

Diversity of spiders (Araneae) in the Western Ghats – an overview

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Abstract: Spiders form the seventh largest animal order in terms of numbers of known species and are common predatory arthropods in all terrestrial and many aquatic ecosystems. This is the most diverse, female-dominated and entirely predatory order in the arthropod world. Spiders are key components of all ecosystems in which they live and are considered to be useful indicators of the overall species richness and health of terrestrial communities. However, spiders of the Western Ghats are a poorly explored group and detailed information about their systematics, diversity and ecology in this 'biodiversity hotspot' is scarce. In this article, we attempt to amass the available knowledge existing thus far about this very important invertebrate group distributed along the Western Ghats together with an analysis of their important faunistic features. The Western Ghats harbours a total of 275 species of spiders belonging to 139 genera of 39 families. Classification based on the ecological guild concept yields seven feeding guilds, with 'sheet web builders' constituting the dominant guild at the family level. Analysis of faunistic features reveals that 44 species are endemic to India, about 45 to Indo-Sri Lankan region. The Western Ghats spider fauna bear affinities with Oriental and Palearctic regions, as well as with the island fauna of Sri Lanka and Andaman and Nicobar Islands, parts of Indian mainland such as Sikkim, and Kolkata and many south-east Asian countries.

Keywords: Araneae, diversity, spiders.

Introduction

Spiders form one of the most ubiquitous groups of predaceous organisms in the animal kingdom (Riechert and Lockley 1984). Spiders, unique among all organisms in their modes of silk production and usage are common predatory arthropods in all terrestrial and many aquatic ecosystems, from marine intertidal zones to tundra and rocky

peaks, and all points between. The ardent arachnologist is always close to a wealth of species and numerous specimens of great intrinsic and biological interest. Spiders are found near water's edge, on the ground, in underground caves and the top of mountains. Among all organisms, spiders (Order: Araneae) form the seventh largest order in terms of number of known species, after Coleoptera, Hymenoptera, Lepidoptera, Diptera, Hemiptera

and Acarina. Furthermore, this is the most diverse, female-dominated and entirely predatory order in the arthropod world. As such, spiders are key components of all ecosystems in which they live. Currently 39,725 valid species of spiders in 3677 genera and 108 families have been described (Platnick 2007). Coddington and Levi (1991) commented that up to 170,000 species exist worldwide. Being highly diverse and abundant predators, spiders are important regulators of terrestrial arthropod populations (Riechert and Bishop 1990; Coddington and Levi 1991; Moran *et al.* 1996) and may prove to be useful indicators of the overall species richness and health of terrestrial communities (Noss 1990).

Despite being one of the most diverse groups of organisms on earth, spiders have largely been ignored because of the human tendency to favour some organisms over others of equal importance because they lack a universal appeal (Humphries *et al.* 1995). Spiders also play an important role by being exclusively predatory (Wise 1993) and thereby regulate insect populations. Hundreds of spider species are described every year but the status of spider taxonomic knowledge is far from adequate. No comprehensive key to modern world families exists and only about 20% of the families have been revised using modern methods. Coddington and Levi (1991) explained that if 170,000 species exist, 638 years will pass before the job is finished at the present rate of description.

Spiders of the Western Ghats are poorly studied compared to other parts of the country. With respect to its geographical, climatic and ecological features, the Western Ghats harbours a rich amount of arachnids of which spiders have a huge share. Please see Annexure 1, for a list of spider families showing number of species reported from the World, India and the Western Ghats. This area is also enriched with wide forest area and therefore possesses various assemblages of spiders. Due to the paucity of workers, much of the spider diversity in the Western Ghats remains unex-

plored. As a result, the disappearance of many species remains undocumented.

Current state of knowledge

Studies on Indian spiders were initiated by Blackwall (1850). He described many new species and a new genus of the family Araneidae. Later, Cambridge (1861) gave detailed notes on the systematics of spiders. Pocock (1900) listed arachnid fauna of British India. Hirst (1909) described a number of new species. Gravely (1915; 1935) noted information on Indian mygalomorph spiders. Narayan (1915) described the features of some ant-like spiders in the collection of Indian museum. Later, Sherriff (1919; 1927a, b, c) published a series of volumes about South Indian Arachnology and contributed a lot to the knowledge on the South Indian spiders. Subrahmanyam's (1968) study on South Indian spiders gave more taxonomic information about different species. Coyle (1971) studied the systematics and natural history of the mygalomorph spider genus *Antrodiaetus* and related genera.

