





Monograph

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**Sixteen issid planthopper species in one day in  
Dong Son-Ky Thuong Nature Reserve in North Vietnam:  
Eight new species, one new genus and additional new records  
(Hemiptera: Fulgoromorpha: Issidae)**

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**Abstract.** Sixteen species of Issidae (Hemiptera: Fulgoromorpha) were recorded in a single day of collecting in Dong Son-Ky Thuong Nature Reserve, Quang Ninh Province, Vietnam, of which a checklist is provided. Among them, eight species are new to science and described in different tribes and subtribes: in the Hemisphaeriini Hemisphaeriina: *Gergithoides olivaceus* sp. nov., *Hemisphaerius bresseeli* sp. nov. and *Neogergithoides scapularis* sp. nov.; Hemisphaeriini Mongolianina: *Mongoliana vietnamica* sp. nov.; Kodaianellini: *Kodaianella mua* sp. nov.; Parahiraciini Parahiraciina: *Pusulissus quangninhensis* sp. nov. and *Rostrolatum curviceps* sp. nov.; Sarimini: *Pseudocoruncanius obliquus* sp. nov. The new genus *Melichergithus* gen. nov. is described to accommodate *Gergithus gravidus* Melichar, 1906 and the new combination *Melichergithus gravidus* (Melichar, 1906) gen. et comb. nov. is proposed; a black form of the species is recorded for the first time and described. Two species, *Longieusarima lunulia* Wang, Bourgoïn & Zhang, 2017 and *Parallelissus fuscus* Meng, Qin & Wang, 2020, are recorded from Vietnam for the first time, while another species *Maculergithus luteomaculatus* (Constant & Pham, 2016) is recorded for the first time from Quang Ninh Province. Four species were represented by single females that could not be identified to species level, belonging to the genera *Clypeosmilus* Gnezdilov & Soulier-Perkins, 2017, *Fortunia* Distant, 1909 (two species) and *Kodaianellissus* Wang, Bourgoïn & Zhang, 2017. The five following genera are recorded from Vietnam for the first time: *Kodaianella* Fennah, 1956, *Rostrolatum* Che, Zhang & Wang, 2020, *Longieusarima* Wang, Bourgoïn & Zhang, 2017, *Parallelissus* Meng, Qin & Wang, 2020 and *Kodaianellissus*. The type material of *Hemisphaerius rufovarius* Walker, 1858 and its junior synonyms *H. scymnoides* Walker, 1862, *H. testaceus* Distant, 1906 and *H. virescens* Distant, 1906 was studied and the male terminalia described; as a result, *H. rufovarius* is removed from the fauna of Vietnam and China. *Hemisphaerius bipunctatus* Melichar, 1906 is also removed from the fauna of Vietnam after examination of the corresponding specimens. This study provides a 25% increase in the number of Issidae of Vietnam; a complete list of the 51 species recorded from the country, as well as a map of the number of recorded species per province, are given and discussed.

**Keywords.** Global Taxonomy Initiative, Tonkin, Fulgoroidea, China.

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## Introduction

The family Issidae Spinola, 1839 (Hemiptera, Fulgoromorpha) is a large family of planthopper which currently contains about 1100 species in 222 genera (Bourgoin 2023), representing about 8% of the species of Fulgoromorpha Evans, 1946. It is distributed worldwide but the fauna of some major regions such as tropical Africa, New Guinea or Australia, remains very poorly documented (Gnezdilov 2013c; Gnezdilov *et al.* 2020; Constant & Semeraro 2023).

The Issidae fauna of Vietnam currently counts 41 species (Bourgoin 2023; Constant & Pham 2023), which, compared to neighbouring countries, is a lot more than Cambodia (three species – Constant & Bartlett 2019) or Laos (six species – Constant 2021; Bourgoin 2023), but much less than China (about 180 species – Zhang *et al.* 2020; Bourgoin 2023). More than 60% of the Vietnamese issid species (25 out of 41) were described in the last 20 years. As a recent example, Gnezdilov *et al.* (2014) recorded 25 species in 14 genera, adding six species (two new to science, four new country records) to the fauna of the country.

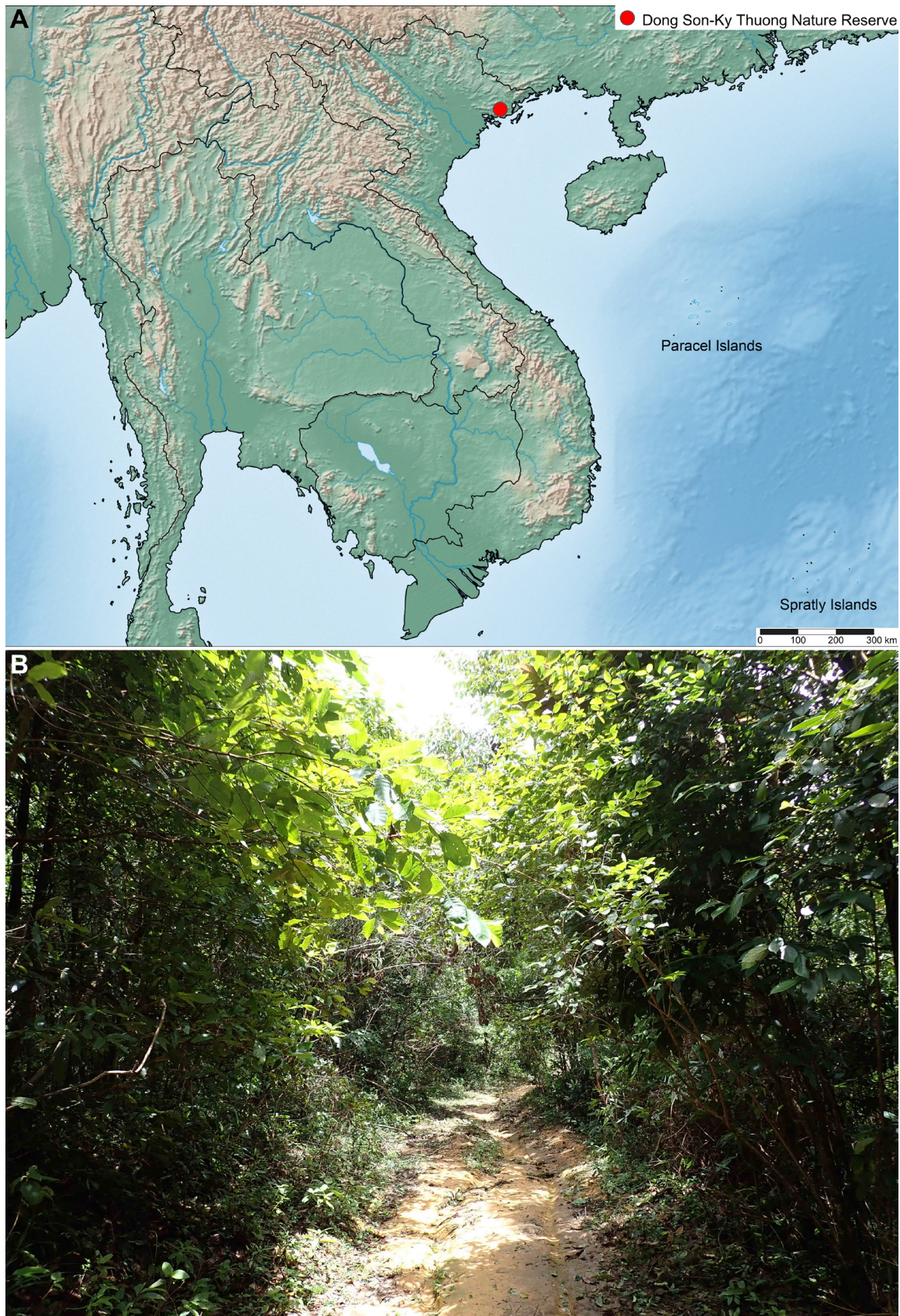
The study of the material of Issidae collected during fieldwork in Dong Son-Ky Thuong Nature Reserve in the framework of our Global Taxonomy Initiative (GTI) project “A step further in the entomodiversity of Vietnam”, revealed a total of 16 species, collected in a single day. Among these, eight were found to be new to science, one representing a new genus, and four remained unidentifiable to species, being represented each by a single female. Although we normally spend three to six days sampling each locality explored in the framework of our GTI projects, the working time in Dong Son-Ky Thuong was reduced due to a longer time spent in the entomologically important Mount Mau Son (Lang Son Province) from which numerous Vietnamese insect species were described, and heavy rains and flooding preventing access to the Nature Reserve for two days.

Dong Son-Ky Thuong Nature Reserve is situated in Quang Ninh Province near the famous Ha Long Bay (Fig. 1) and is considered as the ‘green lung’ of the area. It protects about 15 600 hectares of forest in a mountainous area culminating at 1096 m at Thien Son peak. The habitat is mixed tropical forest on hill slopes, mainly broadleaf trees with abundant epiphytes. The diverse fauna of the reserve contains some important species such as the globally vulnerable Vietnamese crocodile newt *Tylototriton vietnamensis* Böhme, Schöttler, Nguyen & Köhler, 2005 and the globally endangered Vietnamese subspecies of the crocodile lizard *Shinisaurus crocodilurus vietnamensis* Schingen, Le, Ngo, Pham, Ha, Nguyen & Ziegler, 2016. The management board of the Reserve plans to develop ‘sustainable adventure tourism’ in the near future. We collected along a path in the forest on a crest at about 550–600 m in altitude.

The present paper aims to describe the new taxa (one genus and eight species), to add five newly recorded genera to the Vietnamese fauna, and to update the definition and distribution of *Hemisphaerius rufovarius* Walker, 1858. A checklist of the species of Issidae of Vietnam is given and discussed.

## Material and methods

The specimens were captured by hand using small transparent vials with which they were slowly covered or by sweeping the lower vegetation, bushes and lower branches of trees in the forest.



**Fig. 1.** Dong Son-Ky Thuong Nature Reserve. **A.** Topographic map. **B.** Sampled habitat.



**Fig. 2.** Issidae Spinola, 1839 in nature in Dong Son-Ky Thuong Nature Reserve. **A.** *Kodaianella mua* sp. nov. **B.** *Longieusarima lunulia* Wang, Bourgoïn & Zhang, 2017. **C–D.** *Rostrolatum curviceps* sp. nov. **E.** *Fortunia* sp., nymph. **F.** *Hemisphaerius bresseeli* sp. nov. **G.** *Maculergithus luteomaculatus* (Constant & Pham, 2016). **H.** *Neogergithoides scapularis* sp. nov.

The genitalia were extracted after soaking the abdomen in a 10% solution of potassium hydroxide (KOH) at room temperature for about 12 hours. Some drops of saturated alcoholic Chlorazol black solution were added for contrasting when necessary (Carayon 1969). The pygofer was separated from the abdomen and the aedeagus dissected with a needle blade for examination. The whole was thoroughly rinsed in 70% ethanol, then placed in glycerine for preservation in a tube attached to the pin of the corresponding specimen. The hind wings were glued with white glue on a small white cardboard rectangle attached to the pin of the corresponding specimen.

The photographs of live specimens and habitats were taken with an Olympus Though 6 camera, these of the collection specimens were taken with a Leica EZ4W stereo microscope with integrated camera, stacked with CombineZ software and optimized with Adobe Photoshop CS3. The distribution maps were produced with SimpleMappr (Shorthouse 2010).

The external morphological terminology follows O'Brien & Wilson (1985) and for the male genitalia, Bourgoin & Huang (1990). The classification used follows the most recent one published by Gnezdilov *et al.* (2022). The metatibiotarsal formula gives the number of spines on (side of metatibia) the apex of the metatibia / apex of the first metatarsus / apex of the second metatarsus. The terminology of the wing venation follows Bourgoin *et al.* (2015).

## Abbreviations

### Measurements

The measurements were taken as in Constant (2004) and the following abbreviations are used:

BB	=	maximum breadth of the body
BF	=	maximum breadth of the frons
BTg	=	maximum breadth of the tegmen
BV	=	maximum breadth of the vertex
BW	=	maximum breadth of the hind wing
LF	=	length of the frons in median line
LTg	=	maximum length of the tegmen
LT	=	total length (apex of head to apex of tegmina)
LV	=	length of the vertex in median line
LW	=	maximum length of the hind wing

### Male terminalia

<i>An</i>	=	anal tube
<i>ca</i>	=	capitulum of the gonostylus
<i>co</i>	=	connective of the aedeagus
<i>dl</i>	=	dorsal lobe of the periandrium
<i>G</i>	=	gonostylus
<i>ll</i>	=	lateral lobe of the periandrium
<i>lvp</i>	=	lateroventral lobe of the periandrium
<i>Py</i>	=	pygofer
<i>te</i>	=	tectiductus of the aedeagus
<i>vl</i>	=	ventral lobe of the periandrium

## Repositories

BMNH	=	The Natural History Museum, London, United Kingdom
MNHN	=	Muséum national d'histoire naturelle, Paris, France
NHMW	=	Naturhistorisches Museum Wien, Vienna, Austria

RBINS = Royal Belgian Institute of Natural Sciences, Brussels, Belgium  
VNMN = Vietnam National Museum of Nature, Hanoi, Vietnam

## Results

Class Insecta Linnaeus, 1758  
Order Hemiptera Linnaeus, 1758  
Suborder Auchenorrhyncha Duméril, 1806  
  Infraorder Fulgoromorpha Evans, 1946  
    Superfamily Fulgoroidea Latreille, 1807  
      Family Issidae Spinola, 1839  
        Subfamily Issinae Spinola, 1839  
          Tribe Hemisphaeriini Melichar, 1906  
            Subtribe Hemisphaeriina Melichar, 1906  
  
Genus *Gergithoides* Schumacher, 1915

*Gergithoides* Schumacher, 1915: 126. Type species: *Gergithoides carinatifrons* Schumacher, 1915 by monotypy.

*Daruma* Matsumura, 1916: 103 (preoccupied). Type species: *Daruma nitobei* Matsumura, 1916, by original designation. Synonymized by Ishihara (1965: 208) under the erroneous spelling “*Darma*”.

*Darumara* Metcalf, 1952: 227. New name for *Daruma* Matsumura, 1916. Synonymized by Gnezdilov (2009: 85) [already synonymized by Ishihara (1965)].

*Darma* Ishihara, 1965: 208. Misspelling of *Daruma*.

## Diagnosis

The definition of the genus extrapolated from the key to the genera of Hemisphaeriini provided by Sun *et al.* (2012) features the following distinctive set of characters:

- (1) the hind wing longer than half length of tegmen;
- (2) the frons with a complete median carina;
- (3) the lateral margins of the frons not elevated;
- (4) a row of tubercles along the lateral margins of the frons.

At species level, the shape of the bi- or trispinose lateral process of the periandrium provides very stable and reliable characters.

The Vietnamese species of *Gergithoides* were treated in Constant & Pham (2017).

## Species included

*Gergithoides carinatifrons* Schumacher, 1915  
*Gergithoides caudospinosus* Chen, Zhang & Chang, 2014  
*Gergithoides gibbosus* Chou & Wang, 2003  
*Gergithoides gnezdilovi* Constant & Pham, 2017  
*Gergithoides jejudoensis* Rahman, Kwon & Suh, 2012  
*Gergithoides nui* Constant & Pham, 2017  
*Gergithoides olivaceus* sp. nov.  
*Gergithoides rugulosus* (Melichar, 1906)  
*Gergithoides undulatus* Wang & Che, 2003

## Note

The species of *Gergithoides* should be identified based on the comparison of the male terminalia with reliable illustrations. The pending issues in the identity of some species of *Gergithoides*, especially in the fauna of China, were explained in detail by Constant & Pham (2017) but not addressed in Zhang *et al.* (2020).

### *Gergithoides olivaceus* sp. nov.

[urn:lsid:zoobank.org:act:EC8ABF4A-A058-4E0A-B635-235CC5FFE995](https://doi.org/10.21203/rs.3.rs-1234567)

Figs 1, 3–4

## Diagnosis

*Gergithoides olivaceus* sp. nov. can be recognized by

- (1) the shape of the lateroventral bispinose process of the periandrium with anterior spine strongly elongate cephalad, weakly curved, then sinuate in distal portion and pointed apically and posterior spine directed posterodorsad along basal half, then strongly but evenly recurved ventrad and tapering to pointed apex (*lvp* – Fig. 4E–F);
- (2) the ventral lobe of the periandrium with dorsal margin broadly rounded, nearly truncate (*vl* – Fig. 4G);
- (3) the median posterior processes of periandrium pointed apically and laterally emarginate subapically (Fig. 4G).

