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Research Article

Spider Diversity of Maa Manikeshwari University Campus, Bhawanipatna, Odisha

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ABSTRACT

Though spiders form one of the most ubiquitous and diverse group of organisms existing in Odisha, their study remained largely neglected. Although there is much information in the literature about mammals and birds in Odisha, there is little knowledge about spider species despite their important ecological role. The inventory of the species is the prime objective of making a biodiversity conservation plan for a specific region. The present study is a first attempt to survey the spider diversity and identification in Maa Manikeshwari University Campus, Manikya Vihar, Bhawanipatna, Kalahandi, Odisha, was a preliminary survey conducted from Nov 2023 to Feb 2024. Based on the opportunistic observation, 360 spider species were recorded in total. The results indicate that the Maa Manikeshwari University campus had 15 species of spiders belonging to 12 genera falling under 06 families, of which individuals belonging to Salticidae and Araneidae were dominant. However, the study result provides a preliminary data for spider in Manikya Vihar Campus and indicating a diverse variety of spider species in this campus that may be further investigated family wise or species wise throughout year in different sites of Kalahandi district.

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INTRODUCTION

Spiders belong to the Arachnid class under the Arthropoda phylum; form one of the ubiquitous groups of predaceous organisms in the Animal Kingdom [1]. They are one of the most fascinating and diversified invertebrate animals in tropical and subtropical areas of the world. They are highly potential predators to check the insect pests [2].Spiders represent the second largest order within the Arachnids. They are a group of predators that occur in various physical and biological conditions of the terrestrial environment. They are considered biological control agents as they help maintain the ecological balance in the food chain occupyingthe middle trophic level between small insects and birds or bigger insects. Spiders have a major role in stabilizing or regulating insect populations in agriculture as well as in forest ecosystems. They are more sensitive to small changes in the physical, chemical and biological characteristics of habitat. Their role is significant both in agriculture natural ecosystems, and also act as sensitive bio-indicators of environmental changes [3]. They can be biological indicators to assess the ecosystem health as they can be easily identified and are differently responsive to natural and anthropogenic disturbances [4]. This is the most diverse, female dominated and entirely predatory order in the arthropod world. They are key components of all ecosystems in which they live [5]. According to Nyffeler and Birkhofer (2017), if the spiders extinct from the surface of the earth, man would have no more than a few years left to live due to food shortage because of crop destruction [6]. The inventory of the species is the prime objective of making a biodiversity conservation plan for a specific region.

The conservation status of 99.5% of the spider species has not yet been evaluated by the IUCN globally [7]. Globally, they account for 52,047 species in 4,379 genera belonging to 135 families [8]. Because of misidentification different no. of species were recorded by several authors in the same region [9].The first spider taxonomic study was conducted in Odisha (formerly Orissa) in the year 1890 by Walsh [10] and later on, so many workers [11-19] recorded many spider species from different districts of Odisha. Thus, the available literature on the spiders of the state, of Odisha is not systematic and continuous manner, and several areas of the state have not yet been surveyed for their faunal distribution. This number is very much underestimated, and many more species are waiting to be discovered in the country because till date spider studies in India have been restricted to a few areas in the

absence of systematic spider surveys for most of the states in India. Spiders are an important organism, a poorly studied group of arthropods that play a major role in regulating other invertebrate populations in most ecosystems [20]. Despite their documented ecological role in many ecosystems, high diversity and threats, spiders have received little attention from the conservation community [21].

In the context of conservation planning efforts, preservation of spider diversity requires understanding the patterns of diversity on an appropriate regional scale [22]. Though spiders form one of the most ubiquitous and diverse groups of organisms existing in Odisha, their study remained largely neglected. Although there is much information in the literature about mammals and birds in Odisha, there is little knowledge about spider species despite their important ecological role. The present study is a first attempt to survey the spider diversity and identification in Maa ManikeshwariUniversity Campus, Manikya Vihar, Bhawanipatna, Kalahandi, Odisha. In depth knowledge of the biodiversity of spider communities is important both in terms of enhancing pest control and understanding the driving forces influencing conservation strategies [23-26]. It will be helpful to assess the diversity as well as help to make good strategy for preservation and conservation in future.

