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New Distributional Records of Two Cobweb Spiders (Araneae: Theridiidae) Species in Chhattisgarh State, India

Avinash R. Nichat[1], Hitesh Kumar Warte[2], Manik Chand Banjare[3], Mahesh Kumar[4], Jashavant Nayak[5*]

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ABSTRACT

This article presents updated information about the presence of two cobweb spider species in the state of Chhattisgarh: *Steatoda cingulata* (Thorell, 1890) and *Theridula gonygaster* (Simon, 1873), which are part of the family Theridiidae Sundevall, 1833. We collected the spiders by hand-picking in the Rishijharan forest region (Deobhog) of Gariaband district, Chhattisgarh, near the border with Odisha. These are the first recorded occurrences of these species and their respective genera in the state. Both these species have unique morphologies, such as S. cingulata with a dark chocolaty-colored abdomen with a yellow line on the anterior side, and T. *gonygaster* with a blackish abdomen with five yellow patches on the abdomen. Since only a few cobweb spider species have been previously documented in Chhattisgarh, these findings add new information about their distribution and exact location. The detailed description of their morphological features in this study will help in identifying these species easily, which will be useful for researchers in the future.

Introduction

Cobweb spiders, or Theridiids, are a specific type of spider belonging to the family Theridiidae (Yoshida, 2001; 2009; Brignoli, 1969). Worldwide, this family comprises approximately 2,635 species representing 140 genera (WSC, 2026). These spiders are quite different from other spiders (Butler, 1883); they do not build orb webs and mostly live among leaves, in cracks, in the corners of houses, and under stones (Levi, 1967; Yaginuma *et al.*, 1976). Their abdomen is quite large and oval-shaped, while the cephalothorax is small (Yoshida, 2003; 2009). Their leg arrangement follows the 1432 pattern (Quasin *et al.*, 2019; Namkung, 2003). These are entelegyne spiders that produce sticky capture silk (Singh *et al.*, 2026; Song *et al.*, 1999). They have a comb of serrated bristles (setae) on the tarsus of the fourth leg (Gertsch & Archer, 1942; Vanuytven, 2021).

LITERATURE REVIEW

Approximately 126 species of Theridiidae, representing 41 genera, have been recorded in India, and they are distributed across every corner of the country (Singh *et al.*, 2023). Few species have been recorded in the state of Chhattisgarh (Choudhury *et al.*, 2024), distributed across limited regions such as Gariaband, Sarguja and Raigarh (Nayak *et al.*, 2026a; 2026b; Choudhury *et al.*, 2024). The spider species recorded in the present study have already been documented in other states of India, but this is the first time they are being recorded in the state of Chhattisgarh.

There are 120 accepted species of genus *Steatoda* Sundevall, 1833 worldwide (WSC, 2026), of which only seven species are found in India (Singh *et al.*, 2026). It has already been recorded in Kerala, Maharashtra, and Uttarakhand; a total of three species of this genus have been recorded across India (Singh *et al.*, 2026). A total of sixteen species of the genus Theridula Emerton, 1882 have been recorded worldwide, of which only two are found in India, T. *opulenta* (Walckenaer, 1841) and T. *gonygaster* (Simon, 1873). *Theridula gonygaster* (Simon, 1873) has been recorded only in Kerala and Tamil Nadu (Singh *et al.*, 2026).

Chhattisgarh is a state rich in biodiversity, home to a wide variety of animal species (Nichat *et al.*, 2024; 2025; 2026). This documentation represents a crucial initiative for understanding the Arachnofaunal diversity within the state. The study identifies two species and provides insights into their distribution in the region.

MATERIALS AND METHODS

The specimens of both species described in this article were collected from the Rishijharan forest region. A total of three specimens were collected during the study: one female of *Steatoda cingulata* (Thorell, 1890) and two females of *Theridula gonygaster* (Simon, 1873), all obtained from the same area on the same date. Rishijharan falls within the Deobhog region located near the Odisha border in Gariaband district, Chhattisgarh which is a well-maintained forest area characterized by dense vegetation and large boulders.

