Research Article

SURVEY AND DOCUMENTATION OF NATURAL ENEMIES OF *MARUCA VITRATA* (GEYER) IN PULSE GROWING AREAS OF COIMBATORE AND PUDUKKOTTAI DISTRICTS

Haripriya, K.* and S. Jeyarani
Department of Agricultural Entomology, Tamil Nadu Agricultural University, Coimbatore- 3, INDIA
**Corresponding author's E-mail: akharipriya@gmail.com*

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ABSTRACT

An extensive survey was made at different pulse growing blocks of Coimbatore District *viz.*, Annur, Karamadai, Madhukkarai, Periyanayakkanpalayam, Pollachi, Sulur, Thondamuthur, Tamil Nadu Agricultural University (TNAU) - Orchard and Pudukkottai District *viz.*, Arantangi, Gandarvakottai, Karambakudi, Thirumayam, Thiruvarankulam and National Pulses Research Centre (NPRC), Vamban on the incidence of natural enemies of *Maruca vitrata*. Survey revealed that the level of parasitism of legume pod borer under field conditions ranged from 0.00 to 30.00 per cent. Highest parasitization of 30.00 per cent was recorded in National Pulses Research Centre, Vamban. Ponnaviduthi village of Karambakudi block in Pudukkottai district recorded the second highest parasitization of 20.00 per cent followed by Irumborai village of Karamadai block in Coimbatore district. During the survey, four larval parasitoids belonging to the families *viz.*, Braconidae and Ichneumonidae were recorded. The braconid parasitoids that were recorded include *Bassus* sp. and *Phanerotoma* sp.

INTRODUCTION

India is the major pulse growing country in the world, sharing 35 to 36 per cent area with 27 to 28 per cent pulse production. On an average, 2.5 to 3.0 million tonnes of pulses are lost annually due to pest problems (Rabindra *et al.,* 2004). The major insect pests during vegetative stage are thrips, whitefly, leafhopper, black aphid, Bihar hairy caterpillar, stemfly, which cause appreciable damage (Singh and Kumar, 2003). *Maruca vitrata* (Geyer) is one among the pod borers causing serious damage to grain legumes in the tropics apart from *Helicoverpa armigera* (Hubner).

The spotted pod borer, commonly known as legume pod borer, *M. vitrata* (Lepidoptera: Pyralidae) is a serious pest of grain legumes in the tropics and subtropics due to its extensive host range, distribution and destructiveness. The larvae damage the flower buds, flowers and immature pods by webbing and contaminate with their excreta (Rekha and Mallapur, 2007). The grain yield loss due to legume pod borer was estimated to be 10.0 to 80.0 per cent in various crops (Singh and Allen, 1980; Sharma, 1998). Webbings of flowers and pods during feeding makes the pest hard to reach and hence makes the management difficult (Sharma, 1998).

A substantial number of parasitoid species and predators were also reported to attack *M. vitrata* (Pillai and Agnihotri, 2013; Wetro *et al.,* 2014), however they have not been exploited successfully in biological control programmes against *M. vitrata*. This is largely due to the low level of parasitism or predation observed with all the recorded species of parasitoids and predators. Moreover, in pulses cropping system minimum attempts have been made to study the effect of natural enemies and entomopathogens on insect pests under field conditions. Availability of an effective parasitoid, entomopathogens and biopesticides may pave way for formulating biorational pest control strategies to combat the problem of *M. vitrata* on food legumes with food safety.

MATERIALS AND METHODS

An extensive survey was made at different pulse growing blocks of Coimbatore District *viz.*, Annur, Karamadai, Madhukkarai, Periyanayakkanpalayam, Pollachi, Sulur, Thondamuthur, Tamil Nadu Agricultural University (TNAU) - Orchard and Pudukkottai District *viz.*, Arantangi, Gandarvakottai, Karambakudi, Thirumayam, Thiruvarankulam and National Pulses Research Centre (NPRC), Vamban on the incidence of natural enemies of *M. vitrata*. During the survey, the spotted pod borer, *M. vitrata* infested pods were collected randomly from ten plants from

different field locations and were brought to the laboratory and maintained in separate cages for further observations. The extent of parasitization and kind of parasitoids emerged were observed for each block. The collected parasitoid specimens were preserved in 70 per cent ethyl alcohol and identified based on literature / by experts.

