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# New creeping water bugs (Insecta: Heteroptera: Naucoridae) from China and the Philippines

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## Abstract

Three species of creeping water bugs (Naucoridae) are newly described: *Ctenipocoris sinicus* sp.n. and *Heleocoris jaechi* sp.n. from Yunnan, China; and *Stalocoris freitagi* sp.n. from Camiguin, the Philippines.

**Key words:** Heteroptera, Nepomorpha, Naucoridae, Heleocorinae, Naucorinae, *Ctenipocoris*, *Heleocoris*, *Stalocoris*, new species, China, Philippines.

## Zusammenfassung

Drei Arten der Schwimmwanzen (Naucoridae) werden neu beschrieben: *Ctenipocoris sinicus* sp.n. und *Heleocoris jaechi* sp.n. aus Yünnan, China, sowie *Stalocoris freitagi* sp.n. von Camiguin, Philippinen.

## Introduction

The present paper reports three new species of Naucoridae that were discovered recently during revisionary work on the collection of the Natural History Museum Vienna. Naucoridae, or creeping water bugs, live on the ground of freshwater, but some exceptions are hygropetric; most Asian species inhabit streams. The fauna of southeastern Asia and the Malay Archipelago still is insufficiently known, with the exception of Thailand (e.g., SITES & al. 1997, SITES & VITHEEPRADIT 2007, 2011) and the Philippines (ZETTEL & al. 1999, ZETTEL 2003), where detailed inventories have been published.

## Material and methods

All specimens are glued on card-boards and deposited in the Natural History Museum Vienna, Austria. Material is referred to by citing the original labels, which are marked with “”; the backslash sign \ indicates the break of a line. Evaluation of hind-wing morphs (brachypterous or macropterous) was performed by examination of the claval fractures of the forewing (incomplete in brachypterous morph). The description of the new species primarily was made using a Nikon SMZ800 binocular microscope. Drawings (Figs. 5–23) were prepared with the help of a camera lucida fixed to this microscope. The stacked photographs (Figs. 1–4) were taken with a Leica DFC490 camera attached to a Leica MZ16 binocular microscope with the help of Leica Application Suite V3 and processed with CombineZM and Adobe Photoshop 7.0 software.

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Figs. 1–2: (1) Female holotype, dorsal aspect, of *Ctenipocoris sinicus* sp.n. (2) Colour pattern on right forewing (in situ) of *Ctenipocoris asiaticus*.

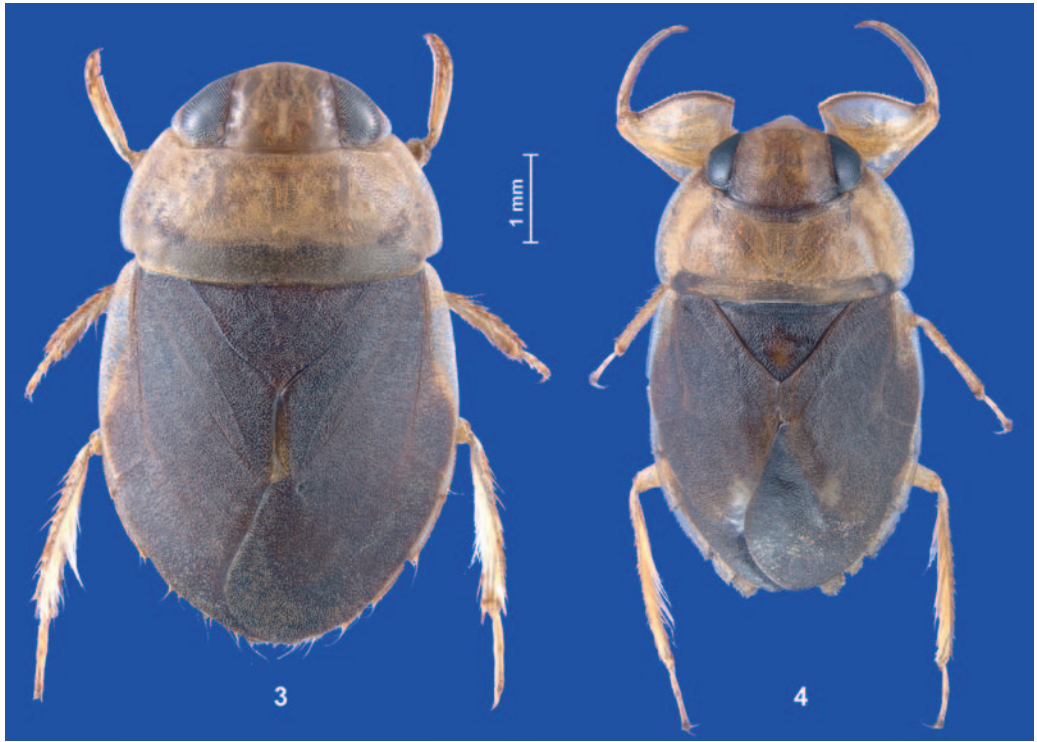
***Ctenipocoris sinicus* sp.n.** (Figs. 1, 5–9)

