



A new species of centipede of the genus *Cryptops* Leach (Scolopendromorpha: Cryptopidae) from southern Western Ghats with a key to the species of *Cryptops* in India

Dhanya Balan¹, P.M. Sureshan² & Vinod Khanna³

^{1,2}Western Ghat Regional Centre, Zoological Survey of India, Calicut, Kerala 673006, India

³SaiDrishti, 151, AshokVihar, Salawala, Dehra Dun, Uttarakhand 248001, India

Email: ¹dhanyamkrishna@gmail.com (corresponding author), ²pmsuresh43@yahoo.com, ³drvkhanna51@gmail.com

Abstract: A new species of blind cryptopid centipede of the genus *Cryptops* Leach belonging to the *hortensis* group viz. *Cryptops* (*C.*) *malabarensis* is described from the southern Western Ghats, Kerala, India and the family Cryptopidae (Scolopendromorpha) is reported for the first time from the area. Affinities of the new species with a Madagascar species are discussed and a key to separate the Indian species of *Cryptops* is also provided.

Keywords: Chilopoda, Cryptopidae, *Cryptops malabarensis* sp. nov, key, new species, Scolopendromorpha, southern Western Ghats.

The Western Ghats in India, with its very diverse assemblage of flora and fauna is one of the hotspots of biodiversity (Myers et al. 2000). With a few exceptions, the invertebrate fauna of the Western Ghats has been inadequately studied both in terms of their diversity and conservation priorities (Kunte in press). Though an integral part of the soil ecosystems, the fauna of scolopendromorph centipedes (Chilopoda: Scolopendromorpha) of the Western Ghats is still little known except for the pioneering works by Attems (1930), Jangi & Dass (1984), Yadav (1993) and Sureshan et al. (2006). A perusal of the literature reveals the occurrence of 40 species of scolopendrid centipedes belonging to eight genera and two families in the Western Ghats. Like the families Plutonidiumidae and Scolopocryptopidae and the order Geophilomorpha, the family Cryptopidae are blind centipedes, lacking ocelli. *Cryptops* Leach, 1815, is the largest genus of the family Cryptopidae, with 153 named species worldwide (Lewis 2002), in four subgenera i.e., *C. (Cryptops)* Leach, 1815; *C. (Chromatonops)* Verhoeff, 1906; *C. (Haplocryptops)* Verhoeff, 1934 and *C. (Trigonocryptops)* Verhoeff, 1906 (Bonato et al. 2011). The smaller size and fragile body, coupled with an abundance of species names, often founded on inadequate samples and with imprecise descriptions, make cryptopid centipedes a taxonomically difficult group and only seven species in two genera have so far been described from India. The Indian species of *Cryptops* are *Cryptops* (*C.*) *faeae* Pocock, 1891, *Cryptops* (*C.*) *doriae* Pocock, 1891, *Cryptops* (*C.*) *kempi* Silvestri, 1924, *Cryptops* (*C.*) *setosior* Chamberlin, 1959 and *Cryptops* (*Trigonocryptops*) *orientalis* Jangi, 1955 (Khanna 2005, 2008).

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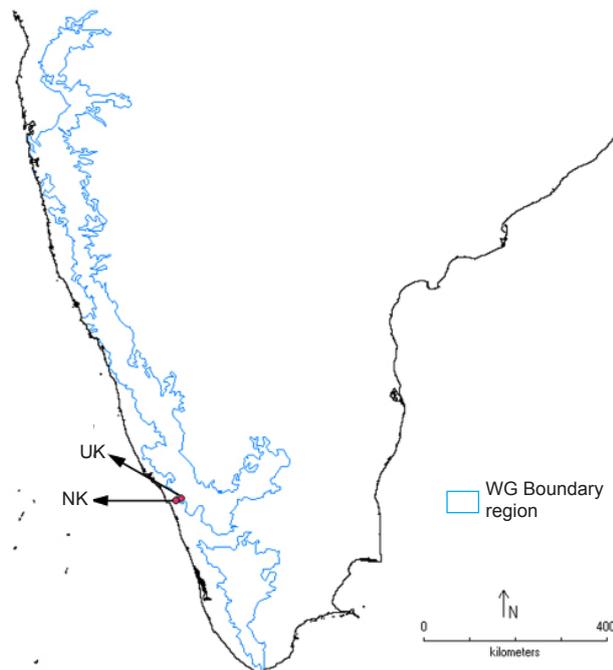


Figure 1. Location of the Western Ghats in southern India with the two localities of *Cryptops malabarensis* sp.nov. indicated by coloured circles. UK - Urakkuzhy, Malabar Wildlife Sanctuary; NK - Narayankulam.

