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Notes on *Laccotrephes* STÅL, 1866 with the description of a new species of the *L. griseus* group (Insecta: Heteroptera: Nepidae)

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Abstract

Two Philippine species of *Laccotrephes* have been identified: *Laccotrephes robustus* STÅL, 1871 and *L. simulatus* MONTANDON, 1913; the latter is recorded for the Philippines for the first time. In addition, *Laccotrephes longicaudatus* sp.n. from Vietnam is described; it belongs to the *Laccotrephes griseus* species group.

Key words: Nepidae, Nepinae, *Laccotrephes*, *Laccotrephes griseus* group, water scorpion, taxonomy, new species, new record, Philippines, Vietnam

Zusammenfassung

Von den Philippinen sind zwei *Laccotrephes*-Arten identifiziert worden, *Laccotrephes robustus* STÅL, 1871 und *L. simulatus* MONTANDON, 1913, der hier erstmals für die Philippinen nachgewiesen wird. Außerdem wird *Laccotrephes longicaudatus* sp.n. aus Vietnam beschrieben, der in die *Laccotrephes griseus*-Artengruppe gehört.

Introduction

The genus *Laccotrephes* STÅL, 1866 is the dominant genus of the subfamily Nepinae of the family Nepidae of the insect suborder Heteroptera. It is a large genus (about 60 species, KEFFER 2004) essentially restricted to the Old World tropics. The last revision of the genus is by FERRARI (1888). POISSON (1965) published a catalogue of African Nepidae in which the parameres of African *Laccotrephes* are figured. POLHEMUS & KEFFER (1999) published a survey of the *L. grossus* subgroup but otherwise there is no recent survey of Asian species. KEFFER (2004) published a thorough study of the male genitalia of the family Nepidae dividing it into sixteen species groups, which are not consistent with the present division into genera. His conclusion is that the male genitalia provide useful additional characteristics for the delimitation of species groups but are, as a rule, of little use in specific identification.

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Most species of *Laccotrephes*, like other representatives of the Nepinae, live at the shallow edge of stagnant waters, including virtually stagnant bays of streams, keeping contact with atmospheric air by their respiratory siphons. They hide between leaves or in the mud waiting for prey to come within reach of their raptorial fore legs. When they are scooped up from their habitat they tend to feign death (katalepsis) and are difficult to find in the mud or between the leaves. An alternative way to collect them is to disturb the mud or leaves at the edge of stagnant waters with the handle of the net (or a stick). If there are Nepinae present they will after a short time start to crawl around to regain a favorable position and can then easily be picked up.

Material and methods

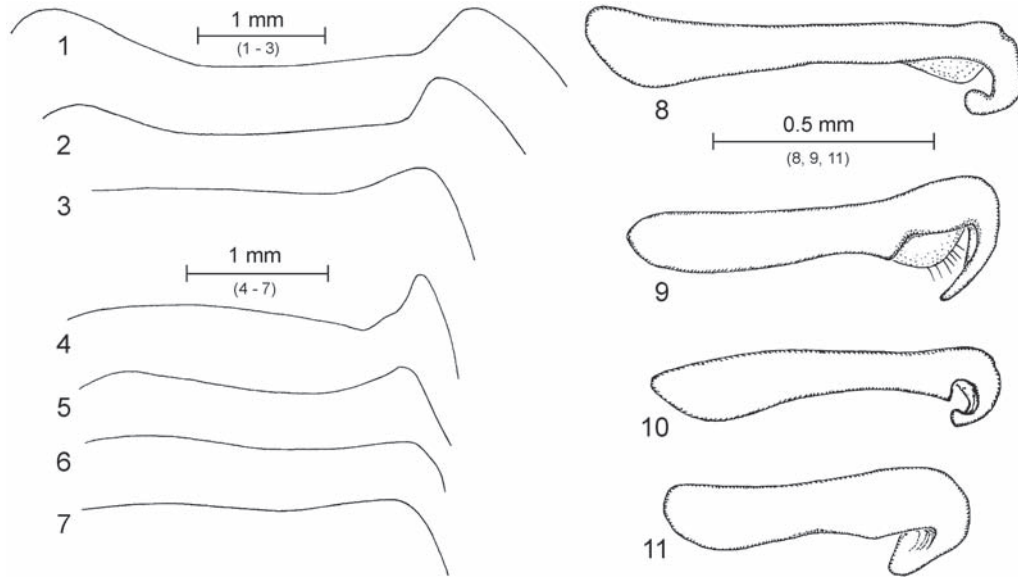
This publication is based on specimens from various collections, mainly NHMW, RMNH, and SECK. In addition, some specimens from other collections have been studied (see depositories). All measurements are in millimetres, and presented as the mean or the range with the mean in italics. The (width of) interoculus is the shortest distance between eyes in dorsal view. The length of antennal segments II and III is the largest measurement, and the width is the maximal width of the finger-shaped process.

