

## THE GENUS *EOTRECHUS* (HETEROPTERA: GERRIDAE) IN VIETNAM, WITH DESCRIPTIONS OF TWO NEW SPECIES

**John T. Polhemus**

Colorado Entomological Institute, 3115 S. York St., Englewood, CO 80113 USA

Email: jtpolhemus@msn.com

**A. D. Tran**

Systematics and Ecology Laboratory, Department of Biological Sciences

National University of Singapore, 14 Science Drive 4, Singapore 117543

Email: tran.anhduc@nus.edu.sg

**Dan A. Polhemus**

Department of Natural Sciences, Bishop Museum, 1525 Bernice St., Honolulu, HI 96817 USA

Email: bugman@bishopmuseum.org

**ABSTRACT.** – Two new species of hygropetric water striders in the genus *Eotrechus* are described from Vietnam: *E. fansipan*, new species, from the Sa Pa area of northern Vietnam, and *E. pumat*, new species, from the Pumat Nature Reserve of north-central Vietnam. Figures of key morphological characters are given for both species. Discussion is also provided of the unusual habits of *E. brevipes* Andersen, which is recorded from Vietnam for the first time and shown to inhabit dry bedrock exposures with scattered clumps of grasses and sedges. Photographs are provided of this habitat and of the adjacent wet rheocrene type locality for *E. fansipan*.

**KEYWORDS.** – *Eotrechus*, new species, Vietnam, taxonomy.

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### INTRODUCTION

The genus *Eotrechus* was described by Kirkaldy (1902) to contain a single species, *E. kalidasa*, based on an indeterminate number of specimens collected by L. Fea at Carin Cheba, Burma (east of modern Toungoo). These specimens were said to be deposited in the Museo di Storia Naturale “Giacomo Doria” in Genoa, but possibly never returned there (Andersen, 1982). We have seen a male lectotype of this species in the Snow Entomological Museum in Lawrence, Kansas, and a female in the Distant Collection at the British Museum (these types were studied by Andersen, 1982). This species, and many others in the genus, have been rare in collections up to the present time, probably because collectors did not choose to scramble over slippery, vertical rock faces after creatures of unknown importance. As the ecology of *Eotrechus* species has become better understood, however, a number of substantial collections have been reported over the last decade, with new species described by Andersen (1982, 1998), Tran & Yang (2006), Tran & Zettel (2006), and Vitheepradit & Sites (2007) from various parts of southeast Asia and China, bringing the total number of known species to 14. With the addition of the two new species reported here, a total of 16 species are now

described. The four known species from Vietnam are keyed and discussed below.

*Eotrechus* species are generally considered to inhabit rheocrenes or waterfall splash zones, but are also known from wet trails or damp ground. During our collecting around the waterfalls in the Sa Pa area of northern Vietnam we even found *E. brevipes* running on perfectly dry, steep rock faces and hiding in clumps of grass amid the crevices on such cliffs, an unexpected discovery described in greater detail below. Although once thought to be the most primitive of the Gerridae because of their large terminal claws, the Eotrechinae are now considered to be among the most evolved of all water striders, representing a remarkable evolutionary reversal from aquatic to terrestrial existence (Andersen, 1982, 1995).

To date, all captures of *Eotrechus* in Vietnam have come from the northern half of the country. In particular, we have no records of this genus from the Central Highlands of Vietnam, despite the presence of many suitable habitats in that area. We independently made extensive collections of aquatic Heteroptera throughout the Central Highlands in 2001 (by J. T. Polhemus & D. A. Polhemus) and in 2003 & 2005

(by Tran A. D.) and found only the genus *Onychotrechus*, a smaller member of the Eotrechinae, inhabiting rheocene sites where *Eotrechus* might reasonably have been expected to occur. Therefore, we believe the absence of the latter genus in the central and southern sections of Vietnam may represent a true distributional anomaly, rather than an artifact of insufficient sampling.

**MATERIALS AND METHODS**

The material studied consisted of dry-mounted and alcohol-preserved specimens deposited in the following collections: Natural History Museum, London (BMNH), Bernice Bishop Museum, Honolulu, Hawaii (BPBM), J. T. Polhemus collection, Englewood, Colorado (JTPC), Natural History Museum Vienna (NHMW), United States National Museum, Washington, DC (USNM), Zoological Museum, Hanoi University of Science (ZMHU), Zoological Reference Collection, National University of Singapore (ZRC).

Measurements of new species refer to the holotype and the allotype. Body size measurements (length and width) are given as ranges based on randomly selected specimens. Length of the body was measured from the anterior margin of the head to the posterior tip of the last abdominal tergum. Width of the body was measured across the meso-acetabula. All measurements are given in millimetres. Illustrations were made using a camera lucida attached to a binocular microscope.

**TAXONOMY**

***Eotrechus* Kirkaldy, 1902**

*Eotrechus* Kirkaldy, 1902: 137 (type species: *Eotrechus kalidasa* Kirkaldy, 1902, by monotypy); Distant, 1903: 182; Matsuda, 1960: 249–251; Andersen, 1982: 5–8.

