Journal of Biological Control, 27(4): 336–339, 2013

Research Note

Studies on natural enemies of insect pests of drumstick

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ABSTRACT: Study conducted at the University of Horticultural Sciences, Bagalkot, Karnataka brought to light six species of insects, a spider and couple of birds as natural enemies in drumstick ecosystem during the year 2012-13. Out of the natural enemies recorded, six were predators and one was parasitoid on pests in drumstick. The lady bird beetle, *Cheilomenes sexmaculata* Fabricius, pentatomid bug, *Eocanthecona furcellata* (Wolf), green lace wing, *Chrysoperla zastrowii sillemi* (Esben-Peterson), gitonid, *Cacoxenus* sp., preying mantid, *Anaxarcha limbata* Goglio-Toss, an undetermined species of spider and a parasitoid, *Agathis* sp. were recorded.

KEY WORDS: Natural enemies, drumstick ecosystem

(Article chronicle: Received: 09-10-2013; Revised: 19-12-2013; Accepted: 22-12-2013)

Drumstick is an important vegetable crop rich in minerals and vitamins. India is the largest producer of drumstick with an annual production of 1.1–1.3 million tonnes of tender fruits from an area of 38,000 ha. Among the different states, Andhra Pradesh leads in both in production and area (15,665 ha), followed by Karnataka (10, 258 ha) and Tamil Nadu (7,408 ha), whereas other states occupy an area of 4,613 ha (Singh, 2011). Over the past ten years, there has been a rapid growth in on drumstick cultivation. Considerable research has been done on its cultivation and on insect pests damaging various parts and its natural enemies. Cherian and Basheer (1939) reported one species of Ichneumonidae (*Peristomerus* sp.), three species of Braconidae (*Apanteles* sp., *Microbracon brevicornis* Wesman, *Chelonus* sp.) and three species of Chalcidoidea (*Elasmus hyblacae* Ferr., *Perilampus* sp., and *Systasis* sp.) as larval parasitoids of *Noorda moringae* Tams., from Coimbatore. Shamila *et al.* (1996) reported two pathogens *viz*., *Aspergillus flavus* Lk. and *Aspergillus niger* Van Tiegh on larvae of *Noorda blitealis* Walker from Rajasthan. Butani and Verma (1981) reported *Pericallia ricini* (Fabricius) to be parasitised by *Apanteles ricini* Bhatnagar, *Meteorus* sp., *Sturmia* sp., *Thelaira nigripes* Fab., *Euplectrus* sp. and *Henicospilus rufus* Tosq. Spiders were found inhabiting in large numbers on new flush exerting natural control on the increasing population of *N. blitealis* (Beaulah *et al.,* 2010).

But the studies on natural enemies in drumstick ecosystem particularly in agroclimatic zone 3 of Karnataka are very meager hence the present study was undertaken.

Field survey was conducted at Bagalkot (Karnataka) on the drumstick crop grown at the University of Horticulture Sciences (UHS), Bagalkot during the year 2012-13. Occurrence of natural enemies in drumstick ecosystem was studied along with phytophagus species by conducting a fixed plot survey. The established drumstick (cv. Bhagya / KDM-01) at UHS garden was pruned, manured and maintained throughout the course of study by following recommended horticultural practices except the plant protection. The occurrence of phytophagus insects and their associated natural enemies was recorded at regular intervals of 15 days by selecting 10 plants randomly.

Randomly selected 25 larvae of different insects occurring on drumstick were collected and reared in the laboratory and observed for the emergence of parasitoids. The active predators observed in the field on 10 plants selected at random were collected and confirmed with respect to their feeding habit and were later preserved for taxonomic identification.

During the period of investigation, six predators and a parasitoid were encountered as natural enemies on pests in drumstick ecosystem (Table 1). The lady bird beetle, *Cheilomenes sexmaculata* Fabricius, pentatomid bug, *Eocanthecona furcellata* (Wolf) green lace wing,

Table 1. Natural enemies and their prey / host observed in drumstick ecosystem during 2012-13

