

## The creeping water bugs (Insecta: Heteroptera: Naucoridae) of Brunei

H. Zettel\* & D.J.W. Lane\*\*

### Abstract

A recent survey of the Naucoridae of Brunei Darussalam yielded material of six species. Brunei is the type locality of two naucorids, *Laccocoris horvathi* MONTANDON, 1897 and *Laccocoris staudingeri* MONTANDON, 1897. Another four species are recorded from Brunei for the first time: *Coptocatus kinabalu* D. POLHEMUS, 1986, *Coptocatus jaechi* ZETTEL, 2002, *Laccocoris marginatus* MONTANDON, 1897, and *Thurselinus scutellaris* (STÅL, 1860). An identification key to the Naucoridae of Brunei is presented. A lectotype is designated for *Laccocoris horvathi* MONTANDON, 1897.

**Kye words:** Brunei, Naucoridae, *Coptocatus*, *Laccocoris*, *Thurselinus*, first record, faunal survey, lectotype designation

### Zusammenfassung

Die Erfassung der Naucoridae von Brunei Darussalam hat Material von sechs Arten erbracht. Brunei ist die Typenlokalität von zwei Naucoriden, *Laccocoris horvathi* MONTANDON, 1897 und *Laccocoris staudingeri* MONTANDON, 1897. Weitere vier Arten werden erstmals von Brunei gemeldet: *Coptocatus kinabalu* D. POLHEMUS, 1986, *Coptocatus jaechi* ZETTEL, 2002, *Laccocoris marginatus* MONTANDON, 1897 sowie *Thurselinus scutellaris* (STÅL, 1860). Ein Bestimmungsschlüssel zu den Naucoridae Bruneis wird beigefügt. Ein Lektotypus wird für *Laccocoris horvathi* MONTANDON, 1897 festgelegt.

### Introduction

The Naucoridae, or creeping water bugs, is a moderately large family of true water bugs (Nepomorpha) that inhabit stagnant and running freshwater in all zoogeographical regions except Antarctica. Most species are found in tropical regions, whereas the fauna of temperate zones is relatively impoverished. Highest diversity is found in the Neotropics (POLHEMUS & POLHEMUS 2008a).

The creeping water bugs of Borneo are reasonably well known and comprise ten species. With six described species the island's predominant genus is *Coptocatus* MONTANDON, 1909 of the benthic subfamily Cheirochelinae; *Coptocatus* is endemic to Borneo (MONTANDON 1909, POLHEMUS 1986, NIESER & CHEN 1999, ZETTEL 2002, POLHEMUS & al. 2008). The subfamily Laccocorinae is represented by three species of *Laccocoris* STÅL, 1856 (MONTANDON 1897a, b; POLHEMUS & POLHEMUS 2008b). The subfamily Naucorinae, represented by a single species *Thurselinus scutellaris* (STÅL, 1860), is recorded here – for Brunei and Borneo – for the first time.

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*Thurselinus scutellaris* is the only Bornean naucorid that can be found in stagnant water (including temporary pools), but it occurs also in marginal areas of streams and rivers where current is minimal. Species of *Laccocoris* inhabit slow sections of streams and rivers and typically are found either in deep side pools or below the undercut of banks. In contrast, species of *Coptocatus* are found under rocks at the bottom of streams and rivers, usually in reaches where the current is strong.

In the late 19<sup>th</sup> century, Arnold Lucien Montandon described two new laccocorines from Brunei (MONTANDON 1897b). Since then, no further country records have been published. In this study, we summarize data from our field work and other collections in Brunei. We include a key to the species known from Brunei which, in particular, enables easy identification of the three Bornean species of *Laccocoris*. Presented also are notes on two type specimens in the Zoological Museum Hamburg.