Many specimens are covered with a layer of mud which is difficult to virtually impossible to remove. This makes it impossible to observe the colouration of legs and sometimes the details of grooves and carinae on head and pronotum.

Acronyms of depositories:

DEIC	Deutsches Entomologisches Institut, Müncheberg, Germany (formerly at Eberswalde)
MNHN	Muséum national d'Histoire naturelle, Paris, France
NCTN	Nieser Collection, Tiel, The Netherlands
NHMW	Natural History Museum, Vienna, Austria
RMNH	National Museum for Natural History "Naturalis", Leiden, The Netherlands
SCV	Coll. Franz Seyfert, Vienna, Austria
SECK	Entomological Collection, Snow Hall, University of Kansas, U.S.A.
UPLB	Museum of Natural History, University of the Philippines, Los Baños, Laguna, Philippines
ViSCA	Leyte State University (formerly Visayas State College of Agriculture), Baybay, Leyte, Philippines
ZCV	Coll. H. & S.V. Zettel, Vienna, Austria
ZMHU	Zoological Museum, Hanoi University of Science, Vietnam
ZMUC	Zoological Museum, University of Copenhagen, Denmark

Specimens were studied with a binocular microscope; ink drawings were done with the help of a camera lucida. The holotype of *L. longicaudatus* sp.n. (Fig. 21) was photographed with a Nikon D1X digital camera (lens: PC-Micro 85 mm f/2.8D Micro); several focal layers were stacked and manually assembled in Adobe Photoshop CS programme.



Figs. 1–11: (1–7) Prosternal carina, anterior to the right, venter up. (1) *Laccotrephes robustus* from Catanduanes, Philippines; (2) *L. robustus* from Palawan, Philippines; (3) *L. pfeifferiae* from Perak, West Malaysia; (4) *Laccotrephes griseus*; (5) *L. longicaudatus* sp.n.; (6) *L. simulatus* from China; (7) *L. simulatus* from Luzon, Philippines. (8–11) Right parameres, lateral view. (8) *L. griseus*; (9) *L. longicaudatus* sp.n.; (10) *L. maculatus*, holotype (not on scale); (11) *L. simulatus*.

Laccotrephes robustus STÅL, 1871 (Figs. 1, 2, 12, 15, 17–19)

Laccotrephes robustus STÅL, 1871: 706.

Nepa robusta: FERRARI 1888: 182.

Laccotrephes robustus: POLHEMUS & KEFFER 1999: 2–3.

