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Spider diversity from the various localities of Nagpur District, Central India

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ABSTRACT

Spider diversity is significant because spiders play a key role in terrestrial ecosystems as predators and biological control agents. The present study was conducted to explore the composition of spider diversity in various localities of Nagpur district of Central India. A total of 106 species belonging to 71 genera under 18 families were recorded from the various habitats. This study providing the checklist cited with their habitats and localities which will help the other researchers in their work.

Keywords: Spider diversity, Nagpur district, Central India

INTRODUCTION

Spiders (Arachnida: Araneae) are an integral part of biodiversity since they play most important role in ecosystems as predators and sources of food for other creatures. They have clearly established themselves as model organisms in biochemical (silk proteins and venom), behavioural (sexual and web-building behaviours) and ecological (foraging, predator-prey systems and integrated pest management) research (Sebastian et al., 2011). There are currently 48,953 reported spider species placed in 4195 genera and 128 families in the world and, there are many species yet to be identified and described (World Spider Catalogue, 2020). Diversity of spider species is also influenced by the structure of landscape, habitat type, and period of plant growth (Jeetikasiddhu et al., 2021). Spider community is closely related to the characteristics of the plant community where they live (Rimbing and Memah, 2008). The study of the spider diversity it is most important for conservation because they ultimately help to the farmer and maintain to the ecosystem. The various types of agricultural pest attack on the agricultural crops, with the help of spider trap the spider attacked on the trapped pest and utilized as food. Ultimately decreasing the number of pest, so its help to the farmer to quality and quantity of agricultural crops (Shambharkar, 2023). Khandelwal et al. (2024), recently worked

out the Spider diversity from the Ambazari Lake, Nagpur city. Present documentation study may contribute spider fauna diversity database in this region.

MATERIALS AND METHODs

Study Area:

Nagpur is the divisional headquarter of Eastern Maharashtra. It lies between latitudes 20° 35' and 21° 44' north and longitudes 78° 15' and 79° 40' east and has an area of 9930 square kilometers. The district has an average elevation between 275.50 and 305m above sea level & its relief features are characterized by large residual hill ranges of Satpudas and their detached members. District is divided into 14 talukas viz. Bhiwapur, Hingna, Kalmeshwar, Kamptee, Katol, Kuhi, Mouda, Nagpur, Nagpur Rural, Narkhed, Parseoni, Ramtek, Saoner and Umred (Kamble *et al*, 2013).

Several visits were made in the district for the floristic survey during whole year. Spiders specimens were collected, by nets, pitfall trap, visual searching, sweeping and stroking sticks were used, from the various localities of plants vegetation, tree trunks, on ground surface, under stones, near water bodies etc. The spider specimens were preserved in preservatives and preciously labeled with field data. The identification and authentification has been done with the help of with the pertinent literature, Tikader and Biswas (1981), Davies and Zabka (1989), Gajbe (1987), Barrion and Litsinger (1995), Biswas and Biswas (1992), a hand book of "Spiders of India" (Sebastian and Peters, 2009), Platnick (2010) and the world spider catalogue (2020).

RESULT AND DISCUSSION

Nagpur district is blessed with plentiful amount of green cover. It is of southern tropical moist deciduous and tropical dry deciduous type of forest. Major parts are covered under wetland area. Spiders specimens were collected, by nets, pitfall trap, visual searching, sweeping and stroking sticks were used, from the various localities of plants vegetation, tree trunks, on ground surface, under stones, near water bodies etc. Nomenclature of spiders carried out according to their web pattern, behavior of spiders and similarity with other individuals. A total of 106 species belonging to 71 genera under 18 families were recorded from the various habitats with the checklist cited with their habitats and localities.

