

DIVERSITY OF SPIDERS IN THE AGRICULTURAL FIELDS FROM CHANDURBAZAR, DISTRICT AMRAVATI, MAHARASHTRA STATE

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ABSTRACT

Spiders are insectivorous predators on earth. Spiders are eight eyes and eight legs small creature. Spiders, are the most common ubiquitous animals on land, constitute an essential portion of the predatory arthropods in several ecosystems. Spiders play an important role in insect pest control without any harm to ecosystem. They are Feed on insects and consume large number of preys without damaging the crops. Recently in agricultural fields reduced pesticide use and ecological sustainability have lead to increased interest in spiders as potential biological pest control agents. Considerably insect populations increases when release from predations by spiders. Regularly use of pesticides in agricultural fields which decreases the spider populations. Spiders are among the most abundant insectivorous predators of Terrestrial ecosystem. Spider species abundance in agro-ecosystem can be high as undisturbed natural ecosystem. Spiders act as pest control creature, which feeds on crop destructive insects. A survey of Spiders was carried out in Chandurbazar of Amravati District during September 2019- September 2020. This article presents a study on the Diversity, distribution and current status of spider families in Chandurbazar of Amravati District. During the present study I have reported 112 species of Spiders belonging to 13 Families and 34 genera. Spiders of Families Araneidae, Clubionidae, Eresidae, Gnaphosidae, Lycosidae, Oecobiidae, Oxyopidae, Salticidae, Sparassidae, Tetragnathidae, Theridiidae, Thomisidae, and Uloboridae were recorded during the investigation. Such surveys are vital for conservation of these creatures in the light of climate change and building a biodiversity spider fauna.

Keywords: Spiders, Diversity, Chandurbazar, Maharashtra State.

Introduction

Spiders belong to order Araneae, class Arachnida and are members of phylum Arthropoda, animal with jointed legs and hard exoskeleton. They are the largest group of arachnids comprising more than 40,000 species distributed over 62 families over worldwide. They have unique habitat and they live in almost all the environments. Spiders are one of the dominant predatory groups found in ecosystems in India. They have special adaptations towards a predatory way of life. Their distensible abdomens enable them to consume large amounts of food in relatively short periods of time, while their rate of predation may greatly increase during short periods when plentiful supply of food is available. Spiders are known to occupying most of the terrestrial habitats. They are generalist predator, which can act against a broader range of insect pests. Sunderland K. and Samu F.(2000).

Spider species abundance in ecosystem can be high as undisturbed natural ecosystem. Spiders act as pest control creature, which feeds on crop destructive insects. Spiders are beneficial bio-control agent of insect pest in ecosystem.

S. Jeyaparvathi, S. Baskaran and G. Bakavathiappan (2013). Spiders are known to occupying most of the terrestrial habitats. They are generalist predator, which can act against a broader range of insect pests. In spite of their importance as generalist predator, the role of spiders in ecosystems is usually ignored, mainly because spiders do not fit the conventional profile of biological control agents. The current global list of spider fauna is approximately 44,223 belonging to 3929 genera and 111 families (Platnick N. I. 2019). Spiders play an important role in insect pest control without any harm to ecosystem. Recently in agricultural fields reduced pesticide use and ecological sustainability have lead to increased interest in spiders as potential biological pest control agents. Spiders act as natural biological control agent in ecosystem. Some recent workers on Indian spiders include Majumdar and Tikader (1991), Reddy and Patel (1992), Biswas and Biswas (1992), Sadana and Goel (1995), Biswas et al. (1996), Gajbe, U. A. (1999), Biswas and Majumdar (2000), Biswas B. and Biswas K. (2003). A survey of Spiders was carried out in Agro ecosystem of Chandurbazar, District Amravati during September 2019 – September 2020.

