The taxonomy of some unusual Microveliinae (Hemiptera: Heteroptera: Veliidae) from India

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Abstract. Two new genera and three new species of Microveliinae are described from India: *Thirumalaia ocularis* gen. nov. & sp. nov. from Tamil Nadu, *Eyarinella robusta* gen. nov. & sp. nov. from Kerala and Tamil Nadu, and *Geovelia fikaceki* sp. nov. from Arunachal Pradesh. A male-based key to the genera of Microveliinae of India and a checklist of Indian species are provided. *Neoalardus typicus* (Distant, 1903) is recorded for the first time from Rajasthan.

Key words. Hemiptera, Heteroptera, Veliidae, checklist, key to genera, new genera, new species, taxonomy, India, Oriental Region


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Introduction

Microveliinae are the most neglected subfamily of the Veliidae. THIRUMALAI (2002) recorded five genera and eleven species from India in its present borders. We include a list of all published names known to us (see Appendix), but the validity of some descriptions is doubtful – or they are simply not given, as in fifteen published names (“sp. nov.”) by GUPTA & SHARMA (2017). Ten Indian species were placed in the genus *Microvelia* Westwood, 1834. A revision and redescriptions of several *Microvelia* species are necessary, as most of them were so inadequately described that subgeneric placement for these species is impossible. Exceptions to the above pattern include two widely distributed, common species, *Microvelia leveillei* (Lethierry, 1877) and *Microvelia douglasi* Scott, 1874, as well as *Microvelia miyamoti* Gupta & Gupta 2008, and also *Microvelia annandalei* Distant, 1909 which LUNDBLAD (1933) has redescribed. However, *Microvelia* is excluded from this study. In *Pseudovelia* Hoberlandt, 1950, only *P. sexualis* (Paiva, 1917) is well-known, two species are inadequately described (GUPTA & KHANDELWAL 2003, KHANDELWAL 2013), and one of them is a junior primary homonym; fifteen additional names by GUPTA & SHARMA (2017) are not available according to ICZN (1999).

The main result of this paper is that the generic diversity of Microveliinae on the Indian subcontinent is higher than previously expected. We describe two new genera whose long antennae and legs indicate a hygropetric lifestyle, although this remains to be confirmed by field observations. We further record the terrestrial genus *Geovelia* Zimmermann, 1984 from India for the first time. In addition, we provide the first records of *Neoalardus typicus* (Distant, 1903) from Rajasthan, a monotypic genus that was previously recorded in India from the Andaman and Nicobar Islands (THIRUMALAI 2002) and from Meghalaya (JEMALAL & CHANDRA 2020), and also extends its distribution to Southeast Asia (YANG et al. 1997, ZETTEL 1998).

Material and methods

This taxonomic study is based on 39 specimens that were dry mounted on paper cards. Additional nine paratypes of *Geovelia fikaceki* sp. nov. are kept in pure ethanol.

List of repositories:
- NHMW Natural History Museum, Vienna, Austria;
- NMPC National Museum in Prague, Czech Republic;
- ZMUC Zoological Museum, University of Copenhagen, Denmark.

Measurements were performed with a Leica Wild M10 binocular microscope at magnifications from 20× to 80× and are given in millimetres. They refer to the maximum length or width of the respective structure. Measurements of body length and width were taken in dorsal view of specimens. Synthlipsis is the dorsal minimum eye distance.

Images: Stacked digital images (Figs 1–8) were taken with a Leica DFC450 camera attached to a Leica Z16APO optics carrier, using Leica Application Suite V3.8. Images were stacked with ZereneStacker 64-bit and processed with...
Adobe Photoshop 7.0. Protibial comb index is calculated by length of protibial comb divided by total tibia length.

Drawings of larger body parts (Figs 9–12, 16–21, 25–28) were made by using a camera lucida fixed to a Leica WILD M10 binocular microscope. Drawings of the males’ genitalia (Figs 13–15, 22–24, 29–31) were made with an OLYMPUS BX40 microscope with a camera lucida at a magnification of 100–400X.

