Journal of Entomology and Zoology Studies

Available online at www.entomoljournal.com

Journal of Entomology and Zoology Studies

E-ISSN: 2320-7078
P-ISSN: 2349-6800
JEZS 2018; 6(6): 57-60

Received: 10-09-2018
Accepted: 12-10-2018

Rojeet Thangjam
College of Agriculture, Kyrdemkulai, Central Agricultural University (Imphal), Meghalaya, India

AS Vastrad
Department of Agricultural Entomology, University of Agricultural Sciences, Dharwad, Karnataka, India

Correspondence
Rojeet Thangjam
College of Agriculture, Kyrdemkulai, Central Agricultural University (Imphal), Meghalaya, India

Studies on pest complex of sesame and their natural enemies in North Karnataka, India

Rojeet Thangjam and AS Vastrad

Abstract
Sesame is attacked by numerous pests which reduce its yield both in quality and quantity. To study the pest complex of sesame and their natural enemies, roving survey and fixed plot survey was conducted in North Karnataka and in Agricultural Entomology field, MARS, UAS, Dharwad during *Kharif* -2011 and summer-2012. Altogether 55 species of arthropods were found to be associated with sesame, out of which 30 species were identified as pest and 25 as natural enemies including 2 strains of entomopathogen. Among the different insect pests recorded, highest number of species was obtained in Heteroptera followed by Homoptera, Lepidoptera, Coleoptera and Thysanoptera. During *Kharif* 2011, 25 species were recorded however in summer 2012, only 22 species were recorded and their relative abundance was 53.19 and 46.81 per cent respectively. Out of 30 species recorded, *Acherontia styx*, *Spilarctia oblique*, *Nezara viridula*, *Dolycoris indicus*, *Orosius albicinctus* and *Bemisia tabaci* were the major pests but the occurrence of *Oxycarenus hyalinipennis* and unidentified mealybug was recorded for the first time which needs further investigation. Among the natural enemies recorded, 14 species were predators, 9 species were parasitoids and 2 strains of entomopathogen. The activity of the natural enemy was highest during *Kharif* 2011 than summer 2012 and their relative abundance was 58.33 and 41.67 per cent respectively.

Keywords: Sesame, pest complex, natural enemies, *kharif*, summer, North Karnataka

1. Introduction
Sesame (*Sesamum indicum* Linnaeus) is an important oilseed crop grown since the beginning of arable cultivation. The majority of the wild species of the genus *Sesamum* are native to sub-Saharan Africa. The crop is mainly grown in tropics and sub-tropics and major producing countries are India, China, Turkey, Myanmar, Pakistan, Egypt, Sudan, Greece, Venezuela, Argentina, Colombia, Nicaragua, Elsalvador, Mexico and USA. Its seeds are rich source of oil and protein. In the world it is grown on an area of 7.73 million ha with the production of 6.11 million tonnes. Among the sesame growing countries in the world, India ranks first in area (17.5 lakh ha) and production (8.93 lakh tonnes) and productivity is 368 kg/ha but its productivity is quite low as compared to world's average (489kg/ha) [1]. In India, Gujarat is the leading state contributing 22.3% of total production followed by West Bengal., Karnataka, Rajasthan, Madhya Pradesh, Tamil Nadu, Andhra Pradesh and Maharashtra. Several insect pests have been reported to infest the sesame crop causing about 25-30% yield losses [2-4]. Among various insect pests, *Acherontia styx*, *Antigastra catalaunalis*, *Cystopteris tenuis* and *Spilarctia oblique* were responsible for the low productivity of sesame [5, 8]. Piercing and sucking insects have great economic importance to sesame plants. They cause serious damage directly by sucking plant sap or indirectly by transmission of virus and Phytoplasma diseases to sesame plant [6]. Since, little work has been done on pest complex and their natural enemies on sesame ecosystem in North Karnataka. Therefore, the present investigation was undertaken to record the diversity of insect pest and their natural enemies in sesame.