Materials and Methods

Study Area

Chandurbazar is the most diversity rich agro-ecosystem in Amravati District. Chandurbazar is the municipal council of the district Amravati, approximately 35 km. Chandurbazar is situated about 10 kilometers from the border of Madhya Pradesh. Chandurbazar is located between N21.2417° and E77.7456° with an elevation on 720 meters. Cool climate in the city when compared to Vidarbha region. Summer is also not so hot as compared to other Vidarbha regions. The annual rainfall averages 850 mm. Total area under forest is 90 sq km. It is dry deciduous type and mixed type of forest with some grassland forest. The area receives rainfall during southwest monsoon. Average temperature of the district ranges from minimum of 10°C in winter to a maximum of 45°C in summer with the relative humidity varying from 10-15% to 60-90%.

The spider inventory studies were conducted from September 2019 to September 2020 in the five different Agroecosystems of Chandurbazar, district Amravati from Maharashtra state. I have selected Six microhabitats for observations in the study area viz; agricultural land.

Sampling methods

Spider Inventory work was conducted at the ecosystems by different groups of workers. Four surveys were conducted per season at all study sites. Five 25 x 25 m quadrates were taken for extensive surveys. All surveys were conducted in the morning hours between 7:00 am to 9:00 am Spiders were collected by adopting standard sampling techniques as described below.

1. Sweep netting: Spiders from herbaceous-shrub-small tree vegetation were collected using standardized insect-collecting net. This method is used to collect the foliage spider by this method from herbs and shrubs.

2. Beating sheets: Spiders from trees and woody shrubs were dislodged and collected on a sheet by beating trees and shrubs with a standard stick. 10 beats per tree or shrub were employed in each quadrat.

3. Active searching and hand picking: Spiders from all three layers were collected using this method. In this method spider specimens were actively searched for 30 minutes per quadrat for searching under rocks, logs, ground debris, and loose dead barks of trees etc.

4. Litter Sampling: Litter i.e. deciduate from the ground was collected by hand and was put in big tray. Litter sampling involved sorting of spiders from litter collection tray.

Collected spiders were photographed in life and later preserved in 70% ethyl alcohol. Identification: Spiders were observed using stereo zoom microscopes for studying identification keys. All specimens were initially separated from other material and identified to the family level. Spiders were identified upto species level using the standard monographs, Majumder S.C. and Tikader B. K. (1991).

Result

During the present study I have reported 112 species of Spiders belonging to 13 Families and 34 genera. Spiders of Families ARANEIDAE, CLUBIONIDAE, ERESIDAE, GNAPHOSIDAE, LYCOSIDAE, OECOBIDAE, OXYOPIDAE, SALTICIDAE, SPARASSIDAE, TETRAGNATHIDAE, THERIDIIDAE, THOMISIDAE and ULOBORIDAE were recorded during the investigation.

Sr. No.	Family	Species	Common Name of Spiders	Locality
01	ARANEIDAE (34)	<i>Araneus cucurbitinus</i> ♀	Orb Weaver	Cotton Field
02		<i>Araneus mitifica</i> (Simon) ♀	Orb Weaver	Cotton Field
03		<i>Araneus mitifica</i> (Simon) ♂	Orb Weaver	Cotton Field
04		<i>Araneus pachganiensis</i> ♀	Orb Weaver	Cotton Field
05		<i>Araneus pahalgaoensis</i> ♀	Orb Weaver	Cotton Field
06		<i>Argiope aemula</i> ♀	Orb Weaver	Cotton Field
07		<i>Argiope aemula</i> ♂	Orb Weaver	Cotton Field
08		<i>Chorizopes anjanus</i> ♂	Orb Weaver	Cotton Field
09		<i>Chorizopes calciopae</i> ♀	Orb Weaver	Cotton Field
10		<i>Cyclosa bifida</i> (Doleschall) ♀	Orb Weaver	Banana Field

