



Review Article

## FAUNAL DIVERSITY OF SPIDER FAMILIES DICTYNIDAE, DYSDERIDAE, ERESIDAE AND FILISTATIDAE (ARANEOMORPHAE: ARANEAE: ARACHNIDA) IN INDIA

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### ABSTRACT

The present article deals with the faunal diversity of four families of araneomorph spiders, viz. Dictynidae, Dysderidae, Eresidae and Filistatidae (Araneae: Arachnida) in different Indian states and union territories. None of the spider species of these families is recorded from Bihar, Himachal Pradesh, Jharkhand, and northeast India (Arunchal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland and Tripura). Two families Dictynidae and Filistatidae are represented by 16 and 13 species, respectively. Other families are very poorly represented, single species in Dysderidae and five species in Eresidae. However, the species of Eresidae are widely distributed in the country, particularly, *Stegodyphus sarasinorum* Karsch, 1892. Maximum number of spider species were recorded in Maharashtra (15 species) followed by Gujarat (14 species), Jammu & Kashmir (8 species), Tamil Nadu (7 species), Karnataka, Kerala and Madhya Pradesh (6 species each), Rajasthan (5 species) and less number in other states and union territories. Of the 31 species from these four families, 17 species are endemic to India.

**Keywords:** Spiders, Faunal Diversity, Dictynidae, Dysderidae, Eresidae, Filistatidae, India, Checklist.

### INTRODUCTION

Spiders are the members of the order Araneae of class Arachnida with 49,084 described species under 4,205 genera and 128 families (WSC, 2021). Earlier, (Keswani *et al.*, 2012) updated the Indian spider fauna listing 1686 species belonging to 438 genera in 60 families, out of which 1238 species belonging to 340 genera were reported to be endemic. Recently, Indian spider fauna was updated up to 1855 species belonging to 477 genera in 61 families (Caleb & Sankaran, 2021). However, there are likely many species that have escaped the human eye to this day and many specimens stored in collections waiting to be described and classified. It is estimated that only 20-30% of existing species have been described. In spite of current researches on diversity and distribution of spiders in India, their number is insufficient as compared to other parts of the world. Recently, the species distribution of 21 families of spiders was updated in India (Sharma *et al.*, 2020a, b;

Singh & Singh, 2020; Singh *et al.*, 2020a, b, c, d, e, f, 2021).

The present article deals with the faunal distribution of four families of Araneomorphae spiders, Dictynidae, Dysderidae, Eresidae and Filistatidae in different Indian states and union territories. Although a moderate amount of knowledge of these families is available in India but the literature are all scattered and so far no consolidated account is available regarding their distribution pattern across the country. Therefore, this present work was undertaken to provide up-to-date information of these families in the light of modern taxonomic concept. Several species reported and described from India appear to be misidentified and the records are reported erroneously as these species are said to be identified by using existing literature without a re-examination of the corresponding types and without consulting any spider taxonomist of the

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country (Singh & Singh, 2020). Hence, such reports need re-examination. Also, in most of the literature, published earlier, there are several errors in their scientific names even in the recent ones because such contents become outdated quickly and, due to their perceived comprehensiveness, researchers sometimes fail to notice newer sources of data. In addition, researches continue to add knowledge on spider taxonomy with the description of new taxa, their modified status, and other nomenclatural decisions (Singh *et al.*, 2020b).

## MATERIALS AND METHODS

This checklist is prepared on the basis of published literature in surveys, books, journals, theses and World Spider Catalogue (WSC) up to 10 January, 2021. In the present checklist, attempts have been made to correct such errors in the scientific names of the spiders. Only those synonymies were referred that were reported in India. For other synonymies, WSC (2021) may be consulted. All the endemic species are marked with (\*). Seemingly erroneous records are marked with (♣). If the spider species is not endemic, its elsewhere distribution is also provided.

## RESULTS AND DISCUSSION

### A. Family Dictynidae O. Pickard-Cambridge, 1871

Dictynidae is a moderately large family of cribellate, hackled band-producing spiders, commonly known as meshweavers. The family comprises 470 species described under 52 genera worldwide (WSC, 2021). These spiders usually spin irregular and complex web on the tops of small bushes or the dry standing remains of weeds, making a tangle of silken fibers, sometimes with zig-zag lines. The mesh weavers are small, less than 4 mm long and sometimes they are difficult to notice as they hide in a silk retreat near the center of the tangle. These spiders may be either eyeless, or have six or eight eyes in two rows; their anterior lateral spinnerets are separated and the posterior lateral spinnerets are longer than the anterior lateral spinnerets. Some species of meshweavers live in different kind of social organization (Jackson, 1979).

