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A new species of *Helotrephes* Stål, 1860 (Insecta: Hemiptera: Heteroptera: Helotrephidae) from Nan Province, Thailand

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Abstract

A new species of *Helotrephes* Stål, 1860 is described: *Helotrephes grossepunctatus* sp.n. from Nan Province in Thailand belongs to the *H. sausai* species group, which is distributed in various mountain ranges of Southeast Asia and southern China. Its closest relatives are *H. monticola* Zettel, 2000 from the Doi Inthanon (Chiang Mai Province, Thailand) and *H. komareki* Zettel, 2004 from Zengcheng (Guangdong Province, China). A key to males of the *H. sausai* species group is added.

Key words: Helotrephidae, *Helotrephes*, new species, stream, Thailand, Oriental.

Zusammenfassung

Eine neue Art der Gattung *Helotrephes* Stål, 1860 wird beschrieben: *Helotrephes grossepunctatus* sp.n. aus der Provinz Nan in Thailand gehört in die *H. sausai*-Artengruppe, die in den verschiedenen Gebirgszügen Südostasiens und Südchinas verbreitet ist. Die nächsten Verwandten sind *H. monticola* Zettel, 2000 vom Doi Inthanon (Provinz Chiang Mai, Thailand) und *H. komareki* Zettel, 2004 aus Zengcheng (Provinz Guangdong, China). Ein Bestimmungsschlüssel zu den Männchen der *H. sausai*-Artengruppe wird vorgestellt.

Introduction

Helotrephes Stål, 1860 is among the most diverse genera of the aquatic family Helotrephidae. It can be distinguished from other helotrephids by the presence of carinae on abdominal sterna 4–5 or 4–6. Most species of the genus occur on the mainland of Southeast Asia and in southern China, and few occur on the islands of Java, Borneo, and Taiwan. Zettel & Polhemus (1998) treated 15 species and placed them in five species groups, but several species have been described since, so that the genus currently comprises 30 species in six species groups. Hitherto six species have been placed in the *H. sausai* species group (Zettel & Polhemus 1998, Kovak & Papáček 2000, Zettel 2000, 2004, 2005), and one new species is added here. All are very rarely collected, and four of the seven species were described from elevations higher than 700 m a.s.l. According to existing data, they are all regional endemics, with restricted distribution in southern China, northern Thailand, and northern Vietnam.

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Material and methods

Of the new species, only a single imago, the holotype, is available. It has been photographed and afterwards dissected to produce Figures 4–8; it is deposited in the collection of the Natural History Museum Vienna, Austria. Two nymphs of *Helotrephes*, which were sampled with the holotype, are possibly conspecific. They are stored in 96 % ethanol for the purpose of molecular studies and will be deposited in the collection of Khon Kaen University, Thailand.

The verbal descriptions of new species including morphometric measurements largely follow previous descriptions of congeners (e. g., Zettel 2006, 2009). A Leica Wild M10 stereomicroscope with magnification of up to 108× and equipped with a camera lucida was used for measurements (given in millimetres) and for the drawing of Figures 4–8. The photographs of Figures 1–3 were taken with a Leica DFC camera attached to a Leica MZ16 binocular microscope using Leica Application Suite V3. They were stacked with ZereneStacker 64-bit. Processing of images was performed with Adobe Photoshop 7.0.

The *Helotrephes sausai* species group

Diagnosis (after Zettel & Polhemus 1998, slightly modified): Large species, body length 3.1–3.9 mm. Colour varying. Cephalonotum with fine punctures, more or less shiny; hind margin of cephalonotum without tubercles. Pronotal plate posteriorly not dilated, with convergent sides. Prosternal carina with a more or less deep emargination posteriorly. Male genitalia: aedeagus of most species with distinct apical plate (but lacking in *H. trani*); left paramere usually stout, with modified apex (except with simple pointed apex in *H. sausai*); right paramere variable. Female (unknown in some species): sternum 6 with straight hind margin. Subgenital plate (sternum 7) with a short, triangular or tongue-like, never stalked, middle lobe.

The following key includes the seven species of the *H. sausai* species group plus the isolated species *H. confusus* (a similarly large montane species; see Zettel 2009) for practical reasons.

