A new species of *Conothele* Thorell, 1878 (Aranei: Halonoproctidae) from the northern Western Ghats, India

**Новый вид рода *Conothele* Thorell, 1878 (Aranei: Halonoproctidae) из северной части Западных Гат, Индия**

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**KEY WORDS:** Maharashtra, Araneae, Ummidiinae, trapdoor spiders, taxonomy.

**КЛЮЧЕВЫЕ СЛОВА:** Махараштра, Araneae, Ummidiinae, пауки-землекопы, таксономия.

**ABSTRACT.** The trap-door spider *Conothele ogalei* sp.n. is described from the holotype male and paratype females collected in Amboli (Maharashtra, India). This is the first report of the genus *Conothele* from the northern Western Ghats and also the first description of a male congener from India. The data on the natural history of the new species as well as notes on the diversity and distribution of Indian *Conothele* spp. are provided.

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**РЕЗЮМЕ.** Паук-землекоп *Conothele ogalei* sp.n. описывается по самцу гологипну и самкам паратипам из Амболи (Индия, штат Махараджгар). Статья впервые отмечает род *Conothele* для северной части Западных Гат и впервые приводит описание самца для индийских видов рода. Представлены также данные по биологии нового вида и замечания по разнообразию и распространению индийских представителей рода *Conothele*.

**Introduction**

The trap-door spider family Halonoproctidae Pocock, 1901 (Opisthothelae: Mygalomorphae) was recently extracted from the family Ctenizidae Thorell, 1887 based on molecular evidences [Hedin, Bond, 2006; Bond et al., 2012; Godwin et al., 2018]. Previously, *Conothele* Thorell, 1878 was placed in the family Ctenizidae together with the morphologically similar genus *Ummidia* Thorell, 1875, both sharing the morphological characteristic of a saddle-shaped depression on tibia III [Raven, 1985; Godwin, Bond, 2021]. Given their morphological similarity, the distinct taxonomic status of *Conothele* and *Ummidia* is debated [Main, 1957; Gertsch, 1979; Coyle, 1985; Ortiz, 2007; Decae, 2010, Opatova et al., 2019]. Based on recent molecular evidence and geographical range separation, these two genera may be reciprocally monophyletic (see Godwin et al. [2018]).

In India, the subfamily Ummidiinae Ortiz, 2007 is represented by two genera, namely *Conothele* and *Latouchia Pocock*, 1901, including together six species (see Siliwal et al. [2009, 2015]; Sunil Jose [2021]). *Latouchia* and *Conothele* are distinguished based on the characteristics of the embolus and spermathecae as well as the saddle-shaped depression on tibia III (absent in the former and present in the latter) (see Decae et al. [2021]). However, only one species of the latter genus, *Latouchia cryptica* (Simon, 1897), has been described from India, although the precise type locality remains unknown (Deccan region).

During the arachnid surveys in and around Amboli (Sidhudurg District, Maharashtra), we (AK and SP) collected three samples of an unidentified trapdoor species from the vicinity of Whistling Woods resort. We tentatively assign these to the genus *Conothele* based on their ocular formula, saddle-shaped depression on tibia III, and short burrow structure. Here, we describe them as a new species, *C. ogalei* sp.n., based solely on morphology. This is the first description a male specimen of Indian *Conothele*. In addition, notes on the natural history of the species are provided.
Materials and Methods

Specimens were hand-collected, and live individuals were photographed using a Canon 60D (Canon) equipped with a macro lens (60 mm) and Speedlight 430 EX II external flash. The specimens were preserved in 70% ethanol. The left pedipalp was removed, examined, and photographed. Leg measurements are given as follows: total length (femur, patella, tibia, metatarsus, and tarsus). All measurements are in millimeters. Spermathecae were dissected and cleared in clove oil. Photographs of body parts were obtained using a Leica MC120 HD camera attached to a stereo-binocular microscope with the LAS Core software package (Leica MC120).

The burrows were carefully removed with the help of brush and forceps and then fixed using varnish. Measurements were obtained using ImageJ (NIH, Bethesda, MD, USA) and a digital caliper to the nearest 0.001 mm. All burrows and specimens are deposited in the Museum and Research Collection Facility of National Centre for Biological Sciences, Bengaluru, India. Specimens studied here do not fall under any schedule of the Wildlife (Protection) Act of India, 1972, and were collected from nonprotected area.

