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

VISHAL MITTAL, IRFAN ILLAHI, ANIL DHAR and M. A. KHAN
Central Sericultural Research & Training Institute, Central Silk Board, Pampore 192 121, Jammu and Kashmir, India.
E-mail: vishalmittal777@yahoo.com, sirfanawp@gmail.com

**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, *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

(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, *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 larva are found. 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 predating upon the larvae of G. pyloalis during the cropping period (Table 1).

Table 1. Natural enemies of mulberry pyralid, Glyphodes pyloalis

<table>
<thead>
<tr>
<th>Name</th>
<th>Family</th>
<th>Order</th>
<th>Stage attacked</th>
<th>Period of activity</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Parasitoids</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Apanteles obliquae</em></td>
<td>Braconidae</td>
<td>Hymenoptera</td>
<td>Larval instars</td>
<td>July-Oct</td>
</tr>
<tr>
<td><em>Bracon hebetor</em></td>
<td>Braconidae</td>
<td>Hymenoptera</td>
<td>Larval instars</td>
<td>July-Oct</td>
</tr>
<tr>
<td><em>Chelonus carbonator</em></td>
<td>Braconidae</td>
<td>Hymenoptera</td>
<td>Late larval instars</td>
<td>July-Oct</td>
</tr>
<tr>
<td><em>Pristomerus sulci</em> M. &amp; K.*</td>
<td>Ichneumonidae</td>
<td>Hymenoptera</td>
<td>Late larval instars / Pupae</td>
<td>July-Oct</td>
</tr>
<tr>
<td><em>Xanthopimpla sp.</em></td>
<td>Ichneumonidae</td>
<td>Hymenoptera</td>
<td>Late larval instars / Pupae</td>
<td>July-Oct</td>
</tr>
<tr>
<td><strong>Predators</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Tetragnatha sp.</em></td>
<td>Araneae</td>
<td>Tetragnathidae</td>
<td>Larval instars</td>
<td>Throughout the study period</td>
</tr>
<tr>
<td><em>Philodromus sp.</em></td>
<td>Araneae</td>
<td>Philodromidae</td>
<td>Larval instars</td>
<td>Throughout the study period</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Period</th>
<th>No. of larvae collected</th>
<th>% Parasitism by</th>
<th>Total % Parasitism (Mean)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2008 2009 Mean</td>
<td><em>Apanteles obliquae</em> 2008 2009 Mean</td>
<td><em>Bracon hebetor</em> 2008 2009 Mean</td>
</tr>
<tr>
<td>July</td>
<td>325 85 205</td>
<td>28.61 15.29 21.95</td>
<td>5.84 4.70 5.27</td>
</tr>
<tr>
<td>August</td>
<td>175 145 160</td>
<td>28.00 16.55 22.27</td>
<td>6.28 4.82 5.55</td>
</tr>
<tr>
<td>September</td>
<td>280 230 255</td>
<td>29.64 18.26 23.95</td>
<td>5.35 6.52 5.93</td>
</tr>
<tr>
<td>October</td>
<td>310 255 282.5</td>
<td>30.64 15.29 22.96</td>
<td>5.48 5.88 5.68</td>
</tr>
</tbody>
</table>
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.

**ACKNOWLEDGEMENTS**

The authors are grateful to Dr. V. V. Ramamurthy, Principal Scientist, National Pusa Collection, Division of Entomology, IARI, New Delhi, India, for his valuable services in the identification of parasitoids. Thanks to Dr. G. K. Ramegowda, Scientist-B and Smt. Imtiayaza Akhtar, Technical Assistant, CSR &TI, Pampore, Kashmir, India, for their help during the study.

**REFERENCES**


