



## Note on *Thereuopoda longicornis* (Fabricius, 1793) (Scutigermorpha: Scutigeridae) from Kerala, India

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**ABSTRACT:** Description and variations of *Thereuopoda longicornis* (Fabricius, 1793) from Kerala, India, with a key to two widespread species of the genus is provided. It is the first attempt to describe a scutigermorph centipede from Kerala, and one of very few, from India.

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**KEYWORDS:** Centipede, Chilopoda, Scutigermorpha, *Thereuopoda*, first description

Being a tropical country with four biodiversity hotspots, India is home to all kinds of centipedes, except the order Craterostigmomorpha (Palita, 2016). But there have been no comprehensive contributions ever made to the taxonomy of order Scutigermorpha in India. The genus *Thereuopoda* Verhoeff, 1904 comprises two geographically widespread species, i.e., *T. clunifera* and *T. longicornis*, each showing significant morphological variations across regions (Würmli, 1979). Scutigermorphs are unique among centipedes in terms of their distinctive features such as compound eyes, multisegmented tarsi, dorsal tergal spiracles, domed head capsule, and the mode of deposition of the spermatophore. They are the only living representatives of the subclass Notostigmomorpha. Comprehensive molecular data, along with their unique morphological characteristics have placed them as the sister group of all other centipedes (Muriene *et al.*, 2010). Despite having a worldwide distribution, the Scutigermorpha is the least studied and most poorly documented centipede order under the class Chilopoda, phylum Arthropoda (Negrea, 2003;

Stoev and Geoffroy, 2004; Bonato *et al.*, 2010; Bonato and Zapparoli, 2011).

Globally, scutigermorph diversity stands at around 200 described species. However, further re-examinations of the type specimens have synonymized many of them and reduced the current valid species to about 100 (Würmli, 1979; Stoev and Geoffroy, 2004; Minelli, 2006). The scutigermorph classification was pioneered by Karl Wilhelm Verhoeff in the early 20th century. Currently, this order comprises three families, Scutigeridae, Psellioididae, and Scutigerinidae. The latter two families are comparatively less abundant and their distribution is limited to the Neotropics and tropical Africa (Psellioididae) and Africa and Madagascar (Scutigerinidae) (Koch and Edgecombe, 2006; Edgecombe, 2011). On the other hand, the family Scutigeridae enjoys an extensive distribution across the continents and is further divided into two subfamilies, Scutigerinae and Thereuoneminae (Acosta, 2003; Edgecombe, 2011).

The scutigermorph diversity in India is never been recorded before and the country has recently gained

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momentum in centipede taxonomy, but it is limited to the order Scolopendromorpha (Khanna, 1998; Joshi and Edgecombe, 2018; Joshi *et al.*, 2020). Published data on other chilopod orders like Scutigermorpha, Lithobiomorpha and Geophilomorpha from India are scanty. Order Lithobiomorpha and Geophilomorpha are comparatively better documented globally than Scutigermorpha.

The present paper describes *Thereuopoda longicornis* (Fabricius, 1793), a scutigermorph centipede that belongs to the family Scutigeridae and subfamily Thereuoneminae. The regional description of this species is useful because, Würmli (1979) observed this animal shows extensive morphological transitions at various levels (especially colouration, distribution of pigments, maximum length, shape of the head sutures, and female gonopod). He also argued that the widespread *T. longicornis* is not a homogenous species, as it is the most variable chilopod known until recently. In the same study, he synonymized many specimens from different regions, indicating the regional variation of this species. A distribution map (Würmli, 1979, fig. 26) indicates several widely distributed records of *T. longicornis* in India, including Kerala.

The specimen was obtained from Mayiladummugal, Thekkada (8°37'57.1"N; 76°57'19.8"E, elevation 128m above MSL), a village area located 23 km away from Ponmudi (the nearest stretch of the Western Ghats, 8°46'00.2"N; 77°06'41.0"E). The sampling site is a rocky area surrounded by rubber monoculture. Active searching in the possible hideouts within the selected quadrant (10x10 m) exposed the centipede under a rock (Fig. 1). The animal was captured alive and brought to the lab without losing any appendages. After microscopic examination (Labomed – Luxeo 6z), the specimen was preserved in alcohol (70%) and deposited in the museum of the Department of Zoology, University of Kerala. The identification was done by using the taxonomic key published by Würmli (1979).

