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## ***Helotrephes steiningeri* sp. n., and notes on two further Helotrephini spp. (Heteroptera, Helotrephidae) from Thailand and West Malaysia**

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**Abstract:** *Helotrephes steiningeri* sp. n. from Thailand, the largest helotrephid species found so far, and *Helotrephes flaviceps rompinensis* ssp. n. from West Malaysia are described. *Helotrephes flaviceps flaviceps* ZETTEL & POLHEMUS 1998 is recorded from West Malaysia for the first time. Some aberrant characters of the male genitalia of *Hydrotrepes septentrionalis* ZETTEL 1998 from Thailand are discussed.

**Key words:** Helotrephidae, *Helotrephes steiningeri*, new species, *Helotrephes flaviceps rompinensis*, new subspecies, *Hydrotrepes septentrionalis*, variability, Thailand, West Malaysia.

### **Introduction**

Species of the genus *Helotrephes* inhabit streams and rivers in the East-Oriental region. This genus has recently been revised by ZETTEL & POLHEMUS (1998) and contains sixteen species and three subspecies. In the present paper we describe the following new *Helotrephes* taxa: *H. steiningeri* n. sp. from North Thailand and *H. flaviceps rompinensis* n. ssp. from West Malaysia. Furthermore, we report on the first record of *H. flaviceps flaviceps* from West Malaysia and on variability of some characters of the male genitalia in *Hydrotrepes septentrionalis*. The genus *Hydrotrepes* also belongs to the tribe Helotrephini and mainly occurs in lotic habitats in the Oriental Region and Wallacea. It has recently been studied by POLHEMUS (1997), ZETTEL (1998, 2000), and NIESER & CHEN (1999).

### **Measurements and abbreviations**

All measurements are in millimetres. Body length and maximal width have been measured in all specimens.

brach. ....brachypterous

macr. ....macropterous

NHMW .....Natural History Museum, Vienna, Austria

SMF .....Senckenberg Research Institute (Senckenberg Museum Frankfurt), Frankfurt am Main, Germany

ZRC .....Zoological Reference Collection, Raffles Museum of Biodiversity Research, Department of Biological Sciences, National University of Singapore, Singapore

***Helotrephes steiningeri* sp. n. (Figs 1–6)**

Type material: **holotype** (brach. ♂): Thailand, Chiang Mai Province, stream near Pong Duet Hot Springs, on the road from Chiang Mai to Mae Hong Son, between submerged tree roots, 8 Apr. 1998, A19, leg. D. Kovac (SMF); **paratypes**: 3 ♂♂, 4 ♀♀ (all brach.), same locality data as holotype; 1 ♂, 2 ♀♀ (all brach.), same locality data as holotype, A19B (SMF); same locality, 6 Apr. 1999, 2 ♂♂, 1 ♀, A202/99, (SMF).

**Description:** Body length of ♂♂ 3.54–3.64, of ♀♀ 3.60–3.85, body width of both sexes 2.38–2.73. Ground colour yellowish to yellowish brown. Colouration variable in different specimens; it depends probably on the level of sclerotization and pigmentation of adults of "different age". Cephalonotum with complex patterns and scattered weakly to strong dark markings between and behind eyes; clypeal area and anterior part of frontal area yellow; posterior area of cephalonotum with stripe-like complex pattern in dark specimens. Mesoscutellum a bit lighter than hemelytra, with dark anterior part in dark specimens. Both mentioned body regions with weakly dark scattered punctations (in light specimens) or dark patterns respectively (in dark specimens). Venter yellowish brown. Legs and antennae yellow. Rostrum: basal part yellow, distal part yellowish brown to dark brown.

Cephalonotum convex, shining, set with small alveoli in dorsal view, broader than long (length: 1.30–1.54, width: 2.30–2.40); lateral margins behind eyes carinate. Eye length : width, 0.71–0.24. Interocular distance: 1.23–1.30. Pronotal plate with deep slightly asymmetrical notch, and with sharp posterior angle (Fig. 1). Posterior corner of the notch with posteriorly localized, roundly curved lamella (Fig. 1). Mesoscutellum weakly shining, hemelytra shining to opaque; both these body parts with small depressed alveoli, each with one short seta. Mesoscutellum length : width, 1.95 : 1.66. Ventral midsternal carina: prosternal part with two caudally extended tips; apical tip of mesosternal carina directed anteriorly; metasternal carina with posteroventrally oriented tip, carina of abdominal segment 2 relatively long and low (Fig. 2).

