



NOTES ON NATURAL HISTORY

Some Spiders from in and around the Caves of Taranga Hills, Mahesana, Gujarat, India

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Study Area: Taranga Hill, Mehsana district, Gujrat.

Coordinated: 23.7846°N 72.6333°E

Key words: Cave arthropods, Cave habitats

Introduction:

Cave ecosystems comprise a unique diversity of living organisms (Biswas, 2010; Vandel, 1965). Among the cave-dwelling invertebrates, members of the phylum Arthropoda are the most diverse (Vandel, 1965). Spiders belong to the class Arachnida under the phylum Arthropoda. They play significant roles in the ecosystem as a bio-controller agent of insects and predators in the food chains of terrestrial ecosystems (Bianchi *et al.*, 2006; Kremen & Chaplin-Kramer, 2007). They are seen to be the foremost powerful predator within the caves (Biswas & Biswas, 2014). They have an intensive diversity in guilds and Habitats. The aim of this study was to determine the diversity of spiders in and around the caves of Taranga hills.

Our survey and collection:

Five caves; Kalayai (Kalimata) cave, Taran-Dharan Cave, Jogida Cave, Digambar temple cave and Kotishilla cave of Taranga hills. Mixed scrub type forest and vegetation surround the study area. According to Champion & Sethi (1968), forest of the study area fall under unclassified reserved forest (under section-IV).

Sample collections were done by using active search and handpicking methods. Collected samples were transferred in the plastic air-tight cap with 75% ethyl alcohol for preservation purposes. Later, these samples were transferred to properly labeled vials in the laboratory for identification. Identification of samples was done with help of taxonomic keys and relevant literature (Keswani *et al.*, 2012; WSC, 2017; Siliwal *et al.*, 2003).

Identification:

From a total of 247 individuals, 42 species belonging to 35 genera of 18 families were recorded from various cave sites of Taranga hills (Table-1). Taran-Dharan cave (23°58'29.23"N 72°44'34.95"E) had the highest number of species (24 species) and Kotishilla cave had low numbers of species (11 species). In Taran-Dharan Cave, 54% spiders were weaver: foliage/ground and non-weaver/ hunting were 46%. In Kalayai cave, 69% spiders were weaver: foliage/ground and non-weaver/hunting were 31%. In Jogida Cave, 50% spiders were weaver: foliage/ ground and 50% were non-weaver/hunting. In Digambar Cave, 37% spiders were weaver: foliage/ ground and non-

weaver/hunting were 63%. In Kotishilla Cave, 73% spiders were weaver: foliage/ ground and non-weaver/hunting were 27%. Nine guilds were recorded from the study sites (Table-2). The diversity indices, Simpson_{1-D}, Shannon_H and Evenness_{e^H/S} were determined using PAST: (Paleontological statistics software) for each site (Table-3). The diversity indices Shannon's index (J') and Simpson Diversity (D) are measures widely used as these indices to include each species richness and evenness to measure range the amount the quantity of abundant species in a sample and therefore the number of abundant species. Simpson index (D) that varied from zero to one given the likelihood that two individual species drawn at random from a population belong to same species. The value D will increase with decreasing diversity.

Taran-Dharan Cave had the highest number of species (Species = 24) followed by Digambar Cave (Species = 16), Jogida Cave (Species = 14), Kalayai (Kalimata) Cave (Species = 13) and Kotishilla cave had the least number of species (Species = 11).

Anthropogenic activities such as mining, local tourism, and pilgrimage were observed in all caves escape Taran-Dharan Cave. Due to these activities, these caves may have limited number of spiders species.

Table -1: Spiders captured from study area:

Family	Species	a	b	c	d	e
Araneidae	<i>Araneus</i> sp.	P	P	P	A	A
	<i>Argiope anasuja</i>	A	P	A	A	P
	<i>Cyrtophora cicatrosa</i>	P	A	P	P	A
	<i>Neoscona mokerjei</i>	P	A	P	P	A
	<i>Neoscona nautica</i>	A	A	A	A	P
	<i>Neoscona subfusca</i>	A	P	A	A	A
	<i>Neoscona theisi</i>	A	P	A	A	A
	<i>Cyclosa confragosa</i>	P	A	P	A	A
	<i>Poltys bhavnagarensis</i>	A	P	A	A	A
Clubionidae	<i>Clubiona drassodes</i>	A	P	A	A	P
Corinnidae	<i>Castineira zetes</i>	P	P	A	A	P
Filistatidae	<i>Filistata</i> sp.	P	P	P	A	A
Gnaphosidae	<i>Drassodes</i> sp.	A	P	A	A	A
	<i>Gnaphosa</i> sp.	A	P	A	A	A
Hersiliidae	<i>Hersilia savignyi</i>	P	A	P	P	P
	<i>Hersilia</i> sp.	A	P	A	A	A
Lycosidae	<i>Hippasa</i> sp.	A	A	P	A	P
	<i>Lycosa</i> sp. 1	A	A	A	P	P

