



Spider Diversity in Agroecosystem of Akot region district Akola (Vidharbh)

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Abstract:

Spiders are one of the predatory fauna found in agriculture fields which feeds on a wide range of insect pests and hence acts as buffer to limit pest populations. In our present study spiders were collected from cotton, banana, citrus field. Area of Akot region, dis Akola, Vidharbha. Akot is located at 21.1° N 77.06° E it has an average elevation of 345 meters. The investigation was carried out for a period of six months from September 2016 to February 2017. spider were collected from using hand picking, visual search method. During this study 14 species belonging to 12 genera and 7 families. Araneidae, Salticidae, Oxyopidae, Philodromidae, Scytodidae, Uloboridae, Lycosidae. Araneidae represented maximum number of species. The richness of the spider species based on the fluctuation in different months by the seasonal variation.

Keywords: Spider diversity agroecosystem Akot region Cotton, banana and Citrus.

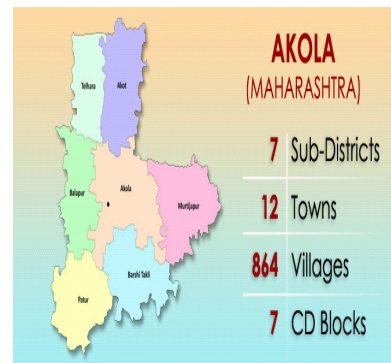
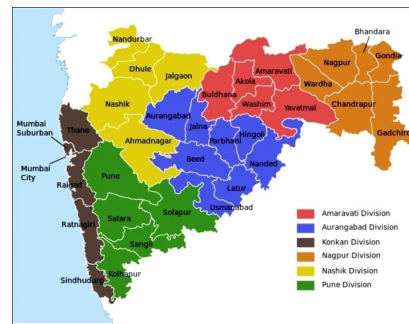
Introduction:

Cumulative studies made on spider from three major agricultural fields of Akot, district Akola Vidharbha. The agricultural ecosystem in Akot is entirely dependent on rainy season as there is hardly any irrigation facility available in this area. Also the agriculture fields are continuously been disturbed by farmers for getting fodder (weeds grown in between the main crops) to feed their cattle's. Spiders belonging to the order Araneae are generalist predators and one very potential biological agent in controlling insect pests in agricultural ecosystems (Marc 1999). Spiders are ubiquitous in terrestrial ecosystems and abundant in both natural and agricultural habitats (Turnbull 1973). They play an important role in regulating insect pests in agriculture ecosystems. Spider feed on insect and other Arthropods. They play important roles in pest's control. 46617 species of spiders have been identified in the world (World Spider Catalog Version 18.0) Family of spiders that are often found in agroecosystems and play an important role in the natural control of insect pest species are members of the Araneidae, Linyphiidae, Lycosidae, Oxyopidae, Salticidae, Tetragnatidae, and Thomisidae (Susilo F. 2007). Spiders are considered to be of economic value to farmers as they play valuable role in pest management by consuming large number of prey in the agriculture fields without any damage to crops (Rajeshwaram 2005), (Sundaeland 1999)..

MATERIAL AND METHODS

The study area was located in Akot region, in Akola district. Maharashtra, India Akot is located at 21.1° N 77.06° E it has an average elevation of 345 meters.

Map AKOT REGION: DISTRIC AKOLA, VIDHARBHA



The investigation was carried out for a period of six months from September 2016 to February 2017. Sampling was conducted in 6 month at the

randomly from selected cotton, banana and orange field. Sampling was done every month from quadrates. Spider were collected from 1 quadrates (1sq.m x 1sq.m) placed at four comers and centre of 10 sq.m x 10 sq.m area by visual search and hand picking method. Spiders were preserved after proper stretching into 70% alcohol. Morphological characters were noted down. Identification was done on basic of morphometric characters of various body parts and genitalia. The help was mainly taken from the keys and catalogues provided by Biswas&Biswas (2003,2004) Nentwig (2004) and Plantik (2004), world spider catlogue version 15 (2015) and various literature and information and photographs available on internet and other relevant literature.