**Male:** aedeagus long, distally slender, with large apical plate which is thicker apically (anteriorly) than subapically (posteriorly) from lateral view (Figs 3a, b); right paramere slightly curved, subapically slender, apically with anteriorly oriented dilatation, posteroapically with relative long setae (Figs 4a, b); left paramere straight to slightly posteriorly curved, relatively hirsute, with distinct posterobasal lobe, anterior outline of its apex round, posterior outline truncate (Fig. 5).

**Female:** abdominal sternum 7 (= subgenital plate) with broad tongue-like middle lobe (Fig. 6); proximal part with long pilosity, distal part with short pilosity.

**Comparative notes:** *Helotrephes steiningeri* agrees with the characteristics of the *Helotrephes sausai* group (see ZETTEL & POLHEMUS 1998, p. 115). It is similar (and probably also the closest relative) to *H. major* in the shape of the aedeagus but it differs from this species, and also by *H. monticola*, especially by the slightly curved left paramere and the posteroapical truncation of right paramere in males, and by short, tongue-like middle lobe of abdominal sternum 7 in females. *H. steiningeri* is distinguishable from *H. sausai* by the long aedeagus, the shape of both parameres in males, and by the narrower middle lobe of abdominal sternum 7 in females. *H. steiningeri* differs from all other species of the genus by the strictly caudally oriented two tips of prosternal midventral carina of both sexes, and the shape of the right paramere. *H. steiningeri* is the largest known species of Helotrephidae.

**Habitat:** *Helotrephes steiningeri* was found between submerged tree roots and only occurred at locations with fast flowing water. It was collected together with *Helotrephes australis*.

**Distribution:** Thailand, Chiang Mai Province.

**Etymology:** Named in honour of Prof. Dr. F. Steininger, the head of the Senckenberg Research Institute, who made it possible for D. Kovac to go on a field trip to Thailand during which the new species was found.

***Helotrephes flaviceps flaviceps* ZETTEL & POLHEMUS 1998**

*Helotrephes flaviceps* ZETTEL & POLHEMUS 1998: 131.

**Material examined:** holotype ♂ (brach.): "Thailand: Mae Hong Son Prov.\ 17rd. km N Mae Hong Son\ Mok Cham Pae, nr. Fish Cave\ 11. 11. 1996, leg. H. Zettel (12b)" (NHMW); paratype: 1 ♀ (brach.), the same locality data as holotype (NHMW); further material: 2 ♂, 2 ♀ (all brach.), "21 XII 1997 Thaild.\ ca. 12 km N of.\ Mae Hong Son", "Tam Pla Resort\ at Tam Pla River\ Dr. W. Ullrich leg.", N 019°25'34.2" E 097°59'16.7" "Dr. Wolfgang ULLRICH\ collection" (NHMW); 2 ♂, N. Thailand, Nam Khong River, 14 Apr. 1999, between submerged plants at river bank, A75/99, leg. D. Kovac, (SMF); 1 ♂, 2 ♀, N. Thailand, 9 May 1999, Nam Khong River, between submerged plants at river bank, A355/99, leg. D. Kovac, (SMF); 1 ♂, 2 ♀, S. Thailand, 23 Oct. 1999, Narathivat Prov., Ban Sac, LHK 0402, leg. H. K. Lua, (ZRC); 2 ♂, 1 ♀, W. Malaysia, 21 Oct. 1999, Terengganu, Sekayu, Sungei Brang, LHK 0401, leg. H. K. Lua., (ZRC).

