

***Eotrechus fuscus* sp. nov. from Northeastern India**
with a key to Indian species
(Hemiptera: Heteroptera: Gerridae)

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Abstract. *Eotrechus fuscus* sp. nov. (Hemiptera: Heteroptera: Gerridae: Eotrechinae) is described from Sikkim, Himalaya, India and compared with all known congeners. The male genitalia study was undertaken to confirm validity of this species. *Eotrechus longipes* Andersen, 1982 is recorded from Sikkim for the first time. A key to all known Indian species is also provided. With the addition of this new species, a total of six species of this genus are currently reported from India.

Key words. Hemiptera, Heteroptera, Gerridae, new species, taxonomy, Sikkim, Himalaya, India, Oriental Region

Introduction

Gerridae, commonly known as water striders or water skaters, inhabit all varieties of aquatic habitats ranging from freshwater to brackish water ecosystems, where they are found skating on the water surface (SPENCE & SCUDDER 1980, STONEDAHL & LATTIN 1982, THIRUMALAI 1999). Among them, the semi-terrestrial water striders of the genus *Eotrechus* Kirkaldy, 1902 are typical inhabitants of montane waterfalls from northern India and Nepal to southern China, northern Thailand and Vietnam (TRAN & YANG 2006, TRAN & ZETTEL 2006, VITHEEPRADIT & SITES 2007, POLHEMUS et al. 2009).

The members of the genus *Eotrechus* are distinguished morphologically by the presence of apically inserted claws (ANDERSEN 1982, VITHEEPRADIT & SITES 2007). They are rarely collected because of their special habitat and behavior, being confined to wet rock surfaces of waterfalls or even seepages (ANDERSEN 1982, TRAN & ZETTEL 2006). ANDERSEN (1982)

was the first to revise the genus. Subsequent studies and species descriptions were provided by POLHEMUS & ANDERSEN (1984), ANDERSEN (1998), TRAN & ZETTEL (2006), TRAN & YANG (2006), VITHEEPRADEIT & SITES (2007), and POLHEMUS et al. (2009). Five species have been previously reported from India: *E. brevipes* Andersen, 1982 from Arunachal Pradesh, Sikkim, West Bengal, *E. kalidasa* Kirkaldy, 1902 from Meghalaya, *E. longipes* Andersen, 1982 from Arunachal Pradesh, Uttar Pradesh, West Bengal, *E. terrestris* Andersen, 1982 from Sikkim, West Bengal (THIRUMALAI 2002), and *E. pilicaudatus* Tran & Zettel, 2006 from Meghalaya (TRAN & ZETTEL 2006). With the description of *E. fuscus* sp. nov., the total number of *Eotrechus* has raised to six in India and seventeen from the World.

Material and methods

During the recent survey in 2016, a specimens were collected from the wet rock surface of Rimbi waterfalls, Sikkim, India by using a small square-shaped aquatic net, and preserved in 75% ethyl alcohol. The sample was hand-picked, because the insects were observed to hide in cryptic habitats such as crevices amid wet rocks. The collected specimens were examined using a Leica M205A binocular dissecting microscope at the Zoological Survey of India, Kolkata. The male genitalia were dissected for further examination of diagnostic characters. The dissected genitalia were immersed in 10% KOH for 30 minutes to clear the muscles and photographed using Leica M205A binocular microscope. All measurements are in millimeters (mm). Morphological terminology used in this manuscript follows that of ANDERSEN (1982).

Taxonomy

Eotrechus fuscus sp. nov.

