

First report of Spiders (Arachnida:Araneae) from Dachigam National Park, Kashmir, India

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Abstract

This study deals with the survey of spiders from Dachigam National Park, Srinagar, Kashmir was carried out to know the spider diversity. 73 spider species from 19 families and 50 genera were recorded. In our observation Araneidae is the most represented family with 16 species. Various families of spiders, recorded in the study areas for a period of two year were as Agelenidae, Amaurobiidae, Araneidae, Clubinidae, Gnaphosidae, Linyphiidae, Lycosidae, Miturgidae, Oxyopidae, Phloromidae, Pholcidae, Pisauidae, Salticidae, Scytodidae, Sicariidae, Sparassidae, Tetragnathidae, Therididae and Thomsidae.

Key words: Spider diversity,
National Park, Dachigam.

Introduction

India being a megadiverse country is rich in both flora and fauna, however there exists an extremely fragmentary knowledge about the diversity and distribution of spider fauna. The order Araneae is most diverse group of organisms on

earth with 1,70,000 spider species (Coddington and Levi 1991) about 42,055 ie 20% of these spiders are described worldwide under 3733 genera and 110 families. (Platnick 2011). In India 1520 species belong to 377 genera under 60 families (Sebastian and peter 2009). Spiders appear to be good subject for studying biodiversity patterns(Platnick 1999) One approach to investigate multispecies systems is to focus on dominant taxa or a key assemblage, which is potentially critical for local community food web dynamics (Polish and Strong 1996). Furthermore, the knowledge of the Himalayan spiders diversity and distribution is sparse as compared to the other regions, because of its difficult terrain and climatic condition. The present study was carried out in Dachigam National park, Srinagar, Kashmir, as there have been no study conducted on the spiders in this region. The study obtained the first comprehensive representation of the spider fauna in the Dachigam National park, which will help in assessing the status of spider diversity in this region keeping in mind its conservational value.

Material and Methods

Dachigam National park extends in two districts of Kashmir division namely Srinagar and Anantnag with entrance via Srinagar at Harwan, some 21Km north-east of Srinagar city. The National Park is located among high and mighty western Himalayan mountains located between 34.04-34.11'N latitude and 74.54'-75.09"E longitude. The variation in altitude is vast, ranging from 5500ft to 14000ft above mean sea level. Officially the area of the national park is recorded as 141sq.km but recently the estimates obtained from the satellite images report a slightly higher area. Dachigam National park was a hunting reserve of Maharaja of Jammu and Kashmir until 1947 following Indian independence the area came under the control of forest Department and was declared a sanctuary in 1951 wide State Order No 276/C and later on upgraded to the status of national Park on February 4th 1981. Among other issues, one of the mandates of protected areas was to ensure clean supply of water for whole Srinagar city.

A variety of collection methods are used and each one is

suited for collection in a certain type of habitat/ ecosystem. Along environmental gradients changes in both climate and structure occur, leading to shift in composition of potential prey species (Otto and Svensson ,1982). Study was conducted in six different sites

Site I Ulmus wallichiana dominated forest scrub area(North Facing).

Site II Oak or Qnercus robur dominated deciduous forest area/patch . . (South facing).

Site III Boulder- laiden pasture area (South facing).

Site IV Themeda anathera dominated Grass Scrub Area.(South facing). Site V Mixed pine (Pinus wallichiana) and Parrotiopsis jacquemontiana . area (North facing).

Site VI Pine (Pinus wallichiana) dominated forest scrub area (North facing)

The sampling was done on monthly basis at the same sampling sites and plots. The principal purpose of this sampling was to produce a relatively complete species list and associated abundance data for a the region and of the region as a whole.

Aerial sampling (for upper layer spiders up to 1.5m) involved searching leaves, branches, tree trunks and spaces in between ,from knee height up to maximum overhead arms reach. **Ground collection** (for ground layer spiders) involved searching on hands and knees, exploring the leaf litter,



logs, rocks and plants below knee level. **Beating** (for middle layer spiders up to 1m) consisted of striking vegetation with a 1 meter long stick and catching the falling spiders on a sheet, white cloth (1m 1.2m) laid horizontally below the vegetation. **Sweep netting** (for middle layer spiders up to 1 meter) was carried out in order to access foliage dwelling spiders. Specimens were identified up to family, genus and species level when possible. All the above methods were employed during the morning and afternoon.