Taxonomy

Microveliinae China & Usinger, 1949

Key to the genera and subgenera of Microveliinae known from India (males only)

1 Mesotibia with grasping comb. ................................. 2
– Mesotibia without grasping comb. ........................... 3

2 Profemur and mesofemur of male strongly incrassate. Both parameres reduced, very small. ....................... \ldots Microvelia subgen. Dilatovelia Zettel, 2012
– Profemur and mesofemur not incrassate. Right parame-re well developed, larger than left paramere. .......... \ldots Microvelia subgen. Picaultia Distant, 1913

3 Protibia without grasping comb (Fig. 7). ....................... \ldots Neoalardus typicus (Distant, 1903)
– Protibia with grasping comb (e.g., Figs 10, 26; very small and apical in Eyrinarella gen. nov., Fig. 18). ... 4

4 Antenna short; antennomere I surpassing apex of head by less than half of its length. ................................. \ldots Microvelia Westwood, 1834 (without subgenus)
– Antenna long (only moderately long in Pseudovelia); antennomere I surpassing apex of head by more than half of its length (e.g., Figs 9, 16, 25). ................. 5

5 Protibial grasping comb short, about 1/6 of tibia length or shorter (e.g., Figs 18, 26). ................................. 6
– Protibial grasping comb long, at least 1/4 of tibia length (e.g., Fig. 10). .................................................. 8

6 Body very elongated. \ldots Aquavelavia Thirumalai, 1999
– Body very stout (Figs 3, 5). .................................... 7

7 Claws subterminal, their apices surpassing apex of tarsus (Fig. 26). Postocular region of head short, shallowly inserted in a weak concavity of the anterior margin of pronotum (Fig. 25). Propleuron unmodified. ............. \ldots Geovelia Zimmermann, 1984
– Claws preterminal, their apices not reaching apex of tarsus (Fig. 18). Postocular region of head long, deeply inserted in a concavity of the anterior margin of pronotum (Fig. 16). Propleuron with ridge behind eye (Fig. 17). ................................................................. \ldots Eyrinarella gen. nov.

8 Antennomere IV distinctly stouter than antennomere III. ............................... \ldots Pseudovelia Hoberlandt, 1950
– Antennomeres III and IV both very slender, filiform (Fig. 1). ................................................................. 9

9 Profemur and protibia curved or otherwise modified. Abdominal segments 6 and 7 modified by lobes (both characters reduced in the smallest males). Paramere small and sickle-shaped. ........ Baptista Distant, 1903
– Profemur, protibia, and abdominal segments 6 and 7 without such modifications. Paramere prominent, of characteristic shape (Fig. 14). \ldots Thirumalaia gen. nov.

New taxa

Thirumalaia gen. nov.
(Figs 1, 2, 9–15)

Type species. Thirumalaia ocularis sp. nov.

Diagnosis. Body of male moderately stout (Fig. 1), of female much stouter (Fig. 2). Postocular region of head deeply inserted in anterior part of pronotum (Fig. 9). Eyes very large, synthlipsis 0.28–0.34 (Fig. 9). Antenna very long and slender, about two thirds of body length (Figs 1, 2); antennomere I approximately as long as head length (in male longer than in female); relative lengths of antennomeres: IV ≧ III > I > II. Pronotum convexly rounded posteriorly (Fig. 9). Lateral evaporatorium situated approximately in middle of metapleuron. Legs long and slender. Claws preterminal. – Male: Propleuron unmodified. Femora unmodified. Protibia unmodified; protibial grasping comb long, about one third of tibia length (Fig. 10). Mesotibia without grasping comb. Claws simple, minimally surpassing apex of tarsus. Abdomen without projections. Segment 8 elongated. Pygophore pear-shaped, narrow at base, with truncated posterior margin (Fig. 13). Proctiger very slender (Fig. 15). Parameres symmetrical, medium-sized, of characteristic shape as shown in Figure 14. – Female: Genitalia situated in a strictly posterior opening of segment 7.

Comparative notes. Thirumalaia gen. nov. resembles some species of Baptista Distant, 1903 in habitus and shares with this genus some other characters like the long protibial grasping comb, structure of antenna, and a concave anterior margin of the pronotum. Most species of Baptista, including those hitherto reported from India, differ from Thirumalaia gen. nov. by strong modifications of foreleg and abdominal segments 6–7 of the males (= Baptista femoralis group sensu Kovac & Yang 2000). Four species of Baptista from Southeast Asia and Southern China form the Baptista collaris group and also lack such modifications (Zettel 2004, Yi et al. 2014b). However, Thirumalaia gen. nov. possesses none of the characters defining this group either (described in detail by Zettel 2004). The sexually dimorphic body shape, the enlarged compound eyes, and the characteristic parameres are the most important characteristics of Thirumalaia gen. nov. For distinction from other genera see the key.

Etymology. Dedicated to the memory of the Scientist of the Zoological Survey of India Dr. G. Thirumalai, honouring his significant contribution to the knowledge of Indian water bugs. Gender: feminine.