Material examined. PHILIPPINES: Luzon: [Benguet Province], Baguio, date and collector unknown, 1 ♀ (SECK); Benguet [Province], Baguio, 2 km below Camp John Hay, 18.II.1999, leg. H. Zettel (181), 1 ♂ (ZCV); Zambales [Province], date and collector unknown, 3 ♂♂, 2 ♀♀ (SECK). Catanduanes: E of San Andres, 11.–12.III.1999, leg. H. Zettel (200), 3 ♂♂, 3 ♀♀ (NHMW, UPLB), leg. F. Seyfert (26), 1 ♂, 1 ♀ (SCV). Leyte: Mt. Pangasugan, 26.II.1984 M.J.P. Ceniza & S. Aguja, 1 ♂ (ViSCA). Mindanao: [Zamboanga del Norte Prov.,] Batocan River, 19.XII.1907, Steamer Albatross, 1 ♂ (SECK); Bukidnon Province, Malaybalay, Spring Site, 650 m asl., 7.XI.1996, leg. H. Zettel (91), 1 ♂ (NHMW). Cebu: Cebu City, Minglanilla, Camp Seven, 300 m asl., 21.–22.V.1991, leg. R.A. Müller, 1 ♀ (NHMW); Cebu City, Cantipla-Uno, Forest Reserve, 800 m asl., 1.III.2008, leg. H. Zettel & C. V. Pangantihon (512), 1 ♀ (ZCV); Badian, Matutinao, Kawasan Falls, 1–30 m asl., 11.XI.2003, leg. C. V. Pangantihon (P352a), 1 ♂ (ZCV). Negros: [Negros Occidental Province,] SE Bacolod, Mambucal, Seven Falls, 15.–16.III.1994, 900 m asl., leg. H. Zettel (39a), 3 ♂♂, 4 ♀♀ (NHMW, UPLB, NCTN); Negros Oriental [Province], Cuernos de Negros, Valencia, Apolong, Casaroro Falls, 3–4.III.2008, leg. H. Zettel (513), 1 ♀ (ZCV); Negros Oriental [Province], Sibulan, Lake Balinsasayao – Lake Danao, spring with marsh and pond, 30.X.2004, leg. C. Pangantihon (P403b), 1 ♂ (ZCV). Panay: Antique [Province], 50 km NE San Jose de Buenavista, San Remigio, Napula Falls, 20.III.1994, leg. H. Zettel (43), 3 ♂♂ (NHMW); Ilo-Ilo [Province], 10 km NE Igaras, Nadसान Falls, 500 m asl., 22.III.1994, leg. H. Zettel (47), 1 ♂ (NHMW). Palawan: "Palawan", date and collector unknown, 1 ♀ (SECK); Roxas, Fort Barton, Matalangab, III–V.1985, leg. Rodriguez, 1 ♀ (NHMW); 9 km W Puerto Princesa, Iwahig, Balsahan River, 24.III.1994, leg. H. Zettel (48), 3 ♂♂, 2 ♀♀ (NHMW).

Busuanga (Calamianes group north of Palawan): 2 km W Coron, 23.II.1996, leg. H. Zettel (80a), 3 ♂♂, 3 ♀♀ (ZCV, UPLB); 5 km NW Coron, Mabintangen River, 25.-29.II.1996, leg. H. Zettel (82), 2 ♂♂ (ZCV). *Island unknown*: "Philippines", 1885, leg. Marche, 1 ♂ (MNHN).

Diagnosis. Dimensions (n = 10 ♂♂, 10 ♀♀): length of body ♂ 32.5–36.5–39.6, ♀ 34.2–37.5–39.0; length of siphon ♂ 33.0–38.7–42.8, ♀ 35.4–37.6–39.3; width of body ♂ 10.4–11.6–13.2, ♀ 11.1–12.0–12.5.

Colour: Medium to dark brown, eyes light brown to dark grey. Dorsum of abdomen light to medium brick red to crimson with variable dark markings medially. Legs medium brown, fore femur with narrow, sometimes interrupted whitish to pale yellow zigzag band in distal third, fore tibia with pale spot in proximal quarter.

Structural characteristics: Head, pronotum, scutellum, proximal fifth of hemielytron and proximal half of its costal margin beset with tufts of short bristles. Median length of head slightly less than its width across eyes (3.69 : 3.99). Clypeus and lora well recognizable, maxillary plates large, meeting in front of clypeus; median carina on vertex well developed, with distinct transverse depression at level of anterior third of eyes, anterior part of carina higher than posterior part. Eyes in lateral view about even with the level of median carina. Antenna (Fig. 12), length of segments II : III = 1.57 : 1.41; segment III distally with 40–50 long hairs, in a single or more or less double row, about 0.8–1.2 times as long as width of segment; shorter bristle-like hairs, about half as long as width of segment, more or less evenly dispersed over ventral surface of segments II and III. Pronotum, anterior submedian tubercles present, blunt; submedian carinae broad and dorsally blunt; transverse groove medially interrupted, laterally of submedian carinae deep and wide, medially shallow and narrow. Lateral margins of pronotum nearly straight, humeral angles round only slightly projecting; humeral width of pronotum less than maximal width (10.8 : 11.7). Prosternal carina (Figs. 1, 2) slightly raised posteriorly and with distinct blunt tooth anteriorly; fringe of setae only posterolaterally, not meeting posteriorly. Scutellum, hayfork-shaped carinae well developed except for medioanterior part. Abdomen parallel-sided in anterior two-thirds, posteriorly convergent in males, lateral margin of abdomen slightly convex in females.