Once the spiders were collected they can be identified from either live or preserved samples. Araneid specimens are generally preserved in 75% alcohol.

Besides the fauna of British India, reports of already identified spiders (reports of ZSI etc) taxonomic determination /identification of the araneids was performed from keys and catalogues provided by Tikader (1987), Barrion and Litsinger (1995), Roth (1993) Dayal (1935), Kaston

1978) Tikader 1980) Tikader and Biswas 1981) Davis and Zabka (1989), Platnick 1989, Biswas and Biswas (2003:2004) Nentwig et al 2003, Platnick 2011 and others relevant literatures.

Results

In the study a total of 73 species under 50 genera and 19 families are recorded during the study period of two years from Dachigam National Park. In our observation Araneidae is the most represented family with 16 species. Various families of spiders, recorded in the study areas for a period of two year were as Agelenidae, Amaurobiidae, Araneidae, Clubinidae, Gnaphosidae, Linyphiidae, Lycosidae, Miturgidae, Oxyopidae, Philoromidae, Pholcidae, Pisauidae, Salticidae, Scytodidae, Sicariidae, Sparassidae, Tetragnathidae, Theridiidae and Thomisidae all the study sites.

Table1. Checklist of the Spider species/morphospecies from Dachigam National Park, Kashmir, India.

S.No	Family/Species	Guild
	Agelenidae	Funnel web weaver
1	<i>Tegenaria sp</i>	
	Amaurobiidae	Hacklemesh weaver
2	<i>Callobius sp</i> CHAMBERLIN 1947	
	<i>Coelotes sp</i> BLACKWALL 1841	
	Araneidae	Orb web builder
3	<i>Araneus cucurbitinus</i> CLERCK 1757	
4	<i>Araneus diadematus</i> CLERCK 1757	
5	<i>Araneus himalayensis</i> TIKADER 1975	
6	<i>Araneus nympa</i> SIMON 18896	
7	<i>Araneus pahalgaonensis</i> TIKADER AND BAL 1981	
8	<i>Araneus sp</i> CLERCK 1757	
9	<i>Argiope sp</i> SCOPOLI 1772	
10	<i>Cyclosa conica</i> PALLAS 1772	
11	<i>Cyclosa elongate</i> BISWAS AND RAYCHAUDHURI 1998	
12	<i>Cyrtophora sp</i> SIMON 1864	
13	<i>Neoscona achine</i> SIMON 1906	
14	<i>Neoscona elliptica</i> TIKADER AND BAL 1981	
15	<i>Neoscona mukerjei</i> TIKADER, 1980	
16	<i>Neoscona pavidia</i> SIMON	
17	<i>Neoscona rumpfi</i> THORELL 1878	
18	<i>Neoscona thesisi</i> WALCKENAER, 1842	
	Clubinidae	Foliage runner
19	<i>Clubiona drassodes</i> CAMBRIDGE, 1874	
	Gnaphosidae	Ground runner
20	<i>Drassodes sp</i> WESTRING 1851	
21	<i>Haplodrassus dalmatensis</i> L. KOCH 1866	
22	<i>Sergiolus montanus</i> EMERTON 1890	
23	<i>Zelotes sp</i> GISTEL, 1848	
	Linyphiidae	Sheet web builder
24	<i>Lepthyphantes leprosus</i> OHLERT 1865	
25	<i>Linyphia sp</i>	
26	<i>Linyphia triangularis</i> CLERCK 1757	
27	<i>Nerine sp</i> BLACKWALL 1833	
	Lycosidae	Ground runner
28	<i>Hippasa agelenoides</i> SIMON, 1884	

