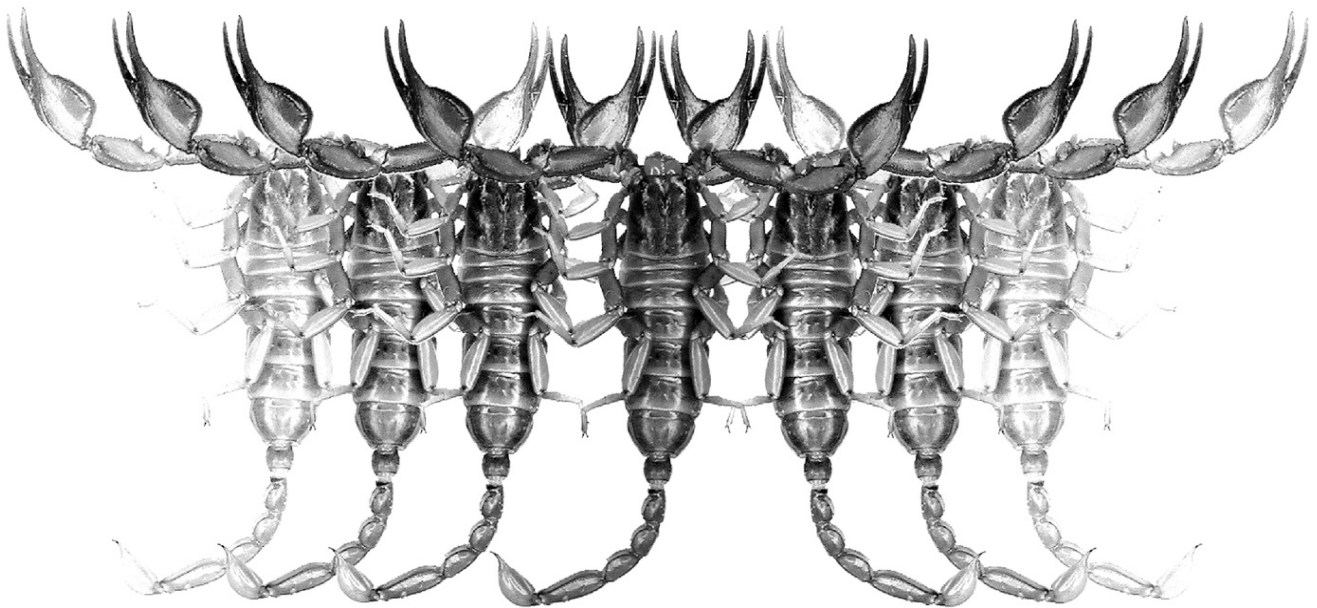


Euscorpius

Occasional Publications in Scorpiology



**A new species of *Chiromachetes* Pocock, 1899
(Scorpiones: Hormuridae) from southern
Western Ghats, India**

**Akshay Khandekar, Tejas Thackeray, Swapnil Pawar, Satpal
Gangalmale & Vivek Waghe**

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A new species of *Chiromachetes* Pocock, 1899 (Scorpiones: Hormuridae) from southern Western Ghats, India

Akshay Khandekar^{1,2,*}, Tejas Thackeray¹, Swapnil Pawar¹, Satpal Gangalmale¹ & Vivek Waghe¹

¹Thackeray Wildlife Foundation, Mumbai, 400051, India

²Department of Zoology, Shivaji University, Kolhapur, 416004, India

*Corresponding author. akshaykhandekar555@gmail.com

<http://zoobank.org/urn:lsid:zoobank.org:pub:5A443AC9-B88F-4F84-9147-BD1D93C791A9>

Summary

A new species of the genus *Chiromachetes* Pocock, 1899 (Hormuridae Laurie, 1896) is described based on a single male and two female specimens collected from Agasthyamalai Mountains in Kalakad-Mundanthurai Tiger Reserve, southern Western Ghats, India. The new species can be easily distinguished from all five known congeners by combination of non-overlapping morphological characters such as chela length-width ratio, femur length-width ratio, chela length-movable finger length ratio, the number of pectinal teeth, and subtle color differences of both the sexes respectively. *Chiromachetes agasthyamalaiensis* sp. n., represent the sixth described species, the fifth from the Western Ghats, and the first to be reported from the state of Tamil Nadu of this peninsular Indian endemic genus.

Introduction

The family Hormuridae Laurie, 1896 has experienced complex taxonomic history in last three decades or so (Lourenço, 1985, 1989; Fet et al., 2000; Soleglad & Fet, 2003b; Monod & Prendini, 2014). It was previously recognized as a subfamily under the family Hemiscorpiidae Pocock, 1893 (Soleglad et al., 2005) until recently, Monod & Prendini (2014) elevated it to the family. The family Hormuridae currently includes 11 genera and 95 species worldwide (Ythier & Richard, 2020; Rein, 2022). In India, the family is represented by three genera, namely: *Liocheles* Sundevall, 1833 (three species), *Iomachus* Pocock, 1893b (five species), and *Chiromachetes* Pocock, 1899 (five species) (Pocock, 1900; Lourenço, 1997; Tikader & Bastawade, 1983; Rein, 2022).