The present knowledge on the spiders of the Western Ghats remains confined to the early works of Pocock (1895; 1899; 1900), Hirst (1909), Gravely (1915; 1935), Sherriff (1919; 1927a, b, c), Sinha (1951), Subrahmanyam (1955) and Charpentier (1996). More recently, Joseph *et al.* (1998) reported the spiders of Periyar Tiger Reserve in Idukki district. Jose and Sebastian (2001), Smith (2004) and Sugumaran *et al.* (2005; 2006) attempted to document the diversity of spider fauna in the Western Ghats region. Patel (2003) published a preliminary list with 91 species of spiders from the Parambikulam Wildlife Sanctuary of the Western Ghats of Kerala, with descriptions of three new species. Jose *et al.* (2008) too listed a total of 147 species of spiders from the same wildlife sanctuary. Sudhikumar *et al.* (2006) conducted a preliminary study on the diversity of spider fauna in Mannavan shola forest of the Western Ghats.

A few studies have been conducted on the spider fauna of different agroecosystems of the Western Ghats. Sundararaju (1984) reported some spiders as natural enemies of cashew pests in Goa. Rajendran (1987), Nirmala (1990) and Ganesh Kumar (1994) conducted a diversity study of predatory spiders associated with paddy fields around the Western Ghats in Tamil Nadu. Anbalagan and Narayanaswamy (1999) analysed the population fluctuation of spiders in the paddy fields. Venkateshalu and Viraktamath (1998) studied the change in the diversity of spiders according to the plant growth in the paddy fields around the Western Ghats of southern Karnataka. Sebastian *et al.* (2005) documented the spider diversity in the high ranges associated with the Western Ghats of central Kerala. Manu and Hebsy Bai (2006) reported the diversity of spiders in southern Kerala. Sathiamma *et al.* (1998) studied the predatory spiders associated with coconut plantations of central Kerala. Poornima (2001) and Raghavendra (2001) revealed the diversity of spiders in garden crops and cashew orchards of Karnataka lying along the Western Ghats. Likewise, Mathew *et al.* (2005) studied the diversity of spiders in cardamom plantations of high ranges of Kerala. Rajashekhar and Raghavendra (2001) gave an overview of spiders in the Western Ghats. Siliwal and Molur (2007) tried to document the spiders of the Western Ghats in their checklist of Indian spiders.

A total of 275 species belonging to 139 genera of 39 families have been identified and described from the Western Ghats. This can be included into the two existing suborders: Mygalomorphae and Araneomorphae based on the arrangement of chelicerae.

Spiders of the suborder Mygalomorphae are considered to be comparatively primitive and they have two pairs of book lungs on the underside of the abdomen. They have paraxial chelicerae, i.e. projecting horizontally and fang articulated with chelicerae in vertical plane and movable in a plane more or less parallel to the median plane of the body and fang closing backward. They usually live

in burrows either in the ground or in crevices in tree trunks. Sixteen species of Mygalomorph spiders belonging to 12 genera and 4 families are reported from the Western Ghats.

Araneomorph spiders are considered modern and they are characterized by one pair of book lungs. The chelicerae are diaxial, i.e. projecting downward and fang articulating with chelicerae in a vertical plane, with the fang not closing backward. Suborder Araneomorphae is further divided into two sections, Cribellate and Ecribellate, based on the presence or absence of cribellum (a transverse spinning plate in front of spinnerets).

A checklist of spiders reported from the Western Ghats is given in Annexure 2.

Faunistic features of spiders of Western Ghats

Endemism

Family Theraphosidae has three endemic genera: *Plesiophrictus* and *Poecilotheria* are endemic to Indo-Srilankan region, whereas *Thrigmopoeus* are found only in Indian subcontinent. About 45 are found to be endemic to Indo-Sri Lankan region. These findings are in accordance with the endemism of other flora and fauna reported from the Western Ghats.

Affinities

The Western Ghats spider fauna bear affinities with Oriental and Palearctic regions. An affinity with the island fauna of Sri Lanka is also pronounced. According to Holloway (1974), Indian fauna is formed as a result of displacement by invaders from other regions of the oriental region after its separation from Gondwanaland and merger with Asia. Some species of the genera *Argiope*, *Cyclosa*, *Eriovixia*, *Gasteracantha* (Araneidae); *Tylorida*, *Tetragnatha* (Tetragnathidae) and *Nephila* (Nephilidae) reported from the Western

Ghats show strong affinities to their Srilankan relatives. Some species of the genera *Argiope*, *Cyclosa*, *Eriovixia*, *Gasteracantha*, *Neoscona* family Araneidae); *Leucauge*, *Tetragnatha* (Tetragnathidae) and *Nephila* (Nephilidae) show oriental affinities. A small fraction of species like *Araneus nympha* (Simon, 1889), *Eriovixia laglaizei* (Simon, 1877), *Gasteracantha hasselti* Koch, 1837 and *Nephila pilipes* (Fabricius, 1793) show palearctic affinities. The Western Ghats spider fauna shows affinities with Andaman Nicobar islands, north-east hills, Eastern India and southeast Asia (Table 1).

