International Journal of Advanced Research in Biological Sciences
ISSN: 2348-8069
www.ijarbs.com
DOI: 10.22192/ijarbs Coden: IJARQG(USA) Volume 4, Issue 5 - 2017

Research Article

DOI: http://dx.doi.org/10.22192/ijarbs.2017.04.05.015

Diversity of spiders (Arachnida: Araneae) in Nilgiris, Tamilnadu

Jayaraman Dharmaraj[1]*., Chinnappan Gunasekaran[2] Vallavan Rajkumar[3] and Panneerselvam Chinnaraj[4]

[1]Ph.D., Research Scholar, Conservation Biology, Department of Zoology, Bharathiar University, Coimbatore – 46, Tamilnadu, India
[2]Conservation Biology, Department of Zoology, Bharathiar University, Coimbatore – 46, Tamilnadu, India
[3]Conservation Biology, Department of Zoology, Bharathiar University, Coimbatore – 46, Tamilnadu, India
[4]Conservation Biology, Department of Zoology, Bharathiar University, Coimbatore – 46, Tamilnadu, India

Abstract

The study describes the identification of the spider assemblages with respect to their diversity and distribution in the forest area of the Nigiris. The paper aims to introduce this neglected Order- *Araneae* which is primarily unknown to Science particularly in Northeast India. A total of 40 species of spiders belonging to 36 genera and 11 families were recorded during the study from January - April, 2016. The species were identified using keys for Indian spiders from (Tikader, B. K. 1970). Methodology included active searching at all layers from ground level to tree canopy layer accessible easily for hand collecting and visual surveys. This is the documentation and to report the spider Nilgiris and their microhabitat preferences from The Nilgiris, Tamilnadu. Such surveys are vital for conservation of these creatures and building a biodiversity database of this mega diverse group from a fragmented forest ecosystem in the Nilgiris, India. This study is focused on the neglected diversity of spider fauna representing this forest.

Keywords: Spider, Diversity, Nilgiris, Conservation, Microhabitat, Forest.

Introduction

Spiders belong to the class Arachnida and like all arachnids, spiders have just two body parts, a cephalothorax and an abdomen. The abdomen is soft and unsegmented while the cephalothorax is harder and includes the eight legs that characterize spiders. Arachnids lack wings and antennae(Oyeniyi Abiola Oyewole., 2014). Most arachnids are carnivorous, typically preying on insects and other terrestrial organisms. Arachnids provide an important service, keeping insect populations under control. Spiders have helped in biological control of insects; without spiders some insects would have reached pest proportions. Members of the order Araneae mainly prey on insects. However, spiders can only consume liquids, as they lack chewing mouthparts. They use chelicerae, pointed appendages at the front of the cephalothorax, to grasp prey and inject venom. Digestive juices break the food down into liquid, which can then be ingested by the spider. Araneae is the largest entirely carnivorous group of animals on the planet. Scientists have

described over 75,000 species of arachnids with many more undescribed. Spider diversity, distribution and insectivorous feeding habits of spider are suspected of playing an important role in the balance of nature(Oyeniyi Abiola Oyewole., 2014). Globally, the loss and degradation of natural habitats results in the loss of biodiversity(Foelix, R.1996) and altered species distributions (Chakraborty, D. & Gupta, A. K). This may disrupt ecosystem functions and constitute a major threat to the long-term biodiversity conservation . The last few decades have witnessed an intensive destruction of tropical forests and replacement by plantations. In comparison to cropland, tree plantations and restored forests may conserve biodiversity and original ecosystem services. However, replacement forests will not match the composition and structure of the original forest cover(Carwardine, M., 1998). The rapid conversion of tropical forests has generated vast human-modified landscapes. Such developments potentially have dire consequences for tropical biodiversity(Tikader, B.K. 1987).

Spiders are polyphagous and feed on a variety of available prey. They not prey on adult insect pests but also feed on their eggs and larvae. They help in maintaining the ecosystem balance. Spiders are good friends of farmers as they control all types of pests on the crop. Some types of spider species like geolycosa and tarantulas, make burrow in soil and thus help in water percolation. Also most of the spiders in nature feed on mosquitoes and protect us from Malaria and similar other mosquito borne diseases. Some Pisaurid and Tetragnathid spiders feed on mosquito larvae. The mud wasps, many pollinators, lizards and some birds feed their young ones with spiders as spiders are rich in simple proteins.