## Differential diagnosis

The closest species, sharing the character of a bispinose lateroventral process of the periandrium with anterior spine elongate and posterior spine curved, are *G. carinatifrons* described from Taiwan (Schumacher 1915) and *G. undulatus* described from Hainan and Guangxi (Che *et al.* 2003).

From both *G. carinatifrons* (illustrations in Chan & Yang 1994: fig. 5) and *G. undulatus* (illustrations in Che *et al.* 2003: figs 1–6), *G. olivaceus* sp. nov. can be separated by its apically sinuate anterior spine of the lateroventral process of the periandrium (evenly curved dorsad in *G. carinatifrons* and *G. undulatus*) and the evenly rounded hook formed by the posterior spine of the periandrium process (strongly, abruptly reflexed in *G. carinatifrons* and *G. undulatus*).

## Etymology

The species epithet *olivaceus* is a Latin adjective meaning ‘olive-green’. It refers to the general colour of the specimens of the new species.

## Type material

### Holotype

VIETNAM • ♂ (dissected, right hind wing mounted, Figs 3–4); Quang Ninh Province, Dong Son-Ky Thuong Nature Reserve; 21°08'29" N, 107°04'53" E; 27 Aug. 2022; 550 m a.s.l.; secondary forest; GTI Project; J. Constant, J. Bresseel and L. Semeraro leg.; I.G.: 34.518; RBINS.

### Paratypes

VIETNAM • 1 ♀; same collection data as for holotype; RBINS • 1 ♀; same collection data as for holotype; VNMN.

## Description

MEASUREMENTS AND RATIOS. LT: ♂ (n = 1): 5.6 mm, ♀ (n = 2): 6.0–6.4 mm; LT/BB = 1.34; LTg/BTg = 1.67; LW/BW = 1.9; BV/LV = 0.8; LF/BF = 1.27.

**HEAD** (Fig. 3A–D). Vertex slightly longer in midline than broad, brown with margins carinate; anterior margin convex, posterior one concave and lateral converging anteriorly; disc excavate with obsolete tubercles. Side of head yellowish brown. Frons elongate and rugulose, dark reddish brown; median carina yellowish, narrowly margined with a black line, extending from dorsal margin down to frontoclypeal suture; row of yellowish tubercles on black background along dorsal and lateral margins extending to level of base of eyes; lateral margins yellowish under eyes, the yellowish line margined by inner thin black line. Clypeus black-brown with basilateral yellowish spot and black on sides and apex, elevated medially. Labium dark brown with last segment longer than broad, and shorter than penultimate. Scape short, ring-shaped, black; pedicel bulbous, dark brown.

**THORAX** (Fig. 3A–D). Variegated olivaceous brown. Pronotum very short, about half the length of mesonotum in midline, with median carina; anterior and posterior margins carinate; disc rugulose, concave with impressed point on each side of median carina; row of yellowish tubercles along anterior margin extending on paranotal fields to level of base of eyes; another oblique row of 3 weak yellowish tubercles on each side of disc, parallel to anterior margin. Mesonotum short, slightly coriaceous with yellowish median carina and obsolete impressed point on each side of disc; transverse carina along anterior margin yellowish; 2–4 yellowish blunt tubercles grouped at each external angle; yellowish suffused marking on each side of scutellum; apex of scutellum elevated and marked with dark brown. Tegulae olivaceous.

**TEGMINA** (Fig. 3A, C). Strongly convex; slightly longer than broad when taken together in dorsal view; slightly concave at basocostal angle; subcoriaceous with dense reticulum of slightly raised veins and veinlets; main veins barely distinct basally; yellowish brown with brown to black irregular markings, especially along inner margin of cells, making the insect look olivaceous from a distance; small darker spot in middle of sutural margin.

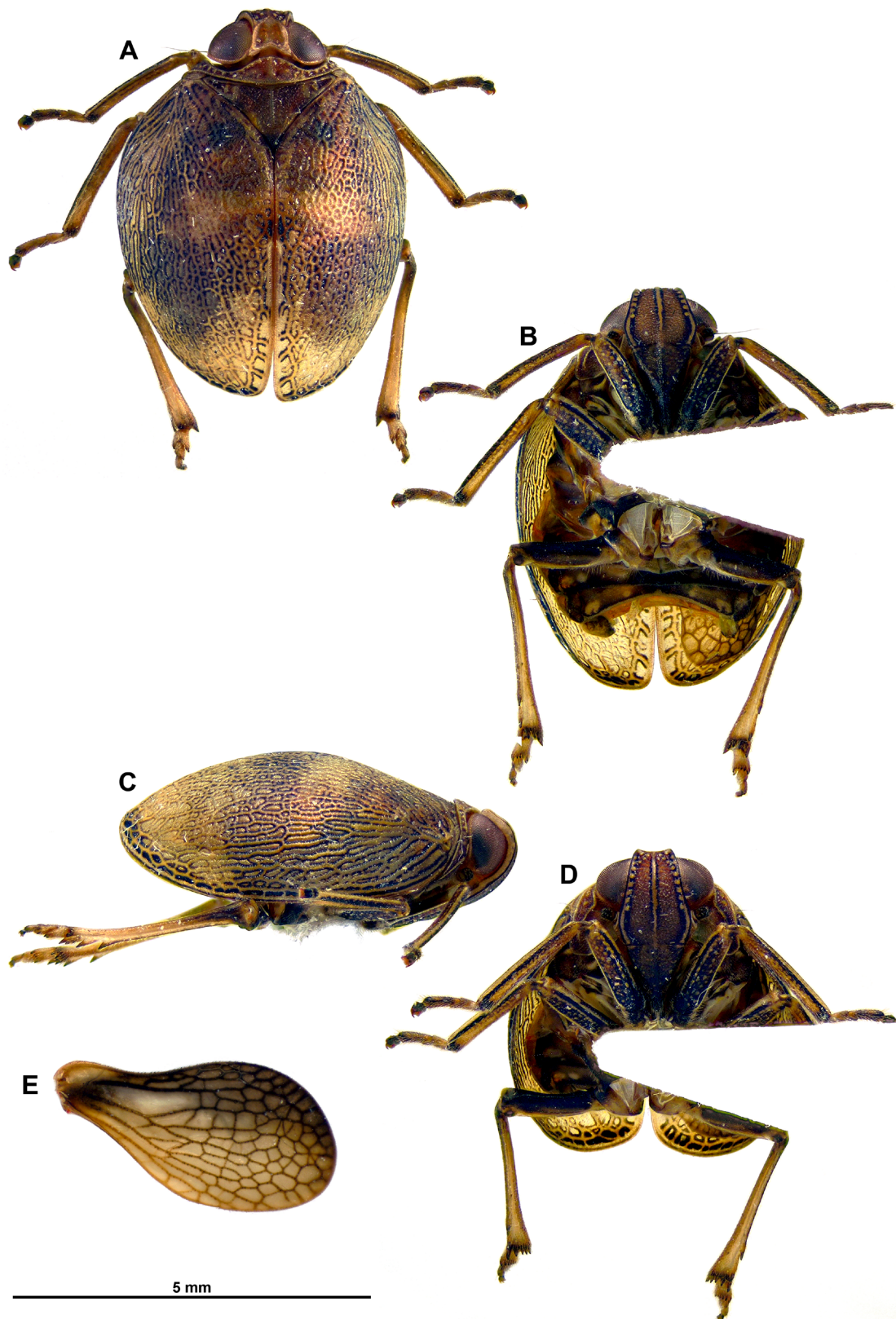
**HIND WINGS** (Fig. 3E). Brown, with costal half suffused with blackish, except basicostal angle, unilobed, with veins darker than cells; elongate, slightly shorter than tegmina. Venation reticulate with main longitudinal veins distinct basally (C, ScP+R, MP, CuA); numerous cross-veinlets. Anal area obsolete. Costal and cubital margins sinuate, distal margin rounded.

**LEGS** (Fig. 3A–D). Elongate and slender, brown with trochanters, base of femora, line along externoventral margin of femora, black; black-brown line on ventral carinae of tibiae; base and apex of tibiae, apex of tarsi and apex of metatibial spines black-brown; pro- and mesofemora with pale yellow tubercles. Posterior tibiae with 2 lateral spines on apical  $\frac{1}{3}$  and 6 apical spines. Metatibiotarsal formula: (2) 6 / 8–9 / 2.

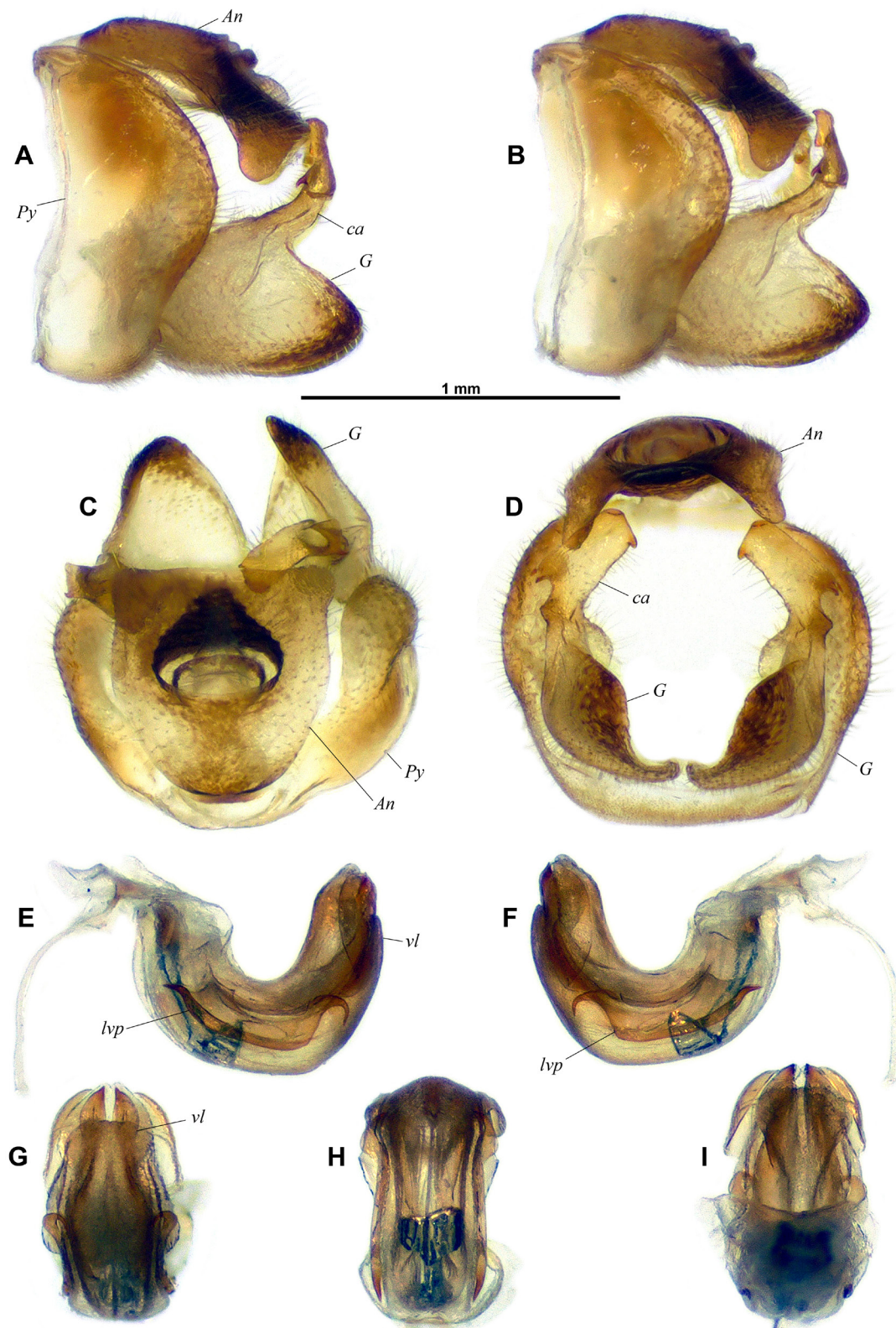
**ABDOMEN** (Fig. 3B). Brown with middle and posterior area darker, often with irregular paler markings on sides of sternites.

**MALE TERMINALIA**. Pygofer (*Py*) 2.2 times as high as broad in lateral view, with posterior margin strongly sinuate, rounded along dorsal  $\frac{2}{3}$  (Fig. 4A–B); ventral margin rounded in lateral view (Fig. 4A–B). Gonostyli (*G* – Fig. 4A–B, D) elongate in lateral view, with ventral margin broadly rounded in lateral view, posterior margin more narrowly rounded in lateral view, dorsal margin oblique basally to neck of capitulum, more posteriorly forming a straight angle with neck of capitulum; capitulum (*ca*) with elongate neck, curved dorsocephalad in lateral view, mesad in posterior view, with small blunt lateral projection in middle of outer margin; apical portion anteroposteriorly laminate, subrectangular in caudal view, bearing one dorsal tooth, one tooth at inner angle and one tooth pointing anteroventrally at anterobasal, followed posterad by a lateral lamina curved ventrad looking like an additional tooth in caudal view. Anal tube (*An* – Fig. 4A–C) nearly as broad as long in midline in dorsal view, dorsoventrally flattened with sides sinuate, diverging towards apex, apical margin weakly bisinuate in dorsal view; in lateral view,





**Fig. 3.** *Gergithoides olivaceus* sp. nov., dissected holotype, ♂ (RBINS). A. Habitus, dorsal view. B. Habitus, ventral view. C. Habitus, lateral view. D. Habitus, perpendicular view of frons. E. Right hind wing.



**Fig. 4.** *Gergithoides olivaceus* sp. nov., holotype, ♂ (RBINS), terminalia. A–D. Pygofer, anal tube and gonostyli. A. Left lateral view. B. Anterolateral view, showing apex of capitulum. C. Dorsal view. D. Caudal view. E–I. Aedeagus and connective. E. Left lateral view. F. Right lateral view. G. Posteroventral view. H. Ventral view. I. Anterodorsal view. Abbreviations: see Material and methods.

anal tube curved ventrally; apicolateral angles roundly projecting lateroventrally. Aedeagus strongly curved posterodorsally, rather simple (Fig. 4E–I). Periandrium with lateroventral process (*lvp*) at basal half showing 2 spines; anterior spine strongly elongate cephalad, weakly curved, more or less parallel to ventral margin of aedeagus, sinuate in distal portion and pointed apically; posterior spine directed posterodorsad, forming a nearly right angle with anterior spine, slightly widening along basal half, then strongly recurved ventrad and tapering to pointed apex (Fig. 4E–F); periandrium with laminate process reflexed cephalad on each side in distal portion, with right one slightly more developed and projecting slightly further laterally than left one (Fig. 4E–F, I) and 2 median processes pointed apically and with lateral margin sinuate antepically (Fig. 4G). Ventral lobe of periandrium (*vl*) broad with apical margin roundly truncate (Fig. 4G).

### Biology

*Gergithoides olivaceus* sp. nov. was collected in August on lower vegetation and bushes, in moist evergreen tropical forest at about 550 m in altitude (Fig. 1B).

### Distribution

Vietnam: Quang Ninh Province, Dong Son-Ky Thuong Nature Reserve (Fig. 1A).

Genus *Hemisphaerius* Schaum, 1850

*Hemisphaerius* Schaum, 1850: 71. Type species: *Hemisphaerius coccinelloides* (Burmeister, 1834).

### Diagnosis

The characters defining the genus were given by Gnezdilov (2017b):

- (1) frons flat, smooth, widened above clypeus, with lateral margins slightly projecting on sides;
- (2) frons and postclypeus without carinae;
- (3) vertex wider than long;
- (4) pro- and mesonotum without carinae;
- (5) costal margin of tegmina not strongly projecting anteriorly under eye;
- (6) hind wings rudimentary;
- (7) metatibiae with 2 lateral spines;
- (8) periandrium asymmetrical;
- (9) aedeagus without ventral hooks;
- (10) posterior margin of pygofer rounded in lateral view;
- (11) gonostyli with short and wide capitulum;
- (12) anal tube wide in dorsal view.