Sr. No.	FAMILY	SPECIES	LOCATION	HABIT AND HABITAT
1	Araneidae	Araneus bilunifera Pocock ♀.	Munia Conservation reserve(MCR), Nagpur.	Riparian habitat, Grasslands, Dry deciduous vegetation, Mixed forest with tall trees and shrubs.
2	Araneidae	Araneus cucurbitinus Clerck ♀.	Munia Conservation reserve(MCR), Nagpur.	Riparian habitat, Grasslands, Dry deciduous vegetation, Mixed forest with tall trees and shrubs.
3	Araneidae	Araneus mitifica (Simon) ♀.	Munia Conservation reserve(MCR), Nagpur.	Riparian habitat, Grasslands, Dry deciduous vegetation, Mixed forest with tall trees and shrubs.
4	Araneidae	Argiope aemula (Walckenaer)♀.	1.Munia Conservation reserve(MCR), Nagpur 2.Karhandla, Nagpur 3.VNIT, Nagpur	It makes vertical orb - webs, which can be easily recognized by the white coloured, X - shaped stabilimentum.
5	Araneidae	Chorizopes khanjanes Tikader 9.	GorewadaForest Reserve,Nagpur	Riparian habitat, Grasslands, Dry deciduous vegetation, Mixed forest with tall trees and shrubs.
6	Araneidae	Cyclosa bifida (Doleschall) Q.	GorewadaForest Reserve,Nagpur	Riparian habitat, Grasslands, Dry deciduous vegetation, Mixed forest with tall trees and shrubs.
7	Araneidae	Cyclosa moonduensis Tikader ♀.	GorewadaForest Reserve,Nagpur	Riparian habitat, Grasslands, Dry deciduous vegetation, Mixed forest with tall trees and shrubs.
8	Araneidae	Cyrtophora bidenta	Munia Conservation	Riparian habitat, Grasslands, Dry deciduous

 Table 1: Flavonoid content of medicinal plant extracts

		Tikader Ŷ .	reserve(MCR), Nagpur	vegetation, Mixed forest with tall trees and shrubs.
9	Araneidae	Cyrtophora cicatrosa (Stoliczka) ♀	Munia Conservation reserve(MCR), Nagpur	Riparian habitat, Grasslands, Dry deciduous vegetation, Mixed forest with tall trees and shrubs.
10	Araneidae	Cyrtophora citricola (Forskal) 9.	1.Munia Conservation reserve(MCR), Nagpur 2.Karhandla, Nagpur	It makes a characteristic horizontal tent shaped web. Sometimes many females build their webs in close vicinity.
11	Araneidae	Cyrtophora moluccensis (Doleschall) Q.	Seminary hills,Nagpur	Generally found in the woodlands or plantations (bamboo).
12	Araneidae	Larinia chloris (Audouin) ¥.	Zhilpi lake, Nagpur	The first species was found near water, corroborating observations in the literature that it prefers riparian habitats.
13	Araneidae	Neoscona bengalensis Tikader and Bal	Gorewada Forest Reserve, Nagpur	Prefers grassland habitat.
14	Araneidae	Neoscona chrysanthusi Tikader and Bal ? .	Munia Conservation reserve(MCR), Nagpur	Riparian habitat, Grasslands, Dry deciduous vegetation, Mixed forest with tall trees and shrubs.
15	Araneidae	Neoscona excelsus (Simon) Q.	Gorewada Lake, Nagpur.	Normally they are found in the vasinity of water bodies.
16	Araneidae	Neoscona laglaizei (Simon)♀.	Munia Conservation reserve(MCR), Nagpur	Riparian habitat, Grasslands, Dry deciduous vegetation, Mixed forest with tall trees and shrubs.
17	Araneidae	Neoscona lugubris (Walckenaer) ♀.	Gorewada Forest Reserve, Nagpur	Riparian habitat, Grasslands, Dry deciduous vegetation, Mixed forest with tall trees and shrubs.
18	Araneidae	Neoscona molemensis Tikader and Bal Q .	Gorewada Forest Reserve, Nagpur	Riparian habitat, Grasslands, Dry deciduous vegetation, Mixed forest with tall trees and shrubs.
19	Araneidae	Neoscona mukerjei Tikader 9.	Seminary hills, Nagpur	Semi - arid Grassland
20	Araneidae	Neoscona nautical (L.Koch) ♀.	Karhandla, Nagpur	It is found in home gardens and roadside vegetation. It constructs its orb-web at dusk. Grassland habitat with nearby water bodies.
21	Araneidae	Neoscona nautical (L. Koch) ৫.	Karhandla, Nagpur	Grassland habitat with nearby water bodies.
22	Araneidae	Neoscona odites (Simon) 9.	Gorewada Forest Reserve, Nagpur	Riparian habitat, Grasslands, Dry deciduous vegetation, Mixed forest with tall trees and shrubs.
23	Araneidae	Neoscona pavida (Simon) ♀.	Munia Conservation reserve(MCR), Nagpur	Riparian habitat, Grasslands, Dry deciduous vegetation, Mixed forest with tall trees and shrubs.
24	Araneidae	Neoscona rumpfi (Thorell) ♀.	Waranga, Nagprur	Agricultural field
25	Araneidae	Neoscona shillongensis Tikader	Munia Conservation reserve(MCR), Nagpur	Tropical moist Forests
26	Araneidae	<i>Zygeilla indica</i> Tikader and Bal ਰ .	Maharajbagh	Botanical gardens
27	Araneidae	Acusilas coccineus	Gorewada Forest Reserve, Nagpur	Prefers dry habitat. Hide inside the curled leaf. In India, it is found in woodlands and among shrubs. It is a small orb-weaver. The spider is distinguished by having a curled leaf at the center of its web, in which it shelters. The curled leaf also shelters eggs.
28	Araneidae	Arachnura angora Tikader	Maharajbagh	Botanical gardens
29	Araneidae	Araneus ellipticus Tikader & Bal	Maharajbagh	Gardens, fields and forests.
30	Araneidae	Araneus mitificus Simon	Munia Conservation reserve(MCR), Nagpur	It is found in the bushes, short trees etc. The spider builds its resting nest by folding small leaf like a cone later ties the edges with sticky threads. In a curled leaf with margins

