

Study on Diversity of Spider fauna in University College of Science Campus, Tumakuru, Karnataka, India

Suraj R.¹, Parimala B.^{2*}

P. G. Student, Department of Studies and Research in Zoology, Tumkur University, Tumakuru, Karnataka, India¹

Assistant Professor, Department of Zoology, University College of Science, Tumakuru, Karnataka, India^{2*}

ABSTRACT: Biodiversity refers to all the population species and communities in a defined area. India is a mega diverse country with rich flora and fauna. Spiders are one of the most diverse groups of organisms existing in India. However, they are largely been ignored. According to the recent studies, the Spiders play an important role in ecological balance and are considered to be the ecological indicators. Hence a preliminary survey of spider fauna was carried out in the University College of Science Campus, Tumkur University. The main aim to conduct this survey was to evaluate the current status of spider diversity in the study area. During the survey a total 172 number of spiders belonging to 14 different species of 6 families namely Hersiliidae, Pholcidae, Oxyopidae, Lycosidae, Salticidae and Theridiidae were been identified. The number of spiders identified in Site -1 (S1) was 53, Site -2 (S2) was 37 and Site -3 (S3) was 82. From this survey it is inferred that, the University College of Science premises provides a favourable condition to the spider's diversity.

KEYWORDS: Spider diversity, Survey, University College of Science, Tumakuru.

I. INTRODUCTION

All the population species and communities in a defined area is referred as the biodiversity. India is found to be rich with both floral and faunal population as it has biodiversity hotspots such as the Western Ghats and the Eastern Himalaya which are an abode of different species along with Spiders. They are one of the ubiquitous and diverse groups of organisms belonging to Class Arachnida. However, Spiders are largely been ignored because of the human tendency to favour some organisms over others of equal importance because they lack a universal appeal [1].

They are extremely sensitive to small changes in the habitat structure; including habitat complexity, litter depth and microclimate characteristics [2]. Spiders are abundant and diverse with over 34000 recognized species, comprise among the largest invertebrate fauna in any habitat [3]. They are distributed on every continent except Antarctica and have adapted to all know ecological environments except air and open sea [4]. The most important characteristic of spiders is the presence of carapace on dorsal side of Cephalothorax. Their jaws are called Chelicerae, having fangs which are used as piercing device for injecting venom. They vary in their size and colour. The size of the giant bird eating spider. Their size is increased with replacement of hard and old skin with new one [5]. In fact they help to protect crops from the pests as a biological pest control agent [6][7]. Their venom pollute less than pesticides used in agro ecosystem [8] and testing for the treatment of heart disease [9]. Recent studies have investigated the importance of spiders as ecological indicators. Habitat destruction, modification and fragmentation are widely recognized as the most current threats to biological diversity of many regions. In most of the surveys conducted in these area has given importance to the conservation of charismatic species of animals. The analysis was conducted in University College of Science, Tumkur University. The aim of the present study was to identify the status of the spider species. This study may help for further studies.

II. STUDY AREA

The study was conducted in University College of Science premises located in Tumkur University, B.H Road Tumakuru. This area is important due its unique location and biological diversity as it is nearby DevarayanaDurga reserve forest. It is located between $13^{\circ}20'16''$ N and $77^{\circ}07'13''$ E longitudes at an altitude of 822 m. The campus is green with good floral diversity providing space to different fauna. Study was done between the months of January 2019 to June 2019.



III. MATERIALS AND METHODS

Sampling technique

Survey was carried out in the morning hours between 6:00 am to 9:30 am.

The spiders were identified by following techniques:

1. **Beating techniques or inverted umbrella method:** An open inverted umbrella was kept below the branch and the branch was shaken well. The spiders present in the aerial part of the plant (i.e. in the leaves, stem and in the inflorescence) fall down and the spiders were collected in empty 35mm film plastic vials. These specimens were given a definite number with the sampling sites S1, S2 and S3.

