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Short Communication

Evaluation of Spinosad and Indoxacarb for the management of legume pod borer, *Maruca vitrata* (Geyer) in pigeonpea

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Among 200 species of insects that feed on pigeonpea, few of them are serious pests such as gram pod borer, *Helicoverpa armigera* Hubner, pod fly, *Melanagomyza obtusa* Malloch and legume pod borer, *Maruca vitrata* (=*testulalis*) (Geyer). The direct damage caused by these species to the plant reproductive structures is widely recognized throughout Asia. The legume pod borer, *Maruca vitrata (Geyer)* is a serious pest of grain legumes in the tropics and sub-tropics (Sharma *et al.* 1999). It is widely distributed in Asia, Africa, Australia, and the Americas (Taylor 1978). In Asia, it is an important pest of pigeonpea, common beans, soybean and cowpeas (Lee 1965, Barroga 1969, Saxena 1974, Srivastava 1974, Subasinghe and Fellows 1978). In recent years, the legume pod borer has emerged as major threat in short duration pigeonpea genotypes that flower in the months of August - September in peninsular India and urdbean in the months of January-February in coastal region of Andhra Pradesh. Eggs are laid singly or in batches of 2 to 16 on leaves, buds, and flowers. Larvae feed from inside a webbed mass of leaves, buds, and pods. This typical feeding habit protects the larvae from adverse conditions, natural enemies and even from insecticidal sprays. Several insecticides have been evaluated against *Maruca* on cowpea and pigeonpea (Degri and Chaudhary 1998, Sahoo and Senapati 2000, Das Mahapatra and Srivastava 2002). Since conventional chemicals were found to be ineffective in managing this pest, the present study was taken up to identify an effective option for its management.

In order to identify effective control options against this pest, new chemicals were evaluated during 2005 rainy season. The study was conducted in ICRISAT red precision fields with pigeonpea variety ICPL 88034. The crop was sown in June with row spacing of 60 cm and a plant to plant spacing of 20 cm with plot size of 17 m^2. The chemical evaluation study consisted of five treatments; Spinosad 45 SC (0.4 ml/liter), Indoxacarb 14.5 SC (1 ml/liter), Monocrotophos 36 EC (1.5 ml/liter), *Metarhizium* $1x10^8$ /g (1g/liter) and control. These treatments were applied during the peak pest infestation (September) and replicated four times. The chemicals were sprayed twice at 15 day-interval and the observations on larval population were taken at two and five days after spraying. The per cent reduction in larval population was calculated. The yield data were recorded from 10 m^2 net plot and calculated for one hectare. The observation on *Maruca* damage was recorded by collecting 100 pods randomly in each plot at harvest (first fortnight of October) and the data were subjected to statistical analysis.

The crop attained flowering in the first week of August and *Maruca* adults started invading pigeonpea crop during the second fortnight of August which resulted in peak larval population by September 17, with 6.5 larvae/plant. The results revealed that the maximum reduction in larval population (82%) was obtained with Spinosad within two days after application compared to 72% with Indoxacarb, 40% with Monocrotophos and 20% with *Metarhizium*. The highest population of 6.5 larvae/plant was recorded in control plot. Observations after five days of chemical application had resulted in 93% reduction in larval population with Spinosad as compared to 85% with Indoxacarb and 22% with Monocrotophos. The larval population in Metarizhium treated plot was at par with control (Table 1).

Table 1. Evaluation of selected chemicals for the management of *Maruca* in short duration pigeonpea during 2005

Treatment	Larval population/ plant		Pod damage (%)	Seed damage (%)	Grain yield (kg/ha)
	2 days	5 days*			
Metarhizium	5.2[c*]	6.5[c]	65.4[c]	40.3[c]	112[a]
Indoxacarb	1.8[a]	0.9[a]	11.8[a]	3.9[a]	795[c]
Spinosad	1.2[a]	0.5[a]	8.5[a]	3.7[a]	688[c]
Monocrotophos	3.9[b]	4.7[b]	34.4[b]	22.5[b]	408[b]
Control	6.5[c]	6.0[c]	64.4[c]	41.2[c]	128[a]
L.S.D. (*P=0.05*)	2.29	1.34	7.01	9.67	140.0

*After spraying.

Treatments followed by same letter in each column are not significantly different

The observations on pod damage at harvest in plots treated with different chemicals clearly indicated significant superiority of Spinosad (8.5%) and Indoxacarb (11.8%) over Monocrotophos (34.4%) and Metarhizium (65.4%) in the management of this pest. The pod damage in treatment with Monocrotophos (34.4%) was significantly lower than the Metarhizium (65.4%) and control. The plots treated with Spinosad and Indoxacarb had less than 4% seed damage as compared to 22.5% with monocrotophos, 40.3% with Metarhizium treated plots. The untreated control had 41.2% seed damage. The superiority of Spinosad and Indoxacarb in larval population reduction was also reflected in yield with

688 and 795 kg/ha, respectively. The yield from Monocrotophos treated plots was around 400 kg/ha and was significantly superior to control. The plots treated with Metarhizium yielded on par with control (Table 1). In view of the occurrence of this species on the short duration pigeonpea during the peak rainy season and the less-effectiveness of the conventional chemicals on this species, the present results are quite encouraging. This would facilitate the adoption of short duration pigeonpea varieties in areas where *Maruca* is a major constraint in limiting the yield. The results suggest that *Maruca vitrata* can be managed effectively with new chemicals, Spinosad and Indoxacarb (with 82 and 72% reduction in population) within two days after application. Since the reduction in larval population is faster with these chemicals as compared to other conventional chemicals, it would be worth keeping these new chemicals as one of the best options in IPM module for effective management of this species.

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