In India, its representation is very poor. Only 16 species belonging to 8 genera are reported from only 11 Indian states and 3 union territories and two-third of the species (10 species) are endemic. Two species, *Nigma walckenaeri* (Rower, 1951) and *Nigma puella* (Simon, 1870) seem to be erroneous record from India. Few species of the family reported by Caporiacco (1935) from Jammu & Kashmir remained unnoticed (Caleb & Sankaran, 2021). Maximum species (7) of these spiders were recorded in Maharashtra. Following is the detail list of these spiders distributed in Indian states and union territories and elsewhere.

#### 1. *Ajmonia bedeshai* (Tikader, 1966)\*

=*Dictyna bedeshai* Tikader, 1966

=*Dictynomorpha bedeshai* (Tikader, 1966)

- Andaman & Nicobar Islands (Tikader, 1977)

- Maharashtra (Tikader, 1966a, 1977)

#### 2. *Ajmonia marakata* (Sherriffs, 1927)\*

=*Dictyna marakata* Sherriffs, 1927

=*Dictyna tungabhadrai* Tikader, 1966

=*Dictynomorpha marakata* (Sherriffs, 1927)

- Karnataka (Tikader, 1966a)
- Maharashtra (Tikader, 1966a)
- Tamil Nadu (Sherriffs, 1927)

#### 3. *Ajmonia velifera* (Simon, 1906)

=*Dictyna velifera* Simon, 1906

=*Ajmonia patellaris* Caporiacco, 1934

- Jammu & Kashmir (Caporiacco, 1935)
  - Sikkim (Simon, 1906a; Sherriffs, 1927; Tikader, 1977)
- Elsewhere: China

#### 4. *Anaxibia folia* Sankaran & Sebastian, 2017\*

- Kerala (Sankaran & Sebastian, 2017)

#### 5. *Anaxibia rebai* (Tikader, 1966)\*

=*Dictyna rebai* Tikader, 1966, only female

- Andaman & Nicobar Islands (Tikader, 1977)
- Maharashtra (Tikader, 1966a, 1977)

#### 6. *Archaeodictyna consecuta* (O. Pickard-Cambridge, 1872)

=*Dictyna consecuta* O. Pickard-Cambridge, 1872

- Jammu & Kashmir (Caporiacco, 1935)
- Elsewhere: Caucasus, Central Asia, China, Europe, Iran, Russia

#### 7. *Devade dubia* Caporiacco, 1934\*

- Jammu & Kashmir (Caporiacco, 1934)

#### 8. *Dictyna chandrai* Tikader, 1966\*

- Maharashtra (Tikader, 1966a)

#### 9. *Dictyna turbida* Simon, 1905

=*Brigittea turbida* (Simon, 1905)

- Kerala (Simon, 1905)
  - Maharashtra (More & Sawant, 2013)
  - Tamil Nadu (Sherriffs, 1927)
  - Uttar Pradesh (Hore & Uniyal, 2008)
- Elsewhere: Sri Lanka

#### 10. *Dictyna umai* Tikader, 1966\*

=*Brigittea umai* (Tikader, 1966)

- Maharashtra (Tikader, 1966a)

#### 11. *Dictyna* sp.

- Gujarat (Patel & Vyas, 2001; Yadav *et al.*, 2017)
- Kerala (Patel, 2003a)
- Odisha (Choudhury *et al.*, 2019)
- Tamil Nadu (Kapoor, 2008)
- Uttarakhand (Quasin & Uniyal, 2010; Gupta & Siliwal, 2012)

#### 12. *Lathys sindi* (Caporiacco, 1934)\*

=*Auximus sindi* Caporiacco, 1934

- Jammu & Kashmir (Caporiacco, 1934, 1935)

#### 13. *Nigma albida* (O. Pickard-Cambridge, 1885)

=*Dictyna albida* O. Pickard-Cambridge, 1885

- Uttar Pradesh (Hore & Uniyal, 2008)
- Elsewhere: China, Pakistan

#### 14. *Nigma puella* (Simon, 1870) (♣)

- Karnataka (Nijagal *et al.*, 2020)
- Elsewhere: Europe, Azores, Madeira, Canary Is.