Identification key to the species of the *H. confusus* and *H. sausai* species group (males only)

1 Posterior incision of pronotal plate wide and shallow. **2**

– Posterior incision of pronotal plate narrow (e. g., Fig. 4), deep or shallow. **4**

2 Posterior outline of aedeagus straight. Vietnam. (The only species of *H. confusus* group.) ..... ***H. confusus* Zettel, 2009**

– Posterior outline of aedeagus with distinct subapical convexity. **3**

3 Prosternal carina deeply incised. Left paramere slender and acuminated. China (Yunnan). ..... ***H. sausai* Zettel, 1995**

– Prosternal carina shallowly incised. Left paramere stout and truncated. Vietnam. ..... ***H. trani* Zettel, 2005**

4 Apical plate of aedeagus large. Posterior incision of pronotal plate deep. **5**

– Apical plate of aedeagus small (e. g., Fig. 6). Posterior incision of pronotal plate shallow or deep. **6**

5 Right paramere apically acuminate. Thailand (northern Chiang Mai). .... ***H. major* ZETTEL & POLHEMUS, 1998**

– Right paramere apically slightly truncated. Thailand (Chiang Mai: Doi Inthanon). ..... ***H. steiningeri* KOVAC & PAPÁČEK, 2000**

6 Posterior incision of pronotal plate round and wide. China (Guangdong). .... ***H. komareki* ZETTEL, 2004**

– Posterior incision of pronotal plate angular and narrow (Fig. 4). **7**

7 Punctures at base of elytra of moderate size. Thailand (Chiang Mai: Doi Inthanon). ..... ***H. monticola* ZETTEL, 2000**

– Punctures at base of elytra very large (Figs. 2, 3). Thailand (Nan: Mae Charim). ..... ***H. grossepunctatus* sp.n.**

Helotrephes grossepunctatus sp.n. (Figs. 1–8)

Etymology: Named after the very large punctures at the base of hemielytra.

Type material: Holotype (hindwing-micropterous male): "Thailand: Nan Prov., Mae Charim N.P., Huay Tao Ranger Station, Huay Nam Pang, 18°35.112' N 101°04.102' E, 520 m, leg. Narumon Sangpradub" (NHMW).

Type locality and habitat: Thailand, Nan Province, Mae Charim National Park, Huay Tao Ranger Station, Huay Nam Pang, close to office of Ranger Station, 18°35.112' N, 101°04.102' E, 520 m a.s.l. The specimens were collected in a steep section of the stream, which is 6.9 to 8.7 m wide at the site and flows through primary forest. The substrate consisted of 10 % boulder, 40 % cobble, 45 % sand, and 5 % litter. The site was not disturbed from human activity.

Description of hindwing-micropterous male: Body length 3.25 mm; maximum width at cephalonotum 2.36 mm.

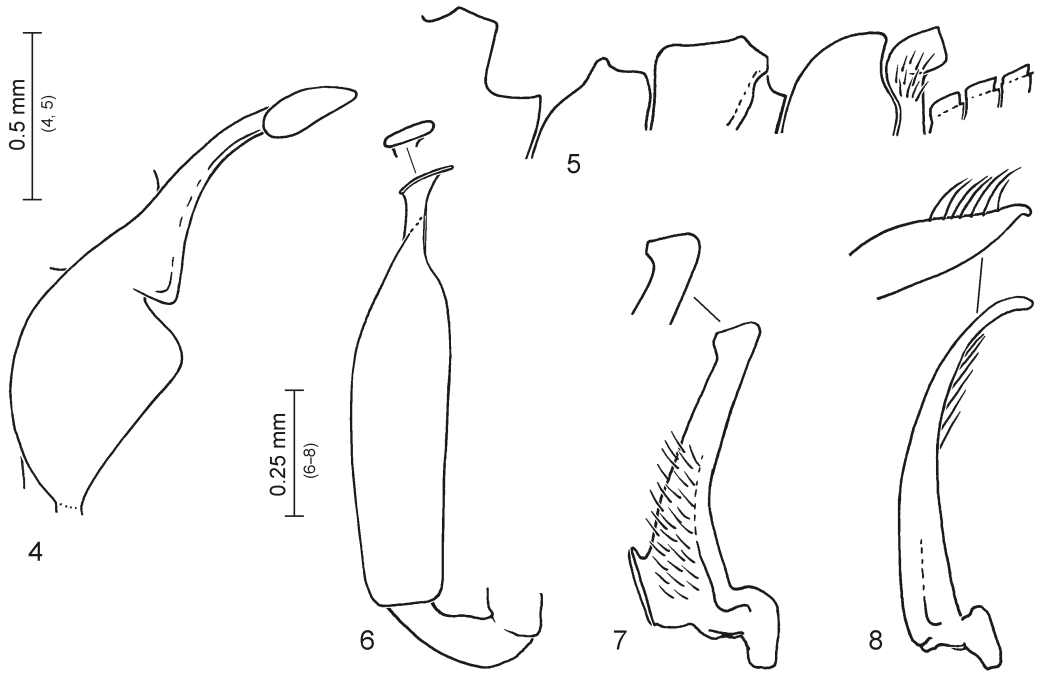
Colour: Cephalonotum mainly yellowish brown to dark brown; base of mesoscutellum blackish. For pattern of cephalonotum, mesoscutellum, and hemielytra see Figures 1–3. Ventral surface yellowish brown, sides of sterna darker. Legs, antennae, and base of rostrum yellowish; segment 4 of rostrum dark brown.

