



Diversity of Hemipteran Insects with Different *Kharif* crops in Rajasthan

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ABSTRACT

The present investigation entitled Diversity of Hemipteran Insects with different *Kharif* crops in Bikaner vicinity, Rajasthan was carried out during the year 2020-2021 in the Department of Entomology, College of Agriculture, Swami Keshwanand Rajasthan Agricultural University, Bikaner. The collection of hemipteran insects was started in the last week of July from different crops grown in the vicinity of district Bikaner, Rajasthan and continued up to the mid October. The maximum number (761 insects out of 2327) of hemipteran insects were associated with the crop family Gramineae followed by family Leguminosae (32.16%) and Malvaceae (27.30%).

Key Word: Family, Fauna Hemiptera, *Kharif*, Insects

INTRODUCTION

Biological diversity means the variability among the living organisms from all sources including, interalia, terrestrial, marine, and other aquatic ecosystems and the ecological complexes of which they are a part; this includes diversity within species, between species and of ecosystems (Harper and Hawksworth, 1994). Usually, biodiversity is considered at 3 levels genetic diversity, species diversity and ecosystem diversity (Solbrig, 1991). Insects are the world's most diverse group of animals on earth, in terms of both taxonomic diversity and ecological function. Insects represent the vast majority of species in terrestrial and fresh water ecosystem (Belamkar and Jadesh, 2014). Hemipteran insects that are usually are of great economic importance as most of them are pests of various commercial crops.

The crops grown in *Kharif* season of Bikaner district are bajra, moth bean, moong bean, cluster bean, groundnut and cotton. About 200 insect pests

that belongs to different families of Hemiptera, Coleoptera, Diptera, Hymenoptera, Lepidoptera, Orthoptera Thysanoptera and 7 species of mites of order Acarina are known to infest these *kharif* crops. The foliage feeding insect fauna of Coleoptera and Lepidoptera have been well documented in literature. With regards to the insect fauna of order Hemiptera, many pestiferous and predatory insect fauna of hemipteran happens to be incompletely documented for *Kharif* crops in Bikaner district of Rajasthan. The present study on diversity of hemipteran fauna will help us in understanding the species complex and their distribution in *kharif* ecosystem in Bikaner vicinity.

MATERIALS AND METHODS

The study site was located in North Bikaner at 28.01°N latitude and 73.22°E longitude with an altitude of 234.70 meters above mean sea level. This region falls under Agro Climatic Zone I C [Hyper Arid Partially Irrigated Western Plain

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Zone] of Rajasthan and Agro Climatic Zone XIV (Western Dry Region) of India. The climate of this zone is typically arid, which is characterized with low rainfall and wide range of temperature in summer and winter. During the summers, temperature go as high as 48° C, while in winters, it may fall as low as 0° C. The annual rainfall of this tract is 250 mm which is mostly received from July to September. The relative humidity varies between 8 to 92 per cent. This region prone to high wind velocity and soil erosion, soil drifting due to high wind velocity leads to soil erosion. The study was conducted at research farms of College of Agriculture, Agricultural Research Station, landscape area of Swami Keshwanand Rajasthan Agricultural University and vicinity of Bikaner. Moth bean, cluster bean, groundnut, cotton, pearl millet, cowpea, mung bean, millets, brinjal, okra and sponge guard were grown during the *Kharif* season. The research farms of the university were surrounded by neem, khejri, peepal and other trees species.

The material required for collecting the hemipterans were insect collecting net, insect killing bottles, forceps, hand lens, entomological pins, drying chamber, small hair brush, ethyl alcohol (90%), stereo zoom microscope, different colour century papers, insect preservation boxes etc. Family level identification of hemipteran fauna with the help of following taxonomic key (Choate, 2010 and Wilson, 2005) and collected during the investigations was done in Post Graduate Laboratory, Department of Entomology, College of Agriculture, Swami Keshwanand Rajasthan Agricultural University, Bikaner during 2020-21. Some of the specimens were submitted to Department of Entomology, University of Agricultural Science, GKVK, Bengaluru for species identification and got identified.

RESULTS AND DISCUSSION

The collection of Hemipteran insects was started in the last week of July to the mid October. During this period, a total 2476 Hemipterans were

collected from field of different places by using net, hand picking and preserved for further study and some Hemipterans were collected from light source of study area (table 1). The similar study was conducted by Chandra and Kushwaha (2015) on the true bugs (Hemiptera) fauna at Pachmarghi biosphere reserve, M.P., India. They recorded more than 250 specimens of true bugs from different localities. Identification was made through the current literature including the volumes of Fauna of British by Distant (1902 & 1904). In the line of present investigation, Chandra *et al* (2012) carried out the study on distribution and diversity of Hemiptera fauna of Veerangana Durgavati Wildlife Sanctuary, Damoh, Madhya Pradesh (India). They were recorded total 136 specimens of hemipteran fauna.