The genus *Chiromachetes* was described by Pocock, 1899 to accommodate a new species, *C. fergusonii* Pocock, 1899 on the basis of three spines on tarsomere II of all legs. Subsequent workers treated *Chiromachetes* as a valid genus (Sreenivasa-Reddy, 1968b; Tikader & Bastawade, 1983). However, Lourenço (1985) raised doubts about its validity by stating that this monotypic genus was described based on single female specimen without sufficient morphological differences. Sissom, (1990) followed this decision and excluded both genus and species from his work. A decade later, Lourenço (1997) himself revalidated the genus, described a new species from Tirupati and provided detailed hemispermatophore morphology of the new species. Presently, this peninsular Indian endemic genus is reported only from four Indian states

with maximum number of species described from northern Western Ghats of Maharashtra: *C. sahyadriensis* Mirza, Sanap & Zambre, 2015 from Tamhini Ghat; *C. parakrami* Sulakhe et al., 2020 from Amba Ghat; and *C. ramdasswammii* Sulakhe et al., 2020 from Varandha Ghat (Mirza et al., 2015; Sulakhe et al., 2020). Remaining two species, *C. fergusonii* Pocock, 1899, described from 'Trivandrum' in Western Ghats of Kerala and later reported from state of Gujarat, and *C. tirupati* Lourenço, 1997 from Tirupati, Andhra Pradesh (Pocock, 1899, 1900; Sreenivasa-Reddy, 1968a; Tikader & Bastawade, 1983; Lourenço, 1997; Bhatt & Patel, 2013; Sulakhe et al., 2020).

During the recent arachnid survey in Tamil Nadu state, we collected a few scorpions from multiple habitats, across elevational ranges in Kalakad-Mundanthurai tiger reserve, Tirunelveli District. Out of which, three scorpions collected from rock crevices in Agasthyamalai mountain were tentatively identified as genus *Chiromachetes* based on presence of three spines on tarsomere II of all legs. A detailed morphological examination revealed that the specimens differ from the five known species by a combination of non-overlapping characters such as, chela length-width ratio, femur length-width ratio, chela length-movable finger length ratio, pectinal teeth count, and color patterns. In this paper, we describe them as a new species based on their distinctive morphology.

Material & methods

Scorpions were collected during both day and night surveys from rock crevices, locality data were recorded by using Google Maps, live specimens were photographed of



Figure 1. *Chiromachetes agasthyamalaiensis* sp. n., in vivo habitus (an uncollected male from the type locality).

using Canon 80D DSLR camera mounted with canon 100 mm macro lens and a canon speed-lite external flash. The specimens were euthanized using isoflurane, preserved in 8% formaldehyde for ~12 hours, washed and kept in tap water for ~24 hours, and then transferred into 70% ethyl alcohol for long term storage. All three specimens of the new species were examined under ZEISS Stemi 305 stereo dissecting microscope; measurements were made using Mitutoyo digital vernier caliper (to the nearest 0.01 mm). Method for calculating median eye ratio: distance measured from posterior edge of median eyes up to posterior margin of carapace, divided by a distance measured from anterior edge of median eyes up to anterior margin of carapace. Nomenclature and measurements follow Stahnke (1971) and Sissom (1990) except for cheliceral dentition that follow

Vachon (1963), trichobothria that follow Vachon (1974), metasomal carination that follow González-Santillán & Prendini (2013), sternum that follow Sologlad & Fet (2003a) and lateral eyes that follow Loria & Prendini (2014). Abbreviations are as follows: Lt = left, Rt = right, L = length, W = width; trichobothria: *d* = dorsal, *i* = internal, *V* = ventral, *Db/db* = dorsal basal, *dsb* = dorsal subbasal, *Dt/dt* = dorsal terminal, *em* = exterior medial, *Eb/eb* = exterior basal, *Esb/esb* = exterior subbasal, *Et/et* = exterior terminal, *Est/est* = exterior subterminal (capital letters are assigned to the surfaces of the chela manus and lowercase letters to the fixed finger). Specimens are deposited in the Museum and Research Collection Facility at National Centre for Biological Sciences, Bengaluru (NRC-AA) and Bombay Natural History Society, Mumbai (BNHS).

Dimensions (mm)		<i>C. agasthyamalaiensis</i> sp. n.	<i>C. agasthyamalaiensis</i> sp. n.	<i>C. agasthyamalaiensis</i> sp. n.
		♂ holotype	♀ paratype	♀ paratype
Carapace	L / W	8.56 / 9.39	9.28 / 10.59	10.22 / 11.41
Mesosoma	L	25.36	27.84	30.03
Tergite VII	L / W	5.53 / 5.65	6.02 / 7.27	6.95 / 7.47
Metasoma + telson	L	30.16	29.48	32.03
Segment I	L / W / D	3.83 / 2.38 / 2.15	3.74 / 2.56 / 2.24	3.98 / 2.61 / 2.35
Segment II	L / W / D	4.28 / 1.91 / 2.19	4.08 / 1.98 / 2.27	4.50 / 2.09 / 2.47
Segment III	L / W / D	4.54 / 1.80 / 2.23	4.48 / 1.92 / 2.36	4.94 / 1.98 / 2.43
Segment IV	L / W / D	5.13 / 1 / 73 / 2.02	5.02 / 1.78 / 2.20	5.53 / 1.88 / 2.33
Segment V	L / W / D	6.19 / 1.67 / 2.00	5.99 / 1.78 / 2.18	6.74 / 1.96 / 2.31
Telson	L / W / D	6.19 / 2.13 / 2.31	6.17 / 2.07 / 2.40	6.34 / 2.18 / 2.53
Pedipalp	L	38.69	40.08	42.63
Femur	L / W	10.24 / 3.78	10.02 / 4.09	10.74 / 4.41
Patella	L / W	9.77 / 4.69	9.94 / 5.13	10.54 / 5.61
Chela	L / W / D	18.68 / 5.06 / 3.34	20.12 / 6.09 / 3.73	21.35 / 6.44 / 4.12
Movable finger	L	9.66	10.62	11.65
Total	L	64.40	66.76	72.25
Pectinal teeth count	Lt / Rt	7 / 7	5 / 6	4 / 5
Fulcrum count	Lt / Rt	7 / 7	5 / 6	4 / 5
Middle lamellae count	Lt / Rt	1 / 1	2 / 2	2 / 3
Marginal lamellae count	Lt / Rt	3 / 3	3 / 3	3 / 3
Denticles of movable finger	inner / outer	54 / 64	52 / 63	57 / 62

Table 1. Mensural and meristic data of the holotype and paratypes of *Chiromachetes agasthyamalaiensis* sp. n. Abbreviations given in the Materials and Methods except for Length (L), Width (W), Depth (D), Anterior width (Wa), Posterior width (Pa).

