

FAUNAL DIVERSITY OF SPITTING SPIDERS (SCYTODIDAE: ARANEOMORPHAE: ARANEAE: ARACHNIDA) IN INDIA

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ABSTRACT

The present article deals with the faunal diversity of spitting spiders (Scytodidae: Araneomorphae: Araneae: Arachnida) in different Indian states and union territories and provides an up-to-date checklist of these spiders based on the literature published up to February 5, 2021. It includes 14 species of spiders described under 2 genera in 20 states and 4 union territories, out of which 5 species are strictly endemic. In India, *Scytodes* Latreille, 1804 is the largest genus consisting of 12 species. The records demonstrated that only *Scytodes thoracica* (Latreille, 1802) is widely distributed in 14 Indian states/union territories. Maximum 7 species of these spiders were recorded in Maharashtra followed by 6 species in Gujarat, 5 species in Tamil Nadu, 4 species each in Kerala and Madhya Pradesh, 3 species each in Assam, Haryana, Karnataka, Meghalaya, Odisha and West Bengal. No spitting spider is recorded in Andhra Pradesh, Arunachal Pradesh, Bihar, Himachal Pradesh, Jharkhand, Nagaland, Sikkim and Telangana and need extensive survey research work for these spiders. Despite their role as insect predators and being crucial to the health of terrestrial ecosystems, none of the species of spitting spiders recorded in India is listed in IUCN Red List.

KEYWORDS: Scytodidae, spitting spiders, faunal diversity, checklist, India.

INTRODUCTION

Biodiversity of spiders (Araneae: Arachnida: Chelicerata: Arthropoda) ranks seventh in global diversity (49,146 species, 4207 genera, 128 families).^[1] after the five largest insect orders (Coleoptera – ca. 4,00,000 species, Lepidoptera – ca. 1,80,000 species, Hymenoptera – ca. 1,50,000 species, Diptera – ca. 1,25,000 species, Hemiptera – ca. 50,000 species) and one arachnid order (Acari – over 50,000 species). Almost all spiders are predatory, mostly entomophagous, and thus regulate the insect population both in agroecosystems and wild ones. Except few species, most of them are not harmful to human beings; still public opinion is not in their favour. Even the diversity studies are limited only in few localities. In India, spider fauna is comparatively better known only in few states and union territories, such as Andhra Pradesh, Andaman & Nicobar Islands Gujarat, Karnataka, Kerala, Maharashtra, Tamil Nadu, and West Bengal and other states are poorly known for spiders because of inadequate studies. The number of spider species recorded in India at present is only 3.77% (1855 species placed in 477 genera).^[2] of the world in spite of large area and hotspots. Recently, we updated the biodiversity and distribution of 47 families

of spiders in India.^[3-18] In this continuation, the present article enlists the diversity and distribution of another family of spider, the Scytodidae in India.

Scytodidae is a family of araneomorph spiders commonly called as spitting spiders. They are haplogyne (gonopore without an epigyne) and have six-eyes arranged in three pairs, the middle being larger. The prosoma of these spiders has a circular shape with a dome-shaped carapace and is larger than its abdomen. The body length is 4 to 8 mm, light brown in colour with black spots having very long legs with black rings. The spitting spiders are known to have their silk glands are in the prosoma, unlike other spiders where these are located in the abdomen. Also, silk glands are connected with its poison glands, so that the spider is able to produce venomous silk. Most of these spiders are nocturnal and slow hunter. The silk produced by spitting spiders is used to seize prey meticulously which is unique among spiders. They spit venomous sticky silk threads through the opening of their cheliceral fangs over the prey from a distance of 10-20 mm very quickly (1/700 sec) in a zigzag manner by which the prey becomes immobilised at once.^[19] For bigger preys, the spider spits several

times.^[20] The spitting is also used as defense against predators. The female does not build nests and actively pursue their prey (usually found wandering over walls and ceilings in buildings) and carries her egg sacs under the abdomen in a net of silk. Few species carry egg sacs in their chelicerae. Few species of spitting spiders live in caves. These spiders are also unique because of exhibiting complicated social structure in terms of web sharing and prey capture, particularly by the few species of the type genus *Scytodes* Latreille, 1804. Group feeding of spiderlings of these spiders is common. Cannibalism among siblings is common in cave dwelling spitting spiders.^[21]

Scytodidae is a small family comprising only 246 species described under 5 genera throughout the world.^[1] Despite their role as insect predators and being crucial to the health of terrestrial ecosystems, only one species, *Scytodes pholcoides* Simon, 1898 is listed in IUCN Red List as globally endangered species.^[22] Most of the spider species were still not evaluated for their conservation status. However, none of the species recorded in India is in this list.

