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Spotted Pod Borer, *Maruca vitrata* (Fabricius): A Threat to Pulses in India

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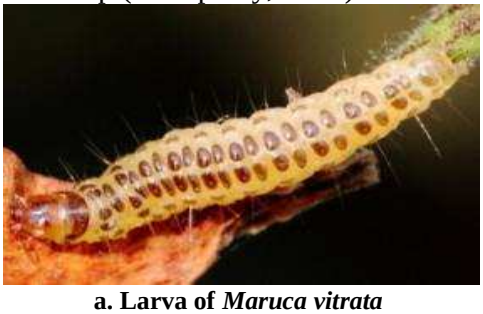
Spotted pod borer, *M. vitrata* is one of the major pests of tropical food legumes which causes damage by webbing of tender leaf axils, flower buds, flowers and pods, thus forming clusters of flowers or pods on about 39 hosts. Moths and larvae are nocturnal in nature and infestation is first noticed at the terminal shoots (21 days after planting), which then shifts to reproductive parts. Larvae are found to infest and cause significant damage at both vegetative and reproductive stages of the crop. The treatment of chlorantraniliprole, flubendamide, indoxacarb, thiodicarb and spinosad are used to reduce larvae of *M. vitrata*.

Introduction

Pulses form an integral part in the diet of most vegetarians all over the world. Among the various obstacles responsible for diminishing production of pulses in India, the predominant factor is the damage caused by insect pests. Among the various insect pest causing economic losses in pulses, the spotted pod borer, *M. vitrata* (Lepidoptera: Crambidae) is the most damaging one. Spotted pod borer, *M. vitrata* is one of the major pests of tropical food legumes which causes damage by webbing of tender leaf axils, flower buds, flowers and pods, thus forming clusters of flowers or pods on about 39 hosts (Ganapathy, 2010). The typical concealed feeding behaviour of the larvae in the webbed mass safeguards is from natural enemies and diminishes the efficacy of insecticides. Moths prefer to oviposit at flower bud stage (Sharma, 1998). Larvae move from one flower to another and each larva may consume 4-6 flowers till it approaches the larval development. In pigeonpea, the first instar larvae prefer flowers over pods and leaves, while third instar larvae show a strong preference to pods as compared to flowers and leaves (Sharma, 1998). Third to fifth instar larvae bore into the pods and intermittently into peduncle and stems (Taylor, 1967). Moths and larvae are nocturnal in nature and infestation is first noticed at the terminal shoots (21 days after planting), which then shifts to reproductive parts (Jackai, 1981). Larvae are found to infest and cause significant damage at both vegetative and reproductive stages of the crop (Ganapathy, 2010).



a. Larva of *Maruca vitrata*

b. Adult moth of *Maruca vitrata*

Host Range

Though an array of insect pests infest the legume crops, *M. vitrata* has become persistent pest on various legume crops like pigeonpea, cowpea, mungbean and urdbean. *Physalis minima*, *Abutilon* sp. and *Tephrosia* sp. (weeds), greengram, blackgram, cowpea, pigeonpea and groundnut (legumes), daincha and sunhemp (green-manuring crops) have been reported to act as alternative hosts for *M. vitrata* (Rani *et al*., 2013). Evidences show that it has also been reported from soybean, groundnut, field pea, hyacinth bean, rajmash, limabean and kharif weed *Crotolaria*. However, cowpea, pigeonpea and hyacinth have been found to be the most preferred hosts of *Maruca* as determined from larval rearing studies (Sharma *et al*., 2014).

Economic Damage in Different Pulse Crops

Maruca vitrata is known to cause highest infestation in flowers, followed by flower buds, terminal shoots and pods. Damage due to *M. vitrata* also varies with respect to branching and podding pattern in pigeonpea. *M. vitrata* has been reported to pose serious threat to the cultivation of early pigeonpea across the country. The extent of infestation in pigeonpea has been reported to be 89.4 per cent causing total failure of the crop almost every year in Bihar (Sinha *et al*., 1979). Halder (2004) conducted experiments on field screening of the flower buds, flowers and pods of the five legume crops, *viz*., cowpea, field bean, pigeonpea, mungbean and urdbean against *M. vitrata*. The results revealed that significant differences existed in the infestation levels of *M. vitrata* and highest incidence on flower and flower buds was in cowpea (46.10%), followed by field bean (15.38%), urdbean (10.97%) and mungbean (9.75%), while least damage was in pigeonpea (3.29%). Maximum pod damage (39.52%) was also noticed in cowpea, followed by urdbean (9.75%), mungbean (9.44%), field bean (7.35%), whereas lowest was in pigeonpea (2.6%). The damage due to pod borer complex including *M. testulalis* in blackgram ranged from 8.1 to 22.6 per cent as estimated by Sontakke and Muduli (1990) in blackgram. Prasad *et al.* (2011) reported that the spotted pod borer caused about 5.07 to 16.66 per cent pod damage in dolichos bean. Mandal (2005) reported that the population of *M. testulalis* was higher than that of the other pod borer with the pod damage in the range of 8.6 to 28.2 per cent among the ricebean cultivars.

Management

Application of insecticides is still supposed to be the first line of defense for the efficient control of insect pests. However, degradation of environment and the development of resistance to synthetic insecticides in the insect pests have become a matter of great concern (Armes *et al.* 1992). These problems have triggered the discovery of novel chemistry, more effective and eco-friendly alternatives for pest control. Therefore, evaluation of newer molecules having novel mode of action for their efficacy against a pest like *M. vitrata* is necessary. Investigations on the bioefficacy of some novel insecticides against spotted pod borer, *M. vitrata* have revealed that the treatment of chlorantraniliprole, flubendamide, indoxacarb, thiodicarb and spinosad cause highest per cent reduction of larvae of *M. vitrata*. Bio-pesticides like *Bacillus thuringiensis*, entomopathogenic fungi such as *Beauveria bassiana* and *Metarhizium anisopliae*, and neem oil either alone or in combinations with other bio-pesticides have been proved to be an effective tool in managing the borer pests including *M. vitrata* (Srinivasan, 2008).

Conclusion

Maruca vitrata has become a threat to the pulse production across the world and India as well. There is a dire need to undertake eco-friendly measures which rely heavily on the use of bio-pesticides to manage the pest population without causing any harm to the users, consumers and the environment.

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