

## A report on the diversity of spider fauna from Charghad river basin of Morshi, Amravati India

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### ABSTRACT

The present field study was carried to record variety and abundance of spiders in Charghad river basin of Morshi tehsil, Amravati district, Maharashtra, India. The field survey was carried from August 2017 to March 2018. The spiders were collected and photographed in quadrants covering all significant area with natural vegetation along 5 km of river patch. Ideally, all sites along the river basin were studied during this period. Diversity index and Evenness of spiders were calculated. This survey shows the occurrence of 48 species belonging to 12 families. Of which Salticidae was prominent (9 Genera with 14 species) followed by Araneidae (5 Genera with 13 species). Shannon Wiener diversity index (H) is 2 and Evenness of species found to be 0.80. The study suggests Charghad river basin has a rich diversified spider fauna.

**KEY WORDS:** SPIDER, DIVERSITY, ABUNDANCE, CHARGHAD, MORSHI TEHSIL

### INTRODUCTION

Spiders make up a considerable proportion of the biodiversity of this vast and diversified nature. They are cosmopolitan and found in all types of ecosystems and habitat. Spiders are air-breathing predatory animals having two body segments, belonging to class Arachnida with about 45,776 species under 3974 genera distributed over 114 families (WSC, 2016). In India, they are represented

by 1686 species to 438 genera of 61 families (Keswani *et al.*, 2012, WSC, 2015; WSC,2016). About 91 species from Mygalomorphae under 28 genera belonging to 8 families have been reported by Keswani *et al.*, (2012). Abundance of spider depends on the type of environment, vegetation and prey base. River basin provides the ideal hunting ground for spiders. Spider as an ecological indicator plays an important role in maintaining ecological equilibrium, (Halarnkar and Pai 2018).

#### ARTICLE INFORMATION:

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Received 12<sup>th</sup> July, 2019

Accepted after revision 22<sup>nd</sup> Sep, 2019

BBRC Print ISSN: 0974-6455

Online ISSN: 2321-4007 CODEN: USA BBRCBA

Thomson Reuters ISI ESC / Clarivate Analytics USA



Crossref

Clarivate  
Analytics

NAAS Journal Score 2019: 4.31 SJIF: 4.196

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Online Contents Available at: <http://www.bbrc.in/>

DOI: 10.21786/bbrc/12.3/38

Charghad River is originated in Satpuda mountain ranges near village Velmandali of Amravati district and is tributary of Wardha River. Charghad River flows through Morshi tehsil and merges into Wardha River. Hippargi *et al.*, recorded an occurrence of spiders belonging to 19, 25 and 31 respective families from Lonar, Melghat and Southern Tropical thorn forest, Solapur. The diversity of spider in Satpuda ranges adjacent to this study area was studied by Deshmukh and Raut (2013) recorded 57 species belonging 35 genera under 14 families during 6-month survey in Salbardi forest (Satpura range). Again Deshmukh and Raut (2014) studied the seasonal diversity of Salbardi forest (Satpuda range) and recorded 104 species of 52 genera under 18 families during year 2014. Deshmukh and Chaudhari (2016) recorded 49 spider species belonging to 22 genera under 9 families from orange agroecosystem in the catchment area of upper Wardha dam, Amravati, Maharashtra. The diversity of spiders from Charghad river basin is not yet explored, so the attempt was made to study and make a checklist of spiders from this area. The ecosystem of Charghad river basin depends upon rainfall. The survey was made to study diversity and abundance of spider's fauna in Charghad River Valley of Morshi Tehsil, Amravati District, and Maharashtra, India. The study has been started in the month of August 2017 and extended to March 2018 along the river basin which is 45km from Amravati district of Maharashtra. The study area is located latitude 21.324196° N and longitude 78.013832° E at an elevation of 303 meters from sea level. Charghad River is originated in Satpuda mountain ranges near village Velmandali of Amravati district and passes through Morshi Tehsil being is tributary of Wardha River. Morshi Tehsil has a temperature range of 32 to 48° C in summer and 16 to 27° C in winters. The rainfall is with southwestern monsoon from June to September having annual an average rainfall of 758.40 mm.