Our knowledge on Indian Scytodidae is inadequate and highly inconsistent primarily due to the unexplored diversity of these spiders and extensive surveys were done only in a few regions. There are several species of these spiders yet to be described and several species recorded from India have also been misidentified as many species reported from India are said to be identified by using existing old literature without a

re-examination of the corresponding types and without consulting any spider taxonomist.^[13] Hence, these reports need re-examination. At present, inadequate information of Scytodidae is available in India and also the published records 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 this family in the light of modern taxonomic information.

MATERIALS AND METHODS

This checklist is based on the literature published in recent past books, journals and few authentic theses, websites, and World Species Catalog up to 5 February, 2021. In most of the literature, published earlier, several errors crept in their scientific names even in the recent ones. It happened because such contents become outdated quickly and, due to their perceived comprehensiveness, readers sometimes overlook newer sources of data. Additionally, the researches on spider taxonomy are continued with the description of new taxa, their modified status, and the publication of other nomenclatural decisions.^[6] If a spider species is identified only up to the generic level, it was considered as species if no other species of that genus is reported within the state. In the present checklist, attempts have been made to correct the errors in the scientific names of the spiders following World Spider Catalog. Only those synonymies were mentioned that were reported in India. All the endemic species are marked with (*).

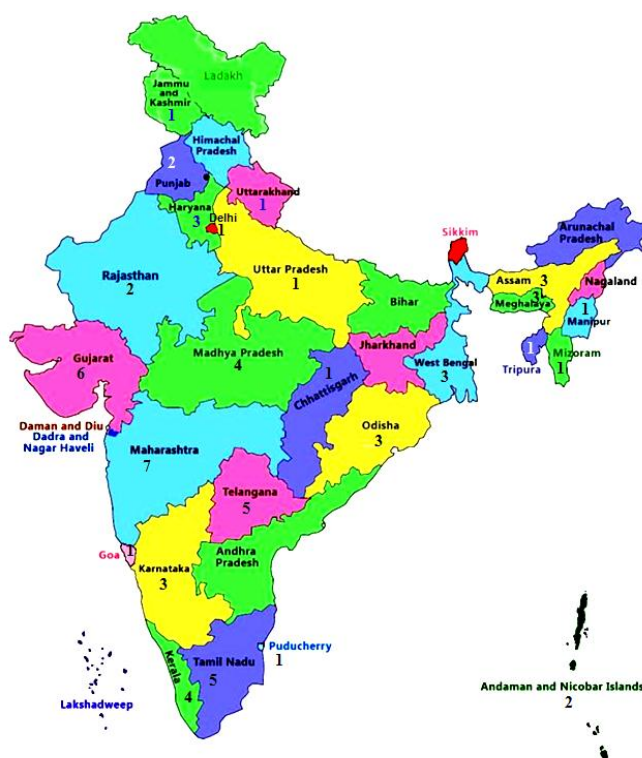


Figure 1: Distribution of spitting spiders (Scytodidae) in Indian states and union territories. Numerals indicate the number of species recorded from that place.

RESULTS AND DISCUSSION

In India, Stoliczka^[23] seems the first to describe a spitting spider, *Scytodes propinqua* which was observed near Kolkata (West Bengal) and later, it was recorded in Puducherry and Tamil Nadu.^[24] Subsequently, the species was reported from Gujarat, Madhya Pradesh and Punjab by several workers. After 16 years, Simon^[25] described another species, *Scytodes univittata* from Tamil Nadu. Later, Thorell^[26] and Simon^[25] recorded *Scytodes fusca* Walckenaer, 1837 from Andaman & Nicobar Islands, Assam, Gujarat and Puducherry. Simon^[27] described the third species *Scytodes stoliczkai* from Maharashtra. After 69 years, among the Indian worker, Tikader^[28] was first to describe a new species, *Scytodes mawphlongensis* from Meghalaya. Subsequently, Patel^[29] Gajbe^[30] Keswani^[31] and Ahmed *et al.*^[32] described four more species of spitting spiders.