## Material and methods

### Depositories of specimens:

BMNH	The Natural History Museum, London, U.K.
BMBD	Brunei Museum, Brunei Darussalam
CZW	Coll. H & S. V. Zettel, Vienna, Austria
NHMW	Natural History Museum Vienna, Austria
UBD	Universiti Brunei Darussalam, Brunei Darussalam
ZMH	Zoological Museum Hamburg, Germany
ZRCS	Zoological Reference Collection, National University of Singapore, Singapore

Stacked digital images were taken with a Leica DFC camera attached to a Leica MZ16 binocular microscope and processed using Image Manager IM50 (Figs. 2–6) or Leica Application Suite V3 (Figs. 1, 8, 9, 12–15). They were then stacked with Auto-Montage Pro (Figs. 2–6) or ZereneStacker 64-bit (Figs. 1, 8, 9, 12–15) and processed with Adobe Photoshop 7.0.

### Identification key to the Naucoridae of Brunei

Notes: This key includes most of the naucorid species recorded from Borneo, except for four species of *Coptocatus* that have restricted distributions in Sabah and Sarawak. A key to all species of *Coptocatus* was published by ZETTEL (2002) and a slightly modified translation was presented by POLHEMUS & al. (2008). Considerable variation in forewing development and pronotum shape are related to wing polymorphism and of no taxonomic use in Naucoridae (POLHEMUS & POLHEMUS 2008b).

- 1     Rostrum arising from deep excavation on venter of head. Body sides subparallel at medial third. Habitus, see Figures 1, 2. .... *Coptocatus* 2
- Rostrum arising not from excavation. Body sides convex at medial third. Habitus, see Figures 3–6. .... 3
- 2     Body length > 17.4 mm. Dorsal surface of body mainly punctured. Embolar margin of forewing smooth or weakly indented. – Male: Flexor face of profemur sinu-



Figs. 1–2: Habitus, dorsal aspect, of (1) *Coptocatus kinabalu* (male; Sabah) and (2) *Coptocatus jaechi* (female paratype; Sarawak). Scales = 1.0 mm.

- ate and with two teeth (Fig. 1). Flexor face of protibia with two shallow concavities. – Female: Subgenital plate subapically bearing one medial patch of hairs. .... *Coptocatus kinabalu*
- Body length < 15.4 mm. Dorsal surface of body mainly granulate. Entire embolar margin distinctly indented. – Male: Flexor face of profemur convex. Flexor face of protibia concave. – Female: Subgenital plate subapically bearing one pair of hair patches. .... *Coptocatus jaechi*
- 3 Protibia and protarsus fused (but suture faintly visible). Anterior margin of head only slightly deflexed. Habitus see Figure 6. .... *Thurselinus scutellaris*
- Protibia and protarsus articulated. Anterior margin of head strongly deflexed. Habitus see Figures 3–5. .... *Laccocoris* 4
- 4 Anterior part of embolium of forewing totally yellow (in some individuals with indistinct, faded, dark stripe). Mesoscutellum yellow with pair of large blackish marks, often confluent (Fig. 5). .... *L. horvathi*
- Embolium of forewing with narrow yellow stripe along lateral margin. Mesoscutellum totally dark brown or with small yellow spot at apex (Figs. 3, 4). ....5

- 5 Yellow margin of embolium parallel-sided (of equal width over its whole length; Fig. 3). Head shiny, almost smooth, between scarce punctures. .... *L. marginatus*  
 – Yellow margin of embolium narrowed posteriorly (Fig. 4). Head with matt texture, with fine, reticulate microsculpture obscuring fine punctures. .... *L. staudingeri*

### Species accounts

#### *Coptocatus kinabalu* D. POLHEMUS, 1986 (Fig. 1)

Brunei material examined: Belait District, Labi, Rampayoh, Sungai Mendaram, Mendaram Falls, 11.X.2001, leg. H.H. Tan & K.K.P. Lim (THH0188), 1 macropterous male, 1 brachypterous male (ZRCS). Temburong District, Belalong Basin, Sungai Temburong, 5.X.2001, leg. H.H. Tan & K.K.P. Lim (THH0183), 1 nymph (ZRCS).

Notes: The nymph from Temburong is identified provisionally, based on its large size.

Distribution: Endemic to Borneo. Originally described from Sabah where it is widespread (POLHEMUS 1986, ZETTEL 2002). First record from Brunei.

