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## Natural enemies for sesame leaf Webber *Antigastra catalaunalis* (Duponchel.) (Lepidoptera: Pyralidae) on sesame

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### Abstract

A field experiment was conducted at Main Agricultural Research Station, Raichur, during *kharif* 2015 and *rabi* 2016 to study the natural enemies of capsule borer, *Antigastra catalaunalis* (Dup.) on sesame and its correlation with weather parameters. The natural enemies recorded were coccinellid beetles and spiders in the sesame field during *kharif*. Coccinellid beetles population ranged from 0.2 to 2.1 per plant during the cropping period in *kharif*. The population of coccinellid beetle reached maximum during the fourth week of October (43<sup>rd</sup> standard week) with adult population of 2.1 per plant and gradually declined thereafter during the month of November (0.3 / plant). The spider population was recorded from fourth week of September and it reached highest during the fourth week of October (1.15 / plant). Coccinellid beetle population varied from 0.1 to 1.8 larvae per plant during the cropping period during *rabi* with highest being recorded during the second week of February and gradually declined thereafter in the month of third week of February. The larval parasitoids were reared from larvae of the sesame leaf Webber *Antigastra catalaunalis* (Duponchel.) on sesame. These parasitoids recorded were *Eribor* sp. (Hymenoptera: Ichneumonidae), *Trathala flavoorbitalis* (Cameron) (Hymenoptera: Ichneumonidae), *Bassus* sp. (Hymenoptera: Ichneumonidae) *Habrobra conhebetor* (Say) (Hymenoptera: Braconidae), *Phanerotoma* sp. (Hymenoptera: Braconidae), Agathidinae (Hymenoptera: Braconidae). The infected larvae of capsule borer were brought to the laboratory and reared them in the cages to look for the emergence of parasitoids. The major predators were Coccinellid beetle and spider.

**Keywords:** Sesame, *Antigastra catalaunalis* (Dup.), natural enemies, weather parameters

### Introduction

Sesame, *Sesamum indicum* Linn., is the oldest oilseed known to man. India is among the top five countries of the world in oilseed production with an estimated 25.5 m tonnes annually. Nine edible oilseeds are cultivated in India and sesame ranks fifth in production, after groundnut, rape seed, soybean and sunflower. India is still the world leader with maximum production (25.8%) and the largest area (29.8%) as well as highest (40%) export. Sesame is grown in an area of 19.01 lakh hectares with a production of 8.10 lakh tonnes and an average yield of 426 kg/ha. In Karnataka it is being grown in 0.60 lakh hectares with a production of 0.30 lakh tonnes with an average yield of 500kg/ha (Anon., 2015) [1]. Sesame seed contains 46 to 64 per cent oil, 26.25 per cent protein, high amount of minerals such as calcium, iron, and phosphorus (Gnanasekaran *et al.*, 2010) [2]. Sesame is attacked by many insect pests. The number and importance of these pests vary from place to place, time to time and season to season. It is attacked by more than 38 insect pests at various stages of the growth (Rai, 1976) [3] of which, sesame shoot Webber and capsule borer (*A. catalaunalis*) is most serious pest throughout India. In India, infestation of insect pests is of prime importance. Out of 67 insect-pests infesting sesame crop, til leaf Webber and capsule borer, *A. catalaunalis* is the most detrimental pest infesting the crop at leaf, flower and capsules stage, causing yield loss up to 68.2 per cent (Ahuja, 1990) [4].

The pest can be managed using chemical insecticides. Insecticides do not form an economically visible solution due to unpredictable monsoon and consequently the loss of yield noticed. Therefore, there is a need to evaluate other methods of pest management currently in agricultural pest control, the adverse effect of insecticides have made the scientists to search for alternatives to chemical control based on health, environmental and economic concerns (Solomon and Schettler, 2000) [11]. Insect parasitoids play a vital role in the natural regulation of crop pests, As a result, biological control is combat pest outbreaks and in and turn in integrated pest management (Yadav and Yadav, 2013) [10]. Hence, present study is an endeavour to provide the information on the natural enemies of the *Antigastra catalaunalis* (Fig. 1).

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Fig 1: *Antigastra catalaunalis*

## Material and Methods

The sesame variety DS-5 was sown on 20<sup>th</sup> of August 2015 in *kharif* and 8<sup>th</sup> of December in *rabi*. The crop was raised with a spacing of 30 cm x 10 cm under irrigated conditions with all the agronomic practices as per the recommendation except the plant protection (Anon., 2014). After the germination of the crop, observations were recorded at weekly intervals to determine the seasonal incidence and relative abundance of important insect pest and natural enemies of sesame crop till the harvest of the crop during *kharif* and *rabi* of 2015-16. The plot was divided into sub plot and observations were recorded from 20 randomly selected plants.