The three specimens were collected using the hand-picking method and preserved in 70% ethanol. *Steatoda cingulata* (Thorell, 1890) has been placed in vials no. DBZ605, while *Theridula gonygaster* (Simon, 1873) has been placed in vial no. DBZ609 & DBZ610. Live photography of these specimens was conducted using a Canon EOS

[1] Assistant Professor & Head, Department of Zoology, M. V. V. Govt. P. G. College Bhakhara, Dhamtari, Chhattisgarh, India
[2] Research Scholar, Department of Life Science, Shri Rawatpura Sarkar University Raipur, Chhattisgarh, India
[3] Guest Professor, Department of Zoology, Naveen Govt. Girl's College Khairagarh, Chhattisgarh, India
[4] Guest Professor, Department of Zoology, Govt. Naveen College Aamdi, Dhamtari, Chhattisgarh, India
[5] Research Scholar, Department of Zoology, Govt. Dudhadhari Bajrang Girls Post Graduate College Raipur, Chhattisgarh 492001, India
[*] Corresponding author's e-mail: jashavant.nayak@dbgirls.org

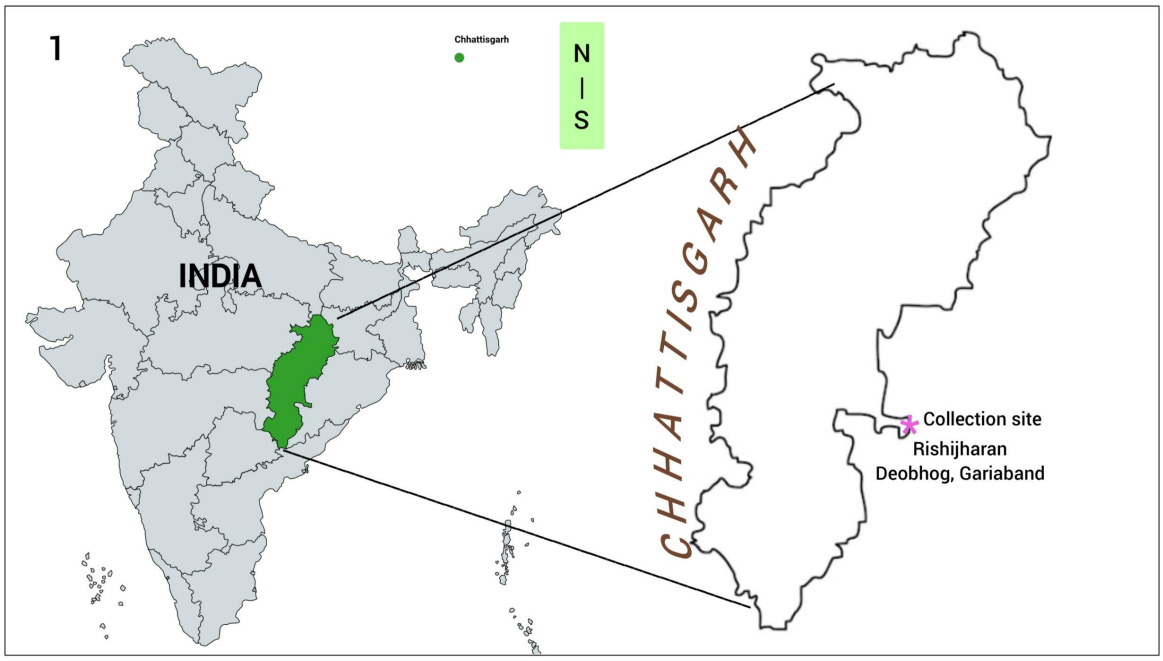


Figure 1: The map represents the current location of spiders species in the state and collection site

1500D camera. All collected specimens have been preserved in the Zoology Laboratory of Govt. D.B. Girl's P.G. College, Raipur.

The specimens were identified based on their morphological characteristics using a stereomicroscope. To identify these specimens, the characteristics of the current specimens were directly compared with data from previously published literature. The identification of S. cingulata is based on data from (Quasin *et al.*, 2019), and the identification of T. *gonygaster* is based on data from (Sekhar & Sunil, 2021). The measurements of the specimens have been taken in millimeters. During the analysis of the epigynum, the muscles attached to the epigyne were cleared away with the help of KOH (Potassium hydroxide).

