

DIVERSITY OF SPIDERS IN AGRO-ECOSYSTEMS OF TAHSIL ANJANGAON-SURJI DISTRICT AMRAVATI(M. S.)

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ABSTRACT

Spiders are among the most abundant insectivorous predators of Terrestrial ecosystem. Spiders are widespread and diverse predators that are part of terrestrial Arthropod assemblages. Spiders are one of the most diverse animal groups in the World. Spiders play an important role as stabilizing agents or regulators of insect populations in agro, forest and other terrestrial ecosystems. Thus their presence in an ecosystem may well influence the population dynamics of other arthropods present. Spiders play an important role in insect pest control without any harm to agro-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 agro-ecosystem. Considerably insect populations increases when release from predations by spiders. Regularly use of pesticides in agricultural fields which decreases the spider populations. 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. Spiders are beneficial bio-control agent of insect pest in agro-ecosystem. A survey of Spiders was carried out in Agro-ecosystems of Anjangaon surji, Amravati District during Oct. 2018 – Oct.2019. During the present study I have reported 156 species of Spiders belonging to 16 Families and 62 genera. Spiders of Families ARANEIDAE, CLUBIONIDAE, ERESIDAE, GNAPHOSIDAE, HERSILIDAE, LYCOSIDAE, OXYOPIDAE, PHILODROMIDAE, PHOLCIDAE, SALTICIDAE, SCYTODIDAE, SPARASSIDAE, TETRAGNATHIDAE, THERIDIIDAE, THOMISIDAE, and ULOBORIDAE were recorded during the investigation. This article presents a study on the distribution and current status of spider families in this agro-ecosystem of Anjangaon surji, Amravati District. Such surveys are vital for conservation of these creatures in the light of climate change and building a biodiversity database of spider fauna of Vidarbha in near future.

Keywords: Diversity, Agro-ecosystems, Spiders, Anjangaon-surji.

Introduction

Spiders are an important but generally poorly studied group of arthropods that play a significant role in the regulation of insect pests and other invertebrate populations in most ecosystems. Spiders are among the most abundant insectivorous predators of Terrestrial ecosystem. Biodiversity can be simply defined as the variety of all types of living organism. Spiders are among the most diverge group on earth, which received the sixth ranking in global diversity after the sixth largest insect orders. Spiders belonging to the order Araneae, which is one of the major group of creature. The current global list of spider fauna is approximately 44,057 belonging to 3928 genera and 110 families (Platnick N. I. 2019). The spider fauna of India is represented by 1520 spider species belonging to 377 genera and 60 families (Sebastian and Peter, 2009). There still exist major gaps in our knowledge of biodiversity of spiders in many areas within varied ecosystems of India.

Spiders play an important role in insect pest control without any harm to agro-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 agro-ecosystem. Considerably insect populations increases when release from predations by spiders. Regularly use of pesticides in agricultural fields which decreases the spider populations. 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 K. Biswas 2003.

Materials and Methods

Study Area

Anjangaon surji is the diversity rich agro-ecosystem in Amravati District. It is situated at the westernmost border of Vidarbha region of Maharashtra and is 800 km from the state capital, Mumbai. Anjangaon surji is a big

Tahsil of Amravati District of Maharashtra, located in the easternmost part of it. The settlement emerged as a small and big farmer's village, and it has been developing fastly. Anjangaon is located at 21.1641°N 77.3159°E. It has an average elevation of 374 meters (1227 feet). Anjangaon surji is a city and a municipal council in Amravati district in the state of Maharashtra, India. Anjangaon City got the status of Municipal Council in 1930. It is the first municipal council established in Amravati district & the second biggest council. Anjangaon Surji Tahsil was established in 1981. It is technically made up of two main zones, Anjangaon and Surji, on either side of Shahanur River, and is called Anjangaon-Surji in combination.