2. Materials and Methods
Roving and fixed plot survey of insect pests of sesame and their natural enemies was conducted in North Karnataka during *Kharif*-2011 and summer-2012. Roving survey was conducted in the sesame growing areas of North Karnataka *viz*., Dharwad, Belgaum, Gadag, Haveri, Bijapur and Bagalkot districts when the crop was in flowering and pod maturation stage. In each district one taluk and from each taluk three to four villages and from each village one field was selected for the survey. In each field insect pests and their natural

enemies were collected for identification. Fixed plot survey was also carried out in Agricultural Entomology field, MARS, Dharwad at fortnightly intervals starting from 15 days after sowing on crop sown on four different dates at fortnightly interval. The arthropods were photographed and collected by using aspirator, pit fall trap and insect collecting net. The insect specimens were killed by using chloroform and preserved them in 80 per cent ethanol in plastic vials for small and soft bodied insects and pinning was done for larger insects. The samples were sent to National Bureau of Agricultural Insects Resources (NBAIR), Bangalore and other taxonomist for proper identification. The relative abundance was also calculated by counting total number of species in each season and sum of species and expressed in percentage.

3. Results and Discussion

During the period of investigation, sesame crop was found to be infested by different insect pests under field condition. A total of 55 species of arthropods were found to be associated with sesame, out of which 30 species were identified as pest and 25 as natural enemies including 2 strains of entomopathogen. Among the different insect pests recorded, highest number of species was obtained in Heteroptera followed by Homoptera, Lepidoptera, Coleoptera and Thysanoptera (Table 1). Out of which, *Acherontia styx*, *Spilarctia oblique*, *Nezara viridula*, *Dolycoris indicus*, *Orosius albicinctus* and *Bemisia tabaci* were the major pests whereas *Spodoptera litura* Fabricius, *Poppiocapsidea biseratense* Distant, *Nesidiocoris* sp., *Campylomma* sp., *Dortus* sp., *Eysarcoris montivagus* Distant, *Plautia crossota* Dallas, *Hermolaus typicus* Distant, *Dysdercus koenigii* Fabricius, *Spilostethus pandurus* Scopoli, *Clavigralla gibbosa* Spinola, *Cletus bipunctatus* Herrich-Schaffer, *Oxycarenus hyalinipennis* Costa, *Hishimonus phycitis* Distant, *Amrasca biguttula biguttula* Ishida, *Balclutha incisa* Matsumura, *Batracomorphus angustatus* Oshorn, *Cemus* sp., *Oliarus* sp., *Myzus persicae* Sultzer, *Scirtothrips dorsalis* Hood, *Aulacophora* sp., *Oxycetonia albopunctata* Fabricius and unidentified mealy bug were categorized as minor pest. However, the occurrence of *Oxycarenus hyalinipennis* and unidentified mealybug was recorded for the first time in sesame and therefore further investigation on these pests is required. The incidence of pests was low in summer as compare to *Kharif* season. During *Kharif* 2011, 25 species were recorded however in summer 2012, only 22 species were recorded and their relative abundance was 53.19 and 46.81 per cent respectively (Table 1 and Figure 1).