MATERIALS AND METHODOLOGY

Study Area

The study site was Manikya Vihar Campus located in Bhawanipatna, Kalahandi District Southern Odisha with Latitudinal extent 19°55′09″North to 83°10′27″East **(Fig.1)**. The collection of data was made from different sites of Maa Manikeshwari University Campus of Bhawanipatna, Odisha, eastern India. Bhawanipatna is located at 19.9°N 83.17°E, has a tropical wet and dry climate, and the annual average rainfall is 1300mm. Kalahandi is a district of Odisha in India, which is situated between 19.3N and 21.5N latitudes and 82.20E and 83.47E longitudes, has an area of 8,364.89 square kilometres. The topography of Kalahandi consists of plain land, hills and mountains. The climate of this district is quite extreme remaining mostly dry except during monsoon. The campus is rich in so many flora and fauna.

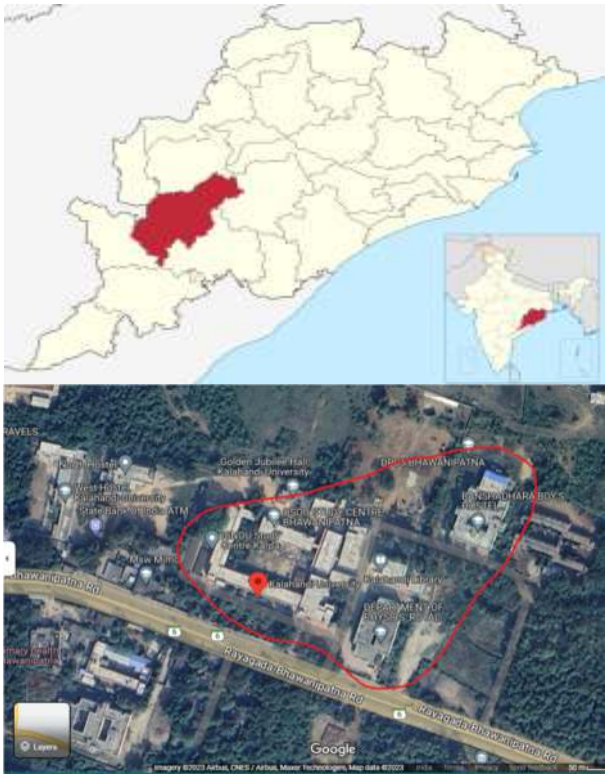

Fig: 1 Satellite view of study site Manikya vihar Campus.

Sampling Methods

A regular survey was carried out in different sites of campus twice in a month during morning hours between 8-11 AM from November 2023 to February 2024. Observed and collected species were photographed in live condition using NIKON Z-50 DSLR Camera and identified up to species level with the help of experts and available literature [27-29] and then released to their natural habitat and some specimens were preserved in 70% alcohol for further study. Collections were done by hand picking, gentle beating on surroundings so as to make the individual pass into the cleared area for better viewing.

3. RESULTS

During survey 360 numbers of spiders were collected belonging to 6 families in 12 genera. Among families Arachaneidae was found as most common family as 131(36.39%) number of individuals were collected belonging to this family followed by Salticidae (27.78%), pholcidae (16.11%), oxyopidae (12.22%), Sparassidae (5%), Theridiidae (2.5%) **(Fig. 2)**. Among the species, *Crossoprisa lyoni* was more common as 58 (16.11%) individuals werecollected followed by *Argiope ansuja* 54 (15%). Least number of individual 5 (1.39%) were collected belonging to family Salticidae (*Cyrba ocellata*) (**Table: 1& Fig. 3**).

Table: 1 Number of individuals and percentage (%) of different spiders (Family wise and Species wise) found Maa Manikeshwari University Campus.