11		<i>Cyclosa bifida</i> (Doleschall)♂	Orb Weaver	Banana Field
12		<i>Cyclosa confraga</i> (Thorell)♀	Orb Weaver	Banana Field
13		<i>Cyclosa fissicauda</i> Simon ♀	Orb Weaver	Banana Field
14		<i>Cyclosa insulana</i> (Costa) ♂	Orb Weaver	Banana Field
15		<i>Cyclosa moonduensis</i> ♀	Orb Weaver	Banana Field
16		<i>Cyclosa moonduensis</i> ♂	Orb Weaver	Banana Field
17		<i>Cyclosa mulmeinensis</i> ♀	Orb Weaver	Banana Field
18		<i>Cyclosa neilensis</i> Tikader ♀	Orb Weaver	Banana Field
19		<i>Cyclosa simoni</i> ♀	Orb Weaver	Banana Field
20		<i>Cyrtophora bidenta</i> ♀	Orb Weaver	Banana Field
21		<i>Cyrtophora cicatrosa</i> ♀	Orb Weaver	Banana Field
22		<i>Cyrtophora citricola</i> ♀	Orb Weaver	Banana Field
23		<i>Larinia chloris</i> (Audouin) ♀	Orb Weaver	Jawar Field
24		<i>Larinia chloris</i> (Audouin) ♂	Orb Weaver	Jawar Field
25		<i>Neoscona achine</i> (Simon) ♀	Orb Weaver	Jawar Field
26		<i>Neoscona achine</i> (Simon) ♂	Orb Weaver	Jawar Field
27		<i>Neoscona bengalensis</i> ♀	Orb Weaver	Jawar Field
28		<i>Neoscona bengalensis</i> ♂	Orb Weaver	Jawar Field
29		<i>Neoscona nautica</i> ♀	Orb Weaver	Jawar Field
30		<i>Neoscona nautica</i> ♂	Orb Weaver	Jawar Field
31		<i>Neoscona theis</i> ♀	Orb Weaver	Cotton Field
32		<i>Neoscona theis</i> ♂	Orb Weaver	Cotton Field
33		<i>Zygiella indica</i> Tikader ♀	Orb Weaver	Cotton Field
34		<i>Zygeilla indica</i> Tikader ♂	Orb Weaver	Cotton Field
35	CLUBIONIDA	<i>Clubiona acanthochemis</i> ♀	Sac Spider	Cotton Field
36	E (3)	<i>Clubiona analis</i> Thorell ♀	Sac Spider	Cotton Field
37		<i>Clubiona analis</i> Thorell ♂	Sac Spider	Cotton Field
38	ERESIDAE(2)	<i>Stegodyphus sarasinorum</i> ♀	Colonial Spider	Papaya Field
39		<i>Stegodyphus sarasinorum</i> ♂	Colonial Spider	Papaya Field
40	GNAPHOSID	<i>Drassodes lubrica</i> Simon ♀	Ground dwelling	Cotton Field
41	AE (8)	<i>Drassodes sagarensis</i> ♀	Ground dwelling	Cotton Field
42		<i>Gnaphosa poonaensis</i> ♀	Ground dwelling	Cotton Field
43		<i>Gnaphosa poonaensis</i> ♂	Ground dwelling	Cotton Field
44		<i>Sosticus nainitalensis</i> ♀	Ground dwelling	Cotton Field
45		<i>Sosticus poonaensis</i> ♀	Ground dwelling	Cotton Field
46		<i>Zelotes poonaensis</i> ♂	Ground dwelling	Cotton Field
47		<i>Zelotes sajali</i> Tikader♀	Ground dwelling	Cotton Field
48	LYCOSIDAE	<i>Hippasa greenalliae</i> ♀	Wolf Spider	Jawar Field
49	(20)	<i>Hippasa greenalliae</i> ♂	Wolf Spider	Jawar Field
50		<i>Hippasa partita</i> ♀	Wolf Spider	Jawar Field
51		<i>Hippasa partita</i> ♂	Wolf Spider	Jawar Field
52		<i>Hippasa pisaurina</i> ♀	Wolf Spider	Jawar Field
53		<i>Hippasa pisaurina</i> ♂	Wolf Spider	Jawar Field
54		<i>Lycosa barnesi</i> Gravely ♀	Wolf Spider	Jawar Field
55		<i>Lycosa bistriata</i> Gravely ♀	Wolf Spider	Cotton Field
56		<i>Lycosa choudhuryi</i> ♀	Wolf Spider	Cotton Field
57		<i>Lycosa poonaensis</i> ♀	Wolf Spider	Cotton Field
58		<i>Lycosa poonaensis</i> ♂	Wolf Spider	Cotton Field
59		<i>Lycosa prolifica</i> Pocock ♀	Wolf Spider	Cotton Field
60		<i>Pardosa annandalei</i> ♂	Wolf Spider	Cotton Field
61		<i>Pardosa annandalei</i> ♂	Wolf Spider	Cotton Field
62		<i>Pardosa birmanica</i> ♀	Wolf Spider	Cotton Field
63		<i>Pardosa birmanica</i> ♂	Wolf Spider	Chilly Field
64		<i>Pardosa timida</i> (Simon) ♀	Wolf Spider	Chilly Field