				joined with silk mesh, on many trees usually garden plants.
31	Araneidae	Argiope pulchella Thorell.	VNIT, Nagpur	It is found commonly in gardens, woodlands, grasslands and crop fields. Upon disturbance the spider vibrates the web or move to the other side of the web. Prefers dense, moist environment. Builds perfect orb webs and rest at the center of the web in upside down position.
32	Araneidae	<i>Cyclosa hexatuberculata</i> Tikader	Munia Conservation reserve(MCR), Nagpur	Agroecosystem– Natural communities that have been modified by humans for agricultural purpose.
33	Araneidae	<i>Cyrtophora cicatrosa</i> Stoliczka	Gorewada forest Reserve, Nagpur	Riparian habitat, Grasslands, Dry deciduous vegetation, Mixed forest with tall trees and shrubs.
34	Araneidae	Cyrtophora citricola Forsskal	Munia Conservation reserve(MCR), Nagpur	It makes a characteristic horizontal tent shaped web. Sometimes many females build their webs in close vicinity.
35	Araneidae	Eriovixia laglaizei Simon	Maharaj bagh, Nagpur	Garden
36	Araneidae	<i>Gasteracantha geminata</i> Fabricius	Seminary hills	Tropical and Subtropical climates.
37	Araneidae	Gasteracantha kuhli Koch	Seminary hills	This species builds orb webs in open forests and shrubby areas and waits for prey in the center of the web.
38	Araneidae	Herennia multipuncta	Seminary hills	It is found in dry environment on tree trunks or barks.
39	Araneidae	Neoscona mukerjei Tikader	Gorewada forest reserve	Small temporary pond.
40	Araneidae	Neoscona theisi Walckenaer	Gorewada forest reserve	Riparian habitat, Grasslands, Dry deciduous vegetation, Mixed forest with tall trees and shrubs.
41	Araneidae	Nephila pilipes ♀.	1.Munia Conservation reserve(MCR), Nagpur 2.Karhandla, Nagpur	It is found in forests or wooded areas and gardens, where it builds large orb - webs between the trunks of trees. These orb - webs may appear golden in bright sunlight.
42	Araneidae	Paraplectana sp.	Ambazari lake	Although they generally live in moist areas, they can survive in dry areas if they have access to water.
43	Corinnidae	<i>Castianeira zetes</i> Simon	Maharaj bagh nagpur	Ground dweller spiders which are seen commonly in summer season running on ground and logs. Closely mimic black ants in colouration and behavior. Mimics characteristic behavior of ants by moving abdomen up and down while moving forward.
44	Cheiracanthiid ae	Cheiracanthium melanostomum Thorell	Maharaj bagh nagpur	It is often found living in the foliage of forests and gardens but also can inhabit human homes.
45	Hersiliidae	Hersilia savignyi Lucas	1.Munia Conservation reserve(MCR), Nagpur 2.Karhandla, Nagpur	It lives on the trunks of large trees - including commonly on the trunk of the coconut palm. Its colour closely matches that of the tree trunks in which it lives.
46	Linyphiidae	Neriene sundaica Simon	Futala lake nagpur	Some species live near the oceans and some live into the pond.
47	Liocranidae	Oedignatha sp.	Seminary hills	Secondary forest - man-made habitats like palm and other tree plantations.
48	Lycosidae	Hippasa agelenoides Simon	1.Munia Conservation reserve(MCR), Nagpur 2.Karhandla, Nagpur	Grassland
49	Lycosidae	<i>Lycosa tista</i> Tikader	Gorewada Forest Reserve	semi arid habitat