Fore leg, femur with distinct and comparatively acute proximal tooth, femoral groove of male with small but distinct distal tooth; length of femur slightly over four times its width (14.10 : 3.33).

Male genitalia: Genital capsule and superficial articular and phallic structure (Figs. 17–19) according to *L. ater* group of KEFFER (2004) without characteristics for specific identification, apex of posterior diverticulum very similar to that of *L. pfeiferiae* (FERRARI, 1888) (Figs. 15, 16).

Discussion. Until recently, *L. pfeiferiae* was considered a synonym of *L. robustus* and consequently *L. robustus* was reported to be distributed throughout tropical Asia. POLHEMUS & KEFFER (1999) studied the *Laccotrepes* of their *L. grossus* group, which is part of the *L. ater* group of KEFFER (2004), and revived *L. pfeiferiae* as a good species. The most important differences between these species, they noted, were in the third antennal segment, which in *L. pfeiferiae* has more numerous (60–80) and longer setae than in *L. robustus* (35–40 setae, cf. Figs. 12 and 14) and the carina on the head in lateral view, which in *L. robustus* has a deep transverse depression at the level of the anterior

third of the eye whereas in *L. pfeiferiae* this carina is not or hardly interrupted (POLHEMUS & KEFFER 1999). In addition, the prosternal carina of *L. robustus* is posteriorly more elevated (in lateral view with venter up) than the keel of *L. pfeiferiae* (cf. Figs. 1–3).

The true *L. robustus* is restricted to the Philippines and *L. pfeiferiae* occurs in the remainder of tropical Asia. POLHEMUS & KEFFER (1999) also concluded that in most species of *Laccotrephes* the male genitalia are of little use in specific identification. KEFFER (2004) essentially confirmed this conclusion although he found that the apex of the posterior diverticulum may show diagnostic characteristics for specific identification in some cases. Our study of material of *Laccotrephes* from various localities in the Philippines and elsewhere in Asia confirm the opinion of POLHEMUS & KEFFER (1999) that *L. robustus* is restricted to the Philippines, including Palawan. So far, *L. robustus* is the only large species of *Laccotrephes* found in the Philippines. There are small differences in the ratios between samples from various islands, but those structural characteristics which are presently regarded useful for specific identification are all identical.

Distribution. Endemic, but widespread in the Philippines. At present recorded from the islands of Luzon, Catanduanes, Leyte, Mindanao, Cebu, Panay, Negros, Busuanga, and Palawan.

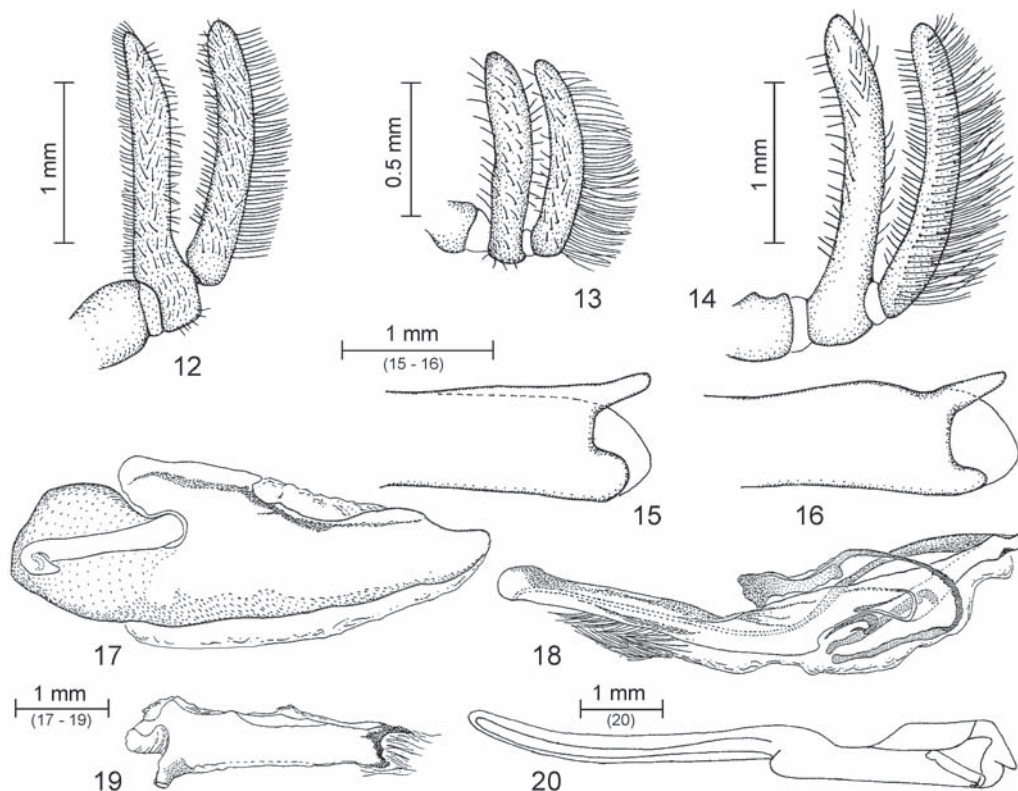
Laccotrephes simulatus MONTANDON, 1913 (Figs. 6, 7, 11)