65		<i>Pardosa timida</i> (Simon) ♂	Wolf Spider	Chilly Field
66		<i>Pardosa minutus</i> ♀	Wolf Spider	Chilly Field
67		<i>Pardosa minutus</i> ♂	Wolf Spider	Chilly Field
68	OECOBIIDAE	<i>Oecobius marathaus</i> ♀	Tiny Spider	Cotton Field
69	(2)	<i>Oecobius marathaus</i> ♂	Tiny Spider	Cotton Field
70	OXYOPIIDAE	<i>Oxyopes bharatae</i> Gajbe ♀	Lynx Spider	Cotton Field
71	(9)	<i>Oxyopes biharensis</i> ♀	Lynx Spider	Cotton Field
72		<i>Oxyopes burmenicus</i> ♀	Lynx Spider	Cotton Field
73		<i>Oxyopes chittrae</i> ♀	Lynx Spider	Cotton Field
74		<i>Oxyopes elongates</i> ♀	Lynx Spider	Cotton Field
75		<i>Oxyopes pankaji</i> Gajbe ♀	Lynx Spider	Tur Field
76		<i>Oxyopes pankaji</i> Gajbe ♂	Lynx Spider	Tur Field
77		<i>Peucetia viridana</i> ♀	Lynx Spider	Tur Field
78		<i>Peucetia viridana</i> ♂	Lynx Spider	Tur Field
79	SALTICIDAE(<i>Marpissa decorata</i> ♀	Jumping	Cotton Field
80	12)	<i>Marpissa dhakuriensis</i> ♀	Jumping	Cotton Field
81		<i>Myrmarachne maratha</i> ♀	Jumping	Cotton Field
82		<i>Myrmarachne maratha</i> ♂	Jumping	Cotton Field
83		<i>Phidippus pateli</i> Tikader ♀	Jumping	Cotton Field
84		<i>Phidippus paykulli</i> ♀	Jumping	Cotton Field
85		<i>Plexippus paykullii</i> ♀	Jumping	Cotton Field
86		<i>Plexippus paykullii</i> ♂	Jumping	Jawar Field
87		<i>Rhene indicus</i> Tikader ♀	Jumping	Jawar Field
88		<i>Rhene indicus</i> Tikader ♂	Jumping	Jawar Field
89		<i>Telamonia dimidiata</i> ♀	Jumping	Tur Field
90		<i>Telamonia dimidiata</i> ♂	Jumping	Tur Field
91	SPARASSIDA	<i>Heteropoda venatoria</i> ♀	Giant Crab	Tur Field
92	E(2)	<i>Heteropoda venatoria</i> ♂	Giant Crab	Tur Field
93	TETRAGNAT	<i>Leucauge decorata</i> ♀	Water orb weaver	Cotton Field
94	HIDAE(2)	<i>Leucauge fastigata</i> ♀	Water orb weaver	Cotton Field
95	THERIDIIDAE	<i>Argyrodes gouri</i> ♀	Cob web Spider	Cotton Field
96	(2)	<i>Argyrodes gouri</i> ♂	Cob web Spider	Cotton Field
97	THOMISIDAE	<i>Thomisus pugillis</i> ♀	Crab Spider	Sunflower Field
98	(13)	<i>Thomisus pugillis</i> ♂	Crab Spider	Sunflower Field
99		<i>Thomisus whitakeri</i> ♀	Crab Spider	Sunflower Field
100		<i>Tmarus pachpediensis</i> ♀	Crab Spider	Sunflower Field
101		<i>Xysticus jayanti</i> ♀	Crab Spider	Sunflower Field
102		<i>Xysticus minutes</i> Tikader ♀	Crab Spider	Sunflower Field
103		<i>Xysticus minutes</i> Tikader ♂	Crab Spider	Sunflower Field
104		<i>Synaema decorata</i> ♀	Crab Spider	Sunflower Field
105		<i>Synaema decorata</i> ♂	Crab Spider	Sunflower
106		<i>Thomisus elongates</i> ♀	Crab Spider	Sunflower Field
107		<i>Thomisus beautifularis</i> ♀	Crab Spider	Sunflower
108		<i>Thomisus pooneus</i> ♂	Crab Spider	Sunflower Field
109		<i>Thomisus projectus</i> ♀	Crab Spider	Sunflower Field
110	ULOBORIDA	<i>Uloborus danolius</i> ♀	Feather leg Spider	Cotton Field
111	E(3)	<i>Uloborus danolius</i> ♂	Feather leg Spider	Cotton Field
112		<i>Uloborus khasiensis</i> ♀	Feather leg Spider	Cotton Field