In this study emphasis was laid on to specify the diversity of spiders and their potential as bioindicators of this region. In general, taxonomic studies on spiders and invertebrates of Nilgiris, Tamilnadu, India are comparatively few and limited. No specific extensive studies on spider faunal diversity in this region were done.This study focuses on the spiders (Aracnida: Araneae) as a representative invertebrate fauna from this ecosystem. Data thus collected may facilitate future initiatives of biodiversity database of these species in the region.

Materials and Methods

Study area: The Nilgiris District is in the southern Indian state of Tamil Nadu. Nilgiri (English: Blue Mountains) is the name given to a range of mountains spread across the borders among the states of Tamil Nadu, Karnataka and Kerala. The Nilgiri Hills are part of a larger mountain chain known as the Western Ghats. The district has an area of 2,552.50 km^2. The district is basically hilly, lying at an elevation of 1000 to 2,600 meters above MSL, and divided between the Nilgiri plateau and the lower, smaller Wayanad plateau. The district lies at the juncture of the Western Ghats and the Eastern Ghats. Its latitudinal and longitudinal location is 130 km (Latitude : 11°12 N to 11°37 N) by 185 km (Longitude : 76°30 E to 76°55 E). The district is bounded by Chamarajnagar district of Karnataka to the North, and Wayanad, Malappuram and Palakkad districts of Kerala to the West, Coimbatore district of Tamil Nadu to the South, and Erode district of Tamil Nadu to the East. In this district the topography is rolling, with steep escarpments; about 60% of the cultivable land is slopes ranging from 16° to 35°. The rolling hills of the Downs look quite similar to the Downs in southern England, and were formerly used for such activities as hunting and picnicking. Two ecoregions cover portions of the Nilgiris. The South Western Ghats moist deciduous forests lie between 250 and 1000 meters elevation. These forests extend south along the Western Ghats range to the southern tip of India, and are dominated by a diverse assemblage of trees, many of them deciduous during the winter and spring dry season.

***Sampling*:** Line transects were used to search the spiders in different sections. Transects were chosen in random with semi-quantitative sampling methods to record the spiders. Spiders were searched for maximum two hours (0900-1100 hrs) in each compartment, extending the search with different compartment sizes. The sampling was carried for six months from January – April 2016. The sampling methods includes-visual searching for the spiders as far distinct vision is possible. Ground search were done under leaf litter, dry wood. Sweep netting was done for the foliage dwelling spiders covering the herbs and shrubs. Beating trap was done with a wooden stick and an umbrella placed under the trees to

catch the spiders which were unable to reach or seen hanging above. Web pattern, habitat type was recorded with every encounter. The caught spiders were placed separately on vials with 70% ethyl alcohol. The collection date, compartment name and habitat were recorded on each vial. Spiders were identified up to the species level using the identification keys by(Sudhikumar, A.V., Mathew, M.J., Sunish, E, Murugesan, S. and Sebastian, P.A.2005). Immature spiders together with insufficient knowledge and identification keys were classified up the morpho species level (Oliver, I. and Beattie, A. J.2004). A general list of spiders recorded in study area during the survey period is enlisted in [8] was followed for the taxonomic classification of the spiders.

Table 1. Spider species recorded during the study.

S.No	Family	Species	Natural History
1	Araneidae (Simon,1895)	*Acacesia* sp	Orb web spider
		Argiope pulchella (Thorell, 1881)	Orb web spider
		Argiope sp.	Orb web spider
		Cyrtophora citricola (Forskal, 1775)	Orb web spider
		Cyrtophora sp.	Orb web spider
		Cyrtophora sp.	Orb web spider
		Neoscona sp.	Orb web spider
		Neoscona sp.	Orb web spider
		Thelacantha brevispina (Tikader & Bal)	Orb web spider
2	Agelenidae	*Agelenopsis* sp.	
3	Clubionidae	*Clubiona* sp.	
4	Hersiliidae (Thorell, 1870)	*Hersilia savignyi* (Lucas, 1836)	Bark Spider
5	Lycosidae (Sundevall, 1833)	*Hippasa*sp.	Bark Spider
		Lycosa sp.	Bark Spider
6	Oxyopidae (Thorell, 1870)	*Hamataliwa* sp.	Plant Dwelling Spider
		Oxyopes sp.	Plant Dwelling Spider
		Oxyopes shweta (Tikader, 1970)	Plant Dwelling Spider
		Oxyopes sp	Plant Dwelling Spider
		Oxyopes sp.	Plant Dwelling Spider
		*Peucetia*sp.	Plant Dwelling Spider
		Peucetia sp.	Plant Dwelling Spider
		Peucetia sp.	Plant Dwelling Spider
		Peucetia sp.	Plant Dwelling Spider
7	Pholcidae (C.L. Koch, 1851)	*Pholcus* sp.	Zunk web Spider
8	Salticidae (Blackwell, 1841)	*Evarcha infrastriata*	Jumping spider
		Hyllus sp.	Jumping spider
		Myrmarachne sp.	Jumping spider
		Opisthoncus sp.	Jumping spider
		Plexippus paykulli (Audouin, 1826)	Jumping spider
		Plexippus sp.	Jumping spider
		Servaea sp.	Jumping spider
		Stenaelurillus sp.	Jumping spider
		*Telemonia*sp.	Jumping spider
9	Sparassidae (Bertkau, 1872)	*Heteropoda venatoria* (Linnaeus 1767)	Wandering spiders
		Olios sp.	Wandering spiders
10	Tetragnathidae (Menge, 1866)	*Tetragnatha* sp	Orb Web Spider
11	Thomisidae (Sundevall, 1833)	*Thomisus* sp.	Foliage Dweller
		Thomisus sp.	Foliage Dweller
		Thomisus sp.	Foliage Dweller