Laccotrephes simulatus MONTANDON, 1913: 122–123.

Laccotrephes simulatus: POLHEMUS 1995: 15.

Material studied. SRI LANKA: Kandy, 7.IV.1902, leg. Dr. Uzel, 1 ♂ (NHMW). CHINA: Jiangxi Province (labelled "Kiang-Si"), 1875, leg. A. David, 1 ♀ (MNHN); Jiangxi Province, Pingxiang, leg. Kreyenberg, 1 ♂ (DEIC; specimen collected with the types of *L. simulatus*, but bearing an identification label "*Laccotrephes maculatus*" by Montandon in 1911, so apparently not used when preparing the description of *L. simulatus*); [Guizhou Province,] Kouy-Tchéou, Pin-Fa region, environment of Kony-Yang, leg. Père Cavalerie, 2 ♀♀ (MNHN). VIETNAM: N. Tonkin, [Quang-Ninh Province,] Tien-Yen, 1914, leg. A. Bonnet, 1 ♀ (MNHN); "Conchinchine, Kouranne", leg. Eydoux, 1 ♂ (MNHN). PHILIPPINES: Luzon: Pangasinan [Province], Gayaman, Binmaley, 19.XI.1955, leg. P. Catungal, 1 ♂ (SECK). INDONESIA: Sumatra: no locality data, Sumatra expedition 1877–1878, 2 ♂♂; [Sumatera Barat (West Sumatra),] "Fort de Kock" [Bukittinggi], 920 m asl., 1925, leg. E. Jacobson, 2 ♂♂ 3 ♀♀; Sumatra Barat [West Sumatra], Lubuksikaping, 450 m asl., 1926, leg. E. Jacobson, 2 ♂♂, 3 ♀♀; Sumatra Selatan Province [South Sumatra], Palembang, in the [river] Musi, I.1947, leg. W.C. Verboom, 1 ♂ (all RMNH, identified as *L. maculatus*); "Montes Ballak", undated, leg. Fruhsdorfer, 2 ♂♂ (NHMW); West Sumatra [S. Barat], Solok, VII.1992, collector unknown, 4 ♂♂ (NHMW). Java: no locality data, leg. I. Pfeiffer, 1 ♀ (NHMW; identified as *maculata* by Ferrari and Montandon); no locality data, leg. Mulier, 1 ♀; no locality data, leg. Reinw. 1 ♀; Jawa Barat [West Java], Cibinong, 1 ♀; Sukabumi, leg. E. le Mout, 1 ♂; surroundings of Garut, 1928, leg. W.C. van Heurn, 1 ♂, 1 ♀ (all RMNH, identified as *L. maculatus*); South Java, no locality data and collector, 1 ♂ (DEIC, identified as *L. maculatus* by Montandon, 1911); Batavia [= Jakarta], Tanah Abang, 1904, leg. P. Serre, 1 ♂ (MNHN). Borneo: no locality data, II.1878, leg. Plason, 1 ♂ (NHMW; identified as *maculata* by Ferrari and Montandon). MALAYSIA: Borneo: Sarawak, 50 km S Kuching, Tapah, in pond, 18.II.1993, leg. H. Zettel (5), 3 ♂♂ (NHMW).