### Distribution

China, Japan, Taiwan, Vietnam, Cambodia, Myanmar, Thailand, India, Sri Lanka, Malaysia, Singapore, Philippines, Indonesia, New Guinea, Solomon Islands (Bourgoin 2023).

*Hemisphaerius bresseeli* sp. nov.

[urn:lsid:zoobank.org:act:AF30A751-E428-4E96-B589-42758A659B90](https://zoobank.org/act:AF30A751-E428-4E96-B589-42758A659B90)

Figs 2F, 5–9

*Hemisphaerius rufovarius* Walker, 1858 – Zhang *et al.* 2020: 266, fig. 101 pl. 19g–i (described, figured with genitalia, recorded from Hainan, Yunnan and Guangxi).

*Hemisphaerius bipunctatus* Melichar, 1906 – Lallemand 1942: 70 (listed).

*Hemisphaerius testaceus* Distant, 1906 – Chen *et al.* 2014: 64, fig. 2-24 (described, figured with genitalia, recorded from Hainan: Jianfengling, and Taiwan – the latter not substantiated by specimens!).

## Diagnosis

*Hemisphaerius bresseeli* sp. nov. varies in body colour, with tegmina being either red, pale brown or green, with or without black spot (Figs 5–7) but can be recognized by

- (1) the shape of anal tube, subtriangular in dorsal view and with posterolateral angles projecting lateroventrad (*An* – Fig. 8A–D);
- (2) the strongly U-shaped lateral aspect of the aedeagus (Fig. 8E–F);
- (3) the asymmetrical lateral lobes of the perianthium laminate with outer margin rounded and with numerous small teeth (*ll* – Fig. 8K);
- (4) the ventral lobe of the perianthium apically lanceolate (*vl* – Fig. 8G, K).

## Differential diagnosis

The closest species is *H. caninus* Che, Zhang & Wang, 2020 (in Zhang *et al.* 2020), from which *H. bresseeli* sp. nov. differs by having small teeth along the outer margin of the lateral lobes of the perianthium (outer margins without teeth in *H. caninus*), by a more elongate anal tube and by the lanceolate apex of the ventral lobe of the perianthium (apex truncate in *H. caninus*).

## Etymology

The species epithet is a patronym dedicated to Joachim Bresseel, stick insect expert, who has worked with us on the Global Taxonomy Initiative project in Vietnam for more than ten years.

## Type material

### Holotype

VIETNAM • ♂ (dissected, Figs 5, 8); Quang Ninh Province, Dong Son-Ky Thuong Nature Reserve; 21°08'29" N, 107°04'53" E; 27 Aug. 2022; 550 m a.s.l.; secondary forest; GTI Project; J. Constant, J. Bresseel and L. Semeraro leg.; I.G.: 34.518; RBINS.

### Paratypes

VIETNAM • 2 ♂♂ (dissected), 1 ♀; same collection data as for holotype; RBINS • 1 ♂ (dissected), 2 ♀♀; same collection data as for holotype; VNMN • 1 ♂ (dissected); Vinh Phuc Province, Me Linh [Biological Station]; 21°23'04" N, 105°42'44" E; 15 Aug. 2007; [100 m a.s.l.]; H.T. Pham leg.; VNMN • 1 ♂ (dissected – Fig. 7A–D); Tonkin, Hoa Binh; Père De Cooman leg.; R.I.Sc.N.B. I.G. 18.385; “*Hemisphaerius bipunctatus* Mel, dét. V. Lallemand 19””; RBINS • 1 ♂ (dissected); Tonkin, Hoa Binh; [Père De Cooman leg.]; R.I.Sc.N.B. I.G. 18.385; [“*Hemisphaerius bipunctatus* Mel, dét. V. Lallemand 19””]; RBINS • 1 ♀ (Fig. 7E–H); Tonkin, Hoa Bing; [Père De Cooman leg.]; R.I.Sc.N.B. I.G. 23.285; “H. Synave det., 195 *Hemisphaerius bipunctatus* Mel.”; RBINS.

## Notes

### (1) on *Hemisphaerius bipunctatus* Melichar, 1906.

The specimens identified and recorded as *H. bipunctatus* Melichar, 1906 by Lallemand (1942) in the RBINS collection were examined (Fig. 7). They are from Hoa Binh in North Vietnam and are not conspecific with the specimens of *H. bipunctatus* from Singapore and southern Thailand, also in the RBINS collection. The type localities of *H. bipunctatus* are Perak in Malaysia and Java (Melichar 1906), and the Vietnamese specimens, instead, belong to the new species *H. bresseeli* sp. nov. as described above. Hence, *H. bipunctatus* must be removed from the Vietnamese fauna.

### (2) on *Hemisphaerius rufovarius* Walker, 1858.

*Hemisphaerius rufovarius* Walker, 1858 (described from Myanmar) was considered by Liang (2001) as a senior synonym of *Hemisphaerius virescens* Distant, 1906 (described from Myanmar, Tenasserim Valley, Myitta), *H. testaceus* Distant, 1906 (Myanmar, Tenasserim Valley, Myitta) and *H. scymnoides*

Walker, 1862 (Thailand, Chantaburi). However, this action was not considered by Chen *et al.* (2014). This explains why the same species was referred to as *H. testaceus* in Chen *et al.* (2014), and later as *H. rufovarius* in Zhang *et al.* (2020) who followed Liang (2001).

#### From China

The two specimens recorded as *H. rufovarius* from Hainan Island (Dwa Bi and Ta Han) by Fennah (1956), representing the first record of the species from China, probably belong to *H. bresseeli* sp. nov. but were not examined by the authors.

The material referred to as *H. testaceus* in Chen *et al.* (2014), and later as *H. rufovarius* in Zhang *et al.* (2020) (including specimens from Hainan), according to the corresponding illustration of the male terminalia available in these publications, actually belongs to *H. bresseeli* sp. nov.

#### From Vietnam

The first record of *H. rufovarius* from Vietnam (Hoa Binh) was published under the junior synonym *H. scymnoides* by Fennah (1978) but these specimens are assumed to also belong to *H. bresseeli* sp. nov. (like the Hoa Binh specimens in RBINS), although we did not examine them. This record served as a base for the later publications recording *H. rufovarius* from Vietnam (see below in dedicated section).

The holotype of *H. rufovarius* was examined by the first author (see section on this species below) and is a female, so the relevant male terminalia features to accurately characterize this species are missing. The types of the junior synonyms are also females, except for a syntype of *H. testaceus*, which is here used as a reference for the senior synonym *H. rufovarius*. The male terminalia of the species are very different from those of *H. bresseeli* sp. nov. and, among the numerous specimens of “*rufovarius*-like” *Hemisphaerius* examined by the authors from the area separating the documented distribution of *H. bresseeli*, and the type locality of *H. rufovarius* and its synonyms, no specimen matching *H. bresseeli* was found. Instead, externally similar but clearly different genitalia-wise species were observed (Constant, unpubl. data). Hence, *H. rufovarius* must be removed from the fauna of China and Vietnam.

#### Description

MEASUREMENTS AND RATIOS. LT: ♂ (n = 4): 4.3 mm (4.2–4.4), ♀ (n = 3): 4.7 mm (4.6–4.9); LT/BB = 1.5; LTg/BTg = 1.6; BV/LV = 3.5; LF/BF = 1.1.

#### Note

The bright colour of the live specimens (Fig. 2F) tends to fade in collection specimens with the turquoise colour of the markings on the thorax and head turning to yellow and the rest of the body tending to become more yellowish as well (Figs 5–7).

HEAD (Figs 5A–D, 6A–D, 7A–C, E–G). Vertex strongly broader than long in midline, bright red, flat with median shallow groove and margins not carinate; anterior margin weakly curved, posterior one concave and lateral ones oblique, slightly converging cephalad. Side of head bright red. Frons convex, slightly elongate and weakly rugulose, bright red with turquoise marking at dorsolateral angles; no carina; maximum breadth slightly under level of antennae. Clypeus black with basal transverse red band under frontoclypeal suture, convex, smooth. Labium yellow-brown with last segment longer than broad, about as long as penultimate. Antennae yellow-brown; scape short, ring-shaped; pedicel bulbous.

THORAX (Figs 5A, C–D, 6A, C–D, 7A–C, E–G). Pronotum bright red with 2 subtriangular turquoise markings on disc; very short, about 1/3 the length of mesonotum in midline, extremely narrow behind eyes, slightly rugulose, without median carina, with fine carinae along anterior and posterior margins; disc with small, impressed point on each side of median red line; paranotal lobes red, paler at ventral inner angle, without black marking. Mesonotum bright red with median turquoise line not reaching

anterior margin and large triangular turquoise marking on lateral angles; rather short, slightly rugulose with fine transverse carina along anterior margin but without longitudinal carinae. Tegulae coloured as tegmina, red or green.

TEGMINA (Figs 5A, C, 6A, C, 7A–B, E–F). Two main colour morphs: (1) red narrowly marked with bright red on postclaval margin along mesonotum, extending to basal  $\frac{1}{3}$  of tegmen length; (2) bright green; both morphs often with more or less developed black spot in distal half portion of tegmen; strongly convex, rugulose; longer than broad when taken together in dorsal view; costal margin broadly rounded, apical margin rounded; venation obsolete.

HIND WINGS (Fig. 5E). Pale brown with basal portion suffused with red and cells of distal half irregularly darker; strongly reduced, curved and widening from base to  $\frac{4}{5}$  of length. Veins indistinct on basal  $\frac{1}{3}$ , reticulate on remaining portion.

LEGS (Figs 5A–D, 6, 7B–C, F–G). Elongate and moderately slender, pale red or green (according to colour morph); all tarsi with black-brown onychium; pro- and mesofemora slightly wider than corresponding tibiae; metacoxae, metatrochanters and moderately broad band along basal  $\frac{2}{3}$  of outer margin of metafemora, dark brown. Apex of metatibial spines and metatarsal spines, black-brown. Metatibiae with 2 lateral spines on apical  $\frac{1}{3}$  and 6 apical spines. Metatarsi short with first segment about as long as combined length of remaining segments. Metatibiotarsal formula: (2) 6 / 8–9 / 2.

ABDOMEN (Figs 5B, 6B). Brown with middle and posterior area darker, sometimes black.

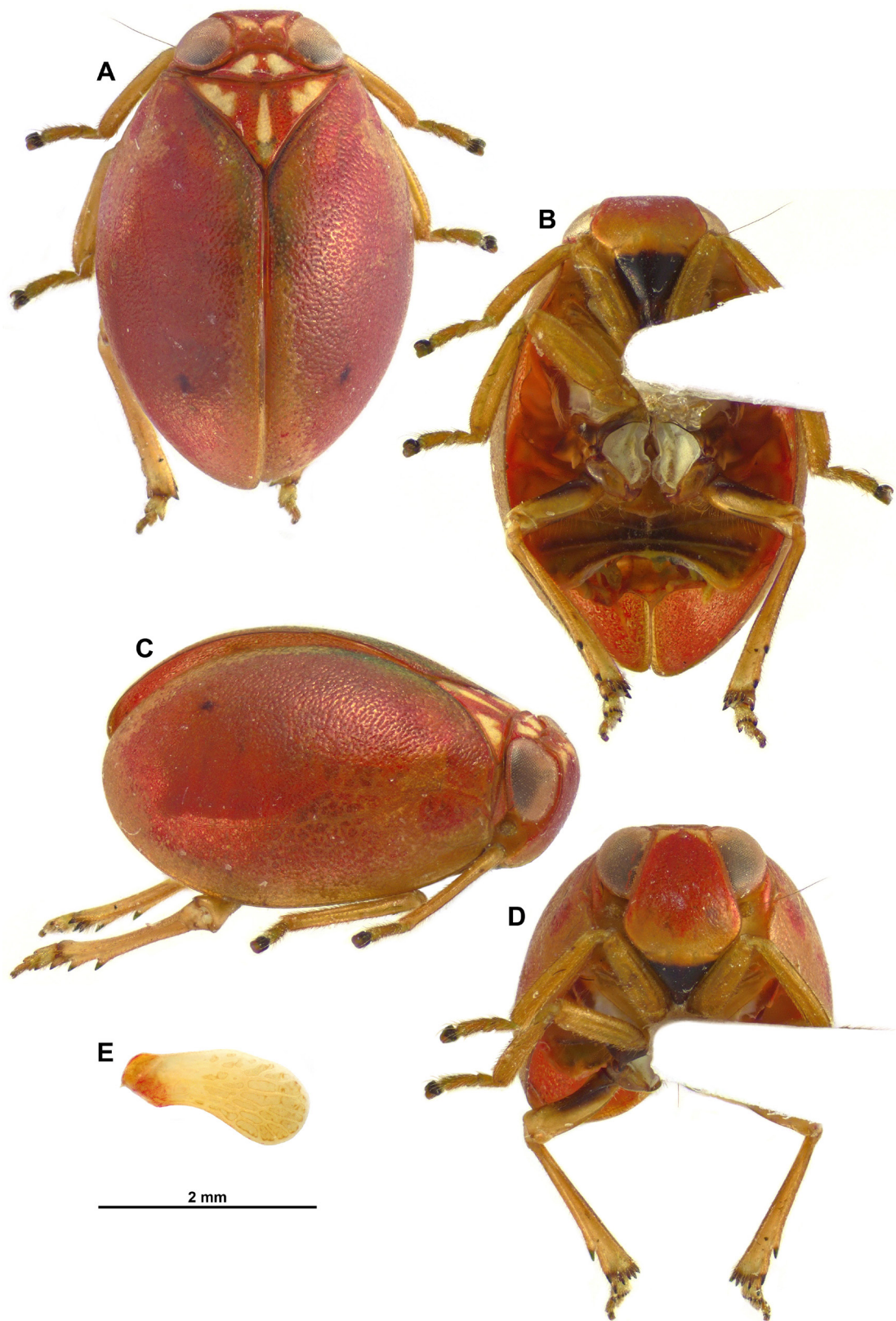
MALE TERMINALIA. Pygofer (*Py*) about 2.4 times as high as long at mid-height in lateral view, with posterior margin strongly rounded in dorsal  $\frac{2}{3}$ , then sinuate in ventral  $\frac{1}{3}$  in lateral view (Fig. 8A); ventral margin rounded in lateral view (Fig. 8A). Gonostyli (*G* – Fig. 8A–C) convex, sub-semicircular in lateral view with dorsal margin weakly rounded and ventroapical margin strongly rounded, with emargination at base of capitulum; capitulum (*ca*) with short and wide neck in lateral view, projecting dorsomesad, with dorsal tooth directed anteromesad and lateral slightly laminate tooth curved lateroventrad, a distinct hump at base of capitulum in caudal view (Fig. 8C). Anal tube (*An* – Fig. 8A–D) dorsoventrally flattened, subtriangular, slightly wider than long in median line and with anal opening at about basal  $\frac{1}{3}$ , lateral margins evenly diverging and posterior margin nearly straight in dorsal view; dorsal margin straight and ventral margin curved ventrad in lateral view; apical angles strongly projecting lateroventrad; apical margin evenly curved in caudal view. Aedeagus (Fig. 8E–K) asymmetrical, strongly curved, reflexed dorsad at right angle at midlength in lateral view. Ventral lobe of periandrium (*vl*) laminate, lanceolate apically and shorter than lateral lobes (Fig. 8F–G, K). Lateral lobes of periandrium (*ll*) laminate with outer lateral margin rounded and bearing regular small teeth in distal portion, a slightly larger one at apical angle; inner margin smooth; right lobe more developed, nearly twice as wide as left one in laterocaudal view (perpendicular to plane of lobes – Fig. 8K). Connective (*co* – Fig. 8E–F, H–K) strongly developed, corpus connective long and regularly curved in lateral view, tectiductus (*te*) strongly developed, conical with wide anterior foramen and with crista developed in a single laminate carina.

