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Objektyp: **Article**

Zeitschrift: **Contributions to Natural History : Scientific Papers from the Natural History Museum Bern**

Band (Jahr): - **(2008)**

PDF erstellt am: **22.07.2024**

Persistenter Link: <https://doi.org/10.5169/seals-787070>

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## African and Southeast Asian elements in the spider fauna of the Western Ghats of India

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### Abstract

Although the Western Ghats are a biodiversity hotspot in the world, the studies conducted on the faunal affinity of this region are very few and there are no studies focused on spiders. Biota of the Western Ghats is the product of extreme climatic, ecological and biogeographical history. In this study, we tried to expose the faunal affinities of spiders distributed along this biodiversity hotspot based on their distribution throughout the world. A total of 270 species of 138 genera grouped in 39 families of spiders are so far reported from the Western Ghats of India. The biogeographical analysis revealed that a total of six genera of spiders are endemic to the Western Ghats, four genera showing affinities to the African region and 18 showing affinities to the Southeast Asian region. Another 20 genera are common to Africa, Western Ghats and Southeast Asian regions and 90 genera are cosmopolitan in distribution. These results agree with previous studies conducted on other faunal and floral elements of India, because India was part of the African continent until about 130 million years ago. It detached from there and later moved northwards and finally collided with Eurasia about 50 million years ago. In between, India was an isolated island for about 50 million years. This isolation might have led to the creation of its unique fauna and flora. After the collision with Eurasia, the fauna of the Western Ghats underwent drastic changes due to faunal migrations between Southeast Asia and the Indian plate. There are different hypotheses explaining this migration of different animal groups through a continuous corridor of tropical evergreen forest. During this event, the Indian plate actually functioned as a “biotic ferry” which led to the spreading of African spiders to Southeast Asia. It is concluded that the spider fauna of the Western Ghats can be divided into an ancient African lineage, later Southeast Asian migrant and an endemic part. So a detailed phylogeographical approach is necessary to differentiate between these different time scale elements.

### INTRODUCTION

One of the features of the biota of the Western Ghats is its strong affinity with African and Southeast Asian biota. There are several such cases of affinity in different taxa like

mammals (Kurup 1974), birds (Ali 1935), freshwater fish (Jayaram 1974), amphibians (Das 2002), reptiles (Daniel 2002), insects (Singh 1974) and plants (Mani 1974a). Fauna and flora of the Western Ghats are an excep-

tionally interesting and challenging objective for biogeographers due to its antiquity, unique plate tectonic and palaeoclimatic history, and astounding array of physiognomic and habitat diversity (Ashton & Gunatilleke 1987). These factors have contributed to a considerable diversification of biota in this region (Morley 2000). Additionally, changes in the extents of habitats, especially of tropical evergreen forests in space and time, have resulted in striking endemism in almost all taxonomic groups, inviting much debate about processes underlying them (Swan 1993).

Dealing with complex palaeogeographical histories is a problem of major importance in biogeographical studies. Since the superposition of palaeogeographical events may produce multiple changes in species range distributions, highly complex patterns of animal and plant distributions are to be expected (Nelson & Platnick 1981; Myers & Giller 1988). As changes may interact and produce an apparent discordance between species distributions, the biogeographical relationships of areas are often difficult to trace back in time (McLennan & Brooks 2002; Brooks & Van Veller 2003). The Indian subcontinent exhibits such a complex biogeographical pattern, and several hypotheses based on different processes have been proposed to explain the presence of Southeast Asian and African faunal and floral elements in India (Mani 1974b). Some studies related this area as a sister area with the Southeast Asian region (Wallace 1876) or as sister area with the African region (Blanford 1876). Biogeographically the Indian region contains a complex assortment of barriers and dispersal routes varying in their nature as well as spatial scale to which multiple co-distributed taxonomic groups are unlikely to show a congruent response.