(Figs1–12)

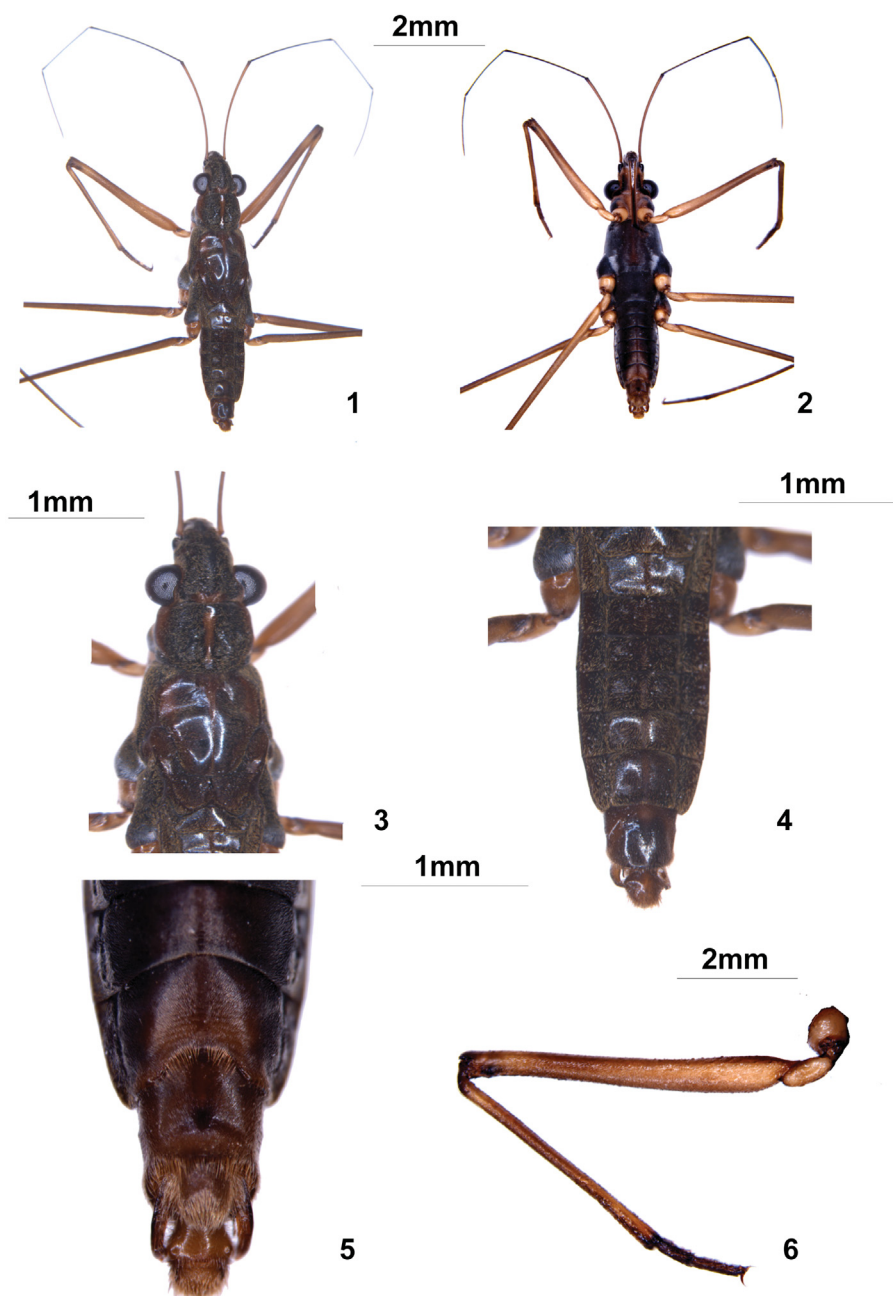
Type locality. India, Sikkim, West Sikkim District, Rimbi waterfalls.

Type material. HOLOTYPE: ♂ (apterous), **INDIA: SIKKIM:** West Sikkim, Rimbi waterfalls, 27.314035°N, 88.186561°E, alt. 4153 ft [= 1266 m a.s.l.], 11.v.2015, coll: S. Basu. The specimen is deposited in the National Zoological Collection of Zoological Survey of India, Kolkata (NZC-ZSI).