**Diagnosis and distribution:** see ZETTEL & POLHEMUS (1998, p. 131).

***Helotrephes flaviceps rompinensis* ssp. n. (Figs 7–10)**

**Type material:** holotype ♂ (macr): W. Malaysia, Rompin-Endau-Expedition, Sungei Kinchin, at the Base Camp, between submerged plants at the river bank, 19 May 1988, Alt7, leg. D. Kovac (SMF); paratypes: 1 ♂, 2 ♀ (all brach.), same locality data as holotype, Alt7/Alt7B (SMF); 1 ♂ (macr.), 2 ♂, 3 ♀ (all brach.), W. Malaysia, Rompin-Endau-Expedition, Sungei Kinchin, between submerged plants, Alt8, 23 May 1988, leg. D. Kovac (SMF).

**Description and comparative notes:** Similar to the nominate subspecies (see and cf. ZETTEL & POLHEMUS 1998; pp. 191, 132; Figs 84–86, 94, 96, 100, 107) described from Thailand, and differing only in the following characters:

**Body size** of both macropterous as well as brachypterous morph smaller than in brachypterous morph of *H. flaviceps flaviceps*. Macropterous male, length: 2.30–2.41, width: 1.80–1.90; brachypterous specimens of both sexes, length: 2.25–2.38, width: 1.78–1.90.

**Male:** aedeagus apically somewhat narrowed, its apical plate somewhat curved (Figs 7a, b); right paramere only slightly twisted, with minute anteroapical club-shaped tuberculate process, strongly hirsute (Figs 8a, b), apical hook lacking; left paramere posterodorsally rounded, without anterobasally oriented lobe and posterobasal lamella, apically more rounded, without tip pointing outline (Fig. 9).

**Female:** slightly asymmetrical abdominal sternum 7, the same ground shape as in nominate subspecies, but differing by blunt un conspicuous tip of hind margin of middle posterior lobe, and by more developed anterolateral lobe of left margin of the basal part of this sclerite (Fig. 10, see black arrow).

**Note:** The anteriorly pointing left margin of posterior middle lobe of female abdominal sternum 7 (Fig. 10, see white arrow) is not a differential character from *H. flaviceps flaviceps*. The same structure was also ascertained in the type material of the nominate subspecies.

**Discussion:** *H. flaviceps rompinensis* was established as a new subspecies, because of the shape of male terminalia, female abdominal sternum 7, and the differences in body size. These characters are constant in specimens from the Rompin district in W. Malaysia. No diagnostic characters could be found in colour, shape of pronotal plates, and midsternal carinae. *H. flaviceps rompinensis* occurs allopatrically with *H. flaviceps flaviceps*.

**Distribution:** W. Malaysia, Pahang.

**Etymology:** Named after the type locality, the Rompin district in Pahang.

**Notes on some aberrant characters of male terminalia in *Hydrotrepes septentrionalis* ZETTEL 1998 (Figs 11, 12)**

**Material examined:** (a) aberrant: 2♂♂ (brach.), N. Thailand, Pai River, between submerged plants at river bank, 7 Sept. 1998, Aq11; 4♂♂ (brach.), N. Thailand, 8 Sept. 1998, Nam Khong River, between submerged plants at river bank, Aq20; 2♀♀, N. Thailand, 8 May 1999, Nam Lang River, between submerged plants at river bank, A339/99; 2♂♂, 3♀♀, N. Thailand, 9 May 1998, Nam Khong River, between submerged plants at river bank, A355/99. All specimens leg. by D. Kovac and deposited at SMF. (b) not aberrant: holotype and paratypes deposited at NHMW (see ZETTEL 1998, p. 131).

**Aberrant characters:** Not only apical part of the right paramere can be aberrant as ZETTEL (1998, Fig. 7) depicts but also anterobasal part is variable. It can be distinctly incised in some specimens as it is illustrated in Figs 11a, b, c. Posterobasal part of the left paramere can be reduced to various degree (compare ZETTEL (1998, Fig. 8) and Figs 12a, b of this paper – see black arrows). The outline of apex of the aedeagus (see ZETTEL 1998, Fig. 6) is not variable; it is a constant and reliable diagnostic character of *H. septentrionalis*.

### Zusammenfassung

*Helotrephes steingeri* sp. n. aus Thailand und *Helotrephes flaviceps rompinensis* ssp. n. aus West Malaysia werden neu beschreiben. *H. flaviceps flaviceps* wird zum ersten Mal aus West Malaysia gemeldet. Einige variierende Merkmale der männlichen Genitalien von *Hydrotrepes septentrionalis* aus Thailand werden diskutiert.

