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CONOTHELE THORELL, 1878 (MYGALOMORPHAE:
HALONOPROCTIDAE) FROM THE EASTERN GHATS, INDIA**

ZEESHAN A. MIRZA

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**A new species of trapdoor spider of the genus *Conothele* Thorell, 1878
(Mygalomorphae: Halonoproctidae) from the Eastern Ghats, India**

Zeeshan A. Mirza

<https://orcid.org/0000-0003-1685-9816>

National Centre for Biological Sciences, Tata Institute for Fundamental Research, Bangalore, Karnataka 560065, India.

Email: snakeszeeshan@gmail.com

Abstract

A new species of *Conothele* Thorell, 1878 is described from the Eastern Ghats based on two male specimens collected from Kanger Valley National Park, Chhattisgarh. This is the second species of the genus from India to be described on the basis of male specimens. The new species is similar to *Conothele oglei* Sanap, Pawar, Joglekar & Khandekar, 2022 from the Western Ghats but differs from that species in leg supination and in the number of labial cuspules.

Keywords

Conothele, Chhattisgarh, SEM, taxonomy, male specimens

Introduction

The trapdoor spider subfamily Ummidiinae Simon, 1903, is diagnosed by presence of a distinct dorsal excavation on tibia III of males and females in *Ummidia* Thorell, 1875 and *Conothele* Thorell, 1878 (Decae 2010). Even though the two genera are morphologically similar however, *Conothele* is distributed in the Old world and *Ummidia* in the new world (Decae 2010). There have been debates about the distinctness of the genus *Conothele*, but recent work based on 565 loci showed the two genera to be monophyletic clades (Godwin *et al.* 2018; Godwin & Bond 2021).

The genus *Conothele* is currently recognized as having 34 species distributed in the Oriental and Australian region, of which 13 are recorded from Asia (World Spider Catalog 2022; Xu *et al.* 2017; Godwin & Bond 2021). Occurrence of the genus in India was confirmed in 2009 (Siliwal *et al.* 2015) based on two new species, since which time, three more species were described bringing the total to six.

The species reported from India and their distributions are *C. varvarti* Siliwal, Nair, Molur & Raven, 2009 from Odisha; *C. vali* Siliwal, Nair, Molur & Raven, 2009 from Arunachal Pradesh; *C. giganticus* Siliwal & Raven, 2015 (in Siliwal *et al.* 2015) from Mizoram and *C. khunthokhanbi* Kananbala, Bhubaneshwari & Siliwal, 2015 (in Siliwal *et al.* 2015) from Manipur (Siliwal *et al.* 2009, 2015), *C. chinnarensis* Sunil Jose 2021 from Kerala (Sunil Jose, 2021) and *C. ogalei* Sanap, Pawar, Joglekar & Khandekar, 2022 from Maharashtra (Sanap *et al.* 2022). As presently understood, based on these six species, the genus is distributed in Eastern and northeastern India and the Western Ghats.

The Eastern Ghats are a broken chain of mountains, which have long been neglected in terms of the biodiversity they host. As part of an ongoing project to document the biodiversity of the Eastern Ghats, I was able to briefly survey parts of Kanger Valley National Park in southern Chhattisgarh, which lies in western part of northern Eastern Ghats. Unfortunately the area has restricted access so return visits have not been possible. I collected two male specimens of Halonoproctidae, which were later identified as belonging to *Conothele*

following Godwin *et al.* (2018). All species reported of the genus *Conothele* from India were previously known only from females and the nearest known locality for *Conothele* is of *C. varvarti* described from Similipal Tiger Reserve, Odisha, a straight-line distance of about 560km from Kanger Valley National Park. The localities are far enough apart to safely conclude that the males from Kanger Valley National Park represent an undescribed species, which is herein described with notes on the genus *Conothele*.

Material & Methods

Specimens in field were captured in containers and were euthanized and preserved in 70% ethanol after photography. Specimens were examined using a LeicaTM S8APO stereo-binocular microscope and measurements were taken with a MitutoyoTM digital caliper. Eye measurements were taken with the software ImageJ (<http://imagej.nih.gov/ij/>). All measurements are in millimetres and with an error of ± 0.01 . Descriptive style and format follows Mirza *et al.* (2012). The new species is compared to congeners whose males are described as the species of the genus are sexually dimorphic. The palp bulb and claw were removed from the male and scanned on an electron microscopy, after processing in a Leica EM CPD300 to remove traces of ethanol and water followed by gold sputter coating at a thickness of 30nm for three minutes in a Pelo SC-7 sputter coater. SEM imaging was conducted with a Zeiss Merlin VP Compact (Carl Zeiss Microscopy GmbH, Göttingen) and images were slightly edited for contrast correction. The types are deposited in the collections of the National Centre of Biological Sciences (NCBS), Bangalore. LSID for the publication: urn:lsid:zoobank.org:pub:4C6D8584-326F-4C23-8D07-B1AA92DC7F0A.