50	Lycosidae	<i>Pardosa mysorensis</i> Tikader & Mukerji	Gorewada Forest Reserve	grasslands, marshes, riversides, fens, saltmarsh, woodland clearings, hedge banks, moorland, blanket bog, waste ground, field margins and rarely heath land, gardens.
51	Lycosidae	Pardosa pseudoannulata Bosenberg	Ambazari lake nagpur	Found in wet habitat near the edge of water bodies.
52	Lycosidae	Pardosa sumatrana Thorell	Waranga, Nagprur	Grasslands, Farms
53	Oxyopidae	Hamadruas sp.	Maharaj bagh nagpur	In forests, home gardens, and fields around India.
54	Oxyopidae	<i>Oxyopes javanus</i> Thorell	.Munia Conservation reserve(MCR), Nagpur	Commonly seen on the upper surface of grasses and shrubby vegetation during daytime. At night they rest underneath the leaves. They are solitary active hunters. They do not build web.
55	Oxyopidae	<i>Oxyopes shweta</i> Tikader	.Munia Conservation reserve(MCR), Nagpur	Commonly seen in grasses and shrubby vegetation during daytime. At night they rest underneath the leaves. Females tend to protect their egg sac by covering them. They are solitary active hunters and do not build web.
56	Pholcidae	Pholcus sp.	1.Munia Conservation reserve(MCR), Nagpur 2.VNIT,Nagpur	Caves, under rocks, forest shrubs and deep limestone cracks.
57	Pholcidae	Smeringopus pallidus Blackwall	Maharaj bagh nagpur	Smeringopus pallidus can be found in dusty and dark corners of the house. They also build their webs under covered drains and on mud walls in gardens.
58	Philodromidae	<i>Tibellus elongatus</i> Tikader	Seminary hills	Tibellus habitat of the scrub regions and the tropical dry evergreen forest.
59	Salticidae	Asemonea tenuipes	1.Munia Conservation reserve(MCR), Nagpur 2.VNIT,Nagpur	Prefer habitats of slightly hilly areas. Seen generally under broad leaves of short heighted trees.
60	Salticidae	Brettus cingulatus Thorell	1.Munia Conservation reserve(MCR), Nagpur 2.VNIT,Nagpur	Tropical forests harbor the most species, but they are also found in temperate forests, scrubland, deserts, intertidal zones, and mountainous regions.
61	Salticidae	Burmattus sp.	1.Munia Conservation reserve(MCR), Nagpur 2.VNIT,Nagpur	Tropical forests harbor the most species, but they are also found in temperate forests, scrubland, deserts, intertidal zones, and mountainous regions.
62	Salticidae	Chalcotropis pennata Simon	1.Munia Conservation reserve(MCR), Nagpur 2.VNIT,Nagpur	Tropical forests harbor the most species, but they are also found in temperate forests, scrubland, deserts, intertidal zones, and mountainous regions.
63	Salticidae	Epeus tener Simon	1.Munia Conservation reserve(MCR), Nagpur 2.VNIT,Nagpur	Tropical forests harbor the most species, but they are also found in temperate forests, scrubland, deserts, intertidal zones, and mountainous regions.
64	Salticidae	Epeus indicus Proszynski	Gorewada Forest Reserve	Found on foliage of shrubs, bushes and tall trees. It is a very active spider. Females are seen to guard its eggs in its nest constructed on the under surface of leaves.
65	Salticidae	<i>Epocilla aurantiaca</i> Simon	Gorewada Forest Reserve	Woodland
66	Salticidae	Hasarius adansoni Audouin	Karhandla, Nagpur	Agricultural fields and other habitats.