### Note

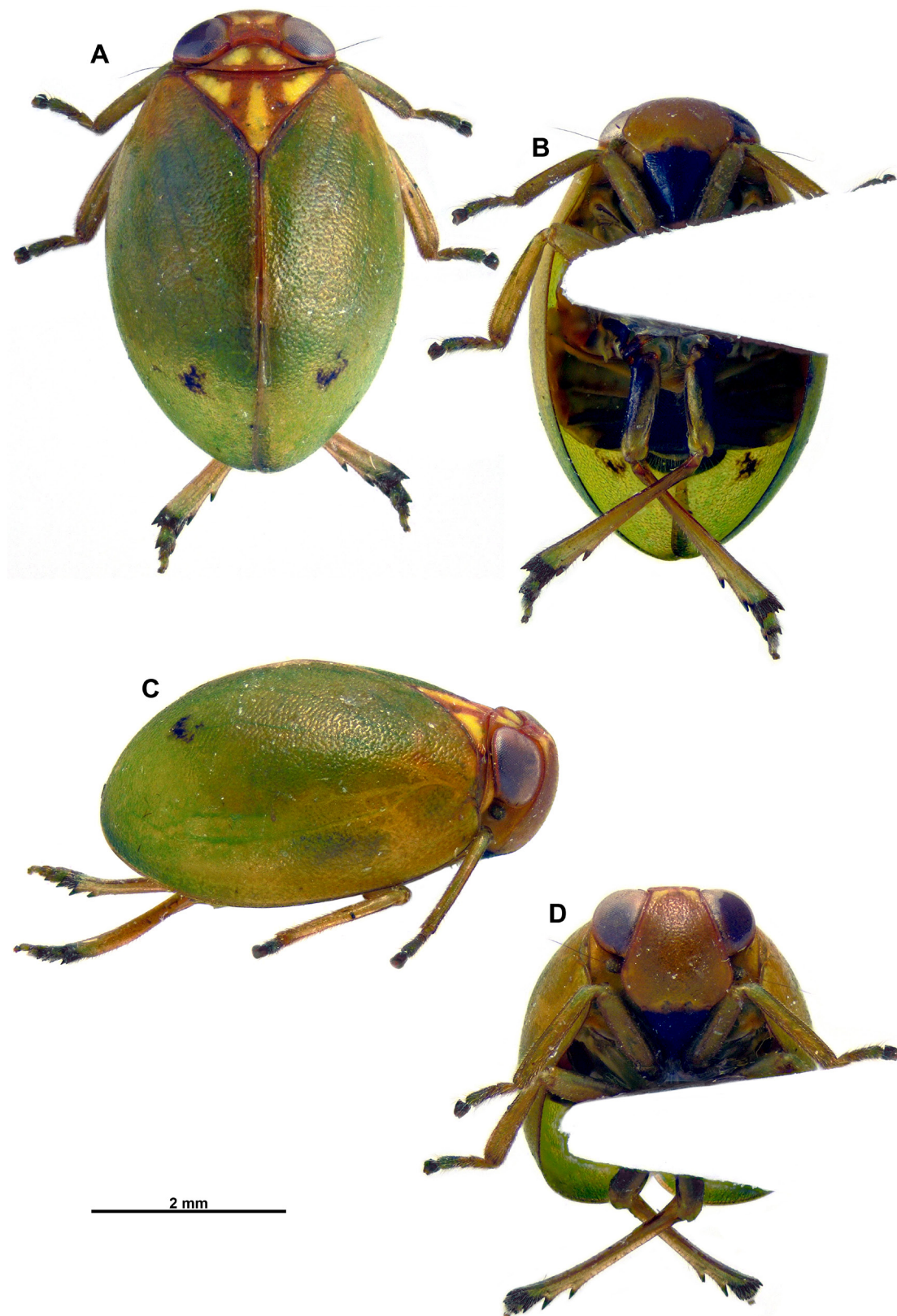
In the studied material, sexual dimorphism was observed, the males being red (Figs 5, 7A–C) and the females green (Figs 6, 7E–G). However, this will need to be confirmed by a larger sample of specimens.

### Biology

*Hemisphaerius bresseeli* sp. nov. was collected in August on lower vegetation and bushes, in moist evergreen tropical forest at about 550 m in altitude in Dong Son-Ky Thuong Nature Reserve (Fig. 1B).

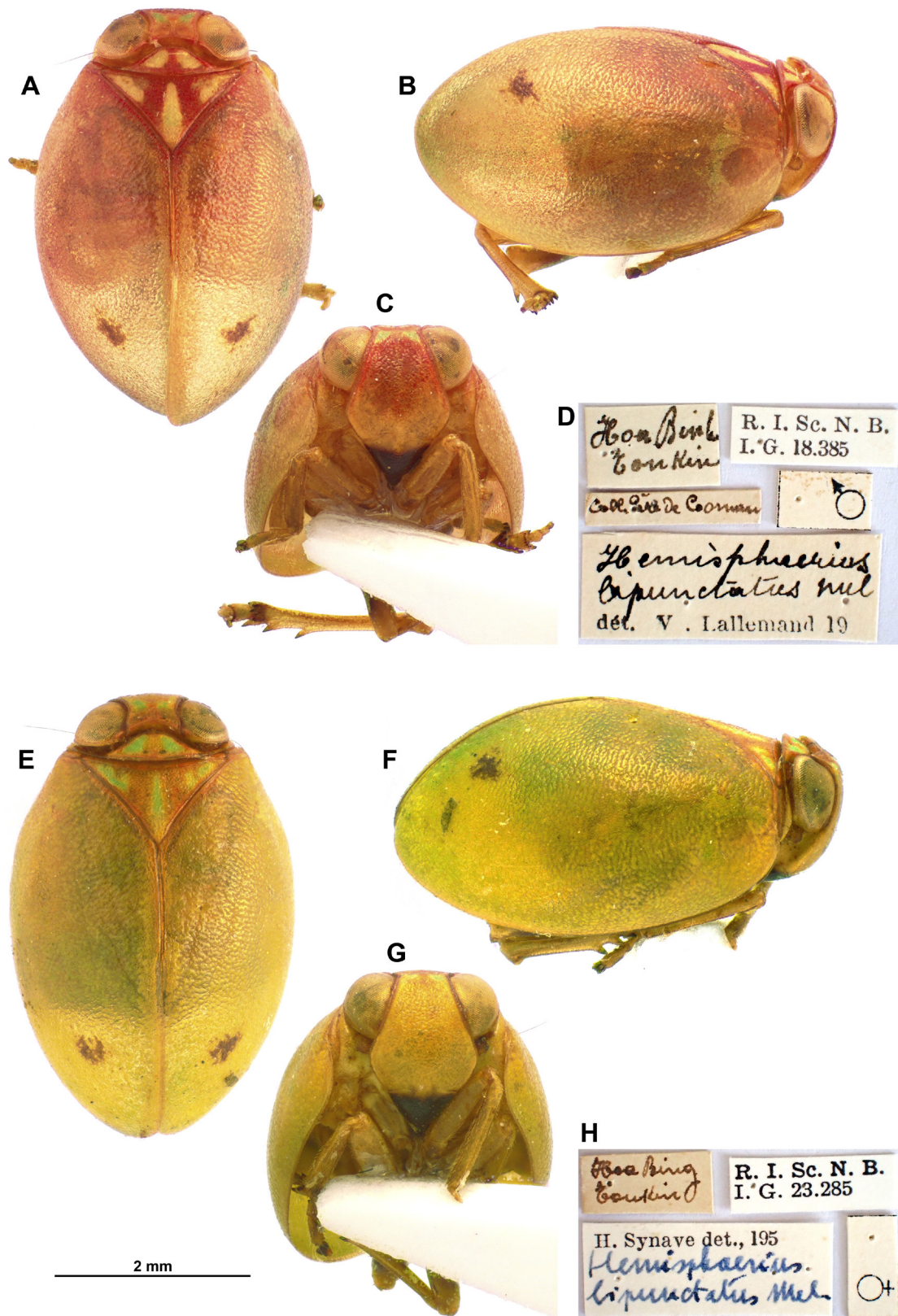


**Fig. 5.** *Hemisphaerius bresseeli* sp. nov., dissected holotype, ♂ (RBINS). **A.** Habitus, dorsal view. **B.** Habitus, ventral view. **C.** Habitus, lateral view. **D.** Habitus, perpendicular view of frons. **E.** Right hind wing.

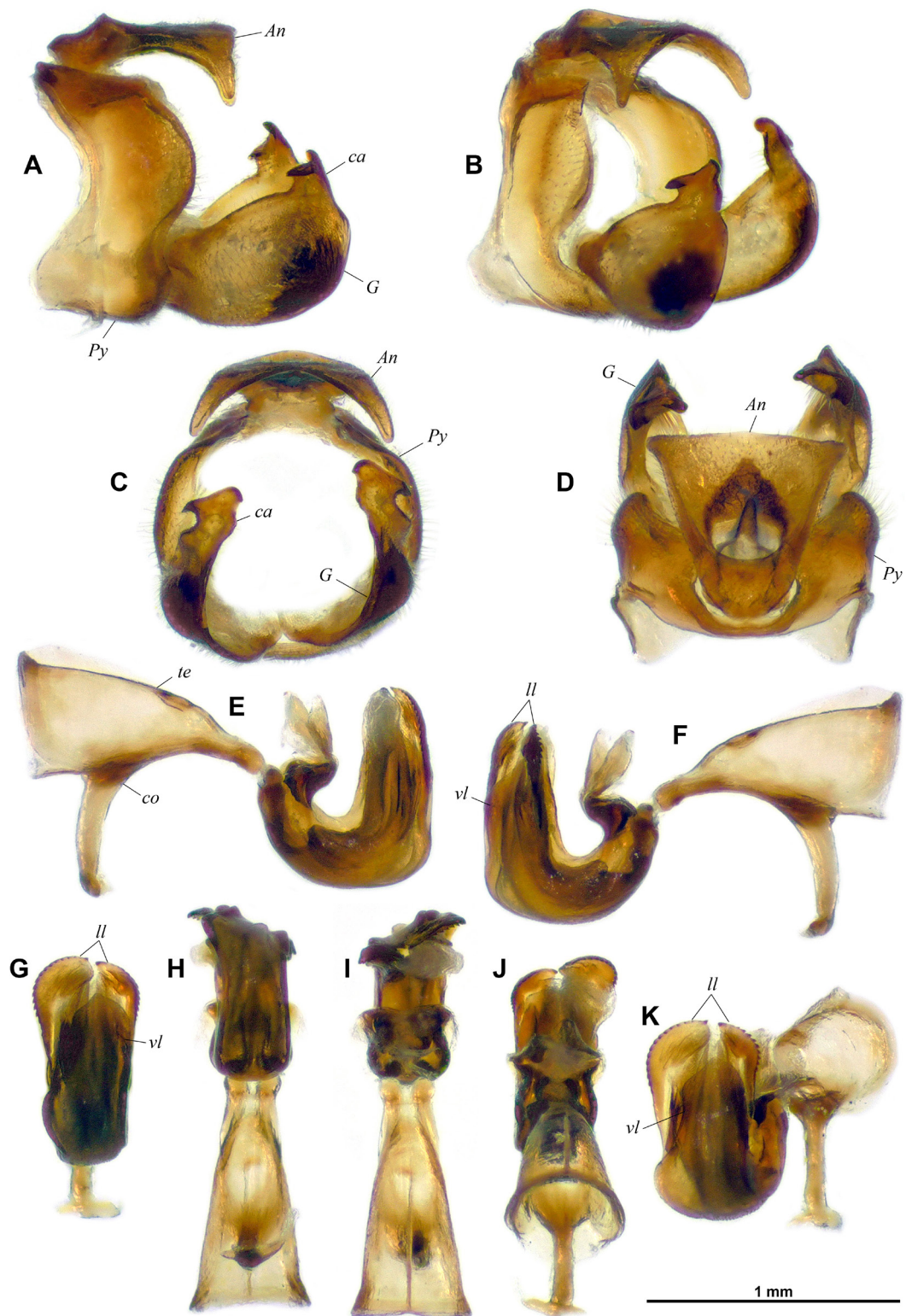


**Fig. 6.** *Hemisphaerius bresseeli* sp. nov., paratype, ♀ from Vietnam, Dong Son-Ky Thuong Nature Reserve (RBINS). **A.** Habitus, dorsal view. **B.** Habitus, ventral view. **C.** Habitus, lateral view. **D.** Habitus, perpendicular view of frons.





**Fig. 7.** *Hemisphaerius bresseeli* sp. nov., paratypes, specimens identified as *H. bipunctatus* Melichar, 1906 from Hoa Binh (RBINS). A–D. Male. A. Dorsal view. B. Lateral view. C. Frontal view. D. Labels. E–H. Female. E. Dorsal view. F. Lateral view. G. Frontal view. H. Labels.



**Fig. 8.** *Hemisphaerius bresseeli* sp. nov., holotype, ♂ (RBINS), terminalia. **A–D.** Pygofer, anal tube and gonostyli. **A.** Lateral view. **B.** Laterocaudal view. **C.** Caudal view. **D.** Dorsal view. **E–K.** Aedeagus and connective. **E.** Left lateral view. **F.** Right lateral view. **G.** Caudal view. **H.** Ventral view. **I.** Dorsal view. **J.** Anterodorsal view. **K.** Laterocaudal view, perpendicular to plane of posterolateral lobes of periandrium. Abbreviations: see Material and methods.

In other places, it was also collected in moist evergreen tropical forest, at altitudes as low as 100 m in Me Linh Biological Station (Fig. 9B). Specimens were collected in the month of August.

### Distribution

Vietnam: provinces of Quang Ninh, Hoa Binh and Vinh Phuc; China: Hainan, Yunnan, Guangxi (Fig. 9A).

### Notes

The species was recorded from the following localities in China by Zhang *et al.* (2020) (S. Chen pers. com. Feb. 2023):

Hainan • Yaxuling, Qiongzong • Nada • Xinglong Hot Spring • Jianfengling (Jianfeng Mountain) • Jianfengling Tianchi (a lake in Jianfeng Mountain).

Yunnan • Mengla County, Xishuangbanna Dai Autonomous Prefecture.

Guangxi • Pinglongshan (Pinglong Mountain), Fangcheng District, Fangchenggang.

The record of the species, under the name *H. testaceus*, from Taiwan by Chen *et al.* (2014: 64) is not associated with specimens or a reference in literature, and the species, either under this name, or under its senior synonym *H. rufovarius*, is not included in the revision of the Issidae from Taiwan by Chan & Yang (1994). Hence, the species must be excluded from the fauna of Taiwan until a confirmed record becomes available.

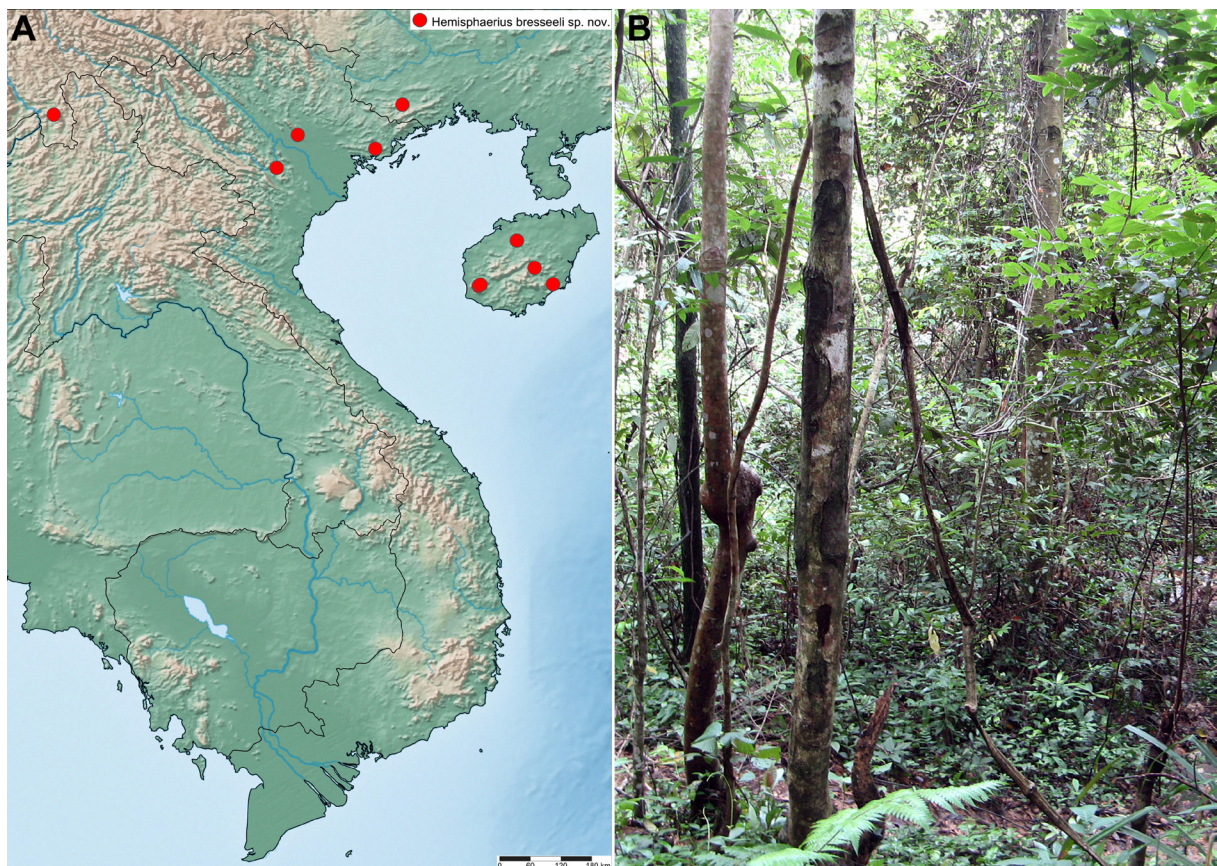


Fig. 9. *Hemisphaerius bresseeli* sp. nov. A. Distribution map. B. Habitat in Me Linh.