At present, only 14 species are described or recorded under 2 genera in 20 Indian states and 4 union territories (Andaman & Nicobar Islands, Delhi, Jammu & Kashmir, and Puducherry) and out of them five species are strictly endemic (Figure 1). However, Caleb and Sankaran.^[2] enlisted only 12 species of Scytodidae. Indian record is only 0.06% of the world scytodid fauna (5 genera and 246 species).^[1]

In India, *Scytodes* Latreille, 1804 is the largest genus consisting of 12 species. Maximum 7 species of these spiders were recorded in Maharashtra followed by 6 species in Gujarat, 5 species in Tamil Nadu, 4 species each in Kerala and Madhya Pradesh, 3 species each in Assam, Haryana, Karnataka, Meghalaya, Odisha and West Bengal, and so on. *Scytodes thoracica* (Latreille, 1802) is widely distributed in 14 Indian states/union territories. Strangely, no spitting spider is recorded in following states of India: Andhra Pradesh, Arunachal Pradesh, Bihar, Himachal Pradesh, Jharkhand, Nagaland, Sikkim and Telangana. Comparatively, extensive surveys are performed only in few states such as Kerala, Gujarat, Maharashtra and West Bengal and need extensive survey research work for these spiders in other areas also. Following is the detailed list of these spiders distributed in Indian states and union territories and elsewhere.

I. Specieswise check-list and distribution of scytodid spiders in India

1. *Dictis ganeshi* Keswani, 2015*

- Maharashtra.^[31]

2. *Dictis mumbaiensis* Ahmed *et al.*, 2015*

- Maharashtra.^[32]

3. *Dictis* sp.

- Karnataka.^[33]
- Maharashtra.^[34]

4. *Scytodes alfredi* Gajbe, 2004*

- Chhattisgarh.^[35,36]
- Madhya Pradesh.^[30,37]

- Maharashtra.^[38, 39, 40]
- Tamil Nadu.^[41]

5. *Scytodes fusca* Walckenaer, 1837

syn. *Dictis fumida* Thorell, 1891; *Scytodes domestica* Doleschall, 1859

- Andaman & Nicobar Islands.^[26]
- Assam.^[26,42]
- Gujarat.^[24,43, 44, 45]
- Haryana.^[46]
- Karnataka.^[33]
- Kerala.^[47,48,49]
- Maharashtra.^[39,40]
- Mizoram.^[50]
- Puducherry.^[24]
- Rajasthan.^[51]

Elsewhere: tropical Africa, Central and Southern America, China, Hawaii, Japan, Europe, Myanmar, Seychelles.

6. *Scytodes gilva* (Thorell, 1887)

- Tamil Nadu.^[52]

Elsewhere: Myanmar

7. *Scytodes kinsukus* Patel, 1975*

syn. *Loxosceles kinsukus* Patel, 1975, wrongly mentioned^[54,56]

- Gujarat.^[44,53,54,55]
- Kerala.^[56]
- Madhya Pradesh.^[55,57]

8. *Scytodes lugubris* (Thorell, 1887)

- Tamil Nadu.^[58,59]

Elsewhere: Congo, Hawaii, Java, Mexico, Myanmar, Sumatra

9. *Scytodes mawphlongensis* Tikader, 1966

- Meghalaya.^[28,60]

Elsewhere: Nepal, Thailand

10. *Scytodes pallida* Doleschall, 1859

- Assam.^[42,61]
- Gujarat.^[45,62]
- Haryana.^[46]
- Karnataka.^[63]
- Kerala.^[64,65]
- Maharashtra.^[39,40,66]
- Odisha.^[67,68]
- Tripura.^[69]
- Uttar Pradesh.^[70]
- West Bengal.^[64,71]

Elsewhere: China, New Guinea, Philippines

11. *Scytodes propinqua* Stoliczka, 1869

- Gujarat.^[62]
- Madhya Pradesh.^[55 57]
- Puducherry.^[24]
- Punjab.^[55,72,73]
- Tamil Nadu.^[24]
- West Bengal.^[23,55,72,73,74,75]

Elsewhere: Pakistan

12. *Scytodes semipullata* (Simon, 1909)

Syn. *Dictis semipullata* Simon, 1909

- Meghalaya^[76]

Elsewhere: Tibbet

13. *Scytodes stoliczkai* Simon, 1897*

- Maharashtra^[27]

