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Research Article

Evaluation of bio-pesticide *Metarhizium anisoplea* against brown plant hopper (*Nilaparvatha lugens*) and its efficiency on the improvement of the productivity of paddy

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ABSTRACT

Increase in dose of *Metarhizium anisoplea* from 2kg/ha to3 kg/ha decreased the BPH counts at 7 days after spraying. This was on par with Thiomethoxam. Similar beneficial effect was also noticed on the seed yield of paddy. Sparaying of *Metarhizium anisoplea* @ 2.5 kg/ha recorded significantly higher seed yield of paddy (8060 kg/ha) over *Metarhizium anisoplea* @ 2 kg /ha (7643 kg/ha), Clothiandidin (6701kg/ha) and control (5922 kg/ha). This was at par with Thiomethoxam (8313 kg/ha) and Imidachloraprid (7843 kg/ha). The *Metarhizium anisoplea* 2. 5 kg/ha was not found to be phytotoxic and it was safer to natural enemies.

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INTRODUCTION

Rice (*Oryza sativa*) is a major field crop of India, covering the large area in the country. In order to meet the growing demand of the ever increasing population, we need to produce more rice every year. But the rice production is limited by both biotic and abiotic stresses of which insect pests alone cause about 25 per cent losses (Dhaliwal *et al*., 2007). Over 100 species of insect attack and feed on rice crop from nursery to maturity and also in storage. Of these dozen are consistently reported on major pests of economic importance, through the damage caused by them varies in time and space. Hence, we also need to reduce the yield losses due to major pests and diseases.

Among the plant hoppers, brown plant hopper (BPH) *Nilaparvatha lugens* (Stal.) and white backed plant hopper (WBPH) *Sogatella fucifera*(Horvath) are of importance in India. The third species, smaller brown plant hopper(SBPH) *Laodelphax stritellus*(Fallen) has also been reported (Shukla, 1979) but not in abundance belongs to the order Homoptera, family Delphacidae with piercing and sucking mouth parts. The plant hoppers suck the plant sap from the phloem vessels through their proboscis, due to this plant starts wilting with outer most leaves drying first and then the entire plant dries up.

The BPH damage is more often seen in well irrigated densely planted fields with high doses of nitrogen and frequent insecticide application. The insect immigrate into the freshly planted crop and colonize. The nymph and adult stay at the base of the rice plant and suck the plant sap. As a result of feeding by second and third generation of insect, plants turn yellow and dry up rapidly. During early phase of infestation, round yellow patches appear in the field which soon turn brownish due to the drying up of the plants. This condition is called as "hopper burn". Hopper burn is caused mainly by brown plant hopper (BPH) *Nilaparvatha lugens* (Stal.), threatens a global rice crop, particularly in Asia. The patches of infestation may then spread out and cover the entire field. Long term reliance on chemical control has caused high brown plant hopper resistance to common insecticides. For instance, Imidacloprid has been compromised by development in BPH and other sucking pest since 1990 and is no longer recommended for BPH control (Liu *et al*., 2005 and 2008). Thus, cautious use of this chemical is necessary for its prolonged market life. An alternative strategy is to reduce the chemical