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Biodiversity of Spiders (Order: Araneae) from Hadol Hills, Gujarat, India

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ABSTRACT:

The present study was conducted from 2017 to 2019 around the Hadol Hills. Hadol is situated in Mahesana, Gujarat. A total of five sites were selected for study purposes. Due to a variety of spider habitats and guilds, a combination of collection methods, were Hand-picking, Ground Hand Collecting, Aerial Hand Collecting, and visual searching methods. A total of 1230 spider samples were collected. In the study, a total of 109 species belonging to 68 genera and 18 families were identified. Family Araniedae is diverse and dominant with 24 species and 11 genera in the total collection. A total of eight guilds were recorded based on the grouping of spiders.

Keywords: Taranga hills forest, Spiders, diversity**.**

Introduction

The spiders belong to the order Araneae and class Arachnida of phylum Arthropoda. Statistically, a total of 51,725 species of 4355 genera and 136 families of spiders in the world (World Spider Catalog, 2023) and around 1686 species of 438 genera and 60 families of spiders in India, (Keswani, *et.al*., 2012) In Gujarat, 415 species of 169 genera and 40 families were previously recorded (Yadav, *et.al*., 2017).

Hadol Hills is one of the quarrying industrial places and is well known for having a wide diversity of flora and fauna of Kheralu Taluka. The present documentation and observation have been conducted in five selected sites of Hadol Hills to offer reference data for future studies on the biology of spider fauna.

Study Area

Hadol Hills is located (23.9430° N and 72.8098° E) at the start of the Aravalli range in the Mahesana district of Gujarat. The study area falls in the unclassified reserve(under section-IV) forest (Champion *et.al*., 1968) with 18.12 sq. km. The forest has tropical thorn-scrub-like vegetation. Climatically the study area falls in the semiarid zone. Rainfall is an annual average of 663.60mm and irregular. Diurnal temperature ranges are also irregular with the season, averaging 39°C in summer and 21°C in winter. The main rivers are Rupen Pushpavti, Saraswati, and the Sabarmati.

TABLE:1 SITES DESCRIPTION OF TARANGA HILLS FOREST

No	Sites name	Geographical location	Description
1.	**Radhupura Village**	23° 93’96’’ N 72°77’35’’ E	Mixed thorny type Natural jungle
2.	**Hadol village**	23° 95’22’’ N 72°77’47’’ E	Mixed thorny type Natural jungle
3.	**Hills near Khadamali village**	23° 97’61’’ N 72°81’07’’ E	Tropical thorn scrub-type vegetation.
4.	**Khodamli quarry**	23° 97’89’’ N 72°79’92’’ E	Tropical thorn scrub-type vegetation.
5.	**Hills near Hanuman temple**	23° 97’05’’ N 72°78’51’’ E	Tropical thorn scrub-type vegetation.

Methodology

The specimen collection was done from 2017 to 2019 from a total of five sites(Table 1) in the study area. According to a study area, specimen collection requires a combination of collection methods and techniques because the study area consists of a hilly area, forest area, agricultural area, etc., so four diverse collection techniques viz., Hand picking, Ground Hand Collecting, Aerial Hand Collecting, and visual searching methods are employed**.**

All methods and techniques were used two times during the day and one time during night sampling. During the collection, capture the photographs and write notes on field observation of the spider and its habitats. Collected specimens were transferred to the collecting screw cap vials, which contain 70% ethanol. Later on, the preserved spiders were carried into the laboratory for identification. The detailed study of specimens has been done through a stereo zoom microscope using taxonomic literature, various keys, and catalogs given by arachnologists (Gajbe, 2007, Patel, 1972; 1973; 1975, Parmar, 2013; 2018, Pocock, 1900, Sebastian, *et.al*., 2009, Tikader, 1977; 1980; 1981; 1982; 1987).