29	<i>Alopecosa sp</i> SIMON 1885	
30	<i>Arctosa sp</i>	
31	<i>Lycosa sp</i> LATREILLE 1804	
32	<i>Pardosa flavisterna</i> CAPORIACCO 1935	
33	<i>Pardosa fuscula</i> THORELL	
34	<i>Pardosa mirabilis</i>	
35	<i>Pardosa sp</i> C.L.KOCH, 1847	
	Miturgidae	Foliage runner
36	<i>Cheiracanthum sp</i> C.L.KOCH, 1839	
	Oxyopidae	Foliage runner
37	<i>Oxyopes birmanicus</i> THORELL, 1887	
38	<i>Oxyopes elegans</i> L.KOCH 1878	
39	<i>Oxyopes lineatus</i> LATREILLE 1806	
40	<i>Oxyopes ramosus</i> JACKSON 1912	
	Philodromidae	Ambusher
41	<i>Thanatus alpines</i> KULCZYNSKI 1887	
	Pholcidae	Scattered line weaver
42	<i>Physocyclus globosus</i> TACZANOWSKI, 1874	
43	<i>Pholcus phalangioides</i> FUESSLIN, 1775	
	Pisauridae	Ground runner
44	<i>Pisaura mirabilis</i> CLERCK, 1757	
	Salticidae	Foliage runner
45	<i>Bianor albomaculatus</i> LUCAS 1846	
46	<i>Marpissa sp</i> C.L.KOCH 1846	
47	<i>Myrmarachne orientales</i> TIKADER 1973	
48	<i>Myrmarachne platyleoides</i> O.P.CAMBRIDGE 1869	
49	<i>Plexippus paykulli</i> AUDOUIN, 1826	
50	<i>Zygoballus sp</i> PECKHAM AND PECKHAM 1885	
	Sparassidae	Ground runner
51	<i>Heteropoda venatoria</i> LINNAEUS 1767	
52	<i>Olis sanguinifrons</i> SIMON 1906	
	Sicariidae	Ground runner
53	<i>Loxosceles rufescens</i> DUFOUR 1820	
	Scytodidae	Ground runner
54	<i>Scytodes thoracica</i> LATREILLE 1802	
	Tetragnathidae	Ord web builder
55	<i>Leucauge celebesiana</i> WALCKENAER, 1842	
56	<i>Leucauge sp</i> BLACKWALL, 1864	
57	<i>Tetragnatha montana</i> SIMON 1874	



58	<i>Tetragnatha</i> sp LATREILLE,1804	
59	<i>Tetragnatha maxillosa</i> THORELL 1895	
60	<i>Tylorida culta</i> CAMBRIDGE,1869	
61	<i>Nerienne</i> sp BLACKWALL 1833	
	Theridiidae	Scattered line weaver
62	<i>Anelosimus</i> sp SIMON 1891	
63	<i>Enoplognatha</i> sp CLERCK 1757	
64	<i>Episinus</i> BANKS 1911	
65	<i>Nesticodes rufipes</i> LUCAS 1846	
66	<i>Phoroncidia</i> sp WESTWOOD 1835	
67	<i>Steatoda grossa</i> C.L.KOCH 1838	
68	<i>Steatoda triangulosa</i> C.A.WALCKENAER 1802	
69	<i>Theridion</i> sp WALCKENAER 1805	
	Thomisidae	Ambusher
70	<i>Ozyptila trux</i> BLACKWALL 1846	
71	<i>Thomisus nirmali</i> SAHA AND RAYCHAUDHURI 2007	
72	<i>Xysticus cristatus</i> CLERCK 1757	
73	<i>Xysticus</i> sp C.L.KOCH,1835	

16 species with 5 genera belong to family Araneidae, 4 species each belong to family Gnaphosidae, Linyphiidae, Oxyopidae and Thomisidae, 8 species each belonging to family Theridiidae and Lycosidae. 6 species each belonging to Saltcidae and Tetragnathidae, 2 species each belong to family Amaurobiidae, Pholcidae and Sparassidae 1 specie each belong to Agelenidae, Clubinidae Miturgidae, Philoromidae, Pisauridae, Scytodidae and Sicariidae.