Abbreviations: ALE – anterior lateral eyes, AME – anterior median eyes, MOQ – median ocular quadrangle, PLE – posterior lateral eyes, PME – posterior median eyes, PLS – posterior lateral spinnerets, PMS – posterior median spinnerets, ZM – Zeeshan Mirza, d – dorsal, fe – femur, mt – metatarsus, p – prolateral, pa – patella, r – retrolateral, ta – tarsus, ti – tibia, v – ventral. The total length excludes chelicerae length.

Taxonomy

Family Halonoproctidae

Genus *Conothele* Thorell, 1878

Conothele purvaghati sp. nov.

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Figs. 1–4

Type material: Holotype, NCBS AU701 ♂, INDIA: Chhattisgarh, Bastar District, Kanger Valley National Park (18.907348° N, 81.904668° E, elevation 516m), coll. Saunak Pal & Zeeshan Mirza on 16 June 2017. Paratype male NCBS AU702, same data as for the holotype.

Etymology: The specific epithet is a combination of two Hindi words ‘*Purva Ghati*’ for the Eastern Ghats, a neglected biodiversity hotspot.

Diagnosis: *Conothele purvaghati* sp. nov. differs from *C. taiwanensis* Tso, Haupt, Zhu and *C. fragaria* Dönitz, *C. linzhi* Liu, Xu, Zhang, F. Liu & Li in bearing a much longer, filiform embolus. The new species is similar to *C. taiwanensis* in bearing numerous thorn-like spines on prolateral aspect of Leg I absent in *C. fragaria* and in having the palp bulus embolus tip directed retrolaterally whereas the tip is directed forward in *C. fragaria*, however differs from *C. taiwanensis* in bearing 4 promarginal and 6 retromarginal teeth (vs. 8 in *C. taiwanensis*). Based on the harpoon-shaped embolus tip, the new species is similar to *C. martensi* Decae, Schwendinger & Hongpadharakiree, *C. isan* Decae, Schwendinger & Hongpadharakiree and

C. dequin Yang & Xu, however, differs from these in bearing spines on tibia II vs absent in *C. martensi* and *C. isan*. Differs from *C. cangshan* Yang & Xu & *C. dequin* in bearing 10-11 cuspules (>22 in *C. cangshan* & *C. dequin*). The new species differs from *C. oglaei* in bearing >20 spines on prolateral, ventrolateral and ventral aspect of tibia leg I vs. <16 in *C. oglaei*; 10-11 cuspules vs. 15 in *C. oglaei*.

Description of male holotype NCBS AU701 (Fig. 1): The specimen is in good condition but with left pedipalp and chelicerae dissected. Total length 8.15. Carapace 4.45 long, 4.75 wide. Fovea 0.64 wide, distance from anterior border 5.62. Abdomen 3.7 long, 2.8 wide. Spinnerets: PMS, length 0.43, midwidth 0.19, apart 0.1; PLS, total length 0.74 (0.34 basal, 0.30 middle, 0.10 apical; midwidths 0.6, 0.4, 0.1 respectively), 0.55 apart.



Figure 1. *Conothele purvaghati* sp. nov. holotype male NCBS AU701 in life.

Color in preservative (Fig. 2–3): carapace blackish brown. Abdomen pale brown dorsally, much paler ventrally with a shade of yellow. Femur dark brown, patella, tibia and metatarsi yellowish brown. Tarsi of all legs almost yellow lacking brown tinge.

Carapace (Fig 2): nearly as long as wide; width/length about 0.93. Entire surface coarsely granular. Caput arched.

Eyes (Fig. 2): ocular group front width, midwidths, back width, length, 0.92, 1.33, 0.79, 0.78 respectively. Anterior row and posterior row straight. MOQ square, front width 0.55, back width 0.70, length 0.58. Diameter of AME 0.28, ALE 0.39, PME 0.25, PLE 0.27. Eye interspaces: AME–AME 0.14, AME–ALE 0.10, ALE–ALE 0.58, PME–PLE adjacent, PME–PME 0.40, ALE–PLE 0.17. Eye tubercle present.

Chelicerae: 2.10 long. Prolateral and retrolateral face glabrous, greyish brown with numerous short black bristles on its dorsum; 4 promarginal and 6 retromarginal teeth; rastellum not distinct, few spike-like setae in a row.

Labium: 1.07 wide, 0.75 long; labiosternal groove distinct. Cuspules seven in number, restricted to the anterior border of the labium.

Maxillae: 1.31 long in front, 1.94 long in back, 0.90 wide; 10/11 cuspules scattered medially. Posterior retodorsal heel distinctly produced, anterior lobe indistinct.