Results and Discussion

The spider fauna of India is represented by 1520 spider species belonging to 377 genera and 60 families (Oxford, G.S. and Gillespie, R.G. 1998). The study represents 18 families, 56 genera and 95 species arranged on their field. The distribution of some families was found to be continuous (Araenidae, Salticidae, Tetragnathidae etc), while some had very discontinuous distribution. Coloration in spiders varies extensively among the species due to different environmental effects which also is due to different behavioral pattern observed on them (Pocock, R. I. 1900).

Family diversity: Araenidae (9 species), Salticidae(9 species), Oxypidae (9 species), Thomisidae (3 species), Sparrasidae (2 species) covers the middle order of species diversity. Lycosidae (2 species), Pholcidae (1 Species), with Hersilidae (1 species), Agelenidae (1 Species) Clubionidae (1 species) and Tetragnathidae (1 species) counts with only few species during the study.

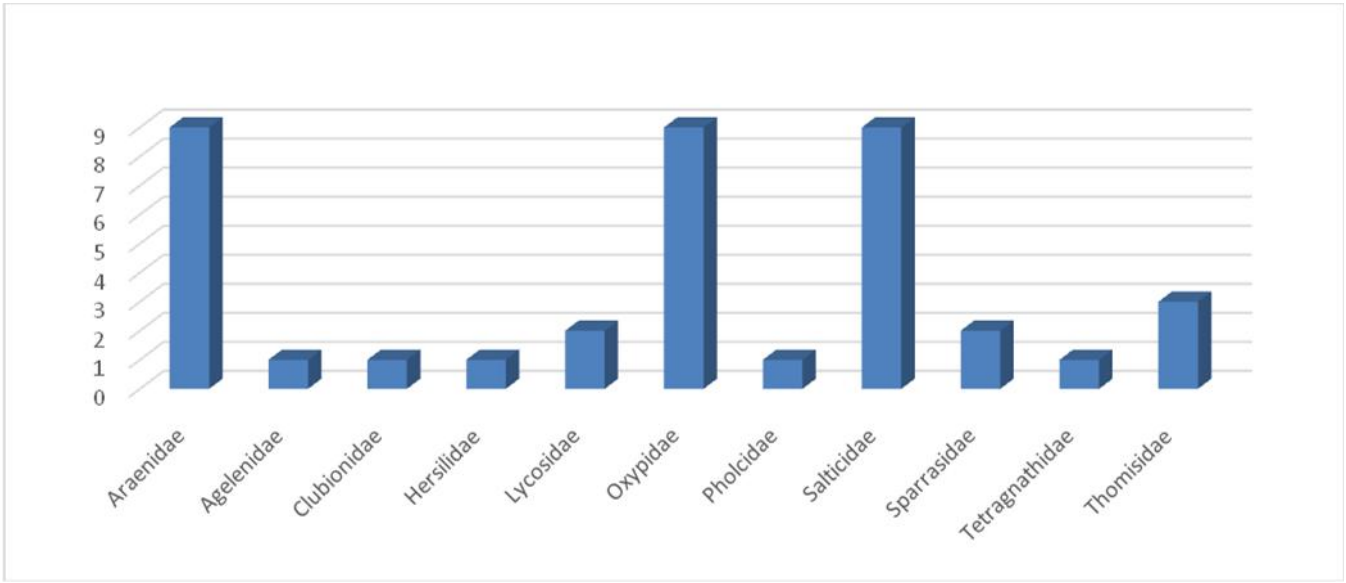

Fig.1 Graph of spiders and their numbers re-corded during the study.