67	Salticidae	Hyllus semicupreus Simon	Gorewada Forest Reserve	Builds its shelter in the dry leaves, crevices of tree trunks. Prefers dry habitat.
68	Salticidae	<i>Menemerus bivittatus</i> Dufour	1.Munia Conservation reserve(MCR), Nagpur 2.Karhandla, Nagpur	The spider is an active runner and found in the tree trunks. Feed on small insects, flies, other spiders etc.
69	Salticidae	Myrmaplata plataleoides	Karhandla, Nagpur	Agricultural fields and other habitats.
70	Salticidae	<i>Phintella vittata</i> Koch	Gorewada Forest Reserve	Commonly seen on small bushes and small- medium sized plants. Under sunshine they appear to shine due to their iridescent body surface.
71	Salticidae	<i>Plexippus paykulli</i> Audouin	1.Munia Conservation reserve(MCR), Nagpur 2.Karhandla, Nagpur	In warm areas on limestone grounds and on and around houses.
72	Salticidae	<i>Plexippus petersi</i> Karsch	1.Munia Conservation reserve(MCR), Nagpur 2.Karhandla, Nagpur	Woodland
73	Salticidae	Portia fimbriata Doleschall	1.Munia Conservation reserve(MCR), Nagpur	Prefers to live among dry leaves and debris in order to remain camouflaged with the background. This species is known to spin web unlike other salticid spiders.
74	Salticidae	<i>Rhene flavigera</i> Koch	1.Munia Conservation reserve(MCR), Nagpur	Seen among bushes, shrubs and small trees. They appear similar to beetles.
75	Salticidae	Siler semiglaucus Simon	Gorewada Forest Reserve	Commonly found near small black ant colonies. They prey on these ants and their eggs.
76	Salticidae	<i>Telamonia dimidiata</i> Simon	1.Munia Conservation reserve(MCR), Nagpur 2.Karhandla, Nagpur	Found in various Asian tropical rain forests, in foliage in wooded environments.
77	Salticidae	Thiania bhamoensis Thorell	.Karhandla, Nagpur	Agricultural, Forest, Grassland, Plantation, Garden.
78	Scytodidae	<i>Scytodes thoracica</i> Latreiller	Munia Conservation reserve(MCR), Nagpur	It prefers warm temperatures and is not rare inside houses.
79	Selenopidae	Selenops sp.	Gorewada Forest Reserve	They are primarily tropical and subtropical, though several species are found in deserts. They are commonly found on walls or under rocks.
80	Sparassidae	<i>Heteropoda venatoria</i> Linnaeus	1.Munia Conservation reserve(MCR), Nagpur 2.Karhandla, Nagpur	It is native to the tropical regions of the world, and it is present in some subtropical areas as an introduced species.
81	Sparassidae	Martensopoda sp.	Waranga, nagpur	Overall high diversity of soil.
82	Sparassidae	<i>Olios</i> sp.	Munia Conservation reserve(MCR), Nagpur	As this genus is widespread, they are found in a large variety of habitats, from savannahs to rainforest. They are mainly found in vegetation, and rarely houses. They are sometimes shipped alongside fruit, but this is not a common occurrence.
83	Tetragnathidae	Leucauge decorata Blackwall	1.Munia Conservation reserve(MCR), Nagpur 2.Karhandla, Nagpur	Usually found in shaded vegetation of gardens and forest. It constructs an oblique to horizontal orb web with open hub. Usually remains hung in its web with its ventral surface facing upwards.
84	Tetragnathidae	Leucauge tessellata Thorell	Gorewada Forest Reserve	Commonly seen in shrubby vegetation of forest area.
85	Tetragnathidae	<i>Opadometa fastigata</i> Simon	Gorewada Forest Reserve	Wooded areas
86	Tetragnathidae	Tetragnatha hasselti Thorell	Munia Conservation reserve(MCR), Nagpur	Rural Areas
87	Tetragnathidae	Tetragnatha mandibulata	Munia Conservation	It is a nocturnal spider that builds web after