During the studies, 25 species of natural enemies belonging to 9 orders were recorded including two strains of entomopathogen among which Hymenoptera was recorded highest followed by Coleoptera, Hemiptera, Neuroptera, Diptera, Mantodea, Araneae, Baculoviruses and Moniliales (Table 2). Among the natural enemies recorded, 14 species were predators (*Cheilomenes sexmaculata* Fabricius, *Coccinella transversalis* Fabricius, *Hormonia octomaculata* Fabricius, *Scymnus* sp., *Tillus* sp., Unidentified Soldier beetle, *Geocoris* sp., *Coranus* sp., *Sycanus* sp., *Cydnocoris* sp., *Micromus* sp., *Chrysopa* sp., *Mantis religiosa* Linnaeus and *Oxyopes sp.*), 9 species were parasitoids (*Telenomus* sp., *Trichogramma* sp., *Gryon* sp., *Apanteles* sp., unidentified Ichneumonid, *Euplectrus xanthovultus* Wijesekara & Schauff, *Brachymeria* sp., *Zygobothria atropivora* Robineau-Desvoidy and *Turanogonia chinensis* Wiedeman) and 2 strains of entomopathogen (nuclear polyhedrosis virus and *Nomuraea rileyi* Samson). The activity of the natural enemy was highest during *Kharif* 2011 than summer 2012 and their relative abundance was 58.33 and 41.67 per cent respectively (Table 2 and Figure 2) and this may be due to more number of pests occurred during *Kharif* season. The present results are in conformity with findings of Nath [5] who reported 7 insect pest species of sesame from West Bengal. These include *A. styx*, *Antigastra catalaunalis*, *Diacrisia obliqua*, *Agonoscelis* sp., *Cystopteris tenuis*, *Hishimonas phycitis* and *M. persicae*. Rai [2] also reported 29 insect pests of sesame from all over India and mentioned that *A. Cataleunalis*, *Asphondylia sesami* and *Amsacta moorei* were the major pests. Bhadauria *et al.* [7] observed 25 species of insect and a mite pest on sesame at Gwalior, which includes 11 Hemipterous, 2 each of Orthopterous, Coleopterous and Dipterous and 1 Acarina pest and Biswas *et al.* [8] also reported 29 insects and one mite infesting the different growth stages of sesame and 17 different species of predators and 2 species each of parasitoids and pathogens from Bangladesh and only four namely *A. styx*, *S. obliqua*, *C. tenuis* and *A. catalaunalis* was recorded as the major pest. Similarly, Egonyu *et al.* [9] reported 38 insect pest species infesting sesame in Uganda, of which *A. catalaunalis* and *A. sesame* were the major pest. Kumar [10] also observed *A. styx* as a major pest on *Sesamum indicum* in North Karnataka and *Trichogramma chilonis* Ishii and *Zygobothria ciliata* Wulp were eggs and larval parasitoid of *A. styx*. Mallappa [11] also reported *Trichogramma chilonis*, *Zygobothria ciliata* and *Zygobothria atropivora* on sphingid moth (*Agrius convolvuli* Linnaeus) in green gram in North Karnataka.

Table 1: Insect pests of sesame with their relative abundance recorded during *Kharif* and summer 2011-12

Sl. No.	Common name	Scientific name	Family	Order/sub order	*Kharif* 2011	Summer 2012	Crop stage
1	Til hawk moth	*Acherontia styx* Westwood	Sphingidae	Lepidoptera	+	+	Vegetative to maturity
2	Bihar hair caterpillar	*Spilarctia obliqua* Walker	Arctiidae	Lepidoptera	+	+	Vegetative to pod formation
3	Tobacco caterpillar	*Spodoptera litura* Fabricius	Noctuidae	Lepidoptera	+	-	Vegetative to pod formation
4	Mirid bug	*Poppiocapsidea biseratense* Distant	Miridae	Heteroptera	-	+	Vegetative to pod formation
5	Mirid bug	*Nesidiocoris* sp.	Miridae	Heteroptera	+	+	Vegetative to pod formation
6	Mirid bug	*Campylomma* sp.	Miridae	Heteroptera	+	+	Vegetative to pod formation
7	Mirid bug	*Dortus* sp.	Miridae	Heteroptera	+	-	Vegetative to pod formation
8	Pentatomid bug	*Eysarcoris montivagus* Distant	Pentatomidae	Heteroptera	-	+	Vegetative to maturity
9	Pentatomid bug	*Plautia crossota* Dallas	Pentatomidae	Heteroptera	+	+	Vegetative to maturity
10	Green stink bug	*Nezara viridula* Linnaeus	Pentatomidae	Heteroptera	+	+	Vegetative to maturity
11	Pentatomid bug	*Dolycoris indicus* Stal.	Pentatomidae	Heteroptera	+	-	Vegetative to maturity
12	Pentatomid bug	*Hermolaus typicus* Distant	Pentatomidae	Heteroptera	-	+	Vegetative to maturity
13	Red cotton bug	*Dysdercus koenigii* Fabricius	Pyrrhocoridae	Heteroptera	+	+	Flowering to maturity
14	Seed bug	*Spilostethus pandurus* Scopoli	Lygaeidae	Heteroptera	+	+	Vegetative to maturity