Thirumalaia ocularis sp. nov.
(Figs 1, 2, 9–15)

Type material. Holotype: ♀ (apterous) (NHMW), labelled “INDIA: Tamil Nadu, 23.1.1999 \ldots Nilgiri Hills, 5km E Kundah \ldots 1900m \ldots D. Boukal (80)”. Paratypes (NHMW, NMPC): 2 ♀♂ (all apterous) (include allotype) with same label data; 1 ♀ (apterous), labelled “India: Tamil Nadu, Nilgiri Hills \ldots Kotagiri env., Kadasalola N 11°25′ E 76°55′, 1500 m \ldots 12.1.1999 \ldots D. Boukal (74)”; 3 ♀♂ (all apterous), labelled “INDIA: Tamil Nadu, 12.1.1999 \ldots Palni Hills 10°16′N 77°33′E \ldots Perumalmalai, 1600 m \ldots D. Boukal (60)”; 2 ♀♂ (apterous), labelled “INDIA: Tamil Nadu, 11.1.1999 \ldots Palni Hills 10°14′N 77°29′E \ldots Kodaikanal, Bear Shola Falls \ldots 2100m \ldots D. Boukal (57)”.

Zettel & Laciny: New Microveliinae (Hemiptera: Heteroptera: Veliidae) from India
Figs 1–4. Habitus of *Thirumalaia ocularis* gen. nov. & sp. nov. (1 – apterous male, 2 – apterous female), and of *Eyarinella robusta* gen. nov. & sp. nov. (3 – apterous male, 4 – apterous female).

**Description of apterous male.** Measurements of holotype:
Body length 2.62; maximum body width (at metapleura) 0.96. Head length 0.46, width 0.64. Synthlipsis 0.28. Pronotum length 0.53, width 0.86. Lengths of antennomeres, I 0.49, II 0.30, III 0.54, IV 0.54. Lengths of leg segments: profemur 0.81, protibia 0.72, protarsus 0.31, mesofemur 0.99, mesotibia 0.93, mesotarsus 0.20 + 0.31, metafemur 1.09, metatibia 1.36, metatarsus 0.26 + 0.31; protibial comb length 0.25; comb index 0.35. Measurements of paratypes (n = 6): Body length 2.55–2.64; maximum body width (at metapleura or abdominal segment 4) 0.92–0.98. Head length 0.44–0.46, width 0.64–0.66. Synthlipsis 0.29–0.31. Pronotum length 0.50–0.54, width 0.88–0.92. Protibia length 0.70–0.76; protibial comb length 0.21–0.27; comb index 0.30–0.36.

Colour (Fig. 1): Black. Sides of head yellowish brown. Pronotum anteromedially with a narrow transverse yellow stripe, narrowly interrupted at midline. Acetabula
orange-brown to black. Rostrum yellow, terminal segment black. Antenna dark brown. Legs yellow, apices of femora, protibiae, and tarsi infuscated.

Pilosity: Body covered by a short appressed greyish brown pilosity; pilosity on legs yellowish to whitish. Antenna with two long setae on antennomere I, and one on antennomere II; additionally, with numerous shorter, oblique setae on antennomeres II–IV. Most of body with brown, relatively short to moderately long oblique standing setae (longest on mediomertites). Legs with long whitish standing setae on flexor sides, and with more oblique, shorter, mostly brownish setae on extensor side. Silverish pilosity (Fig. 1) extended on anterior part of pronotum and sides of mediomertite 1; small spots often developed at hind margins of lateromertites and (minute and indistinct) on sides of mediomertites 5–7.

Structures: Body moderately stout (Fig. 1); sides of abdomen subparallel. Head wider than long, anteriorly blunt, posteriorly weakly protruded, in a shallow concavity of the anterior margin of pronotum. Anteocyepus and labrum shiny. Eyes prominent; eye width larger than half of synthlipsis (Fig. 9). Antenna very long and slender; antennomere II slightly slenderer and shorter than I; antennomeres III and IV similar in length and width, or IV slightly longer than III. Rostrum stout, reaching base of mesosternum. Pronotum long (Fig. 9), reaching mediomertigete 1 posteriorly; sides of pronotum slightly protruded anteriad; disc with a shallow transverse groove bearing a row of sensory pores and separating anterior part from posterior lobe; anterior margin with another row of pores; numerous pores scattered over pronotal lobe. Legs long, hardly modified. Profemur (Fig. 10) slightly thicker than meso- and metafemur, not curved. Tibiae and tarsi slender. Protibial comb about one third as long as protibia (Fig. 10). Second tarsomeres on middle and hind leg longer than first. Abdomen moderately wide. All mediomertites transverse (Fig. 1); mediomertigete 7 about 1.6 times as wide as long. Abdominal sternia hardly modified. Sternal 5–7 very shallowly impressed along midline. Hind margin of sternum 7 broadly concave. Segment 8 (Fig. 12) subcylindrical, 1.5 times as long as wide; ventrally, posterior and anterior margin strongly concave, dorsally posterior margin with concavity in medial third. Pygophore (Fig. 13) pear-shaped, but with truncated posterior margin, widest at paramere insertion, about 1.6 times as long as wide. Proctiger (Fig. 15) small and slender, posterior part almost round. Parameres (Fig. 14) symmetrical, medium-sized, of characteristic shape.