***Hemisphaerius rufovarius* Walker, 1858**  
Figs 10–12

*Hemisphaerius* [*sic*] *rufovarius* Walker, 1858: 95 (described from Myanmar).

*Hemisphaerius scymnoides* Walker, 1862: 309 (described from Thailand, “Siam”). Synonymized by Liang (2001).

*Hemisphaerius testaceus* Distant, 1906: 360 (described from Myanmar, Tenasserim, Myiatta). Synonymized by Liang (2001).

*Hemisphaerius virescens* Distant, 1906: 360 (described from Myanmar, Tenasserim, Myiatta). Synonymized by Liang (2001).

*Hemisphaerius rufovarius* – Butler 1875: 95 (keyed). — Atkinson 1886: 44 (described). — Distant 1906: 359, fig. 187 (described, keyed, illustrated dorsal and frons). — Melichar 1906: 72 (keyed), 90 (described, records from Nias Island and Borneo, Kinabalu), 317 (listed). — Schmidt 1910: 155 (record from Borneo). — Matsumura 1938: 151 (compared to *H. kotoshonis* Matsumura, 1938). — Metcalf 1958: 151 (catalogued). — Liang 2001: 236 (senior synonym of *H. scymnoides*, *H. testaceus* and *H. virescens*; colour and size variability). — Gnezdilov 2015a: 15 (listed from Borneo based on Melichar (1906)), 16 (in key to Hemisphaeriini from Borneo), figs 15–16 (holotype dorsal and lateral). — Constant & Jaranaisakul 2020: 5 (listed from Thailand).

*Hemisphaerius scymnoides* – Butler 1875: 95 (keyed). — Melichar 1906: 73 (keyed), 97 (described), 317 (listed). — Metcalf 1958: 152 (catalogued). — Liang 2001: 236 (junior synonym of *H. rufovarius*).

*Hemisphaerius testaceus* – Metcalf 1958: 155 (catalogued). — Liang 2001: 236 (junior synonym of *H. rufovarius*).

*Hemisphaerius virescens* – Metcalf 1958: 157 (catalogued). — Liang 2001: 236 (junior synonym of *H. rufovarius*).

non *Hemisphaerius rufovarius* – Fennah 1956: 507 (record from Hainan Island, specimens compared to type), fig. 17a–b (dorsal head and thorax; frons and clypeus) (erroneous identification! = *H. bresseeli* sp. nov.). — Pham & Ta 2009: 245 (listed from Vietnam, Quang Binh Province). — Gnezdilov & Constant 2012: 575 (listed from Vietnam based on record of *H. scymnoides* by Fennah (1978)). — Gnezdilov *et al.* 2014: 82 (listed from Vietnam). — Zhang *et al.* 2020: 260 (keyed), 266 (described, senior synonym of *H. testaceus*, records from China), fig. 101 (head wings, genitalia), pl. 19g–i (photos of habitus) (erroneous identification! = *H. bresseeli* sp. nov.).

non *Hemisphaerius scymnoides* – Fennah 1978: 263 (record from Vietnam, Hoa Binh Province).

non *Hemisphaerius testaceus* – Chen *et al.* 2014: 64 (described, reinstated as a valid species from synonymy with *H. rufovarius*), fig. 2–24 (habitus, details and genitalia) (erroneous identification! = *H. bresseeli* sp. nov.).

### Diagnosis

*Hemisphaerius rufovarius* varies in body colour, with tegmina being either red, pale brown or green, with or without black spot (Figs 10–11) but can be recognized by

- (1) the anal tube subtrapezoidal in dorsal view, with posterolateral angles rounded and with pointed process ventrally projecting posteroventrad (*An* – Fig. 12A–C);
- (2) the strongly curved, more or less evenly rounded lateral aspect of the aedeagus (Fig. 12D–E);
- (3) the strongly asymmetrical lateral lobes of perianthium laminate with left lobe distinctly larger, spatulate, sinuate in caudal view, strongly concave with apex pointed and recurved cephalodorsad, the right lobe short and rather narrow, curved mesad in distal portion with apical point, and a distinct lateral tooth at about midlength (*ll* – Fig. 12D–H);
- (4) the ventral lobe of the perianthium apically lanceolate (*vl* – Fig. 12F).

### Differential diagnosis

The closest species is *H. lysanias* Fennah, 1978, as interpreted by Che *et al.* (2006), from which *H. rufovarius* differs by having a wider anal tube with a distinct, pointed ventral process (anal tube narrower, 1.3 times as long in midline, as wide and without ventral process in *H. lysanias* – Che *et al.* 2006: figs 5–6), an apically lanceolate ventral lobe of periandrium (round in *H. lysanias* – Che *et al.* 2006: fig. 9), and the smaller right lobe of the periandrium with a distinct lateral tooth (tooth absent in *H. lysanias* – Che *et al.* 2006: figs 8–9).

### Note

The material identified as *H. lysanias* Fennah, 1978 by Che *et al.* (2006) and Zhang *et al.* (2020) differs from the original description by Fennah (1978) in showing a strongly asymmetrical aedeagus and a median lobe (= ventral lobe of Fennah) terminating in a spine. Comparison with Fennah's type material will probably reveal that the specimens from China represent another species, and question the synonymy with *Gergithus esperanto* Chou & Lu, 1985, as proposed by Che *et al.* (2006).

### Material examined

#### Holotype of *Hemisphaerius rufovarius* Walker, 1858

MYANMAR • ♀ (Fig. 10A–C); [Myanmar]; “Birmah”, “57 16”, “Type”, “*Hemisphaerius rufovarius*”; BMNH.

#### Syntype of *Hemisphaerius scymnoides* Walker, 1862

THAILAND • ♀ (Fig. 10D–G); [Thailand, Chantaburi]; [Mission] Pascoe leg.; “Siam, Chantabun”, “*Hemisphaer. scymnoides* Walker Type”, “Miss Pascoe 96–41”, “Type”, “Syntype”; BMNH.

#### Syntype of *Hemisphaerius testaceus* Distant, 1906

MYANMAR • ♂ (dissected – Fig. 11E–H); Tenasserim Valley, Myitta; Doherty leg.; “Tenass Vall, Myitta (Doherty).”, “*Hemisphaerius testaceus* Dist. type”, “Distant Coll. 1911–383”, “Type”; BMNH.

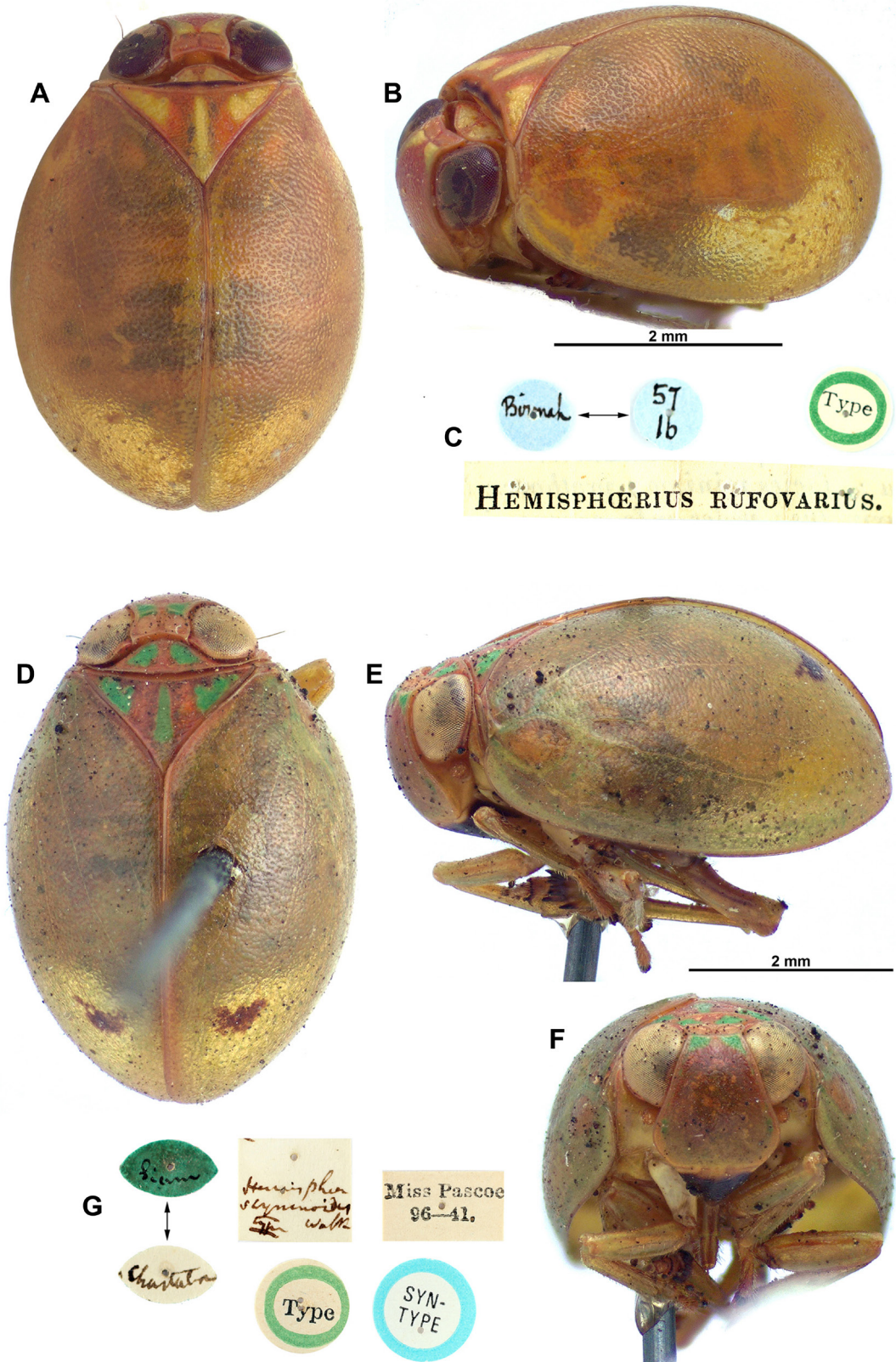
#### Holotype of *Hemisphaerius virescens* Distant, 1906

MYANMAR • ♀ (Fig. 11A–D); Tenasserim Valley, Myitta; Doherty leg.; “Tenass Vall, Myitta (Doherty).”, “*Hemisphaerius virescens* Dist. type”, “Distant Coll. 1911–383”, “Type”; BMNH.