**Etymology:** This species is named for its country of origin, China. The specific epithet is a Latinized adjective.

**Type material:** Holotype (macropterous female) labelled “CHINA: Yünnan, Xishuangbanna\ ca. 11km N Mengyang\ 12.11.1999, ca. 700 m\ leg. Jäch, et al. (CWBS 378)”, in the Natural History Museum Vienna.

**Type locality and habitat:** China, Yunnan Province, Xishuangbanna Dai Autonomous Prefecture, Menghai County, ca. 11 km north of Mengyang, near “Elefant Valley”, geographical coordinates not available, ca. 700 m a.s.l. In a small stream, ca. 1 m wide, meandering through primary forest (from JÄCH & Ji 2003).

**Description of macropterous female:** Size: body length 9.38 mm; maximum body width (at embolar margin) 5.69 mm; head width across eyes 3.08 mm; pronotal width 4.74 mm.

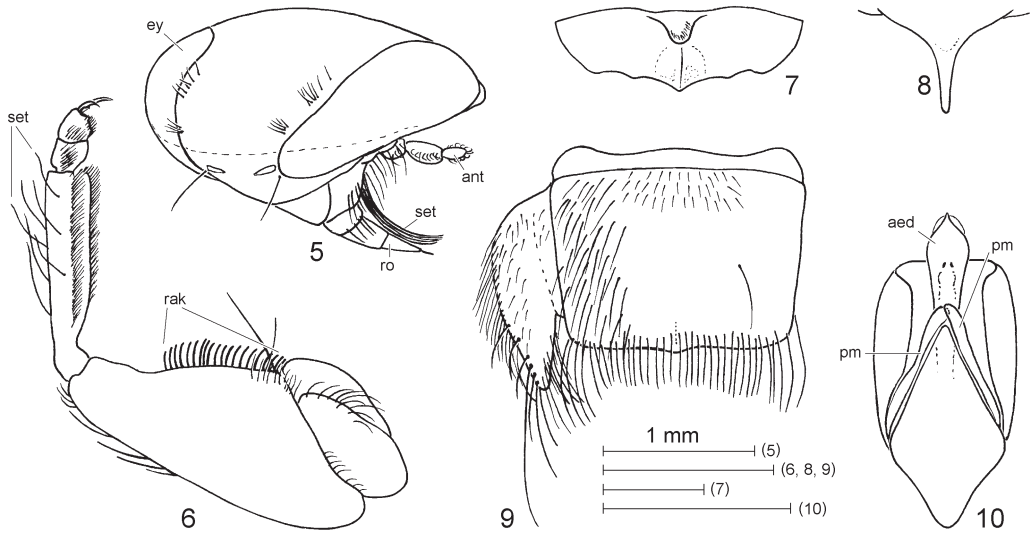


Figs. 3–4: Male holotypes, dorsal aspect, of (3) *Heleocoris jaechi* sp.n. and (4) *Stalocoris freitagii* sp.n.