Cephalonotum shiny. Head with fine punctures, their distances mostly larger than their diameter; interspaces with very fine micropunctures, especially on anterior half of head. Pronotum with punctures of slightly larger size than on head, on disk their distances about 1–2 times diameter of punctures, more densely set posteriorly and laterally. Genal plate very narrow. Pronotal plate anteriorly very narrow, in middle of hind margin with narrow and relatively shallow incision (Fig. 4). Inner corner of propleural plate truncate. Eye index: 3.1 (minimum distance of eyes 1.23 : maximum eye width 0.40). Fourth rostral segment 2.05 times as long as segment 3 (0.45 : 0.22). Mesoscutellum ca. 1.1 times as long as wide, punctures larger than on cephalonotum, but much smaller than on hemielytron; interspaces about 1–2 diameters wide, bearing very fine micropunctures. Hemielytron matt, with very large and coarse punctures; in anterior half alveolate, diameter of punctures about 3–4 times as large as punctures on adjacent areas of

Figs. 1–3: Habitus of *Helotrephes grossepunctatus* sp.n., holotype, in (1) frontal, (2) lateral, and (3) dorsal view. © Harald Bruckner.

cephalonotum; their distances about half diameter of punctures or even smaller; size of punctures becoming steadily smaller towards apex, posteriorly about half as large as anteriorly and distances of punctures equalling their diameters; interspaces with very fine micropunctures.

Ventral carinae (Fig. 5): Prosternal carina with rectangular posterior corner, posterior edge with large angular incision. Mesosternal carina and metasternal carina as typical for genus; mesosternal carina low; metasternal carina with almost straight ventral outline, posteriorly with blunt corner. Carina of sternum 2 with acute, posteriorly directed apex. Carina of sternum 3 small, squared. Carinae of sterna 4–6 all small, weakly elevated.



Figs. 4–8: Habitus of *Helotrephes grossepunctatus* sp.n., holotype: (4) pronotal and genal plate, ventrolateral view; (5) sternal carinae (venter turned upward), in lateral view; (6) aedeagus; (7) left paramere; (8) right paramere. © Herbert Zettel.

Genitalia: Aedeagus (Fig. 6) parallel-sided and stout in four fifths of main piece, subapically with long, very thin neck, with a small and very narrow apical plate (in apical view). Left paramere (Fig. 7) with basal lobe, weakly tapered toward apex, which bears a small posteriorly directed protrusion. Right paramere (Fig. 8) longer than left paramere, slender lanceolate, distally with short row of setae, with small, slightly curved, acute tip.

Comparative notes: *Helotrephes grossepunctatus* sp.n. is very similar to *H. monticola* from the Doi Inthanon in Chiang Mai Province, North Thailand, but the two species can be easily distinguished by the different size of punctures on the hemielytra: in *H. monticola* they are only about half as large as in *H. grossepunctatus* sp.n. In addition, differences in the genitalia of males were recognized: The aedeagus has a longer "neck" in *H. grossepunctatus* sp.n. than in *H. monticola*. The right paramere is more slender in *H. grossepunctatus* sp.n. than in *H. monticola.* The apices of the left paramere have different shapes. The genitalia of *Helotrephes komareki* are also very similar to those of *H. grossepunctatus* sp.n., but the left paramere of *H. komareki* is much stouter; in addition, *H. komareki* has a larger incision of the pronotal plate and smaller, more widely spaced punctures on the hemielytra.

Distribution: Thailand: Nan Province, only known from the type locality.

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