Results and Discussion

The present study was done from 2017 to 2019 with a collection of a total of 1230 specimens. In the results of collected specimens, a total of 109 spiders belonging to 68 genera spread over 18 families were identified(Table:2). The family Araniedae (24 Species) was numerically dominant and also found in all sites with an orb-weaver guild. The family Salticidae (17 Species) was recorded during the daytime most diverse in site-1. The family Thomisidae(10 species) was dominant in site 1. The family Tetragnathidae and Lycosidae consist of eight species near Hadol village. Other Families were recorded as less than eight species. Based on the group of spiders total eight guilds(Table:3) were recorded which were Orb web builder(33 Species), Foliage runner (21 Species), Ground runner (19 species), Ambusher(10 Species), Scattered line weaver (7 Species), Foliage hunter(4 Species), Foliage weaver (2 Species) and Snare/sheet web builder (1 Species). Seven different types of webs were documented from the study area namely, orb webs, funnel web, irregular web, sheet web, tangle web, tube web, and tent web. Site-wise, the most diverse sites were Hadol Village with 90 Species, and Radhupura Village with 89 Species, other sites has less than 56 spider species were recorded.

TABLE: 2 SPIDERS COLLECTED FROM VARIOUS SITES

No	Family	Genus/Species	Site:1	Site:2	Site:3	Site:4	Site:5
1.	**ARANEIDAE**	***Arachnura angura***	-	-	-	-	+
2.		***Araneus mitificus***	+	+	+	-	+
3.		***Araneus bilunifer***	+	+	+	-	+
4.		***Araneus sp.***	+	-	-	-	-
5.		***Argiope anasuja***	+	+	+	+	+
6.		***Argiope pulchella***	-	+	-	+	-
7.		***Chorizopes stoliczkae***	+	-	-	-	-
8.		***Cyclosa bifida***	+	+	+	+	+
9.		***Cyclosa confraga***	+	+	+	+	+
10.		***Cyrtophora citricola***	+	+	+	+	+
11.		***Cyrtophora cicatrosa***	+	+	+	+	+
12.		***Eriophora sp.***	+	+	+	+	+
13.		***Eriovixia excelsa***	+	+	+	-	+
14.		***Eriovixia laglaizei***	+	+	+	+	+
15.		***Larinia chloris***	+	+	+	+	+
16.		***Larinia phthisica***	+	-	-	-	+
17.		***Neoscona achine***	+	-	-	+	+
18.		***Neoscona biswasi***	+	-	-	-	+
19.		***Neoscona mukerjei***	+	+	+	-	+
20.		***Neoscona nautica***	+	+	+	+	+
21.		***Neoscona odites***	+	+	+	-	+
22.		***Neoscona theisi***	+	+	+	+	+
23.		***Neoscona sp.***	+	+	+	-	+
24.		***Poltys sp.***	-	+	-	-	-
25.	**CLUBIONIDAE**	***Clubiona Drassodes***	+	+	-	-	+
26.		***Clubiona sp.***	+	+	+	-	-
27.	**CORINNIDAE**	***Castianeira tinae***	+	+	+	+	-
28.		***Castianeira sp.***	+	+	-	-	+
29.	**ERESIDAE**	***Stegodyphus sarasinorum***	-	+	+	-	-
30.	**EUTICHURIDAE**	***Cheiracanthium sp.1***	-	+	+	-	+
31.		***Cheiracanthium sp.2***	-	+	-	+	-
32.	**GNAPHOSIDAE**	***Drassodes sp.***	+	+	-	-	-