The spiders of the Western Ghats are a poorly worked out group compared to other parts of the country. With respect to its geographical, climatic and ecological features, the Western Ghats region harbours a rich amount of arachnids of which spiders have

a huge share. This area is also enriched with large forests and therefore possesses various assemblages of spiders. Due to high species endemism, the Western Ghats are listed among the 34 biodiversity hotspots of the world (Mittermeier et al. 2005). Due to the paucity of workers, much of the spider diversity in the Western Ghats has remained unexplored so far. As a result, the disappearance of many species remains undocumented. The present study provides the result of a preliminary analysis of the faunistic affinities of the spiders in the Western Ghats of India, which aims to demonstrate their great diversity and their high degree of endemism and to present a biogeographic hypothesis of the region.

#### MATERIALS AND METHODS

The Western Ghats occupy the western part of Peninsular India, between 8° and 20° North and between 73° to 77° East. The Western Ghats cover a practically unbroken relief dominating the west coast of the Indian peninsula for almost 1600 km from the river Tapti in the north to the tip of Peninsular India. Zoogeographically, the Western Ghats can be divided into three parts: a northern division, comprising the Deccan Trap area from the Tapti river down to 16° N, about the region of Goa; a central division, extending from 16° N southwards and including the Kudagu and Wayanad region of south Karnataka and Nilgiris; and a southern division, comprising the Anaimalai, Palani and Cardamom hills of Kerala (Bhimachar 1945). The Western Ghats are the main watershed in peninsular India from which all the principal rivers, namely Godavary, Krishna and Cauvery originate and flow east emptying into the Bay of Bengal. A large number of short perennial, torrential west flowing rivers also originate from it. The average height of the Ghats is less than 1500 m above sea level, but in the south it rises up to 2000 m and to exceptionally high peaks of 2500 m and above. Along its entire length, this hill range has only one discontinuity, the Pal-

ghat gap in Kerala, a more than 30 km wide gap, less than 100 m above sea level (Nair 1991).

The presence of spiders, which are reported from the Western Ghats, in other geographic regions of the world was collected from the literature. A checklist of spiders so far reported from the Western Ghats was prepared based on the world spider catalogue (Platnick 2008). Each species was classified according to its distribution in the African region and Southeast Asian region, and it was stated whether its distribution is endemic or cosmopolitan, *i. e.*, distribution in the tropics throughout the world.

## RESULTS

A total of 270 species of 138 genera listed in 39 families of spiders are so far reported from the Western Ghats (Appendix 1). Among these 138 genera, six genera are endemic; *Diplothele* and *Sasonichus* of the family Barychelidae; *Annandaliella*, *Haploclastus*, *Poecilotheria* and *Thrigmopoeus* of the family Theraphosidae. A total of 91 species are endemic in the Western Ghats. A total of four genera shows affinities with the African region but there is no common species with distribution in the Western Ghats and Africa. A total of 18 genera shows affinities with the Southeast Asian region and a total of 68 species share a distribution in these two regions. Although there are species of another 20 genera showing a distribution in Africa, Southeast Asia and the Western Ghats, there is no common species between these regions. Among the 270 species of spiders reported from the Western Ghats, a total of 90 genera and 111 species are distributed in the tropics throughout the world.

## DISCUSSION

India's peculiar and diverse biota has attracted the attention of researchers for more than a century. Earlier workers noticed close similarities with Africa's biota, which sparked a perpetual debate on the origins and biogeographical relationships of India's

flora and fauna. The question of whether the links with Southeast Asia or Africa are more important has been a central aspect of this discussion. It culminated in the refusal of Wallace's (1876) hypothesis that India's biota was essentially of Southeast Asian origin, by Blanford (1876), who in turn emphasized a strong African influence on India's fauna and flora.