Guild structure

The concept of the ecological guild has its origin in early plant and animal ecology, when ecologists recognized the organization of trophic groups. Modern usage of the term 'guild' was formalized as 'a group of species that exploit the same class of environmental resources in a similar way' (Root 1967). An assumption derived from the competition theory is that species within guilds are most likely to competitors; therefore guilds are suggested to form the basis of community organization.

The spiders reported from Western Ghats can be classified into the following seven ecological guilds based on their foraging mode.

Stalkers

Spiders coming under this category actively jump over the prey for feeding. Spiders of the family Salticidae and Oxyopidae show this type of feeding behaviour.

Orb weavers

Spiders of this guild construct perfect orb webs for prey capture. Spiders of the family Araneidae, Deinopidae, Tetragnathidae and Uloboridae come under this category.

Ground runners

Spiders of this guild mainly feed on ground layer of the field and rarely come to the foliage or canopy of the plant for prey capture. Spiders of the family Corinnidae, Ctenidae, Gnaphosidae, Lycosidae, Oonopidae, Prodidomidae, Scytodidae and Zodariidae come under this guild.

Space web builders

These spiders construct irregular space webs for prey capture. Spiders of the family Dictynidae, Pholcidae and Theridiidae come under this category.

Ambushers

These spiders show a 'sit-and-wait' type of behaviour for prey capture. Spiders of the families Mimetidae, Philodromidae, Pisauridae, Sparassidae, Selenopidae, Theraphosidae and Thomisidae come under this category.

Foliage runners

These spiders hunt on foliage for phytophagous insects. This guild contains three families, viz. Clubionidae, Hersiliidae and Miturgidae.

Sheet web builders

These spiders construct sheet-like web for prey capture. A total of 11 families of spiders come under this category, viz. Agelenidae, Atypidae, Barychelidae, Dipluridae, Eresidae, Filistatidae, Hahniidae, Linyphiidae, Oecobiidae, Psecridae and Stenochilidae.

Among 39 families of spiders collected, a majority of them fall under 'sheet web builders' (28%). The second dominant guild is the 'ground runners' (23%). Ambushers (18%), orb weavers (10%), foliage runners (8%), space web builders (8%) and stalkers (5%) are the other ecological guilds.

Table 1. Faunal similarity of spiders found in the Western Ghats with that of other places in India and some Southeast Asian countries.

Species	Andaman and Nicobar Islands	Sikkim	Kolkata	Singapore	Philippines
<i>Artema atlanta</i> Walckenaer, 1837	×				
<i>Achaearanea diglipuriensis</i> Tikader, 1977	×				
<i>Argiope pulchella</i> Thorell, 1881			×		
<i>Argyrodes andamanensis</i> Tikader, 1977	×				
<i>Argyrodes gazedes</i> Tikader, 1970		×			
<i>Argyrodes xiphias</i> Thorell, 1873	×				
<i>Ariamnes flagellum</i> (Doleschall 1857)				×	
<i>Artema atlanta</i> Walckenaer, 1837			×		
<i>Crossopriza lyoni</i> (Blackwall 1867)			×	×	
<i>Cyclosa bifida</i> (Doleschall 1859)				×	
<i>Cyclosa insulana</i> (Costa 1834)		×	×	×	
<i>Cyrtophora bidenta</i> Tikader, 1970		×			
<i>Eriovixia laglaizei</i> (Simon 1877)				×	
<i>Eriovixia poonaensis</i> (Tikader and Bal 1981)			×		
<i>Gasteracantha hasselti</i> Koch, 1837		×	×	×	
<i>Hersilia savignyi</i> Lucas, 1836	×				×
<i>Hyllus diardi</i> (Walckenaer 1837)				×	
<i>Leucauge decorata</i> (Blackwall 1864)		×	×	×	×
<i>Leucauge pondae</i> Tikader, 1970		×			
<i>Leucauge tessellata</i> (Thorell 1887)		×			
<i>Myrmarachne plataleoides</i> (O.P. Cambridge 1869)	×				
<i>Nephila kuhlii</i> (Doleschall 1859)			×		
<i>Nephila pilipes</i> (Fabricius 1793)	×	×	×	×	×
<i>Opadometa fastigata</i> (Simon 1877)					×
<i>Oxyopes shweta</i> Tikader, 1970		×			
<i>Parawixia dehaani</i> (Doleschall 1859)			×	×	
<i>Pardosa sumatrana</i> (Thorell 1890)	×		×		
<i>Perenethis unifasciata</i> (Doleschall 1859)				×	×
<i>Phintella vittata</i> (Koch 1846)			×	×	
<i>Phycosoma martinae</i> (Roberts, 1983)					×
<i>Polyboea vulpina</i> Thorell, 1895				×	
<i>Telamonia dimidiata</i> (Simon, 1899)			×	×	
<i>Tetragnatha vermiformis</i> Emerton, 1884					×
<i>Tetragnatha andamanensis</i> Tikader, 1977	×				
<i>Tetragnatha ceylonica</i> O.P. Cambridge, 1869					×
<i>Theridion manjithar</i> Tikader, 1970		×			
<i>Theridula angula</i> Tikader, 1970		×			
<i>Tylorida ventralis</i> (Thorell 1877)			×	×	

Annexure 1. A list of spider families showing the number of species reported from the world India and the Western Ghats.