OBSERVATION AND RESULT

Present study made on spider diversity in agroecosystem of Akot region Akola. At random

sampling were made from cotton, banana, and citrus cultivated area during this study we collected 20 spider species belonging to seven families (Table 1).

The population dynamic of spider collection yielded 20 species belonging to Twelve genera and seven families. Among the seven families, Araneidae 42%, Salticidae 14.28%, Oxyopidae 14.28%, Philodromidae 7.14%, Scytodidae 7.14%, Uloboridae 7.14%, Lycosidae 4.14%. Araneidae represented maximum number of species followed by Salticidae, Oxyopidae, Philodromidae, Scytodidae, Uloboridae, Lycosidae. (Table 1).

Generic diversity study show 4 genera belonging to family Araneidae, one genera to lycosidae, two genera represent by oxypidae, one genera to philodromidae two genera belonging to salticidae and one genera to uloboridae (table 1).

Table 1- Taxonomical diversity of spider from different habitat of Akot region, district Akola during September 2016-February 2017.

Family	No. of Genera	No. of Species	% of Species
Araneidae	04	06	42%
Lycosidae	01	01	4.14%
Oxyopidae	02	02	14.28%
Philodromidae	01	01	7.14%
Salticidae	02	02	14.28%
Scytodidae	01	01	7.14%
Uloboridae	01	01	7.14%
Total	12	14	

Species diversity study shows that maximum species belong to family Araneidae i.e. six species they are *Neosconatheisi* followed by *Neosconaoaxacensis*, *Neosconamukharji*, *Araneussp*, *Eriovixiasp* and *Cyclosa sp*. In the studied area Table 2. Whereas Oxyopidae and Salticidae represent two species each they are *Oxypussp*, *Oxyopesmacilentus*, *Phintellavitata* and *Stenaelurillusalbus* respectively while remaining

family represent one species each such as *Paradosasp*, spitting spider and *Uloboroussp* respectively (Table 2). Similar result were also reported by Keshwani and Vankhede (2012) from the agroecosystem of Amravati district.

Comparative microhabitat study reveals that banana agro-ecosystem shows more spider diversity followed by Cotton, Banana and Orange agroecosystem.

Table 2) Taxonomical diversity of spider from different habitat of Akot region, district Akola during September 2016-February 2017.

Habitat	Family	Genus/species	
Banana	• Araneidae	1) <i>Araneussp</i>	
		2) <i>Cyclosasp</i>	
		3) <i>Eriovixiasp</i>	
Cotton	• Philodromidae	1) <i>Haarvest man</i>	
		• Araneidae	1) <i>Neosconatheise</i> female
			2) <i>Neosconoaxacensis</i> female
			3) <i>Neosconasp</i> female
			4) <i>Neosconasp</i> male
			5) <i>Neosconatheise</i>
	6) <i>Neosconamukharji</i>		
	• Lycosidae		1) <i>Paradosasp</i>
	• Oxyopidae	1) <i>Oxypussp</i>	
	• Salticidae	1) <i>Phintellavitata</i>	
		2) <i>Stenaelurillusalbus</i>	
	• Scytodidae	• <i>Spitting spider</i>	
	• Uloboridae	1) <i>Uloboroussp</i>	
Orange	• Araneidae	1) <i>Araneussp</i>	
		• Oxyopidae	1) <i>Oxyopesmacilentus</i>

Table 3: Species richness of spider from different habitat of Akotregion ,district Akola September2016-February 2017.