As the present study revealed the occurrence of both African and Southeast Asian influence on the spider fauna of the Western Ghats, it has been related to the geographic history of India. The geographic history of India can be summarised as follows based on plate tectonics and continental drift. First, the Indian subcontinent detached from Africa – 130 million years ago (Krause et al. 1997), as part of the Madagascar–Seychelles–India block. Its long northward drift across the Tethys sea, with disconnection from Madagascar at – 88 million years ago (Storey et al. 1995) and the Seychelles at – 65 million years ago (Courtilot et al. 1988), ended only in the Palaeogene (Najman et al. 2001), after accretion to the Eurasian block. The first contact between both landmasses immediately enabled Southeast Asian animals and plants to invade the subcontinent (Briggs 1989), and lineages of old African origin, if they persisted on the drifting subcontinent, to disperse to Southeast Asia (Bossuyt & Milinkovitch 2001; Conti et al. 2002; Gower et al. 2002; Wilkinson et al. 2002). During this million years long process, the movement of the Indian subcontinent over the Reunion mantle plume at the Cretaceous–Tertiary transition (K-T transition) generated the notorious Deccan basalt floods (Courtilot et al. 1988) that almost wiped out old African lineage, which resulted in the formation of the Western Ghats. Upon impact with Asia in the Early Tertiary, the uplift of the Himalayan chain and subsequent Late Tertiary aridification further contributed to the progressive impoverishment of African elements from the Indian biota, with the exception of refugial areas in India (Raven & Axelrod 1974; Gu-

leria 1992; Morley 2000). So the presence of four genera of spiders in the Western Ghats with African affinity can be explained by their common origin in former Gondwanaland and by vicariance.

Among the 138 genera of spiders reported from the Western Ghats, 20 genera share distribution in the African region and the Southeast Asian region along with the Western Ghats. As much of Southeast Asia was never part of old Africa, the presence of African forms in Southeast Asian region is intriguing. The main hypothesis for the presence of African elements in Southeast Asia is that fauna and flora associated with the drifting Indian plate were dispersed into Southeast Asia following accretion with Eurasia (Wilkinson et al. 2002). This hypothesis known as "out-of-India" hypothesis (McKenna 1973), has been proposed to explain the presence of African forms in Southeast Asia. The geophysical evidence for this scenario is well known (Briggs 2003a). Thus it is plausible that rafting peninsular India carried with it African forms to Asia. Mani (1974b) points out that with the physical contact of peninsular India with Asia, extensive interchange between Indian and Southeast Asian flora and fauna occurred. In all these studies, the drifting Indian landmass is perceived as a "biotic ferry" for old African groups. This biotic ferry model (McKenna 1973; Morley 2000; Briggs 2003b) became the standard explanation for the presence of African elements in Southeast Asia. Based on this model, a number of studies in different taxa like amphibians (Bossuyt & Milinkovitch 2001; Gower et al. 2002; Wilkinson et al. 2002) and plants (Conti et al. 2002) suggested that African elements colonized South and Southeast Asia as "out-of-India".

A total of 18 genera and 68 species are commonly present in the Western Ghats and Southeast Asia. Some taxonomic (Hora 1949; Bande & Prakash 1986; Bande 1992) and recent molecular (Krause & Maas 1990; Clyde et al. 2003) studies revealed the dispersion of organisms from the Southeast Asian region

into India, for which the term "out of Asia" hypothesis was coined by Hedges et al. (1993). It has been proposed that, during the Early Tertiary, Southeast Asian lineages reached India over temporary land connections almost immediately after the collision with Eurasia. Many paleontological studies also suggested that the latest Cretaceous-Paleocene Indian fauna and flora which survived extensive volcanic activities was almost completely replaced by the diverse and relatively advanced biota from Southeast Asia upon the India-Asia collision (Briggs 2003b).

Landmasses that have experienced a prolonged period of extensive isolation may lead to the evolution of their own fauna and flora. Such high level endemism is apparent on large islands or island groups, such as New Zealand (Hay et al. 1995), the Seychelles (Ruvinsky & Maxson 1996) and Madagascar (Vences et al. 2000). When long term isolation is followed by restoration of contact with other regions, the biotic uniqueness of an area may gradually fade due to floral and faunal interchange. Nevertheless, some previously isolated regions may incidentally retain inconspicuous remnants of a unique ancient biotic composition. During the journey of India from Africa to Asia it was in an isolated condition during 50 million years. When continents or islands are well isolated for such extended periods of time, evolution invariably produces endemic species. If the isolation continues long enough, a host of peculiar genera and families may appear. In this study a total of six genera and 91 species of spiders are found as endemic. The presence of some endemic genera in spiders of the Western Ghats, provides strong evidence that India underwent an extended isolation during its journey across the middle of the Indian Ocean. Recent molecular dating estimates in 14 species of amphibians (Bossuyt & Milinkovitch 2001) indicated that several lineages originated on the Indian subcontinent during its trans-Tethys drift. Remarkable suites of endemic species are characteristic of isolated land masses. This

is particularly true for India, where the biota is well known for its extraordinary high levels of endemism, with species frequently confined to minute distributional ranges (Myers et al. 2000).