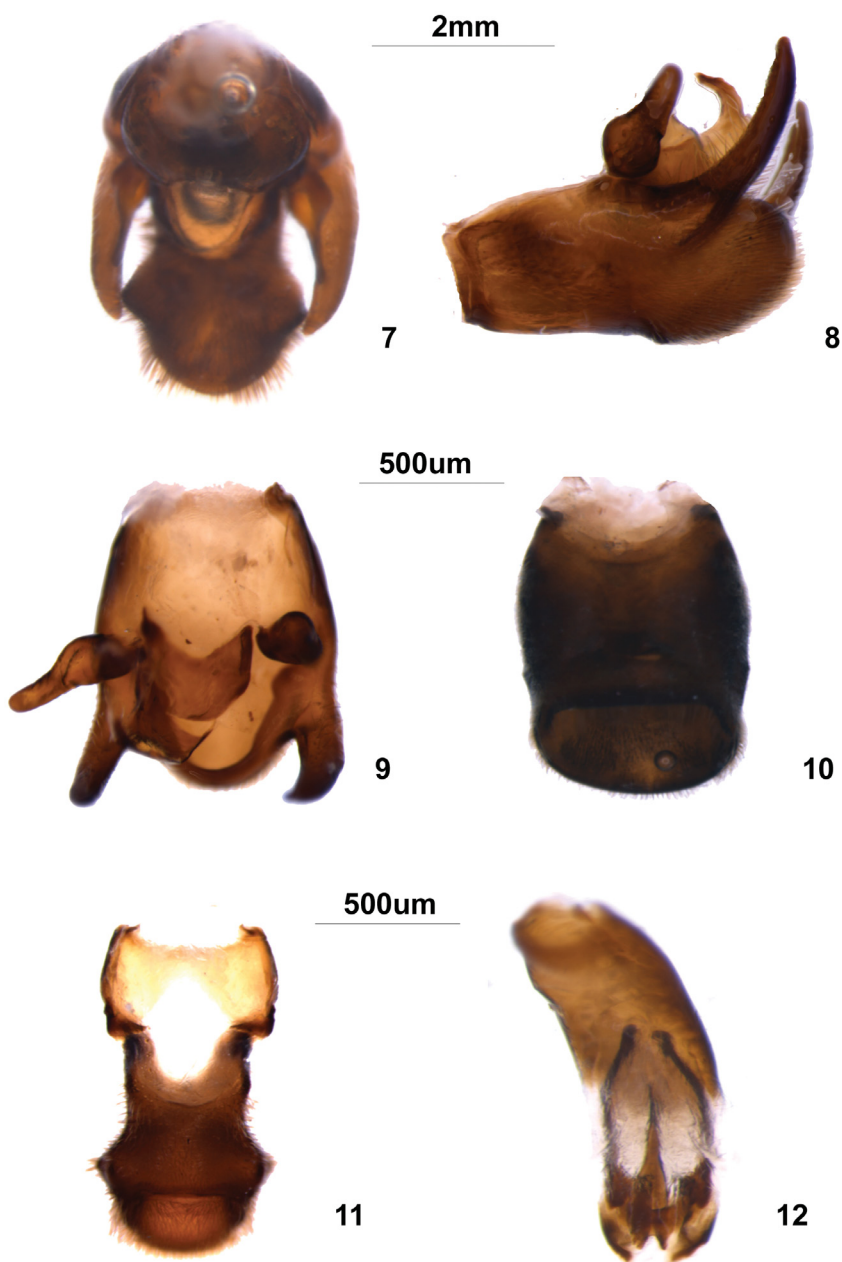
Description. *Male* (apterous). *Body.* Body length 11.15 mm, maximum width across mesoacetabula 2.67 mm.

Colour. Dorsally body colour mainly black, covered with golden pubescence. Head black, with ‘v’-shaped brown mark pointing towards posterior margin. Eyes, abdominal tergites black. Antennae and legs brown. Pronotum with a long median brown marking extending from anterior to posterior end. Meso- and metanotum black with typical dark brown markings as in Fig.1. Ventral coloration mainly black except for dark brown head, prosternum, and 8th abdominal sternite.