Colour (dorsum: see Fig. 1): Head and pronotum yellow, with some small brown and black dots. Mesoscutellum blackish brown, posterior margins lined with yellow. Hemelytron mostly blackish brown and beset with minute greyish granules, except larger part of embolium pale yellow and other parts of corium faintly speckled with brown. Connexiva dorsally and ventrally with narrow yellow margin; tergites dark brown. Ventrally, head and prothorax yellowish; labrum, rostrum, antennae, legs yellow; remainder dark brown.

Structures: Head anteriorly with blunt bend separating a dorsal from an anterior face (Fig. 5); dorsally shiny, almost smooth (with faintest reticulation) except for large punctures along inner eye margins. Head width across eyes 3.05 times head length; posterior distance of eyes 0.53 times head width across eyes. Head margin at postero-lateral eye margin narrow and very short. Labrum 2.0 times as wide as long; apical margin broadly rounded and beset with setae. Maxillary plate not extended ventrally. Rostrum moderately long, segment 3 with numerous long setae laterally and with some short setae subapically on ventral surface; segment 4 slightly shorter than segment 3 (0.9 times), bare.

Pronotum (Fig. 1) weakly convex on disc, but more strongly downcurved at sides; ventral surface distinctly concave. Pronotum shape subtrapezoidal, with slightly curved lateral margins; maximum width near posterior corners, 2.33 times as large as medial length, and 1.54 times head width. Pronotum shiny, with relatively fine, unevenly distributed



Figs. 5–10: (5–9) *Ctenipocoris sinicus* sp.n. (female holotype; pilosity partly omitted). (5) Head with antenna (ant) and rostrum (ro), anterolateral aspect. Note anteriorly convergent compound eyes (ey) and tuft of long setae (set). (6) Right foreleg, ventral aspect. Note rake-like structure (rak) on femur and long setae (set) on tibia. (7) Mesosternum, ventral aspect. (8) Metaxiphus, ventral aspect. (9) Sternum 7 (subgenital plate), ventral aspect. (10) *Ctenipocoris asiaticus* (non-type specimen from Laos, Khammouan Province, Ban Khoun Ngeun). Genital capsule of male with parameres (pm) and main piece of aedeagus (aed) (proctiger removed).

(but generally sparse) puncturation; disc with additional faint reticulation; scattered larger punctures emitting long, stout, subcumbent setae, some forming a transverse row in front of hind margin; similar setae also on mesoscutellum and hemielytra. Lateral margins of pronotum canaliculate and with dense, appressed pilosity. Mesoscutellum (Fig. 7) 1.9 times wider than long, densely punctured (distance on average equal to diameter of punctures), moderately shiny; each puncture beset with one minute scale. Hemielytron with similar sculpture as mesoscutellum, but punctures denser on clavus and corium (distance smaller than diameter); on embolium with large, almost puncture-free area laterally; on membrane punctures becoming gradually sparser from base to shiny apex. Prosternum carinate. Mesosternum anteriorly with small tubercle, posteriorly cushion-like, densely pilose, posterior margin elevated, medially forming blunt angle. Metaxiphus (Fig. 8) forming a narrow, posteroventrally directed spine, with some long setae.

Foreleg (Fig. 6): Profemur small, weakly expanded, on flexor side with row of relatively long, stout setae forming a rake-like structure; maximum width 0.45 times maximum length. Protibia almost straight, rows of short setae on flexor side widely separated, with several very long and thin hairs, mostly dorsally. Protarsus consisting of two articulated segments. Both claws well developed. Middle and hind leg: Meso- and metatibia with numerous long stout spines (Fig. 1), those on mesotibia not clearly arranged in rows. First tarsomeres inconspicuous. Claws long, those of hind leg 0.6 times as long as last metatarsomere.