Systematics

Hormuridae Laurie, 1896

Chiromachetes Pocock, 1899

Chiromachetes agasthyamalaiensis sp. n.

(Figures 1–25; Table 1)

<http://zoobank.org/urn:lsid:zoobank.org:act:B9199D5D-EE84-45DF-AB46-54A9A561A6E9>

TYPE LOCALITY AND TYPE DEPOSITORY. India, Tamil Nadu, Tirunelveli District, Agasthyamalai Mountains; 8.6362 N 77.2446 E; ca. 1150 m a. s. l.; NCBS & BNHS.

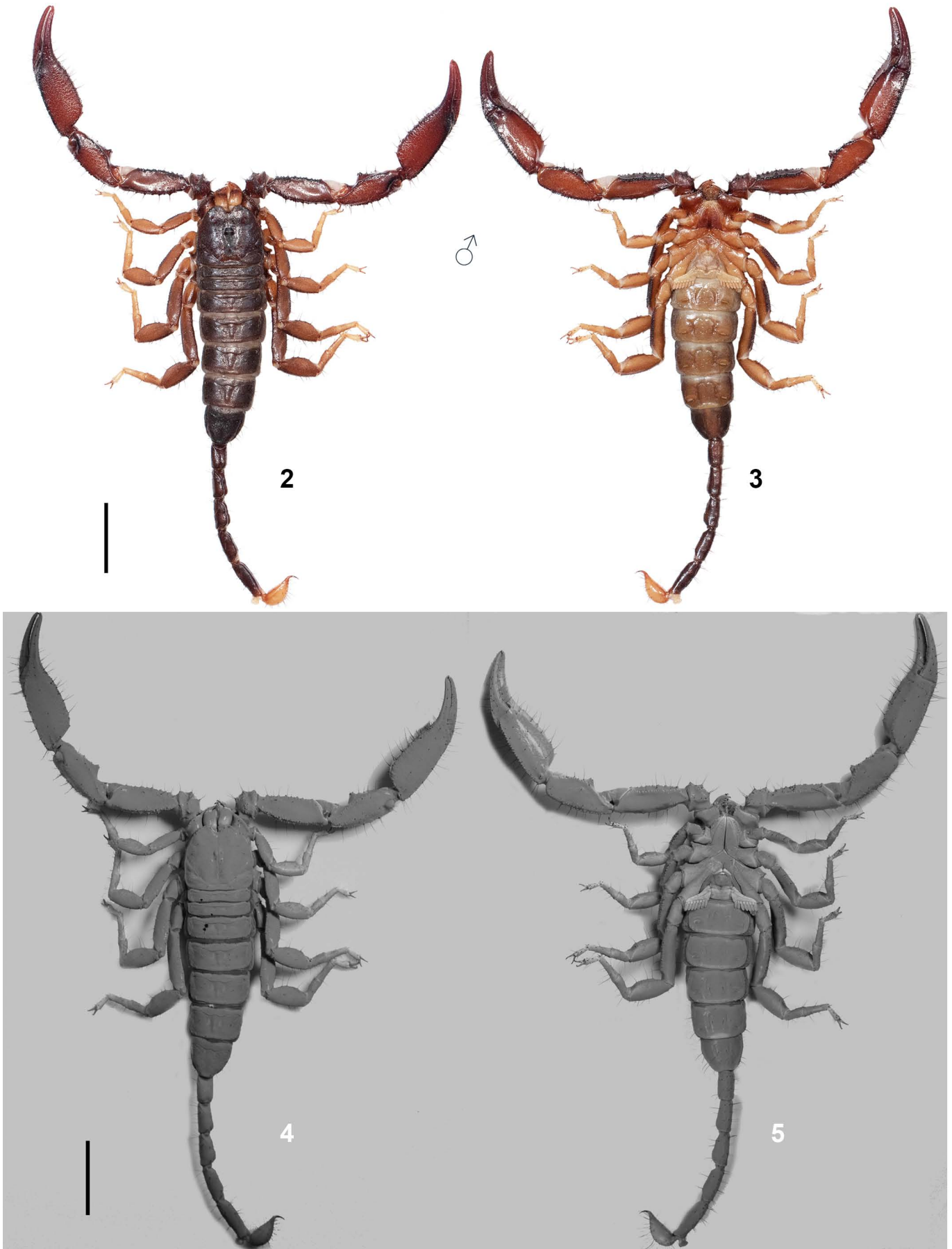
TYPE MATERIAL. India, Tamil Nadu, Tirunelveli District, Agasthyamalai Mountains; 8.6362 N, 77.2446 E; ca. 1150 m a.s.l., 1♂ (holotype, NRC-AA-1189; AK-SC-420), 1 (paratype, NRC-AA-1190; AK-SC-421), 1♀ (paratype, BNHS SC 173; AK-SC-423), 23 April 2021; all types leg. A. Khandekar & team.

ETYMOLOGY. The specific epithet is a toponym for the Agasthyamalai Mountains in Kalakad-Mundanthurai Tiger Reserve in Tirunelveli District of Tamil Nadu, the type and currently the only known locality for this species.