33.		***Gnaphosa stoliczkai***	+	+	-	+	-
34.		***Poecilochroa sp.***	+	+	-	-	-
35.		***Zelotes sp.***	+	+	-	-	-
36.	**HERSILIIDAE**	***Hersilia savignyi***	+	+	+	+	+
37.		***Hersilia striata***	+	+	-	-	+
38.		***Hersilia sp.***	-	+	-	-	+
39.	**LYCOSIDAE**	***Acantholycosa sp.***	-	+	+	+	+
40.		***Arctosa indica***	-	+	+	+	-
41.		***Hippasa agelenoides***	-	+	+	+	+
42.		***Lycosa poonaensis***	-	+	+	+	-
43.		***Lycosa tista***	-	+	+	+	+
44.		***Lycosa sp.***	+	+	+	-	-
45.		***Pardosa birmanica***	+	+	+	-	-
46.		***Pardosa pseudoannulata***	+	-	-	-	-
47.		***Pardosa sp.***	+	-	+	-	-
48.	**NEPHILIDAE**	***Nephila pilipes***	-	-	+	-	-
49.	**OXYOPIDAE**	***Oxyopes bharatae***	+	+	+	-	+
50.		***Oxyopes javanus***	+	+	+	+	+
51.		***Oxyopes sp.***	+	+	+	-	+
52.		***Peucetia elegans***	+	+	-	-	+
53.	**PHOLCIDAE**	***Artema atlanta***	+	+	+	+	+
54.		***Crossopriza lyoni***	+	+	+	-	+
55.		***Pholcus phalangioides***	+	+	+	+	+
56.		***Pholcus sp.***	-	+	-	-	-
57.	**PISAURIDAE**	***Pisaura sp.***	+	-	-	-	-
58.		***Nilus sp.***	+	-	-	-	-
59.	**SALTICIDAE**	***Chrysilla lauta***	+	+	-	-	-
60.		***Carrhotus viduus***	+	+	+	+	-
61.		***Epeus indicus***	+	+	-	-	-
62.		***Epocilla aurantiaca***	+	+	-	-	+
63.		***Hasarius adansoni***	+	+	+	-	-
64.		***Hyllus semicupreus***	+	+	-	-	-
65.		***Menemerus bivittatus***	+	+	+	-	-
66.		***Menemerus fulvus***	+	+	+	+	+
67.		***Myrmarachne plataleoides***	+	+	-	-	+
68.		***Myrmarachne sp.***	+	+	-	-	-
69.		***Phintella vittata***	+	+	+	+	+
70.		***Phintella sp.***	+	+	-	-	-
71.		***Phlegra dhakuriensis***	+	+	-	-	-
72.		***Plexippus paykulli***	+	+	+	+	+
73.		***Stenaelurillus lesserti***	+	+	+	+	-
74.		***Telamonia dimidiata***	+	+	-	-	-
75.		***Thyene imperialis***	+	+	-	-	+
76.	**SPARASSIDAE**	***Heteropoda venatoria***	+	+	+	+	+
77.		***Heteropoda bhaikakai***	+	+	+	+	+
78.		***Olios iranii***	+	+	+	+	+
79.		***Olios milleti***	+	+	-	+	-
80.		***Olios sp.***	-	-	+	-	+
81.	**TETRAGNATHIDAE**	***Guizygiella indica***	+	+	+	-	-
82.		***Guizygiella melanocrania***	+	+	-	+	-
83.		***Leucauge decorate***	+	+	+	-	+
84.		***Tetragnatha extensa***	+	+	-	-	-
85.		***Tetragnatha mandibulata***	+	+	-	-	-
86.		***Tetragnatha maxillosa***	+	+	-	-	-
87.		***Tetragnatha sp.***	+	+	-	-	-
88.		***Tylorida ventralis***	+	+	+	-	+
89.	**THERIDIIDAE**	***Achaearanea triangularis***	-	-	-	-	+
90.		***Argyrodes argentatus***	+	+	+	+	+