In dorsal aspect, connexiva hardly surpassing hemielytra; posterior corners of connexiva only slightly produced. Venter of abdomen symmetrical, sterna with dense mats of recumbent hairs medially and with sparse, long, erect hairs laterally. Subgenital plate (sternum 7; Fig. 9) trapezoidal, convex in ventral aspect, clearly shorter than wide, length : width = 5 : 6 (in normal, not flattened position); its hind margin almost straight, medially faintly produced.

**Comparative notes:** *Ctenipocoris* MONTANDON, 1897 belongs to Laccocorinae where it is distinguished by the two-segmented, articulated tarsus and two claws on the foreleg of both sexes (e.g., SITES & VITHEEPRADIT 2007, SITES & al. 2011). These characters – and an overall hardly raptorial foreleg with a hardly incrassate profemur (MONTANDON 1897, CHEN & al. 2005; Fig. 6) – set *Ctenipocoris* in a basal position in this subfamily. Additional important characteristics define this genus very well (or at least its Oriental clade because there are also African and New World species with uncertain generic position): (1) Eyes large, anteriorly convergent (MONTANDON 1897, CHEN & al. 2005) and nearest to each other at anteroventral face of the head. (2) Paired tufts of very long setae arising from edges of the maxillary plates, escorting the rostrum in its resting position and surpassing the rostrum's apex (Fig. 5). (3) Metaxiphus developed as a long, narrow spine (Fig. 8). (4) Forefemur at leading edge (flexor side) with rake-like structure of long, stout setae. (5) Foretibia with two rows of short setae widely separated from each other, and with several very long, very thin hairs (Fig. 6). (6) Meso- and metatibia both with numerous long, stout spines (MONTANDON 1897, CHEN & al. 2005; Fig. 1). (7) Genital capsule of male (unknown in *C. sinicus* sp.n.; but see Fig. 10 for *C. asiaticus*) with triangular apex, and with posterior rim of opening produced anteriorly as a long triangular plate (its apex slightly rounded), so that the posterodorsal part of the capsule appears diamond-shaped. (8) Parameres (unknown in *C. sinicus* sp.n.) long and slender.

The type species, *Ctenipocoris asiaticus* MONTANDON, 1897, is the only species so far described from Asia and has a wide distribution from Myanmar (MONTANDON 1897) to the island of Nias in Indonesia (unpublished material in the Natural History Museum Vienna); the author has studied specimens from Laos, West Malaysia, and Indonesia. *Ctenipocoris sinicus* sp.n. is very similar to *C. asiaticus*, but differs by the following characteristics: (1) Size large, body length 9.4 mm (vs. 7.9–8.4 mm in *C. asiaticus*), pronotum width 4.7 mm (vs. 3.9–4.2 mm in *C. asiaticus*). (2) Colour of hemielytron comparatively dark, pale elements poorly developed except on embolium (Fig. 1; vs. richly developed in *C. asiaticus*, Fig. 2). (3) Pilosity relatively long. (4) Sides of pronotum strongly downcurved and their ventral surface distinctly concave (vs. sides of pronotum weakly downcurved and ventral surface almost flat in *C. asiaticus*).

### *Heleocoris jaechi* sp.n. (Figs. 3, 11–17)

**Etymology:** The species epithet is named to honour its discoverer, Dr. Manfred A. Jäch.

**Type material:** Holotype (macropterous male) labelled “CHINA: Yünnan, Xishuangbanna\ ca. 10km NW Menglun\ 7.11.1999, ca. 700 - 800 m\ leg. Jäch, et al. (CWBS 360)” and paratype (macropterous female) labelled “CHINA: Yünnan, Xishuangbanna\ ca. 13km N Mengyang\ 10.11.1999, ca. 700 m\ leg. Jäch, et al. (CWBS 373)”, both in the Natural History Museum Vienna.



**Type locality and habitat:** China, Yunnan Province, Xishuangbanna Dai Autonomous Prefecture, Mengla County, Menglun Town, ca. 10 km northwest of Menglun proper, geographical coordinates not available, ca. 700–800 m a.s.l. In small stream, ca. 1–2 m wide, flowing through dense primary forest (from JÄCH & JI 2003, see also fig. 9 in that article).