Description of apterous female. Measurements of allo-type: Body length 2.88; maximum body width (at abdominal segment 4) 1.38. Head length 0.51, width 0.68. Synthlipsis 0.34. Pronotum length 0.50, width 0.98. Lengths of antennomeres, I 0.44, II 0.28, III 0.47, IV 0.51. Lengths of leg segments: profemur 0.81, protibia 0.70, protarsus 0.33, mesofemur 0.91, mesotibia 0.95, metatarsus 0.19 + 0.32, metatarsom 1.10, metatibia 1.38, metatarsus 0.27 + 0.34. Measurements of paratypes (n = 7): Body length 2.80–3.00; maximum body width (at abdominal segment 3 or 4) 1.18–1.38. Head length 0.47–0.52, width 0.67–0.70. Synthlipsis 0.31–0.34. Pronotum length 0.50–0.54, width 0.93–0.99.

Colour (Fig. 2): Similar as in male.

Pilosity: Similar as in male. Silvery pilosity on mediomertites and lateromertites on average more extended. Setae on mediomertigete 8 similar as on mediomertigete 7. Gonocoxa with moderately long, oblique pilosity.

Structures: Body stout (Fig. 2); shape of abdomen ovate. Most characters similar as in male. Antennomere IV slightly longer than 3. Legs unmodified; all femora of similar width; protibia without grasping comb. Mediomerites strongly transverse (Fig. 2). Mediomertigete 7 about 1.25 times as long as 6, at anterior margin 2.4 times as wide as long, posteriorly strongly narrowed; posterior margin straight. Mediomertigete 8 (Fig. 11) almost semi-circular in shape, directed straight posteriorly. Proctiger knob-shaped, directed posteriorly. Gonocoxa plate-like, not concealed by sternum 7.

Comparative notes. The generic diagnostic distinguishes Thirumalaia ocularis sp. nov. from all other Indian Microveliinae except Microvelia santala Hafiz & Ribeiro, 1939. This species was described from apterous males collected in Jharkhand (formerly Bihar; HAFIZ & RIBEIRO 1939). It has several similarities with Thirumalaia ocularis sp. nov. as it is also a slender species with large eyes, very long appendages, and a long protibial grasping comb (cf. HAFIZ & RIBEIRO 1939), a character combination that does not fit Microvelia. Therefore, it may represent a second species of Thirumalaia. However, genitalia were not treated in the original description, and therefore we do not transfer M. santala to the new genus. Microvelia santala clearly differs from Thirumalaia ocularis sp. nov. by the greater slenderness of its body and a mediomertigete 7 of the male that is longer than broad (cf. HAFIZ & RIBEIRO 1939: p. 426, text-fig. a).

Eymology. The species epithet, Latin adjective ocularis (-is, -e), refers to the large, protruding eyes.

Eyarinella gen. nov.

(Figs 3, 4, 16–24)

Type species. Eyarinella robusta sp. nov.

Diagnosis. Body stout, ovate (Figs 3, 4). Posterior of head deeply inserted in anterior part of pronotum (Fig. 16). Eyes moderately large (Figs 16, 17). Antenna long and slender, about two thirds of body length; antennomere 1 (Fig. 16) 0.9 times as long as head length; relative lengths of antennomeres: IV > III ≧ 1 > II. Pronotum convexly rounded posteriorly (Fig. 16). Lateral evaporatorium small, situated in ventral half of metapleuron. Legs stout. Claws preterminal, their apices not reaching apex of tarsus. – Male: Propleuron with a sharp ridge behind eye (Fig. 17), in dorsal view appearing tooth-like. Femora stout (Figs 18, 19), otherwise unmodified. Protibia unmodified; protibial grasping comb extremely short (Fig. 18), restricted to a short ear-shaped spur at apex of tibia. Mesotibia without grasping comb. Pregenital abdomen without projections. Segment 8 moderately elongated (Fig. 21). Pygophore (Fig. 22) distally upcurved and with concave posterior margin. Proctiger (Fig. 23) narrow, tongue-shaped; apex narrowly rounded. Parameres (Fig. 24) symmetrical, curved, very
long and slender. – Female: Genitalia situated in a posterior opening of segment 7.

