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RESEARCH ARTICLE

PRELIMINARY STUDY ON FAUNAL DIVERSITY OF SPIDER AROUND RIVER NARMADA, JABALPUR DIVISION (MADHYA PRADESH)

[1,*]Arjun Shukla, [2]Saket Mishra and [3]Shivani Rai

[1]Govt. Model Science (Autonomous) College, Jabalpur (M.P.)
[2]Rani Durgavati University, Jabalpur (M.P.)
[3]Govt. M.H. College of Home Science and Science for Women, Jabalpur (M.P.)

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ABSTRACT

A pioneering study was conducted to reveal the spider diversity in surroundings of river Narmada in central India. The objectives of the present study were to explore the diversity and abundance of spider fauna at different habitats. In total 26 species of spiders belonging to 10 families were observed. Thus family Araneidae was the most dominant family exploring 35% of species. The Narmada Valley area is home to several species rich endemic flora and harbors different species of fauna. The area prevail humid and moderate rainfall and climate. The high species diversity of spiders in river Narmada surrounding can be attributed to the high diversity of plants and insects.

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INTRODUCTION

India is a mega diversity country and rich in both flora and fauna. Spider form one of the most ubiquitous and diverse groups of organisms around the world and are known to occupy nearly every terrestrial habitat. They have, however, largely been ignored because of the human tendency to favor some organisms over others of equal importance because they lack a universal appeal (Humphries *et al*., 1995). Spiders form the seventh largest order among all organisms in the world and (Coddington and Levi, 1991) had estimated a world total of 170,000 spider species. Generally spiders are known as predatory arthropods in all terrestrial and many aquatic ecosystems throughout India. Spiders, of class Arachnida, order Araneae under Phylum Arthropoda, vary considerably in size, shape and behavior. The characteristics shared by them are- body divided into cephalothorax and the abdomen, presence of eight legs (made up of seven segments each) and pedipalps, capacity to produce silk and possess no antenna. They are identified for their webs and web silk with future prospects. Spiders are unique among all organisms in their modes of silk production and usage and of reproduction.

Corresponding author: Arjun Shukla,
Rani Durgavati University, Jabalpur (M.P.)

All spiders can make silk but many don't spin web, they may use the silk to wrap the prey, to hang from and to make egg sacs and nests. They are ubiquitous in terrestrial ecosystems and abundant in both natural and agricultural habitats Nyfeller and Benz, 1987). Furthermore, spiders are ruthless storm troops in the matriarchal anarchy that is the arthropod world: theirs the most diverse, female-dominated, entirely predatory order on the face of the earth. Diversity generally increases when a greater variety of habitat types are present (Ried and Miller, 1989).

Structurally more complex shrubs can support a more diverse spider community and extremely sensitive to small changes in the habitat structure; including habitat complexity (Uetz, 1991), litter depth and microclimate characteristics (Downie *et al*., 1999 and New, 1999). Spiders generally have humidity and temperature preferences that limit them to areas within the range of their "physiological tolerances" which make them ideal candidates for land conservation studies (Riechert and Gillespie, 1986). The ecological development of these types is attributed to various climatic, edaphic, and topographic factors. However biotic factors play a significant role depending upon their frequency and intensity. Therefore spider can consider as indicator in case of change in environmental condition or

interference of human activities. Ironically, the spider diversity in central India is still not fully explored or understood.

MATERIAL AND METHODS

Site and duration

Spider fauna was collected from forest plantation, crops, and agriculture fields and wild plants in some habitats of central India. Spiders were collected from Narmada valley in Jabalpur division using insect's net, pitfall trap and stroking sticks umbrellas. Jabalpur is one of the important destinations of the country. It has some of the best places of the country. Jabalpur is located between 23°10'N latitude and 79°56'E longitude. The specimens were preserved in 70% alcohol and labeled. Bushes, tree trunks, ferns, forest floor, foliage and grass lands were all searched for spiders and collected by hand picking method as suggested by Tikader (1987).