Family	Species/Genera	No.of Ind.	% of species
Araneidae	<i>Araneussp</i>	01	0.78%
	<i>Cyclosasp</i>	02	1.56%
	<i>Eriovixiasp</i>	01	0.78%
	<i>Neosconatheisife</i> male	25	19.53%
	<i>Neosconoaxacensis</i> female	29	22.65%
	<i>Neosconasp</i> female	18	14.06%
	<i>Neosconasp</i> male	06	4.68%
	<i>Neosconamukharji</i>	1	0.78%
	Lycosidae	<i>Paradosasp</i>	2
Oxyopidae	<i>Oxypussp</i>	5	3.90%
	<i>Oxyopesmacilentus</i>	1	0.78%
Salticidae	<i>Phintellavitata</i>	10	7.81%
	<i>Stenaelurillusalbus</i>	3	2.34%
Scytodidae	<i>Spitting spider</i>	3	2.34%
Uloboridae	<i>Uloboroussp</i>	20	15.62%
	Total	128	

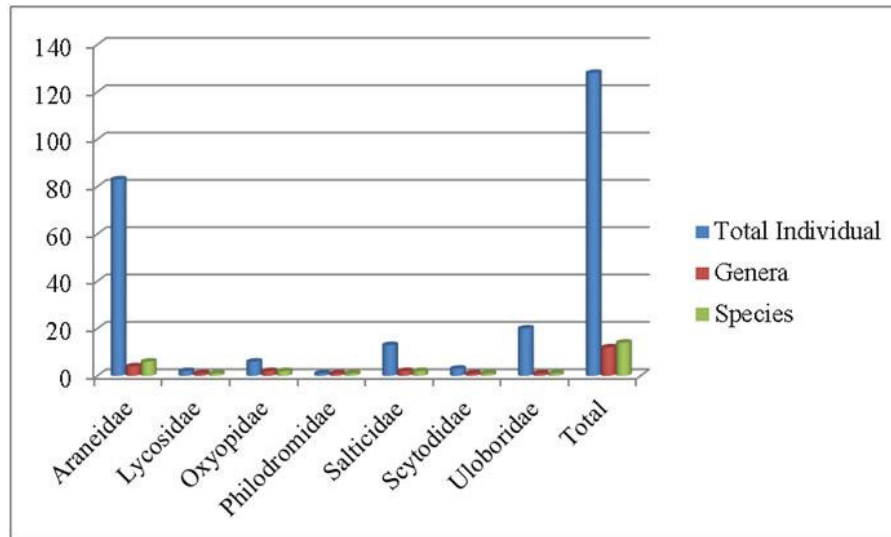
In the present study we collected 128 individuals of the different species belonging to the six family (Table 3).

Species richness study reveals that *Neosconaoaxacensis* (22.65%); *Neosconatheisi* (19.53%) *Neosconasp* (14.06%); *Cyclosasp* (1.56%);

Neosconasp male (4.68%) and *Araneussp*, *Eriovixiasp*, *Neosconamukharji* (0.78%) in the collected sample (Table 3 and photoplate 1-6).

Graphical study shows that member of family Araneidae predominant through the period of investigation (Graph 1)

Graph 1: Spider diversity of Agroecosytem in Akot region District Akola during September 2016 to February 2017.



Graph 2: Species richness of agroecosytemAkot region District Akola during September 2016 to February 2017.

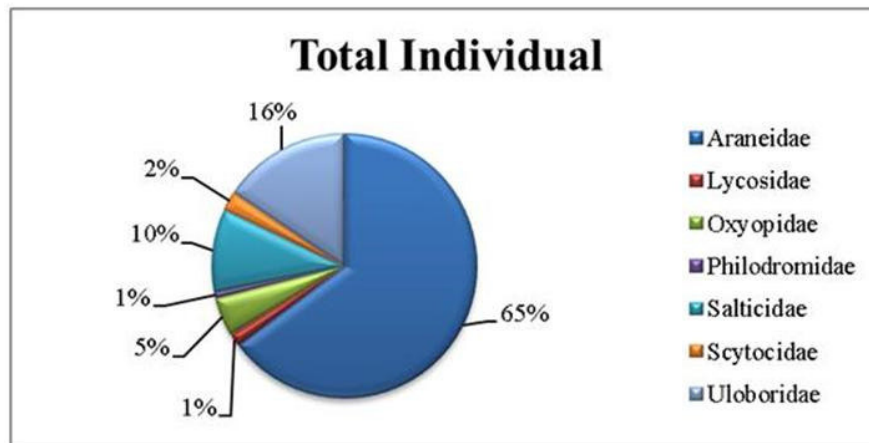


PHOTO PLATE : -

ARANEIDEA :-



Dorsal view
Araaneussp.