Anjangaon surji is located between N21.1641° and E77.3159° with an elevation on 374 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 800 mm. The area receives rainfall during southwest monsoon. Average temperature of the district ranges from minimum of 10°C in winter to a maximum of 44°C in summer with the relative humidity varying from 10-19% to 65-90%.

The spider inventory studies were conducted from October 2018 to October 2019 in the ten different localities of Anjangaon surji, Amravati district from Maharashtra state. I have selected Ten microhabitats for observations in the study area viz; agricultural land.

Experimental and sampling methods

Spider Inventory work was conducted at the agro-ecosystems by different groups of workers. Two surveys were conducted per season at all study sites. Five 20 x 20 m quadrates were taken for extensive surveys. All surveys were conducted in the morning hours between 6:00 AM to 09:00 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. 20 standard sweeps were employed per quadrat.

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.

Preservation

Collected spiders were photographed in life and later preserved in 75% 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).

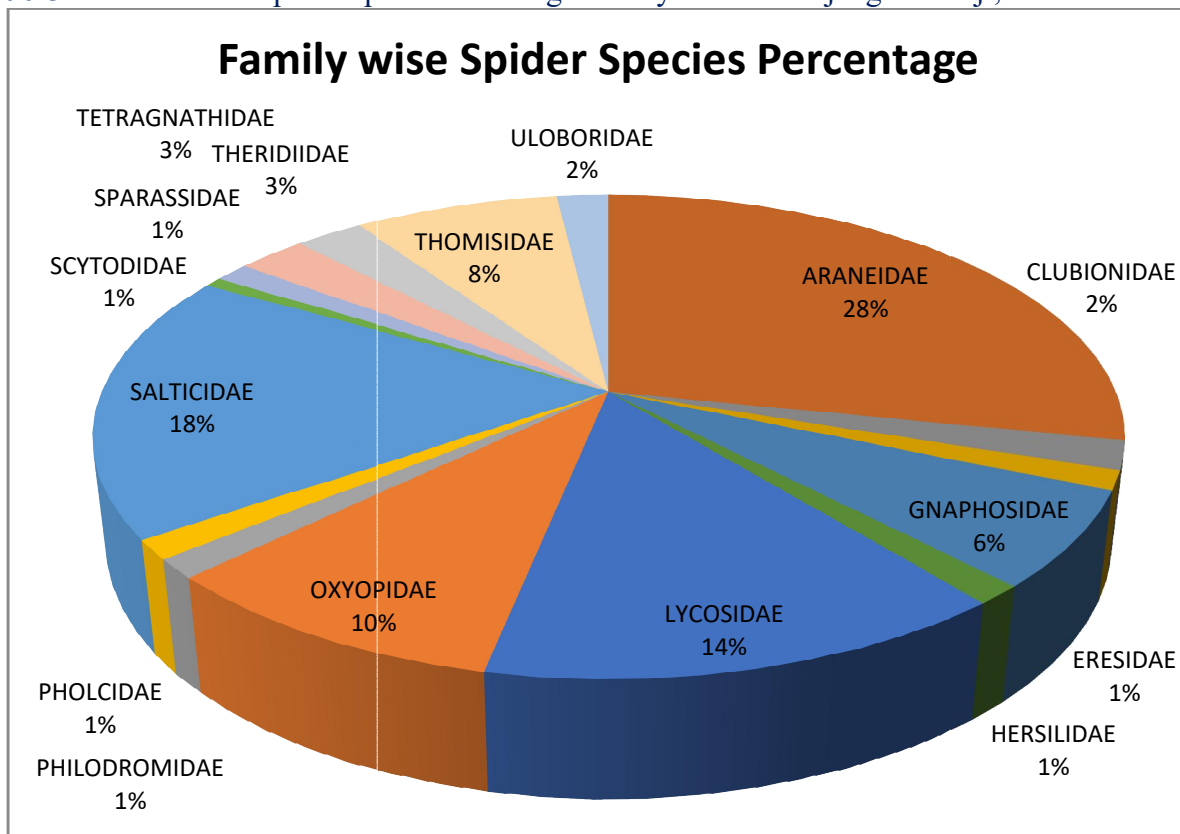
Spider species abundance in agro-ecosystem can be high as undisturbed natural ecosystem. Spiders act as pest control creature, which feeds on crop destructive insects. Spiders are beneficial bio-control agent of insect pest in agro-ecosystem. S. Jeyaparvathi, S. Baskaran and Ga. Bakavathiappan (2013). A survey of Spiders was carried out in Agro-ecosystems of Anjangaon surji, Amravati District during Oct. 2018 – Oct. 2019.