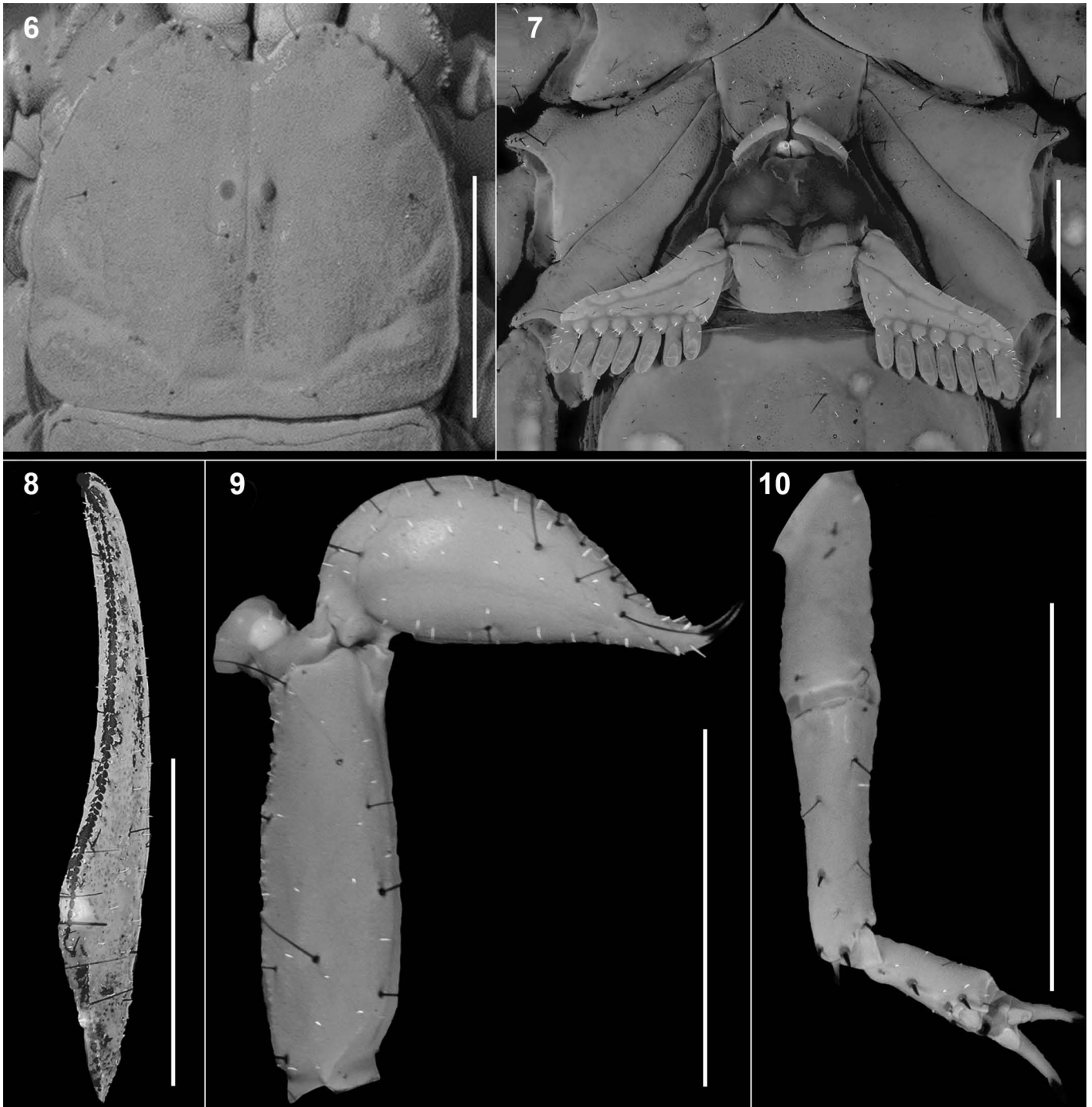
DIAGNOSIS. Medium-sized, 64–73 mm long ($n=3$); overall coloration of body and pedipalp reddish brown, all legs and sternites light brown, much paler than body, vesicle yellowish; median eyes situated on anterior portion of the carapace in the ratio 1:1.8; tergite I inconspicuously elevated medially, tergite II slightly elevated medially, and III–VI moderately so, all tergites densely punctuated; seven pectinal teeth in male ($n=1$) and 4–6 in females ($n=2$) on either side respectively; all metasomal segments longer than wide in both the sexes; movable fingers of chela pedipalps with two rows of granules, 52–57 inner denticles and 62–64 outer denticles; femur and patella of pedipalps with four granular carinae, chela with five granular carinae; femur length-width ratio 2.7 in male and 2.4 in females, chela length-width ratio 3.7 in male and 3.3 in females, chela length to movable finger length ratio 1.8 in male and 1.9 in females.

DESCRIPTION (♂ holotype, Figs. 2–5). Measurements are given in Table 1.

Coloration. (Figs. 1–3, 18–21) Carapace reddish brown, area between median eyes and around the lateral eyes speckled with darker pigments. Chelicerae reddish brown with brownish fingers and much darker denticles. Mesosomal tergites reddish brown except, segment VII which is much darker than rest. Pectines, genital operculum, and sternum light yellow, paler than vesicle. Sternite I pale brown, rest of the sternites



Figures 2–5. *Chiromachetes agasthyamalaiensis* sp. n., male holotype, in dorsal (2, 4) and ventral (3, 5) views under white (2–3) and ultraviolet (4–5) light. Scale bars = 10 mm.

