



Natural enemies of insect pests of cotton in Orissa

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ABSTRACT: Survey for natural enemies of major insect pests of cotton (cv. MCU-5) around Umerkote, Orissa resulted in recording six species of parasitoids, eight species of predators and two species of pathogens. The larval parasitoids viz., *Rogadinae* sp. and *Mesochorus* sp. are new records on *Earias vittella* Fabricius and *Syllepte derogata* Fabricius, respectively. Maximum activity of the natural enemies was recorded during September-November synchronizing with the peak occurrence of the pests.

KEY WORDS: Cotton, Insect pests, parasitoids, predators

Orissa, basically a non-traditional cotton growing state grows the crop mainly in the western and southern districts viz., Kalahandi, Bolangir, Nuapada, Rayagada, Koraput and Nawarangpur. This commercial crop is gaining popularity in recent years and the area has gone up to 29000 ha during 2003-04 as against an area of 2290 ha in the year 1974-75. Expansion of area of a crop, particularly cotton and its cultivation contiguously in large hectareage over years is likely to increase the pest menace. A thorough knowledge on insect pests of cotton and its natural enemies in a particular locality is imperative in order to develop bio-intensive integrated pest management tactics, as large number of natural enemies has been reported to occur in cotton ecosystem (Singh, 1992; Jayaswal and Sundaramurthy, 1992). Hence, the present investigation was undertaken to find out the potential natural enemies associated with major insect pests of cotton in Eastern Ghat High Land Zone of western Orissa.

Field survey on the occurrence of natural enemies in the cotton ecosystem were undertaken at the Regional Research and Technology Transfer Sub-Station, Umerkote in the district of Nawarangpur during 2000-01 to 2002-03. Fortnightly observations on population of predators were recorded on cotton crop (var. MCU-5) grown in plot of 500sq. m under unsprayed conditions from 2nd half of July up to harvest of crop. For recording the parasitoids, immature stages of insect pests of cotton were collected at fortnightly interval and reared in specimen tubes under laboratory conditions till the emergence of parasitoids. The specimens collected were got identified from Department of Entomology, College of Agriculture, Orissa University of Agriculture and Technology Bhubaneswar, Central Institute for Cotton Research, Nagpur and Department of Zoology, University of Calicut, Kerala.

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Table 1. Natural enemies of major insect pests of cotton at Umerkote, Orissa

Natural enemy	Host insect	Stage attacked	Activity period
A. Parasitoids Hymenoptera: Braconidae 1. <i>Rogadinae</i> sp. 2. <i>Bracon</i> sp. 3. <i>Cotesia</i> sp.	<i>Earias vittella</i> Fabricius. <i>Helicoverpa armigera</i> (Hübner). <i>Pectinophora gossypiella</i> Saunders <i>Anomis flava</i> Fabricius.	Larva Larva Larva Larva	Sept.-Nov. Sept.-Nov. Nov.-Dec. Sept.-Oct.
Diptera: Tachinidae 4. <i>Palloxista laxa</i> (Curran)	<i>A. flava</i>	Larva	Aug.- Oct.
Hymenoptera: Ichneumonidae 5. <i>Mesochorus</i> sp.	<i>Syllepte derogata</i> Fabr.	Larva	Sept.- Oct.
Hymenoptera: Trichogrammatidae 6. <i>Trichogramma chilonis</i> Ishii	<i>E. vittella</i> , <i>H. armigera</i>	Egg	Sept.- Oct.
B. Predators Neuroptera: Chrysopidae 1. <i>Chrysoperla carnea</i> (Stephens) 2. <i>Mallada boninensis</i> Okamoto	<i>E. vittella</i> , <i>H. armigera</i> <i>A. flava</i> , <i>Aphis gossypii</i> Glover	Egg and neonate larva, nymph and adult	Aug.-Oct. Aug. – Oct.
Coleoptera: Coccinellidae 3. <i>Cheilomenes sexmaculata</i> Fabr.	<i>A. gossypii</i>	Nymphs and adults	Sept.-Nov.
Hemiptera: Pentatomidae 4. <i>Eocanthecona furcellata</i> (Wolff)	<i>A. flava</i> , <i>H. armigera</i>	Early instar larvae	
Hymenoptera: Vespidae 5. <i>Delta</i> sp.	<i>A. flava</i> , <i>H. armigera</i>	Larvae	Sept. –Nov.
Diptera: Syrphidae 6. <i>Ischiodon scutellaris</i> Fabr.	<i>A. gossypii</i>	Nymphs	Aug. – Sept., Nov.
Arannae: Araneidae (Spiders) 7 <i>Argeope</i> sp., <i>Oxyopes</i> sp.	Bollworms, semilooper and leaf roller	Larvae	Sept.-Nov.
C. Pathogens Deuteromycotina: Moniliales 1. <i>Beauveria bassiana</i> (Balsamo) 2. <i>Nomuraea rileyi</i> (Farlow) Samson	<i>A. Flava</i> <i>H. armigera</i>	Larvae	Sept.- Oct.

Sixteen species of natural enemies viz., six parasitoids, eight predators and two pathogens were found attacking insect pests of cotton (Table 1). Various parasitoids recorded in the cotton ecosystem were: *Rogadinae* sp. parasitizing late instars of *Earias vittella*; *Cotesia* sp. and *Palexorista laxa* (Curran) parasitizing *Anomis flava*; *Bracon* sp. parasitizing *E. vittella* and *H. armigera* and *Mesochorus* sp. parasitizing *Syllepte derogata*.

Except *Rogadinae* sp. and *Mesochorus* sp., all the above-mentioned parasitoids have been earlier reported by Jayaswal and Sundaramurthy (1992). The eggs of *E. vittella* and *H. armigera* were parasitized by the trichogrammatid *Trichogramma chilonis* Ishii, which is in accordance with the finding of Varma and Shenhmar (1988) and Singh (1990). The present finding of parasitoids viz., *Rogadinae* sp. and *Mesochorus* sp. in cotton ecosystem is a new record.

The potential predators recorded were *Chrysoperla carnea* (Stephens), *Mallada boninensis* Okamoto, *Cheilomenes sexmaculata* Fabricius, *Eocanthecona furcellata* (Wolff.), *Delta* sp., *Ischiodon scutellaris* Fabricius and spider (*Argeope* sp. and *Oxyopes* sp.). The present finding on predators in cotton ecosystem was in support of the findings of Bhatnagar *et al.* (1983), Jayaswal and Sundaramurthy (1992), Muralidharan and Chari, (1992) and Gahukar (1997).

Among the pathogens, *Beauveria bassiana* (Balsamo) and *Nomuraea rileyi* (Farlow) Samson infected maximum larvae of *H. armigera* and *A. flava* during September – October. Mycosis of *N. rileyi* in natural population of *H. armigera* and *A. flava* has been earlier reported in India (Anon., 2000)

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