The river basin is flourished with various flora with perennial plants like *Ficus bengalensis* (wad), *Acacia leucophela* (hiwar), *Bauhinia racemosa* (apta), *Zyzyphus vulgaris* (ber), *Acacia catechu* (khir), *Limonia acidissima* (kaut), Bamboo and dominant grasses like *Andropogon martini* (tikhari), *Sorghum halepense* (boru), *Cynodon dactylon* (hariali), *Ichamum sulcatum* (paonia), *Ichamum laxum* (sahada) and *Andropogon contortus* (kusal) and *Lantana cammera*. Ideally all sites of the river basin were studied. The field work was designed in 10 quadrants covering all significant area with natural vegetation along 5 km of river patch. Where sampling sites of 10 sq. meters were selected and marked. Sampling was done from this 10 sq. meter quadrants in river basin every weekend; mostly during from early morning to late night. Visual search was carried out by walking through the habitat and visually searching for spiders, their webs or retreats

(curled leaves, silk case). When walking in the grass, due to disturbances ground jumping of spiders was seen and by keeping their trail spiders were captured. Heavy insect net sweeps were used through soft vegetation or tall grassin a zigzag pattern in the marked area. After a few sweeps, dump the content on flat sheet and capture the spider. But it is less effective in wet condition. In this case, an inverted umbrella opened place was used under the bush or lowered branches. The branches were given vigorous shaking or striking them with sticks.

Spiders were dislodged and were collected in the umbrella. This is mostly used and successful technique which was also used in the present study. Any smooth plastic bottle of 10 cm diameter and 11 cm depth was buried within the ground surface with a funnel at top of the container. Spiders tumble into the container and captured in the collection bottle. Only mature spiders were collected for identification they were photographed and release back in natural habitat. The keys of Platnick (1981-1987); Barrión and Litsinger (1995); Tikader (1987); Gajbe (2005) were used for species identification and to record classification. Statistical analysis was done using Shannon Wiener diversity index (H) and Evenness of species.

$$H = - \sum [(P_i) \times \ln (P_i)]$$

$$E = \frac{H}{H_{max}} \text{Where,}$$

$$\text{Summation of } p_i = \frac{\text{Number of individual of species}}{\text{total number of species}}$$

S = Species richness

H max = maximum diversity possible.

E= Evenness

During a survey of 8 months in river basin, the individual belongsto 48 species of 31 Genera and 12 families (table no. 1) were recorded. This present study indicates

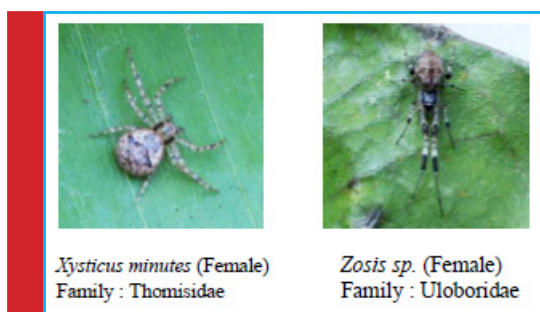
Table 1. Family wise distribution of Spider Species and Genus.

Sr. no	Name of Family	Number of Genus	Number of Species
1	Araneidae	5	13
2	Clubionidae	1	1
3	Erasidae	1	1
4	Hersilidae	1	1
5	Lycosidae	2	2
6	Miturgidae	1	2
7	Oxyopidae	2	3
8	Pisauridae	3	3
9	Salticidae	9	14
10	Sparassidae	1	1
11	Tetragnathidae	2	4
12	Thomisidae	3	3
	Total	31	48

Table 2. Family wise distribution list of spider species from Charghad River basin Eco-system.