#### 15. *Nigma shiprai* (Tikader, 1966)\*

=*Dictyna rebai* Tikader, 1966, only male  
 =*Dictyna shiprai* Tikader, 1966

- Gujarat (Patel & Pillai, 1988)
- Madhya Pradesh (Tikader, 1966a; Gajbe P., 2003; Patil, 2012)
- Maharashtra (Tikader, 1966a)
- Rajasthan (Lawania & Trigunayat, 2015)
- Uttar Pradesh (Lawania & Mathur, 2014)

#### 16. *Nigma walckenaeri* (Roewer, 1951) (♣)

- Gujarat (Thumar, 2019)
- Elsewhere: Caucasus, Europe, Turkey

#### 17. *Nigma* sp.

- Chhattisgarh (Ekka & Kujur, 2015)
- Odisha (Choudhury *et al.*, 2019)

#### 18. *Sudesna grossa* (Simon, 1906)\*

=*Dictynia grossa* Simon, 1906

- Himalayan plateaus (Simon, 1906b)

### B. Family Dysderidae C.L. Koch, 1837

The family Dysderidae, commonly known as woodlouse hunters, sowbug-eating spiders, and cell spiders, comprises 578 species belonging to 25 genera worldwide (WSC, 2021). They are largely found in Eurasia, extending into North Africa with very few species occurring in South America. These spiders vary in size between 5 to 14 mm and have an elongated body. They can be diagnosed by having six eyes arranged in a semicircle, large and stout chelicerae, stout legs with few or none spines and females without a sclerotized epigyne (haplogyne). These spiders are nocturnal and spend day under stones in a silken cell. Eggs are laid inside these cells.

In India, its representation is very poor, only one species, *Dysdera cylindrica* O. Pickard-Cambridge, 1885, described from Pakistan, is reported from Jammu & Kashmir and remained unnoticed till now (Marusik, 2017; Caleb & Sankaran, 2021).

#### 1. *Dysdera cylindrica* O. Pickard-Cambridge, 1885

- Jammu & Kashmir (Caporiacco, 1935)
- Elsewhere: Pakistan

### C. Family Eresidae C.L. Koch, 1845

The family Eresidae, commonly known as velvet spiders, is a small group of spiders comprising 101 species belonging to 9 genera (WSC, 2021). They are almost distributed in Europe, Africa, and Asia, but there are records from Brazil. They have eight-eyed spiders and females have a genital plate (entelegyne). They are cribellate and construct

unkempt webs using wooly silk. Some species are nearly eusocial (Seibt & Wickler, 1988) and work together in preying and in brood rearing. After the birth of brood, the mother spider dissolves her internal organs and regurgitates this material as food. Members of the genus *Stegodyphus* Simon, 1873 typically build silken nests in vegetation while others live in silk tubes under barks, stones or underground (Miller *et al.*, 2012).

In India, only 5 species of a single genus *Stegodyphus* are reported from 16 states and 4 union territories and, out of them, 2 species are endemic. All the 5 species are recorded in Maharashtra while 4 species are recorded in Gujarat. *Stegodyphus sarasinorum* Karsch, 1892 is most widely distributed species in the country. Following is the detail list of these spiders distributed in Indian states and union territories and elsewhere.

#### 1. *Stegodyphus hisarensis* Arora & Monga, 1992\*

- Haryana (Arora & Monga, 1992)
- Maharashtra (Rithe, 2012)

#### 2. *Stegodyphus mirandus* Pocock, 1899\*

- Gujarat (Siliwal *et al.*, 2003b)
- Maharashtra (Pocock, 1899, 1900; Bastawade & Khandal, 2006)

#### 3. *Stegodyphus pacificus* Pocock, 1900

=*Stegodyphus semadohensis* Shivaji, 2013

- Andhra Pradesh (Palem *et al.*, 2016)
  - Delhi (Malik *et al.*, 2015)
  - Gujarat (Patel, 2003b; Patel & Vyas, 2001; Solanki *et al.*, 2020; Yadav *et al.*, 2017)
  - Karnataka (Gajbe, 2007)
  - Madhya Pradesh (Gajbe, 2003, 2007)
  - Maharashtra (Gajbe, 2007; Pocock, 1900; Shivaji, 2013; Tikader, 1966b)
  - Rajasthan (Jangid *et al.*, 2019; Kashmeera *et al.*, 2020; Tikader, 1966b)
  - Tamil Nadu (Karthikeyani *et al.*, 2017)
- Elsewhere: Iran, Jordan, Pakistan