**Description of macropterous male:** Size: body length 7.05 mm; maximum body width (at embolar margin) 4.34 mm; head width across eyes 2.64 mm; pronotal width 3.85 mm.

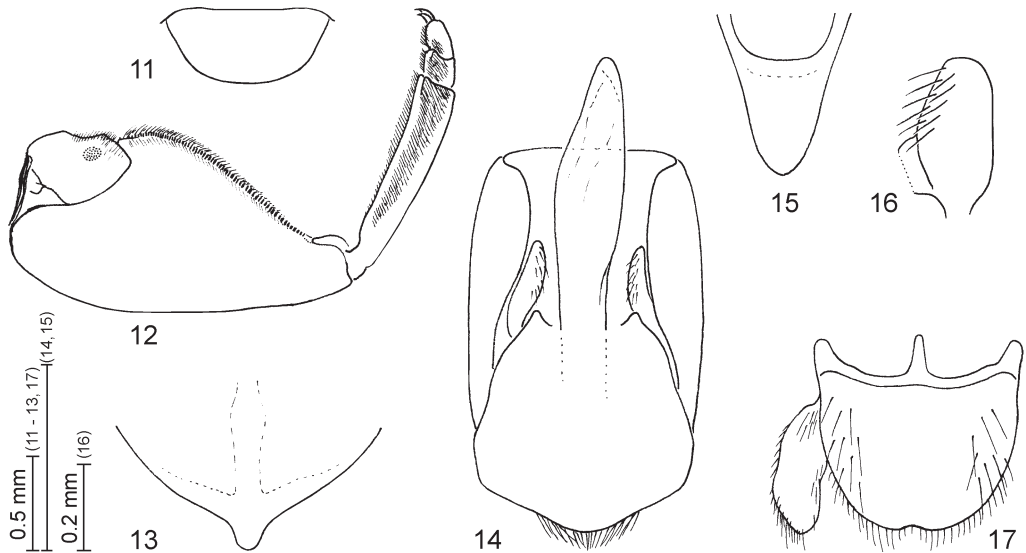
Colour (dorsum: see Fig. 3): Head and pronotum almost entirely yellow, brown maculation reduced, except for pair of short thin lines near midline of head, and pair of comma-shaped spots on pronotum posterolaterally. Posterior fourth of pronotum slightly transparent and appearing brownish. Mesoscutellum blackish brown. Hemielytron mostly blackish brown and beset with inconspicuous greyish granules, except apex of clavus and large part of embolium yellow. Connexiva yellow. Ventrally, head and prothorax yellowish; labrum, rostrum, antennae, and legs yellow; remainder dark brown.

Structural characteristics: Head with reduced sculpture, strongly shiny. Head width across eyes 2.8 times head length, head in front of eyes 0.13 times head length; synthlipsis 0.53 times head width across eyes. Labrum (Fig. 11) inserted close to anterior margin of head, directed almost ventrad, 1.9 times as wide as long; anterior margin broadly rounded. Maxillary plate without ventral extension, with dense pilosity reaching until apical margin of labrum. Rostrum short, segment 3 about 1.4 times as long as segment 4 at anterior margin; segment 3 with pair of subapical setae anteriorly, segment 4 with paired tufts of short setae posteriorly.

Pronotum (Fig. 3) evenly, but weakly convex, 2.35 times as wide as medial length; with strongly convex lateral margins, strongly convergent anteriorly; posterior corners emarginate; maximum width at posterior third of lateral margin. Pronotum with distinct puncturation, distance between punctures on disc on average 1–2 diameters; punctures becoming denser toward sides and hind margin. Mesoscutellum 1.85 times as wide as long, coarsely rugulose, dull. Hemielytron (Fig. 3) reaching end of abdomen, laterally almost covering connexiva; sutures of clavus and embolium complete. Clavus, corium, and embolium rugulose and with some scattered small tubercles, dull; membrane indistinctly separated from corium, weakly shiny, with finer sculpture. Posterior corners of connexivum 3 right-angled, of following connexiva blunt.