The abbreviations used in the text: Eyes: ALE — anterior lateral eye, AME — anterior median eye, MOQ — median ocular quadrates, PLE — posterior lateral eye, PME — posterior median eye. Spinnerets: PLS — posterior lateral spinnerets, PMS — posterior median spinnerets. Leg segments: fe — femur, mt — metatarsus, pa — patella, ta — tarsus, ti — tibia. Spines and their position: d — dorsal, p — prolateral, r — retrolateral, v — ventral, * — broken.

Taxonomy

Genus Conothele Thorell, 1878

The members of Conothele and Ummidia share a characteristic dorsal saddle-shaped depression on tibia III [Coyle, 1985; Ortiz, 2007; Deceae, 2010], but they differ in terms of their geographical distribution. The genus Conothele has largely been described from the Oriental region and Australia, whereas the genus Ummidia has been reported from the Neotropical, Mediterranean, Caribbean, and Central Asian regions [Main, 1957; Haupt, 2006; Zonstein, 2008, 2014; Deceae, 2010; Xu et al., 2017; Yang, Xu, 2018; Godwin et al., 2018; Deceae et al., 2021; Godwin, Bond, 2021]. However, the precise geographic ranges of both genera are incompletely known, as evidenced by the present description of a new Conothele species from a region not known before. Therefore, these genera warrant taxonomic revision based on additional systematic sampling and molecular evidence.

Conothele ogalei sp.n.

Fig 1–7, Map.

TYPES. HOLOTYPE: # (NRC-AA-1128) India, Maharashtra, Sindhudurg, Amboli in the vicinity of Whistling Woods resort (15.95995°N, 73.99737°E; 690 m asl.), 11.06.2016, A. Khandekar and S. Pawar. PARATYPES: 2 $$ (NRC-AA-1129 and NRC-AA-1130), the same collection data as for the holotype except 20.02.2016.

ETYMOLOGY. The specific epithet is a patronym honoring our friend Mr. Hemant Ogale, an eminent naturalist who also runs a resort in Amboli from where the type series were collected. He has been documenting biodiversity around Amboli and working toward the conservation of the landscape for two decades.

DIAGNOSIS. Conothele ogalei sp.n. male differs from the males of all other known Asian congeners by the abrupt proximal narrowing from which the embolus originates (see Fig. 3). The conspecific females differ from those of the other known Indian congeners in terms of the following characteristics: spermathecae with paired receptacles, with each stalk slightly broader at the base, gradually narrowing distally and bearing comma-shaped, globose apical lobes facing each other (vs two receptacles, distal end bowl-shaped, pale yellowish with dark brown dots; proximal portion darker; stalks long and twisted in C. chinanarensis Sunil Jose, 2021; globose apical lobe swollen, with a sclerotized, upward-facing stalk, partially bent with a zigzag pattern at the base of lobe in C. giganticus Siliwal et Raven, 2015; paired lobes, with straight stalks, slightly broader toward the base,
Conothele ogalei sp.n. from India

gradually narrowing distally, with globular apical swollen lobes at the base, stalks with a sclerotized ring-like twisted band in *C. khanthokhanbi* Kananbala, Bhubaneshwari et Siliwal, 2015; globular apical lobe on a stalk bent at 45° and twisted twice distally in a zigzag manner in *C. vali* Siliwal, Nair, Molur et Raven, 2009; and bowl-shaped apical lobe on a stalk, twisted twice distally in *C. varvarti* Siliwal, Nair, Molur et Raven, 2009.

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**Fig. 2.** *Conothele ogalei* sp.n., male (holotype NRC-AA-1128): A — cephalothorax and abdomen, dorsal; B — same, ventral; C — eyes, dorsal; D — left chelicera, retrolateral; E — chelicera, showing rastellum, promarginal, and retromarginal teeth, ventral. Scale bars: A, B — 2 mm; C, D, E — 0.5 mm.

Рис. 2. *Conothele ogalei* sp.n., самец (голотип NRC-AA-1128): A — головогрудь и брюшко сверху; B — то же, снизу; C — глаза, сверху; D — левая хелицера, ретролатерально; E — хелицера снизу, показаны растеллум, зубцы на внешнем и внутреннем краях желобка. Масштаб: A, B — 2 мм; C, D, E — 0.5 мм.
Fig. 3. *Conothele ogalei* sp.n. (holotype NRC-AA-1128), left male palp, entire (A–C) and close-up view of cymbium and bulb (D–F): A, D — prolateral; B — ventral; C, F — retrolateral; E — dorsal. Scale bars, 1 mm.