Although fauna and flora of India originated in Africa, present similarity with African region is very low. This may be due to the faunal interchange with the Southeast Asian region and the evolution of its own biota during the period of isolation. These intruders from Southeast Asia not only led to the dilution of its original fauna but also dominated gradually as described in this study. So a detailed study using modern phylogenetic methodology is needed to differentiate between these faunal elements and to estimate the age of these different components in spiders of India, especially the Western Ghats region.

#### ACKNOWLEDGEMENTS

This study was supported by Special Research Fund (BOF) from Ghent University, Belgium to the first author.

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## APPENDIX 1

## Check list of spiders reported from the Western Ghats of India

- \* Endemic species.  
 \*\* Species distributed in the Southeast Asian region.  
 † Endemic genus.  
 †† Genus with African affinity.  
 ††† Genus with species distribution in the African region, the Southeast Asian region and the Western Ghats.  
 †††† Genus with species distribution in the Southeast Asian region.

## FAMILY AGELENIDAE C.L. Koch, 1837

*Agelena kariansholaensis*\* Sugumaran et al. 2005

*Agelena satmila*\* Tikader, 1970

## FAMILY ARANEIDAE Simon, 1895

*Arachnura*††† *angura*\* Tikader, 1970

*Arachnura scorpionoides*\* Sugumaran et al., 2005

*Araneus bilunifer* Pocock, 1900

*Araneus ellipticus* (Tikader & Bal, 1981)

*Araneus himalayaensis* Tikader, 1975

*Araneus nympa*\*\* (Simon, 1889)

*Argiope aemula* (Walckenaer, 1842)

*Argiope anasuja* Thorell, 1887

*Argiope catenulata* (Doleschall, 1859)

*Argiope pulchella* Thorell, 1881

*Chorizopes*††† *bengalensis* Tikader, 1975

*Chorizopes calciope*\*\* (Simon, 1895)

*Cyclosa anaikattae*\* Sugumaran et al., 2005

*Cyclosa bifida* (Doleschall, 1859)

*Cyclosa confraga* (Thorell, 1892)

*Cyclosa hexatuberculata*\* Tikader, 1982

*Cyclosa insulana* (Costa, 1834)

*Cyclosa moonduensis*\* Tikader, 1963

*Cyclosa mulmeinensis* (Thorell, 1887)

*Cyclosa quinqueguttata* (Thorell, 1883)

*Cyclosa spirifera* Simon, 1889

*Cyrtarachne bengalensis*\*\* Tikader, 1961

*Cyrtophora bidenta*\* Tikader, 1970

*Cyrtophora cicatrosa*\*\* (Stoliczka, 1869)

*Cyrtophora citricola* (Forsk., 1775)

*Cyrtophora koronadalensis* Barrion & Litsinger, 1995

*Eriophora himalayaensis* (Tikader, 1975)

*Eriovixia*††† *excelsa*\*\* (Simon, 1889)

*Eriovixia laglaizei*\*\* (Simon, 1877)

*Eriovixia poonaensis*\* (Tikader & Bal, 1981)

*Gasteracantha dalyi*\*\* Pocock, 1900

*Gasteracantha geminata* (Fabricius, 1798)

*Gasteracantha hasselti*\* C.L. Koch, 1837

*Gasteracantha kuhli* Koch, 1837

*Gasteracantha remifera* Butler, 1873

*Gea subarmata*\*\* Thorell, 1890

*Gibbaranea bituberculata*\*\* (Walckenaer, 1802)

*Heurodest*†††† *porculus*\*\* (Simon, 1877)

*Macracantha*†††† *arcuata*\*\* (Fabricius, 1793)

*Neoscona bengalensis* Tikader & Bal, 1981

*Neoscona molemensis*\*\* Tikader & Bal, 1981

*Neoscona mukerjei* Tikader, 1980

*Neoscona nautica*\*\* (L. Koch, 1875)