#### 4. *Stegodyphus sarasinorum* Karsch, 1892

- Andhra Pradesh (Bastawade & Khandal, 2006; Majumder, 2005; Rao *et al.*, 2005)
- Chhattisgarh (Gajbe, 2003, 2004; Gajbe & Sharma, 1994)
- Goa (Bastawade & Khandal, 2006)
- Gujarat (Majumder, 2004; Parmar *et al.*, 2015; Patel, 2003b; Sherriffs, 1928; Siliwal *et al.*, 2003a, b; Simon, 1905; Yadav *et al.*, 2017; Yadav & Kumar, 2019)
- Jammu & Kashmir (Thakur *et al.*, 1995)
- Karnataka (Bastawade & Khandal, 2006; Gajbe, 2004; Nautiyal *et al.*, 2017; Sherriffs, 1927; Tikader & Biswas, 1981)
- Kerala (Adarsh & Nameer, 2016; Bastawade & Khandal, 2006; Jose *et al.*, 2018; Sebastian *et al.*, 2005, 2011; Subrahmanyam, 1953; Sivaperuman *et al.*, 2002)
- Madhya Pradesh (Gajbe, 2003, 2004, 2007; Patil *et al.*, 2013; Sharma *et al.*, 2010)

- Maharashtra (Bastawade & Khandal, 2006; Biswas & Biswas, 1992; Gajbe, 2007; Majumder, 2004, 2005; More & Sawant, 2013; Nerlekar *et al.*, 2016; Patil, 2012; Pocock, 1900; Rithe, 2012; Tikader & Biswas, 1981)
- Odisha (Biswas, 1987; Biswas & Biswas, 1992; De & Palita, 2018; Gajbe, 2004; Gravely, 1921; Majumder, 2005; Tikader & Biswas, 1981)
- Puducherry (Simon, 1905)
- Punjab (Biswas & Biswas, 1992; Gajbe, 2004; Majumder, 2004, 2005; Tikader & Biswas, 1981)
- Rajasthan (Gajbe, 2007; Jangid *et al.*, 2019; Saha *et al.*, 2015; Sen *et al.*, 2009; Sivaperuman & Rathore, 2004)
- Tamil Nadu (Bastawade & Khandal, 2006; Biswas & Biswas, 1992; Caleb, 2020a, b; Karthikeyani *et al.*, 2017; Majumder, 2004, 2005; Sherriffs, 1919)
- Telangana (Sailu *et al.*, 2017)
- Uttar Pradesh (Kumar *et al.*, 2017; Tandon & Lal, 1983)
- Uttarakhand (Biswas & Biswas, 2010)
- West Bengal (Biswas & Biswas, 1992; Majumder, 2004, 2005; Tikader & Biswas, 1981)

Elsewhere: Myanmar, Nepal, Sri Lanka

#### 5. *Stegodyphus tibialis* (O. Pickard-Cambridge, 1869)

=*Eresus tibialis* O. Pickard-Cambridge, 1869

=*Stegodyphus socialis* Pocock, 1900

- Andhra Pradesh (Palem *et al.*, 2016)
- Gujarat (Patel, 2003b; Patel & Vyas, 2001; Siliwal *et al.*, 2003b; Yadav *et al.*, 2017)
- Karnataka (Abhijith, 2019; Gajbe, 2004, 2007; El-Hennawy, 2016; Pickard-Cambridge, 1869; Pocock, 1900; Sherriffs, 1928)
- Madhya Pradesh (Gajbe P, 2003, 2004, 2007)
- Maharashtra (El-Hennawy, 2016; Gajbe, 2004, 2007; Kraus & Kraus, 1989; More, 2015; More & Sawant, 2013)
- Tamil Nadu (Caleb *et al.*, 2016; El-Hennawy, 2016; Karthikeyani *et al.*, 2017; Kraus & Kraus, 1989; Phaniel, 1963; Sherriffs, 1919)
- Telangana (Gunti *et al.*, 2016)

Elsewhere: China, Myanmar, Thailand

#### 6. *Stegodyphus* sp.

- Chhattisgarh (Ekka & Kujur, 2015)
- Gujarat (Yadav *et al.*, 2017)
- Karnataka (Mubeen & Basavarajappa, 2018; Murali *et al.*, 2017)
- Rajasthan (Chauhan *et al.*, 2009)

#### D. Family Filistatidae Simon, 1864

Filistatidae, considered primitive family in Araneomorphae spiders, contains cribellate web-weaving spiders or crevice weaver spiders. Their web is so designed that it looks like a sheet that narrows to a silk-lined retreat in a tube or crevice. It contains 19 genera and 185 species worldwide (WSC, 2021). The diagnostic character is the unusual upward bend near the femur of the first pair of legs that not only help in jumping but also helpful in holding the spider to the side walls of the crevices if some larger prey

ever tries to pull it. In addition, these spiders are characterized by an oval or narrow heart-shaped carapace. They are weavers of funnel or tube webs in cracks in walls and under stones. They are mostly distributed in southern hemisphere but few are recorded in the Mediterranean area.