#### *Coptocatus jaechi* ZETTEL, 2002 (Fig. 2)

Brunei material examined: Temburong District, Belalong Basin, Sungai Engkiang, 8.X.2001, leg. H.H. Tan & K.K.P. Lim (THH0184), 1 brachypterous male (ZRCS).

Notes: The specimen from Brunei and another brachypterous male from Sarawak (Kapit, Sungai Semaning; ZRCS) differ from the type series by much smaller size (body length 10.6–10.7 mm vs. 13.7–15.3 mm) and a pale yellow embolium of the forewing. However, body structures and genitalia agree well with the holotype.

Distribution: Endemic to Borneo. Originally described from the Kelabit Highlands in Sarawak (ZETTEL 2002). First record from Brunei.

#### *Laccocoris marginatus* MONTANDON, 1897 (Fig. 3)

Brunei material examined: Temburong District, Kuala Belalong, 10.II.-20.VII.1995, leg. Borcherdig, 1 macropterous female (CZW).

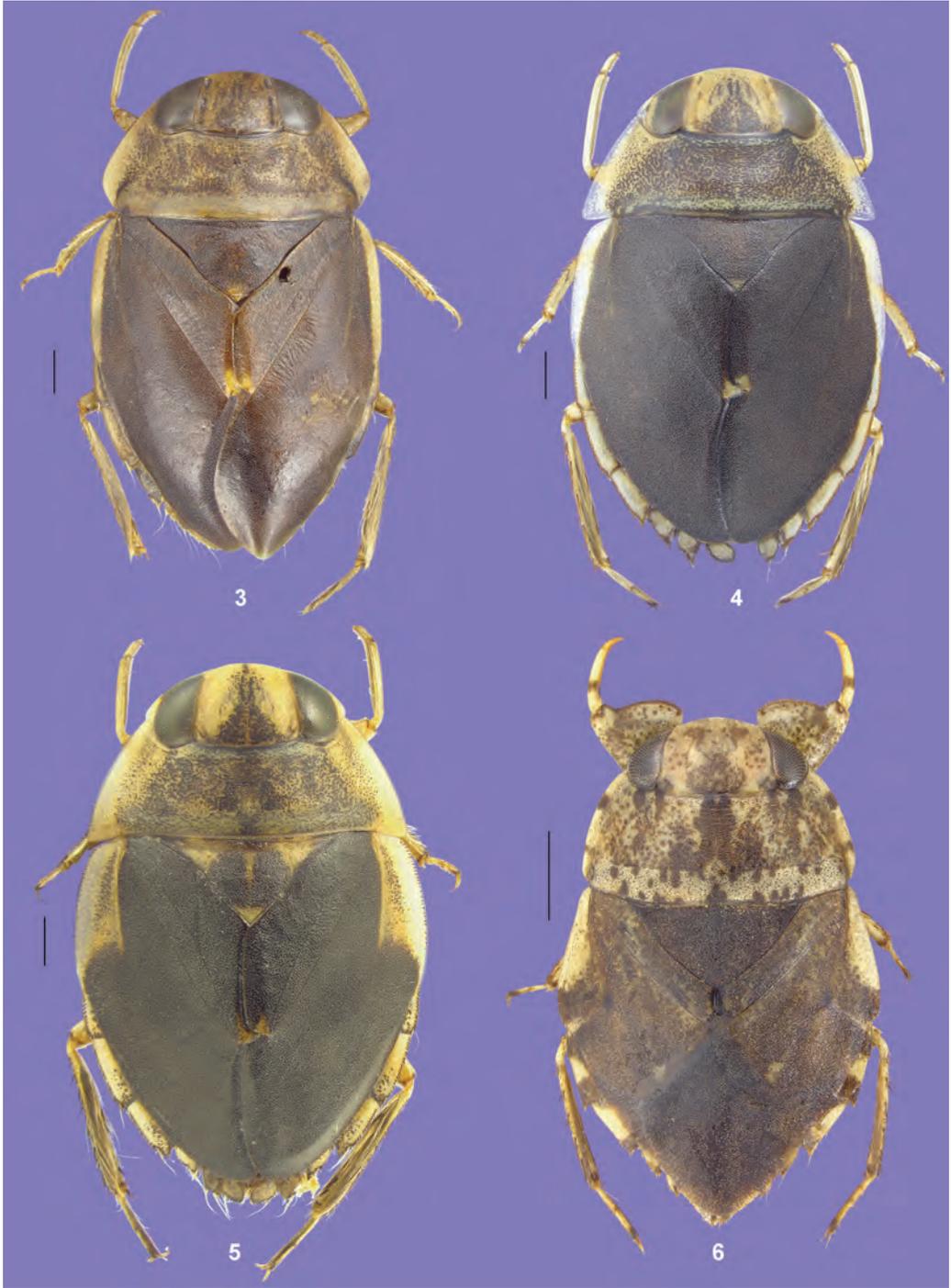
Notes: The holotype of *L. marginatus* (Fig. 3), deposited in the Natural History Museum Vienna, was collected by Felix Isidor Bacztes on Borneo in 1886. According to other labels by the same collector it probably originates from Sarawak.