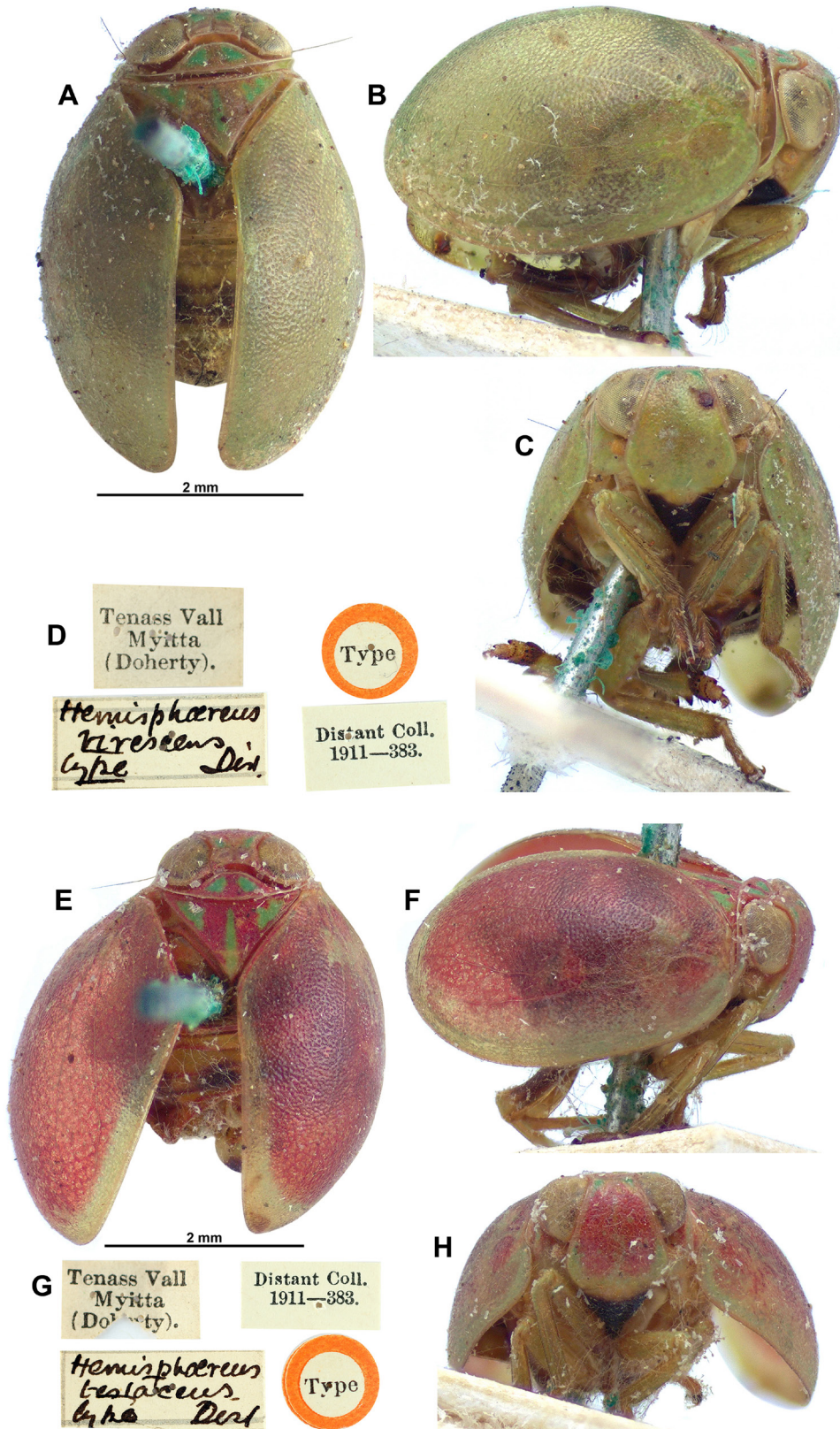
### Supplementary description

#### Male terminalia

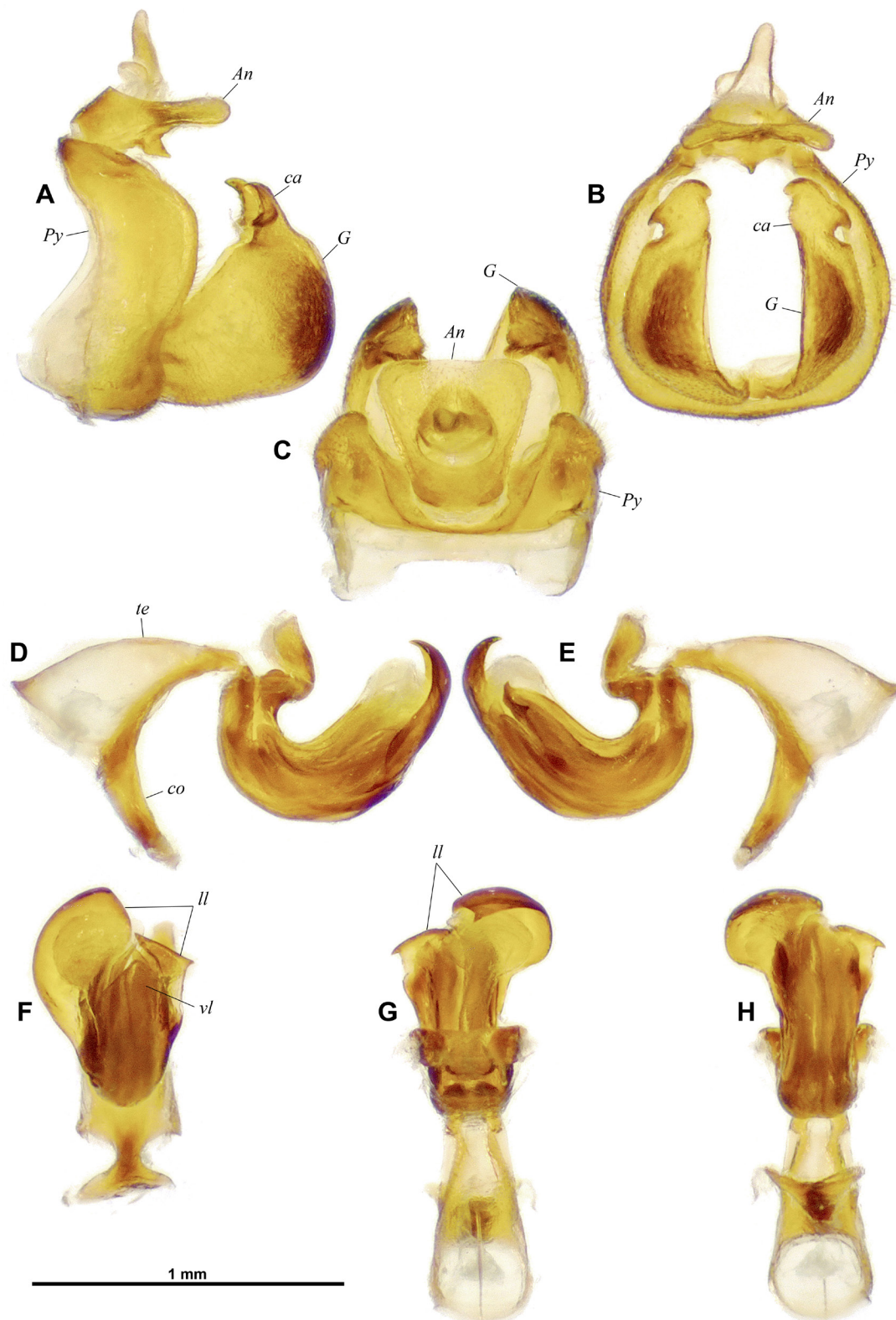
Pygofer (*Py* – Fig. 12A–C) about 3.0 times as high as long at mid-height in lateral view, with posterior margin strongly rounded in dorsal  $\frac{2}{3}$ , then sinuate in ventral  $\frac{1}{3}$  in lateral view; ventral margin rounded in lateral view. Gonostyli (*G* – Fig. 12A–B) convex, subtriangular with posteroventral angle rounded in lateral view, with anterodorsal margin more or less straight, oblique, with an emargination at base of capitulum; capitulum (*ca*) with short and wide neck in lateral view, projecting dorsomesad, with dorsal tooth slightly elongate directed anteromesad and lateral slightly laminate tooth strongly hooked lateroventrad, a distinct hump at base of capitulum in caudal view. Anal tube (*An* – Fig. 12A–C) dorsoventrally flattened, subtrapezoidal, slightly wider than long in median line and with anal opening at about basal  $\frac{1}{3}$ , lateral margins evenly diverging and posterior margin nearly straight in dorsal view, with angles rounded; in lateral view, dorsal margin more or less straight after anal opening and ventral margin weakly curved ventrad; ventral surface with strong pointed process in middle, directed posteroventrad; apical margin slightly, evenly curved in caudal view. Aedeagus (Fig. 12D–H) asymmetrical, rather strongly, roundly curved posterodorsad in lateral view. Ventral lobe of periandrium (*vl*) laminate, lanceolate apically and shorter than lateral lobes. Lateral lobes of periandrium (*ll*) laminate with left lobe distinctly larger, spatulate, sinuate in caudal view, strongly concave with apex pointed and recurved cephalodorsad over



**Fig. 10.** A–C. *Hemisphaerius rufovarius* Walker, 1858, holotype, ♀ (BMNH). A. Dorsal view. B. Lateral view. C. Labels. D–G. *H. scymnoides* Walker, 1862, syntype, ♀ (BMNH). D. Dorsal view. E. Lateral view. F. Frontal view. G. Labels.



**Fig. 11.** A–D. *Hemisphaerius virescens* Distant, 1906, holotype, ♀ (BMNH). A. Dorsal view. B. Lateral view. C. Frontal view. D. Labels. E–H. *H. testaceus* Distant, 1906, syntype, ♂ (BMNH). E. Dorsal view. F. Lateral view. G. Labels. H. Frontal view.



**Fig. 12.** *Hemisphaerius testaceus* Distant, 1906, syntype, ♂ (BMNH), terminalia. **A–C.** Pygofer, anal tube and gonostyli. **A.** Lateral view. **B.** Caudal view. **C.** Dorsal view. **D–H.** Aedeagus and connective. **D.** Left lateral view. **E.** Right lateral view. **F.** Caudal view. **G.** Dorsal view. **H.** Ventral view. Abbreviations: see Material and methods.



membranous phallus; right lobe short and rather narrow, curved mesad in distal portion with apical point, and a distinct lateral tooth at about midlength. Connective (*co*) strongly developed, corpus connective long and regularly curved in lateral view, tectiductus (*te*) strongly developed, curved and conical with wide anterior foramen and with crista developed in a single laminate carina.

Genus *Maculergithus* Constant & Pham, 2016

*Gergithus* (*Maculergithus*) Constant & Pham, 2016: 3. Type species: *Gergithus* (*Maculergithus*) *tamdao* Constant & Pham, 2016 by original designation.

*Maculergithus* – Gnezdilov 2017b: 1344 (raised to genus level).

**Diagnosis**

The characters defining the genus were given by Constant & Pham (2016) and Gnezdilov (2017b):

- (1) the black-brown ground colour;
- (2) the tegmina without humeral hump or projection of the costal margin under eye, and with numerous yellow spots separated from one another;
- (3) the frons wide, widened above clypeus, with a broad yellow transverse band above frontoclypeal suture;
- (4) the clypeus without carina;
- (5) the vertex at least 4 times as wide as long in midline;
- (6) the mesonotum with a yellow spot on each lateral angle;
- (7) the hind wing well developed, unilobed;
- (8) the posterior margin of the pygofer of the male genitalia strongly rounded posterad in lateral view and without process;
- (9) the anal tube of the male elongate, wide, truncate apically and with apicolateral angles projecting posteroventrally;
- (10) the asymmetrical aedeagus with ventral pair of short hooks and left lateral lobe of periandrium with large process.

**Species included**

*Maculergithus luteomaculatus* (Constant & Pham, 2016)

*Maculergithus multipunctatus* (Che, Zhang & Wang, 2007)

*Maculergithus quinquemaculatus* (Che, Zhang & Wang, 2007)

*Maculergithus tamdao* (Constant & Pham, 2016)

*Maculergithus luteomaculatus* (Constant & Pham, 2016)

Fig. 2G

*Gergithus* (*Maculergithus*) *luteomaculatus* Constant & Pham, 2016: 6 (keyed, described), figs 2a–b, 3–4 (habitus, details, male terminalia).

*Gnezdilovius luteomaculatus* – Meng *et al.* 2017: 18 (transferred to *Gnezdilovius* Meng, Webb & Wang, 2017).

*Maculergithus luteomaculatus* – Gnezdilov 2017b: 1345 (transferred to *Maculergithus*).

**Diagnosis**

*Maculergithus luteomaculatus* can be recognized by:

- (1) the frons with a yellow spot along dorsal margin;
- (2) the yellow vertex;

- (3) the two yellow spots on tegmina along sutural margin;
- (4) the tegmina with 8 yellow spots in total;
- (5) the left ventrolateral lobe of periandrium laminate and projecting laterally with 3 pointed processes projecting anterolaterally, the median one more developed, and another, more posterior pointed process projecting laterally.

#### Material examined

VIETNAM • 2 ♀♀; Quang Ninh Province, Dong Son-Ky Thuong Nature Reserve; 21°08'29" N, 107°04'53" E; 27 Aug. 2022; 550 m a.s.l.; secondary forest; GTI Project; J. Constant, J. Bresseel and L. Semeraro leg.; I.G.: 34.518; RBINS • 1 ♀; same collection data as for preceding; VNMN.

#### Note

This represents the first record of the species outside its type locality in Tam Dao National Park, and the first record from Quang Ninh Province.

Genus *Melichergithus* gen. nov.

[urn:lsid:zoobank.org:act:2E9A4553-3DE8-417A-A9AE-223EE7FC544C](https://doi.org/10.25318/urn:lsid:zoobank.org:act:2E9A4553-3DE8-417A-A9AE-223EE7FC544C)

#### Type species

*Gergithus gravidus* Melichar, 1906 by present designation.

#### Diagnosis

*Melichergithus* gen. nov. can be differentiated from all other genera of Hemisphaeriini by the following combination of characters:

- (1) the hind wings unilobous, slightly shorter than the tegmina but not rudimentary;
- (2) the strongly rounded costal margin of the tegmina (in dorsal view) and very convex body making the insect strongly hemispherical;
- (3) the frons nearly wider than long in midline, smooth, without carina;
- (4) the three transverse black lines on the ventral side of the pro- and mesofemora;
- (5) the colour pattern of the tegmina which are either entirely black or black with yellow marking on disc of and with several, alternate black and yellow concentric lines along the costal margin;
- (6) the pygofer without spine on posterior margin;
- (7) the asymmetrical aedeagus with a lateral laminate process on each side of the periandrium.

#### Differential diagnosis

The most similar genera are *Ishiharanus* Hori, 1969, *Ceratogergithus* Gnezdilov, 2017 and *Maculergithus* Constant & Pham, 2016.

*Melichergithus* gen. nov. can be separated

- (1) from *Ishiharanus* by its much wider frons (0.85 times as long in midline as wide; 1.1 time as long as wide in *Ishiharanus*) and by the lateral laminate processes of the periandrium (absent in *Ishiharanus*);
- (2) from *Ceratogergithus* by the absence of a spine on the posterior margin of the pygofer (always present in *Ceratogergithus* species) and by the lateral laminate processes of the periandrium (absent in *Ceratogergithus*);
- (3) from *Maculergithus* by the very different colour pattern, never dark brown/black with numerous bright yellow round spots (always dark brown/black with numerous bright yellow spots in *Maculergithus*), the pattern of the pro- and mesofemora with 3 transverse black bands ventrally (black bands absent in *Maculergithus*) and by the lateral laminate processes of the periandrium (absent in *Maculergithus*).

### Etymology

The name of the new genus is formed from the combination of 'Melich-', reminiscent of Leopold Melichar (1856–1924) who described the type species *Gergithus gravidus* in his monograph on Issidae (Melichar 1906), and '-*ergithus*' to remind that the genus, like *Gergithus*, belongs to the group of Hemisphaeriini with rather long hind wings. The gender is masculine.

### Description

MEASUREMENTS. Rather large (5–6 mm), very convex, round-bodied Hemisphaeriinae.

COLOUR. Variable with 2 main morphs (legs always with characteristic pattern as described below): (1) black and bright yellow, with yellow transverse bands on frons, yellow marking on disc of tegmen and several, alternate black and yellow concentric lines along costal margin of tegmina; (2) black, with one yellow transverse band along frontoclypeal suture.

HEAD. Vertex strongly broader than long in midline, weakly concave; anterior margin weakly curved, posterior one concave. Frons convex, wider than long in midline, smooth; maximum breadth slightly under level of antennae. Clypeus convex, smooth; anteclypeus convex but without defined median carina. Labium with last segment longer than broad, shorter than penultimate. Antennae with scape short, ring-shaped, and bulbous pedicel.

THORAX. Pronotum wider than head, short, slightly less than 3 times as short as mesonotum in midline; disc with 2 impressed points; paranotal lobes with rounded lateroventral angle. Mesonotum triangular, smooth with weak transverse carina parallel to anterior margin and shallowly impressed point along lateral margins at midlength; without longitudinal carinae.

TEGMINA. Strongly convex, minutely punctured, and with rounded lateral margins in dorsal view (making the insect look hemispherical); nearly as wide as long when taken together in dorsal view; apical margin rounded; venation weakly distinct, with longitudinal veins marked as blunt ridges.

HIND WINGS. Slightly shorter than tegmina, unilobed. Venation reticulate with main longitudinal veins distinct basally (C, ScP+R, MP, CuA), and numerous cross-veinlets. Costal margin sinuate; sutural margin rounded at midlength and apical margin rounded.

LEGS. Rather elongate and slender, with pro- and mesofemora dorsoventrally flattened, ventrally with 3 contrasting black transverse markings and black line along anterior margin; pro- and mesotibiae slender with black line along outer margin; pro- and mesotarsi rather elongate; metatibiae with 2 lateral spines in distal half and 6 apical spines. Metatarsi rather short with first segment about as long as combined length of remaining segments. Metatibiotarsal formula: (2) 6 / 8 / 2.

MALE TERMINALIA. Pygofer short, about 3 times as high as long at mid-height in lateral view, with posterior margin rounded in lateral view. Gonostyli convex, with posterior margin rounded in lateral view; capitulum rather short, with a wide neck with basal hump on posterior margin, with apical tooth directed mesad and lateral laminate process at mid-height. Anal tube dorsoventrally flattened, wide in dorsal view and with anal opening in basal half. Aedeagus asymmetrical, strongly curved in lateral view. Ventral lobe of periandrium laminate and with lateral processes; lateral lobes of periandrium laminate, covering base of lateral elongate processes of periandrium. Connective well developed, corpus connective long, regularly and rather weakly curved in lateral view, tectiductus well developed, conical with wide anterior foramen.

### Distribution

China: Guangxi; Vietnam: provinces of Cao Bang, Hanoi, Ha Tinh, Hai Phong, Hoa Binh, Lang Son, Ninh Binh, Phu Tho, Quang Ninh, Thai Nguyen, Thanh Hoa and Vinh Phuc.

### Note

The record from Hai Phong Province is based on specimens which were collected in Cat Ba Island (in RBINS and VNMN), and that from Cao bang Province on specimens from Pia Oac National Park (in MNHN). All are females that cannot be identified to species level, which must be based on male terminalia examination, hence, they might represent undescribed species.

### Species included

*Melichergithus gravidus* (Melichar, 1906) gen. et comb. nov.

*Melichergithus gravidus* (Melichar, 1906) gen. et comb. nov.  
Figs 1, 13–19

*Gergithus gravidus* Melichar, 1906: 59 (keyed), 61 (described). Types in NHMW.

*Gergithus gravidus* – Lallemand 1942: 70 (listed). — Fennah 1978: 267 (recorded from Cuc Phong, Ninh Binh Province). — Che *et al.* 2007: 612 (recorded from China, Guangxi, described), figs 1–4 (head, thorax, wings). — Meng & Wang 2012: 3 (keyed). — Gnezdilov & Constant 2012: 573 (listed from Vietnam). — Chen *et al.* 2014: 52 (described, recorded from China, Guangxi), fig. 2-15 (specimen, details, terminalia). — Gnezdilov *et al.* 2014: 82 (listed from Vietnam). — Gnezdilov 2017b (transferred back from *Gnezdilovius* Meng, Webb & Wang, 2017, compared to representatives of *Maculergithus* Constant & Pham, 2016).