Sl. No.	Family	Scientific Name	Common name	No. of individual collected	Total Family wise	Percentage	
						Species wise	Family wise
1	Araneidae (Clerck,1757)	*Crytophena cicatresa* (Sttolizka,1869)	Garden tent spider	23	131	6.38	36.39
		Argiope ansuja (Thorell,1887)	Signature spider	54		15	
		Argiope pulchella (Thorell,1881)	Garden cross spider	22		6.11	
		Neoscona menghaiensis (Xie&peng, 1990)	Barn spider	15		4.17	
		Neoscona mukerjei (Tikader,1980)	Orb weaving spider	17		4.72	
2	Salticidae (Blackwall,1841)	*Telamonia dimidiate* (Simon,1899)	Two striped Telamonia	30	100	8.34	27.78
		Phinetella vittata (C.L.Koch,1864)	Banded Phintella	12		3.34	
		Menemerus nigli (Wesolowska & Freudenschurs,2012)	Jumping spider	33		9.17	
		Plexipus pakykuli (Audouin,1826)	Penta tropical jumping spider	20		5.56	
		Cyrba ocellata (Kroneberg,1875)	Jumping spider	5		1.39	
3	Oxyopidae (Thorell,1869)	*Oxyopes salticus* (Hentz,1845)	Stripted Lynx spider	31	44	8.61	12.22
		Oxyopes hindostanicus (Pocock,1901)	Lynx spider	13		3.61	
4	Pholcidae (C.L. Koch,1850)	*Crossoprisa lyoni* (Blackwall,1867)	Tailed cellar spider	58	58	16.11	16.11
5	Theridiidae (Sundevall,1833)	*Nihonhimea indicum* (Tikader1977)	Tangle web spider	9	9	2.5	2.5
6	Sparassidae (Bertkau,1872)	*Heteropoda maxima* (Jager,2001)	Giant hunts man spider	18	18	5	5
Total				**360**	**360**	**100**	**100**

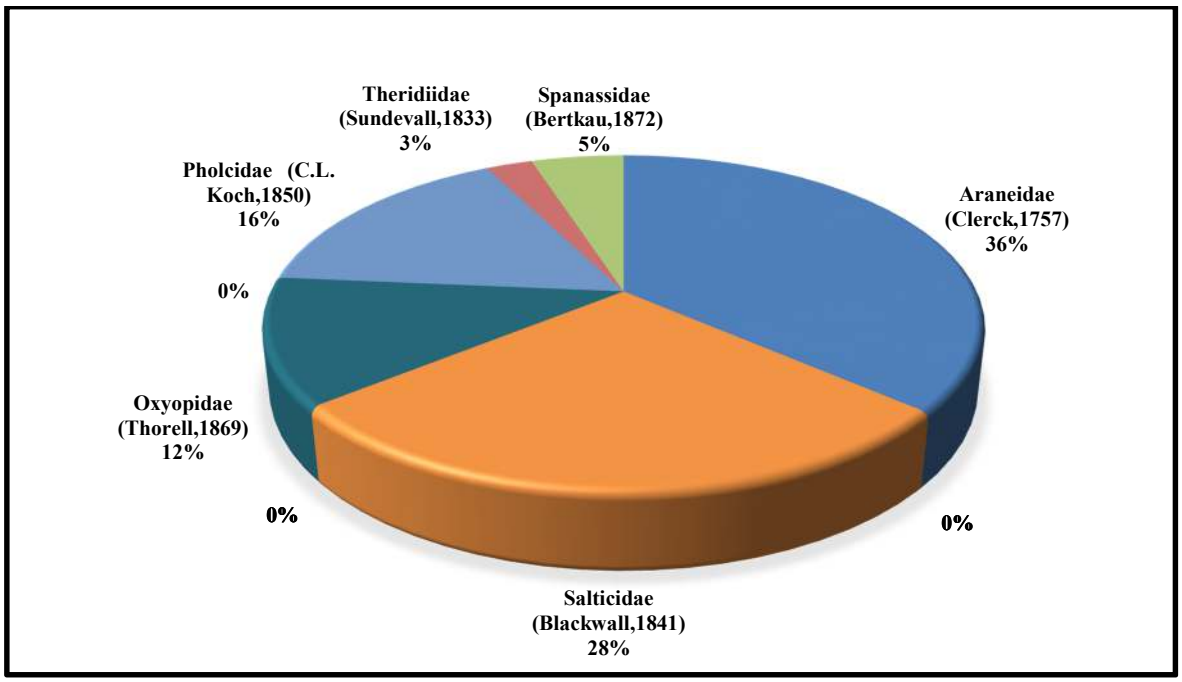

Fig: 2 Showing number of spider specimen collected family wise from Manikya Vihar campus