2. **Visual searching:** Collection of spiders by visual searches of arboreal, terrestrial and even near aquatic bodies. The spiders were collected using plastic boxes with proper aeration irrespective of their size.

3. **Active searching:** Whenever and wherever in study sites the spiders were encountered, they were carefully picked without injuring them. Sedentary spiders found on the leaf blades, tree trunks and those on the webs were caught in the jar by holding it open beneath them and by tapping the spiders into it with the lid [10].

Methodology

To study the diversity of spiders line transect method was followed in the survey which was conducted for 6 months from January 2019 to June 2019. Total length of transect was 100 meters, which includes 3 sites. They are:

S₁ = Physics and Electronics Department wing.

S₂ = Botany and Zoology Department wing.

S₃ = Dhanvanthari Garden and Buddhavana.

(S indicates Sites)

Photography and identification

Freshly collected specimens were anaesthetized with ether and then placed on a slide or leaf and photographed immediately. The data and location of collection were noted and the other morphological features were observed clearly and noted. All Spiders specimens were identified referring the taxonomic keys for Indian spiders given by [11]. After taking the photograph of spiders collected, they were released into their natural habitats.

IV. RESULTS AND DISCUSSIONS

University College of Science provides diverse habitat to various spider species. A total of 172 spiders representing 6 families and 14 species were recorded (Table-1 & 3) in the College campus. In the study period Hersiliidae is the most represented family. In the present study 62 individuals belonging to family Hersiliidae, 38 individuals belonging to family Pholcidae, 16 individuals belonging to family Oxyopidae, 30 belonging to Lycosidae, 21 individuals belonging to Theridiidae and 5 individuals belong to Salticidae was recorded.

Table 1. Spider species collected in the University Campus

Sl. No.	Family	Spider fauna genus/species
1	Hersiliidae	1. <i>Hersilia</i> spp. 2. <i>Hersilia</i> aadi 3. <i>Hersilia</i> albinota 4. <i>Hersilia</i> sumatrana 5. <i>Murricia</i> cornuta 6. <i>Hersilia</i> laturcica
2	Pholcidae	7. <i>Pholcus</i> phalangioides 8. <i>Spermophora</i> spp.
3	Oxyopidae	9. <i>Oxyopes</i> javanus 10. <i>Oxyopes</i> lineatipes
4	Lycosidae (Wolfspider)	11. <i>Hippasa</i> agelenoides
5	Salticidae	12. <i>Evarcha</i> culicivora 13. <i>Plexippus</i> petersi
6	Theridiidae	14. <i>Theridion</i> manjithar

It is also interesting to note that out of 60 families recorded in India region [11] 6 families were recorded at University College of Science. Hersiliidae was the dominant family in this biome. The members of this family were found on the tree barks, these were recorded more in S₂ and S₃, as this area has more number of trees. The second most dominant families were Pholcidae and Lycosidae were identified in S₁ and S₂ respectively. The members belonging to these families are commonly called as Home spider, as they mostly prefer the man made habitat. The family Theridiidae included 21 individuals, which were found in S₂ and S₃ as the members of this family mostly prefer the grass habitat as well as leads arboreal mode of life. 16 and 5 Individuals belonging to families Oxyopidae and Salticidae respectively were recorded in S₁ and S₂ respectively, as these individuals prefer manmade habitat as well as trees (Table 2).