*Gnezdilovius gravidus* – Meng *et al.* 2017: 18 (transferred to *Gnezdilovius*). — Zhang *et al.* 2020: 204 (keyed in Chinese, transferred back from *Gergithus*), 219 (described), 547 (keyed in English), fig. 72 (head, thorax, wings, female terminalia), pl. XVI, a–c (habitus).

### Diagnosis

*Melichergithus gravidus* (Melichar, 1906) gen. et comb. nov. is the only species in the genus *Melichergithus* gen. nov.

The characters of the male terminalia (Figs 17–18) must be used for species recognition, for example the elongate, laminate lateroventral processes of the periandrium, the long sinuate shaft-shaped lateral processes of the periandrium, the long lateral spinose processes of the ventral lobe of the periandrium curved cephalad or the more or less round anal tube (in dorsal view).

### Material examined

#### Syntypes

VIETNAM • 2 ♀♀ (examined from photographs – Fig. 13); [Lang Son Province], Mount Mau Son; [21°50'17" N, 106°54'49" E]; Apr.–May [1900]; H. Fruhstorfer leg.; “Tonkin, Montes Mauson; April, Mai 2-3000”, H. Fruhstorfer”, “*gravidus* n. sp. det. Melichar”; NHMW.

#### Additional material

VIETNAM • 1 ♂ (dissected, Figs 14, 17), 1 ♀; Quang Ninh Province, Dong Son-Ky Thuong Nature Reserve; 21°08'29" N, 107°04'53" E; 27 Aug. 2022; 550 m a.s.l.; secondary forest; GTI Project; J. Constant, J. Bresseel and L. Semeraro leg.; I.G.: 34.518; RBINS • 1 ♂ (dissected); Tonkin, Hoa Binh; [20°48'48" N, 105°20'18" E]; Jul. 1939; A. de Cooman leg.; R.I.Sc.N.B. I.G.18.385; *Gergithus gravidus*

Mel. det. V. Lallemand 1940; RBINS • 1 ♀; Tonkin, Hoa Binh; R.I.Sc.N.B. I.G.23.285; H. Synave det. 195. *Gergithus gravidus* Mel.; RBINS • 1 ♂ (dissected), 3 ♀♀; Tonkin, region of Hoa Binh; 1928; A. de Cooman leg.; MNHN (EH24639, 24640, 24643, 24644) • 4 ♂♂ (dissected), 6 ♀♀; Hoa Binh Province, Ngoc Son-Ngo Luong Nature Reserve; 20°26'16" N, 105°20'15" E; 25–30 Jul. 2016; GTI Project; J. Constant and J. Bresseel leg.; I.G.: 33.282; RBINS • 2 ♀♀; Ninh Binh Province, Cuc Phuong National Park; 20°19'00" N, 105°36'30" E; 19–23 Jul. 2011; J. Constant and J. Bresseel leg.; I.G.: 31.933; RBINS • 1 ♂ (dissected); Hoa Binh Province, Mai Chau; [20°40'47" N, 105°00'36" E]; 30 Jun. 2001; 900 m a.s.l.; H.T. Ta leg.; VNMN • 1 ♀; Hanoi Province, Ba Vi National Park; 21°4'4" N, 105°21'30" E; 25–29 Jul. 2015; day collecting; J. Constant and J. Bresseel leg.; I.G.: 33.092; RBINS • 1 ♀; Phu Tho Province, Xuan Son National Park; 12–18 Aug. 2022; 21°8'23" N, 104°56'29" E; J. Constant, J. Bresseel and L. Semeraro leg.; I.G.: 34.518; RBINS • 1 ♀; same locality as for preceding; 12 Jun. 2004; H.T. Pham leg.; VNMN • 1 ♀; Thai Nguyen Province, Vo Nhai, Than Xa; [21°50'23" N, 105°54'14" E]; 16 Oct. 2004; H.T. Pham leg.; VNMN • 5 ♀♀; Vinh Phuc Province, Tam Dao National Park; 21°31' N, 105°33" E; 25–30 Jul. 2011; day time; J. Constant and J. Bresseel leg.; I.G.: 31.933; RBINS • 1 ♂ (dissected), 2 ♀♀; Thanh Hoa Province, Xuan Lien Nature Reserve, near Hón Can station; 19°51'42" N, 105°12'50" E; 10–11 Jul. 2023; J. Constant, J. Bresseel and L. Semeraro leg.; I.G.: 34.661; RBINS • 1 ♂ (dissected); Ha Tinh Province, Vu Quang National Park, near Co station; 18°17'21" N, 105°22'30" E; 16–18 Jul. 2023; J. Constant, J. Bresseel and L. Semeraro leg. I.G.: 34.661; RBINS.

### Supplementary description

MEASUREMENTS AND RATIOS. LT: ♂ (n = 1): 5.4 mm, ♀ (n = 1): 5.9 mm; LT/BB = 1.23; LTg/BTg = 1.5; LW/BW = 2.0; BV/LV = 2.3; LF/BF = 0.85.

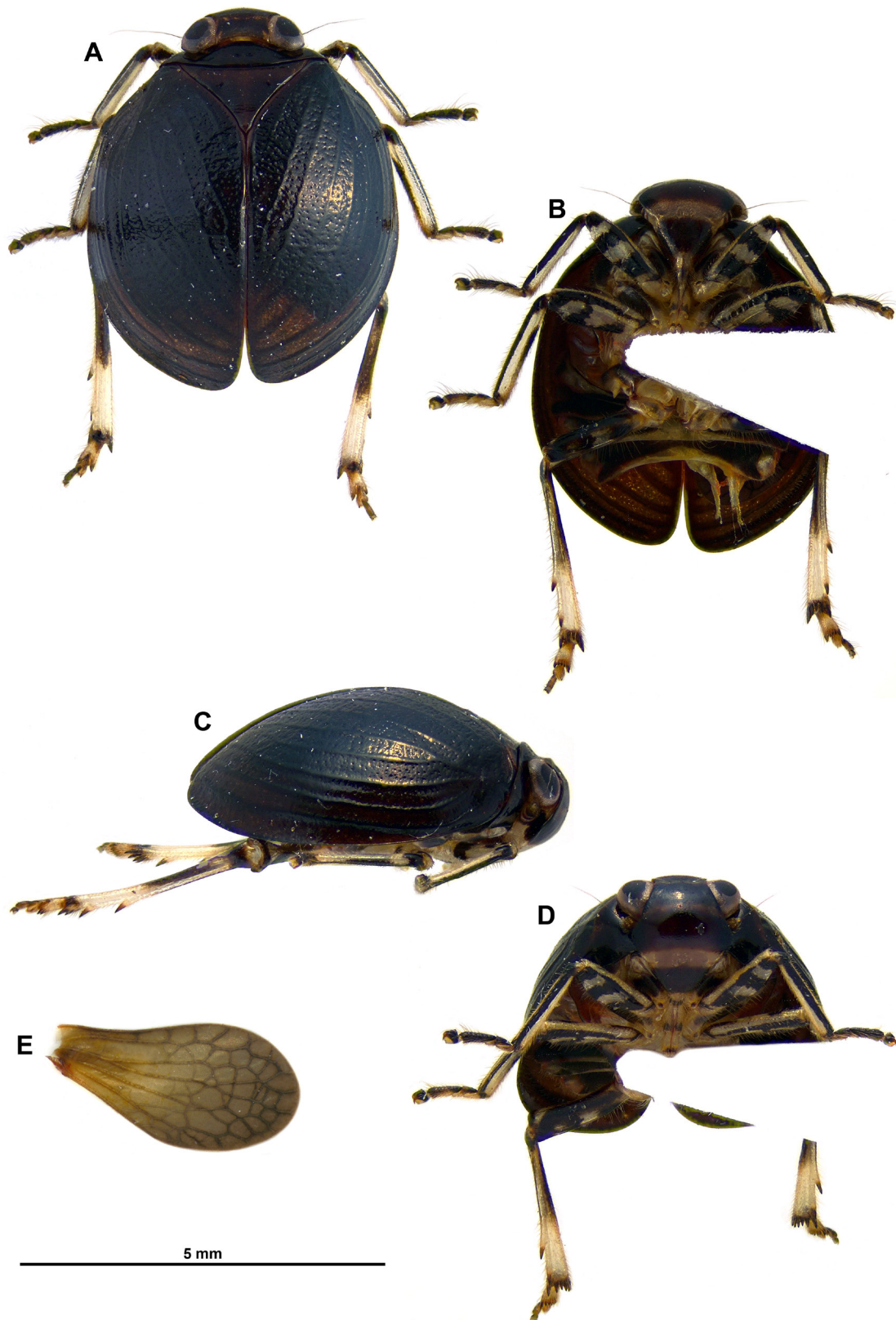
COLOUR. Variable with 2 main morphs: (1) black and bright yellow, with yellow transverse bands on frons, yellow marking on disc of tegmen and several, alternate black and yellow concentric lines along costal margin of tegmina (Figs 13, 15–16); (2) black, with one yellow transverse band along frontoclypeal suture (Fig. 14).

LEGS. With pro- and mesofemora ventrally with 3 contrasting black transverse markings and black line along anterior margin; pro- and mesotibiae with black line along outer margin; metafemora black with yellow markings; metatibiae black with more or less developed yellowish white portion in distal 1/3 sometimes extending basad.

MALE TERMINALIA. Pygofer (*Py* – Figs 17A–C, 18A–D) short, curved, about 3 times as high as long at mid-height in lateral view, with posterior margin somewhat angularly rounded in middle in lateral view; suboval in caudal view. Gonostyli (*G* – Figs 17A–B, 18A–C) convex, with ventral margin nearly straight and posterior margin rounded in lateral view; elongate in ventral view; capitulum (*ca*) rather short, with a wide neck with basal hump on posterior margin, with apical tooth directed mesad and lateral laminate process at mid-height. Anal tube (*An* – Figs 17A–C, 18A–D) dorsoventrally flattened, ventrally slightly depressed medially, 1.2 times as wide as long in midline in dorsal view and with anal opening in basal half. Aedeagus (Figs 17D–I, 18E–J) asymmetrical, strongly upcurved in lateral view. Ventral lobe of periandrium (*vl*) laminate with 2 longitudinal rows of minute teeth hooked cephalad, and with elongate, thin, lateroventral processes (*lvp*) sinuately curved dorsocephalad, left one before midlength of aedeagus, right one after midlength; lateral margins minutely denticulate; sides roundly projecting dorsad; median portion developed into a lobe obliquely weakly sinuate apically. Lateral lobes of periandrium (*ll*) laminate, moderately curved posteroventrad, reaching about half length of aedeagus and covering base of lateral elongate processes of periandrium; latter shaft-like, directed caudad in basal half then strongly curved dorsocephalad. Connective (*co*) well developed, corpus connective long, regularly and rather weakly curved in lateral view, tectiductus (*te*) well developed, reaching about half length of corpus connective, conical with wide anterior foramen.



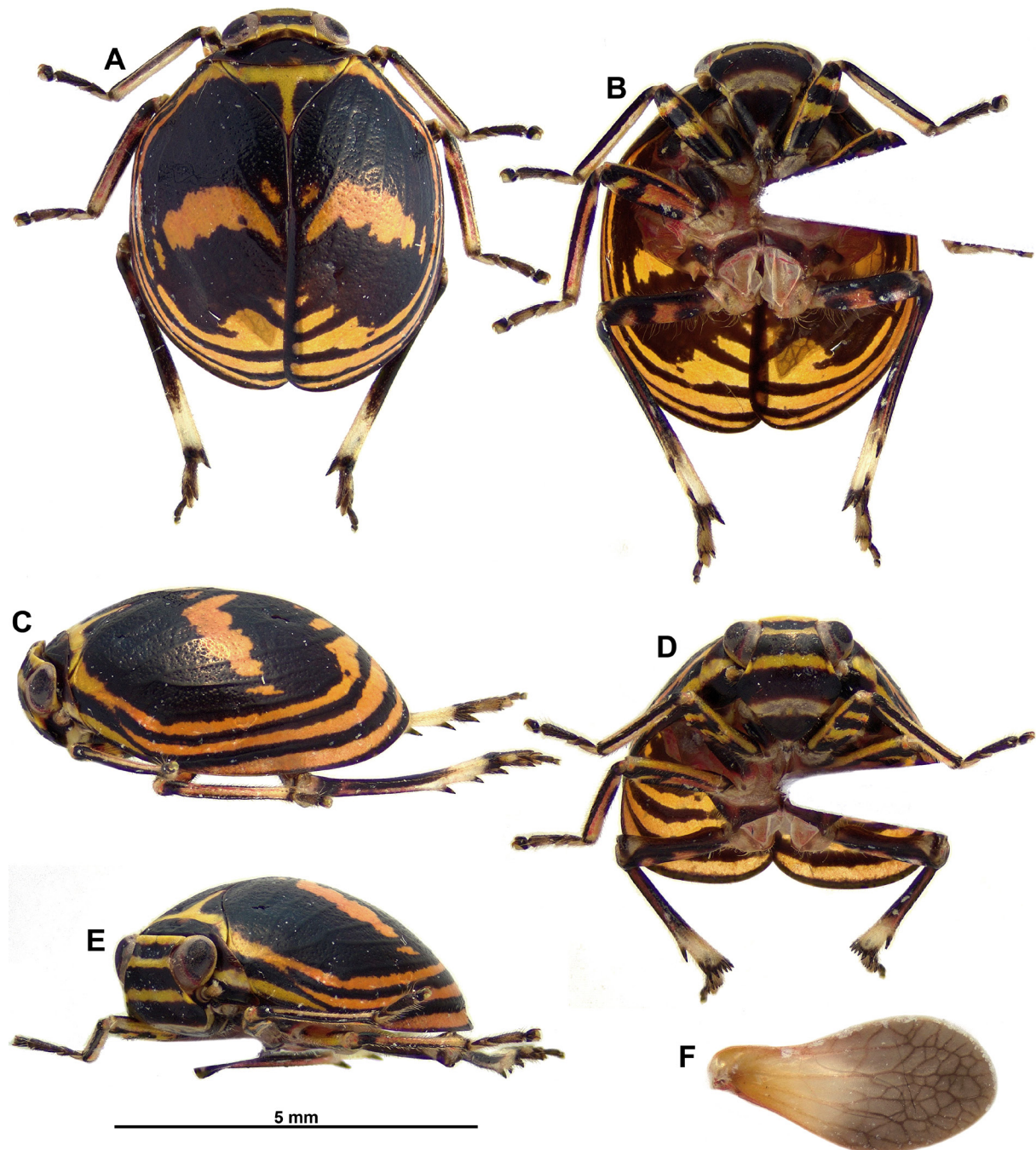
**Fig. 13.** *Melichergithus gravidus* (Melichar, 1906) gen. et comb. nov., syntypes, ♀♀ (NHMW – photographs by H. Brückner). A–D. Syntype 1. A. Habitus, dorsal view. B. Habitus, frontal view. C. Habitus, lateral view. D. Labels. E–F. Syntype 2. E. Habitus, dorsal view. F. Labels.



**Fig. 14.** *Melichergithus gravidus* (Melichar, 1906) gen. et comb. nov., dissected ♂, black morph from Dong Son-Ky Thuong Nature Reserve (RBINS). **A.** Habitus, dorsal view. **B.** Habitus, ventral view. **C.** Habitus, lateral view. **D.** Habitus, perpendicular view of frons. **E.** Right hind wing.