15	Corid bug	*Clavigralla gibbosa* Spinola	Coriedae	Heteroptera	+	-	Vegetative to maturity
16	Spined legume bug	*Cletus bipunctatus* Herrich-Schaffer	Coriedae	Heteroptera	+	-	Flowering to maturity
17	Dusky cotton bug	*Oxycarenus hyalipennis* Costa	Oxycarenidae	Heteroptera	+	+	Flowering to maturity
18	Mealy bug	Unidentified	Pseudococcidae	Homoptera	+	-	Vegetative to maturity
19	Leafhopper	*Hishimonas phycitis* Distant	Cicadellidae	Homoptera	+	+	Vegetative to pod formation
20	Leafhopper	*Amrasca biguttula biguttula* Ishida	Cicadellidae	Homoptera	+	+	Vegetative to pod formation
21	Leafhopper	*Balclutha incisa* Matsumura	Cicadellidae	Homoptera	+	+	Vegetative to pod formation
22	Leafhopper	*Orosius albicinctus* Distant	Cicadellidae	Homoptera	+	+	Vegetative to pod formation
23	Leafhopper	*Batracomorphus angustatus* Oshorn	Cicadellidae	Homoptera	+	+	Vegetative to pod formation
24	Leafhopper	*Cemus* sp.	Delphadidae	Homoptera	-	+	Vegetative to pod formation
25	Leafhopper	*Oliarus* sp.	Cixiidae	Homoptera	-	+	Vegetative to pod formation
26	Aphid	*Myzus persicae* Sultzer	Aphididae	Homoptera	+	+	Vegetative to pod formation
27	White fly	*Bemisia tabaci* Genn.	Aleurodidae	Homoptera	+	+	Vegetative to pod formation
28	Thrips	*Scirtothrips dorsalis* Hood	Thripidae	Thysanoptera	+	+	Vegetative to flowering
29	Red pumpkin beetle	*Aulocophora* sp.	Chrysomelidae	Coleoptera	+	-	Vegetative to maturity
30	Flower beetle	*Oxycetonia albopunctata* Fabricius	Scarabaedae	Coleoptera	+	-	Seedling to flowering
Total					25	22	
Relative abundance (per cent)					53.19	46.81	

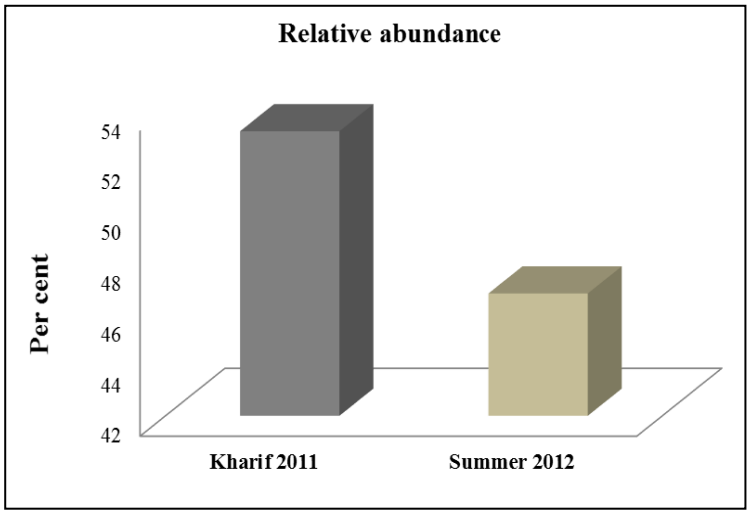

Fig 1: Relative abundance of insect pests during *Kharif* and summer 2011-2012

Table 2: Natural enemies of sesame pests with their relative abundance recorded during *Kharif* and summer 2011-12