**KEY TO SPECIES OF *EOTRECHUS* OF VIETNAM**

- 1. Male pygophore with posterolateral projections bearing a finger-like process at apex. Female genitalia totally concealed by sternum VII and tergum VIII ..... *E. brevipes* Andersen
- Male pygophore with posterolateral projections (if present) without finger-like process at apex. Female genitalia not concealed by sternum VII and tergum VII ..... 2
- 2. Pronotum and mesonotum with a prominent light median longitudinal stripe, laterally with brownish markings, but not extensive light markings. Male genitalia without prominent posterolateral projections (Figs. 8, 10) ..... *E. fansipan*, new species
- Pronotum and mesonotum with extensive light markings medially and laterally. Male genitalia with prominent posterolateral projections (Figs. 14, 16) ..... 3
- 3. Male pygophore with a pair of prominent posterolateral digitate and flat projections ..... *E. vietnamensis* Tran & Yang
- Male pygophore with a pair of prominent posterolateral broad foliate processes, directed upward in lateral view (Figs. 14–16) ..... *E. pumat*, new species

***Eotrechus brevipes* Andersen, 1982**

(Figs. 1–3)

*Eotrechus brevipes* Andersen, 1982: 17–19, Figs. 13, 19, 25–27, 32–33 (type locality: Goom, Darjeeling, India); Andersen, 1998: 4–5 (descriptive notes).

**Material examined.** – INDIA: 1 apterous male, “N. India: Darjeeling, 7000 ft., 11–20.iii.1924, Maj. R.W.G. Hingston / Everest Exp. Brit. Mus. 1924-386” (paratype, BMNH); 1 macropterous female, “Gopaldhara, Darjeeling, 4720 [not 4729 as in Andersen, 1982]–6100 ft., on wet ground, 24-7-17, H. Stevens, Brit. Mus. 1922-307” (paratype, BMNH); 1 apterous female, NW Bengal, Rimbik-Srikhola, 2,650m, coll. E. Kučera, 15–27 May 2006 (NHMW). VIETNAM, **Lao Cai Prov.**: 5 apterous males, 13 apterous females, dry steep rockface, 17 km northwest of Sa Pa, 1,935 m. [6,350 ft.], 22°21'17"N 103°46'28.3"W, 8 Apr.2000, 1115–1300 hrs., CL 4401, coll. J.T. Polhemus, D.A. Polhemus & P. Nguyen (USNM, JTPC, ZRC).

**Diagnosis.** – Size: apterous male, length 7.35, width 2.28; apterous female, length 6.80, width 2.51. Colour as in Andersen (1982).

Body mainly brown, covered with green reflective pubescence. Antennae about 0.7× body length, first antennal segment shorter than head width across eyes. Male fore femur strongly incrassate (slightly less in female) and not spinose; fore tibia slightly curved with a small projection on apex. Abdomen relatively short. Male sternum VII about 1.66× length of two preceding sterna combined, posterior margin emarginated with a broad medial notch (about 1/3 of sternum VII length). Male pygophore with a pair of posterolateral projections, each projection with a finger-like process. Female genital segments concealed, proctiger covered by tergum VIII.

**Remarks.** – The specimens listed above represent the first record of this species for Vietnam, and represent a range extension of 1,700 kilometres from the original type locality at Darjeeling, India (Andersen, 1982). This, in combination with other records (see below) implies that the species is distributed along the entire southern margin of the Himalayan uplift from Assam, through Burma and Yunnan, to Vietnam. It has likely been overlooked because of its odd ecological habits, as described in the following section.

**Ecological notes.** – *Eotrechus brevipes* is notable among members of the family Gerridae for exhibiting an essentially terrestrial mode of existence. At the Vietnamese locality 17 km northwest of Sa Pa, this species was found inhabiting clumps of grasses and sedges clinging to an exposure of dry, brown bedrock adjacent to a waterfall and associated lateral rheocrenes (Figs. 1–3). Specimens of *E. brevipes* were found only in this dry setting, where they sheltered at the bases of the vegetation clumps (Fig. 3). If disturbed, they were able to move across the steeply sloping rock face with great rapidity to another patch of sedges or grasses, and were therefore most easily collected by application of a light pyrethrin fog, which slowed their movements and caused them to emerge from their hiding places. The striking color pattern of this species, consisting of longitudinally parallel orange and green stripes, although conspicuous in a collection tray, in



Figs. 1–3. Type locality for *E. fansipan*, new species, at a waterfall 17 km. northwest of Sa Pa, Vietnam. Both *E. brevipes* and *E. fansipan*, new species, occurred at this location. 1, general view of waterfall and surroundings, showing wet rheocrenes adjacent to the fall itself, on the left side of the photo, which provided habitat for *E. fansipan*, new species, and dry slopes to the right side of the photo, which provided habitat for *E. brevipes*. The senior author, standing to the right of the fall, provides scale; 2, lateral view of fall, showing dry bedrock faces in the foreground on which *E. brevipes* occurred; the photo was taken from near the position of the senior author in Fig. 1; 3, detail of *E. brevipes* habitat, showing clumps of vegetation scattered on open bedrock. Individuals of *E. brevipes* sheltered within the vegetation clumps.