Sl. No.	Common Name	Scientific Name	Order	Family	Host / Prey
1.	Coccinellid beetle/ Lady bird beetle	*Cheilomenes sexmaculata* Fabricius	Coleoptera	Coccinellidae	Aphids
2.	Pentatomid bug	*Eocanthecona furcellata* (Wolf)	Hemiptera	Pentatomidae	larvae of *Noorda* spp.
3.	Green lace wing	*Chrysoperla zastrowii sillemi* (Esben-Peterson)	Neuroptera	Chrysopidae	Aphids, thrips, eggs larvae of *Noorda* spp.
4.	Gitonides	*Cacoxenus* sp.	Diptera	Drosophilidae	Aphids
5.	Preying mantids	*Anaxarcha limbata* Goglio- Toss	Mantodea	Mantidae	Larvae of *Noorda* spp.
6	Spiders	Undetermined	–	Arenae	Caterpillars, Ashweevils
7.	Braconid	*Agathis* sp.	Hymenoptera	Braconidae	Larvae of *N. blitealis*

Chrysoperla carnea Stephens, gitonid *Cacoxenus* sp., preying mantid, *Anaxarcha limbata* Goglio-Toss, undetermined species of spiders and a parasitoid, *Agathis* sp. were noticed.

The grubs and adults of *C. sexmaculata* were observed to predate on the aphids on drumstick. Activity of the predator was noticed during August and December. Pentatomid bug, *E. furcellata* was observed to predate on caterpillars. The activity of predator was seen in the month of August, November and January (Table 2). These predators have not been recorded earlier in the drumstick ecosystem. The green lace wings were observed to prey on sucking pests like aphids and thrips.

Cacoxenus sp. was a first record on drumstick. Chassagnard and Tsacas (2003) described seven species in the subgenus of the genus *Cacoxenus* namely, *C. campsiphallus* sp. nov. on cotton mealy bug and *C.* (*Gitonides*) *perspicax* predator on aphid, *C. orientalis* sp. nov., *C. pachyphallus* sp. nov. *Australicus* sp. nov. predator on *Psuedococcus* sp. on passion fruit. The present study also revealed one hymenopteran parasitoid, *Agathis* sp., from the larvae of *Noorda blitealis* Walker. The parasitoid was also reported by Honnalingappa (2001) on larvae of *N. blitealis* on drumstick.

In addition to the above, few general predators were noticed in drumstick ecosystem *viz.,* preying mantids, *Anaxarcha limbata* Goglio-Toss, spiders and birds. The preying mantids were observed to prey on lepidopteran caterpillars throughout the year. Spiders were observed as effective general predators in drumstick ecosystem. They fed on lepidopteran caterpillars *N. blitealis* and *N. moringae*. The activity of spiders was observed throughout the year. Beaulah *et al.* (2010) reported spiders inhabiting in large numbers on new flush, exerting natural control on the increasing population of *N. blitealis.*

ACKNOWLEDGEMENTS

The authors are grateful to Dr. C. A. Viraktamath, Principal Investigator, Network Project on Biosystematics, Department of Entomology, GKVK, Bangalore and Dr. Hannah Cornish, Natural History Museum, London (U.K) for their help in identification of natural enemies specimens.

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Table 2. Seasonal occurrence of natural enemies of drumstick pests during 2012-13*

Sl. No.	Name of natural enemies	July	Aug		Sept		Oct		Nov		Dec		Jan		Feb		March		April		May		June		Mean
		II	I	II	I	II	I	II	I	II	I	II	I	II	I	II	I	II	I	II	I	II	I	II	–
1.	*Cheilomenes*[#] *sexmaculata* (beetle/plant)	0	0	0.2	0	0	0	0	0	0.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.01
2.	*Anaxarcha limbata G*[#] 0.2	0.4	0.2	0	0.2	0	0.2	0.4	0	0	0.2	0.6	0.2	0.2	0	0	0.2	0.2	0	0	0.2	0	0.2	0.15	
3.	*Eocanthecona furcellata*[#]	0	1.0	0	0	0	0	0	0.2	0	0	0	0.4	0	0	0	0.2	0	0	0	0	0	0	0	0.07
4.	Spiders[##]	1	1.4	1.8	2.2	2.8	1.8	1.2	1.2	0.8	0.2	0.8	1.2	1.0	0.8	0.8	0	0.4	1.0	0.8	0.8	0	0	0.2	0.96
5.	Spiders on flowers	1.4	1.8	1.2	1.4	1.0	0.6	0	0.8	0.4	0.6	0.2	0	0.8	0.2	0.2	1.8	1.0	1.2	0.2	0.4	0	0	0	0.65

No per plant

No per branch/inflorescence

* Fortnightly observation

(Gitonides) Knab (Diptera: Drosophilidae). *Ann de la Soc Ent France* **39**: 271–286.

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