Thus the family Araneidae is the most dominant family exploring

22% of species, second dominant family Lycosidae and Theridiidae with 11% species, family Saltcidae, Tetragnathidae, exhibit 8% species, family Gnaphosidae, Linyphiidae, Oxyopidae, Thomisidae reveal 5%, family Amaurobiidae, Pholcidae, Sparassidae revealed 3% while other families Agelenidae, Clubinidae Miturgidae, Philoromidae, Pisauridae, Scytodidae, Sicariidae display 2% of the total species diversity. Distribution of different families of spiders at Dachigam National Park is illustrated in (Table 1 and Fig 1)

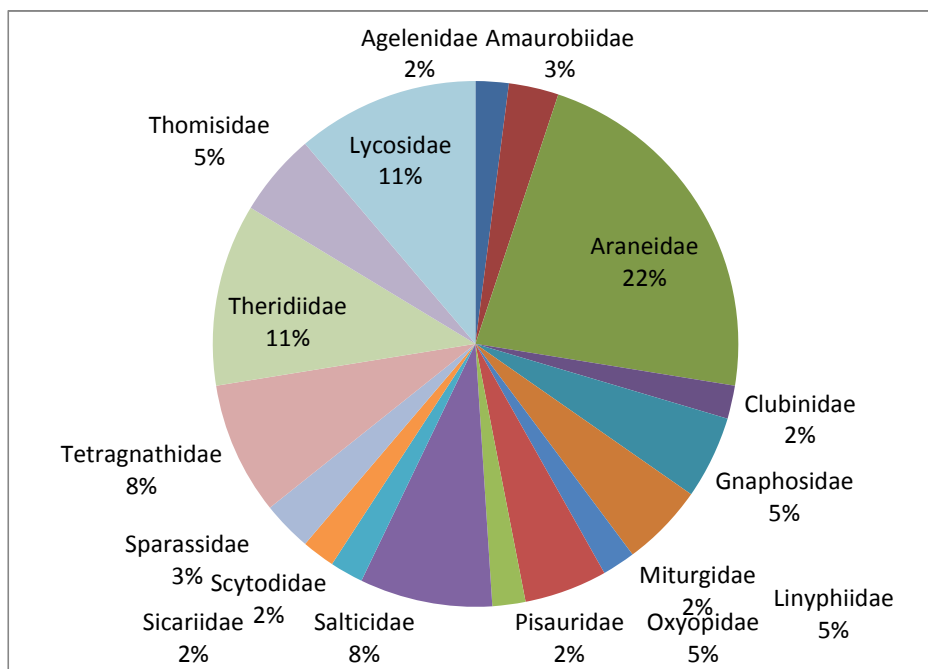


Fig 1 Comparative density (percentage) of spider families recorded during the study period

Family Diversity

Out of 60 families recorded in Indian region (Sebastian and Peter 2009) 19 families were observed at Dachigam National Park. This represented 31.66 % of the total families recorded in India.

The most common species reported from all the six sites during the period of study are 20 species included *Tegenaria sp*, *Callobius sp*, *Coelotes sp*, *Clubiona drassodes*, *Drassodes sp*, *Zelotes sp*, *Lepthyphantes leprosus*, *Linyphia sp*, *Linyphia triangularis*, *Neriene sp*, *Cheiracanthum sp*, *Bianor*

albobimaculatus, *Marpissa sp*, *Myrmarachne orientales*, *Myrmarachne plataleoides*, *Plexippus paykulli*, *Zygoballus sp*, *Ozyptila trux*, *Hippasa agelenoides*, *Pardosa fuscula* *Pardosa sp* and *Lycosa sp*. The taxa *Araneus himalayensis*, *Araneus sp*, *Physocyclus globus*, *Nesticodes rufipes* made representation at three sites out of six. Similarly species like *Araneus nympha*, *Neoscona pavida* and *Pholcus globus* were reported from 2 sites out of six only in 1st year of study while *Araneus nympha* and *Neoscona pavida* also showed its

present at one addition site making their presence at 3 sites out of six while *Argiope sp* was found to be restricted to site VI only.