Table 1. Survey on natural enemies of *M. vitrata* in Coimbatore district

Blocks	Location	Parasitoid	Parasitization percentage
Sulur	TNAU orchard	Braconid, *Phanerotoma* sp.	10.00
	Pappampatty	Braconid, *Phanerotoma* sp.	6.66
	Neelambur	-	-
	Muthugoundenpudur	-	-
Thondamuthur	Devarayapuram	Braconid, *Phanerotoma* sp.	12.50
	Narasipuram	Ichneumonid	5.00
	Narasipuram	-	-
	Thondamuthur	Braconid	8.00
Periyanayakanpalayam	Panapalli	Braconid, *Bassus* sp.	10.00
	Veerapandi	Braconid, *Phanerotoma* sp.	12.50
Karamadai	Jadayampalayam	-	-
	Irumborai	Braconid - *Phanerotoma*	16.66
	Chikkarampalayam	-	-
	Tholampalayam	-	-
Annur	Telungupalayam	Ichneumonid	6.66
	A.mettupalayam	-	-
	Kariampalayam	-	-
Madukkarai	Seerapalayam	-	-
	Arisipalayam	Ichneumonid	13.33
Pollachi	Kanjampatti	-	-
	Ammegoundanur	-	-
	Tozhilpettai	Braconid, *Bassus* sp.	3.33

Table 2. Survey on natural enemies of *M. vitrata* in Pudukkottai district

Blocks	Location	Parasitoid	Parasitization percentage
Gandaravakottai	Gandaravakottai	-	-
	Ponnanviduthi	Braconid, *Phanerotoma* sp.	20.00
	Theethanipatti	-	-
	Vandanviduthi	-	-
	Kuppakudi	Braconid, *Bassus* sp.	13.33
	Vallathirakottai	Braconid, *Bassus* sp.	16.66
	Meikalpatti	-	-
Thiruvarankulam	Vallikadu	Ichneumonid	8.33
	Kaadaiyanthoppu	-	-
	Venkadakulam	-	-
	NPRC,vamban	Braconid, *Bassus* sp.	30.00
Thirumayam	Thirumayam	Braconid, *Bassus* sp.	3.33
	Vengalur	Braconid, *Bassus* sp.	12.5
Arantangi	Silatur	Braconid, *Bassus* sp.	6.66
	Thanthani	-	-
	Avanathankottai	-	-

RESULTS AND DISCUSSION

Survey revealed that the level of parasitism of legume pod borer under field conditions ranged from 0.00 to 30.00 per cent. Highest parasitization of 30.00 per cent was recorded in National Pulses Research Centre, Vamban. Ponnaviduthi village of Karambakudi block in Pudukkottai district recorded the second highest parasitization of 20.00 per cent followed by Irumborai village of Karamadai block in Coimbatore district (16.66%) (Table 1 and 2). During the survey, four larval parasitoids belonging to the families *viz.*, Braconidae and Ichneumonidae were recorded. The braconid parasitoids that were recorded include *Bassus* sp. and *Phanerotoma* sp.

The results are in accordance with Arodokoun *et al*. (2006) who reported 30 per cent parasitism by *Phanerotoma leucobasis* Kriechbaumer on *M. vitrata* larvae collected from commonly occurring wild host plants. The low level of parasitization may be due to concealed feeding habitat of the larvae *viz*., buds, blossoms, flowers and young pods, making them less accessible to predators and parasitoids (Saxena, 1978).

Present survey revealed the occurrence of parasitoids of the family Braconidae and Ichneumonidae on *M. vitrata* larvae. These findings are in accordance with Srinivasan *et al.* (2015) who recorded three braconid parasitoids of *M. vitrata* through exploratory surveys carried out at Lao, Malaysia, Taiwan, Thailand and Vietnam. Natural occurrence of various braconids and ichneumonids were also documented by several workers (Usua and Singh, 1977; Barrion *et al.,* 1987; Owuor *et al.,* 1991).

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