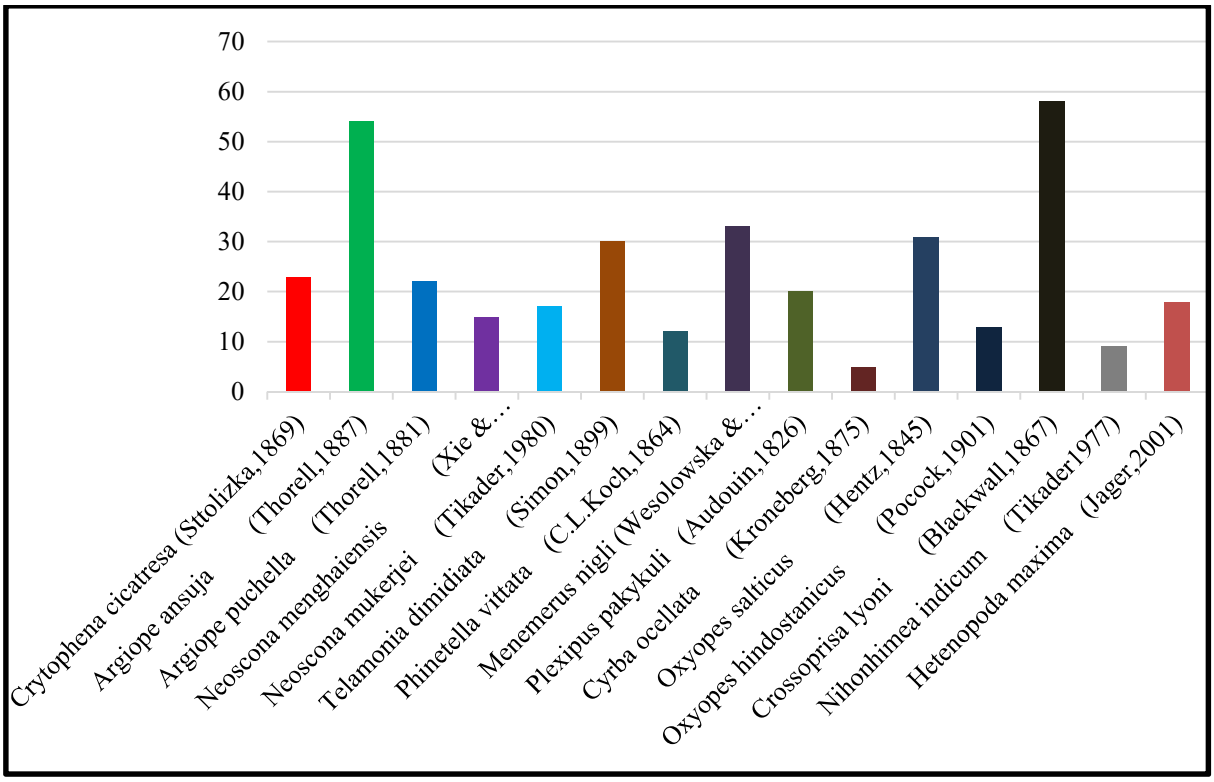

Fig: 3 Showing number of spiders collected from Manikya Vihar campus

Plate 1: showing photographs of captured spiders and their scientific name, common name, and family.