Suborder and family	No. of species (World)	No. of species (India)	No. of species (WG region)
Suborder: Mygalomorphae			
Atypidae Thorell, 1870	42	1	1
Barychelidae Simon, 1889	300	5	3
Dipluridae Simon, 1889	175	4	1
Theraphosidae Thorell, 1870	900	51	11
Suborder: Araneomorphae			
Agelenidae C.L. Koch, 1837	504	10	2
Araneidae Simon, 1895	2841	145	51
Clubionidae Wagner, 1887	538	23	2
Corinnidae Karsch, 1880	925	35	4
Ctenidae Keyserling, 1877	465	14	3
Deinopidae C.L. Koch, 1850	57	1	1
Dictynidae O.P. Cambridge, 1871	562	11	1
Eresidae Koch, 1851	101	4	3
Filistatidae Ausserer, 1867	110	10	1
Gnaphosidae Pocock, 1898	1982	134	5
Hahniidae Bertkau, 1878	235	4	1
Hersiliidae Thorell, 1870	156	6	3
Linyphiidae Blackwall, 1859	4343	26	4
Lycosidae Sundevall, 1833	2305	126	20
Mimetidae Simon, 1881	152	3	1
Miturgidae Simon, 1885	352	29	4
Nephilidae Simon, 1894	75	7	4
Oecobiidae Blackwall, 1862	102	5	1
Oonopidae Simon, 1890	474	15	1
Oxyopidae Thorell, 1870	422	62	14
Philodromidae Thorell, 1870	522	44	2
Pholcidae C.L. Koch, 1851	967	7	4
Pisauridae Simon, 1890	332	18	5
Prodidomidae Simon, 1884	299	9	1
Psechridae Simon, 1890	24	5	2
Salticidae Blackwall, 1841	5077	184	26
Scytodidae Blackwall, 1864	182	9	2
Selenopidae Simon, 1897	189	6	2
Sparassidae Bertkau, 1872	1014	79	14
Stenochilidae Thorell, 1873	12	1	1
Tetragnathidae Menge, 1866	956	45	25
Theridiidae Sundevall, 1833	2267	56	22
Thomisidae Sundevall, 1833	2056	152	15
Uloboridae Thorell, 1869	263	22	7
Zodariidae Thorell, 1881	842	22	5

Annexure 2. Check list of spiders reported from the Western Ghats.**Family Agelenidae C. L. Koch, 1837**

1. *Agelena kariansholaensis* Sugumaran *et al.* 2005
2. *Agelena satmila* Tikader, 1970

Family Araneidae Simon, 1895

3. *Arachnura angura* Tikader, 1970
4. *Arachnura scorpionoides* Sugumaran *et al.* 2005
5. *Araneus bilunifer* Pocock, 1900
6. *Araneus ellipticus* (Tikader & Bal, 1981)
7. *Araneus himalayaensis* Tikader, 1975
8. *Araneus nympha* (Simon, 1889)
9. *Argiope aemula* (Walckenaer, 1842)
10. *Argiope anasuja* Thorell, 1887
11. *Argiope catenulata* (Doleschall, 1859)
12. *Argiope pulchella* Thorell, 1881
13. *Chorizopes bengalensis* Tikader, 1975
14. *Chorizopes calciope* (Simon, 1895)
15. *Cyclosa anaikattae*, Sugumaran *et al.* 2005
16. *Cyclosa bifida* (Doleschall, 1859)
17. *Cyclosa confraga* (Thorell, 1892)
18. *Cyclosa hexatuberculata* Tikader, 1982
19. *Cyclosa insulana* (Costa, 1834)
20. *Cyclosa moonduensis* Tikader, 1963
21. *Cyclosa mulmeinensis* (Thorell, 1887)
22. *Cyclosa quinqueguttata* (Thorell, 1883)
23. *Cyclosa spirifera* Simon, 1889
24. *Cyrtarachne bengalensis* Tikader, 1961
25. *Cyrtophora bidenta* Tikader, 1970
26. *Cyrtophora cicatrosa* (Stoliczka, 1869)
27. *Cyrtophora citricola* (Forsk., 1775)
28. *Cyrtophora koronadalensis* Barrion & Litsinger, 1995
29. *Eriophora* sp.
30. *Eriovixia excelsa* (Simon, 1889)
31. *Eriovixia laglaizei* (Simon, 1877)
32. *Eriovixia poonaensis* (Tikader & Bal, 1981)
33. *Gasteracantha dalyi* Pocock, 1900
34. *Gasteracantha geminata* (Fabricius, 1798)
35. *Gasteracantha hasselti* C. L. Koch, 1837
36. *Gasteracantha kuhli* Koch, 1837
37. *Gasteracantha remifera* Butler, 1873
38. *Gea subarmata* Thorell, 1890
39. *Gibbaranea bituberculata* (Walckenaer, 1802)
40. *Heurodes porculus* (Simon, 1877)