Foreleg (Fig. 12): Protochanter with small tubercle. Profemur moderately expanded, maximum width 0.55 times length. Protibia weakly curved, slightly widened from base to apex. Protarsus articulated, two-segmented, bearing two distinct claws without basal teeth. Both mesotibia and metatibia with numerous relatively short, stout spines; on extensor surface with slightly longer spines. Mesotibia distally on ventral side with slender-triangular area bearing dense pilosity. Claws of hind leg 0.55 times as long as last metatarsomere.

Prosternum sharply carinate in posterior half, anterior edge of carina tooth-like. Mesosternum moderately notched anteriorly, medially with low, blunt, pilose, ridge-like elevation. Metaxiphus (Fig. 13) broad and short, with small caudal tip. Pregenital abdomen subsymmetrical. Genital capsule (Fig. 14) parallel-sided, apically scarcely produced. Proctiger (Fig. 15) small, narrow, tongue-shaped. Aedeagus long, relatively broad, dis-



Figs. 11–17: *Heleocoris jaechi* sp.n. (11–16 male holotype; 17 female paratype; pilosity partly omitted). (11) Labrum, full view. (12) Left foreleg, ventral aspect. (13) Metaxiphus, ventral aspect. (14) Genital capsule, dorsal aspect (proctiger removed). (15) Proctiger. (16) Right paramere, full aspect. (17) Subgenital plate (= sternum 7) and right laterosternite 7, ventral aspect.

tally evenly tapered toward narrowly rounded apex. Parameres (Fig. 16) symmetrical, small, ovate (in situ appearing slender and club-shaped).

**Description of macropterous female:** Size: body length 7.09 mm; maximum body width (at embolar margin) 4.27 mm; head width across eyes 2.75 mm; pronotal width 3.89 mm.

Colour similar to that of male, but dark lines on head inconspicuous and pronotum with three small spots near anterior margin and with transverse row of small spots near posterior margin. Structures similar to those of male. Protarsus one-segmented. Mesotibia with inconspicuous, narrow area bearing dense pilosity. Subgenital plate (Fig. 17) distinctly wider than long (1.3 times), hind margin broadly rounded, but with shallow medial emargination.

**Comparative notes:** *Heleocoris jaechi* sp.n. is the smallest species of *Heleocoris* found in Asia so far. Species of the *Heleocoris bengalensis* complex (containing *H. bengalensis* MONTANDON, 1910, *H. montandoni* LUNDBLAD, 1933 and some related undescribed species) also are relatively small, but differ in a more slender body shape, conspicuous dark markings on head and pronotum, an apico-medially produced genital capsule of the males, and comparatively wide subgenital plates of the females. *Heleocoris jaechi* sp.n., with an apico-medially rounded genital capsule, ovate parameres, and a semicircular subgenital plate of the female, seems to represent a very different lineage. In their recent review of the *Heleocoris* of Thailand, SITES & VITHEEPRADIT (2011) recorded two species from southern China: Both *Heleocoris ovatus* MONTANDON, 1897 and *H. strabus* MONTANDON, 1897 are much larger species (body length > 9 mm) and so they can be readily distinguished from *H. jaechi* sp.n. by size.

*Stalocoris freitag* sp.n. (Figs. 4, 18–23)

**Etymology:** This species is named in honour of its discoverer, Dr. Hendrik Freitag.

**Type material:** Holotype (brachypterous male) and 1 paratype (brachypterous female): “Philippines: Camiguin, 3 km S\ Mambajao, Bal-bagon, Maubog\ 1 km S Enigmanta; small creek,\ 50 m, 09°13'N 124°44'E\ 16.4.1995 leg. Freitag (40)M”, in the Natural History Museum Vienna.