### Acknowledgements

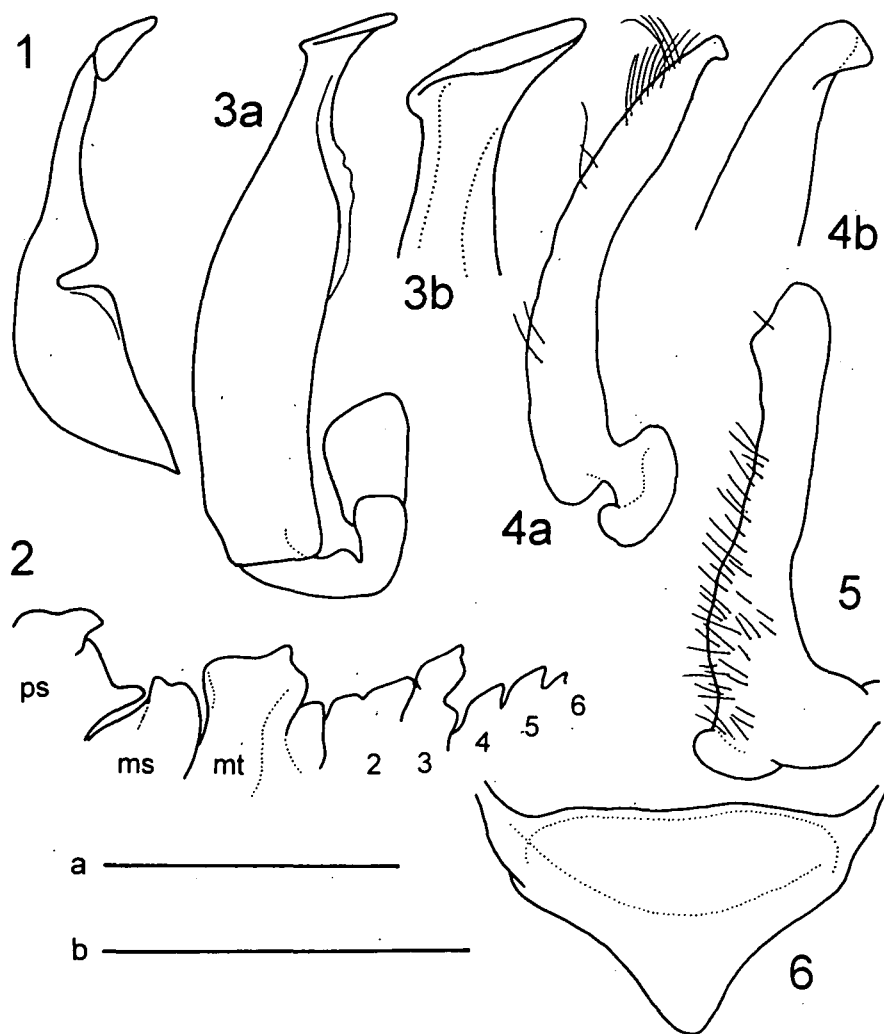
Damir Kovac thanks the Malaysian Nature Society for the opportunity to participate in the Rompin-Endau Malaysian Heritage and Scientific Expedition in 1989 and the German Academic Exchange Service (DAAD) for financing the field trip to Malaysia. Miroslav Papáček thanks Herbert Zettel for the access to the famous collection of Helotrephidae in Museum of Natural History in Vienna, and for notes on the manuscript. He is also indebted to the Grant Agency of the Czech Republic for the financial support of this study by grant No 206/98/0160.