*Neoscona parambikulamensis*\* Patel, 2003

*Neoscona pavida*\* (Simon, 1906)

*Neoscona theisi* (Walckenaer, 1842)

*Neoscona vigilans* (Blackwall, 1865)

*Parawixia dehaani*\*\* (Doleschall, 1859)

*Parawixia mundanthuraiensis*\* Sugumaran et al., 2005

*Poltys*††† *columnaris*\*\* Thorell, 1890

*Zygiella indica*\* Tikader & Bal, 1980

## FAMILY ATYPIDAE Thorell, 1870

*Atypus sutherlandi* Chennappaia, 1935

## FAMILY BARYCHELIDAE Simon, 1889

*Sason*††† *robustum* (O. P.-Cambridge, 1883)

*Sasonichus*† *sullivani*\* Pocock, 1900

## FAMILY CLUBIONIDAE Wagner, 1887

*Clubiona coimbatorensis*\* Sugumaran et al., 2005

*Clubiona drassodes* O. P.-Cambridge, 1874

## FAMILY CORINNIDAE Karsch, 1880

*Castianeira zetes* Simon, 1897

*Oedignatha*††† *carli* Reimoser, 1934

*Oedignatha microscutata* Reimoser, 1934

*Oedignatha scrobiculata* Thorell, 1881

## FAMILY CTENIDAE Keyserling, 1877

*Acanthies*†††† *indicus*\* Gravely, 1931

*Ctenus cochinchinensis*\* Gravely, 1931

*Ctenus indicus*\* Gravely, 1931

**FAMILY DEINOPIIDAE** C.L. Koch, 1850

*Deinopis goalparaensis*\* Tikader & Malhotra, 1978

**FAMILY DICTYNIDAE** O. P.-Cambridge, 1871

*Dictyna umai*\* Tikader, 1966

**FAMILY DIPLURIDAE** Simon, 1889

*Indothele† mala*\* Coyle, 1995

**FAMILY ERESIDAE** Koch, 1851

*Stegodyphus pacificus* Pocock, 1900

*Stegodyphus sarasinorum*\*\* Karsch, 1891

*Stegodyphus tibialis* (O. P.-Cambridge, 1869)

**FAMILY FILISTATIDAE** Ausserer, 1867

*Pritha poonaensis*\* (Tikader, 1963)

**FAMILY GNAPHOSIDAE** Pocock, 1898

*Drassodes cariniolvus*\* Caporiacco, 1934

*Gnaphosa kailana*\* Tikader, 1966

*Poecilochroa barmani*\* Tikader, 1982

*Setaphis subtilis*\*\* (Simon, 1897)

*Zelotes ashae*\* Tikader & Gajbe, 1976

**FAMILY HAHNIIDAE** Bertkau, 1878

*Hahnina alini*\* Tikader, 1964

**FAMILY HERSILIIDAE** Thorell, 1870

*Hersilia††† pectinata* Thorell, 1895

*Hersilia savignyi* Lucas, 1836

*Tama gravelyi*\*\* Sinha, 1950

**FAMILY LINYPHIIDAE** Blackwall, 1859

*Atypena simoni*\* Jocqué, 1983

*Lepthyphantes rudrai*\*\* Tikader, 1970

*Linyphia urbasae*\*\* Tikader, 1970

*Nerienne sundaica*\*\* (Simon, 1905)

**FAMILY LYCOSIDAE** Sundevall, 1833

*Crocodylosa††† leucostigma* (Simon, 1885)

*Evippa†† banarensis*\* Tikader & Malhotra, 1980

*Hippasa†† agelenoides*\* (Simon, 1884)

*Hippasa greenalliae*\* (Blackwall, 1867)

*Hippasa holomerae*\* Thorell, 1895

*Hippasa leucostigma*\* Simon, 1885

*Hippasa lycosina*\* Pocock, 1900

*Hippasa olivacea* (Thorell, 1887)