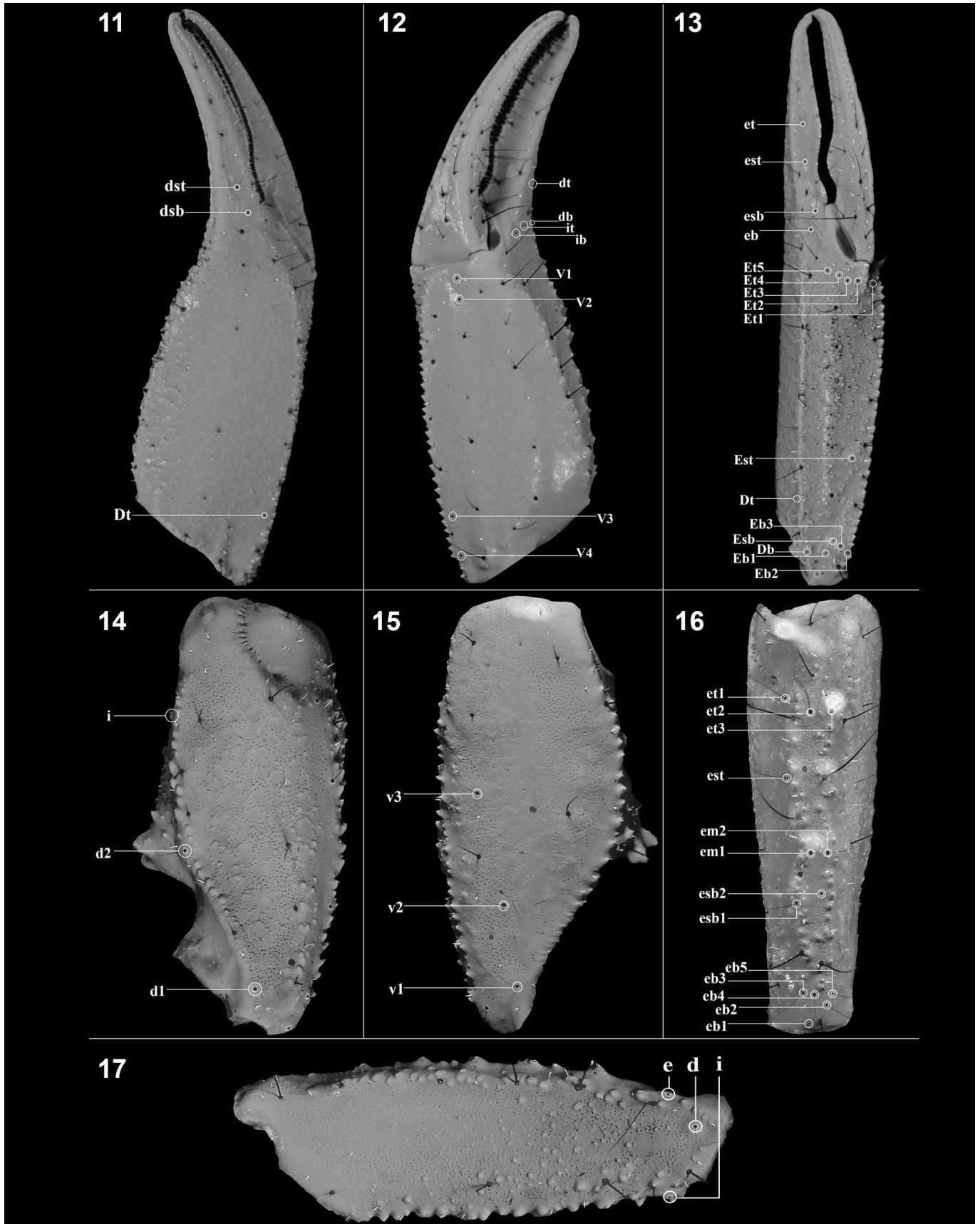


Figures 6–10: *Chiromachetes agasthyamalaiensis* sp. n., male holotype, under UV light. **Figure 6.** Carapace, dorsal view. **Figure 7.** Stemopectinal area. **Figure 8.** Denticles on movable finger. **Figure 9.** Metasomal segment V and telson, lateral view. **Figure 10.** Tibia, Tarsomere I–II of leg III, ventral view. Scale bars = 5 mm.

gradually becoming darker posteriorly. Metasomal segments reddish brown, vesicle yellowish, base of aculeus yellowish brown with reddish brown tip. Femur, patella, chela, and chela fingers of pedipalps reddish brown, all being much darker on the edges. All legs light brown, much paler than body and pedipalp, except for carinae on ventral aspect of femur and patella reddish brown to blackish; all claws reddish brown.

Carapace. (Figs. 2, 4, 6) Carapace wider than long (W/L 1.10), without carinae, anterior portion sparsely granular,

more densely so posteriorly except on furrows and on pair of small median patches between median and lateral eyes; entire carapace moderately punctuated throughout except on furrows and on pair of small median patches between median and lateral eyes. Median lateral furrow shallower than anterior median furrow, posterior median furrow, posterior lateral furrow, and central median furrow; anterior margin with moderately deep 'U' shaped notch. Four pairs of setae on either side of anterior median notch between lateral median



Figures 11–17. *Chiromachetes agasthyamalaiensis* sp. n., male holotype, trichobothrial pattern of the right pedipalp. Chela dorsal (11), ventral (12), and retrolateral (13) views. Patella dorsal (14), ventral (15), and retrolateral (16) views. Femur dorsal (17) view.



Figures 18–21: *Chiromachetes agasthyamalaiensis* sp. n., paratypes. **Figures 18, 20.** Paratype, NRC-AA-1190, dorsal (18), and ventral (20) views. **Figures 19, 21.** Paratype, BNHS SC 173, dorsal (19), and ventral (21) views. Scale bars = 10 mm.

eyes; a single seta behind median and lateral eyes respectively; small median smooth patches between median and lateral eyes on either side. Pair of slightly raised median eyes situated in the ratio 1:1.8 on anterior portion of carapace; with three pairs of lateral eyes.

Chelicerae. (Fig. 2, 4) Cheliceral dentition as typical for family Hormuridae and for genus; four denticles present on movable fingers, fixed fingers with three denticles; basal denticle on fixed fingers bifid.