Structure. Head length 1.76 mm and width across eyes 1.49 mm, longer than broad, wide posteriorly. Interocular width 1.14 mm. Eyes distinct, black and ‘bean’ shaped, length 0.78 mm and width 0.51 mm. Antennae long, slender, without tubercles; length of antennal segments 1st to 4th (mm): 3.97 : 3.39 : 2.03 : 2.33; first antennal segment longer than rest. Rostrum long, 3.52 mm in length, reaching beyond the forecoxa. Pronotum broader than long, length 1.44 mm



Figs 1–6. *Eotrachus fuscus* sp. nov., apterous ♂ (holotype). 1 – dorsal view; 2 – ventral view; 3 – head and pronotum, dorsal view; 4 – abdominal tergites; 5 – abdominal sternites; 6 – right foreleg, ventral view.



Figs 7–12. Genitalia of *Eotrachus fuscus* sp. nov., ♂ (holotype). 7 – dissected genital segment, ventral view; 8 – pygophore with paramere, lateral view; 9 – pygophore, ventral view; 10 – 8th abdominal segment, ventral view; 11 – proctiger of male, dorsal view; 12 – dorsal endosomal sclerite.

Table 1. Measurements (mm) of different leg segments of apterous male of *Eotrechus fuscus* sp. nov. (holotype).

	Femur	Tibia	Tarsomere 1	Tarsomere 2
Fore leg	4.92	4.07	0.62	0.85
Middle leg	9.76	9.35	0.65	0.80
Hind leg	10.47	12.44	0.68	1.13

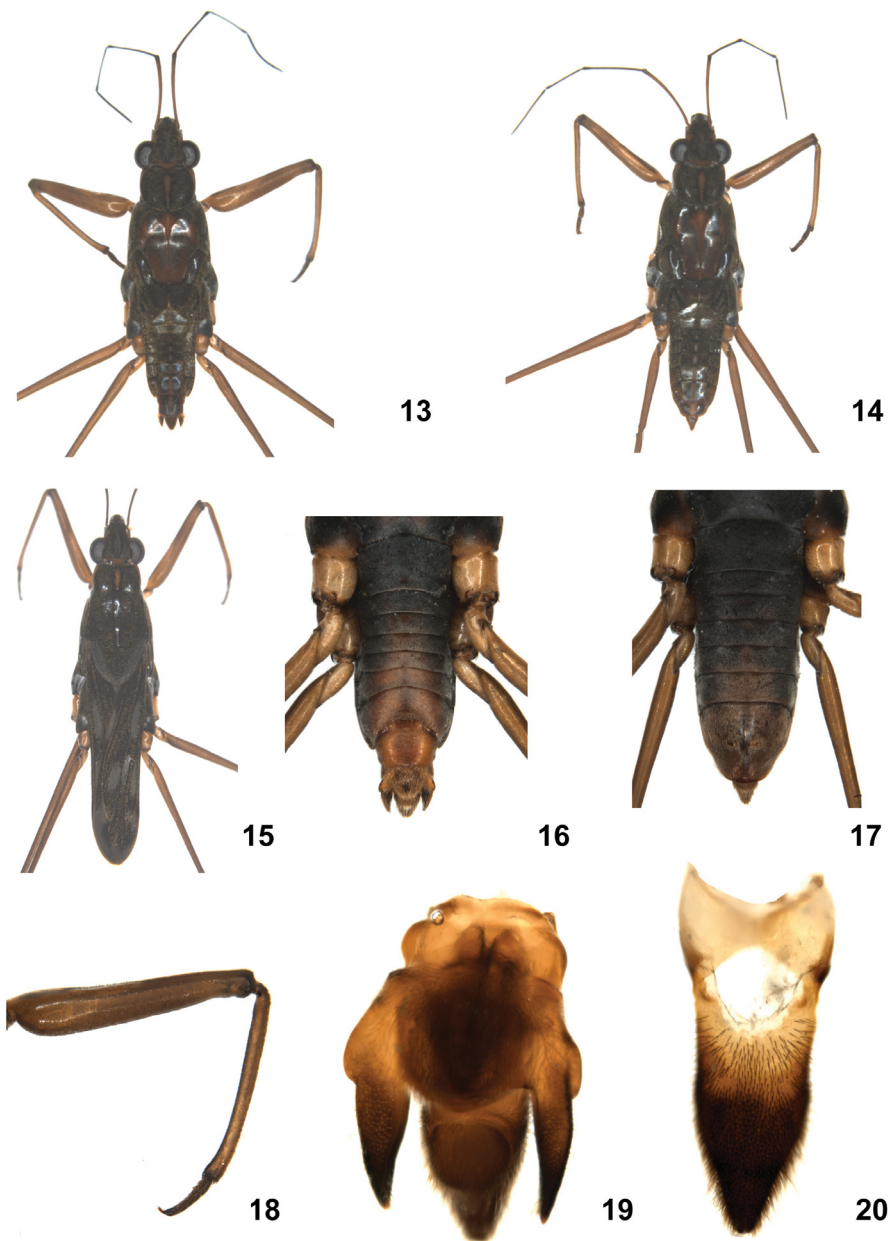
and width 1.69 mm, shorter than head length and with a distinct median ridge, stretching from anterior to posterior end. Total length of meso- and metanotum 3.39 mm and width 2.29 mm, with distinct carination (Fig. 3). Fore femur (Fig. 6) slender, without any modification, slightly incrassate basally, near margin of trochanter, fringed with short hairs along exterior margin, width of fore femur 0.45 mm. Fore tarsus dark brown, covered with numerous short setae, fore claws stout and distinct. Middle and hind legs long, slender and thickened proximally. Hind femur with numerous prominent denticles on inner margin. Claws well-developed, stout and sharply bent, length of fore, middle and hind claws 0.22 : 0.26 : 0.27 mm. Lengths of leg segments as provided in Table 1. Abdomen long, tergites I–VIII black to dark brown, elongated. Tergites I–VII covered with short golden setae, length of abdomen 4.90 mm and width 1.77 mm. Abdominal ventrites slightly depressed from 6th to 8th segment, posterior margin of 7th–8th segment moderately emarginated in middle, covered with long, brown hairs. Segment 8 relatively long with minute notch, projecting outward near posteromedial margin.