Materials and Methods

During the faunal exploration surveys, interesting specimens of cryptopids were collected from the forested tracts of southern Western Ghats and its foot-hills (Fig. 1). The collections represent the first record of the family Cryptopidae from the area and permit the description of a new species of *Cryptops*. The new species shows very close affinity with *C. decoratus* Lawrence, 1960, which has its distribution in Madagascar (holotype), Mauritius (Lewis 2002), and the Seychelles (Lewis 2007). The specimens are deposited in the Zoological Survey of India, Western Ghat Regional Centre, Calicut (ZSIC), Kerala, India.

Digital imaging was carried out using a Leica M205A stereomicroscope and a Leica DFC-500 digital camera. Scanning electron micrographs were captured with a Jeol JCM-5000 Neoscope bench-top SEM. The terminology used by Bonato et al. (2010) is followed in this paper.

Cryptops (Cryptops) malabarensis sp. nov. (Figs. 2-3 and Images 1-5)

Material examined

Holotype: 01.viii.2011, 11°32'40.59"N & 75°55'33.40"E, elevation 641.2m, Urakkuzhy, Kakkayam, Malabar Wildlife Sanctuary, Kerala, India, coll. Dhanya Balan, (ZSI/WGRC/I-R/INV 2111) (Images 1-5).

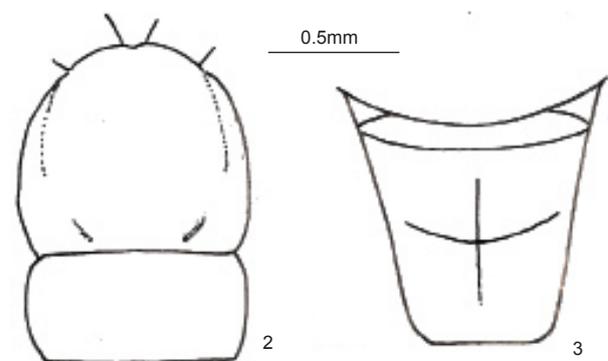
Paratypes: 29.viii.2011, three specimens, from type locality, coll. Dhanya Balan (ZSI/WGRC/I-R/INV 2080, 2108, 2109); 01.iv.2011 two specimens, 11°30'26.98"N & 75°48'24"E, elevation 145m, Narayankulam, Calicut District, Kerala, India, coll. P.K. Umesh (ZSI/WGRC/I-R/INV 2079).

Diagnosis: A species of *Cryptops* lacking anterior transverse suture on Tergite-1; tergite paramedian sutures from tergite 4 or 5-20; absence of saw teeth on the ultimate femur (*C. hortensis* group); ultimate leg tibia with 4-7 saw teeth on the tibia and 3-4 on tarsus one; no accessory spurs associated with the tarsal claw.