Result and Discussion

During the present study I have reported 156 species of Spiders belonging to 16 Families and 62 genera. Spiders of Families ARANEIDAE, CLUBIONIDAE, ERESIDAE, GNAPHOSIDAE, HERSILIDAE, LYCOSIDAE, OXYOPIDAE, PHILODROMIDAE, PHOLCIDAE, SALTICIDAE, SCYTODIDAE, SPARASSIDAE, TETRAGNATHIDAE, THERIDIIDAE, THOMISIDAE, and ULOBORIDAE were recorded during the investigation.

Sr. No.	Family	Genera	Species
1	ARANEIDAE	14	44
2	CLUBIONIDAE	01	03
3	ERESIDAE	01	02
4	GNAPHOSIDAE	03	10
5	HERSILIDAE	01	02
6	LYCOSIDAE	10	22
7	OXYOPIDAE	06	15
8	PHILODROMIDAE	01	02
9	PHOLCIDAE	01	02
10	SALTICIDAE	12	28
11	SCYTODIDAE	01	01
12	SPARASSIDAE	01	02
13	TETRAGNATHIDAE	02	04
14	THERIDIIDAE	02	04
15	THOMISIDAE	05	12
16	ULOBORIDAE	01	03
Total		62	156

Table1: Checklist of Spider Species from Agro-ecosystems of Anjangaon surji, Dist. Amravati.



Graph1: Family wise spider Species Percentage in Agro-field of Anjangaon surji, District Amravati.

Discussion

In the present study, 156 species of spiders belonging to 62 genera of 16 families in agro-ecosystem of Anjangaon surji, district Amravati collected and identified. These spiders were belonging to the family

Araneidae, Clubionidae, Eresidae, Gnaphosidae, Hersilidae, Lycosidae, Oxyopidae, Philodromidae, Pholcidae, Salticidae, Scytodidae, 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, Pholcidae, Tetragnathidae, Theridiidae, and Uloboridae. The non web weaving spiders were belonging to the family Clubionidae, Gnaphosidae, Hersilidae, Lycosidae, Oxyopidae, Philodromidae, Salticidae, Scytodidae, 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. In my investigation I have seen that the abundance of Five Family Spiders species were more. The Orb waver spiders of Family Araneidae and Jumping spiders of Family Salticidae are widely distributed. The Orb waver spiders of Family Araneidae form web and the insect pest entangled in web

spiders feeds on them. The Members of Salticidae directly feeds on insect Pest. Araneidae>Salticidae>Lycosidae>Oxyopidae>Thomisidae

Conclusion

In my investigation I have studied 156 species belonging to 62 genera of 16 Spider Families. On the above result and discussion it is clear that the Spiders are very much important creature. Spiders are act as good Pest controller. Avoid the regular use of pesticides in agricultural fields which decreases the spider populations, so species abundance of spider in agro-ecosystem can be high. Spiders are beneficial bio-control agent of insect pest in agro-ecosystem. The present work includes the Taxonomic position and list of diversified species of spiders. The major families abundant in this agro-ecosystem are ARANEIDAE 44, SALTICIDAE 28, LYCOSIDAE 22, OXYOPIDAE 15 and THOMISIDAE 12.

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