Sternum: 2.99 long, 2.80 wide. Glossy, covered sparsely with short black bristles. Sigilla indistinct.



Figure 2. *Conothele purvaghati* sp. nov. holotype male NCBS AU701 showing carapace and abdomen. Scale bar 2mm.

Legs: formula 1423, morphometry (femur, patella, tibia, metatarsus, tarsus total): I: 4.32, 2.04, 2.90, 2.20, 1.1, 12.56. II: 3.45, 1.75, 2.46, 1.76, 0.80, 10.22. III: 2.95, 1.59, 2.20, 1.85, 1.35, 9.94. IV: 3.85, 1.85, 2.78, 2.60, 1.12, 12.2. palp: 2.91, 1.32, 2.20, -, 0.80, 7.23. Tibial spur absent. Tarsi I short and inflated, femur I depressed laterally. Dorso-prolateral apophysis absent. Anterior legs with thick, thorn-like spines, posterior pair of legs with numerous spike-like setae, lacking thorn-like spines. All leg segments glabrous.

Leg spination: Leg I: ta, 3r, mt, 7v, ti, 22p, 28r, 21v, pa, 1p, 5v, fe, 8p; Leg II: mt, 1p, 5v, ti, 7r, pa, 9v.

Scopulae: Present only on tarsi I & II. Covers the entire tarsi I and only 25% on basal tarsi II.

Trichobothria: ten in number on all tarsi and metatarsi arranged in fairly two rows throughout the segment.

Claws: claw tufts absent on all legs and palp. All claws with unequal bifid tooth, claws of legs III smallest and of leg IV largest.

Abdomen (Fig. 2): abdomen pale brown in color with reticulate markings. Cuticle exposed. Covered sparsely by thick short black bristles dorsally.

Spinnerets: PLS, apical segment dome shape. Covered with short black setae.

Palp bulb (Fig. 3a–c): Palp bulb pyriform, bulb tapers abruptly into a filiform embolus terminating in a sharp tip. Embolus directed downwards in its basal half gradually turning towards the retrolateral aspect. The bulb lacks keels. Scanning electron microscope (SEM) images shown in Fig. 4a-c.

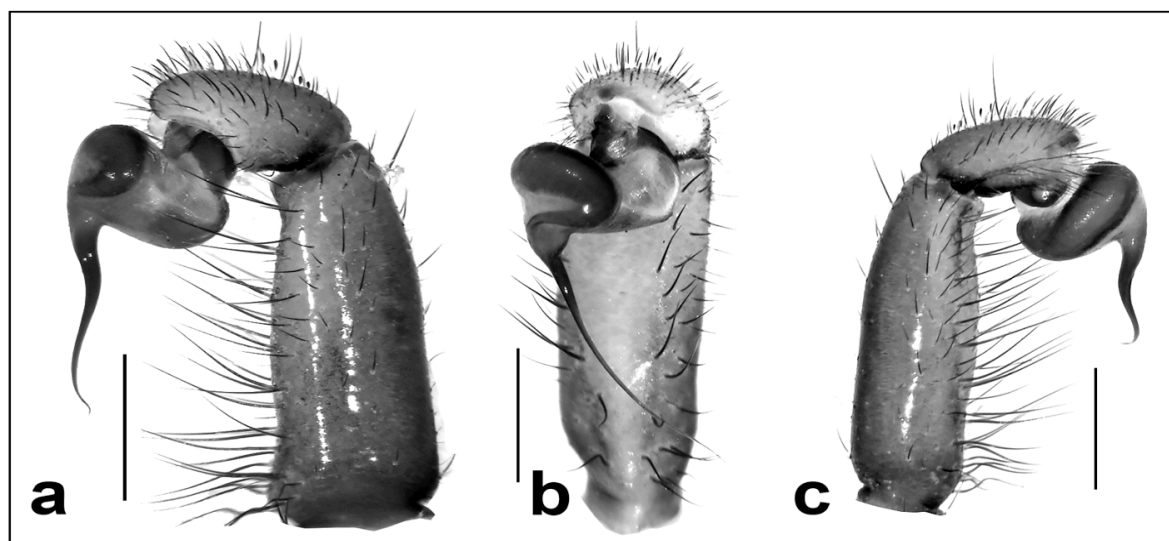


Figure 3. *Conothele purvaghathi* sp. nov. holotype male NCBS AU701 left pedipalp showing (a) retrolateral view, (b) dorsal view, (c) prolateral view. Scale bar 1mm.