fact provides a remarkably effective camouflage amid the green stems and brownish earth of the vegetation clumps in which this species hides. A search of the adjacent wet rheocrenes in closer proximity to the waterfall produced no further captures of *E. brevipes*; instead, these wet rheocrenes were inhabited by *E. fansipan*, new species (see subsequent description). Therefore, it appears that at this single locality, two distinct *Eotrechus* species were segregating rock face habitats on the basis of moisture regime. The unusual preference of *E. brevipes* for dry, partially vegetated rock faces may also explain the relative dearth of captures for this species, given that most collectors would not search for water striders in such settings.

**Distribution.** – India (Sikkim and West Bengal), China (Fukien), and Vietnam (north-western area).

***Eotrechus fansipan*, new species**

(Figs. 1, 4–10, 17)

**Material examined.** – Holotype (apterous male) and allotype (apterous female): VIETNAM, **Lao Cai Prov.**, waterfall, 17 km northwest of Sa Pa, 1,935 m. [6,350 ft.], 22°21'17.0"N 103°46'28.3"W, water temp. 18.5°C., 8 Apr.2000, 1115–1300 hrs., CL 4401, coll. J.T. Polhemus, D.A. Polhemus & P. Nguyen (USNM).

Paratypes: VIETNAM, **Lao Cai Prov.**: 32 apterous males, 35 apterous females, same locality data as holotype (USNM, JTPC, BPBM, ZRC); 5 apterous males, 2 apterous females, 1 macropterous female, rocky streamlet with cascades, 16 km northwest of Sa Pa, 1,890 m. [6,200 ft.], 22°21'28.4"N 103°46'36.8"W, water temp. 17°C., 8 Apr.2000, 1330–1430 hrs., CL 4402, coll. J.T. Polhemus, D.A. Polhemus & P. Nguyen; 9 apterous males, 6 apterous females, 1 macropterous female, Bac Waterfall and smaller side waterfall, 15 km northwest of Sa Pa, 1,829 m. [6,000 ft.], 22°21'39.7"N 103°46'39.5"W, water temp. 19°C., 8 Apr.2000, 1500–1600 hrs., CL 4403, coll. J.T. Polhemus, D.A. Polhemus & P. Nguyen.

**Description.** – Size: apterous male, length 7.66–8.50 (holotype 8.50), width 2.48–2.74 (holotype 2.74); apterous female, length 8.55–9.49 (allotype 9.20), width 2.77–2.94 (allotype 2.87); macropterous female, length 9.54–9.60, width 2.61–2.77.

**Colour.** Apterous form: Dorsum mainly brown, covered with golden pubescence, with yellow markings on head, pronotum, and mesonotum as follows: head with yellow markings on anterolateral corners, next to inner margin of eyes, and a yellow marking on posterior margin; pronotum with yellow median longitudinal stripe, in lateral view with two yellow markings, one longer in upper part and one shorter on lower part; mesonotum mainly dark brown, with yellow median stripe running from anterior to posterior margin and tapering posteriorly, anterior part expanded laterally. Pro-, meso-, metasternopleura, meso- and meta-acetabula with dense patches of reflective silvery pubescence. Metanotum, abdominal tergites mainly dark brown, tergites II–VII usually with narrow yellowish median stripe. All leg segments (including coxae) yellowish, except tarsi dark brown. Ventral body with prosternopleuron yellow; meso-

and metasternopleura usually dark brown; abdominal venter mainly light brown.

**Structural characteristics.** Apterous male (holotype): Head width across eyes 1.80; interocular width 1.00; eye kidney-shaped in dorsal view, length 0.87. Antennae about 0.77× body length (6.55: 8.50), lengths of segments I–IV: 1.92: 1.56: 1.21:1.86; first segment with 5–6 black spines on apical part. Pronotum broader than long, shorter than head length (1.08: 1.49); mesonotum length 1.80. Lengths of mesosternum and metasternum: 2.28 and 0.71. Lengths of leg segments (femur: tibia: tarsal segment I: tarsal segment II) as follows, fore leg: 2.93: 2.71: 0.27: 0.52; middle leg: 7.30: 6.80: 0.67: 0.60; hind leg: 7.50: 7.70: 0.69: 0.67. Fore femur (Fig. 4) incrassate, length about 4.65× maximum width (2.93: 0.63), slightly constricted before apex, basal part with broad tubercle bearing patch of minute dark hairs; ventral surface of femur with a row of about 10 spine-like hairs; fore tibia slightly curved in the middle, long spine-like hairs scattered on external side and denser at apical part (Fig. 4). Mid- and hind femora slender and slightly shorter than body. Mid- and hind trochanters without spines, mid- and hind femora with scattered black spines. Lengths of fore, mid, and hind claws: 0.16: 0.25: 0.25. Abdomen relatively short, venter medially depressed from segment III to VI and more broadly depressed on segment VII, length of abdominal venter from sternum II to sternum VII: 1.96; sternum VII about 1.48× length of two preceding sterna together (0.71: 0.52), posterior margin deeply emarginate, around 2/5 of sternum VII length, margin with long, soft, brown hairs (Fig. 8). Abdominal segment VIII long (dorsal length 0.87, ventral length 0.83), with posteroventral margin almost straight; abdominal spiracle of segment VIII not produced into minute tubercle. Genital segments relatively large, modified as follows: Proctiger trilobate (Fig. 7), posterolateral lobes small, ventrocaudal surface of proctiger with dense patch of long, brushlike hairs (Figs. 6, 7) (not visible in situ). Pygophore moderately long in ventral view and constricted on central section (Fig. 8), two small tubercles near the narrowest part bearing long soft hairs (more visible in dorsal view) (Fig. 10); ventral surface convex, round in lateral view (Fig. 9); posterior part produced into short plate-like structure, with dense patch of long soft hairs on ventrolateral sides, apical margin almost straight (Fig. 10). Paramere very short, blunt, with some soft hairs on apex.