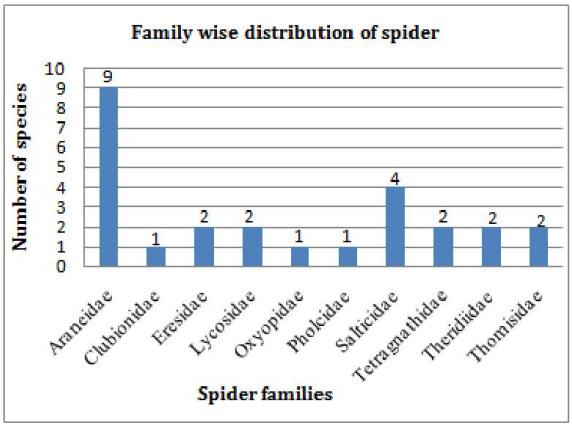

Figure 1. Distribution of species diversity at Narmada valley, Jabalpur Division

Table 1. Distribution of spider species in Narmada valley Jabalpur Division

S. No.	Family of species	Guild	Species name
Class: Arachnida			
Order: Aeaneae			
1.	Araneidae	Orb Weaver	*Araneus sp.*
2.			*Araneus mitifica*
3.			*Argiope sp.*
4.			*Cyclosa spirifera*
5.			*Cyclosa moonduensis*
6.			*Cyclosa sp.*
7.			*Neoscona theis*
8.			*Neoscona sp.*
9.			*Larinia sp.*
10.	Clubionidae	Foliage Runner	*Clubiona sp.*
11.	Eresidae	Social Spider	*Stegodypus sp.*
12.			*Stegodypus prakashi*
13.	Lycosidae	Ground Runner	*Lycosa sp.*
14.			*Hyppasa sp.*
15.	Oxyopidae	Stalkers	*Oxyopus pankaji*
16.	Pholcidae	Space Builder	*Pholcus sp.*
17.	Salticidae	Stalkers	*Myrmarachne sp.*
18.			*Phintella sp.*
19.			*Thiania sp.*
20.			*Telamonia sp.*
21.	Tetragnathidae	Orb Weavers	*Tetragnatha mandibulata*
22.			*Tetragnatha sp.*
23.	Theridiidae	Space Builder	*Theridion sp.*
24.			*Leucauge decorate*
25.	Thomisidae	Ambusher	*Thomisus sp.*
26.			*Xysticus sp.*

Identification was done on the basis of Morphometric characters of various body parts with the help of keys and catalogues provided by Kaston (1978), Tikader (1962,1973,1982), (Biswas and Biswas, 1992), Gajbe (1987) and Platnick (2004). Collected spiders were photographed in live condition identified and then released to their natural habitat. Few spiders were observed under microscope for identification and study of some morphological characteristics.

RESULTS

Total 26 species under 20 genera and 10 families (Table1) were recorded during the 6 month survey in Jabalpur division of Narmada valley. This area is rich in floral diversity. In our observation Araneidae (34%) is the most represented family with 9 species while Clubionoidae (4%), Oxyopidae (4%) and Pholcidae (4%) were least diverse family with 1 species of each.

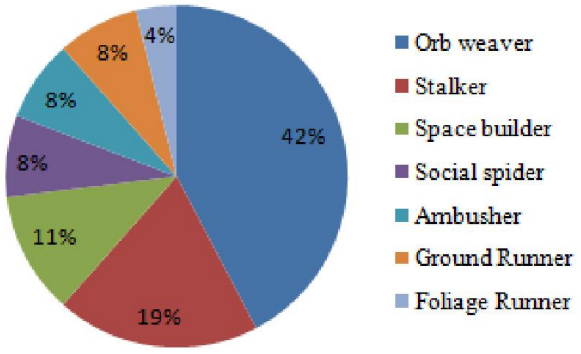

Figure 2. Guild-wise distribution of species of spider in Jabalpur Division

DISCUSSION

Of about 1442 species reported from India. (Siliwal *et al*., 2005), 29 species have been recorded from, central India. Araneidae (34%) was the dominant family subsequently Salticidae (15%), Lycosidae (8%), Tetragnathidae (8%), Theridiidae (8%), Thomisidae (8%), Erasidae (7%) while Clubionoidae, Oxyopidaeand Pholcidae each contributed below 5 %. Thus high species diversity of spiders in this area can be attributed to the high diversity of plants and insects that sustains a high faunal diversity by providing diverse microhabitat especially for invertebrates. Among habitats, spider species richness ranged between one and nine. The presence of diverse habitats like deciduous forests, herbs and shrubs, plateau condition and large water bodies can make central Indian zone an important center of speciation.

The spiders sampled belonged to 7 functional groups (guilds) based on their foraging behavior in the field where Orb Weaver (42%) was dominating, subsequent Stalker (19%), Space Builder (11%), Social Spider (8%), Ambusher (8%), Ground Runner (8%) and Foliage Runner (4%). The peak population densities of spiders coincide with an increase of insect pests (Kiritani, 1972). An increase in the spider population depends on prey availability and, if the density of prey becomes higher, spiders are expected to increase proportionally to some extent. Diversity generally increases when a greater variety of habitat types are present (Ried and Miller, 1989). Holloway (2003), observed that conversion of forest to plantation and other man-induced disturbances lead to reduction in the diversity of invertebrates, both in species richness and in the taxonomic and biogeographic quality. (Downie *et al*., 1999) and New (1999), have demonstrated that spiders are extremely sensitive to small changes in the habitat structure; including habitat complexity, litter depth and microclimate characteristics.

Conclusion

Central India exhibits good number of spiders and remarkable diversity in guilds of spider fauna. This study serves as a baseline for future study of spiders in these ecosystems. But further study is required to confer. This study was conducted only for six months. So seasonal variation in diversity and abundance of spider fauna will needed to be studied. However, considerable work is still needed to clarify the usefulness of spiders as indicators, relevance to high taxon surrogacy and to develop standardized sampling techniques. There is an urgent need for updating the database. Exploration of species diversity understanding the habitat ecology, behavior, etc. culminating into a database for the Jabalpur is an imperative.

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