Distribution: Endemic to Borneo. First record from Brunei.

#### *Laccocoris staudingeri* MONTANDON, 1897 (Figs. 4, 7, 8, 10)

Brunei material examined: 1 paralectotype, hindwing-brachypterous female, from "Brunei" (ZMH). Additional specimen: Temburong District, Sungai Engkiang (tributary of Sungai Belalong), 29.XI.2008, leg. H. Zettel (#28), 1 hindwing-brachypterous female (NHMW).

Notes: MONTANDON (1897b) described this taxon from Brunei. POLHEMUS & POLHEMUS (2008b) designated a hindwing-brachypterous male in BMNH (Fig. 7) as the lectotype of *L. staudingeri* and synonymized it with two further taxa described from Sabah, Malaysia, *L. maai* LA RIVERS, 1970 and *L. lipogonia* LA RIVERS, 1970. We had at hand



Figs. 3–6: Habitus of (3) *Laccocoris marginatus* (male holotype; "Borneo"), (4) *Laccocoris staudingeri* (female; Brunei), (5) *Laccocoris horvathi* (female; Brunei), and (6) *Thurselinus scutellaris* (male; Thailand). Scales = 1.0 mm.

one hindwing-brachypterous female paralectotype from ZMH, one additional female from Brunei, five specimens from Sabah, and a photograph of the lectotype (Fig. 7). There is a considerable variation in size. The lectotype (in BMNH) measures 12.2 mm in body length, 8.2 mm in body width, and 7.6 mm in pronotum width (M. Webb, pers. comm.). The female paralectotype (in ZMH) is a similarly large specimen: body length 12.9 mm, body width 8.5 mm, pronotum width 7.8 mm. In comparison with the types, the female collected in the Sungai Engkiang is much smaller (body length 10.1 mm, body width 6.7 mm, pronotum width 6.3 mm), and the Sabah specimens have a similar small size (body length 10.1–10.4 mm, body width 6.7–7.0 mm, pronotum width 6.2–6.5 mm). However, with such few specimens at hand we follow POLHEMUS & POLHEMUS (2008b) and preliminarily consider *L. staudingeri* as a highly variable species. The female's subgenital plates (e.g. Fig. 12) and the metaxyphus of the two forms are similar, however, we have not been able to study the male genitalia of the large form.

*Laccocoris staudingeri* can be distinguished easily from other Bornean species by its dorsal colour pattern (Figs. 4, 7, 8). *Laccocoris hoogstraali* LA RIVERS, 1970 from the southern Philippines – for a redescription see ZETTEL & al. (1999) – is very similar in colour and many other details, but can be distinguished by a longer head.