Рис. 3. *Conothele ogalei* sp.n. (голотип NRC-AA-1128), левая пальпа самца, целиком (A–C) и увеличенное изображение цимбия и бульбуса (D–F): A, D — пролатерально; B — снизу; C, F — ретролатерально; E — сверху. Масштаб: 1 мм.
Conothele ogalei sp.n. from India

Fig. 4. Conothele ogalei sp.n. male (holotype NRC-AA-1128), legs I–IV structures: A–D — ventral side of legs I–IV, respectively; E — tibia III, prolateral. Scale bars: 1 mm.

COLOUR IN LIFE. Male appears brownish to dark black overall, carapace jet black with yellowish crescent-shaped fovea. Legs black, gradually becoming paler from femur to tarsus. Abdomen dark brown; female similar to the male but much darker, glossy black (Fig. 1A, B).

DESCRIPTION. MALE (holotype). Measurements. Total length 9.09 (excluding chelicerae). Carapace 4.26 long, 4.48 wide. Abdomen 4.83 long, 3.61 wide. Spinnerets: PMS, 0.28 long, 0.19 wide, 0.16 apart; PLS, total length 1.33 (0.25 basal, 0.18 middle, 0.9 apical; midwidths 0.46, 0.37, 0.26, respectively), 0.50 apart.

Carapace: rugose, brownish black, darker between fovea and eyes, carapace edged, weakly serrated, fovea crescent-shaped, yellowish; five to six long black bristles present between eyes and fovea; a single long bristle present between anterior eyes. (Fig. 2A). Eyes: ocular group 1.44 long, 1.30 wide; MOQ square, 0.48 long, 0.52 front width, 0.60 back width; AME 0.24, PME 0.14, ALE 0.27, PLE 0.15, ALE–AME 0.12, AME–AME 0.08, PLE–PME 0.02, PME–PME 0.30 (Fig. 2C).

Chelicerae: 2.33 long, orangish-black, with color gradually becoming paler from dorsal to marginal teeth; prolateral and retrolateral face dorsally rugose, with few setae throughout (Fig. 2D); three promarginal and seven retromarginal teeth; basomobal teeth absent; rastellum conspicuous on low mound, eight thick curved spines arranged in a single row, many long and short bristles present along anterior dorsal surface (Fig. 2E).

Maxillae: 1.12 long in front and 1.50 long in back, 0.87 wide; 15 cuspules; anterior lobe indistinct (Fig. 2B). Labium: 0.58 long, 0.85 wide, labium with seven cuspules; labiosternal groove with distinct sigilla on either side (Fig.
Fig. 5. **Conothele ogalei** sp.n., female (paratype NRC-AA-1129): A — cephalothorax and abdomen, dorsal; B — same, ventral; C — eyes, dorsal; D — left chelicera, retrorotateral; E — chelicera, showing rastellum, promarginal, and retromarginal teeth, ventral; F — spermathecae, dorsal; G — palpal tibia and tarsus, retrorotateral; H — tibia III, prolateral. Scale bars: A, B — 2 mm; C, E — 0.5 mm; D, G — 1 mm; F — 0.2 mm.

Рис. 5. **Conothele ogalei** sp.n., самка (паратип NRC-AA-1129): A — головогрудь и брюшко сверху; B — то же, снизу; C — глаза, сверху; D — левая хелицера, ретролатерально; E — хелицера снизу, показаны растеллум, зубцы на внешнем и внутреннем краях желобка; F — сперматеки, сверху; G — голень и лапка пальпы, ретролатерально; H — голень III, пролатерально. Масштаб: A, B — 2 мм; C, E — 0.5 мм; D, G — 1 мм; F — 0.2 мм.
**Conothele ogalei** sp.n. from India

![Fig 6. Conothele ogalei sp.n., burrow of paratype female (AW-282), morphology: A — burrow with open door, external; B — same with closed door; C — same, above; D — same, frontal. Scale bars: 1 mm.](image)

2B). *Sternum*: 2.30 long, 2.28 wide, yellowish-brown, with color gradually becoming paler posteriorly, covered with long black bristles, with a row of bristles radiating out of the borders, posterior angle acute and not separating coxae IV; sigilla indistinct (Fig. 2B).