41. *Macracantha arcuata* (Fabricius, 1793)
42. *Neoscona bengalensis* Tikader & Bal, 1981
43. *Neoscona molemensis* Tikader & Bal, 1981
44. *Neoscona mukerjei* Tikader, 1980
45. *Neoscona nautica* (L. Koch, 1875)
46. *Neoscona parambikulamensis*, Patel, 2003
47. *Neoscona pavida* (Simon, 1906)
48. *Neoscona theisi* (Walckenaer, 1842)
49. *Neoscona vigilans* (Blackwall, 1865)
50. *Parawixia dehaani* (Doleschall, 1859)
51. *Parawixia mundanthuraiensis* Sugumaran *et al.* 2005
52. *Poltya columnaris* Thorell, 1890
53. *Zygiella indica* Tikader & Bal, 1980

Family Atypidae Thorell, 1870

54. *Atypus sutherlandi* Chennappaia, 1935

Family Barychelidae Simon, 1889

55. *Diplothele walshi* O.P. Cambridge, 1890
56. *Sason robustum* (O.P. Cambridge, 1883)
57. *Sasonichus sullivanii* Pocock, 1900

Family Clubionidae Wagner, 1887

58. *Clubiona coimbatorensis* Sugumaran *et al.* 2005
59. *Clubiona drassodes* O.P. Cambridge, 1874

Family Corinnidae Karsch, 1880

60. *Castianeira zetes* Simon, 1897
61. *Oedignatha carli* Reimoser, 1934
62. *Oedignatha microscutata* Reimoser, 1934
63. *Oedignatha scrobiculata* Thorell, 1881

Family Ctenidae Keyserling, 1877

64. *Acanthies indicus* Gravely, 1931
65. *Ctenus cochinchinensis* Gravely, 1931
66. *Ctenus indicus* Gravely, 1931

Family Deinopidae C.L. Koch, 1850

67. *Deinopsis* sp.

Family Dictynidae O.P. Cambridge, 1871

68. *Dictyna* sp.

(Contd)

Annexure 2. (Contd)**Family Dipluridae Simon, 1889**69. *Indothele dumicola* (Pocock, 1900)**Family Eresidae Koch, 1851**

70. *Stegodyphus pacificus* Pocock, 1900
 71. *Stegodyphus sarasinorum* Karsch, 1891
 72. *Stegodyphus tibialis* (O.P. Cambridge, 1869)

Family Filistatidae Ausserer, 186773. *Pritha* sp.**Family Gnaphosidae Pocock, 1898**

74. *Drassodes* sp.
 75. *Gnaphosa* sp.
 76. *Poecilochroa* sp.
 77. *Setaphis subtilis* (Simon, 1897)
 78. *Zelotes ashae* Tikader & Gajbe, 1976

Family Hahniidae Bertkau, 187879. *Hahnia alini* Tikader, 1964**Family Hersiliidae Thorell, 1870**

80. *Hersilia pectinata* Thorell, 1895
 81. *Hersilia savignyi* Lucas, 1836
 82. *Tama graveleyi* Sinha, 1950

Family Linyphiidae Blackwall, 1859

83. *Atypena* sp.
 84. *Lepthyphantes rudrai* Tikader, 1970
 85. *Linyphia urbasae* Tikader, 1970
 86. *Nerienne sundaica* (Simon, 1905)

Family Lycosidae Sundevall, 1833

87. *Crocodilosa leucostigma* (Simon, 1885)
 88. *Evippa* sp.
 89. *Hippasa agelenoides* (Simon, 1884)
 90. *Hippasa greenalliae* (Blackwall, 1867)
 91. *Hippasa holomerae* Thorell, 1895
 92. *Hippasa leucostigma* Simon, 1885
 93. *Hippasa lycosina* Pocock, 1900
 94. *Hippasa olivacea* (Thorell, 1887)
 95. *Hippasa pisaurina* Pocock, 1900
 96. *Lycosa barnesi* Gravely, 1924