Diagnosis. Dimensions (n = 10 ♂♂, 10 ♀♀): length of body ♂ 14.1–15.2–16.4, ♀ 15.5–17.1–18.5; length of siphon ♂ 10.6–11.8–13.0, ♀ 14.6–16.5–18.1; width of body ♂ 4.3–4.8–5.2, ♀ 4.5–5.0–5.3.



Figs. 12–20: (12–14) Antenna. (12) *L. robustus*; (13) *L. longicaudatus* sp.n.; (14) *L. pfeiferiae*. (15–16) Apex of posterior diverticulum in (15) *Laccotrephes robustus* and (16) *L. pfeiferiae*. (17–19) Male genitalia of *Laccotrephes robustus*. (17) genital capsule, anterior to the right, phallus removed; (18) phallus, lateral view, anterior to the right; (19) anterior diverticulum, anterior to the left, cleared in KOH. (20) Genital capsule of *Laccotrephes longicaudatus* sp.n.

Colour: Medium to dark brown, eyes light brown to dark grey. Legs medium brown, fore femur with distinct whitish to pale yellow zigzag band just distally of middle, fore tibia with pale spot in proximal third. Middle and hind legs with pale rings. Dorsum of abdomen reddish with variable, usually extensive blackish markings medially.

Structural characteristics: Head, pronotum, and costal margin of hemielytron beset with tufts of short bristles. Median length of head subequal to its width across eyes (1.86 : 1.86). Clypeus and lora well recognizable, maxillary plates large, meeting in front of clypeus; median carina on vertex well developed, with distinct depression in front of midway between eyes, anterior part of carina higher than posterior part. Eyes in lateral view extending above level of median carina; length of eye 0.64, width of eye 0.51, interoculus 0.72, length of head behind eyes 0.75. Antenna length of segments II : III = 0.64 : 0.58. Segment III distally with about 25 long hairs in a double row, about as long as width of segment; shorter bristle-like hairs, about half as long as width of segment mostly proximally on segment III, sparsely over entire ventral surface of segment II most densely proximally. Pronotum, anterior submedian tubercles present, blunt; sub-

Fig. 21: *Laccotrephes longicaudatus* sp.n. holotype (body length 16.3 mm), habitus in dorsal view.

median carinae broad and dorsally blunt; transverse groove medially interrupted, laterally of submedian carinae deep and wide, medially shallow and narrow. Lateral margins of pronotum very slightly concave to virtually nearly straight, humeral angles roundly projecting; humeral width of pronotum distinctly less than maximal width (4.4 : 4.9). Prosternal carina (Figs. 6, 7) varying from virtually flat to indication of a tooth anteriorly. Scutellum, hayfork-shaped carinae well developed except for the middle anterior part. Abdomen parallel-sided in anterior two-thirds, posteriorly convergent in males, lateral margin of abdomen slightly convex in females.

Fore leg: Femur with distinct proximal tooth, femoral groove smooth, without distal tooth; length of femur slightly over four times its width (5.49/1.23); claw vestigial.

Male genitalia: Anterior diverticulum short. Paramere short and stout, recurved apex triangularly shaped (Fig. 11).

Distribution. Sri Lanka, South China, Southeast Asia, Sumatra, Java; first record for the Philippines.

***Laccotrephes longicaudatus* sp.n.**
(Figs. 5, 9, 13, 20, 21)

Type material. Holotype (σ): VIETNAM, Dong Noi Prov., Ban Chim, 14 May 2001, leg. H.H. Tran et al., THH0133 (ZMHU). Paratype (σ): VIETNAM, "Tonkin" [North Vietnam], Hoa Binh [in Hoa Binh Province], 1929, leg. A. de Cooman (MNHN).

Description of male. By general impression, a small, rather elongate species (Fig. 21) with respiratory siphon distinctly longer than body. Dimensions (holotype is smaller specimen): length of body 16.3–17.3, length of siphon 23.2 (broken in paratype), width of body 4.5–5.0.



Colour: Dark greyish brown, middle and hind legs and siphon light brown to yellowish. Venter greyish brown, abdominal venter along midline light brown. Legs, eventual annulation not observed due to mud covering.

