

Diversity of Spiders in Agro-ecosystems of Buldhana District (M. S.) India

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Abstract

Spiders are among the most abundant insectivorous predators of Terrestrial ecosystem. 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 increase 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 Buldhana, District during Sep.2018- Sep.19. This article presents a study on the distribution and current status of spider families in this agro-ecosystem of Buldhana District. During the present study I have reported 137 species of Spiders belonging to 16 Families and 61 genera. Spiders of Families Araneidae, Clubionidae, Eresidae, Gnaphosidae, Hersilidae, Lycosidae, Miturgidae, Oxyopidae, Philodromidae, Salticidae, Scytodidae, Sparassidae, Tetragnathidae, Theridiidae, Thomisidae, 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 database of spider fauna of Vidarbha in near future.

Keywords: Diversity, Agro-ecosystems, Spiders.

Introduction

Spiders are the small creature present everywhere on the earth. The current global list of spider fauna is approximately 44,057 belonging to 3928 genera and 110 families [1]. The spider fauna of India is represented by 1520 spider species belonging to 377 genera and 60 families [2]. There still exist major gaps in our knowledge of biodiversity of spiders in many areas within varied ecosystems of India. Some recent workers on Indian spiders include Majumdar and Tikader [3], Reddy and Patel [4], Biswas and Biswas [5], Sadana and Goel [6], Biswas *et al.* [7], Gajbe [8], Biswas and Majumdar [9], Biswas and Biswas [10], Ahmed [11], Bhattacharya *et al.* [12], Asarkar and Ade [13], Khandelwal [14].

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 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 increase when release from predations by spiders. Regularly use of pesticides in agricultural fields which decreases the spider populations.

Materials and Methods

Study sites:

The spider inventory studies were conducted from Sep. 2018 to Sep. 2019 at the study sites of agro-ecosystems of Buldhana District from Maharashtra state. Geography and Climate Buldhana District-It is Located at Latitude-20.5, Longitude-76.1. Buldhana District is sharing border with Akola District to the East, Jalgaon District to the west, Jalna District to the South. Buldhana District occupies an area of approximately 9640 square kilometers. It is in the 502 meters to 252 meters elevation

range. This District belongs to Western India. Study sites Location and Habitat type, Buldhana, 193 60 N 763 32 E. It is located in high altitude. The vegetation area of Buldhana is well developed.

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 6:00am to 10:00am 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 using the taxonomic keys for Indian spiders given by Tikader [15]. 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. Jeyaparvathi *et al.* [16]. A survey of Spiders was carried out in Agro-ecosystems of Buldhana District during Sep. 2018 – Sep. 2019.

Result and Discussion

During the present study I have reported 137 species of Spiders belonging to 16 Families and 61 genera. Spiders of Families Araneidae, Clubionidae, Eresidae, Gnaphosidae, Hersilidae, Lycosidae, Miturgidae,

Oxyopidae, Philodromidae, Salticidae, Scytodidae, Sparassidae, Tetragnathidae, Theridiidae, Thomisidae, Uloboridae were recorded during the investigation.

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 webspiders feeds on them. The members of Salticidae family i.e. jumping Spiders they directly capture the insect pest and feeds on it. Araneidae > Salticidae > Lycosidae > Oxyopidae > Thomisidae

Table 1:

Sr. No.	Family	Genera	Species
1	Araneidae	14	36
2	Clubionidae	01	03
3	Eresidae	01	02
4	Gnaphosidae	03	08
5	Hersilidae	01	02
6	Lycosidae	10	20
7	Miturgidae	01	02
8	Oxyopidae	07	13
9	Philodromidae	01	02
10	Salticidae	12	28
11	Scytodidae	01	01
12	Sparassidae	01	02
13	Tetragnathidae	01	03
14	Theridiidae	01	02
15	Thomisidae	05	11
16	Uloboridae	01	02
Total		61	137

Conclusion

In my investigation I have studied 137 species belonging to 61 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.

In present investigation *Colletotrichum capsici*, *Curvularia lunata* and *Fusarium oxysporum* found on leaf of Solanaceous plants remains continuous on fruit.

Conflicts of interest: The authors stated that no conflicts of interest.

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