Apterous female (allotype): Head width across eyes 1.78; interocular width 1.02; eye kidney-shaped in dorsal view, length 0.84. Antennae about 0.70× of body length (6.41: 9.20), lengths of segments 1-4: 1.82: 1.58: 1.19: 1.82; first segment with about 7 black spines on apical part. Pronotum broader than long, shorter than head length (1.03: 1.40), mesonotum length 2.03. Lengths of mesosternum and metasternum: 2.33 and 0.79. Lengths of leg segments (femur: tibia: tarsal segment I: tarsal segment II) as follows, fore leg: 2.94: 2.48: 0.37: 0.59; middle leg: 7.20: 6.60: 0.68: 0.67; hind leg: 7.20: 7.25: 0.70: 0.70. Fore femur slender, length about 6.68× maximum width (2.94: 0.44), slightly tapering towards apex, base without tubercle; ventral surface with about 12 spine-like hairs in a row; fore tibia almost straight,

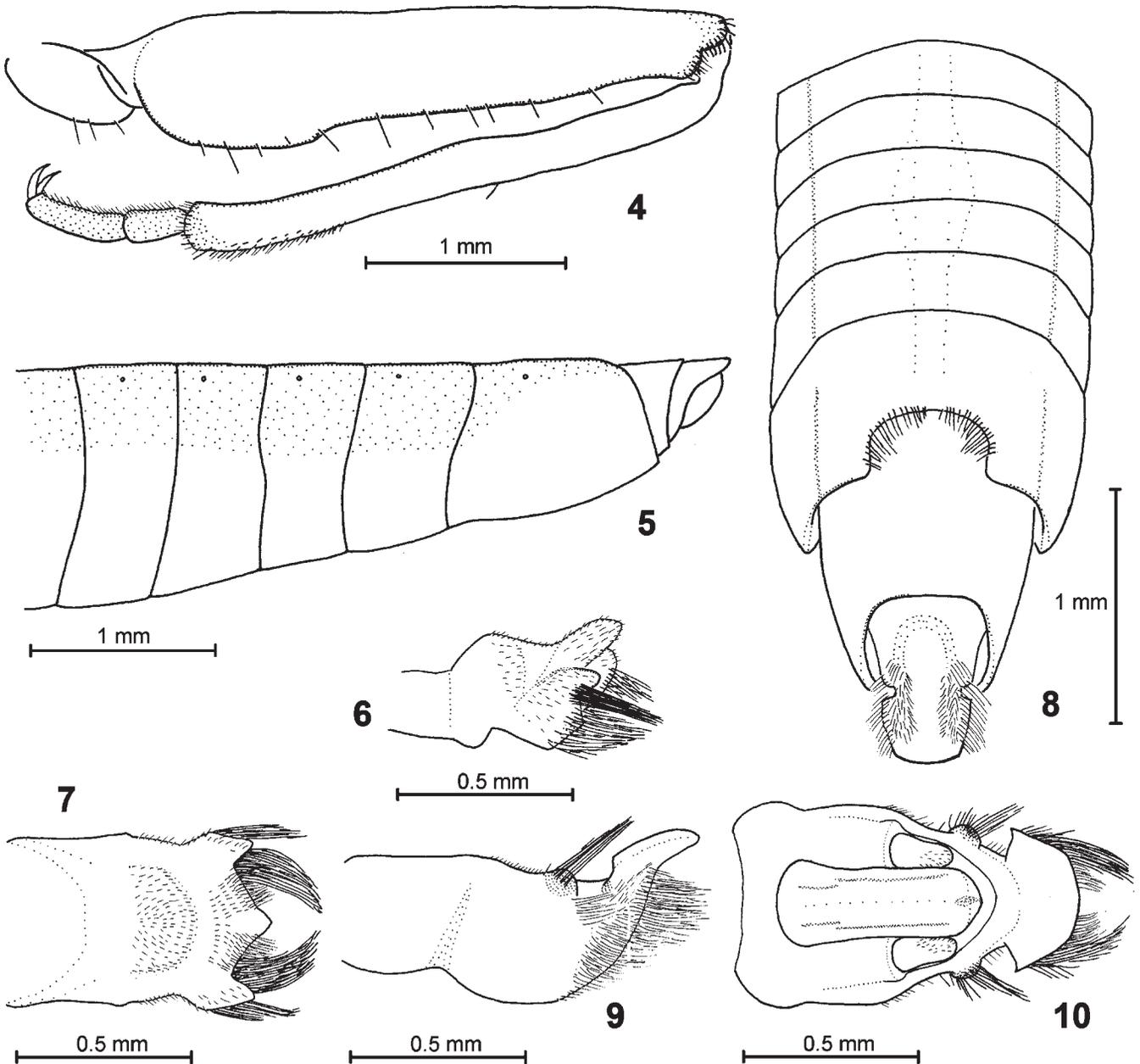
with many long black spine-like hairs along external side, particularly on distal part. Mid- and hind femora slender, slightly shorter than body. Mid- and hind trochanters without spines, mid- and hind femora with black spines scattered distally. Lengths of fore: mid: hind claws: 0.20: 0.24: 0.24. Abdomen (Fig. 5) moderate in length, length of abdominal venter from sternum II to sternum VII: 3.38; sternum VII large, slightly tapering towards apex, length about 1.10× length of two preceding sterna combined (1.10: 1.00), posterior margin smooth. Genital segments not concealed by sternum VII; proctiger acute.