In India, only 13 species of 5 genera were recorded in 10 states and 3 union territories, out of which 7 are endemic. Record of one species, *Sahastata sinuspersica* Marusik *et al.*, 2014, recorded from Gujarat, seems to be erroneous. About half of the species were recorded in Gujarat. Following is the detail list of these spiders distributed in Indian states and union territories and elsewhere.

#### 1. *Filistata* sp.

- Gujarat (Parmar, 2018; Siliwal *et al.*, 2003b)
- Ladakh (Uniyal, 2006)
- Odisha (Gravely, 1921)

#### 2. *Pholcoides chiardolae* (Caporiacco, 1934)

=*Filistata chiardolae* Caporiacco, 1934

- Jammu & Kashmir (Caporiacco, 1934, 1935)
- Elsewhere: Pakistan

#### 3. *Pholcoides seclusa* (O. Pickard-Cambridge, 1885)\*

=*Filistata seclusa* O. Pickard-Cambridge, 1885

- Ladakh (O. Pickard-Cambridge, 1885)

#### 4. *Pritha dharmakumarsinhji* Patel, 1978\*

- Gujarat (Patel, 1978; Yadav *et al.*, 2017)

#### 5. *Pritha insularis* (Thorell, 1891)\*

=*Filistata insularis* Thorell, 1891

- Andaman & Nicobar Islands (Thorell, 1891)
- Maharashtra (More, 2015; More & Sawant, 2013)

#### 6. *Pritha nana* Simon, 1868

- Maharashtra (Kamble *et al.*, 2018)

Elsewhere: Mediterranean countries

#### 8. *Pritha napadensis* (Patel, 1975)\*

=*Filistata napadensis* Patel, 1975

- Gujarat (Parmar & Patel, 2015; Patel, 1975; Patel & Vyas, 2001; Yadav *et al.*, 2017)

#### 9. *Pritha nicobarensis* (Tikader, 1977)\*

=*Filistata nicobarensis* Tikader, 1977

- Andaman & Nicobar Islands (Gajbe, 2007; Tikader, 1977)
- Chhattisgarh (Gajbe, 2003)
- Madhya Pradesh (Gajbe, 2007)

#### 10. *Pritha poonaensis* (Tikader, 1963)\*

=*Filistata poonaensis* Tikader, 1963

- Chhattisgarh (Gajbe, 2003; Gajbe, and Sharma, 1994)
- Gujarat (Gajbe, 2007; Yadav *et al.*, 2017)
- Madhya Pradesh (Gajbe, 2003, 2007)
- Maharashtra (Gajbe, 2007; Tikader, 1963)

#### 11. *Pritha* sp.

- Gujarat (Parmar, 2018; Parmar *et al.*, 2015)
- Karnataka (Nautial *et al.*, 2017; Prashanthakumara & Venkateshwarlu, 2017)

- Kerala (Sebastian *et al.*, 2005, 2011)
- Maharashtra (Bhuvad *et al.*, 2011)
- Rajasthan (Jangid *et al.*, 2019; Lawania & Mathur, 2017).
- Uttarakhand (Gupta & Siliwal, 2012)

#### 12. *Sahastata ashapuriae* Patel, 1978\*

- Gujarat (Parmar, 2018; Patel, 1978)

#### 13. *Sahastata nigra* (Simon, 1897)

- Tamil Nadu (Simon, 1911)

Elsewhere: Mediterranean countries

#### 14. *Sahastata sinuspersica* Marusik *et al.*, 2014 (♣)

- Gujarat (Yadav *et al.*, 2017)

Elsewhere: Iran

#### 15. *Zaitunia rufa* (Caporiacco, 1934)

=*Filistata rufa* Caporiacco, 1934

- Jammu & Kashmir (Caporiacco, 1934, 1935)
- Kerala (Adarsh & Nameer, 2016)

Elsewhere: Pakistan

## CONCLUSION

The diversity of four families of araneomorph spiders, viz. Dictynidae, Dysderidae, Eresidae and Filistatidae in Indian states and union territories is reported. Two families Dictynidae and Filistatidae are represented by 15 and 13 species, respectively. Other families are very poorly reported, single species in Dysderidae and 5 species in Eresidae. Out of 31 species recorded from these 4 families, 17 species are endemic to India. Despite spiders being the most diverse group of predators and crucial to the health of terrestrial ecosystems, none of the species recorded in India is listed in IUCN Red List. Extensive survey for these spiders is urgently required.

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