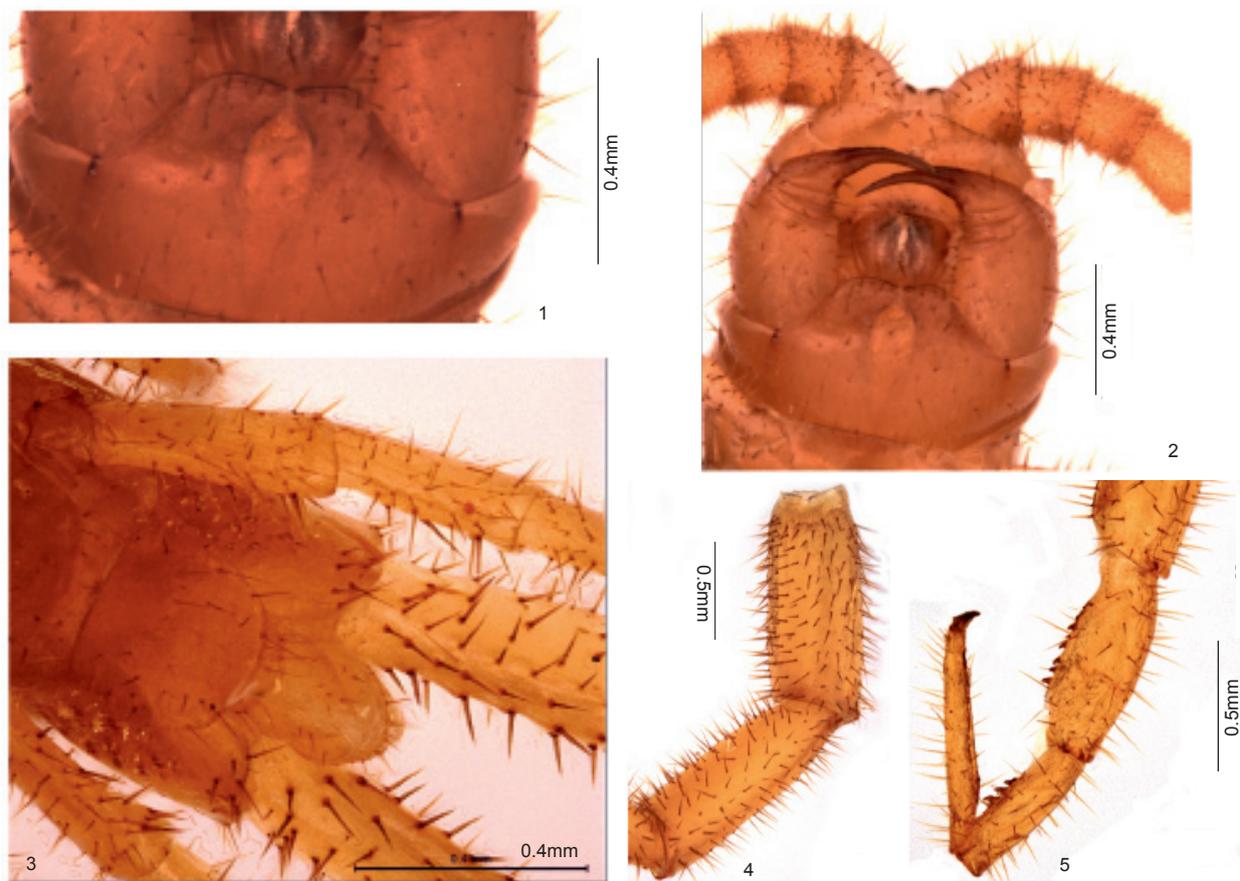
Description of holotype

Body length 23mm. Colour (before and after preservation) greyish-brown with dark subcutaneous pigment on tergites. Ultimate legs yellow.

Antennae composed of 17 articles; basal two articles relatively stout with long setae distally. An irregular whorl of long setae on the proximal end of articles 1-3, the rest with setae scattered irregularly, not in whorls but the dorsal middle region is not densely covered. Short, fine setae abundant from 6th



Figures 2-3. *Cryptops (Cryptops) malabarensis* sp. nov. (ZSI/WGRC/I-R/INV 2108)
2 - Cephalic plate and Tergite-1; 3 - Sternite suture



Images 1–5. *Cryptops (Cryptops) malabarensis* sp. nov. (ZSI/WGRC/I-R/INV 2109). © WGRC, ZSI, Calicut
 1 - Forcipular coxosternum; 2 - Cephalic plate ventral; Sternite-21; Prefemur and femur; Tarsus and tibia

article onwards (Images 4 & 5).

Cephalic plate and tergite one without sutures, tergite one overlying the posterior edge of the cephalic plate (Fig. 2). Anterior edge of forcipular coxosternite weakly bilobed (Image 1) and with four long and one small setae on each side. Tergite paramedian sutures from tergite 4 or 5–20. Tergite 21 without sutures and with slightly angular posterior margin. Sternites with longitudinal and transverse sulci, longitudinal sulci longer than the transverse (Fig. 3). Sternite 21 with sides converging very slightly and straight posterior margin (Images 2 & 8). Legs 1–19 with undivided tarsi. No accessory spurs associated with the tarsal claw (Image 9).

Coxopleuron with nine large pores and with at least three minute setae in porefield; three or four fine setae on posterior margin and upto five between this and porefield. Posterior area of coxopleuron is poreless.

Leg 20 with dense fine setae ventrally on prefemur, femur and tibia in all specimens. Ultimate legs with

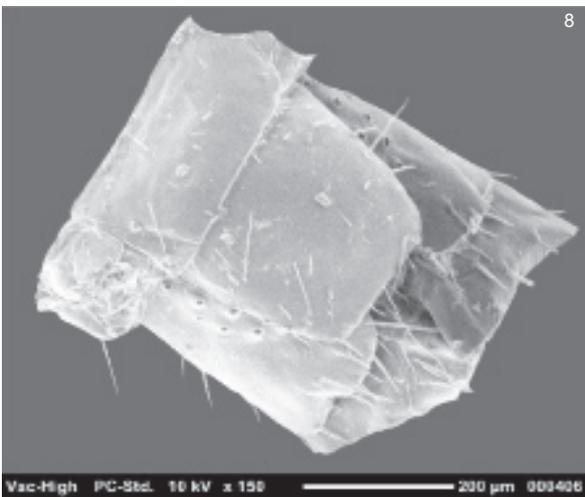
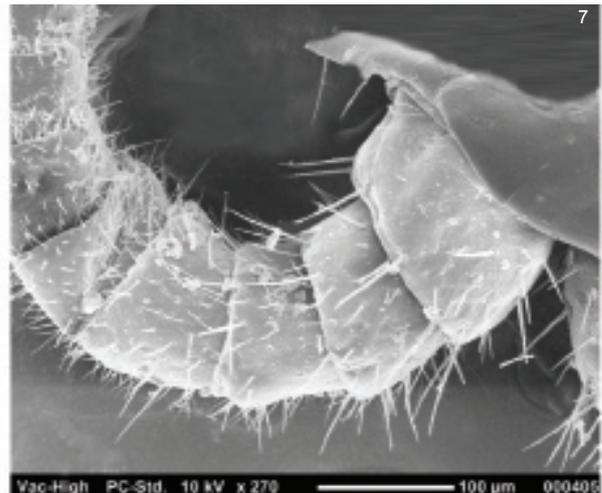
strong setae on anterior, ventral and posterior surfaces of prefemur and on ventral and posterior surfaces of femur. Median longitudinal glabrous area absent. No distal tubercle on tibia and tarsus. No saw tooth on the femur (Image 4); seven on the tibia and three on the tarsus 1 (Image 3).