**Remarks.** – *Eotrechus fansipan*, new species, is closely related to *E. pingae* Andersen, 1998 (*E. pingae* is known from a single male specimen only) and *E. luaae* Tran & Zettel,

2006, especially in the structure of fore leg and genitalia. However, closer examination shows significant differences that separate the former from the other two (Table 1).

**Etymology.** – The name of this species is a noun in apposition and refers to Mt. Fansipan, the highest mountain in Vietnam, which is located near the type locality.

**Ecological notes.** – The type series of *Eotrechus fansipan*, new species, was taken on wet bedrock faces adjacent to a wide, unshaded waterfall along the road from Sa Pa to Lai Chau. The waterfall was set slightly back from the road on the upstream side, and the majority of specimens were taken on the wet rheocrenes to the right side of the fall when looking upstream (Fig. 1). The surrounding vegetation consisted of



Figs. 4–10. *Eotrechus fansipan*, new species, structural details: 4, male foreleg; 5, female abdomen, left lateral view; 6, male proctiger, left lateral view; 7, male proctiger, dorsal view; 8, male terminal abdomen, ventral view; 9, male pygophore, left lateral view; 10, male pygophore, dorsal view.

Table 1. Key characters separating *E. fansipan*, new species, *E. pingae* and *E. luaae*

Male	<i>E. fansipan</i> , new species	<i>E. pingae</i>	<i>E. luaae</i>
Fore tibia	- Internal side curved at middle	- Almost straight	- Almost straight
Abdominal venter	- Median groove from sternum III to VI, less conspicuous	- Median groove from sternum II to VII, narrow and deep	- Median groove from sternum III to VII, less conspicuous
Abdominal segment 8, venter	- Posterior margin straight, without median process	- Without median process	- With small acute median process
Proctiger	- Posterolateral lobes small - With patch of long hairs on ventrocaudal surface	- Posterolateral lobes large - Without such hair patch	- Posterolateral lobes large - With patch of long hairs similar to <i>E. fansipan</i>
Pygophore	- Medium length - Lateral tubercles small - Posterior plate short and broad - With ventrolateral dense hair patches	- Short - Tubercles large - Posterior plate short and broad - Without ventrolateral hair patches	- Long and slender - Without lateral tubercles - Posterior plate narrow, tapering towards apex - With less dense ventrolateral hair patches

disturbed montane subtropical forest, intermixed with dry bedrock exposures and grassy slopes. The stream below the falls dropped steeply downhill through a boulder-strewn channel and passed under the road bridge via a series of shaded pools, which harbored the unusual veliid *Velia tonkina*; see Polhemus & Polhemus (2003) for further discussion of this interesting locality.

### *Eotrechus pumat*, new species

(Figs. 11–17)

**Material examined.** – Holotype (apterous male) and allotype (apterous female): VIETNAM, **Nghe An Prov.**, Kem waterfall, Pu Mat Nature Reserve, 400 m [1,310 ft.], coll. J.T. Polhemus, 01 Apr.2000, CL 4385 (USNM).

Paratypes: VIETNAM, **Nghe An Prov.**: 8 apterous males, 8 apterous females, same data as holotype (USNM, JTPC, ZRC).