**Type locality and habitat:** Philippines, Camiguin Island, municipality of Mambajao, ca. 3 km south of Mambajao town, barangay Balbagon, sitio Maubog, ca. 1 km south of Enigmata Treehouse Ecolodge, 09°13'N 124°44'E (GPS), ca. 50 m a.s.l., in a small, very slow, frowsty creek below a spring, partly flowing through secondary forest (additional information by H. Freitag, pers. comm.).

**Description of brachypterous male:** Size: body length 5.85 mm; maximum body width (at embolar margin) 3.36 mm; head width across eyes 2.01 mm; pronotal width 3.13 mm.

Colour (dorsum: see Fig. 4): Head and pronotum almost entirely yellow. Mesoscutellum blackish brown, at apex with yellowish mark. Hemelytron mostly blackish brown and beset with minute greyish granules; large part of embolium and a spot at distal margin of corium yellow. Connexiva dorsally and ventrally yellow. Ventrally, head and prothorax yellowish; labrum, rostrum, antennae, and legs yellow; remainder dark brown.

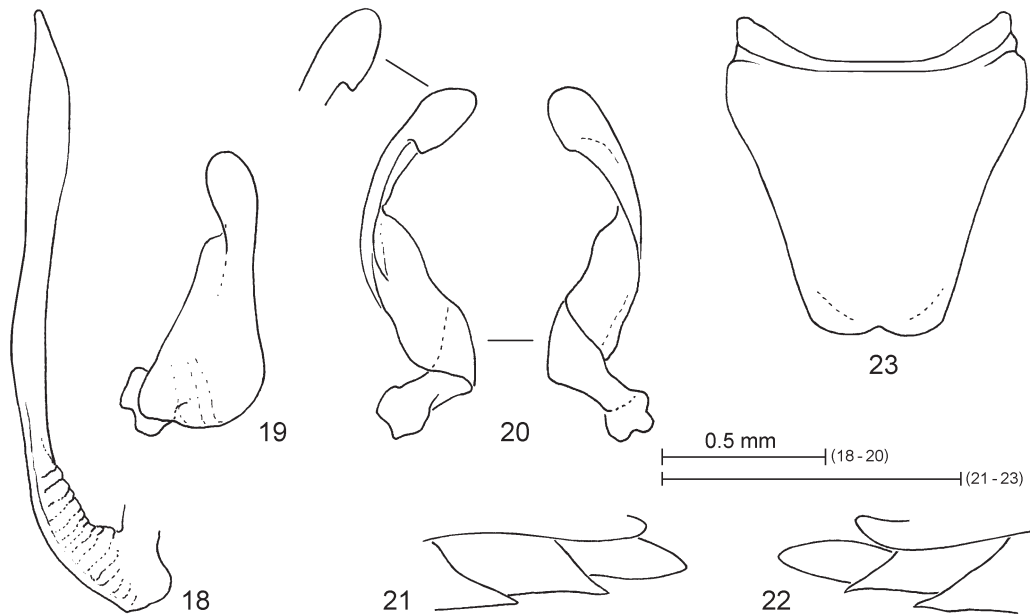
Structural characteristics: Head dorsally with superficial, anteriorly obsolete reticulation; weakly shiny. Head width across eyes 1.7 times head length, head in front of eyes 0.12 times head length; posterior distance of eyes 0.65 times head width across eyes. Labrum inserted close to anterior margin of head, at anterior margin of rostral cavity; twice as wide as long. Ventral extension of maxillary plate anteriorly subequal to one-third of labrum length. Rostrum short, segment 3 about 1.1 times as long as segment 4 at anterior margin.

Pronotum (Fig. 4) evenly, weakly convex; 2.75 times as wide as medial length; with strongly convex lateral margins; margins much more convergent anteriorly than posteriorly; maximum width at posterior two fifths of lateral margin. Surface structure of pronotum more distinctly reticulate than on head, moderately shiny; on disc most meshes with small central fovea, along hind and lateral margins surface structure more rugulose. Mesoscutellum 1.75 times as wide as long, coarsely rugulose, dull. Hemelytron (Fig. 4) almost reaching end of abdomen; sutures of clavus almost obsolete, those of embolium incomplete. Clavus, corium, and embolium rugulose, dull; membrane finely coriaceous and weakly shiny. Posterior corners of connexiva 3–5 weakly acute (almost right-angled). Tergite 5 in middle of posterior margin broadly convex.

