



Research Note

Natural enemies of mulberry pyralid, *Glyphodes pyloalis* Walker (Lepidoptera: Pyralidae), in temperate climate of Kashmir

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ABSTRACT: The incidence of natural enemies on the mulberry pyralid, *Glyphodes* (= *Margaronia*) *pyloalis* Walker (Lepidoptera: Pyralidae) infesting mulberry crop was studied at Pampore, Kashmir during 2008 and 2009 cropping seasons. Five hymenopteran parasitoids including three braconids (*Apanteles obliquae* Wilkinson, *Bracon hebetor* Say and *Chelonus carbonator* Marshall) and two ichneumonids (*Pristomerus sulci* Mahdihassan and Kolubajiv and *Xanthopimpla* sp.) were found to parasitize the larvae. Two predators, viz. *Tetragnatha* sp. (Araneae: Tetragnathidae) and *Philodromus* sp. (Araneae: Philodromidae) were also recorded. The activity of these natural enemies was observed from July to October in the cropping period spread over May–October.

KEY WORDS: *Glyphodes pyloalis*, Kashmir, mulberry, natural enemies

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Mulberry (*Morus* sp.) is the only host plant of silkworm, *Bombyx mori* L. and is ravaged by different pests and diseases. So far over 300 pest species have been recorded on mulberry in different parts of the world (Reddy and Kotikal, 1988). There are as many as 11 major and 10 minor insect pests reported from Jammu and Kashmir (Sharma and Tara, 1985; Khan *et al.*, 2004). Among the insect pests, lepidopterans often cause severe damage to the mulberry crop. In recent years, mulberry pyralid, *Glyphodes* (= *Margaronia*) *pyloalis* Walker (Lepidoptera: Pyralidae) has assumed a serious status as it not only causes leaf yield loss to the tune of 15–20% in Kashmir as well as in entire Asia but is also reported to transmit silkworm diseases (Watanabe *et al.*, 1988), leading to a serious pest status for *G. pyloalis* (Anon., 2010).

A number of parasitoids and predators have been recorded on this pest from most parts of Jammu and Kashmir and elsewhere in Asia (Mathur, 1980). Among them, two braconid larval parasitoids, *Apanteles glomeratus* and *Chelonus* sp. were reported to parasitize the larvae (Nighat *et al.*, 2002). The aim of the present study is to generate information on various parasitoids and predators of mulberry pyralid, *G. pyloalis* and their seasonal incidence in temperate climatic conditions of Kashmir, Jammu and Kashmir, India.

Mulberry cropping period spans from May to October in temperate conditions of Kashmir. The observations on the seasonal occurrence of natural enemies of the mulberry pyralid from July to October on commercially improved genotypes, viz. Goshoerami, Tr-10, KNG, Chinese white and Rokokuyaso were made at fortnightly intervals in Kashmir valley. To study the activity of parasitoids, larvae of mulberry pyralid were collected during each survey and kept in insect rearing wooden cages (50x30x15 cm) in the laboratory. The moribund larvae were kept individually in glass test tubes plugged with cotton wool to observe the emergence of parasitoids, number of parasitoid cocoons and per cent parasitism by each species. The activity of the insect predators was recorded in the field on the pyralid.

During the study, five hymenopteran parasitoids, viz., *Apanteles obliquae* Wilkinson, *Bracon hebetor* Say, *Chelonus carbonator* Marshall, *Pristomerus sulci* Mahdihassan and Kolubajiv and *Xanthopimpla* sp. were observed to parasitize the larvae of *G. pyloalis*. Two predators, viz., *Tetragnatha* sp. (Araneae: Tetragnathidae) and *Philodromus* sp. (Araneae: Philodromidae) were also recorded (Table 1).