97. *Lycosa bistriata* Gravely, 192498. *Lycosa carmichaeli* Gravely, 192499. *Lycosa madani* Pocock, 1901100. *Lycosa tista* Tikader, 1970101. *Pardosa atropalpis* Gravely, 1924102. *Pardosa minuta* Tikader & Malhotra, 1976103. *Pardosa oakleyi* Gravely, 1924104. *Pardosa pseudoannulata* (Bosenberg & Strand, 1906)105. *Pardosa sumatrana* (Thorell, 1890)106. *Wadicosa quadrifera* (Gravely, 1924)**Family Mimetidae Simon, 1881**107. *Mimetus* sp.**Family Miturgidae Simon, 1885**

108. *Cheiracanthium danieli* Tikader, 1975
 109. *Cheiracanthium insulanum* (Thorell, 1878)
 110. *Cheiracanthium melanostomum* (Thorell, 1895)
 111. *Cheiracanthium triviale* (Thorell, 1895)

Family Nephilidae Simon, 1894

112. *Herennia multipuncta* (Doleschall, 1859)
 113. *Nephila kuhlii* (Doleschall, 1859)
 114. *Nephila pilipes* (Fabricius, 1793)
 115. *Nephilengys malabarensis* (Walckenaer, 1842)

Family Oecobiidae Blackwall, 1862116. *Oecobius putus* O.P. Cambridge, 1876**Family Oonopidae Simon, 1890**117. *Opopaea* sp.**Family Oxyopidae Thorell, 1870**

118. *Oxyopes ashae* Gajbe, 1999
 119. *Oxyopes bhadatae* Gajbe, 1999
 120. *Oxyopes birmanicus* Thorell, 1887
 121. *Oxyopes hindostanicus* Pocock, 1901
 122. *Oxyopes javanus* Thorell, 1887
 123. *Oxyopes lineatipes* (C.L. Koch, 1847)
 124. *Oxyopes rukminiae* Gajbe, 1999
 125. *Oxyopes sakuntalae* Tikader, 1970
 126. *Oxyopes shweta* Tikader, 1970
 127. *Oxyopes sitae* Tikader, 1970

(Contd)

Annexure 2. (Contd)

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128. *Oxyopes quadridentatus* Thorell, 1895
 129. *Oxyopes sunandae* Tikader, 1970
 130. *Oxyopes wroughtoni* Pocock, 1901
 131. *Peucetia viridana* (Stoliczka, 1869)
- Family Philodromidae Thorell, 1870**
 132. *Philodromus* sp.
 133. *Tibellus elongatus* Tikader, 1960
- Family Pholcidae C. L. Koch, 1851**
 134. *Artema atlanta* Walckenaer, 1837
 135. *Crossopriza lyoni* (Blackwall, 1867)
 136. *Pholcus phalangioides* (Fuesslin, 1775)
 137. *Uthina atrigularis* Simon, 1901
- Family Pisauridae Simon, 1890**
 138. *Perenethis dentifasciata* (O.P. Cambridge, 1885)
 139. *Perenethis unifasciata* (Doleschall, 1859)
 140. *Pisaura mirabilis* (Clerck, 1757)
 141. *Polyboea vulpina* Thorell, 1895
 142. *Thalassius albocinctus* (Doleschall, 1859)
- Family Prodidomidae Simon, 1884**
 143. *Zimiris* sp.
- Family Psechridae Simon, 1890**
 144. *Fecenia travancoria* Pocock, 1899
 145. *Psechrus torvus* (Cambridge, 1869)
- Family Salticidae Blackwall, 1841**
 146. *Aelurillus* sp.
 147. *Bavia* sp.
 148. *Bianor angulosus* (Karsch, 1879)
 149. *Brettus* sp.
 150. *Hasarius adansoni* (Audouin, 1826)
 151. *Hyllus diardi* (Walckenaer, 1837)
 152. *Hyllus semicupreus* (Simon, 1885)
 153. *Menemerus bivittatus* (Dufour, 1831)
 154. *Myrmarachne markaha* Barrion & Litsinger, 1995
 155. *Myrmarachne orientales* Tikader, 1973
 156. *Myrmarachne plataleoides* (O.P. Cambridge, 1869)
 157. *Phidippus tamilnaduensis* Samiayyan??
 158. *Phintella vittata* (C.L. Koch, 1846)
159. *Plexippus chandraseharani* Samiayyan??
 160. *Plexippus dharineae* Samiayyan??
 161. *Plexippus paykulli* (Audouin, 1826)
 162. *Plexippus petersi* (Karsch, 1878)
 163. *Portia fimbriata* (Doleschall, 1859)
 164. *Pseudicius* sp.
 165. *Rhene danieli* Tikader, 1973
 166. *Rhene flavigera* (C.L. Koch, 1846)
 167. *Rhene rubrigera* (Thorell, 1887)
 168. *Stenaelurillus* sp.
 169. *Tamigalesus* sp.
 170. *Telamonia dimidiata* (Simon, 1899)
 171. *Thiania bhamoensis* Thorell, 1887
- Family Scytodidae Blackwall, 1864**
 172. *Scytodes fusca* Walckenaer, 1837
 173. *Scytodes thoracica* (Latreille, 1802)
- Family Selenopidae Simon, 1897**
 174. *Selenops montigenus* Simon, 1889
 175. *Selenops radiatus* Latreille, 1819
- Family Sparassidae Bertkau, 1872**
 176. *Heteropoda hampsoni* Pocock, 1901
 177. *Heteropoda lentula* Pocock, 1901
 178. *Heteropoda leprosa* Simon, 1884
 179. *Heteropoda lunula* (Doleschall, 1857)
 180. *Heteropoda nicobarensis* Tikader, 1977
 181. *Heteropoda nilgirina* Pocock, 1901
 182. *Heteropoda phasma* Simon, 1897
 183. *Heteropoda venatoria* (Linnaeus, 1767)
 184. *Micrommata virescens* (Clerck, 1757)
 185. *Olios hampsoni* (Pocock, 1901)
 186. *Olios milleti* (Pocock, 1901)
 187. *Olios obesulus* (Pocock, 1901)
 188. *Palystes flavidus* Simon, 1897
 189. *Thelcticopis* sp.
- Family Stenochilidae Thorell, 1873**
 190. *Stenochilus hobsoni* O.P. Cambridge, 1870
- Family Tetragnathidae Menge, 1866**
 191. *Dyschiriognatha dentata* Zhu & Wen, 1978
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Annexure 2. (Contd)