**Comparative notes.** The stout body distinguishes *Eyarinella* gen. nov. from all other Oriental genera of Microveliinae, except from *Geovelia* and a few species of *Microvelia* (*Microvelia* shows a great variation in body shape). However, in *Microvelia* the antenna is much shorter and stouter, and the genitalia of females are less protruding. *Geovelia* differs from *Eyarinella* gen. nov. in several characters, e.g., by a short head that is not deeply embedded in a concavity of the pronotum, by large eyes (e.g., Figs 5, 6), and by subterminal claws. The long antenna of *Eyarinella* gen. nov. resembles several genera of Microveliinae with a hygroscopic lifestyle, e.g., *Baptista* Distant, 1903, *Aquulavelia*

Figs 5–8. Habitus of *Geovelia* fikaceki sp. nov. (5 – apterous male, 6 – apterous female), and *Neoalardus typicus* (Distant, 1903) (7 – apterous male, 8 – apterous female), both specimens from India.
Thirumalai, 1999, and *Thirumalaia* gen. nov. The male of *Eyarinella* gen. nov. possesses the following two unique characters: the sharp ridge anteriorly on propleuron (Fig. 17), and the rudimentary protibial grasping comb (Fig. 18).

**Etymology.** The generic name is dedicated to Dr. E. Eyarin Jehamalar of the Zoological Survey of India for her numerous valuable publications on Indian water bugs. Gender: feminine.

**Eyarinella robusta** sp. nov.

(Figs 3, 4, 16–24)

**Type material:** HOLOTYPE: ♂ (apterous) (NHMW), labelled “INDIA: Kerala, 8.1.1999 \ 10km WSW Munnar, 1200m \ Kallar Valley, 10°03′N 76°59′E \ leg. D. Boukal (52)”. PARATYPES (NHMW): 1 ♀ (apterous) with same label data; 1 ♂ (apterous), labelled “INDIA: Kerala, 7.1.1999 \ 10km WSW Munnar, 1100m \ Kallar Valley, 10°03′N 76°58′E \ leg. D. Boukal (50)”; 1 ♀ (apterous; allotype), labelled “INDIA: Kerala, Kallar Valley \ 10km WSW Munnar, \ 10°03′N 76°58–59′E \ 1100–1200 m a.s.l., \ 7–8.1.1999 \ leg. D. Boukal (49/52)”; 1 ♂ (apterous), labelled “INDIA: Tamil Nadu, 25.1.1999 \ Shevaroy Hills, Yercaud \ Kiliyur Falls env. \ 11°47′N 78°12′E, 1400m \ leg. D. Boukal (85)”; 1 ♀ (apterous), labelled “S. INDIA, KERALA, Thekkady \ Periyar Lake, 09°34′N 77°10′E \ 900–1000m, 19.-27.IV.1997 \ leg. Dembicky & Pacholátko leg.”

**Description of apterous male.** Measurements of holotype: Body length 2.52; maximum body width (at abdominal segment 4) 1.05. Head length 0.44, width 0.65. Synthlipsis 0.36. Pronotum length 0.38, width 0.91. Lengths of antennomeres, I 0.44, II 0.34, III 0.48, IV 0.60. Lengths of leg segments: profemur 0.76, protibia 0.72, protarsus 0.34, mesofemur 0.88, mesotibia 0.82, mesotarsus 0.14 + 0.29, metafemur 1.00, metatibia 0.12 + 0.28; protibial comb length 0.02; comb index 0.03. Measurements of paratypes (n = 1): Body length 2.57; maximum body width (at abdominal segment 4) 1.08. Head length 0.44, width 0.66. Synthlipsis 0.35. Pronotum length 0.34, width 0.89. Protibia length 0.70; protibial comb length 0.03; comb index 0.03.

Colour (Fig. 3): Dark brown to black. Posterior margin of head and stripes along medial eye margin more or less dark orange; only holotype provided posteriorly with a pair of yellow marks. Pronotum anteromedially with a transverse, broad, yellow stripe, sides and a narrow hind margin more or less orange-brown; sharp edge on propleuron below eye yellow. Mediotergite 1 at middle orange-brown. Narrow lateral margins of laterotergites and sternum pale orange. Sides of segment 8 yellowish. Antenna pale brown. Legs basally pale yellow, apices of femora, bases and apices of tibiae, and apices of tarsi indistinctly infuscate.