RESULTS AND DISCUSSION

Taxonomy
Family: Theridiidae Sundevall, 1833
Steatoda Sundevall, 1833
Steatoda cingulata (Thorell, 1890)
(Fig. 2-9)

Specimens Details

Steatoda cingulata **(Thorell, 1890):** Rishijharan, Deobhog, Gariaband, Chhattisgarh, India, 1♀; collected from the Rishijharan forest area of Deobhog, Gariaband, Chhattisgarh, India; 19°47'18.43"N 82°35'24.43"E; elevation, 425.08 m; 13 August, 2026; 01:46 PM (GMT+05:30); The specimen was collected by Hitesh Kumar Warte under a large stone crack; The specimen was deposited and examined in the Zoology laboratory of Government D. B. Girls' P. G. College, Raipur, Chhattisgarh, India. The specimens were preserved in 70% ethanol in vial DBZ605.

Morphology: Total length 9.33mm, Carapace 3.24mm long, 2.18mm wide. Abdomen 5.19mm long, 5.12mm wide. The cephalothorax is small, black in colour, slightly rectangular and slightly longer than wide (Fig. 7). The region on the side of the carapace is flat, whereas the central part is longitudinally convex. The labium is small; the chelicerae are broader than they are long, bearing two marginal teeth, and endites are also present. The sternum is black, oval, and bears setae. The abdomen is round, dark chocolate-brown in color, and larger than the cephalothorax. There are white markings on the dorsal side; the anterior region features a dark, broad yellow band that extends to the lateral sides (Fig. 3), where it forms an inverted 'V' shape. The ventral abdomen is also dark chocolate-brown. There are seven small sigilla in the dorsal part (Fig.6); four of them, located anteriorly, are larger, while the three in the posterior part are smaller. The spinnerets are strong and long, and are surrounded by a broad line.

The leg formula is 1432, in which the first pair of legs is the longest and the second pair is the shortest. Broad, orange-colored longitudinal bands are present on the femora and tibiae of the fourth pair of legs, whereas no such markings are found on the other legs (Fig. 5&7). Leg measurements (femur, patella, tibia, metatarsus, tarsus, total length): Leg I: 2.6, 0.8, 2.0, 2.0, 1.4, 8.8; Leg II: 2.1, 0.5, 1.4, 1.5, 1.6, 7.1; Leg III: 1.7, 0.6, 1.7, 1.3, 0.9, 6.2; Leg IV 2.7, 0.6, 1.8, 2.0, 1.2, 8.3.

Epigyne: There is a broad, wide band surrounding the external epigyne, which covers the epigyne itself; this area is covered by a sclerotized plate (Fig. 8). Internally, the epigyne contains two large, oval-shaped spermatheca; the copulatory ducts are short and compact, fusing together to open into the epigynal opening (Fig. 9-10). The fertilization ducts are small and short.

Global Distribution: India, China, Korea, Japan, Vietnam, Laos, Indonesia (Sumatra, Java) (WSC, 2026).
Indian Distribution: Kerala, Maharashtra, Uttarakhand (Singh *et al.*, 2026).
Theridula Emerton, 1882
Theridula gonygaster (Simon, 1873)
(Fig. 11-16)

Specimens Details
Theridula gonygaster **(Simon, 1873):** Rishijharan, Deobhog, Gariaband, Chhattisgarh, India, 2♀; collected from the Rishijharan forest area of Deobhog, Gariaband, Chhattisgarh, India; 19°47'14.93"N 82°35'26.83"E; elevation, 407.65 m; 13 August, 2026; 03:05 PM (GMT+05:30) (Fig.1); Both specimens were collected



Figure 2-7: Habitus- *Steatoda cingulata* (Thorell, 1890) adult female; 2:Lateral; 3-4: Anterior; 5: Lateral; 6: Dorsal; 7: Anterolateral