Structural characteristics: Head and pronotum beset with tufts of short bristles, very few of such tufts on base of hemielytron. Head about 1.1 times as wide as long (1.9 : 1.7). Clypeus and lora well recognizable, maxillary plates large, meeting in front of clypeus; median carina on vertex well developed, with distinct depression in front of midway between eyes, anterior part of carina higher than posterior part. Eyes in lateral view extending above level of median carina; length of eye 0.68–0.72, width of eye 0.55–0.56, distance between eyes 0.84, length of head behind eyes 0.7. Antenna (Fig. 13), length of segments II : III = 0.74 : 0.68, slightly smaller in paratype: 0.72 : 0.64; segment III distally with about 50 long hairs, about 1.5 times as long as width of segment; ventral and proximal surface of segment III and distal, ventral and proximal surface of segment II thickly beset with shorter bristle-like hairs, about two-thirds as long as width of segment. Pronotum, measurements: median length 2.42–2.54, median length of anterior lobe 1.50–1.52, median length of posterior lobe 0.92–1.03, anterior width 3.55–3.67, posterior width 4.42–4.47; posterior width slightly smaller than basal width of abdomen (4.52–4.82; measured ventrally); anteromedian tubercles well developed, comparatively acute; submedian carinae broad and dorsally blunt; transverse groove medially interrupted, laterally deep and wide, medially shallow and narrow. Lateral margins of pronotum very slightly concave, nearly straight, diverging posteriorly. Prosternal carina (Fig. 5) with blunt tooth anteriorly. Scutellum, hayfork-shaped carinae low, especially anteriorly poorly differentiated. Abdomen almost parallel-sided in anterior two-thirds, posteriorly convergent.

Fore leg: Femur with very distinct and comparatively acute proximal tooth, without subdistal tooth in femoral groove; length of femur 3.3–3.7 times its width (4.80 : 1.28 in holotype, 4.94 : 1.58 in paratype); claw vestigial. Length of leg segments of holotype, femur : tibia : tarsus : claw: in fore leg 4.80 : 4.08 : 0.77 : -; in middle leg 3.70 : 3.40 : 1.25 : 0.51; in hind leg 10.0 : 10.0 : 1.28 : 0.69.

Male genitalia: Anterior diverticulum very long (Fig. 20). Posterior diverticulum apically thin and transparent, without modification (unfortunately apex of posterior diverticulum of holotype was lost by prior preparation and labelling). Paramere (Fig. 9) apically widened, with long and narrow hook.

Comparative notes. The very long anterior diverticulum (Fig. 20) places this species in the *Laccotrephes griseus* group of KEFFER (2004). This group contains at present only three species: *L. griseus* (GUÉRIN-MÉNEVILLE, 1835), *L. maculatus* (FABRICIUS, 1775), and *L. longicaudatus* sp.n. Dr. Kristensen from the Zoological Museum of the University of Copenhagen kindly provided us with photographs of the habitus and some details of the holotype of *L. maculatus*. These showed first that many specimens identified as *L. maculatus* in museum collections are incorrectly identified (e.g., specimens of *L. simulatus*, see above). Secondly, for the species known in this group at present, the parameres give excellent characteristics for specific identification (Figs. 8–10). *Laccotrephes griseus* has the respiratory siphon about two-thirds the length of its body. The siphon of the holotype of *L. maculatus* is lost, but it is reported that it is about 1.5 times the body length of the species, a similar ratio as in *L. longicaudatus* sp.n. However, the parameres

of *L. maculatus* and in *L. longicaudatus* sp.n. are very different (comp. Figs. 9 and 10). *Laccotrephes longicaudatus* sp.n. can be distinguished from the similar, but distantly related *L. simulatus* by the blunt tooth on the anterior edge of the prosternum, by the long siphon, and by the male's genitalia (anterior diverticulum and paramere).

Distribution. Only known from northern and southern Vietnam.

Etymology. The specific epithet is an adjective and refers to the long siphon ("tail").

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Beiträge zur Entomofaunistik



Abb. 1: *Micropterix mansuetella* ZELLER (Spw. 8 mm) fliegt sehr lokal in klei

rsraum der Gewöhnlichen Gebirgsschrecke (*Podisma pedestris*) im Bern 2002. Foto: Josef Weinzettl.

St. Margarethen, 19.VI.2004; (10) Weibchen von *C. brevis* Männchen (12) von *C. haemorrhosa*, beide auf *Marrubium*

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