Pilosity: A short grey appressed pilosity covering body except disc of pronotum. In addition, almost entire body (except sides and venter of head and thorax) with scattered long setae, longest on pronotum and dorsalmost part of metapleuron; those on head and pronotum standing, those on abdomen oblique. Metapleuron densely hirsute. Silvery hairs (Fig. 3) arranged in a pair of large patches laterally on mediotergite 1 and small patches at hind margins of laterotergites 2–6. Antenna with two long setae on antennomere I, and one on antennomere II; all antennomeres with several shorter setae. Legs densely beset with decumbent pilosity; profemur with row of standing setae on flexor side; meso- and metafemur with some longer oblique setae on flexor side subapically; all tibiae with moderately long, oblique setae on extensor sides.
Structures: Head (Fig. 16) short, with pointed apex, posterodorsally deeply inserted in strongly concave anterior margin of pronotum. Eye moderately large (Figs 16, 17), posteriorly touching pronotum. Antenna very long and slender; antennomere I surpassing apex of head by about three fourths of its length (Fig. 16); antennomeres II more slender, III and IV very slender, filiform. Pronotum (Fig. 16) long, anterior margin broadly concave, posterior margin broadly convex, but with a shallow concavity in approximately medial fourth; only there metanotum visible as a narrow transverse line. Pronotum with transverse rows of punctures in front of and behind yellow stripe, and with scattered punctures on disc except on midline. Propleuron with short ridge at anterior margin behind eye (Fig. 17). Legs moderately long, stout; profemur slightly narrower than mesofemur and much narrower than metafemur (Fig. 19). Protibial grasping comb very stout, situated on a small apical spur (Fig. 18). Pregenital abdomen very broad; mediointergites about three times wider than laterointergites; mediointergite 7 ca. 1.5 times longer than 6, about 2.2 times wider than long. Segment 8 (Fig. 21) moderately wide, subcylindrical. Pygophore (Fig. 22) slender, ca. 1.9 times as long as wide, distally upcurved, and with concave posterior margin. Proctiger (Fig. 23) narrow, tongue-shaped, about twice as long as wide, apex narrowly rounded. Parameres (Fig. 24) symmetrical, very long and slender, curved, in resting position surpassing apex of proctiger.

**Description of apterous female.** Measurements of allo-type: Body length 2.69; maximum body width (at abdominal segment 4) 1.34. Head length 0.50, width 0.68. Synthlipsis 0.39. Pronotum length 0.34, width 0.92. Lengths of antennomeres, I 0.47, II 0.35, III 0.47, IV 0.57. Lengths of leg segments: profemur 0.80, protibia 0.74, protarsus 0.38, mesofemur 0.90, mesotibia 0.88, mesotarsus 0.14 + 0.31, metafemur 1.10, metatibia 1.15, metatarsus 0.16 + 0.31. Measurements of paratypes (n = 3): Body length 2.53–2.59; maximum body width (at metapleura) 1.26–1.29. Head length 0.44–0.47, width 0.63–0.66. Synthlipsis 0.35–0.36. Pronotum length 0.31–0.33, width 0.89–0.90. Colour (Fig. 4): Similar to male, in some specimens slightly darker.

Pilosity: Similar to male, but short pilosity also present on pronotal disk, and very long, erect setae all over dorsal surface of head and thorax, mediointergites, laterointergites, and sides of sterna. Long pilosity partially rubbed off in some specimens. Patches of silverish pilosity (Fig. 4) laterally on mediointergite 1 more extended than in male; in addition, a larger central part of mediointergites 6 and 7 silverish. Gonocoxa 1 only with short pilosity.

Structures: Head and thorax similar as in male. Pronotum without concavity of hind margin. Propleuron without ridge behind eye. Abdomen wider than in male, but posteriorly more narrowed. Mediointergite 7 (Fig. 20) about 2.1 times as long as wide. Mediointergite 8 flat, wider than...
long, directed posteriorly. Proctiger narrow, posteriorly protruded. Gonocoxa I flat, base concealed by sternum 7. **Etymology.** The species epithet, the Latin adjective *robustus* (-a, -um), refers to the stout body shape.

**Geovelia fikaceki** sp. nov. (Figs 5, 6, 25–31)

*Type material:* **Holotype:** ♂ (apterous) (NMPC), labelled “INDIA, Arunachal Pradesh (15°11′ km SSE of Tenga, Eagles’ Nest WL sanctuary, 4° 27′ 06″ N, 92° 26′ 02″ E, 2510 m) Šípek lgt.”, “primary evergreen mountain cloud forest with very sparse understory vegetation \ sifting: wet leaf litter”. **Paratypes** (including allotype female; NMPC, NHMW, ZMUC): 10 ♀♂ 11 ♀♀ (all apterous), same label data (5 ♀♂ 4 ♀♀ in pure ethanol).