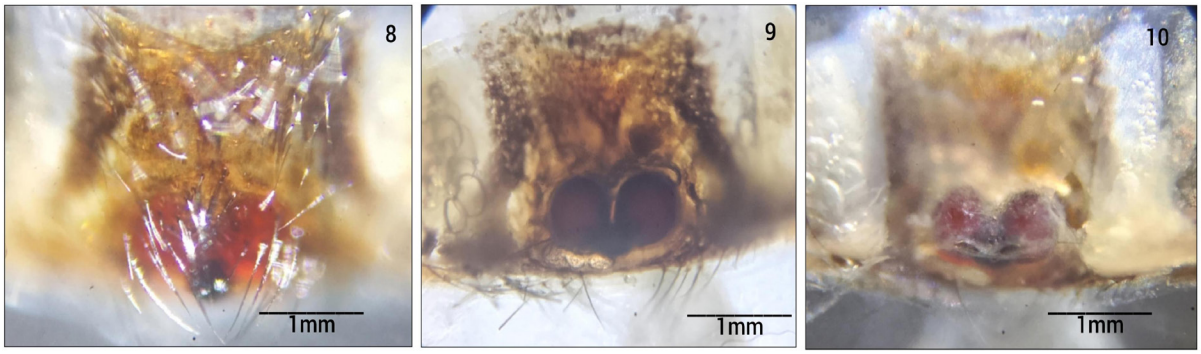


Figure 8-10: Epigyne: 8: Dorsal; 9-10: Ventral

by Jashavant Nayak on the leaves of Teak (Tectona grandis) plant in the same time and place; The specimen was deposited and examined in the Zoology laboratory of Government D. B. Girls' P. G. College, Raipur, Chhattisgarh, India. The specimens were preserved in 70% ethanol in vial DBZ609 & DBZ610.

Morphology: Total length 3.8mm, Carapace 1.0mm long, 0.9mm wide. Abdomen 2.2mm long, 2.4mm wide. The cephalothorax is small, black, slightly rectangular and longer than wide (Fig.11), the sternum is brown and long conical in shape, with the anterior portion wide and the posterior portion narrow. chelicerae are small,

black and strong, labium is small, clypeus is narrow. The abdomen is slightly black and rhomboid in shape; the dorsal surface features five irregular, oval, yellow patches, the two anterior patches are small, the two posterior ones are large, and there is one small patch at the posterior terminal end of the abdomen (Fig. 14). The ventral part of the abdomen is slightly blackish. The middle region is concave (Fig. 13).

The leg formula is 1432, in which the first pair of legs is the longest and the second pair is the shortest. Leg measurements (femur, patella, tibia, metatarsus, tarsus, total length): Leg I: 0.72, 0.27, 0.41, 0.53, 0.23, 2.16; Leg II: 0.62, 0.15, 0.27, 0.14, 0.09, 1.27; Leg III: 0.40, 0.14, 0.31, 0.29, 0.18, 1.32; Leg IV 0.81, 0.21, 0.45, 0.26, 0.20, 1.93.

Epigyne: Epigyne is small and round in shape, external opening is wide and oval in shape, spermatheca are round and oval, copulatory ducts are small, short and straight, entire genital is covered with sclerosis plate (Fig. 15-16).

Global Distribution: Central and South America, Caribbean. Introduced to Europe, Congo, Madagascar, Seychelles, Georgia, India, China, Japan (WSC, 2026).

Indian Distribution: Kerala, Tamilnadu (Singh *et al.*, 2026).

Rajoria first recorded the male specimen in the Mahendri region of the Satpura Range in 2016. Quasin *et al.* (2019) were the first to record *Steatoda cingulata* (Thorell, 1890) female specimens from the Nanda Devi Biosphere Reserve in the Western Himalayas. They collected two male and three female specimens, marking the first record