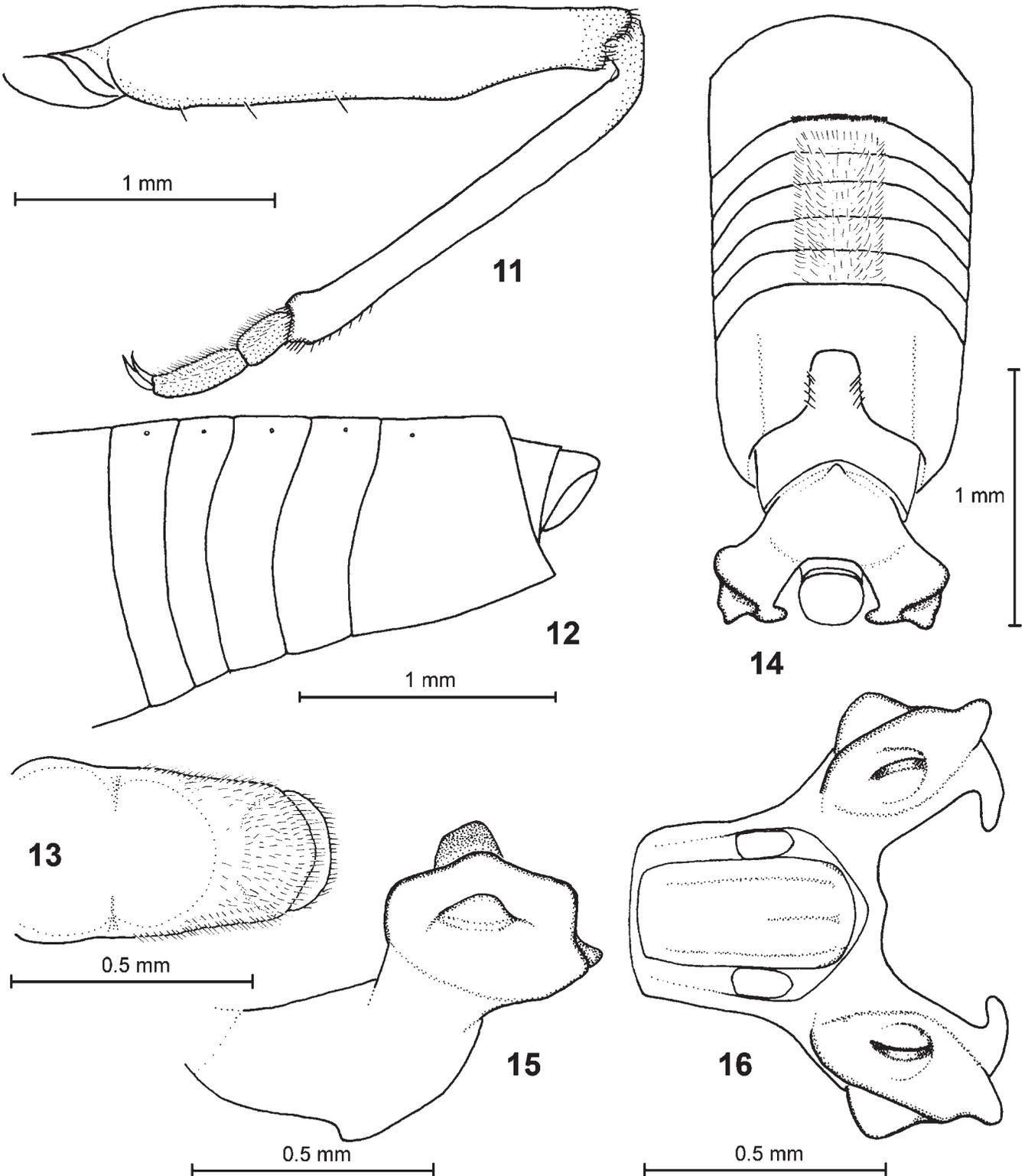
**Description.** – Size: apterous male, length 5.72–6.10 (holotype 5.9), width 1.99–2.19 (holotype 2.13); apterous female, length 6.49–8.44, width 2.33–2.55.

Colour. Apterous form, body mainly brown (ventral side usually paler) with yellowish brown markings dorsally; dorsal surface covered with silvery or greenish pubescence. Head with one narrow median yellow stripe, anterolateral corners and posterior margin yellow. Antennae yellow to brown. Pronotum with five longitudinal yellow stripes on dorsal and lateral sides. Mesonotum mainly brownish yellow with six longitudinal markings: two slender dark brown lateral stripes, two slender dark brown sub-lateral stripes and two brown markings in the centre. Metanotum and abdominal tergum mainly dark brown. Pro-, meso- and metasternopleura with dense silvery and reflective patches of pubescence. Legs with all coxae, trochanters and femora yellow (slightly darker in females), all tibiae and tarsi brown.

