)

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ABSTRACT: **Pathogenicity, entomopathogenic fungus *Metarhizium anisopliae* (Metsch.) Sorokin has been recorded for the first time on rice leaf folder, *Cnaphalocrocis medinalis* (Guenee) (Lepidoptera: Pyralidae). Effective control of the pest was recorded under field conditions after application of spore suspension of *Metarhizium anisopliae* in gelatin (1%) at 1 x 10^8 spores/ml on the infested rice crop. Between 5 to 7 days after treatment, 60-70 per cent mortality was recorded.**

KEY WORDS: *Cnaphalocrocis medinalis*, *Metarhizium anisopliae*, pathogenicity

Rice leaf folder, *Cnaphalocrocis medinalis* inhabits the leaves by folding and scraping the green tissue from within resulting in leaf drying and reducing the area of photosynthesis. High humidity and optimum temperatures are conducive ecological factors for the rapid multiplication of the leaf folder (Pathak, 1975). The economic thresh hold levels (ETL's) of various rice insect pests revealed leaf folder to cause damage both at planting to pre-tillering as well as at panicle initiation to booting stages (Singh & Dhaliwal, 1994). The ETL's for the leaf folder in India was reported to be 10-15 per cent damaged leaves per plant. Threshold levels of 10 per cent damaged leaves in the vegetative phase and 5 per cent of flag leaf damage at the flowering stage have been reported in Tamil Nadu, India (Anonymous, 1985).

Entomopathogenic fungi are promising candidates for biological control of a number of insect pests. *Metarhizium anisopliae* (Metsch.) Sorokin is pathogenic to a wide range of insect pests of Coleoptera, Lepidoptera, Orthoptera and Hemiptera (Alves *et al.*, 1996). In India pathogenicity of *M. anisopliae* has been recorded on termites (Khan *et al.*, 1993), mangohoppers (Vyas *et al.*, 1993) *Helicoverpa* (Deva Prasad *et al.*, 1990) and on rice bug (Harris, 2000).

Main objective of the present study is to test efficacy of *M. anisopliae* for controlling leaf folders of rice in the field. *M. anisopliae* isolate used in the present study was obtained from United States, Department of Agriculture-Agricultural Research Service, as Culture number 3210, originally collected from India and is being maintained as pure culture on Sabarauds dextrose yeast agar slants. Seven to ten day old cultures in Petri-plates were used for harvesting the dry spores. Hot water at 40°C was used for dissolving gelatin and the solution was diluted to final volume with distilled water for getting one per cent gelatin solution. Dry spores of *Metarhizium anisopliae* were thoroughly mixed in the gelatin solution for subsequent use as spray for field application. Twenty five litres of spore suspension ($1x10^8$

spores/ml) was prepared using 10g of dry conidial powder.

The pest load per plant was 5- 8 and 75 per cent of the plants per row were infested with an average of 25 affected leaves per plant in the rice plots at Regional Agricultural Research Station, Ragolu. At random 25 lines comprising of 40-50 plants each were selected for assessing reduction in the pest load after application of the biocontrol agent. Data collected on the seventh day of application revealed the presence of 2-3 live leaf folders per plant. Between 5-7 days after treatment, the number of leaf folders per line were reduced to 60-70 per cent compared to the pest load before treatment and in the untreated plot. Dead larvae were found floating in the water underneath and hanging from the plants, some of which showed mycosis in the form of over growth of the fungus on the cadavers. The larvae were brought to the lab, and used for reisolation of the fungus. The Sabarauds dextrose yeast agar plates after inoculation were incubated at 25±2°C for about a week and the colonies of *M. anisopliae* were separated by single hyphal tip method. Apart from *M. anisopliae* other companion fungi such as *Aspergillus* spp., *Mucor* spp., *Fusarium* spp. and *Penicillium* spp., also appeared in the plates.

Aguda *et al.* (1987) studied the effect of dry conidial sprays of *M. anisopliae* and *M. flavoviride* at $4x10^{12}$ spores/ha and dry mycelial preparations of *B. bassiana* against brown planthopper *Nilaparvata lugens* and recorded pest control after 7-22 days of application. Rice microclimate favours the growth of this pathogen by virtue of high relative humidity of (87%) and favourable temperature (25-35°C). In our previous study on mycopesticide preparation of *B. bassiana*, the fungal spores were suspended in Tween 80, gelatin and vegetable oil, and the adjuvants were found to be effective in controlling cotton pests compared to unformulated samples (Padmaja and Kaur, 2000). Gelatin used in the present study as a sticker and for retention of moisture on the foliage, appears to be a suitable adjuvant for field performance of the biocontrol agent.

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