Mesosoma. (Figs. 2–5) All mesosomal tergites sparsely granular on median portion and becoming more so laterally except one or two small smooth patches on lateral sides, and on median depression on either side of medially elevated portion; tergite I inconspicuously elevated medially, tergites II slightly elevated medially, and moderately elevated on III–VI; all tergites densely punctuated; pretergal portion of all tergites densely punctuated, without granules; setae present on each tergite, six on tergite I, single seta on lateral margin on either side, a single on either side of medially elevated portion, and a pair on posterior margin; 10 setae on tergite II, IV, V, and VI respectively; a pair of setae on lateral margin on either side and on either side of medially elevated portion, and a pair on posterior margin of tergite II; a pair of setae on lateral margin on either side, a single seta on either side of medially elevated portion, and four on posterior margin of tergite IV–VI; six setae on tergite III, all six placed close to posterior margin; eight setae on tergite VII, a pair of setae on lateral margin on either side, and four placed close to posterior margin. All sternites densely punctuated, without granules; pair of median depressions on all sternites; sternites I–IV with a pair of small slit-like stigmata; setae present on each sternite, 16 on sternite I, a single seta on lateral margin on either side, two pairs between furrows, and 10 placed close and along the posterior margin; 20 on sternite II, three setae on lateral margin on either side, four between furrows, a single on either side of furrows and eight on close and along the posterior margin; 18 on sternite III, a pair of setae on lateral margin on either side, four between furrows, single on either side of furrows, and eight placed close and along the posterior margin; 16 on sternite IV, a pair on lateral margin on either side, four between furrows, a single seta on either side of furrows, and six placed closed and along the posterior margin; 12 on sternite V, a pair on lateral margin on either side, four between furrows, and a pair on either side of furrows.

Sternum, genital operculum and pectines. (Figs. 2–5, 7) Sternum pentagonal with inverted T-shaped median furrow on posterior portion, ‘type 1’; moderately punctuated throughout; two pairs of setae on either side of median furrow. Genital operculum divided longitudinally with a pair of genital papillae, each plate semi-circular; more or less smooth, without granulation or punctuation; two pairs of setae on each plate placed on lateral margin on either side. 7/7 pectinal teeth, 7/7 fulcra count, 1/1 middle lamellae; 3/3 marginal lamellae; basal pectinal tooth smallest and increasing in size distally; distal pectinal tooth with one or two microsetae and 5–7 whitish setae, all placed on outer margin; remaining teeth with one

or two whitish setae; fulcra with 1–3 reddish black scattered microsetae; middle lamellae with scattered five or six reddish black microsetae; and marginal lamellae with scattered 2–7 reddish black microsetae. Pectines elongate, extends to coxa-trochanter joint of leg IV.

Metasoma. (Figs. 2–5, 9) All metasomal segments moderately hirsute with whitish and blackish setae, all metasomal segments longer than wide, metasomal segment I distinctly longer than wide (L/W: 1.61), segments II, III, & IV more than two times longer than wide (L/W: 2.24, 2.52 and 2.96 respectively), and segment V more than three times longer than wide (L/W: 3.71). Metasomal segments I–IV lacks carinae except ventral submedian carinae on segments I–IV present merely as depressed ridges; segment V with moderately granular ventral submedian carinae, metasomal segment I sparsely granular on dorsal aspect, few scattered granules present on segments II–V, intercarinal space of segment V granular; all metasomal segments moderately punctuated except few smooth patches present on lateral sides and on furrows; metasomal segment I–III with moderate dorsal median furrow which gradually becomes shallower on segments IV & V respectively.

Telson. (Fig. 9) Telson (except for aculeus tip) densely hirsute with scattered long blackish setae and small whitish setae; vesicle elongated and punctuated throughout; subaculear tooth absent; aculeus short and sharply curved.

Pedipalps. (Figs. 2–5, 8, 11–17) Femur, patella moderately and chela densely hirsute, with reddish brown setae and small whitish setae, both mainly present on internal and external aspects; femur and patella with four granular carinae; prodorsal, retrodorsal, proventral, and retroventral carina present; chela with five granular carinae; single prodorsal, retrodorsal, proventral, retroventral, and promedian carina present. Dorsal aspect of femur sparsely granulated on proximal half, and only a few granules on distal half; prolateral and retrolateral aspects sparsely granulated throughout; ventral aspect without any granules. Dorsal aspect of patella sparsely granulated on proximal half, and only a few granules on distal half; prolateral aspect sparsely granulated with a large protrusion on proximal side, three unequal, blunt spines on the protruded portion, of which upper spine smallest, middle spine almost twice the size than upper, and bottom spine slightly smaller than middle; retrolateral aspect sparsely granulated; ventral aspect without any granules. Dorsal and prolateral aspect of chela sparsely granulated, retrolateral aspect moderately granulated, ventral aspect without any granules. Dorsal and ventral aspect of femur densely, and prolateral and retrolateral aspect sparsely punctuated; dorsal, retrolateral and ventral aspects of patella moderately and prolateral aspect sparsely punctuated. Dorsal and ventral aspect of chela moderately punctuated, and prolateral and retrolateral aspect sparsely punctuated. Movable fingers of chela pedipalps with two rows of denticles, each with 54 inner denticles and 64 outer denticles. Trichobothrial pattern ‘type C’, orthobothriotaxic; number of trichobothria on each segment and aspects as follows (numbers given in parentheses): femur dorsal (1), femur prolateral (1), femur retrolateral (1); patella dorsal (2), patella ventral (3), patella



Figure 22–24. Type locality of *Chiromachetes agasthyamalaiensis* sp. n., view of evergreen forest at Agasthyamalai Mountains (22), view of rocky stream inside the forest from where one paratype was collected at night (23), view of moss-covered boulders inside the forest from where holotype and a paratype were collected during the daytime (24).