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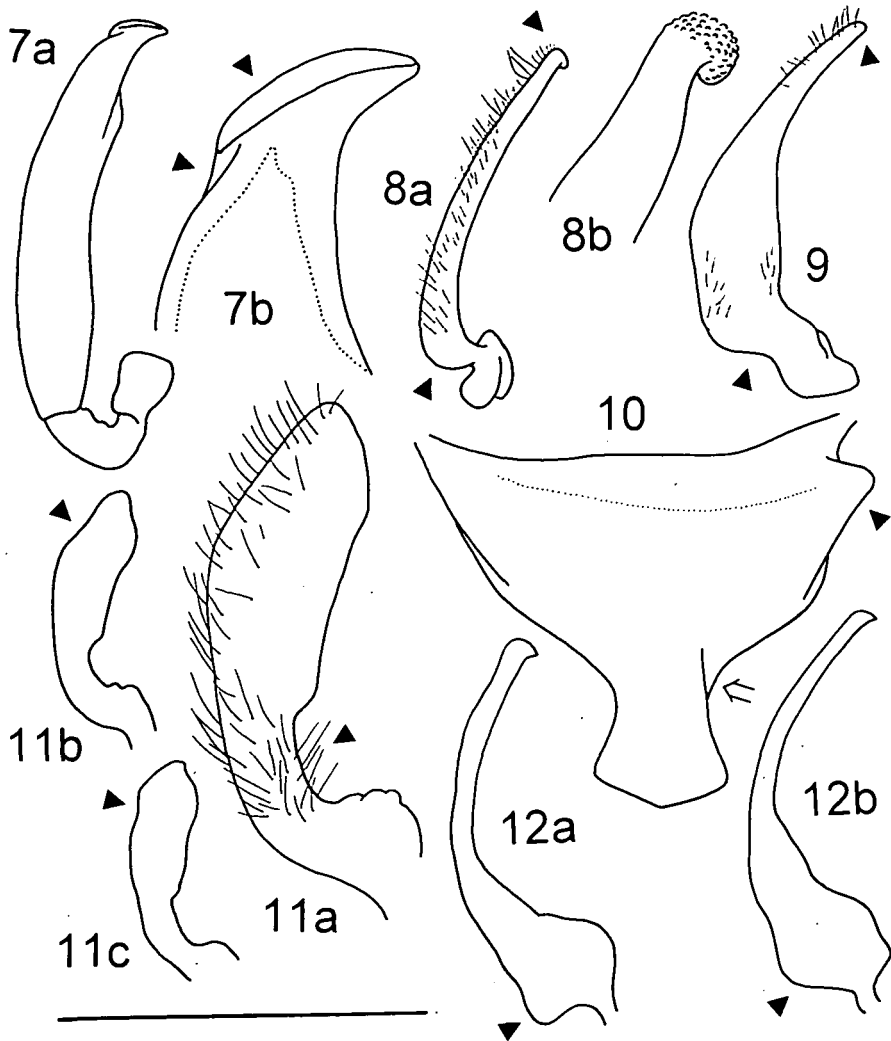
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**Figs 1-6:** *Helotrephes steingeri* sp. n. 1 – propleural plate (right ventrolateral view, venter up); 2 – ventral midsternal carina (right lateral view, venter up), ps - prosternum, ms - mesosternum, mt - metasternum, 2, 3, 4, 5, 6 – abdominal segment 2, 3, 4, 5, 6; 3 – aedeagus; 4 – right paramere; 5 – left paramere (figures 3-5: morphologically right view); 6 – female abdominal sternum 7 (ventral view, pilosity omitted). Scale bar a = 1.0 mm (Figs 1, 2). Scale bar b = 0.5 mm (Figs 3a, 4a, 5), = 0.36 mm (Fig. 6), = 0.25 mm (Figs 3b, 4b).



**Figs 7-12:** 7-10: *Helotrephes flaviceps rompinensis* sp. n.; 11, 12: *Hydrotrepes septentrionalis*. 7 – aedeagus; 8, 11 – right paramere; 9, 12 – left paramere (Figs 7-9, 11, 12 – morphologically right view); 10 – female abdominal sternum 7 (ventral view; white arrow indicates the same character that is presented also in *H. flaviceps flaviceps*, pilosity omitted). Black arrows indicate differential characters from type subspecies (Figs 7 – 10) or type material respectively (Figs 11, 12). Scale bar = 0.5 mm (Figs 7a, 8a, 9, 11b, c, 12a, b), = 0.36 mm (Fig. 10), = 0.25 mm (Figs 8b, 12a), = 0.125 mm (Fig. 7b).

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