Male genitalia. Genital segments relatively large and modified, length 1.64 mm, width 0.90 mm. Proctiger (Fig. 11) distinctly bilobed, elongate, fringed with brush-like hairs, broad at both ends and with straight outer margin in middle. Dissected 8th segment (Fig. 10) of male with round posterior margin. Pygophore (Fig. 9) broad with pair of long curved outer projections, dorsally with long, dense patch of bristle-like hairs. Lateral view of pygophore as in Fig. 8, density of hairs increasing posteriorly. Paramere (Fig. 9) short, distinct, clove-shaped with blunt apex and without hairs. Dorsal view of the well developed endosomal sclerite as in Fig. 12.

Male (macropterous) and female. Unknown.

Differential diagnosis. The new species is closely related to *Eotrechus kalidasa* Kirkaldy, 1902, known from Burma and Assam, and possesses a very similar structure in regard to the fore femur, abdominal apex and pygophore. It can, however, be distinguished from other Indian congeners by the elongate, dark body; long antennae; slender and simple fore femur without any modifications; much longer sternum 7; broad pygophore, with a blunter apex when viewed laterally, and fringed with long hairs throughout, with the density of these hairs increasing apically; by the structure of proctiger, which is more elongate and distinctly bilobed; and the shape of the paramere, which is ‘clove’ shaped, without any hairs, and terminates in a blunt apex.