Structural characteristics. Apterous male (holotype): Head width across eyes 1.36; interocular width 0.83; eye kidney-shaped in dorsal view, length of eye 0.65. Antennae about 1.03× body length (6.06: 5.90), lengths of segments I–IV: 1.88: 1.49: 1.17: 1.52; first segment with 6 black spine-like hairs in apical part. Pronotum broader than long, slightly shorter than head length (0.79: 1.19). Lengths of mesosternum and metasternum: 1.92 and 0.43. Posterior margin of metasternum with a median fringe of short black hairs (Fig. 14). Lengths of leg segments (femur: tibia: tarsal segment I: tarsal segment II) as follows: fore leg: 2.33: 1.88: 0.22: 0.37; middle leg: 6.35: 4.75: 0.67: 0.57; hind leg: 6.60: 5.30: 0.79: 0.59. Fore femur (Fig. 11) slightly concave at the middle part of ventral side and constricted at apical part, length about 6.13× maximum width (2.33: 0.38), ventral surface with three black stout hairs on basal half (two hairs in other paratypes); fore tibia straight, with few long black spine-like hairs on apical margin, fore tarsus covered with long, soft yellowish hairs. Middle and hind femur slender and slightly longer than the body, with scattered small brown spines (more on middle femur). Claws stout, lengths of fore, mid- and hind claws: 0.19: 0.22: 0.22. Abdomen (Fig. 14) short, length of abdominal venter from sternum II to sternum VII = 1.11, with patch of long yellow hairs on median sterna II–VI. Sternum VII about 2.13× length of two preceding sterna combined (0.51: 0.24), posterior margin with very deep rectangular median notch (about half the length of sternum VII) (Fig. 14). Genital segments large, pygophore with a pair of broad and thick posterolateral processes, as in Figs. 14–16, these processes directed upward in lateral view (Fig. 15); on each side of the process (dorsal and ventral) with a prominent tubercle (visible in lateral and dorsal view, Figs. 15, 16); in dorsal and ventral view, each process with a small finger-like process directed inwards (Fig. 14, 16). Proctiger simple, elongate, unmodified (Fig. 13). Parameres small and blunt.

Apterous female (allotype): slightly bigger than the male. Head width across eyes 1.40; interocular width 0.84; eye kidney-shaped, length 0.63. Antennae about 0.8× of body length (5.41: 6.80), lengths of segments I–IV: 1.55: 1.29: 1.06: 1.51; first segment with 2–3 black spines sub-apically. Pronotum slightly shorter than head length (0.79: 1.11).

Lengths of mesosternum and metasternum: 2.21 and 0.56. Lengths of leg segments (femur: tibia: tarsal segment I: tarsal segment II): fore leg: 2.16: 1.86: 0.27: 0.40; middle leg: 6.70: 4.80: 0.75: 0.63; hind leg: 6.90: 5.30: 0.90: 0.62. Fore femur simple and slender, length about 6.8× maximum width (2.16: 0.32), ventral surface with 3 to 5 black spine-



Figs. 11–16. *Eotrechus pumat*, new species, structural details: 11, male foreleg; 12, female abdomen, left lateral view; 13, male proctiger, dorsal view; 14, male terminal abdomen, ventral view; 15, male pygophore, left lateral view; 16, male pygophore, dorsal view.