*Legs*: formula 4132, length: I = 10.07 (4.01 + 1.25 + 2.59 + 1.20 + 1.02); II = 8.46 (3.65 + 1.19 + 1.47 + 1.25 + 0.90); III = 9.05 (3.08 + 1.60 + 1.80 + 1.58 + 0.99); IV = 11.39 (3.78 + 1.76 + 2.48 + 2.36 + 1.01); mid-width: fe, I = 0.98, II = 0.64, III = 0.93, IV = 0.78; ti, I = 0.73, II = 0.59, III = 0.57, IV = 0.72. Palp: length: 6.4 (2.57 + 1.26 + 1.74 + 0.83); mid-width: fe = 2.57, ti = 1.26.

*Leg spination*: curved thick thorn-like spines on legs I and II (Fig. 4A, B), absent on palp, rest typical spines on legs III and IV (Fig. 4C, D). Leg I: ta, p = 2, r = 3; mt, p = 3, r = 5; ti, p = 11, r = 14, v = 15; pa, v = 4, p = 3; fe, p = 7; leg II: ta, p = 2, r = 3; mt, p = 2, v = 3, r = 11; ti, p = 3, v = 11, r = 5; pa, p = 2; leg III, ta, p = 8, r = 5, v = 2; mt, d = 4, p = 3, r = 3, v = 4; ti, p = 3, v = 1; pa, p = 6; leg IV, ta, p = 6, r = 5; mt, r = 2.

*Leg structures*: Legs dark blackish-brown, moderately covered with setae, bristles, and few curved thick thorn-like spines; ti III with a slight saddleshaped depression dorsally (Fig. 4E); trochanters, coxae, and fe I–IV dorsally rugose; legs I and II with a well-developed scopula. *Leg coxae*: yellowish-brown, covered with small and long bristle; (Fig. 2B) coxae III and IV wider than I and II; III and IV almost equal in width; coxae I longer than the rest. *Trichobothria*: Ta I and II, four clavate trichobothria in two rows, 13 filiform trichobothria in multiple longitudinal rows; ti I–IV with six filiform trichobothria in two longitudinal rows at the basal one-fourth; mt I–IV, three or four filiform trichobothria in two longitudinal rows at the distal half; Ta III, one clavate, 17 filiform trichobothria in multiple longitudinal rows. *Palp*: Ta: six long, five clavate trichobothria, Ti: five long filiform trichobothria. *Claws*: all legs with a paired claw, legs II–IV with unequal bifid tooth; claw of leg IV longer than the rest, I & II equal, claw tufts absent.

*Abdomen*: grayish-brown, with pale yellow spots on the dorsal and lateral sides; covered with short and thick black setae and several bristles (Fig. 2A). Ventrally, light yellowish-brown, covered with black setae; spinnerets uniformly covered with short and long bristles. *Spinnerets*: PMS digitiform, covered with black setae ventrally, with the band of spigots at the distal edge; PLS, three-segmented, covered with black setae, apical segment dome-shaped. Spigots present on all segments. (Fig. 2B).
Fig. 7. Conothele ogalei sp.n., natural habitats in the type locality (Amboli, Maharashtra): A, B — typical landscape during the monsoons at the type locality showing moist semi-evergreen forest; C — a mud-bund from the point where a paratype female NRC-AA-1129 was collected; D — an active burrow with a closed door (in situ).

**Fig. 7.** *Conothele ogalei* sp.n., естественная среда типового местообитания (Амболи, Махараджша): A, B — типичный ландшафт с влажным полувечноzelеным лесом в типовом местеобитании во время муссона; C — обнажение глины в том месте, где была собрана самка паратип NRC-AA-1129; D — активная нора с закрытым люком (in situ).

**Copulatory organs.** Palpal organ: embolus elongated and slender, gradually turning retrolaterally, with a curved tip projected downward, and bearing a small hook (Fig. 3).