Eotrechus fuscus is similar to *E. kalidasa* in possessing a rather large and well-developed male paramere, although this structure is of a different shape in the two species, being stouter basally and less expanded distally in *E. fuscus*. In addition, the shape of the lateral process on the pygophore, when viewed laterally (Fig. 8), is thicker and somewhat more curved in *E. fuscus* than in *E. kalidasa*. Finally, the proctiger of *E. fuscus*, when viewed dorsally (Fig. 11), has small, angulate lateral lobes that are missing in *E. kalidasa*. These genital characters,



Figs 13–20. *Eotrechus longipes* Andersen, 1982, 13 – dorsal view of apterous male; 14 – dorsal view of apterous female; 15 – dorsal view of macropterous female; 16 – abdominal sternites of male; 17 – abdominal sternites of female; 18 – ventral view of male foreleg; 19 – pygophore, dorsal view; 20 – proctiger, dorsal view.

in combination with the darker ground coloration of *E. fuscus*, are sufficient to separate the two species.

Etymology. The Latin adjective *fuscus* (-a, -um), meaning dark, refers to the dark black coloration of the species.

Habitat. The type locality is a high altitude mountainous waterfall in Sikkim, in a pristine area. This species occurred on the vertical rock surfaces of the waterfall splashed with water and covered with moss and ferns. The habitat was disturbed to collect the specimen.

Distribution. India, Sikkim, so far known only from the type locality.

Eotrechus longipes Andersen, 1982

(Figs 13–20)

Material examined. INDIA: SIKKIM: 6 ♂♂ 3 ♀♀ (apterous), West Sikkim, Rimbi waterfalls, 27.314035°N, 88.186561°E, alt. 4153 ft [= 1266 m a.s.l.], 11.v.2015, coll. S. Basu (NZC-ZSI); 2 ♂♂ (apterous), 1 ♀ (macropterous), 2 ♀♀ (apterous), West Sikkim, Phamrong falls, 27.357853°N, 88.234138°E, alt. 4872 ft [= 1485 m a.s.l.], 11.v.2015, coll. S. Basu (NZC-ZSI).

Distribution. India: Arunachal Pradesh, Uttar Pradesh, West Bengal, Sikkim (THIRUMALAI 2002). **New species for Sikkim.**

Key to the known Indian species of *Eotrechus* (males)

- 1 Body mainly brown in color, covered with golden or green pubescence. 2
- Body mainly black in color, covered with golden pubescence. 3
- 2 Fore femur greatly incrassate throughout or basally. 4
- Fore femur simple and very slender, ventral surface without spine-like hairs; pygophore of male with elongated postero-lateral projections and bearing brush-like hairs.
..... *E. kalidasa* Kirkaldy, 1902
- 3 Body length less than 10 mm; fore femur moderately incrassate in basal part. 5
- Body length more than 10 mm; fore femur slender, without any modification, only slightly incrassate in basal part; pygophore broad with long hair tufts and a pair of long curved projections. *E. fuscus* sp. nov.
- 4 Body length more than 7 mm; genital segment large, ventrally flattened; pygophore sub-quadrangular, with a ventral, transverse depression and with lateral projections.
..... *E. brevipes* Andersen, 1982
- Body length more than 7 mm; genital segment wide with almost straight postero-ventral margin; pygophore broad, suboval with paired long bristle-like black hair tufts latero-ventrally. *E. pilicaudatus* Tran & Zettel, 2006
- 5 Male genital segment relatively large; pygophore suboval with a posteriorly-directed projection on each side, in lateral view, projection of pygophore with a small notch.
..... *E. longipes* Andersen, 1982
- Male genital segment depressed and medially grooved; pygophore basally constricted with lateral projection on each side, in lateral view, projection of pygophore without a small notch. *E. terrestris* Andersen, 1982

Discussion

A key to all known Indian species has been provided. The Indian species of *Eotrechus* are mostly restricted to the northeast portion of the country, mainly in the Eastern Himalayan region. However, there is also a report of *E. longipes* from the northwestern Himalayan region of India (Uttarakhand). During the recent survey, the first author collected *E. longipes* from the type locality of the new species, *E. fuscus*, which represents a new record for the state of Sikkim. Both species were found to inhabit the same habitat. There is thus a potential for discovery of other new *Eotrechus* species in India if extensive field surveys are undertaken in the Himalayan region.

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