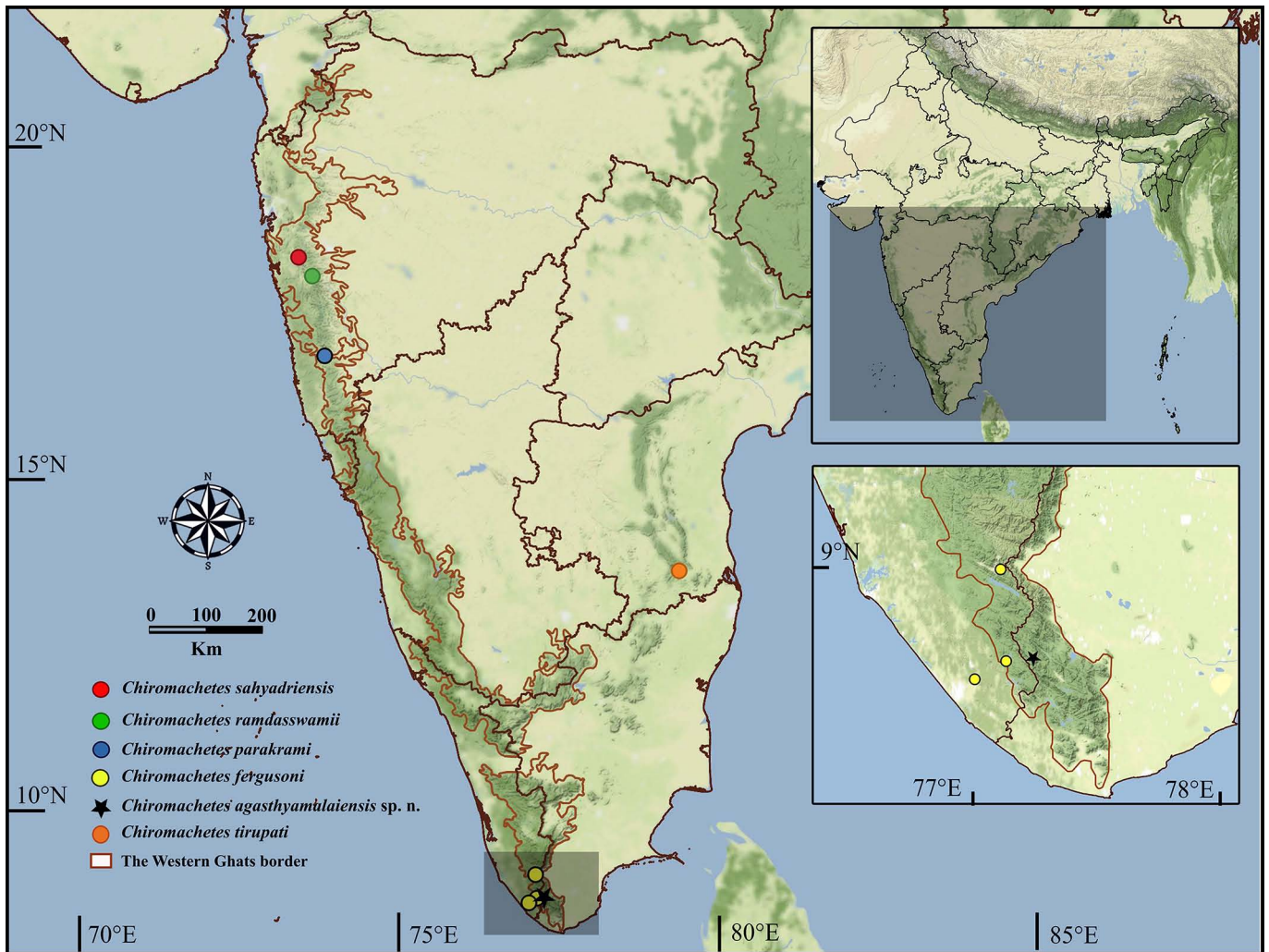


Figure 25. Distribution of *Chiromachetes* in India.

prolateral (1), patella retrolateral (13); chela dorsal (4), chela ventral (4), chela prolateral (2), chela retrolateral (14); total number of trichobothria = 46.

Legs. (Figs. 2–5, 10) All legs sparsely hirsute on trochanter, femur and patella, and moderately hirsute on tibia and tarsomere I & II, with reddish brown setae and small whitish setae, which are mainly present on prolateral and retrolateral aspects. Trochanter, tibia, and tarsomere II of all legs without carinae; femur of leg I with two granular carinae on prolateral aspect, carinae gradually weaker on legs II–IV; single sparsely granular, somewhat irregular carina on retrolateral aspect; patella of leg I with two sparsely granular carinae on prolateral aspect, carinae gradually weaker on legs II–IV; tarsomere I with sparsely granular carina on dorsal aspect of leg I, carina gradually weaker on legs II–IV. Trochanter and tarsomere I & II without granules (except for granular carinae on tarsomere I); dorsal aspect of femur of leg I moderately granular, gradually more granular on legs II–IV, ventral aspect of femur of all legs without granules; tibia with only a few (not more than three or four) granules on dorsal aspect, prolateral, retroalateral, and ventral aspect without granules; all legs punctuated entirely, moderately on trochanter, femur, patella, tibia, and tarsomere

I and sparsely on tarsomere II. Tarsomere I with spines present only on distal half portion, two median spines on ventral aspect, two spines on retrolateral aspect, and single spine and pedal spur on prolateral aspect; tarsomere II with 2–4 median spines on ventral aspect, and single spine on prolateral and retrolateral aspects of all legs respectively. A paired, relatively smaller, curved, superior tarsal claw and an unpaired, marginally curved, and blunt inferior tarsal claw present on all legs.

Variation. (Figs. 18–21) Measurements, pectinal teeth, fulcra, middle lamellae and marginal lamellae, inner and outer denticles count on movable finger for the paratypes are given in the Table 1. Both paratypes are in good conditions except, fourth right leg detached from the body of BNHS SC 173 and metasomal segment about to detach from segment II. Both female paratypes resemble male holotype in overall morphology except as follows: carapace smooth on anterior portion except, few scattered granules on either sides of central median furrow; median portion of carapace sparsely granular and becoming denser posteriorly; all mesosomal tergites sparsely granular on lateral sides, and smooth on median portion; genital operculum fused, lacking a pair of genital papillae; pectines shorten, not extends to coxa-trochanter

joint of leg IV; all metasomal segments smooth; metasomal segment V with sparsely granular ventral submedian carinae; and pedipalp chela stouter in NRC-AA-1190 and BNHS SC 173. Right tarsomere II with four median spines on ventral aspect of leg II & III in BNHS SC 173; and right tarsomere II with four median spines on ventral aspect of leg I, and left tarsomere II with two median spines on ventral aspect of leg II in NRC-AA-1190.