**FEMALE** (patatype NRC-AA-1129). **Measurements.** Total length 16.6 (excluding chelicerae). Carapace 7.50 long, 6.10 wide. Abdomen long 9.10, wide 5.40. Spinnerets: PMS, 0.28 long, 0.19 wide, 0.16 apart; PLS, total length 1.33 (0.25 basal, 0.18 middle, 0.9 distal; midwidths 0.46, 0.37, 0.26, respectively) 0.54 apart.

**Carapace:** globose, caput nine or 10 black long bristles with distinct mound between fovea and eyes; a few bristles anteriorly, a single long bristle between anterior eyes and on the clypeus; fovea deep, procured, U-shaped (Fig. 5A). **Eyes:** distinct ocular tubulicule, posterior row slightly procured; ocular group 0.70 long, 1.02 wide; MOQ: 0.40 anterior width, 0.61 posterior width, 0.47 long. AME 0.20, PLE 0.15; ALE 0.37, PLE 0.29, ALE–AME 0.10, AME–AME 0.08, PLE–PME 0.06, PME–PME 0.38. **Clupeus:** present (Fig. 5C).

**Chelicerae:** 3.05 long, yellowish-orange, with few small setae dorsally and on the retrolateral face; prolateral face glabrous; four promarginal and 10 retromarginal teeth, besosomal teeth absent (Fig. 5D). **Maxillae:** 1.70 long anteriorly, 2.78 long posteriorly, 1.57 wide, 19 cuspules; few cuspules arranged in a C-shaped pattern from anterior basal corner to posterior basal corner; anterior lobe indistinct. **Labium:** 0.95 long, 1.23 wide, labio-sternal groove shallow, straight with procured ends with two labio-sternal sigilla on either end of the groove; four cuspules. **Sternum:** 3.97 long, 3.80 wide; covered with long black bristles, posterior angle blunt and not separating coxae IV; sigilla large, irregularly shaped, centrally placed (Fig. 5B).

**Legs:** formula 4.132, length: I = 11.18 (3.89 + 2.40 + 1.42 + 0.80); II = 9.98 (3.47 + 2.30 + 1.96 + 1.32 + 0.93); III = 10.76 (3.20 + 2.32 + 2.20 + 1.50 + 1.54); IV = 13.11 (4.46 + 2.35 + 2.54 + 2.40 + 1.36); mid-width: fe, I = 1.10, II = 1.29, III = 1.70, IV = 1.27; ti I = 1.38, II = 1.01, III = 1.72, IV = 1.40. Palp: length 10.22 (3.85 + 2.20 + 2.27 + 1.90); mid-width: fe = 0.86, ti = 1.38.

**Leg spination:** curved thick thorn-like spines on legs I and II and palp rest typical spines. Leg I, ta, r = 17, p = 24; mt, r = 25, p = 38; ti, r = 40, p = 44 + 3*; leg II, ta, p = 30, r = 17; mt, p = 34, r = 6; ti, p = 33 + 1*, r = 11 + 2*; leg III, ta, p = 8 r = 3 v = 4; mt, p = 1, d = 4, r = 2, v = 2; ti, p = 2; pa, p = 16; leg IV, ta, p = 9; mt, p = 2, v = 2. Palp: ta, r = 38, p = 41; ti, r = 46, p = 42.

**Leg structures:** ti III with saddle-shape depression on lower basal half (Fig. 5H). **Trichobothria:** ta I, three clavate, 14 or 15 filiform; ti II, five clavate, 13 or 14 filiform; ta III, four clavate, 20 or 21 filiform; ta IV, single clavate, seven or eight filiform; palp 19 or 20 filiform; mt I–IV, six or seven filiform in the distal region; ti I–IV, seven or eight filiform in the basal region. **Leg coxae:** coxae IV clearly wider than...
the rest, I clearly longer than the rest, II & III subequal; covered with black bristle. **Claws**: all legs with three claws, a paired claw with a single tooth; claw III smaller than the rest; palp with a single claw bearing two unequal bifid tooth. **Abdomen**: brownish-black, with few small spots radiating in a curved line, covered with short and black bristles on tubercles. Ventrally, uniformly covered with short and long bristles (Fig. 5A). **Spinnerets**: PMS one-segmented, digitiform, covered with black setae. PLS three-segmented and covered with black setae, apical segment domed.

**Copulatory organs**. **Spermathecae**: paired lobe, each stalk slightly broader at the base, gradually narrowing distally, comma-shaped (Fig. 5F).