*Hippasa pisaurina*\* Pocock, 1900

*Lycosa barnesi*\*\* Gravelly, 1924

*Lycosa bistriata*\* Gravelly, 1924

*Lycosa carmichaeli* Gravelly, 1924

*Lycosa madani* Pocock, 1901

*Lycosa tista*\*\* Tikader, 1970

*Pardosa atropalpis* Gravelly, 1924

*Pardosa minuta*\* Tikader & Malhotra, 1976

*Pardosa oakleyi*\* Gravelly, 1924

*Pardosa pseudoannulata*\*\* (Bosenberg & Strand, 1906)

*Pardosa sumatrana* (Thorell, 1890)

*Wadicosa quadrifera* (Gravelly, 1924)

**FAMILY MIMETIDAE** Simon, 1881

*Mimetus indicus*\* Simon, 1906

**FAMILY MITURGIDAE** Simon, 1885

*Cheiracanthium danieli* Tikader, 1975

*Cheiracanthium insulanum*\*\* (Thorell, 1878)

*Cheiracanthium melanostomum* (Thorell, 1895)

*Cheiracanthium triviale* (Thorell, 1895)

**FAMILY NEPHILIDAE** Simon, 1894

*Herennia†††† multipuncta*\*\* (Doleschall, 1859)

*Nephila kuhlii*\*\* (Doleschall, 1859)

*Nephila pilipes*\*\* (Fabricius, 1793)

*Nephilengys malabarensis*\* (Walckenaer, 1842)

**FAMILY OECOBIIDAE** Blackwall, 1862

*Oecobius putus* O. P.-Cambridge, 1876

**FAMILY OONOPIDAE** Simon, 1890

*Opopaea†† sponsa*\* Brignoli, 1978

**FAMILY OXYOPIIDAE** Thorell, 1870

*Oxyopes ashae*\* Gajbe, 1999

*Oxyopes bhadatae*\* Gajbe, 1999

*Oxyopes birmanicus*\*\* Thorell, 1887

*Oxyopes hindostanicus* Pocock, 1901

*Oxyopes javanus* Thorell, 1887

*Oxyopes lineatipes*\*\* (C.L. Koch, 1847)

*Oxyopes rukminiae*\* Gajbe, 1999

*Oxyopes sakuntalae* Tikader, 1970

*Oxyopes shweta* Tikader, 1970

*Oxyopes sitae* Tikader, 1970

*Oxyopes quadridentatus*\*\* Thorell, 1895

*Oxyopes sunandae* Tikader, 1970  
*Oxyopes wroughtoni* Pocock, 1901  
*Peucetia viridana* (Stoliczka, 1869)

**FAMILY PHILODROMIDAE** Thorell, 1870

*Philodromus ashae*\* Gajbe & Gajbe, 1999  
*Tibellus elongatus*\* Tikader, 1960

**FAMILY PHOLCIDAE** C.L. Koch, 1851

*Artema atlanta* Walckenaer, 1837  
*Crossopriza lyoni* (Blackwall, 1867)  
*Pholcus phalangioides* (Fuesslin, 1775)  
*Uthina*++++ *atrigularis*\*\* Simon, 1901

**FAMILY PISAURIDAE** Simon, 1890

*Perenethis*+++ *dentifasciata*\*\* (O. P.-Cambridge, 1885)

*Perenethis unifasciata*\*\* (Doleschall, 1859)  
*Pisaura mirabilis* (Clerck, 1757)  
*Polyboea vulpina* Thorell, 1895  
*Thalassius*+++ *albocinctus* (Doleschall, 1859)

**FAMILY PRODIDOMIDAE** Simon, 1884

*Zimiris indica*\* Dyal, 1935

**FAMILY PSECHRIDAE** Simon, 1890

*Fecenia*++++ *travancoria*\* Pocock, 1899  
*Psechrus*++++ *torvus*\*\* (Cambridge, 1869)

**FAMILY SALTICIDAE** Blackwall, 1841

*Aelurillus improvisus*\* Azarkina, 2002  
*Bavia*++++ *kairali*\* Samson & Sebastian, 2004  
*Bianor angulosus*\* (Karsch, 1879)  
*Brettus*++++ *anchorum*\* Wanless, 1979  
*Hasarius adansoni* (Audouin, 1826)  
*Hyllus*+++ *diardi* (Walckenaer, 1837)  
*Hyllus semicupreus* (Simon, 1885)  
*Menemerus bivittatus* (Dufour, 1831)  
*Myrmarachne markaha*\*\* Barrion & Litsinger, 1995  
*Myrmarachne orientales* Tikader, 1973  
*Myrmarachne plataleoides* (O. P.-Cambridge, 1869)  
*Phintella vittata* (C.L. Koch, 1846)  
*Plexippus chandraseharani*\* Samiayyan, 1995  
*Plexippus dharineae*\* Samiayyan, 1995  
*Plexippus paykulli* (Audouin, 1826)  
*Plexippus petersi* (Karsch, 1878)