The observations on predators were taken in the randomly selected plants and for parasitoids the infected larva of capsule borer were brought to the laboratory and reared them in the cages to look for the emergence of parasitoids. Emerged Parasitoids were collected from cage and preserved in the 70 per cent alcohol. Later, they were sorted out using the taxonomic keys, and the unidentified specimens were got confirmed from NBAIR specialist (National Bureau of Agricultural Insect Resources) Bangalore.

## Results

### Seasonal incidence of natural enemies of sesame

In *kharif* season the natural enemies recorded were coccinellid beetle and spider in the sesame field during *kharif*. The coccinellid beetle population ranged from 0.20 to 2.10 adults/plant during the cropping period (Table 1). The population of coccinellids reached maximum during the fourth week of October with adult population of 2.1 per plant and gradually declined thereafter in the month of November (0.3 adult / plant). The spider population was recorded from fourth week of September with a highest population during the fourth week of October (1.15 adult /plant). The population of natural enemies coincided with insect population and declined thereafter (Fig 2).

During *rabi* season coccinellid beetle population varied from 0.10 to 1.80 adult per plant during the cropping period during *rabi* (Table 2). The population reached the peak during the second week of February with an adult population of 1.8 per plant and gradually declined thereafter during the third week of February (0.1 adult per plant). The spider population was recorded from third week of January which reached peak during the second week of February (0.9 adult /plant) (Fig 3).

The parasitoids were reared from the parasitized larvae and they were identified at NBAIR Bangalore. These parasitoids recorded (Fig. 4) were *Eriborus* ssp. (Hymenoptera: Ichneumonidae), *Trathala flavoorbitalis* (Cameron) (Hymenoptera: Ichneumonidae), *Bassus* sp. (Hymenoptera:

Ichneumonidae) *Habrobra conhebtor* (Say) (Hymenoptera: Braconidae), *Phanerotoma* sp. (Hymenoptera: Braconidae), Agathidinae (Hymenoptera: Braconidae) larval parasitoid of capsule recorded (Table 3).

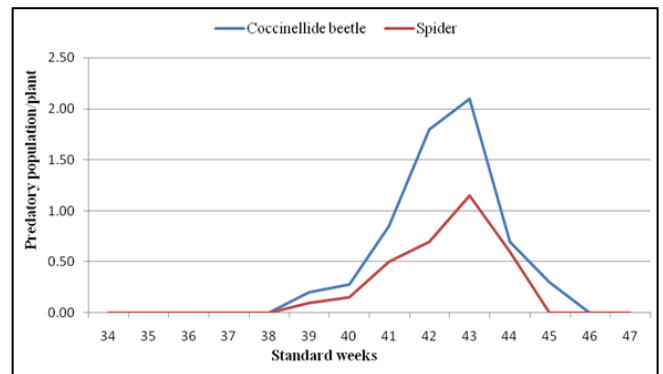


Fig 2: Seasonal incidence of natural enemies of sesame pests during *kharif* 2015-16

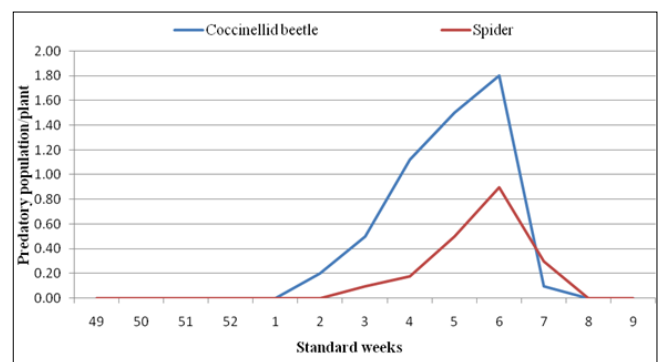


Fig 3: Seasonal incidence of natural enemies of sesame pests during *rabi* 2015-16