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	<i>Lycosa</i> sp. 2	A	A	A	A	A
	<i>Pardosa</i> sp.	A	A	A	A	A
Pholcidae	<i>Physocyclus globosus</i>	P	P	A	A	P
	<i>Crossopriza lyoni</i>	P	P	P	P	P
	<i>Pholcus</i> sp.	A	P	A	P	A
Oecobiidae	<i>Oecobius</i> sp.	P	A	A	P	A
	<i>Uroctea indica</i>	A	A	A	P	A
Psechridae	<i>Psechrus</i> sp.	A	P	A	A	A
Salticidae	<i>Carrhotus</i> sp.	A	A	A	P	A
	<i>Hyllus semicupreus</i>	A	A	P	P	A
	<i>Plexippus paykulli</i>	A	A	A	P	A
	<i>Menemerus bivittatus</i>	A	P	A	P	A
Scytodidae	<i>Scytodes thoracica</i>	P	A	A	P	A
Selenopidae	<i>Selenops</i> sp.	A	P	A	A	A
Sicariidae	<i>Loxosceles rufescens</i>	A	P	P	A	A
Sparassidae	<i>Heteropoda venatoria</i>	A	P	P	P	A
	<i>Heteropoda</i> sp.	A	A	P	P	A
Tetragnathidae	<i>Tetragnatha</i> sp.	A	P	A	A	A
	<i>Meta</i> sp.	A	P	A	A	A
Theridiidae	<i>Achaearanea tepidariorum</i>	A	A	P	A	A
	<i>Achaearanea</i> sp.	A	P	A	A	A
	<i>Argyrodes</i> sp.	A	P	A	A	P
	<i>Theridion</i> sp.	P	A	P	A	P
Uloboridae	<i>Uloborus</i> sp.	P	P	A	P	A

a- Kalayai (Kalimata) Cave; b- Taran Dharan Cave; c- Jogida Cave, d- Digambar Cave; e- Kotishilla Cave. P- Present; A- Absent.

Table 2: Family Distribution and Guilds of Spiders

No	Family	Gn.	Sp.	Family	Guild
				dist %	
1.	Araneidae	6	9	21.42	Orb web weaver
2.	Clubionidae	1	1	2.38	Foliage hunter
3.	Corinnidae	1	1	2.38	Ground runner
4.	Filistatidae	1	1	2.38	Funnel web
5.	Gnaphosidae	2	2	4.76	Ground runner
6.	Hersiliidae	1	2	4.76	Foliage hunter
7.	Lycosidae	3	4	9.52	Funnel web/ground runner
8.	Oecobiidae	2	2	4.76	Disc web builder
9.	Psechridae	1	1	2.38	Lac web/Pseudo-orb web builder
10.	Pholcidae	3	3	7.14	Scattered line weaver
11.	Salticidae	4	4	9.52	Stalker
12.	Scytodidae	1	1	2.38	Ground runner
13.	Selenopidae	1	1	2.38	Ground runner
14.	Sicariidae	1	1	2.38	Ambusher
15.	Sparassidae	1	2	4.76	Ground runner
16.	Tetragnathidae	2	2	4.76	Orb web weaver
17.	Theridiidae	3	4	9.52	Scattered line weaver
18.	Uloboridae	1	1	2.38	Orb web weaver
	Total	35	42	100	(Gn-Genus; Sp.- species)

Table-3: Diversity Indices

Sn.	Diversity Indices	a	b	c	d	e
1.	Individuals	13	24	14	16	11
2.	Shannon_H	2.565	3.178	2.639	2.773	2.398
3.	Simpson_1-D	0.923	0.958	0.929	0.937	0.909
4.	Evenness_e^H/S	0.87	0.895	0.859	0.921	0.898

a- Kalayai (Kalimata) Cave; b- Taran Dharan Cave; c- Jogida Cave, d- Digambar Cave; e- Kotishilla Cave.



Plate: Some of the identified spider species located during the survey in and around the cave vicinity

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