Profemur strongly expanded, maximum width 0.75 times length. Protibia evenly curved; protarsus distinctly separated from protibia. One claw, reduced, minute. Both mesotibia and metatibia with numerous relatively short, stout spines; on extensor surface with slightly longer spines. Claws of hind leg 0.5 times as long as last metatarsomere.

Mesosternum with deep notch near anterior margin, and with blunt median carina. Pre-genital abdomen weakly asymmetrical. Genital capsule posteriorly angulate. Aedeagus (Fig. 18) long and slender, apex acute. Left paramere (Fig. 19) distally with one elongate lobe separated by shallow angular incision from reduced second lobe. Right paramere (Fig. 20) strongly twisted, with ovate, comparatively elongate apex.





Figs. 18–23: *Stalocoris freitagii* sp.n. (18–20: male holotype; 21–23: female paratype; pilosity partly or totally omitted). (18) aedeagus, right side view. (19) left paramere, dorsal aspect. (20) right paramere, two views and apex in full face view. (21) left laterosternites 5–7, lateral view. (22) right laterosternites 5–7, lateral view. (23) subgenital plate, ventral view.

**Description of brachypterous female:** Size: body length 5.76 mm; maximum body width (at embolar margin) 3.40 mm; head width across eyes 1.96 mm; pronotal width 3.08 mm.

Most characteristics as in male. Hind margin of tergite 5 broadly and weakly concave. Tergite 7 with deep trapezoidal emargination; with angular hind corners. Laterosternites 5–6, on both sides, straight or hardly downcurved in lateral aspect (Figs. 21, 22); apices spine-like. Subgenital plate (Fig. 23) trapezoidal, length about 0.9 times basal width, apical width ca. 0.4 times basal width; lateral margins distinctly converging; posterior corners blunt, slightly upcurved in ventral aspect; posterior margin with relatively broad and shallow medial emargination.

**Comparative notes:** *Stalocoris* is endemic in the Philippines and contains eight species (including *S. freitagii* sp.n.) with allopatric distribution from southern Luzon to Mindanao (LA RIVERS 1969, ZETTEL & al. 1999, ZETTEL 2003, 2005). Most species are rarely collected due to their hidden microhabitats.

Some species of *Stalocoris* are extremely similar to each other and can be distinguished only by discrete characteristics of the terminalia of males and females (e.g., ZETTEL & al. 1999). However, the three species from the southern Philippines, *S. breviceps* LA RIVERS, 1969 from Mindanao, *S. rarosae* ZETTEL, 2003 from Leyte, and *S. freitagii* sp.n. from Camiguin are more easily discernable by modifications of the hind margin of the subgenital plate of the female, which are comparatively simple (either straight or evenly

concave) in other species. The subgenital plate of *S. freitag* sp.n. (Fig. 23) resembles more that of *S. breviceps* by having a medial incision of the hind margin that, however, is narrower in *S. freitag* sp.n. than in *S. breviceps*. Moreover, *S. freitag* sp.n. is distinctly larger than *S. breviceps* and has a distinct yellow patch on the distal margin of the corium, which is either absent or, rarely, faintly indicated in *S. breviceps*. The male of *S. freitag* sp.n. can be distinguished by the shape of its left paramere which is narrower subapically than those of *S. breviceps* and *S. rarosae*.

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I thank Dr. Manfred A. Jäch (Natural History Museum Vienna) and Dr. Hendrik Freitag (Senckenberg Museum of Zoology, Dresden, Germany) for providing the insects described in this study; Prof. Dr. Ernst Heiss (Innsbruck), Prof. Robert W. Sites (University of Missouri) and Dr. Tran Anh Duc (Hanoi University of Science) for reviewing the manuscript.

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