91.		***Argyrodes flavescens***	+	+	+	+	+
92.		***Argyrodes sp.***	+	-	-	-	-
93.		***Chrysso angula***	+	+	+	+	+
94.		***Parasteatoda tepidariorum***	-	+	-	-	-
95.		***Steatoda grossa***	-	+	+	+	+
96.		***Theridion sp.***	-	+	+	+	+
97.	**THOMISIDAE**	***Indoxysticus minutus***	+	+	-	-	-
98.		***Oxytate sp.***	+	+	-	-	-
99.		***Misumena sp.***	+	-	-	-	-
100.		***Runcinia sp.***	+	-	-	-	-
101.		***Synema decoratum***	+	+	-	-	-
102.		***Thomisus lobosus***	+	-	-	-	-
103.		***Thomisus projectus***	+	-	-	-	-
104.		***Thomisus sp.***	+	+	-	-	-
105.		***Xysticus kali***	+	-	-	-	-
106.		***Xysticus sp.***	+	-	-	-	-
107.	**ULOBORIDAE**	***Uloborus krishnae***	+	+	-	-	-
108.		***Uloborus plumipes***	+	+	-	+	+
109.		***Zosis sp.***	-	+	-	-	-
		Total Present ⟶	**89**	**90**	**55**	**40**	**55**

[**Site: 1- Radhupura Village**; **Site: 2 - Hadol Village**; **Site: 3- Hills near Khadamali Village**; **Site: 4- Khodamli quarry**; **Site:5- Hills near Hanuman temple**] [- : Absent, +:Present]

TABLE:3 SPIDER COMMON NAMES AND GUILDS

No	Family	Common name	Guild
1	**ARANEIDAE**	Orb- Weavers	***Orb web builder***
2	**CLUBIONIDAE**	Leaf-curling sac spiders	***Foliage hunter***
3	**CORINNIDAE**	Ant–mimicking sac spiders	***Ground runner***
4	**ERESIDAE**	Velvet Spiders	***Snare/sheet web builder***
5	**EUTICHURIDAE**	Long-Legged Sac Spiders	***Foliage runner***
6	**GNAPHOSIDAE**	Flat-bellied Ground Spiders	***Ground runner***
7	**HERSILIIDAE**	Two-Tailed Spiders	***Foliage hunter***
8	**LYCOSIDAE**	Wolf spiders	***Ground runner***
9	**NEPHILIDAE**	Golden Orb Weavers	***Orb web builder***
10	**OXYOPIDAE**	Lynx Spiders	***Foliage runner***
11	**PHOLCIDAE**	Cellar spiders or Daddy long legs	***Scattered line weaver***
12	**PISAURIDAE**	Nursery Web Spiders	***Foliage weaver***
13	**SALTICIDAE**	Jumping spiders	***Foliage runner***
14	**SPARASSIDAE**	Huntsman spiders	***Ground runner***
15	**TETRAGNATHIDAE**	Long jawed orb-weavers	***Orb web builder***
16	**THERIDIIDAE**	Cobweb weavers	***Scattered line weaver***
17	**THOMISIDAE**	Crab Spiders	***Ambusher***
18	**ULOBORIDAE**	Hackled-Orb-web spiders	***Orb web builder***

Conclusion

These investigations have led to the conclusion that the research area's spider fauna is incredibly diverse concerning both number and quality and that it can be employed as a naturally occurring biological control agent against insect pests. It can also be said that the largest number of spiders was observed in areas with lower human activity levels, such as those associated with pilgrimages, ecotourism, local agricultural practices in forested areas, firewood gathering, overgrazing, and transportation. The spider population will be in danger if the crucial measures for protecting the spider biodiversity are not taken to protect it.

Reference

Champion, H. G. and Seth, S. K. (1968). *A revised survey of the forest types of India*. Government of India, Delhi.

Gajbe, U. A. (2007). Araneae: Arachnida. In: Fauna of Madhya Pradesh (including Chhattisgarh), State Fauna Series. Zoological Survey of India, Kolkata 15(1), 419-540.

Gravely F. H. (1915). Notes on Indian mygalomorph Spiders. I. *Rec. Indian Mus.*, 11: 257287

Manisha Patel, (2006). "Studies on spiders with reference to their different habitats in mehsana district" Ph.D. thesis, Hemchandracharya north Gujarat university.

Keswani, S., Hadole P. and Rajoria, A. (2012): Checklist of Spiders (Arachnida: Araneae) from India, *Indian Journal of Arachnology*1 (1) 1-129

Patel, B. H. (1972). "studies of spiders fauna (Araneae: Arachnida) from Gujarat"Ph.D. thesis, S. P. university, Anand.