14. *Scytodes thoracica* (Latreille, 1802)

- Andaman & Nicobar Islands^[77]

- Assam^[77,78]
- Gujarat^[29,43,44,45,53]
- Haryana^[46]
- Jammu & Kashmir^[79]
- Kerala^[48,49,56, 65]
- Madhya Pradesh^[57]
- Maharashtra^[38,40, 66]
- Meghalaya^[80]
- Odisha^[68]
- Rajasthan^[51]
- Uttarakhand^[81]
- West Bengal^[71,72,73,74,75]

Elsewhere: Africa, Argentina, temperate Asia, Australia, China, Europe, Iran, Japan, Korea, New Zealand, North America, Turkey

15. *Scytodes univittata* Simon, 1882

- Gujarat^[44]
- Manipur^[82]
- Tamil Nadu^[25]

Elsewhere: Brazil, Canary Is., Chile, Cuba, Egypt, Hawaii, Iran, Kirghizia, Mexico, Paraguay, Spain, Turkmenia, Venezuela

16. *Scytodes* sp.

- Chhattisgarh^[35,36]
- Delhi^[83]
- Goa^[84]
- Gujarat^[44,85,86]
- Karnataka^[87]
- Madhya Pradesh^[88,89]
- Maharashtra^[34,90]
- Rajasthan^[91,92]
- West Bengal^[93]
- Tamil Nadu^[85]
- Uttarakhand^[81]

II. Statewise check-list and distribution of scytodid spiders in India

A. Indian states

1. **Assam:** *Scytodes fusca*, *Scytodes pallida*, *Scytodes thoracica*
2. **Chhattisgarh:** *Scytodes alfredi*
3. **Goa:** *Scytodes* sp.
4. **Gujarat:** *Scytodes fusca*, *Scytodes kinsukus*, *Scytodes pallida*, *Scytodes propinqua*, *Scytodes thoracica*, *Scytodes univittata*

5. **Haryana:** *Scytodes fusca*, *Scytodes pallida*, *Scytodes thoracica*
6. **Karnataka:** *Dictis* sp., *Scytodes fusca*, *Scytodes pallida*
7. **Kerala:** *Scytodes fusca*, *Scytodes kinsukus*, *Scytodes pallida*, *Scytodes thoracica*,
8. **Madhya Pradesh:** *Scytodes alfredi*, *Scytodes kinsukus*, *Scytodes propinqua*, *Scytodes thoracica*
9. **Maharashtra:** *Dictis ganeshi*, *Dictis mumbaiensis*, *Scytodes alfredi*, *Scytodes fusca*, *Scytodes pallida*, *Scytodes stoliczkai*, *Scytodes thoracica*
10. **Manipur:** *Scytodes univittata*
11. **Meghalaya:** *Scytodes mawphlongensis*, *Scytodes semipullata*, *Scytodes thoracica*
12. **Mizoram:** *Scytodes fusca*
13. **Odisha:** *Scytodes pallida*, *Scytodes propinqua*, *Scytodes thoracica*
14. **Punjab:** *Scytodes propinqua*, *Scytodes thoracica*
15. **Rajasthan:** *Scytodes fusca*, *Scytodes thoracica*
16. **Tamil Nadu:** *Scytodes alfredi*, *Scytodes gilva*, *Scytodes lugubris*, *Scytodes propinqua*, *Scytodes univittata*
17. **Tripura:** *Scytodes pallida*
18. **Uttar Pradesh:** *Scytodes pallida*
19. **Uttarakhand:** *Scytodes thoracica*
20. **West Bengal:** *Scytodes pallida*, *Scytodes propinqua*, *Scytodes thoracica*

B. Union territories

1. **Andaman & Nicobar Islands:** *Scytodes fusca*, *Scytodes thoracica*
2. **Delhi:** *Scytodes* sp.
3. **Jammu & Kashmir:** *Scytodes thoracica*
4. **Puducherry:** *Scytodes fusca*

CONCLUSION

A total of only 14 species under 2 genera of spitting spiders belonging to the family Scytodidae were recorded in 20 states and 4 union territories of India. Maximum species of these spiders were recorded from Maharashtra (7 species) and Gujarat (6 species) followed by Tamil Nadu (5 species), and less number of species in other areas. Extensive survey for these spiders is required in almost all states and union territories.

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