**VARIATION. Female paratype (NRC-AA-1130):** total length 15.06, excluding chelicerae length; carapace 5.62 long 5.24 wide. **Chelicerae**: 2.70 long intact, eight retromarginal and three promarginal teeth, basosomal teeth absent, rastellum on low mount 10 thick spines. **Sternum**: 3.09 long, 3.14 wide. **Labium**: 0.85 long, 1.09 wide, six cuspsules. **Maxillae**: 1.37 long anteriorly, 2.23 long posteriorly, 1.20 wide, 17 cuspsules. **Abdomen**: 9.44 long 7.07 wide. **Spinnerets**: PMS 0.22 long, 0.11 wide, 0.7 apart; PLS, total length (0.22 basal, 0.11 middle, 0.10 distal; midwidths 0.31, 0.29, 0.19, respectively). **Leg length**: I = 7.40 (2.76 + 1.60 + 1.71 + 0.70 + 0.50); II = 6.8 (2.28 + 1.70 + 1.35 + 0.85 + 0.62); III = 7.35 (2.65 + 1.61 + 1.36 + 0.84 + 0.98); IV = 8.53 (2.90 + 1.48 + 1.69 + 1.57 + 0.89); mid-width: fe, I = 0.80, II = 0.79, III = 1.25, IV = 0.90; ti, I = 2.95, II = 1.80, III = 0.79, IV = 0.84. **Palp**: length 6.25 (2.01 + 1.52 + 1.25 + 1.47); mid-width: fe = 0.56; ti = 0.85. Rest of the characters similar to paratype NRC-AA-1129.

**Natural History**

Amboli is a hill station in Maharashtra (India), situated at approximately 700 m a.s.l. This place falls in the northern Western Ghats and receives heavy rainfall (>7,400 mm) during monsoon [Kanade et al., 2008]. The forest type is moist evergreen on the slopes, and lateritic plateaus on the top harbor scattered patches of stunted forest (Fig. 7A, B). The burrows from which the females were collected were situated on mud-bunds (at approximately 1 m above the ground) along roads and streams and at the base of artificial laetrile walls (Fig. 7C). The doors of the burrows were covered in thick moss, making them well-camouflaged with the surroundings and hence difficult to spot (Fig. 7D). After heavy rains on the previous night, a single male (holotype) was collected in the morning on the next day from under a laterite rock in an open patch within the resort campus. In addition, five empty burrows were observed in the same area. Overall, 16 burrows were observed in an area of about 15 m², suggesting their moderate density in the area. Of the 16 burrows, 10 were active and occupied by five adult females and five juveniles. The burrows were collected along with females, and the depth of the burrow, thickness, height, and width of the door, circumference of the outer rim of the opening, and width of the hinge were measured. All measured burrows were relatively short and situated at an angle to the surface. Burrow measurements in
Discussion

Trapdoor spiders, in general, and Conothele species, in particular, have a very secretive mode of life; as such, they spend most of their life inside a short underground burrow made of silk. The “C-shaped” door at the entrance of the burrow is lined with silk and materials such as soil, gravel, or moss (depending on the surroundings), among others, making the burrow cryptic in the surrounding environment, impossible to be detected by an untrained eye. However, the perfectly camouflaged nature of their burrows has impeded their documentation since long. The first ever valid record of the genus Conothele from India was reported in the last decade, along with the description of two new species from northeastern states [Siliwal et al., 2009], followed by two additional new species from Arunachal Pradesh and Odisha [Siliwal et al., 2015].

Conothele ogalei sp.n. is the sixth member of the genus described from India [World Spider Catalog, 2021] and the first to be described from the northern Western Ghats. The new species is also the first record of Conothele for Maharashtra. All six Conothele species have only been recorded from densely forested areas, and their occurrence in other habitats remains unknown. Moreover, the current description of C. ogalei sp.n. represents only the second record of this genus from Western Ghats, following a very recent description of another species, C. chinnarensis, from Kerala.

The recent discoveries of Conothele species from the Western Ghats underscore the fact that large stretches of suitable habitats remain unexplored, and the actual diversity of spiders within this genus is far from our anticipation. Extensive fieldwork, combined with molecular analyses, is the key to the accurately document the diversity of Conothele in India.

Compliance with ethical standards

CONFLICTS OF INTEREST: The authors declare that they have no conflicts of interest.

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