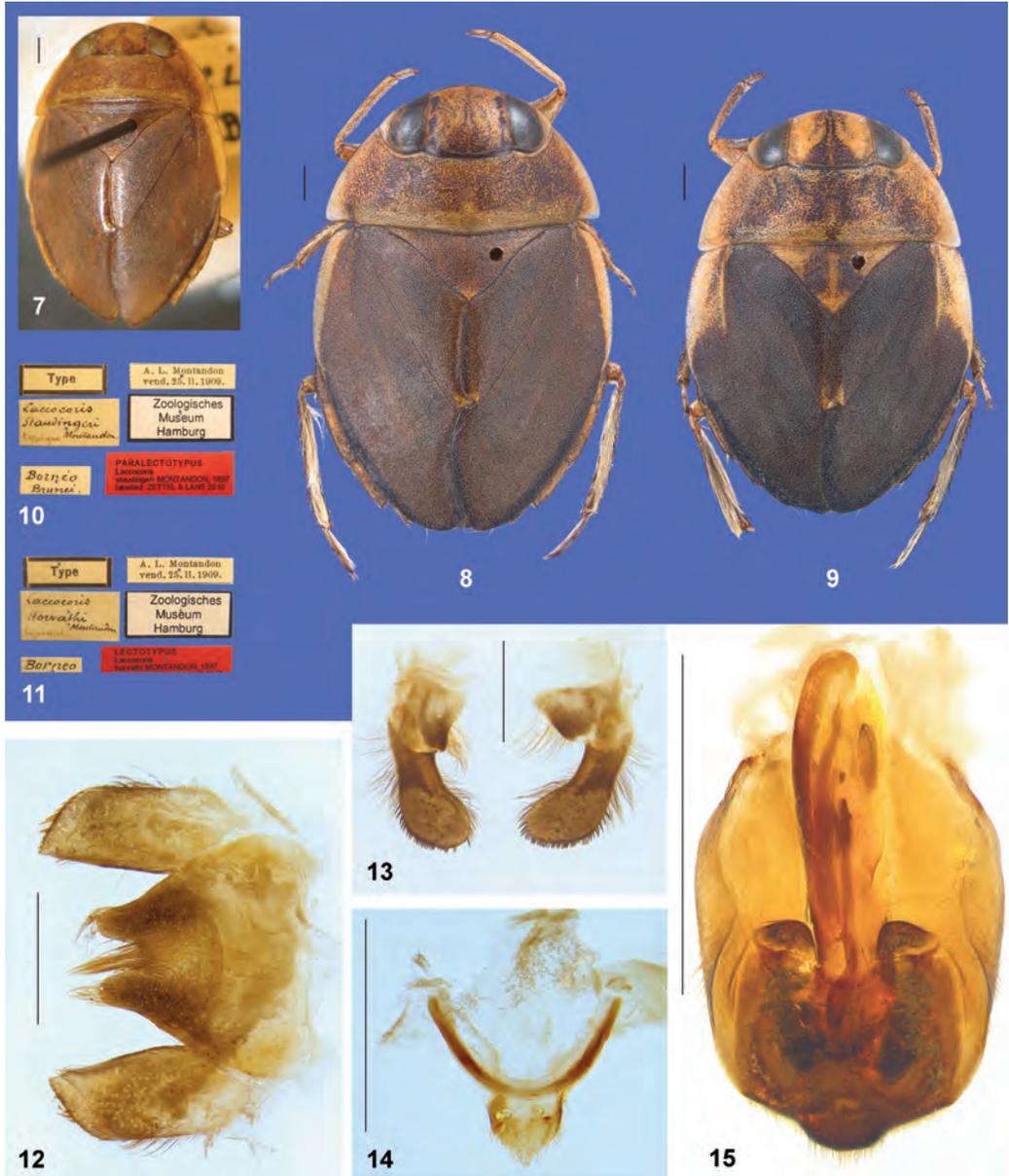
Distribution: Endemic to Borneo and recorded from Brunei, Sabah, and Sarawak (MONTANDON 1897b, POLHEMUS & POLHEMUS 2008b).