A total of 40 spider species coming under 1274 genera under 11 families were collected from the study site. Of the 11 families sampled, the families Araenidae, Salticidae, and Oxypidae were the others with higher diversity having 9, 9 and 9 species respectively. Family Thomisidae possessed 3 species. The families such as Pholcidae, Hersilidae, Agelenidae, Clubionidae and Tetragnathidae having only one species. The remaining families Sparrasidae and Lycosidae were with 2 species each (Table.1). This study revealed that spider fauna in the study area is qualitatively rich.

Conclusion

The study revealed that study area is qualitatively rich in spider with 40 species of spider belonging to 36 genera coming under 11 families (Table.1). It indicates that 22 families identified so for from Tamil Nadu, nearly 50% families were recognized from study field. Diversity generally increases when a greater variety of habitat types were present. While lack of information in ecology and taxonomy of Indian Spiders however lowers the use of spiders as indicators species. Certain factors like distribution and relationship of them to the various habitats, and its responses to the different disturbance made difficult, using them as indicator species. The study shows information related to the species distribution in a particular habitat with response to environment, disturbance, and availability of food. The study area is endowed with different types of habitats such as rain forest and Dry deciduous forest and shrubs. This may be the reason for the species richness. It also emphasizes the need for conservation of this ecosystem by characterizing species diversity and highlighting rare and endemic species in this ecosystem.

Acknowledgments

We are grateful to Dr. C. Gunasekaran for his valuable guidance. With help of my field collection and Department of Zoology, Bharathiar University for providing DSLR for photographic documentation.

References

Carwardine, M. The Guiness Book of Animal Records. 1995. "Spider silk is the strongest of all natural and man-made fibres.... It is even stronger than steel: the dragline of a European garden spider (*Araneus diadematus*).

Chakraborty, D. & Gupta, A. K: Impact of Habitat Frag-mentation on Hoolock Gibbon (*Bunopithecus hoolock*) in Gibbon Wildlife Sanctuary, Assam, India.

Foelix, R.1996. Biology of Spiders 2nd Ed.

Kapoor, V. 2008. Effects of rainforest fragmentation and shade-coffee plantations on spider communities in the Western Ghast. India. J. Insect Conserv. 12, 53–68.

Oliver, I. and Beattie, A. J.2004. Invertebrate morphospecies as surrogates for species: a case study. Conservation Biology 10: 99–109

Oxford, G.S. and Gillespie, R.G. 1998. Evolution and ecology of spider coloration. Annu Rev Ento-mol. 28:337–364.

Oyeniyi Abiola Oyewole., 2014. Diversity and Distribution of Spiders in Southwestern Nigeria. Natural Resources.

Oyeniyi Abiola Oyewole., 2014. Diversity and Distribution of Spiders in Southwestern Nigeria. Natural Resources.1-9

Platnick, N.I. & H. Hofer. 1990. Systematics and ecology of ground spiders (Araneae, Gnaphosidae) from central Amazonian inundation forests. Am. Mus. Novit.

Pocock, R. I. 1900. The Fauna of British India including Ceylon and Burma.

Sebastian, P.A., Peter, K.V., 2009. Spiders of India, First edition, Universities Press, Hyderabad

Sudhikumar, A.V., Mathew, M.J., Sunish, E, Murugesan, S. and Sebastian, P.A.2005. Preliminary studies on the spider fauna in Mannavan shola forest, Kerala, India (Araneae).

Tikader, B. K. 1970. Spider fauna of Sikkim. - Records of the Zoological Survey of India, 64: 1-83.

Tikader, B.K. 1987. Handbook of Indian Spiders (Anon, Ed). Zoological Survey of India, Calcutta, 251pp.

Access this Article in Online	
	Website: www.ijarbs.com
Quick Response Code	Subject: Biodiversity
DOI:10.22192/ijarbs.2017.04.05.015	

How to cite this article:
Jayaraman Dharmaraj, Chinnappan Gunasekaran, Vallavan Rajkumar and Panneerselvam Chinnaraj. (2017). Diversity of spiders (Arachnida: Araneae) in Nilgiris, Tamilnadu. Int. J. Adv. Res. Biol. Sci. 4(5): 143-147.
DOI: http://dx.doi.org/10.22192/ijarbs.2017.04.05.015