			reserve(MCR), Nagpur	sunset. Builds web among grasses, near water bodies and commonly seen in paddy fields.
88	Tetragnathidae	Tetragnatha viridorufa	Karhandla, Nagpur	Wetland, high grass bald, and grassland habitats.
89	Tetragnathidae	Tylorida ventralis Thorell	Karhandla, Nagpur	Wetlands
90	Theridiidae	Achaearanea durgae Tikader	Gorewada Forest Reserve	The original habitat is basically of dry deciduous type, shrubs.
91	Theridiidae	Argyrodes flavescents Pickard-Cambridge	Gorewada Forest Reserve	Builds small webs near the webs of Nephila sp. spiders. Lives a kleptoparasitic life with host spider Nephila.
92	Theridiidae	<i>Chikunia nigra</i> Pickard- Cambridge	Munia Conservation reserve(MCR), Nagpur	Resides in under surface of leaves.
93	Theridiidae	Chrysso urbasae Tikader	Munia Conservation reserve(MCR), Nagpur	Semi arid habitat
94	Theridiidae	<i>Episinus</i> sp.	Gorewada lake	Mostly found on heather and sometimes on coastal grassland.
95	Theridiidae	<i>Twaitesia margaritifera</i> Pickard-Cambridge	Gorewada Forest Reserve	tropical
96	Thomisidae	Amyciaea forticeps Pickard-Cambridge	Gorewada Forest Reserve	Commonly seen in foliage. Seen among red ants (Oecophylla sp.) colony. Black spots present on the abdomen of the spiders resembles the eyes of red ants.
97	Thomisidae	Boliscus sp.	Gorewada Forest Reserve	Their diverse habitats range from wetlands to savannahs and woodlands.
98	Thomisidae	Diaea sp.	Gorewada Forest Reserve	Diaeadorsata prefers forest edges. It can be found on oak leaves. The sub-adults overwinter under the bark of dead trees.
99	Thomisidae	Indoxysticus minutes	Seminary hills	Garden
100		<i>Loxobates</i> sp.	Seminary hills	Gardens, meadows, woodlands, tropical rain- forests, grasslands, marshes and scrub-lands.
101	Thomisidae	Phrynarachne sp.	Seminary hills	Undergrowth at forest fringes.
102	Thomisidae	<i>Strigoplus netravati</i> Tikader	Gorewada forest reserve	Rural Forest
103	Thomisidae	Thomisus lobosus Tikader	1.Munia Conservation reserve(MCR), Nagpur 2.Karhandla, Nagpur	Woodland
104	Thomisidae	Thomisus shillongensis Sen	Munia Conservation reserve(MCR), Nagpur	Occur in the tropics and the warmer regions of the old world.
105	Uloboridae	Uloborus khasiensis Tikader	Munia Conservation reserve(MCR), Nagpur	tropics and subtropics
106	Uloboridae	Zosis geniculata Olivier	Karhandla, Nagpur	Rural, Agricultural, Forest, Grassland, Plantation, Garden

Conflict of interest Notification Page: Authors have no conflicts of interest in publishing this research work.

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