*Portia*+++ *fimbriata*\* (Doleschall, 1859)  
*Pseudicius daitaricus*\* Prószyński, 1992  
*Rhene*+++ *danieli* Tikader, 1973  
*Rhene flavigera*\*\* (C.L. Koch, 1846)  
*Rhene rubrigera* (Thorell, 1887)  
*Stenaelurillus lesserti*\* Reimoser, 1934  
*Tamigalesus munnaricus*\* Zabka, 1988  
*Telamonia*+++ *dimidiata*\*\* (Simon, 1899)  
*Thiania*++++ *bhamoensis*\*\* Thorell, 1887

**FAMILY SCYTODIDAE** Blackwall, 1864

*Scytodes fusca* Walckenaer, 1837  
*Scytodes thoracica* (Latreille, 1802)

**FAMILY SELENOPIDAE** Simon, 1897

*Selenops montigenus*\*\* Simon, 1889  
*Selenops radiatus*\*\* Latreille, 1819

**FAMILY SPARASSIDAE** Bertkau, 1872

*Heteropoda hampsoni*\*\* Pocock, 1901  
*Heteropoda lentula*\*\* Pocock, 1901  
*Heteropoda leprosa*\*\* Simon, 1884  
*Heteropoda lunula* (Doleschall, 1857)  
*Heteropoda nicobarensis* Tikader, 1977  
*Heteropoda nilgirina*\* Pocock, 1901  
*Heteropoda phasma*\*\* Simon, 1897  
*Heteropoda venatoria* (Linnaeus, 1767)  
*Micrommata virescens*\*\* (Clerck, 1757)  
*Olios hampsoni*\*\* (Pocock, 1901)  
*Olios milleti*\*\* (Pocock, 1901)  
*Olios obesulus*\*\* (Pocock, 1901)  
*Palystes*++ *flavidus*\* Simon, 1897  
*Thelcticopis*+++ *maindroni*\* Simon, 1906

**FAMILY STENOCHILIDAE** Thorell, 1873

*Stenochilus*++++ *hobsoni*\*\* O. P.-Cambridge, 1870

**FAMILY TETRAGNATHIDAE** Menge, 1866

*Dyschiriognatha*++++ *dentata*\*\* Zhu & Wen, 1978  
*Leucauge bituberculata* Baert, 1987  
*Leucauge celebesiana*\*\* (Walckenaer, 1842)  
*Leucauge decorata* (Blackwall, 1864)  
*Leucauge dorsotuberculata* Tikader, 1982  
*Leucauge pondae* Tikader, 1970  
*Leucauge subgemmea* Bösenberg & Strand, 1906  
*Leucauge tessellata* (Thorell, 1887)  
*Opadometata*++++ *fastigata*\*\* (Simon, 1877)  
*Orsinome*+++ *marmorea*\*\* Pocock, 1901

*Tetragnatha andamanensis* Tikader, 1977  
*Tetragnatha ceylonica*\*\* O. P.-Cambridge, 1869  
*Tetragnatha cochinchinensis* Gravely, 1921  
*Tetragnatha fletcheri*\*\* Gravely, 1921  
*Tetragnatha javana*\*\* (Thorell, 1890)  
*Tetragnatha mandibulata*\*\* Walckenaer, 1842  
*Tetragnatha maxillosa*\*\* Thorell, 1895  
*Tetragnatha nitens*\*\* (Audouin, 1826)  
*Tetragnatha siruvaniensis* Sugumaran et al., 2005  
*Tetragnatha sutherlandi* Gravely, 1921  
*Tetragnatha vermiformis* Emerton, 1884  
*Tetragnatha virescens* Okuma, 1979  
*Tetragnatha viridorufa* Gravely, 1921  
*Tylorida*+++ *culta*\*\* (O. P.-Cambridge, 1869)  
*Tylorida ventralis*\*\* (Thorell, 1877)