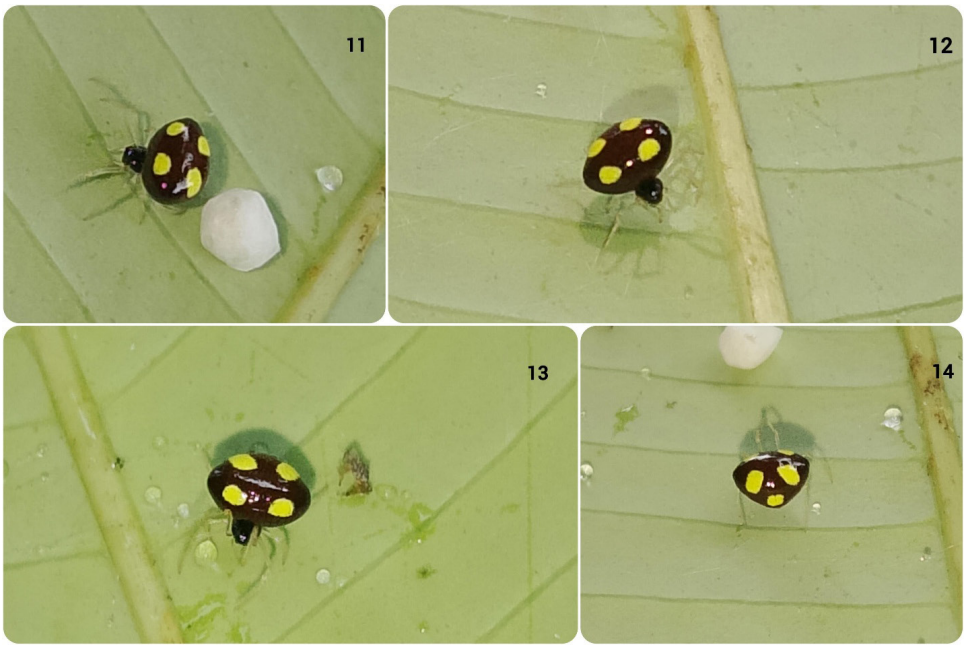


Figure 11-14: Habitus- *Theridula gonygaster* (Simon, 1873)adult female; 11: Lateral; 12-13: Dorsal; 14: Posterior

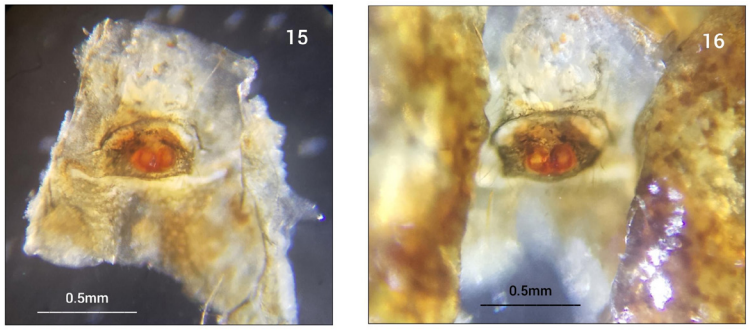


Figure 15-16: Epigyne Both are Dorsal view

of this species in India. They have explained well the male and female morphology in their article which is, female Orangish yellow carapace, abdomen greyish brown with white horizontal and mid dorsal lines, Internally two large round spermatheca with copulatory ducts emerging posterior-laterally and fusing before opening in the atrium, fertilization ducts small and just above copulatory ducts.

The female specimen recorded in the present study is slightly larger (9.33 mm) than the specimens recorded by Quasin and their colleagues, and its abdomen is also larger. Other characteristics, such as leg arrangement, the round abdomen, the slightly rectangular cephalothorax, the oval-shaped spermatheca, and the short copulatory ducts opening via small opening are identical; the overall structure of the epigynum is the same in both sets of

specimens. However, some differences were observed in the legs of the current specimens: longitudinal orange bands are present on the femur and tibia of the fourth pair of legs, and the white line typically found on the dorsal surface of the abdomen is absent.

In 2021, Sekhar & Sunil, recorded two species of the genus Theridula Emerton, 1882, Theridula *opulenta* (Walckenaer, 1841) and *Theridula gonygaster* (Simon, 1873) in Kerala for the first time; this marked the first Indian record for this genus and these species. Subsequently, these species have been recorded in other states. The morphological characteristics of the specimens recorded by them are as follows: the color is blackish with two white spots towards the posterior end of the abdomen; the ventral region is black with a white patch at the posterior end; the total length is 2.99 mm; and the epigyne is small, featuring round spermatheca separated by a distance equal to half their diameter, with their posterior borders joined.

The currently recorded specimens match the data from published literature in several respects, such as the blackish abdominal coloration, small spermatheca, and rhomboid abdomen. However, there are some differences compared to older records: the abdomen bears a total of five yellow spots, has a slightly circular-rhomboid shape, and is somewhat larger in size (3.88 mm).

Comparing the currently recorded specimens with data from previously recorded ones reveals significant similarities, serving as evidence for their correct identification. The specimens described in this article are slightly larger in size than the previously recorded ones.

CONCLUSION

This article describes two new distributional records for the spider species *Steatoda cingulata* (Thorell, 1890) and *Theridula gonygaster* (Simon, 1873) in the state of Chhattisgarh. Both species belong to the family Theridiidae, commonly known as cobweb spiders. Only a few Theridiids have previously been recorded in Chhattisgarh. In this study, specimens of both species were collected from the Rishijharan site in the Deobhog region of Gariaband district. Their documentation adds two more spider species to the state's list; furthermore, both genera are being recorded in the state for the first time. This is highly significant in terms of the state's spider biodiversity. There is a need for more such studies in the state to gain a better and scientifically grounded understanding of its Arachnofaunal diversity.

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