Dorsal view
Cyclosa sp.



Dorsal view
Eriovixia sp.



Dorsal view
Neosconatheis sp.



Dorsal view
Neosconaoaxacensis female



Dorsal view
Neoscona female



Dorsal view
Neoscona male



Dorsal view
Neosconaoaxacensis female



Dorsal view
Neosconaoaxacensis male



Dorsal view
Neosconatheisi female



Dorsal view
Neosconamukharji

LYCOSIDAE :-



Dorsal view
Paradosa sp.

OXYOPIDAE :-



Dorsal view
Oxyopus sp.



Dorsal view
Oxyopesmacilentus

PHILODROMIDAE:-



Dorsal view
Haarvestman

SALTICIDAE :-



Dorsal view
Phintela vitata



Dorsal view
Stenaelurillusalbus

SCYTODIDAE :-



Dorsal view
Spitting spider

ULOBORIDAE :-



Dorsal view
Uloboroussp.

DISCUSSION

In the present study, Fourteen species of spiders belonging to seven families in Akot region collected and identified. These spiders were belonging to the family Araneidae, Lycosidae, Oxyopidae, Philodromidae, Salticidae, Scytodidae, Uloboridae. In this study two species of spiders were observed, one is web weaver and another one is non – web weaver. The web weaving spiders were belonging to the family Araneidae and Lycosidae. The non-web weaving spiders were belonging to the family Salticidae, Oxyopidae. The seasonal variation of

spider population dynamics from this sites have been observed in the cotton field, maximum web – weaving individual had been found in cotton field November while less number of individual, were recorded during February. The study was resulted to identification of fourteen species belonging to twelve genera and eight families. The major families were, Araneidae, Oxyopidae and Salticidae, Scytodidae. Spiders are ubiquitous predators that are abundant and diverse in agricultural ecosystems. Spider assemblages have the ability to limit population growth of arthropod pests alone or in combination

with other natural enemies (Mansour *et al.*, [1980], Oraz and Grigarick [1989], Riechert and Bishop [1990]; Carter and Rypstra [1995]).

CONCLUSION

Spiders are common and occur in high numbers in cotton fields, where they are also some of the very first predators to colonize the fields. In cotton fields they occur on the plants as well as the soil surface. Spiders have a very wide range of prey, including all stages of a pest such as eggs, larvae, pupae and moths. They can show a reproductive response to increased numbers of a pest and prey preferentially on pests occurring in large numbers. Owing to the different guilds they occupy various families are affected differently by pesticides. Their presence in cotton fields should be encouraged and steps should be taken to protect them from harmful chemicals. Although spiders may be incapable of controlling major pest outbreaks by themselves, their role in a complex predatory community could be important in regulating pest species at low densities early in the season and between peaks of pest species activity. They may play an important role in keeping pests at endemic levels and prevent outbreaks from occurring in the first place. The total collected sample of spider comprised 128 individuals consisting of 14 species, 12 genera, and 7 families. We collected from Cotton, Banana, Orange habitat.

SUMMARY

In present study during Sept. 2016 to Feb. 2017 the population dynamic of spider collection yielded 20 species belonging to 12 genera and seven family in regions different sides likes Popatkhed, Akola Road, Vai area.

Comparative study of spider diversity in different habitat reveals that more spider were recorded from Banana, Cotton and Orange field among the seven family observed.

Highest species were found in Araneidae family six species followed by Uloboridae, Salticidae, Oxyopidae, Scytodidae, Philodromidae respectively.

SUGGESTION

Spider is important biological agent which help to control pest population in agroecosystem so there is need to use spider in agroecosystem for maintaining harmonious nature of environment

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