Sl.No	Scientific Name	Common Name	Family	Photographs
1	*Cyrtophena cicatresa* (Sttolizka,1869)	Garden tent spider	Araneidae	
2	*Argiope ansuja* (Thorell,1881)	Signature spider	Araneidae	
3	*Telamonia dimidiate* (Simon,1899)	Two striped Telamonia	Salticidae	
4	*Menemerus nigli* (Wesolowska&Freudenschurs,2012)	Jumping spider	salticidae	
5	*Oxyopes salticus* (Hentz,1845)	Stripted Lynx spider	Oxypidae	

6	*Crossoprisa lyoni* (Blackwall,1867)	Tailed cellar spider	Pholcidae	
7	*Nihonhimea indicum* (Tikader,1977)	Tangle web spider	Theridiidae	
8	*Heteropoda maxima* (Jager,2001)	Giant hunts man spider	Sparassidae	
9	*Argiope pulchella* (Thorell,1887)	Garden cross Spider	Araneidae	
10	*Neoscona menghainesis* (Xie & peng,1990)	Weaver Spider	Araneidae	

11	*Phinetella vittata* (C.L.Koch, 1846)	Banded phintella	Salticidae	
12	*Neoscona mukerjei* (Tikader,1980)	Weaver Spider	Salticidae	
13	*Plexipus pakykulli* (Audouin, 1826)	Penta tropical jumping spider	Salticidae	
14	*Cyrba ocellata* (Kroneberg,1875)	Jumping spider	Salticidae	
15	*Oxyopes hindostanicus* (Pocock,1901)	Lynx spider	Oxyopidae	

DISCUSSION

The spider diversity of Odisha comprises of 248 species belonging to 139 genera [17] but recently 265 species of spiders described under 162 genera belonging to 42 families are enlisted that have been

described and recorded from 21 out of 30 districts of Odisha [9]. During the present study, 15 species *Crytophena cicatresa* (Sttolizka,1869), *Argiope ansuja* (Thorell,1887), *Neoscona menghaiensis* (Xie & Peng,1990), *Argiope puchella* (Thorella,1881), *Neoscona mukerjei* (Tikader,1980), *Telamonia dimidiate* (Simon,1899), *Phinetella vittata* (C.L.Koch,1864), *Menemerus nigli* (wesolowska & Freudenschurs,2012), *Plexipus pakykuli* (Audouin,1826), *Cybra ocellata* (Kroneberg,1875), *Oxyope ssalticus* (Hentz,1845), *Oxyopes hindostanicus* (Pocock,1901), *Crossoprisa lyoni* (Blachwall,1867), *Nihonhimea indicum* (Tikader,1977), *Heteropoda maxima* (jager,2001) of spiders belonging to 12 genera and 06 families were reported from Manikya Vihar, Maa Manikeshwari University Campus, Bhawanipatna, Odisha for the first time **(Plate: 01 & Table: 1)**. Maximum 05 genera were identified from Salticidae family followed by 03 genera from Araneidae, and 01 genera from rest each family Oxyopidae, Pholcidae, Theridiidaeand Sparassidae **(Fig. 2)**. The members of Araneidae family were more dominant in our study (36.39%). The results indicate that the Maa Manikeshwari University campus had 15 species of spiders belonging to 12 genera falling under 06 families, of which individuals belonging to Salticidae and Araneidae were dominant. These two families were also dominant in the finding of Vaibhav et al., (2017) in Karnataka University Campus [30], in Darjeeling tea plantations [2] and Koraput, Odisha [31] but in the study of Priyadarshini, D., & Mahapatra, P. K. (2023) on spider diversity in rice agro ecosystem of Bargarh District, Odisha, there was dominant of Araneidae and Tetragnathidae families [32]. Abundance of spider species differed seasonally according to their ecosystem. Hence, one can undertake further survey/research work on individual species level or family wise, to carry out systematic survey in the entire campus or Kalahandi, district covering all the seasons to get an optimum estimate of spider diversity and reveal more interesting facts as a comprehensive work on any single spider species has not been done so far.

CONCLUSIONS

The present study has recorded 06 families of spiders from Maa Manikeshwari University campus a small part of Kalahandi district, which represent fourteen percent (14.28%) of the total family diversity i.e., 42 families recorded from 21 districts out of 30 in the state of Odisha [9]. The result of the present study revealed that there was great spider diversity within the Maa Manikeshwari University campus, Bhawanipatna, Odisha.

DECLARATION

There is no conflict of interest in publishing this research article.

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