The data (Table 1) indicated that maximum number (761 insects out of 2348) of hemipteran insects were associated with the crop family Gramineae and shared about 32.41 per cent of the total insects where pearl millet was the main crop. The next in terms of association (755 insects) was noticed with the family Leguminosae (32.16%) in which Moth bean, Moong bean, Cluster bean, Groundnut were the main crop and this was followed by Malvaceae (27.30%). The family Solanaceae (108 insects), Cucurbitaceae (87 Insects) and Pedaliaceae (32 insects) could harbour low percentage of hemipteran insects and their numbers were 4.60, 2.17 and 1.36 per cent, respectively. It was observed that most of hemipteran insects were polyphagous and did not spare any crop ecosystem in this locality. The present findings got support from investigation of Seni (2021) who reported that a total of 18 hemipteran insect taxa belonging to 11 insect families were documented from the pigeon pea ecosystem during the study. Among them, nine taxa *viz.*, *Megacopta cribraria* Fabricius, *Otinotus oneratus* (Walker), *Clavigralla gibbosa* (Spinola), *Clavigralla scutellaris* (Westwood), *Aphis craccivora* Koch, *Piezodorus hybneri* (Gmelin), *Nezara viridula* (Lin.), *Empoasca kerri* Pruthi, *Riptortus linearis* (Fab.) were most abundant in

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Table 1. Collection of Hemipteran insects in *kharif* crops during 2020-21.

Sr. No.	Location	Host	No. of insects collected	Family
1.	COA Agronomy field, ARS Fields	Groundnut, Millets, Cowpea, Cotton, Cluster bean, Moong, Moth,	567	Pentatomidae
2.	COA Agronomy field, ARS Fields	Cotton, Groundnut, Okra, Millets, Cowpea,	424	Lygaeidae
3.	COA Agronomy field, ARS Fields	Cotton, Okra, Millets, Brinjal	330	Cicadellidae
4.	COA Agronomy field, ARS Fields	Cotton, Sesame, Millets, Moong, Brinjal, Cluster bean,	251	Miridae
5.	COA Agronomy field, ARS Fields	Pearl Millet	149	Delphacidae
6.	COA Agronomy field, ARS Fields	Groundnut, Millets, Cowpea	131	Cydnidae
7.	COA Agronomy field, ARS Fields	Water Sources	80	Corixide
8.	COA Agronomy field	Cotton, Okra	70	Aleyrodidae
9.	COA Agronomy field, ARS Fields	Pearl Millet, Cotton	66	Alydidae
10.	COA Agronomy field, ARS Fields	Cowpea, Cluster bean, Pearl Millet, Cotton, Moth, Khejri,	62	Coreidae
11.	IFS unit, COA Agronomy field	Sponge guard, Moth	51	Dinidoridae
12.	ARS Fields	Groundnut	45	Aphididae
13.	COA Agronomy field, ARS Fields	Pearl Millet, Cotton	41	Reduviidae
14.	COA Agronomy field, ARS Fields	Cotton, Okra	30	Pyrrhocoridae
15.	COA Agronomy field, ARS Fields	Groundnut, Pearl Millet	28	Geocoridae
16.	COA Agronomy field, ARS Fields	Cotton, Pearl Millet	27	Rhyparochromidae
17.	COA Agronomy field, ARS Fields	Brinjal, Pulses, Pearl Millet	27	Tingidae
18.	COA Agronomy field, ARS Fields	Water Sources	22	Belastomidae
19.	COA Agronomy field, ARS Fields	Weed	22	Stenocephlidae
20.	COA Agronomy field, ARS Fields	Cotton	20	Scutelleridae
21.	COA Agronomy field, ARS Fields	Cowpea, Millets	18	Anthocoridae
22.	COA Nursery	Brinjal	10	Membracidae
23.	COA Agronomy field, ARS Fields	Water Sources	5	Hydrometridae
	Total		2476	

COA*(College of Agriculture, SKRAU, Bikaner)

ARS*(Agricultural Research Station, SKRAU, Bikaner)

IFS*(Integrated Farming System, SKRAU, Bikaner)

pigeon pea ecosystem. They observed in vegetative to reproductive stages of the crop and mostly abundant in November and December. Among miridae family, two insects namely *Poppiocapsidea (=Creontiades) biseratense* (Distant) and *Eurystylus*

bellevoyei (Reuter) were first time observed in pigeon pea in Odisha and under lygaeidae family, *Graptostethus servus* (Fabricius) was first time appeared as pest of pigeon pea.

Table 2. Association of Hemipteran insects with different crop families during Kharif 2020-21.

Sr. No.	Crop family	Total number of insects	Percentage (%)	Major crops
1.	Gramineae	761	32.41	Pearl millet
2.	Leguminosae	755	32.16	Moth bean, Moong bean, Cluster bean, Groundnut & Khejri
3.	Malvaceae	641	27.30	Cotton, Okra
4.	Solanaceae	108	4.60	Brinjal
5.	Cucurbitaceae	51	2.17	Sponge guard
6.	Pedaliaceae	32	1.36	Sesame
	Total	2348	100	

CONCLUSION

Hemipteran fauna was found more active during kharif season particularly in the month of September to October. Hemipterans families viz, *Pentatomidae*, *Lygaeidae*, *Cicadellidae*, and *Miridae* were found dominant in this locality. Crop family Gramineae (pearl millet) and Leguminosae showed maximum association with hemipteran insects and minimum association showed by family Pedaliaceae and Cucurbitaceae. Membracidae, an economically important family had low population in kharif season whereas *Stenocephalidae*, *Geocoridae*, *Scutelleridae*, *Anthocoridae*, *Rhyprochromidae*, *Cydnidae*, *Corixide*, *Hydrometridae* and *Dinidoridae* recorded first time from this area.

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