Sr. no	Family	Species
1	Araneidae	<i>Araneus species</i> (Male) <i>Araneus Praesignis</i> (Female) <i>Araneus diadematus</i> (Female) <i>Argiopaemula</i> (Female) <i>Lariniadirecta</i> (Female) <i>Neoscona bengalensis</i> (Female) <i>Neoscona bengalensis</i> (Male) <i>Neosconacrucifera</i> (Male) <i>Neoscona mokerjei</i> (Male) <i>Neoscona species</i> (Male) <i>Neoscona species</i> (Male) <i>Neoscona species</i> (Male) <i>Polys</i> (Female)
2	Clubionidae	<i>Clubiona drassodes</i> (Female)
3	Erasidae	<i>Stegodyphus species</i> (Female)
4	Hersiliidae	<i>Hersiliasavignyi</i> (Female)
5	Lycosidae	<i>Acantholycosa lignaria</i> (Female) <i>Hippasa holmerae</i> (Female)
6	Miturgidae	<i>Cheiracanthium inclusum</i> (Female) <i>Cheiracanthium insigne</i> (Female)
7	Oxyopidae	<i>Oxyopes bharatae</i> (Male) <i>Oxyopes pankaji</i> (Female) <i>Oxyopes pankaji</i> (Male) <i>Peucetia latikae</i> (Female)
8	Pisauridae	<i>Dolomedes species</i> (Female) <i>Pisaurinamira</i> (Female) <i>Pisaurinamira</i> (Male) <i>Thalassius marginellus</i> (Female)
9	Salticidae	<i>Euophrys frontalis</i> (Female) <i>Harmochirus brachiatus</i> (Female) <i>Hasarius adansoni</i> (Male) <i>Myrmarachne species</i> (Female) <i>Parahelpis species</i> (Female) <i>Phidippus species</i> (Male) <i>Phintella vittata</i> (Female) <i>Plexippus insulanus</i> (Male) <i>Plexippus paykulli</i> (Male) <i>Plexippus paykullii</i> (Female) <i>Plexippus petersi</i> (Female) <i>Plexippus species</i> (Female) <i>Plexippus species</i> (Male) <i>Plexippus species</i> (Female) <i>Telamonia dimidiata</i> (Female)
10	Sparassidae	<i>Heteropoda species</i> (Female)
11	Tetragnathidae	<i>Leucauge dorsotuberculata</i> (Female) <i>Tetragnathas species</i> (Female) <i>Tetragnathas species</i> (Male) <i>Tetragnathas species</i> (Male) <i>Tetragnathas species</i> (Male)
12	Thomisidae	<i>Misumena species</i> (Male) <i>Oxylate species</i> (Female) <i>Thomisus beautifularis</i> (Female)