Table No. 1: Checklist of Spider fauna of Agroecosystems from Chandurbazar in Amravati district of Maharashtra State.

Sr. No.	Family	Genera	Species
01	ARANEIDAE	08	34
02	CLUBIONIDAE	01	03
03	ERESIDAE	01	02
04	GNAPHOSIDAE	04	08
05	LYCOSIDAE	03	20
06	OECOBIIDAE	01	02
07	OXYOPIDAE	02	09
08	SALTICIDAE	06	12
09	SPARASSIDAE	01	02
10	TETRAGNATHIDAE	01	02
11	THERIDIIDAE	01	02
12	THOMISIDAE	04	13
13	ULOBORIDAE	01	03
Total		34	112

Table No. 2 Checklist of Spider Species from Agro-ecosystems of Chandurbazar, district Amravati, Maharashtra state.

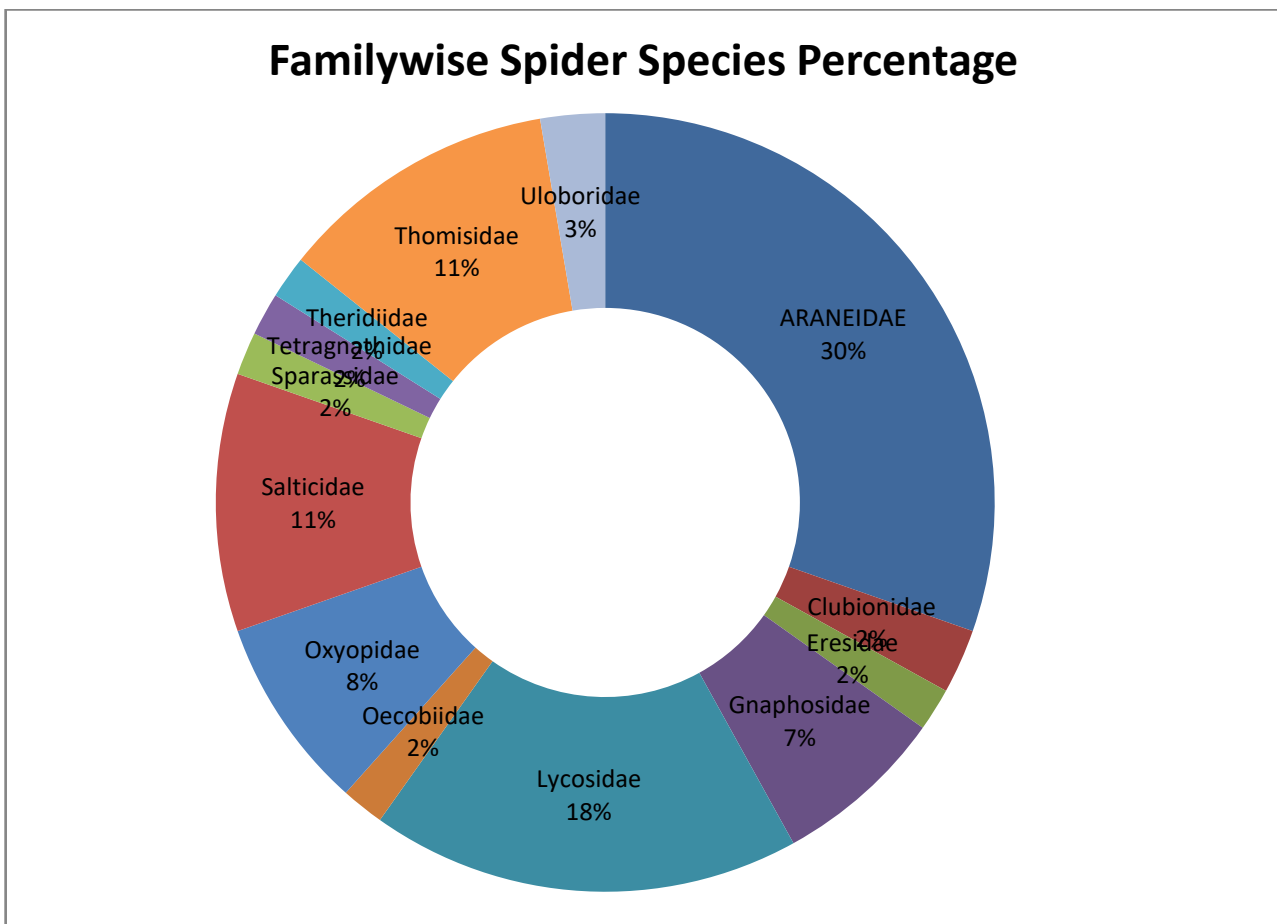


Fig. 1. Graph showing family wise Spider Species Percentage from Agro-ecosystems of Chandurbazar, district Amravati, Maharashtra state.

Discussion

In the present study, I have collected 112 species of spiders belonging to 34 genera of 13 families in Chandurbazar, district Amravati.

These spiders were belonging to the family Araneidae, Clubionidae, Eresidae, Gnaphosidae, Lycosidae, Oecobiidae, Oxyopidae, Salticidae, Sparassidae, Tetragnathidae, Theridiidae, Thomisidae and

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, Eresidae, Oecobiidae, Tetragnathidae, Theridiidae, and Uloboridae. The non web weaving spiders were belonging to the family Clubionidae, Gnaphosidae, Lycosidae, Oxyopidae, Salticidae, Sparassidae and Thomisidae. The increase in the spider density suggests that spider density is influenced by the increase in prey density. In particular, the interaction of prey and predator shows a constant numerical interaction about these relationships which is fundamental to biological control. Spiders are considered as the favorable