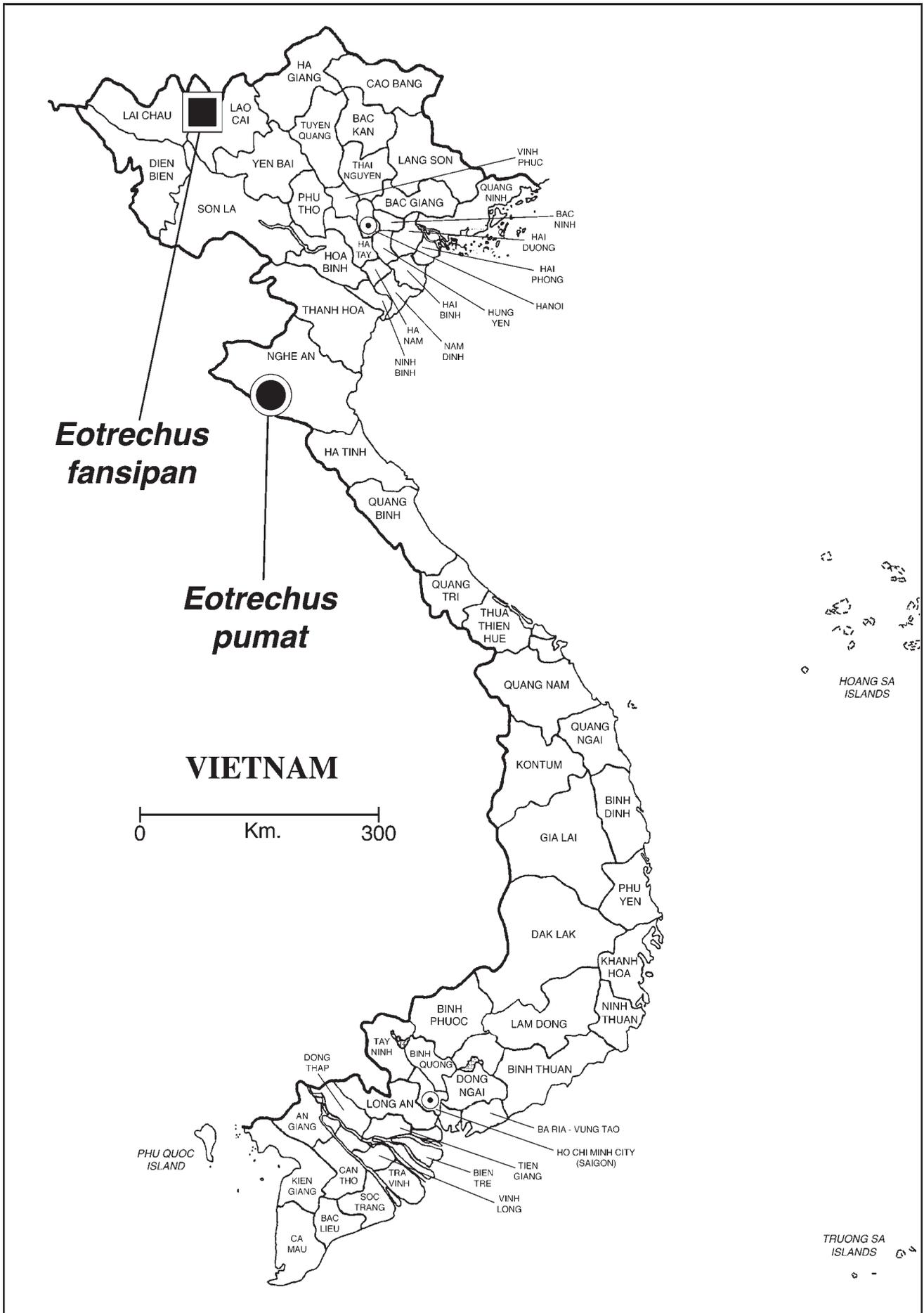


Fig. 17. Distributions of new species of *Eotrechus* in Vietnam: square = *E. fansipan*, new species; circle = *E. pumat*, new species.

like hairs; fore tibia straight with some long black spines on apical margin, fore tarsus covered with long, soft yellowish hairs. Middle and hind femur slender and subequal to body length, scattered with small brown spines (more on middle femur). Claws stout, lengths of fore, mid- and hind claws: 0.19: 0.24: 0.24. Length of abdominal venter from sternum II to sternum VII about 0.29× body length (1.98: 6.80). Venter of sterna II–VII without patch of long hairs. Sternum VII about 1.63× length of two preceding sterna together (0.83: 0.51), posterior margin straight. Genital segments not concealed, proctiger round and slightly deflected (Fig. 12).

**Remarks.** – *Eotrechus pumat* is closely related to *E. vietnamensis* Tran & Yang, 2006. They share similar characteristics, including the dorsal colour pattern, the structure of the male fore femur (Fig. 11), and modifications of the male and female pregenital abdomen (Figs. 12, 14). Females of these two species are indistinguishable. These similarities suggest that they may be sister species. However, *E. pumat* can be easily separated from the latter by the unique structures of male genitalia (Figs. 14–16).

**Etymology.** – The name of this species is a noun in apposition and refers to the type locality, the Pu Mat Nature Reserve in north-central Vietnam.

**Ecological notes.** – The type series was collected from Kem waterfall (Thac Kem) at the end of a trail in the Pu Mat Nature Reserve (Fig. 17). This waterfall flows down over a rather irregular rock face into a large plunge pool below; an excellent color photo of this waterfall is provided in Sites & Vitheepadit (2007, pg. 18). The *Eotrechus* specimens moved rapidly over the slippery face of the waterfall, and were quite difficult to capture.

#### *Eotrechus vietnamensis* Tran & Yang, 2006

*Eotrechus vietnamensis* Tran & Yang, 2006: 11–20, Figs. 1–6, 26 (type locality: Tam Dao, Vinh Phuc, Vietnam).

**Material examined.** – VIETNAM, Vinh Phuc Prov.: 1 apterous male, 1 apterous female, Tam Dao National Park, Suoi Thac Bac (near Doi Che), coll. A.D. Tran & Q.K. Hoang, 17 Jun. 2003, TAD0351 (holotype and allotype, ZMHU). For paratypes, see Tran & Yang (2006).

**Diagnosis.** – Dorsal body with yellow markings on brown background (see Tran & Yang, 2006: fig. 26). Antennae longer than body length, first antennal segment longer than width of head across eyes. Abdomen relatively short in both sexes. Male sternites II–VI with patch of long hairs on median line, sternum VII with a deep rectangular median notch. Male genital segments large, pygophore broadly suboval, with a pair of disto-lateral projections, each directed obliquely upwards, plate like, and with slightly pointed apex in lateral view.

**Remarks.** – See remarks for *E. pumat*.

**Distribution.** – Northern Vietnam: Vinh Phuc, Ba Vi, Lai

Chau, Dien Bien, and Lao Cai provinces (Tran & Yang, 2006).

**Habitats.** – This species occurs on wet bedrock faces and rheocrenes; see discussion in Tran & Yang (2006).

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