192. *Leucauge bituberculata* Baert, 1987
 193. *Leucauge celebesiana* (Walckenaer, 1842)
 194. *Leucauge decorata* (Blackwall, 1864)
 195. *Leucauge dorsotuberculata* Tikader, 1982
 196. *Leucauge pondae* Tikader, 1970
 197. *Leucauge subgemmea* Bösenberg & Strand, 1906
 198. *Leucauge tessellata* (Thorell, 1887)
 199. *Opadometa fastigata* (Simon, 1877)
 200. *Orsinome marmorea* Pocock, 1901
 201. *Tetragnatha andamanensis* Tikader, 1977
 202. *Tetragnatha ceylonica* O.P. Cambridge, 1869
 203. *Tetragnatha cochinchinensis* Gravely, 1921
 204. *Tetragnatha fletcheri* Gravely, 1921
 205. *Tetragnatha javana* (Thorell, 1890)
 206. *Tetragnatha mandibulata* Walckenaer, 1842
 207. *Tetragnatha maxillosa* Thorell, 1895
 208. *Tetragnatha nitens* (Audouin, 1826)
 209. *Tetragnatha siruvaniensis* Sugumaran et al. 2005
 210. *Tetragnatha sutherlandi* Gravely, 1921
 211. *Tetragnatha vermiformis* Emerton, 1884
 212. *Tetragnatha virescens* Okuma, 1979
 213. *Tetragnatha viridorufa* Gravely, 1921
 214. *Tylorida culta* (O.P. Cambridge, 1869)
 215. *Tylorida ventralis* (Thorell, 1877)
- Family Theraphosidae Thorell, 1870**
 216. *Anandaliella travancorica*, Hirst 1909
 217. *Chilobrachys fimbriatus* Pocock, 1899
 218. *Haploclastus kayi* Gravely, 1915
 219. *Haploclastus nilgirinus* Pocock, 1899
 220. *Ischnocolus* sp.
 221. *Plesiophrictus bhorii* Gravely, 1915
 222. *Plesiophrictus raja* Gravely, 1915
 223. *Poecilotheria regalis* Pocock, 1899
 224. *Poecilotheria rufilata* Pocock, 1899
 225. *Poecilotheria striata* Pocock, 1895
 226. *Thrigmopoeus parambikulamensis*, Sanjay & Daniel, 2002
- Family Theridiidae Sundevall, 1833**
 227. *Achaearanea diglipuriensis* Tikader, 1977
 228. *Achaearanea durgae* Tikader, 1970
 229. *Achaearanea mundula* (L. Koch, 1872)
230. *Achaearanea triangularis* (Patel, 2003)
 231. *Argyrodes ambalikaie* Tikader, 1970
 232. *Argyrodes andamanensis* Tikader, 1977
 233. *Argyrodes flavescens* O.P. Cambridge, 1880
 234. *Argyrodes gazedes* Tikader, 1970
 235. *Argyrodes gazingensis* Tikader, 1970
 236. *Ariamnes flagellum* (Doleschall, 1857)
 237. *Chryso argyrodiformis* (Yaginuma, 1952)
 238. *Chryso isumbo* Barrion & Litsinger, 1995
 239. *Chryso nigra* (O.P. Cambridge, 1880)
 240. *Coleosoma floridanum* Banks, 1900
 241. *Faiditus xiphias* Thorell, 1887
 242. *Phycosoma martinae* (Roberts, 1983) *Theridion incertum* O.P. Cambridge, 1885
 243. *Theridion indicum* Tikader, 1977
 244. *Theridion manjithar* Tikader, 1970
 245. *Theridion otsospotum* Barrion & Litsinger, 1995
 246. *Theridula angula* Tikader, 1970
 247. *Steatoda* sp.
- Family Thomisidae Sundevall, 1833**
 248. *Camaricus formosus* Thorell, 1887
 249. *Camaricus khandalaensis* Tikader, 1980
 250. *Misumena decorata* Tikader, 1980
 251. *Misumena silveryi* Tikader, 1965
 252. *Misumenops andamanensis* Tikader, 1980
 253. *Oxytate virens* (Thorell, 1891)
 254. *Ozyptila* sp.
 255. *Pistius* sp.
 256. *Strigoplus netravathi* Tikader, 1963
 257. *Thomisus andamanensis* Tikader, 1980
 258. *Thomisus beautifularis* Basu, 1965
 259. *Thomisus lobosus* Tikader, 1965
 260. *Thomisus pugilis* Stoliczka, 1869
 261. *Thomisus sorajaii* Basu, 1963
 262. *Xysticus himalayaensis* Tikader & Biswas, 1974
- Family Uloboridae Thorell, 1869**
 263. *Miagrammopes extensus* Simon, 1889
 264. *Philoponella* sp.
 265. *Uloborus coimbatorensis* Sugumaran et al. 2005
 266. *Uloborus danoliui* Tikader, 1969
 267. *Uloborus khasiensis* Tikader, 1969