### Description

Length: 25 mm, total body segments - 15 (mature), sex- female (Fig. 2A, D)

Head: Globular slightly longer than wide. Large laterally placed eyes composed of many faceted ommatidia. Flagelliform antennae composed of a scape and three sections (flagella) composed of a large number of annuli, separated from each other by a node. The antennal annuli wider than long. The cephalic sutures have a characteristic “dog-leg” kink with their posterior part deflected outwards, and then the anterior part kinked inwards (Fig. 2B). The cephalic plate has a pale-yellow colour with dark greenish-brown patches at the center, on the anterolateral sides of the cephalic sutures, and behind the eyes. On the ventral side, the anterior margins of the coxites provided with four long spine bristles (Fig. 2G). A similar spine bristle also found at the trochanteroprefemurs of the forcipules.

Tergites: A brownish median longitudinal stripe passes along the tergites flanked by dark greenish-brown colouration on the lateral sides. The spiracles on the posterior ends of tergites long, with two swollen orange-brown stoma saddles on either side (Fig. 2F). The stigmatotergites elongated and have “shouldered” posterolateral margins rather than evenly rounded (two projecting swellings behind the stoma saddles) (Fig. 2E). The spines on the stigmatotergites strong and abundant (medially and on the stoma saddles) except the first, which has low spine count.

Legs: Length of legs increases from the anterior to the posterior (Fig. 2A). Each leg comprises six segments, including coxa, trochanter, prefemur, femur, tibia, and tarsi (I&II). On the ventral side, the coxa of each leg is provided with a long spine bristle. The distal ends of the prefemur, femur, and tibia of legs 1 to 14 are provided with spine bristles. The tarsi of walking legs are extensively divided into many annuli and form a long flagellum. The flagella of these legs (1 to 14) terminate with an apical claw. The ultimate legs are inserted parallel to the body axis and do not have apical claws.

Gonopods: Maximum length 1.3 times maximum width (ratio A/B of Würmli 1973, fig. 1). Proarthron 1.4 times length of mesarthron (ratio C/D of Würmli 1973). The sinus between mesarthron broadly parabolic. Width of mesarthron 0.5 maximum width