biological control agents in the Agro ecosystem. In my investigation I have seen that the abundance of Five Family Spiders species were more. For details I have arranged the data in a Table 2 Format of systematic way. The abundance of Spider families is represented as:

ARANEIDAE 34 > LYCOSIDAE 20 >
THOMISIDAE 13 > SALTICIDAE 12 >
OXYOPIDAE 09.

Mostly Araneidae family spiders are in Cotton field. Thomisidae spiders are more because Sunflower field are in large numbers. Major

Five Families i. e. Araneidae, Lycosidae, Thomisidae, Salticidae and Oxyopidae having occupying maximum percentage area in agro-ecosystems.

Conclusion

During investigation we have studied 112 species belonging to 34 genera of 13 spider Families. On the above result and discussion it is clear that the Spiders are very much important creature. Species abundance of spider in agro ecosystem can be high. Spiders are beneficial bio-control agent of insect pest in the Agro ecosystem.

Spider's predatory capacity can have an effect in decreasing densities of insect pests, when they are used to balance the effect of insecticides and Pesticides. Some spiders are among the most effective predators of leafhoppers, caterpillars, and other pests. Aphids are rarely important pests of Cotton. Some Spiders and Spider lings are main control agents of aphids. Due to destroying the pest or insects, spiders are friends of farmer. Most spiders feeds on insects that's why productivity of crop gets increased, hence spiders are important Pests control agents. Spiders are good pest controller; hence it is Friend of Farmer.

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