Patel, B. H. (1973). Some interesting theridiid spiders (Araneae: Theridiidae) from Gujarat, India. *Bulletin of the British Arachnological Society* **2**: 149-152.

Patel, B. H. (1975). Some spiders of the families Filistatidae and Scytodidae from Gujarat, India. *Oriental Insects* **9**: 425-429.

Patel, B.H., (2003a)**.**Spiders of Vansda National Park, Gujarat.*Zoos Print Journal.* 18 (4): 1279-1083

Patel, B.H. (2003b). Fauna of protected areas - A preliminary list of spiders with the descriptions of three new species from Parambikulam Wildlife Sanctuary, Kerala. Zoo's Print Journal, 18: 1207-1212.

Parmar, B.M. (2013). "Short term study of spider diversity of Pariej wetland". M.Sc. dissertation thesis, *S.P.University.*

Parmar, B.M. and ACHARYA, A.V.R.L.N. (2015a)**.** The spider fauna of Pariej Wetland, Gujarat, India. *International Journal of Science and Research* Vol. 4(10), 1028-1033.

Parmar, B.M. (2015b). The Spiders Diversity from Different Habitats around Biosciences, Vallabh Vidyanagar International Journal of Science and Research, Volume 4 Issue 10, 1985-1988

Parmar, B.M. and K.B.Patel, 2017. Preliminary Study of Spiders (Order: Araneae) from Taranga Hills International Journal of Science and Research, Volume 6 Issue 11, November 2017, 23 – 25 6. Parmar, **B.M. and K.B.Patel** (2018). Jumping Spiders (Araneae: Salticidae) of Satlasana Taluka. International Journal of Advanced Engineering Research and Science, Vol. 5(3), 159-162.

Parmar, B.M. (2018): "Taxonomic and Ecological study of Spiders from Satlasana Taluka, Gujarat, India" PH.D. Thesis, H.N.G.University

Parmar, B.M. and Patel, K. B. (2018a). Jumping Spiders (Araneae: Salticidae) of Satlasana Taluka. *International Journal of Advanced Engineering Research and Science* Vol. 5(3), 159-162

Parmar, Bhavesh. M. (2018b). Some Spiders from in and around the Caves of Taranga Hills, Mahesana, Gujarat, India. *Ambient Science*, Vol. 05(1); 49-50.

Parmar, B.M. 2022. Preliminary study of order Araneae from Little Ran of Kutch, India Int. Res. J. Environment Sci., Volume 11, Issue (1), Pages 26-31, January, 22 (2022)

Pocock, R. I. (1900). *The fauna of British India, including Ceylon and Burma. Arachnida*. London, pp. 1-279.

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

Tikader, B. K. (1977). Studies on spider fauna of Andaman and Nicobar islands, Indian Ocean. *Records of the Zoological Survey of India* **72**: 153-212.

Tikader, B. K. (1980a). Thomisidae (Crab-spiders). *Fauna India* (Araneae) **1**: 1-247.

Tikader, B. K. & Malhotra, M. S. (1980b). Lycosidae (Wolf-spiders). *Fauna India* (Araneae) **1**: 248-447.

Tikader, B. K. & Biswas, B. (1981). Spider fauna of Calcutta and vicinity: Part-I. *Records of the Zoological Survey of India, Occasional Paper* **30**: 1-149.

Tikader, B. K. (1982). Family Gnaphosidae. *Fauna India* (Araneae) **3**: 295-536.

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

World Spider Catalog (2023): World Spider Catalog. Natural History Museum Bern, online at http://wsc.nmbe.ch, version 18.5, accessed on {07/12/2023}. DOI: 10.24436/2

Yadav, A., R. Solanki, M. Siliwal & D. Kumar (2017). Spiders of Gujarat: a preliminary checklist. Journal of Threatened Taxa 9(9): 10697–10716; http://doi. org/10.11609/jott.3042.9.9.10697-10716.