AFFINITIES. *Chiromachetes agasthyamalaiensis* sp. n., can be distinguished from all known Indian congeners by the following differing or non-overlapping characters: chela length-width ratio 3.7 in male and 3.3 females (*versus* 3.4 and 3.6 in *C. fergusonii*, 4.3–4.4 and 3.5 in *C. parakrami*, 4.9–5.0 and 3.3–3.4 in *C. ramdasswammi*, 4.6–4.8 and 3.4 in *C. sahyadriensis*, and 3.6 in male of *C. tirupati*); femur length-width ratio 2.7 in male and 2.4 in females (*versus* 2.3 and 2.6 in *C. fergusonii*, 3.2–3.5 and 3.0 in *C. parakrami*, 3.7–4.1 and 2.6–2.9 in *C. ramdasswammi*, 3.3–3.8 and 2.7–2.8 in *C. sahyadriensis*, and 2.5 in male of *C. tirupati*); chela length to movable finger length ratio 1.8 in male and 1.9 in females (*versus* 2.1 in *C. fergusonii*, 2.4–2.6 and 2.3 in *C. parakrami*, 2.7 and 2.3–2.4 in *C. ramdasswammi*, 2.6–2.8 and 2.3–2.5 in *C. sahyadriensis*, and 1.6 in male of *C. tirupati*); seven pectinal teeth in male on either side (*versus* 10 or 11 in *C. fergusonii*, eight or nine in *C. ramdasswammi* and *C. sahyadriensis*, and five in *C. tirupati*); overall coloration of body reddish brown, all legs light brown, much paler than body (*versus* overall coloration of body dark brownish to blackish, all legs blackish brown, not paler than body in *C. fergusonii*).

DISTRIBUTION AND NATURAL HISTORY. *Chiromachetes agasthyamalaiensis* sp. n., currently known only from around its type locality (Agasthyamalai Mountains between altitudes of 900–1150 m asl.; maximum elevation of the mountain range is 1868 m asl.) in Kalakad-Mundanthurai Tiger Reserve, Tirunelveli District, Tamil Nadu (Fig. 25). Individuals of the new species were seen active at night (2000–2200 hrs.) ambushing at entrance of rock crevices along the perennial stream inside wet evergreen forest (Figs. 22, 23). We also found a few inactive individuals during the daytime (1100–1400 hrs.) resting fairly inside of rock crevices on moss covered boulders located in the wet evergreen forest (Fig. 24). *Chiromachetes agasthyamalaiensis* sp. n., appears to be lithophilic as these scorpions were only observed inhabiting rock crevices. The new species was observed to be fairly common ($n = >15$) indicating good abundance.

DISCUSSION. *Chiromachetes agasthyamalaiensis* sp. n., represent the sixth described species, the fifth from the Western Ghats, and the first to be reported and described from Tamil Nadu state of this peninsular Indian endemic genus. The new species is approximately just 12 km east in aerial distance from one of the reported localities (Peppara Wildlife Sanctuary; Sulakhe et al., 2020) of its geographically closest congener, *Chiromachetes fergusonii*. However, the latter is

reported only from lower elevations (100–400 m asl.) and *C. agasthyamalaiensis* sp. n., is so far known only from mid to higher elevation (900–1200 m asl.). The new species also differs from the later in number of non-overlapping morphological characters (See ‘Affinities’).

Chiromachetes fergusonii was originally described from a single female specimen collected from an unknown locality in Trivandrum (now = Thiruvananthapuram district) of Travancore (now = Kerala state). Subsequently, it was reported from three closely spaced localities: Kaduvapallam (single female), Kuravanthavalam (single female and two immature specimens), and Kazhuthurutti (single female and five immature specimens); all three localities in Thenmala in Quilon (now = Kollam) District of Kerala state (Bastawade et al., 2004; Sureshan et al., 2007). Recently, Sulakhe et al. (2020) presented the first data on male of *C. fergusonii* based on museum specimen collected recently from Peppara wildlife sanctuary in Thiruvananthapuram District, Kerala. Interestingly, *C. fergusonii* is also reported from Shoolpaneshwar wildlife sanctuary in Narmada District of Gujarat state, which is > 1500 km north in areal distance from the type locality (Bhatt & Patel, 2013). The record of the *C. fergusonii* from Gujarat by Bhatt & Patel (2013) seems erroneous and cannot be considered valid for a few reasons such as (1) no morphological data or photographs/ drawings were provided by the authors; (2) no justification on how they identified the species was given; (3) there was no information given about museum voucher numbers for the samples of respective species (if any) which can be reexamined.

Chiromachetes tirupati was first described by Lourenço (1997) based on a single male museum specimen deposited at National Museum of Natural History in Paris, collected from Tirupati, Andhra Pradesh by Sreenivasa-Reddy along with a few other specimens of the genus *Iomachus*. The species since then not been reported in the wild and remained to be known only from the single male holotype. *C. tirupati* is currently the only member of the genus which is described from outside the Western Ghats. Dedicated fieldwork efforts are needed in and around its type locality in order to collect additional samples of the species to establish its robust taxonomic diagnosis and to understand its phylogenetic relationship with rest of its congeners distributed in the Western Ghats.

The discovery of *Chiromachetes agasthyamalaiensis* sp. n., highlights the facts that current species diversity under the genus is hugely underestimated. We are barely scratching the surface in terms of uncovering species diversity with very limited dedicated fieldwork efforts being done so far. With the recent contributions on the genus, it is now clear that the *Chiromachetes* species are narrowly distributed due to their specific microhabitat requirements (Mirza et al., 2015; Sulakhe et al., 2020; AK, pers. obs.). Considering that the vast tracks of suitable habitats in both Western Ghats and Eastern Ghats remain to be sampled, it is almost certain that the genus will experience surge in new species description if dedicated field efforts are made in conjunction with use of molecular techniques for species delimitation.

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