#### **FAMILY THERAPHOSIDAE** Thorell, 1870

*Anandaliella*† *travancorica*\* Hirst, 1909  
*Chilobrachys*++++ *fimbriatus*\*\* Pocock, 1899  
*Haploclastus*† *kayi*\* Gravely, 1915  
*Haploclastus nilgirinus*\* Pocock, 1899  
*Ischnocolus decoratus*\* Tikader, 1977  
*Plesiophrictus*++++ *bhori*\* Gravely, 1915  
*Plesiophrictus raja*\* Gravely, 1915  
*Poecilotheria*† *regalis*\* Pocock, 1899  
*Poecilotheria rufilata*\* Pocock, 1899  
*Poecilotheria striata*\* Pocock, 1895  
*Thrigmopoeus*† *parambikulamensis*\* Sanjay & Daniel, 2002

#### **FAMILY THERIDIIDAE** Sundevall, 1833

*Achaearanea diglipuriensis* Tikader, 1977  
*Achaearanea durgae* Tikader, 1970  
*Achaearanea mundula*\*\* (L. Koch, 1872)  
*Achaearanea triangularis*\* (Patel, 2003)  
*Argyrodes ambalika* Tikader, 1970  
*Argyrodes flavescens* O. P.-Cambridge, 1880  
*Argyrodes gazedes*\* Tikader, 1970  
*Argyrodes gazingensis*\* Tikader, 1970  
*Argyrodes xiphias* Thorell, 1873  
*Ariamnes flagellum* (Doleschall, 1857)  
*Chryso argyrodiformis* (Yaginuma, 1952)  
*Chryso isumbo* Barrion & Litsinger, 1995  
*Chryso nigra* (O. P.-Cambridge, 1880)  
*Coleosoma*++++ *floridanum*\*\* Banks, 1900  
*Faiditus xiphias* Thorell, 1887  
*Phycosoma martinae* (Roberts, 1983)  
*Theridion incertum* O. P.-Cambridge, 1885

*Theridion manjithar*\* Tikader, 1970  
*Theridion otsopotum* Barrion & Litsinger, 1995  
*Theridula angula* Tikader, 1970  
*Steatoda alboclathrata*\* (Simon, 1897)

#### **FAMILY THOMISIDAE** Sundevall, 1833

*Camaricus*+++ *formosus*\* Thorell, 1887  
*Camaricus khandalaensis*\* Tikader, 1980  
*Misumena decorata* Tikader, 1980  
*Misumena silveryi*\* Tikader, 1965  
*Misumenops andamanensis* Tikader, 1980  
*Oxytate virens* (Thorell, 1891)  
*Ozyptila amkhasensis*\* Tikader, 1980  
*Pistius bhadurii*\* Basu, 1965  
*Strigoplus*+++ *netravathi*\* Tikader, 1963  
*Thomisus andamanensis* Tikader, 1980  
*Thomisus beautifularis*\* Basu, 1965  
*Thomisus lobosus* Tikader, 1965  
*Thomisus pugilis* Stoliczka, 1869  
*Xysticus himalayaensis* Tikader & Biswas, 1974

#### **FAMILY ULOBORIDAE** Thorell, 1869

*Miagrammopes extensus* Simon, 1889  
*Philoponella hilaris*\* (Simon, 1906)  
*Uloborus coimbatorensis* Sugumaran et al., 2005  
*Uloborus danolius*\*\* Tikader, 1969  
*Uloborus krishnae*\* Tikader, 1970  
*Zosis geniculata*\*\* (Olivier, 1789)

#### **FAMILY ZODARIIDAE** Thorell, 1881

*Asceua*+++ *cingulata*\* (Simon, 1905)  
*Cryptothele collina*\*\* Pocock, 1901  
*Cryptothele sundaica*\* Thorell, 1890  
*Hermippus*†† *arjuna*\* (Gravely, 1921)  
*Storena arakuensis*\* Patel & Reddy, 1989