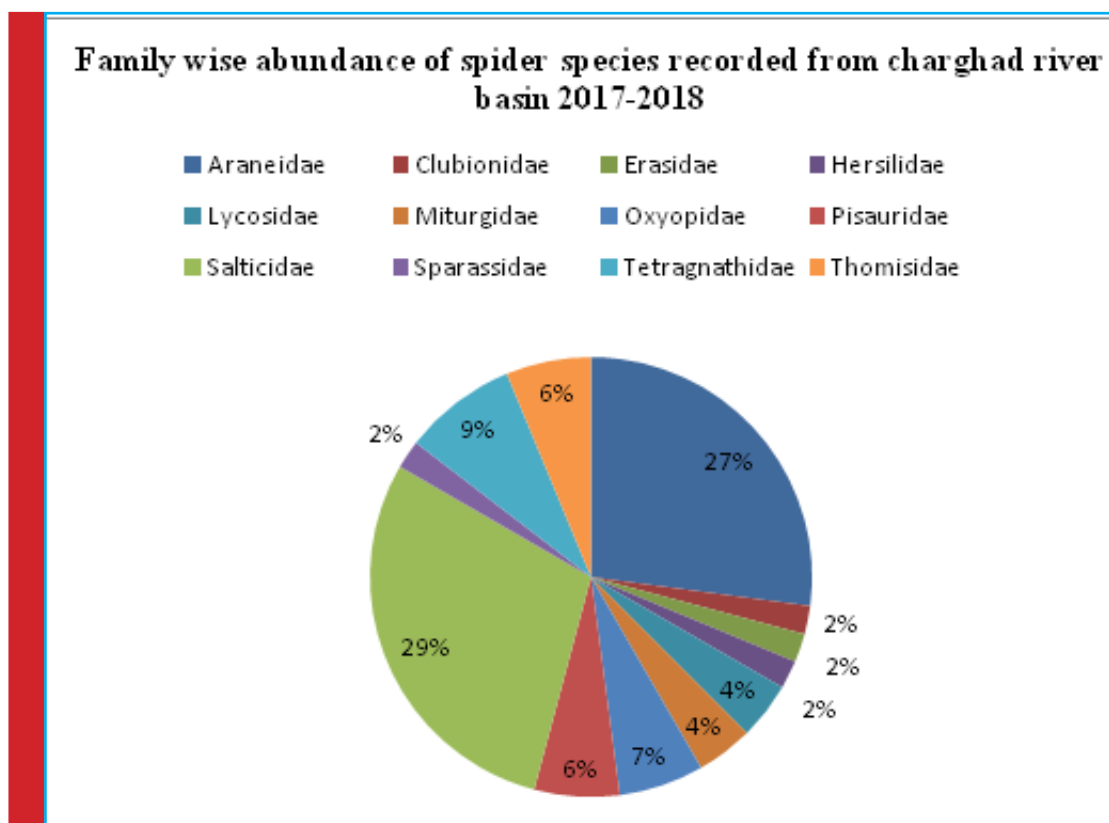


that most abundant species belong to family Salticidae (29.03%) followed by family Araneidae (27.08%) comparatively moderate number of species from family Tetragnathidae (8.33%), Oxyopidae (6.25%), Thomisidae (6.25%), Pisauridae (6.25%), Lycosidae (4.16%), Miturgidae (4.16%) and lowest species diversity was found in the species belong to family Clubionidae (2.08%), Erasiidae (2.08%), Hersilidae (2.08%), Sparassidae (2.08%).

Shannon Wiener diversity index (H) was '2' and Evenness of species was found to be '0.80'. The study suggests Charghad river basin has a rich diversified spider fauna. The Charghad River is a complex ecosystem for various arthropods. The diversity of species is different with respect to habitat, vegetation and prey base along the riverside. The diversity of species was found maximum in adjacent grasses and vegetation. Maximum species were recorded in November, December, January, February, it

is due to fall in water level that increase the abundance of vegetation in the river bed and which also coincides with the life cycle of most insects including grasshoppers, aphids, millipedes, etc. Most of the spider species belongs to family Salticidae and Oxyopidae were found abundant where grasses like *Cynodon dactylon* (hariali), *Ichamum sulcatum* (paonia), *Ichamum laxum* (sahada) and *Andropogon contortus* (kusal) were dominant, where they can hide below thick foliage and have large prey base like Grasshopper nymph, larvae of various flies, millipedes, etc. Most of the spider species belonging to this family were recorded in winter and especially in November to January end.

The second most abundant family found in this ecosystem is Araneidae (19%) which was most abundant along riverside small trees and shrubs like *Zyzyphus vulgaris* (bor), *Bauhinia racemosa* (apta), Bamboo. Some of the orb-web spiders are dominant in the area where big perennial plants found in large number. Where they are able to prepare webs between the twigs for catching the small flying arthropods. *Larinia* species and *Neoscona* species were mostly observed in the night on shrubs and perennial plant with their orb webs, and found most abundant in the winter season. Spiders belong to family Thomisidae, Miturgidae, Clubionidae were found on flowering trees, shrubs and grasses, where they prey on small insects visit for nectar. Along with the river stream



family Pisauridae and Tetragnathidae have rich diversity were they feed on small insect larva and small fishes. Spiders belonging to Hersilidae were abundant on the trunk of perennial trees. Followed by family Lycosidae, Erasidae, Sparassidae which are distributed over vegetation of the river bank. 48 species were recorded in the present study. Thus Chorghad river basin contains rich spider fauna. However, this is not a final conclusion regarding species richness can't be drawn because the area of the river basin is unexplored.

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