Amongst parasitoids, *Apanteles obliquae* was active on early larval instars during July–October, with a peak of 23.95% parasitism during September. Similar

observations on *A. obliquae* were reported from Bangalore by Marimadaiah and Geetha Bai (2000). It is a gregarious larval endo-parasitoid. Fully grown parasitoid larvae, after completion of their feeding stage emerge from the host larval body and spin cocoons within 30-50 minutes on the dead larvae or mulberry leaf on which the host larvae lived for 3-4 days after the exit of parasitoid and showed little or no movement and died invariably before reaching pupal stage. The number of cocoons per mature host larva was 9-21. Cocoons are whitish, elongate and 2.5-4.5mm long (Av. = 3.44±0.48mm) and 1.0-1.5mm wide (Av. = 1.05±0.13mm). Emergence of adult takes place by making a circular opening at one end of the cocoon. *Bracon hebetor* emerged mostly from late larval instars, active through July-October with a peak during September (5.93% parasitism). *Pristomerus sulci* was active on the late larval instars again during July to October months with a peak parasitism of 6.39% during October (Tables 1 and 2). *Apanteles* sp. was found to be the most predominant among all parasitoids, parasitism ranging from 21.95% to 23.9% during July and October,

respectively. The mean parasitism by all parasitoids reached an extent of 30.08% during September. *Apanteles* sp. has been recorded as a predominant parasitoid on the leaf roller and leaf webber in Karnataka and Kashmir, respectively (Anonymous, 1997; *Rajadurai et al.*, 1999 and *Nighat et al.*, 2002).

The other parasitoids, *C. carbonator* and *Xanthopimpla* sp. were also recorded on the mulberry insect pest, of which *C. carbonator* was active on the late larval instars during August-October, with a peak parasitism of 4.78% during September and *Xanthopimpla* sp. was active on the late larval instars and pupae during September-October. Observations on the occurrence and incidence of natural enemies on the leaf roller, *Diaphania pulverulentalis* (Hampson) were also observed from Kanakapura taluk, a rural district of Bangalore. It is reported that two braconid parasitoids, *Apanteles* sp. and *Chelonus* sp. were active during September-January and October-January, respectively (*Srinivasagowda et al.*, 2001). *Tetragnatha* sp. and *Philodromus* sp. were observed predated upon the larvae of *G. pyloalis* during the cropping period (Table 1).

Table 1. Natural enemies of mulberry pyralid, *Glyphodes pyloalis*

Name	Family	Order	Stage attacked	Period of activity
Parasitoids				
<i>Apanteles obliquae</i> Wilkinson	Braconidae	Hymenoptera	Larval instars	July-Oct
<i>Bracon hebetor</i> Say	Braconidae	Hymenoptera	Larval instars	July-Oct
<i>Chelonus carbonator</i> Marshall	Braconidae	Hymenoptera	Late larval instars	July-Oct
<i>Pristomerus sulci</i> M. & K.	Ichneumonidae	Hymenoptera	Late larval instars / Pupae	July-Oct
<i>Xanthopimpla</i> sp.	Ichneumonidae	Hymenoptera	Late larval instars / Pupae	July-Oct
Predators				
<i>Tetragnatha</i> sp.	Araneae	Tetragnathidae	Larval instars	Throughout the study period
<i>Philodromus</i> sp.	Araneae	Philodromidae	Larval instars	Throughout the study period

Table 2. Per cent parasitism of mulberry pyralid, *Glyphodes pyloalis* during 2008-2009

Period	No. of larvae collected			% Parasitism by									Total % Parasitism (Mean)
				<i>Apanteles obliquae</i>			<i>Bracon hebetor</i>			<i>Pristomerus sulci</i>			
	2008	2009	Mean	2008	2009	Mean	2008	2009	Mean	2008	2009	Mean	
July	325	85	205	28.61	15.29	21.95	5.84	4.70	5.27	6.46	4.70	5.58	27.31
August	175	145	160	28.00	16.55	22.27	6.28	4.82	5.55	5.71	4.82	5.26	27.36
September	280	230	255	29.64	18.26	23.95	5.35	6.52	5.93	5.71	6.08	5.89	30.08
October	310	255	282.5	30.64	15.29	22.96	5.48	5.88	5.68	6.12	6.66	6.39	27.36

This study reports the occurrence of some predators and parasitoids on the mulberry pyralid, *G. pyloalis* in the mulberry ecosystem under temperate climatic conditions of Kashmir, India. So far, no efforts have been made in exploiting the potential of these native parasitoids. The present study provides a foundation to explore the possibility of deploying the natural enemies for mulberry pest management under temperate conditions. In-depth studies are needed to deploy these biocontrol agents for the management of *G. pyloalis*, a serious insect pest of mulberry foliage in the region.

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