Guild preference exhibited by spidera at Dachigam National Park/Functional group

The collected spiders can be divided into eight functional groups (Guilds) based on their foraging behavior in the field (Utez et .al.1999). The dominant was orb web builders fig 1 and comprised of (22 species) of spiders. Spiders of the family Araneidae, Tetragnathidae, fall under this category. Spiders of family Gnaphosidae, Lycosidae, Pisauridae fall under the category ground

runners formed the next dominant guild in this ecosystemsm, compirising (18 species) of spiders. Family Clubinidae Miturgidae, Oxyopidae, Saltcidae come under the category of foliage runners (12 species), Pholcidae, Therididae are the scattered line weavers (10 species), spiders Philoromidae, Thomisidae are under the category of ambusher (5 species), Linyphiidae are sheet web builders (4 species). Amaurobiidae the Hackelmesh weaver (2 species), Agelenidae funnel weaver (1specie) Thus spiders at Dachigam National Park exhibit a good diversity in guild preference.Fig2

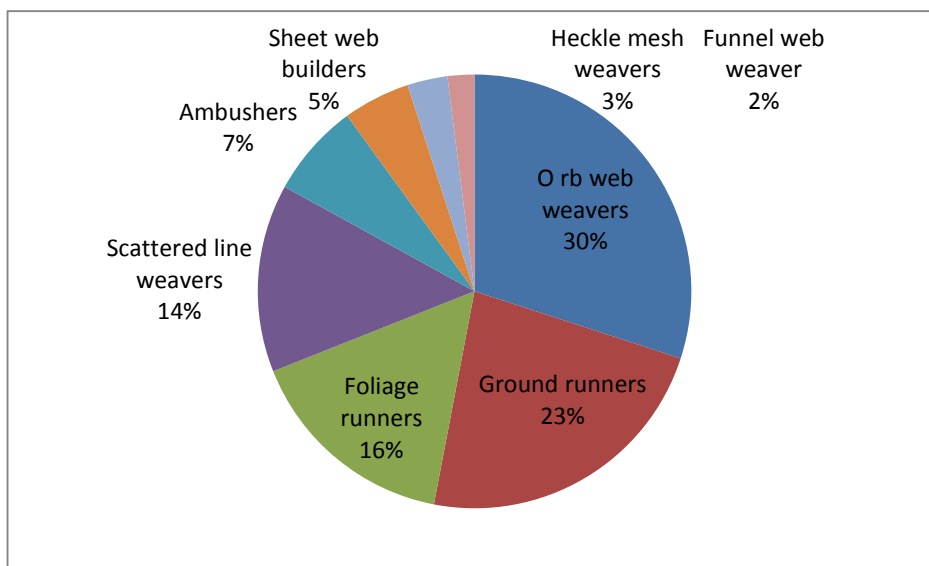


Fig 2. Comparative density (percentage) of spiders recorded during the study period

Generic diversity



India represents 377 genera (Sebastian and Peter 2009) from which 50 genera were recorded in Dachigam National Park during the study. Highest generic diversity found in Theridiidae (7) Araneidae Lycosidae and Salticidae (5) Gnaphosidae and Tetragnathidae (4) Thomisidae and Linyphiidae (3) while as Pholcidae and Sparassidae (2) and others only (1). No proper distribution was recorded from Kashmir. So all the genera are the first record from Dachigam National Park, Kashmir.

Affinities

The present study conducted in Dachigam national Park revealed that the spider fauna of this ecosystem bears affinities with pantropical, paleotropical, holarctic, palearctic and cosmotropical regions. *Leucauge decorate* (Tetragnathidae) bears affinity with paleotropical/ oriental region, *Araneus nympha* (Araneidae), *Oxyopes lineatus* (Oxyopidae) shows palearctic affinities. *Heteropoda venatoria* (Sparassidae) pantropical, *Scytodes thoracica* (Scytodidae) holarctic and *Myrmarachene platyleoides* (Salticidae) shows affinities with cosmotropical region.

Discussion

Earlier no work has been carried out in Dachigam National Park for an inventory of spiders is the first report from Dachigam National Park. As there is no spider species list available for Dachigam National park. During the present spider survey a total of 73 species under 50 genera and 19 families are recorded during the study period of two years it is found that the diversity of genera is more around riparian habitats than in grass land followed by oak. Possibly due to higher structural complexity which comprises of relatively open and diverse overstorey and understory structure of riparian habitat supporting higher number of spider species. The functional groups of the spider assemblage revealed that the Orbweb weavers 30% were dominant wherein the family Araneidae accounted for the largest proportion of the spider species representing approximately 22% of all the species. Thus, Dachigam National Park reflected high diversity of spiders.

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