Sl. No.	Common name	Scientific name	Family	Order	*Kharif* 2011	Summer 2012	Crop stage
1	Six-spotted ladybird	*Cheilomenes sexmaculata* Fabricius	Coccinellidae	Coleoptera	+	+	Flowering to maturity
2	Transverse ladybird	*Coccinella transversalis* Fabricius	Coccinellidae	Coleoptera	+	+	Flowering to maturity
3	Ladybird beetle	*Hormonia octomaculata* Fabricius	Coccinellidae	Coleoptera	-	+	Flowering to maturity
4	Ladybird beetle	*Scymnus* sp.	Coccinellidae	Coleoptera	-	+	Flowering to maturity
5	Checkered beetle	*Tillus* sp.	Cleridae	Coleoptera	+	-	Vegetative to maturity
6	Soldier beetle	Unidentified	Cantharidae	Coleoptera	+	-	Vegetative to maturity
7	Geocorid bug	*Geocoris* sp.	Geocoridae	Hemiptera	+	+	Vegetative to maturity
8	Assassin bug	*Coranus* sp.	Reduviidae	Hemiptera	+	+	Vegetative to maturity
9	Assassin bug	*Sycanus* sp.	Reduviidae	Hemiptera	+	-	Vegetative to maturity
10	Assassin bug	*Cydnocoris* sp.	Reduviidae	Hemiptera	+	-	Vegetative to maturity
11	Brown lace wing	*Micromus* sp.	Hemerobiidae	Neuroptera	+	+	Vegetative to maturity
12	Green lace wing	*Chrysopa* sp.	Chrysopidae	Neuroptera	+	+	Vegetative to maturity
13	Praying mantis	*Mantis religiosa* Linnaeus	Mantidae	Mantodea	+	+	Vegetative to maturity
14	Lynx spider	*Oxyopes sp.*	Oxyopidae	Araneae	+	+	Seedling to maturity
15	Egg parasitoid	*Telenomus* sp.	Platygastridae	Hymenoptera	+	+	Vegetative to pod formation
16	Egg parasitoid	*Trichogramma* sp.	Trichogrammatidae	Hymenoptera	+	+	Vegetative to pod formation
17	Egg parasitoid	*Gryon* sp.	Scelionidae	Hymenoptera	-	+	Vegetative to pod formation
18	Ichneumonid parasitoid	*Apanteles* sp.	Braconidae	Hymenoptera	+	-	Vegetative to pod formation
19	Ichneumonid parasitoid	Unidentified	Ichneumonidae	Hymenoptera	+	-	Vegetative to pod formation
20	Chalcid parasitoid	*Euplectrus xanthovultus* Wijesekara & Schauff	Eulophidae	Hymenoptera	+	-	Flowering to maturity

21	Chalcid parasitoid	*Brachymeria* sp.	Chalcididae	Hymenoptera	+	-	Flowering to maturity
22	Tachinid flies	*Zygobothria atropivora* Robineau-Desvoidy	Tachinidae	Diptera	+	+	Vegetative to maturity
23	Tachinid flies	*Turanogonia chinensis* Wiedeman	Tachinidae	Diptera	-	+	Vegetative to maturity
24	Virus	NPV		Baculoviruses	+	-	Vegetative to maturity
25	Fungus	*Nomuraea rileyi* (Farlow) Samson	Moniliaceae	Moniliales	+	-	Vegetative to maturity
Total					21	15	
Relative abundance (per cent)					58.33	41.67	