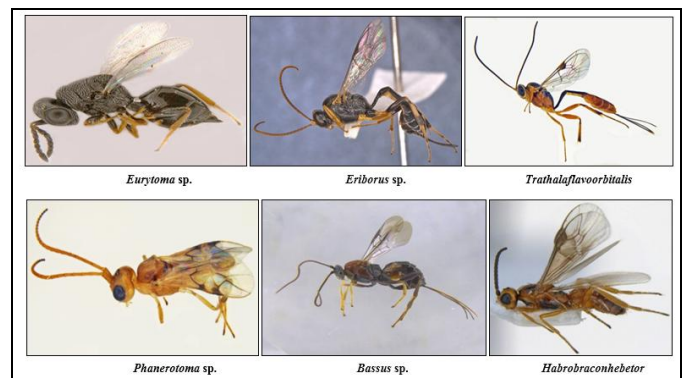


Fig 4: Parasitoids on sesame capsule borer, *A. catalaunalis*

## Discussion

The *A. catalaunalis* defined to be the important pest of sesame crop and were reported to be serious menace on it. The recorded natural enemies were in conformity with report of Choudhary *et al.* (1986)<sup>[6]</sup> who reported that 12 biotic agents constituting the parasite-predator complex in sesame ecosystem under the agroclimatic conditions of Delhi. The natural enemies were spider; coccinellid beetle, *Brumus* sp.; black ant, *Acantholepis simplex* Forel; lacewing *Chrysopascelestes* Bank; yellow wasp, *Polistes hebresus* F; Braconid parasite, *Apanteles* sp.; Ichneumonid parasite, *Trathalanoxiosanoxioso* Moorlex and *Crematus flavo orbitalis* Cam., Staphilinid beetle; Pentatomid bug, *Crematus flavo orbitalis* Wolf.; *Trichogramma* sp., Tachinid, *Zygothria* sp., and fungus, *Aspergillus flavus* Link. Sardar-

Din-Gurs and Tasawwer Husain (1997) [5] also recorded the natural enemies of capsule borer viz., *Brachymeria nigricorporis* Husain, *Doliphocerus gracilis* Hayat, *Tetrasticus* sp., *Eriborus trochanteritis*, an unidentified Dipteran and three predators namely *Eumenes dimidiatipennis*, *Polistes chabraeus* and an undetermined coleopteran grub was reared on leaf webber. Similarly results

are in confirmity with Kumar and Goel (1993) [7], Nair (1986) [8] and Patel and Bhalani (1989) [9] who documented *Elasmus brevicornis*, *Bracon kitcheneri* Dugdeon, *Micro bracon hebetor* Say, *Phenerotomahendecassisell* Cam., *Diadegma* sp, and nematode, *Mermis* sp., to parasitize the larvae of *A. catalaunalis*.

**Table 1:** Seasonal incidence of natural enemies of sesame pests during *kharif* 2015-16

Sl. No.	Month/ week	Standard week	Numbers of adult / plant	
			Coccinellid beetle	Spiders
1	Aug. III	34	--	-
2	Aug. IV	35	-	-
3	Sep. I	36	-	-
4	Sep. II	37	-	-
5	Sep. III	38	-	-
6	Sep. IV	39	0.20	0.10
7	Oct. I	40	0.28	0.15
8	Oct. II	41	0.85	0.50
9	Oct. III	42	1.80	0.70
10	Oct. IV	43	2.10	1.15
11	Nov. I	44	0.70	0.60
12	Nov. II	45	0.30	-
13	Nov. III	46	-	-
14	Nov. IV	47	-	-

**Table 2:** Seasonal incidence of natural enemies of sesame pests during *rabi* 2015-16

Sl. No.	Month/week	Standard Week	Numbers of adult / plant	
			Coccinellid beetle	Spiders
1	Dec. I	49	-	-
2	Dec. II	50	-	-
3	Dec. III	51	-	-
4	Dec. IV	52	-	-
5	Jan. I	1	-	-
6	Jan. II	2	0.20	-
7	Jan. III	3	0.50	0.10
8	Jan. IV	4	1.12	0.18
9	Feb. I	5	1.50	0.50
10	Feb. II	6	1.80	0.90
11	Feb. III	7	0.10	0.30
12	Mar. I	8	-	-
13	Mar. II	9	-	-

**Table 3:** Parasitoids recorded on sesame leaf webber, *A. catalaunalis*.

Sl. No.	Name	Order	Family	Type of parasitoid	Host
1	<i>Eriborus</i> sp.	Hymenoptera	Ichneumonidae	Larval parasitoid	leaf webber
2	<i>Trathala flavoorbitalis</i> (Cameron)	Hymenoptera	Ichneumonidae	Larval parasitoid	leaf webber
3	<i>Eurytoma</i> sp.	Hymenoptera	Eurytomidae	Larval parasitoid	Gall fly
4	<i>Bassus</i> sp.	Hymenoptera	Braconidae	Larval parasitoid	leaf webber
5	<i>Habrobra conhebetor</i> (Say)	Hymenoptera	Braconidae	Larval parasitoid	leaf webber
6	<i>Phanerotoma</i> sp.	Hymenoptera	Braconidae	Larval parasitoid	leaf webber
7	Un identified	Hymenoptera	Braconidae (Agathidinae)	Larval parasitoid	leaf webber

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