***Laccocoris horvathi* MONTANDON, 1897** (Figs. 5, 9, 13–15)

Brunei material examined: Lectotype (present designation; Fig. 9), hindwing-brachypterous male, from "Brunei" (ZMH). Additional specimens, all from Temburong District: Kuala Belalong, 10.II.-20.VII.1995, leg. Borchherding, 2 brachypterous males (CZW), 1 hindwing-brachypterous female. Sungai Belalong, Kuala Belalong, leg. S.L. Goh, 15.VI.1995 (GSL 9502), 1 hindwing-brachypterous male, 1 macropterous female (ZRCS); 16.VI.1995 (GSL 9504), 1 hindwing-brachypterous female (ZRCS). Sungai Buloh (tributary of Sungai Temburong), 28.XI.2008, leg. H. Zettel (#26), 2 hindwing-brachypterous females (UBD, NHMW). Sungai Engkiang (tributary of Sungai Belalong), 29.XI.2008, leg. H. Zettel (#28), 1 hindwing-brachypterous female (UBD). Sungai Belalong, just in front of Kuala Belalong Field Studies Centre, in fast flowing section, 60 m, N 04°32'49.6" E 115°09'28.3" (GPS), 30.XI.2008, leg. H. Zettel (#29), 1 hindwing-brachypterous female (NHMW).

Notes: MONTANDON (1897b) described *L. horvathi* from Brunei. This species can be distinguished easily from congeners by its peculiar colour pattern (Figs. 5, 9). *Laccocoris nervicus* MONTANDON, 1897 from Sumatra, which also has a more expanded – but in details different – yellow colouration, has a more elongate body shape and an acuminate apex of the labrum. In is unclear, how many syntypes of *L. horvathi* exist. For reasons of taxonomic stability, we designate the male syntype in ZMH as the lectotype of *L. horvathi*.

Short description of the lectotype: Body length 11.5 mm, width 8.2 mm. Head length 1.5 mm, width 4.7 mm, Pronotum length 2.1 mm, width 7.5 mm (lengths measured along midline). Colour pattern of dorsum as in Figure 9. Entire dorsal surface finely reticulate and matt, overlain with granulation. Sides of head rounded. Labrum triangular, apex narrowly rounded. Metaxyphus diamond-shaped, posterolateral sides straight, medial carina broad and blunt. Upper claw of foreleg with acute basal tooth. Dorsal parts of segment 8, see Fig. 13. Proctiger, see Fig. 14. Pygophore, aedeagus and parameres see Fig. 15.



Figs. 7–15: Types: (7) Male lectotype of *Laccocoris staudingeri*, BMNH (photo: D.M. Sorger); (8, 10, 12) female paralectotype of *Laccocoris staudingeri*, ZMH; (9, 11, 13–15) male lectotype (present designation) of *Laccocoris horvathi*, ZMH. (7–9) Habitus, dorsal aspect; (10, 11) labels; (12) sternite 7 and ventral laterotergites 7, ventral aspect; (13) dorsal parts of segment 8, dorsal aspect; (14) proctiger, dorsal aspect; (15) genital capsule after dissection of proctiger, dorsal aspect. Scales = 1.0 mm.

Distribution: Endemic to Borneo. In addition to specimens from Brunei, we have seen examples from Sabah and Kalimantan.

***Thurselinus scutellaris* (STÅL, 1860) (Fig. 6)**

Brunei material examined: Belait District, Sungai Belait, 13 m, N 04°32' E 114°28' (GPS), 15.VI.2007, leg. H. Zettel (# 5), 3 hindwing-brachypterous males (NHMW, UBD, BMBD), 1 nymph (NHMW). Belait District, Sungai Ingei (tributary of Sungai. Belait), forest pool beside river, N 04°9' E 114°43' (GPS), 14.VII.2010, leg. D.J.W. Lane, 1 macropterous female (UBD). Tutong District, Lutuk, shaded stream beside road, N 04°47' E 114°44' (GPS), 27.I.2010, leg. D.J.W. Lane, 3 macropterous males, 1 nymph (UBD). Tutong District, Andulau Forest Reserve, forest pool, N 04°43' E 114°36' (GPS), 22.XI.2007, leg. D.J.W. Lane, 1 macropterous female (UBD).

Notes: A detailed description of this common and widespread Oriental species was presented by ZETTEL & al. (1999). The species frequently is referred to as *Naucoris scutellaris* (e.g., CHEN & al. 2005); for generic position see ZETTEL (2001).

Distribution: From India to the Philippines and Sulawesi (ZETTEL & al. 1999, CHEN & al. 2005). First record from Brunei and Borneo.

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