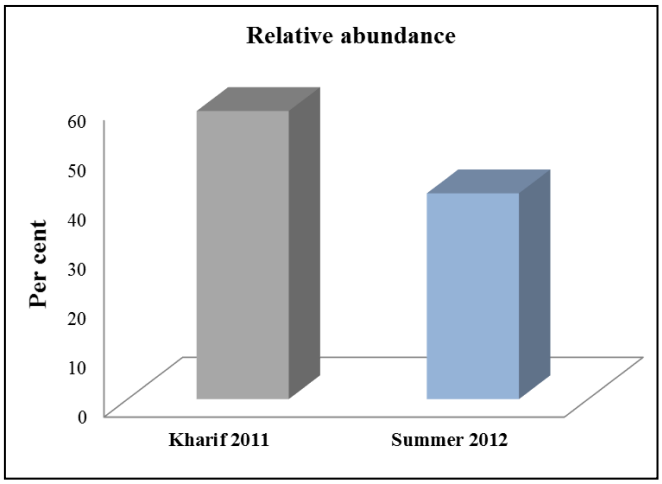

Fig 2: Relative abundance of natural enemies during *Kharif* and summer 2011-2012

4. Conclusion

Many predators, parasitoids, entomopathogenic fungus and viruses have been identified from sesame ecosystem. It is therefore required to study about the efficiency of some of the important predators and parasitoids in order to reduce the use of chemical pesticides in sesame and also conserved many natural enemies as well as the pollinators.

5. Acknowledgement

The authors gratefully acknowledge the help rendered by Dr. C.A. Viraktamath, Bengaluru, Dr. Kumar Ghorpade, Dharwad, Dr. T.C. Narendranan, Kerela and other taxonomist of NBAIR, Bengaluru for identifying the insect specimens.

6. References

1. Anonymous. Third Advance Estimates of Production of Oilseeds & Other Commercial Crops for 2011-12, Directorate of Economics & Statistics, Department of Agriculture & Cooperation, Agricultural Statistics Division (India), 2012.
2. Rai BK. Pests of Oilseed Crops in India and Their Control. Indian council of Agricultural Research. New Delhi, India. 1976, 76-80.
3. Weiss EA, Oilseed Crops. Longman Inc. New York, 1983, 660.
4. Nayar KK, Ananthakrishnan TN, David BV. General and Applied Entomology. Tata McGraw Hill Pub. Co. Ltd. New Delhi, 1986, 589.
5. Nath DK. Note on the insect pests of sesame (*Sesamum indicum* L.) of West Bengal. Indian Journal of Agricultural Research. 1975; 9(3):151-152.
6. El-Gindy MA. Studies on certain homopterous insect vectors of plant pathogenic diseases. PhD thesis. Faculty of Agriculture, Zagazig University, Zagazig, (Egypt), 2002.
7. Bhadauria NKS, Bhadauria NS, Dwivedi US. Pest complex of sesamum and their status under Gwalior condition (M.P.). Agricultural Science Digest. 2000; 20(2):108-109.
8. Biswas GC, Kabir SMH, Das GP. Insect pests of sesame, *Sesamum indicum* Linn. in Bangladesh, their succession and natural enemies. Indian Journal of Entomology. 2001; 63(2):117-124.
9. Egonyu JP, Kyamanywa S, Anyanga W, Ssekabembe CK. Review of pests and diseases of sesame in Uganda. African Crop Science Conference Proceedings. 2005; 7:1411-1416.
10. Kumar K. Biology, seasonal incidence and management of *Acherontia styx* Westwood on sesame. M. Sc. (Agri.) Thesis, Univ. Agric. Sci., Dharwad, Karnataka (India), 2011.
11. Mallappa. Survey and surveillance of green gram sphingid, *Agrius convolvuli* (Linnaeus) (Lepidoptera: Sphingidae) and its management. M. Sc. (Agri.) Thesis, Univ. Agric. Sci., Dharwad, Karnataka (India), 2010.