Fig. 1 Location and habitat type of *Thereuopoda longicornis*

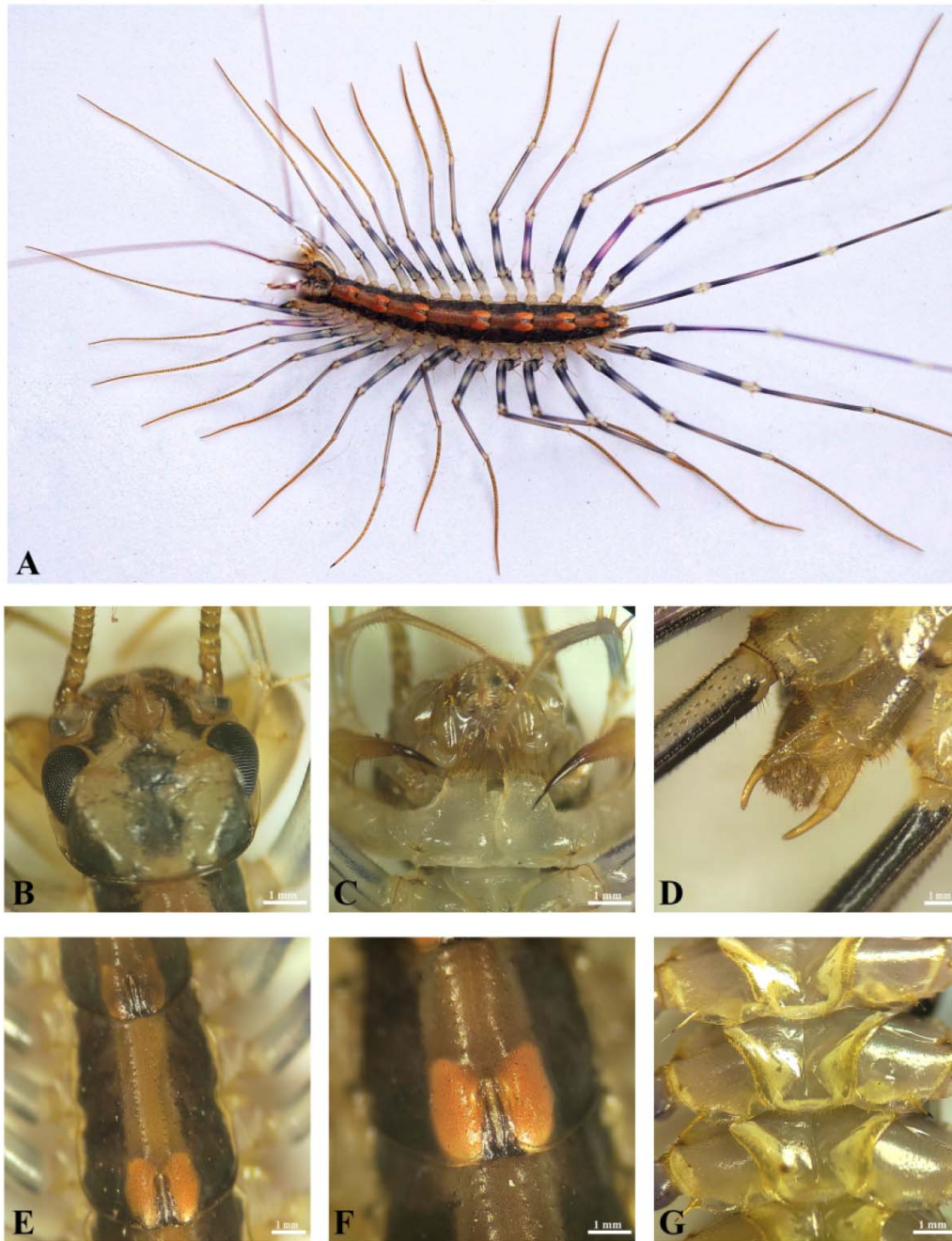


Fig. 2 *Thereuopoda longicornis* and parts

- |  |   |
|--|---|
| A - <i>Thereuopoda longicornis</i>                                   | D - The female gonopods                     |
| B - Cephalic plate and proximal part of antennae, dorsal view        | E - Tergite (4 <sup>th</sup> ), dorsal view |
| C - Head ventral view showing the long spine bristles on the coxites | F - Stoma saddles                           |
|  | G - Sternites, ventral view                 |

of sinus (ratio F/G of Würmli 1973). Proarthron + Mesarthron 1.25 times length of metarthron (ratio C+D/E, Würmli 1973).

Assignment of the specimen to *Thereuopoda* is based on the kinked cephalic sutures, spines on anterior stigmatotergites, vaulted stoma saddles, straight ventral margin of the female subanal plates, and divergent metarthron of the female gonopods. Würmli (1979) delimited two geographically widespread species of *Thereuopoda*, i.e., *T. longicornis* and *T. clunifera* and considered the posterior border of tergites, the degree of divergence of the gonopods, colouration, the longitudinal stripe on the tergites, and the shape of female subanal plates as delimiting criteria. The present specimen has a pale-yellow cephalic plate with dispersed greenish-brown patches. The anterior ends of the head sutures show slight inward kink. The longitudinal stripe on tergites has apparent brown colouration rather than being colourless. Stoma saddles have a strong orange colouration that makes them prominent. These features not static as they vary in different regions, i.e., the strong inward kink of head sutures and colourless longitudinal median stripe in other variants (Würmli, 1979).

**Key for the identification of two wide spread species of *Thereuopoda* (Würmli, 1979)**

1. The posterior border of the tergites is evenly rounded; the gonopods often diverge less, more slender; in general blue-green with less brown pigments; there are no unpigmented longitudinal stripes on the tergites; the pigment is cloudy on the lateral thirds of the tergites, and they are lacking in greater rounded places; female subanal plates do not have appendixes.....  
*Thereuopoda clunifera* (Wood, 1862).
2. The posterior border of the tergites is unevenly rounded; the gonopods diverge more and are larger; colouration is brown to or dark brown, sometimes with blue-green pigment, especially in juveniles; a longitudinal stripe on the tergites is without pigmentation; the female subanal plates often have an appendix .....

.....*Thereuopoda longicornis* (Fabricius, 1793)

Indian terrain supports different types of centipedes. Scutigermorph taxonomy is still a puzzle and demands more robust contributions.

**ACKNOWLEDGEMENTS**

Authors are grateful to Dr. Gregory D. Edgecombe, Natural History Museum, London for the immense help in the identification and for providing valuable resources. Authors also extend sincere gratitude to UGC for providing the funds (JRF Fellowship) for conducting the research. The fieldwork assistance by S. Anaswara, P. Nandu, and A. Muhammed is gratefully acknowledged.

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(Received March 03, 2022; revised ms accepted June 26, 2022; published June 30, 2022)