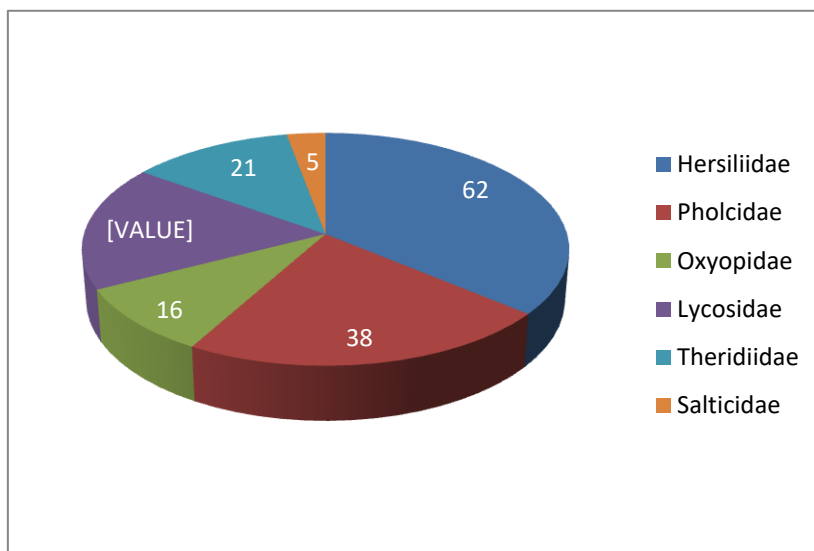
Table 2. Distribution of spider species in different habitats

Sl. No.	Family Name	S1	S2	S3
1	Hersiliidae	-	+	+
2	Pholcidae	+	+	-
3	Oxyopidae	+	+	-
4	Lycosidae	+	+	-
5	Theridiidae	-	+	+
6	Salticidae	+	+	-

Table 3. Family-wise count of spiders collected from different habitats in Tumkur University Campus

Sl.No.	Family	Total No. Of individuals collected
1	Hersiliidae	62
2	Pholcidae	38
3	Oxyopidae	16
4	Lycosidae	30
5	Theridiidae	21
6	Salticidae	5
TOTAL		172

Figure. 1, Chart showing the distribution of families of spider in the study area.





V.CONCLUSION

Spiders being the largest portion of invertebrate fauna with over 34000 recognized species, University College of Science Campus of Tumkur University exhibits remarkable and good number of spider diversity. From the recent studies the importance of spiders as ecological indicators is also inferred. This ecosystem with rich floral diversity provides a favourable environment to the spider fauna and emphasizes the need for conservation of this ecosystem by characterizing species diversity.

REFERENCES

- [1] Humphries C.J., Wilson and Vane-Wright. Measuring spider diversity value for conservation. Annual Review of Ecology and Systematics, 26: 93-111. 1995.
- [2] Downie, I.S., Wilson, W.L., Abernethy, V.J., McCracken, D.I., Foster, G.N., Ribera, I., Waterhouse, A. and K.J. Murphy. The impact of different agricultural land-uses on epigeal spider biodiversity in Scotland. J. Insect Conserv. 3, pp. 275–288. 1999.
- [3] Codrington, J.A. and Levi, H.W. Systematic and evolution of spiders Bulletin of the British and Entomological Society, 7: 83-86. 1991.
- [4] Foelix, R.F. Biology of spiders. 2nd ed., Oxford University Press, New York. 1996.
- [5] Kingsley, R. The spiders. New Star Std. Indus. (Pvt.) Ltd. Sing., pp. 2-34. 1999.
- [6] Fabre, J.H. The life of the spider. Mell. Uni. Mell. UK. pp. 1-13. 1999.
- [7] Platnic, N. An abundance of spiders. Nat. Hist. Mus. USA., 104: 50-53. 1995.
- [8] Novak, K. Spider venom helps hearts keep their rhythm. Nat. Medic., 409: 35-36. 2001.
- [9] Davey, G.C.L. The disgusting spider, the role of disease and illness in the perpetuation of fear of spiders, Society and Animals. Acad. Sci., 2: 17-25. 1994.
- [10] Ganesan R. and Shumugavelu M. Spider Faunal diversity in Perumalmalai forest area, Kodaikanal hills, Dindigul district, Tamil Nadu, India. J. Biosci. Res., 3(1): 1-5. 2012.
- [11] Sebastian P A and Peter K V. Spiders of India University Press Pvt. Ltd. 1st Edition, Hyderabad, India. 2009.