**Diagnosis.** Body small and stout, length 1.88–2.04. Head (Fig. 25) wide, with globular eyes. Pronotum of apterous morph (Fig. 25) moderately short (width / length ca. 3.4), reaching abdominal mediotelegere 1; middle of anterior margin moderately concave; middle of hind margin straight or shallowly concave. Grasping comb of male shorter than subapical tibia width (Fig. 26), less than one tenth of tibia length. Apterous morph with shiny spots anteromedially on mediotelegere 7 and 8 (in male spot on segment 8 not visible in undissected specimen).

**Description of apterous male.** Measurements of holotype: Body length 1.88; maximum body width (at laterotergites 3) 0.94. Head length 0.41, width 0.72. Synthlipsis 0.33. Pronotum length 0.22, width 0.74. Lengths of antennomeres, I 0.25, II 0.23, III 0.42, IV 0.49. Lengths of leg segments: profemur 0.55, protibia 0.50, protarsus 0.21, mesofemur 0.62, metatibia 0.62, mesotarsus 0.10 + 0.19, metametater 0.72, metatibia 0.83, metatarsus 0.13 + 0.21; protibial comb length 0.07; comb index 0.09. Measurements of paratypes (n = 5): Body length 1.85–1.93; maximum body width (at laterotergites 3) 0.92–0.96. Head length 0.39–0.43, width 0.71–0.74. Synthlipsis 0.33–0.36. Pronotum length 0.20–0.22, width 0.74–0.78. Protibia length 0.74–0.76; protibial comb length 0.06–0.07; comb index 0.08–0.09.

Colour (Fig. 5): Ground colour pale brown, ventrally more yellowish brown. Dorsum of head with paired blackish markings. Pronotum with a transverse black stripe in middle of length. Sutural zones between mediotelegere 1–7 with transverse rows of pores. Pronotum length 0.20, width 0.76. Lengths of leg segments: profemur 0.55, protibia 0.50, protarsus 0.21, mesofemur 0.62, mesotibia 0.62, mesotarsus 0.09 + 0.15, metafemur 0.77, metatibia 0.83, metatarsus 0.12 + 0.21. Measurements of paratypes (n = 6): Body length 1.98–2.04; maximum body width (at laterotergites 3 or 4) 1.02–1.06. Head length 0.41–0.43, width 0.74–0.78. Synthlipsis 0.34–0.38. Pronotum length 0.20–0.22, width 0.73–0.78.

Colour (Fig. 6), pilosity, and structures almost same as in male. Body slightly broader. Abdomen unmodified. All mediotelegere 7 about one third longer than 6 and 8, respectively. Mediotergere 8 directed straight caudad (Fig. 27), with moderately convex hind margin. Gonocoxa plate-like, unmodified, not concealed by sternum 7. Proctiger with pointed apex (Fig. 27).

**Notes on Geovelia Zimmermann, 1984.** Species of *Geovelia* inhabit moist leaf litter in forests (Zimmermann 1984, 2014; Zettel 2011). They were described from Nepal (five species, all known only from the apterous morph; Zimmermann 1984, 2014) and Myanmar (one species, known only in macropterous morph; Zettel 2011). *Geovelia hirsuta* Ye, Chen & Bu, 2014 was described from Southwestern China (Ye et al. 2014a), but has been transferred to a new genus (Zettel et al. 2021). *Geovelia fikaceki* sp. nov. is the first record of this genus from India. The altitudinal range of species extends from 350 m a.s.l. (G. *orientalis* Zettel, 2011) to 3200 m a.s.l. (G. *martensi* Zimmermann, 1984).

Species of *Geovelia* can be recognized primarily by the subterminal claws that clearly surpass the tarsal apex; this character is not found in other Oriental Veliidae. Other important characters are a very small and stout body, a short head with very large eyes and long antennae, and a short protibial grasping comb of the male.
Comparative notes. *Geovelia fikaceki* sp. nov. differs from most species (except *G. riegeri* Zimmermann, 2014) by the protibial grasping comb being shorter than the subapical protibia width (Fig. 26). *Geovelia fikaceki* sp. nov. and *G. riegeri* are very similar in appearance by their stocky body, wide head, and globular eyes (these characters are also present in *G. ilamica* Zimmermann, 1984), but differ strongly in the length of the pronotum: In *G. fikaceki* sp. nov. the pronotum is longer (pronotum width : pronotum length = 3.4) and reaches mediotalerite 1 in middle, whereas in *G. riegeri* the pronotum is shorter (pronotum width : pronotum length = 3.6) and leaves the metanotum uncovered in middle (compare measurements and drawings in ZIMMERMANN 2014). The females of *Geovelia fikaceki* sp. nov. are smaller than those of *G. riegeri* (1.90–2.04 vs. 2.20–2.25 mm), whereas the size of males overlaps.