Natural history and distribution: The holotype was found actively moving on a tree trunk at 10h30 after a heavy downpour. The paratype was found in a cavity in a rock with thin webbing, which is likely a temporary refuge. Attempts were made to locate females, but due to heavy rains, locating burrows was difficult. The forest type at the type locality is of mixed moist deciduous type dominated by *Shorea robusta*, *Tectona grandis* and *Bambusoideae* spp.

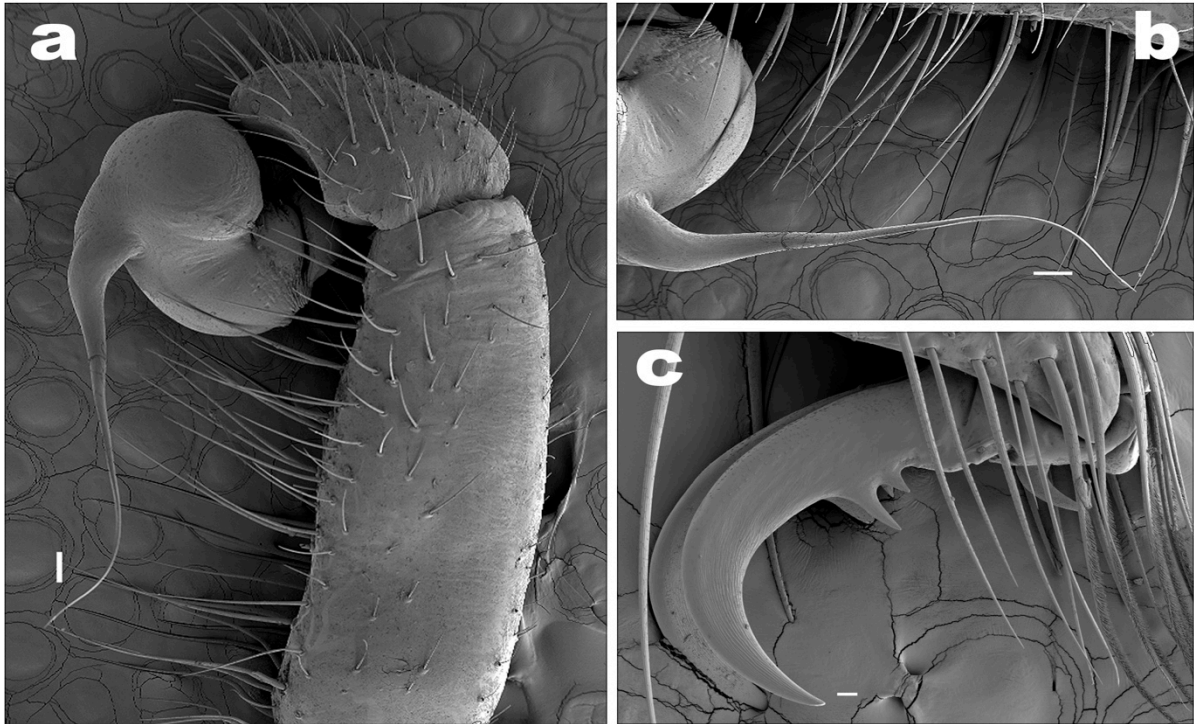


Figure 4. *Conothele purvaghati* sp. nov. holotype male NCBS AU701 SEM images (a) left pedipalp showing retrolateral view, (b) left pedipalp showing dorsal view, (c) claw dentition. Scale bar 0.1mm.

Discussion

The type locality Kanger Valley National Park is located in southern Chhattisgarh, which is located on western part of the hills of the Eastern Ghats and is separated from the type locality of *Conothele varvarti* by two major rivers Mahanadi and Brahmani, which may act as biogeographic barriers for these spiders. In addition to this, the hill ranges of northern Eastern Ghats separate the type localities of *Conothele varvarti* and the new species. Rivers and hill ranges have been identified as biogeographic barriers for many taxa (Mani, 2012) and in this case too as most mygalomorph spiders have low dispersal abilities (Raven, 1985), especially in wet zones species (pers. obs).

Siliwal et al (2009) reported *Conothele varvarti* from Karlapat Wildlife Sanctuary based on two immature specimens (WILD-07-ARA-167, 168). This locality is 400km southwest of the type locality of *Conothele varvarti* and 140km from the type locality of *Conothele purvaghati* sp. nov. (straight line distance). Identification of immature specimens is not possible and the identity of the population of *Conothele* from Karlapat Wildlife Sanctuary is called into doubt. Discovery of *C. chinnarensis* from the Western Ghats of Kerala and *C. ogalei* from Amboli, Maharashtra suggests that the genus is widespread across India and dedicated surveys in unsampled areas across Indian peninsula will most likely yield additional undescribed species of the genus.

The new discovery adds to our growing knowledge of the biodiversity of the Eastern Ghats and warrants dedicated efforts to document the faunal diversity of the region.

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