Additional information from paratypes

Body length of paratypes varies between 11–21 mm. Antennae of leftside is damaged in 2079. When compared to the holotype, the number of saw teeth on the ultimate leg tibia varies from four (2079), five (2080) or six (2108, 2109) and on tarsus 1 the variation is either three (2080, 2108, 2109) or four (2079) saw teeth. The number of coxopleural pores are not clearly countable.

Etymology

The species is named after the type locality “Malabar Wildlife Sanctuary”, Kerala, India.



Images 6–9. *Cryptops (Cryptops) malabarensis* sp. nov. (ZSI/WGRC/I-R/INV 2080). © WGRC, ZSI, Calicut
 6 - Dorsal view of antenna; 7 - Basal antennal articles; Sternite-21; Pretarsus of leg from middle trunk

Table 1. Ecological observations from the sampling sites

Physiographic category	Midland	Highland
Sampling sites	Narayankulam	Kakkayam
Altitude	145m	641m
Atm. temp	24–30 °C	19–28 °C
Distance from water source	120m	75m
Type of vegetation	agro ecosystem near a semi deciduous forest patch	moist deciduous forest
Soil temperature	23–27°C	15–25°C
soil pH	4.91	4.76
Org. Carbon	3.12	9.15

Ecological observations

Habitat: The specimens were collected from moist deciduous forest tracts of southern Western Ghats. All specimens were found in loose soil, about 4–5 cm below the surface. Ecological parameters of the two collection localities during the period of March–April 2011 are provided in Table 1.

Discussion

Cryptops malabarensis sp. nov. is conspicuously different from the other described Indian species of *Cryptops* included in the *C. doriae* group (having saw teeth on the ultimate leg femur); and falls in the Old World *C. hortensis* group of Lewis (2011) (those lacking saw teeth on the ultimate leg femur), which have not yet been reported from India. *C. malabarensis* sp. nov. closely resembles *C. decoratus* Lawrence (1960), which is also

Key to the *Cryptops* species of India

1. Sternites, at least on some anterior segments with trigonal sutures (Subgenus *Trigonocryptops*) *C. (T) orientalis* Jangi
- Sternites without trigonal sutures (Subgenus *Cryptops*) 2
2. Ultimate leg femur with saw teeth 3
- Ultimate leg femur without saw teeth *C. malabarensis* sp. nov.
3. Tergite 1 with an anterior transverse suture. *C. kempii* Silvesteri
- Tergite 1 without anterior transverse suture. 4
4. Each side of forcipular coxosternite convex and with 12 submarginal setae *C. setosior* Chamberlin
- Each side of forcipular coxosternite only slightly convex with 3 or 4 long and one or 2 small setae *C. doriae* Pocock

a member of the Old World *C. hortensis* group. The two species share the absence of sutures on the cephalic plate and tergite one; anterior margin of coxosternite almost straight, an overlapping number of coxopleural pores (7–9), a similar number of setae in the porefield (at least three) and ultimate leg characters such as prefemur with long fine setae dorsally, absence of a median longitudinal glabrous area, tibia with four and tarsus 1 with two saw teeth. However the new species differs from the holotype description of *C. decoratus*, in having no median ridges on the tergites, no posterior median depression on tergite 21 and the absence of accessory spurs on the pretarsi. *C. decoratus* is a Malagasy species closely related to *C. melanotypus* Chamberlin, 1941 from the Philippines, Mauritius and the Seychelles but Lewis (2011) was unsure of their exact status. However, the strong similarity between the new species and *C. decoratus* and *C. melanotypus* suggests dispersal of a group of closely allied species over a wide area.

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