**Etymology.** We dedicate this species to Dr. Martin Fikáček, coleopterist at the National Museum, Prague, and one of the collectors of this new species.

**Collecting circumstances.** All examined specimens were collected by sifting accumulations of leaf litter in primary evergreen cloud forest at ca. 2500 m a.s.l., on the southern slope of the Himalaya Mts. (M. Fikáček, pers. comm.).

**New records**

*Neoalardus typicus* (Distant, 1903) (Figs 7, 8)


**Distribution.** *Neoalardus typicus* was described from West Malaysia (DISTANT 1903). YANG et al. (1997) recorded it from Singapore. ZETTEL (1998) gave a redescriptions of *N. typicus* and some new country records (China, Laos, Indonesia). THIRUMALAI (2002) listed *N. typicus* only for the “Andaman & Nicobar Islands”, but ANDERSEN (1982: fig. 615: map) already indicated that this species occurs in continental India. The species has recently been recorded from Meghalaya (JEHALALAR & CHANDRA 2020). The new record extends the known distribution far westwards.

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**References**


Appendix:

Checklist of Microveliinae known from India
(from Thirumala 2002, Gupta & Khandelwal 2005, and this paper).

Available names

_Aqualvelia occulta_ Thirumalai, 1999
_Baptista sushmae_ Andersen, 1989
_Baptista sushmae_ Gupta & Khandelwal, 2005
_Eyarinella robusta_ Zettel & Laciny, sp. nov.
_Geovelia fikaceki_ Zettel & Laciny, sp. nov.
_Microvelia (Diluotvelia) leveillei_ (Lethierry, 1877)

_Microvelia_ (incertae sedis) _andersoni_ Gupta & Khandelwal, 2002
_Microvelia_ (incertae sedis) _annandaeli_ Distant, 1909
_Microvelia_ (incertae sedis) _atromaculata_ Paiva, 1919
_Microvelia_ (incertae sedis) _javadiensis_ Thirumalai, 1999
_Microvelia_ (incertae sedis) _lineatipes_ Paiva, 1919
_Microvelia_ (incertae sedis) _landbladi_ Gupta & Khandelwal, 2002
_Microvelia_ (incertae sedis) _santala_ Hafiz & Ribeiro, 1939

_Microvelia (Picaultia) douglassi_ Scott, 1874
_Microvelia (Picaultia) miyamoti_ Gupta & Gupta, 2008
_Neopalardus typicus_ (Distant, 1903)

_Pseudovelia_ (Pseudovelia) _lingula_ Gupta & Khandelwal, 2003
_Pseudovelia_ (Pseudovelia) _polhemi_ Khandelwal, 2013
_Pseudovelia_ (Pseudovelia) _sexualis_ (Paiva, 1917)
_Thirumalaia ocularis_ Zettel & Laciny, sp. nov.

Unavailable names

_Baptista fingeri_ Gupta & Sharma, 2017
_Baptista sushmae_ Gupta & Sharma, 2017
_Baptista tridigita_ Gupta & Sharma, 2017
_Lathriovelia pronota_ Gupta & Sharma, 2017
_Microvelia_ (incertae sedis) _aashishi_ Gupta & Sharma, 2017
_Microvelia_ (incertae sedis) _andersoni_ Gupta & Sharma, 2017
_Microvelia_ (incertae sedis) _femandi_ Gupta & Sharma, 2017
_Microvelia_ (incertae sedis) _landbladi_ Gupta & Sharma, 2017
_Microvelia_ (incertae sedis) _miyamoti_ Gupta & Sharma, 2017
_Pseudovelia_ (Pseudovelia) _hungerfordi_ Gupta & Sharma, 2017
_Pseudovelia_ (Pseudovelia) _lingual_ Gupta & Sharma, 2017
_Pseudovelia_ (Pseudovelia) _longiarsa_ Gupta & Sharma, 2017
_Pseudovelia_ (Pseudovelia) _matsuda_ Gupta & Sharma, 2017

1) The availability and validity of this name are uncertain, as we failed to trace this paper by all available means.
2) _Microvelia javadiensis_ seems closely related to _M. petraeus_ Andersen, Yang & Zettel, 2002, but no subgenus has yet been erected for these two species.
3) See comparative notes of _Thirumalaia ocularis_ sp. nov.
4) Junior primary homonym. As validity of the taxon is uncertain, we refrain from replacing it with a new substitute name.
5) Nomen nudum, no description given, no distribution given except India.