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Annexure 2. (Contd)268. *Uloborus krishnae* Tikader, 1970269. *Zosis geniculata* (Olivier, 1789)**Family Zodariidae Thorell, 1881**270. *Asceua* sp.271. *Cryptothele collina* Pocock, 1901272. *Cryptothele sundaica* Thorell, 1890273. *Hermippus arjuna* (Gravely, 1921)274. *Storena* sp.**GAPS**

Our present knowledge about the spiders of the Western Ghats is far from adequate. Practically no documented information is available on the spiders of the northern Western Ghats, especially the states of Maharashtra and Gujarat. Even the available information from other areas is inadequate, which is obtained from studies conducted in relatively smaller geographic units and not representing the Western Ghats in its entirety. Thus, a comprehensive study on the spiders of the Western Ghats is warranted covering all habitat types and geographic units. This study assumes importance simply because spiders are clearly an integral part of biodiversity. This study would be instrumental to throw light into their habitat association, species richness, abundance, diversity, and dominance and thus expose the original nature of spider fauna across different geographic locations of the Western Ghats.

Conclusion

The faunistic diversity of spiders shows that the Western Ghats is a region of considerable species richness. This is supported by the existence of many endemic species. In a zoogeographic respect, the widely distributed spiders are more dominant. Their number is high and their faunistic composition reflects the local character of the fauna. Many of the species found in the Western Ghats are not reported from any other regions in India. Thus, the existing data suggest that the Western Ghats represents one of the main centers of speciation in Asia.

Holloway *et al.* (1992) observed that conversion of forest to plantation and other man-induced disturbances lead to reduction in the diversity of invertebrates, both in species richness and in the taxonomic and biogeographic quality. Being an area with varied habitat and climatic zones, top priority must be given for the conservation of its rich diversity.

Many threats to spider diversity have been documented. The primary threat is habitat loss and degradation, as with many other elements of biodiversity. More specifically, some spiders have become imperiled due to urban development, land-use management techniques, air and groundwater pollution by pesticides and fertilizers, the introduction of alien species, and in some cases, collection and trafficking due to the pet trade. For a few species, these threats have pushed them to the threshold of extinction, attracting the attention of conservation professionals. Many other species may be threatened, but research on them is lacking. Without the appropriate baseline information on status, distribution and abundance, it is difficult to target appropriate habitats for protection, develop appropriate management techniques, or consolidate the necessary resources for obtaining legal conservation status for these species.

Spiders receive relatively little attention from the conservation community and taxonomists alike. Considering the high diversity of species, this is a major oversight. This may be due to fear and dislike of their appearance, behaviour, venomous nature, the fact that most spiders are probably widely dispersed and not presumed to be threatened, or because relatively little is known

about the distribution and abundance of these creatures. Most likely it is a combination of these factors. However, none of these reasons seems sufficient to keep spiders off the conservation radar.

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