### Biology

*Melichergithus gravidus* gen. et comb. nov. was collected in August on lower vegetation and bushes, in moist evergreen tropical forest at about 550 m in altitude in Dong Son-Ky Thuong Nature Reserve (Fig. 1B). In other places it was also collected in moist evergreen tropical forest, at altitudes from about

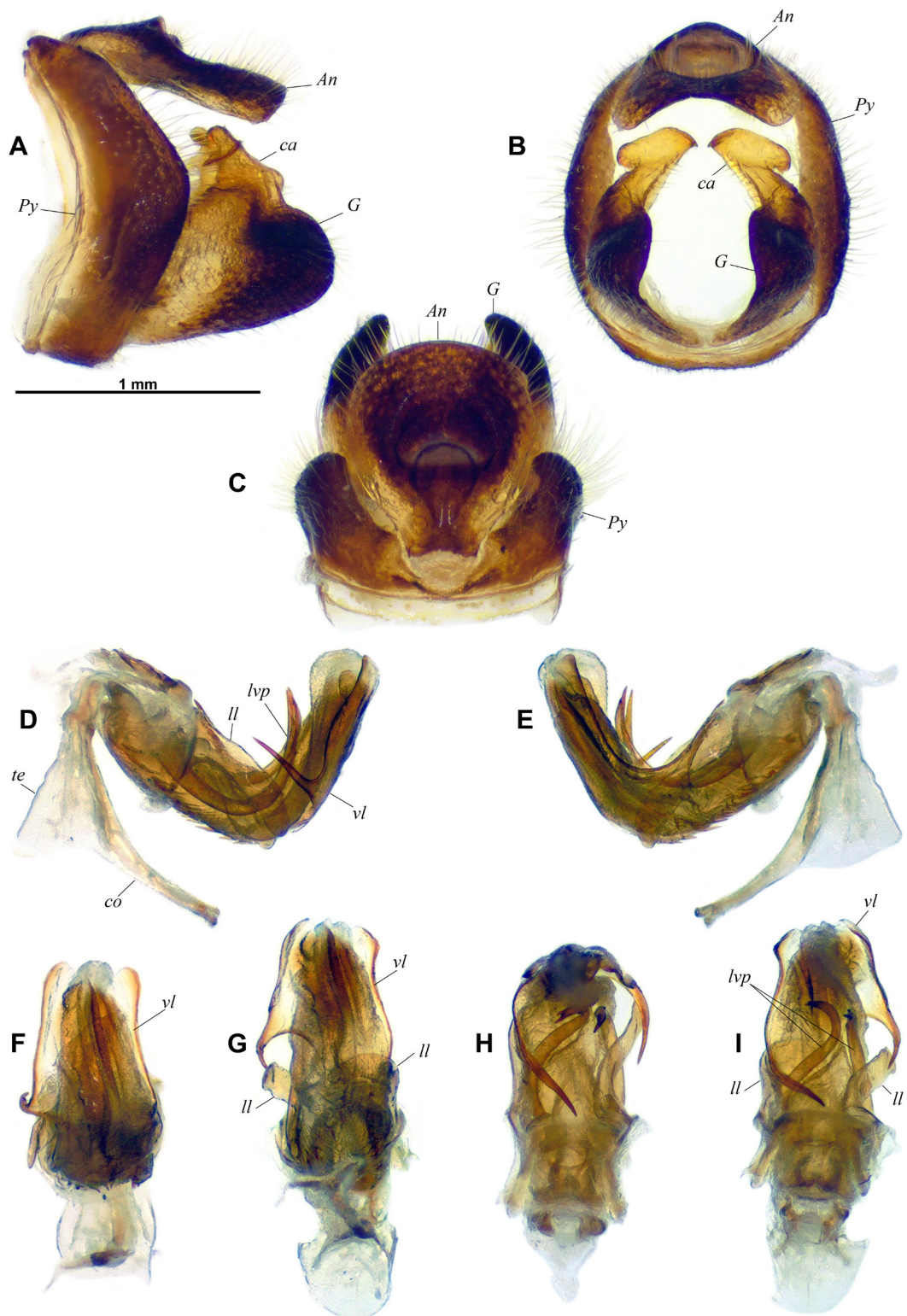


**Fig. 15.** *Melichergithus gravidus* (Melichar, 1906) gen. et comb. nov., dissected ♂, typical morph from Ngoc Son-Ngo Luong Nature Reserve (RBINS). **A.** Habitus, dorsal view. **B.** Habitus, ventral view. **C.** Habitus, lateral view. **D.** Habitus, perpendicular view of frons. **E.** Anterolateral view. **F.** Right hind wing.

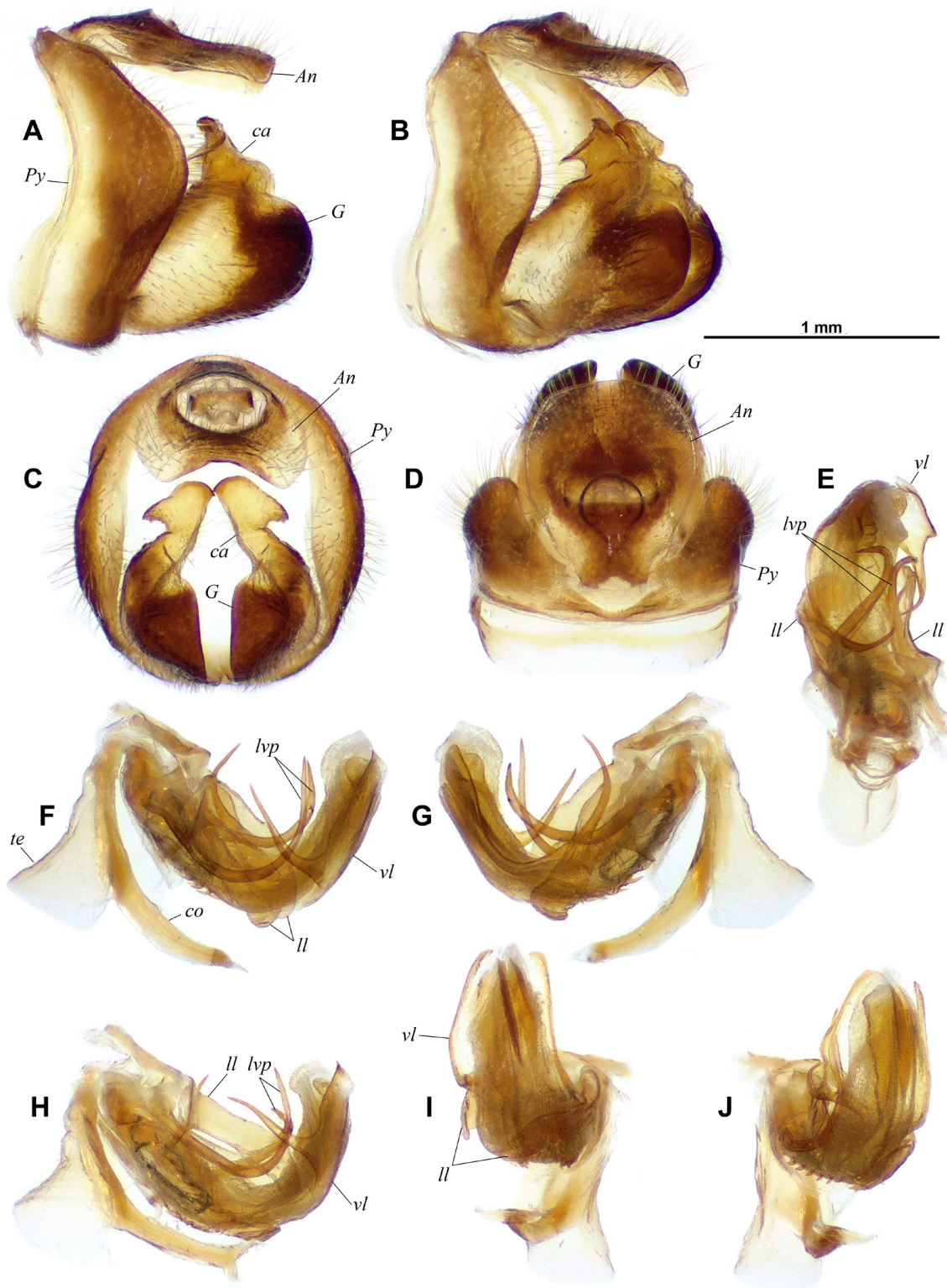




**Fig. 16.** *Melichergithus gravidus* (Melichar, 1906) gen. et comb. nov., dissected ♂, typical morph from Mai Chau (VNMN). **A.** Habitus, dorsal view. **B.** Habitus, ventral view. **C.** Habitus, lateral view. **D.** Habitus, perpendicular view of frons. **E.** Anterolateral view. **F.** Right hind wing.



**Fig. 17.** *Melichergithus gravidus* (Melichar, 1906) gen. et comb. nov., ♂, black morph from Dong Son-Ky Thuong Nature Reserve (RBINS), terminalia. **A–C.** Pygofer, anal tube and gonostyli. **A.** Lateral view. **B.** Caudal view. **C.** Dorsal view. **D–I.** Aedeagus and connective. **D.** Left lateral view. **E.** Right lateral view. **F.** Caudal view. **G.** Ventral view. **H.** Dorsal view. **I.** Anterodorsal view. Abbreviations: see Material and methods.



**Fig. 18.** *Melichergithus gravidus* (Melichar, 1906) gen. et comb. nov., ♂, typical morph from Ngoc Son-Ngo Luong Nature Reserve (RBINS), terminalia. **A–D.** Pygofer, anal tube and gonostyli. **A.** Lateral view. **B.** Laterocaudal view. **C.** Dorsocaudal view. **D.** Dorsal view. **E–J.** Aedeagus and connective. **E.** Dorsal view. **F.** Left lateral view. **G.** Right lateral view. **H.** Left lateroventral view. **I.** Right laterocaudal view. **J.** Left laterocaudal view. Abbreviations: see Material and methods.



**Fig. 19.** *Melichergithus gravidus* (Melichar, 1906) gen. et comb. nov. **A.** Distribution map. **B.** Live specimen on fern, Xuan Lien Nature Reserve, 11 Jul. 2023. **C.** Live specimen on fern, Cuc Phuong National Park, 20 Jul. 2011. **D.** Habitat in Cuc Phuong National Park, 20 Jul. 2011.

150 m in Cuc Phuong National Park to over 1000 m in Tam Dao National Park in the months from April to August, and in October. The specimens were often observed waving their forelegs (Fig. 19B), the conspicuous markings of which might be used for communication.

### Distribution

North Vietnam and northern Central Vietnam: provinces of Hanoi, Ha Tinh, Hoa Binh, Lang Son, Ninh Binh, Phu Tho, Quang Ninh, Thai Nguyen, Thanh Hoa and Vinh Phuc (Fig. 19A).

### Note

The specimens from Guangxi recorded and illustrated in Che *et al.* (2007), Chen *et al.* (2014) and Zhang *et al.* (2020), might represent an undescribed species based on the male terminalia illustration in Chen *et al.* (2014), so the presence of *M. gravidus* gen. et comb. nov. in Guangxi (hence in China) is regarded as doubtful.

Genus *Neogergithoides* Sun, Meng & Wang, 2012

*Neogergithoides* Sun, Meng & Wang, 2012: 43 [described, illustrated, key to Hemisphaeriini genera].

### Type species

*Neogergithoides tubercularis* Sun, Meng & Wang, 2012 by original designation.

### Diagnosis

The genus *Neogergithoides* can be differentiated from all other genera of Hemisphaeriini by the following combination of characters:

- (1) the hind wings unilobous, slightly shorter than the tegmina but not rudimentary;
- (2) the frons about 1.5 times as long as wide, with a median carina and without tubercles along lateral margins;
- (3) the vertex longer than wide but not produced into a cephalic process;
- (4) the clypeus elevated medially but not laminate and not projecting anteriorly;
- (5) the pygofer without spine on posterior margin.

### Species included

*Neogergithoides baviana* Constant & Pham, 2015

*Neogergithoides grootaerti* Constant & Pham, 2015

*Neogergithoides scapularis* sp. nov.

*Neogergithoides tubercularis* Sun, Meng & Wang, 2012

### Note

The Vietnamese species of *Neogergithoides* were recently reviewed by Constant & Pham (2015). The species in this genus should be identified based on the male terminalia characters.

*Neogergithoides scapularis* sp. nov.

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Figs 1, 2H, 20–21

### Diagnosis

*Neogergithoides scapularis* sp. nov. can be recognized by

- (1) the colour pattern of the tegmina with yellow shoulders followed by a contrasting black band and large posterior portion variegated yellow and dark brown to black (Fig. 20A, C);

- (2) the gonostyli moderately produced posteriorly and with dorsal margin in a straight angle at base of capitulum (*G* – Fig. 21A);
- (3) the pygofer about 2.7 times as high as long with maximum length at about half height (*Py* – Fig. 21A);
- (4) the strongly curved, U-shaped aedeagus with periandrium with lateral strongly recurved laterovenral process projecting cephalad (*lvp* – Fig. 21E–F).

### Differential diagnosis

The closest species are *N. grootaerti* Constant & Pham, 2015 and *N. baviana* Constant & Pham, 2015 but *N. scapularis* sp. nov. differs by the contrasting yellow shoulder of the tegmina directly followed by a black band (less contrasted pattern in both other species – Constant & Pham 2015: figs 1a, 4a), a narrower pygofer in lateral view (2.7 times as high as long; less than 2.2 times in both other species), the strongly curved, U-shaped aedeagus in lateral view (more weakly curved in both other species – Constant & Pham 2015: figs 2d, 5d), the laterovenral process strongly recurved, hook-shaped, projecting cephalad (more weakly and not abruptly curved in *N. grootaerti* – Constant & Pham 2015: fig. 2d; only weakly curved in *N. baviana* – Constant & Pham 2015: fig. 5d) and the laterovenral processes situated in the distal half of the aedeagus (in basal half in both other species).

### Etymology

The species epithet derives from ‘*scapula*’, the Latin word for ‘shoulder’, and refers to the yellow marking at the base of the tegmina in this species.

### Type material

#### Holotype

VIETNAM • ♂ (dissected – Figs 20–21); Quang Ninh Province, Dong Son-Ky Thuong Nature Reserve; 21°08'29" N, 107°04'53" E; 27 Aug. 2022; 550 m a.s.l.; secondary forest; GTI Project; J. Constant, J. Bresseel and L. Semeraro leg.; I.G.: 34.518; RBINS.

#### Paratypes

VIETNAM • 1 ♀; same collection data as for holotype; VNMN.

### Description

MEASUREMENTS AND RATIOS. LT: ♂ (n = 1): 6.1 mm, ♀ (n = 1): 7.4; LT/BB = 1.4; LTg/BTg = 1.84; BV/LV = 1.0; LF/BF = 1.5.

HEAD (Fig. 20A–D). Vertex subquadrate, slightly elongate, yellowish on sides and anterior half, with a large brown median marking in posterior half followed by more or less V-shaped black marking in anterior half; margins carinate, anterior one black with middle yellowish marking, posterior one yellowish and lateral ones elevated and black; in dorsal view, anterior margin convex, posterior one concave and lateral subparallel; disc excavate with narrow longitudinal groove in basal half. Side of head yellowish, narrowly black-brown along dorsal margin and around eye; black-brown line from ventral margin of eye to frontoclypeal suture, posteroventral portion behind black line, brown. Frons elongate and smooth, chestnut brown with sides carinated, yellowish, and yellowish median carina extending to apex of clypeus, yellowish carinae margined with black. Clypeus brown to black, elevated in a blunt carina medially and with lateral yellowish line prolongating lateral carinae of frons. Labium brown with last segment longer than broad, and shorter than penultimate. Scape short, ring-shaped; pedicel bulbous, dark brown.

**THORAX** (Fig. 20A–D). Anterior face of prothorax behind eyes, black; posterior margin with pale yellowish line extending laterally to midlength of paranotal lobes; pronotum very short with posterior margin and discal carinae laminate; disc concave with 2 impressed points, brown with pale yellowish obsolete median carina and tubercles; broad dark brown to black line extending from behind eye to lateroventral angle of paranotal lobes; inner portion brown, paler; inner ventral angle of paranotal lobe with pale yellowish marking extending into a fine line along ventral margin. Mesonotum short, slightly rugulose with obsolete impressed point on each side of disc; transverse carina along anterior margin; brown, yellowish along lateroposterior margins and median portion; scutellum dark brown to black. Tegulae dark brown.

**TEGMINA** (Fig. 20A, C). Broadly semicircular, subcoriaceous; yellow basally then with broad black transverse band at basal  $\frac{1}{4}$  to basal  $\frac{1}{3}$ ; posterior  $\frac{2}{3}$  yellowish with veins brown to black; more or less distinct brown to black marking on disc at midlength and darker, poorly marked transverse band at  $\frac{3}{4}$  of tegmina length; submarginal narrow black line from anterior angle to posterosutural angle, running on margin only on basal  $\frac{1}{5}$ ; distal half of lateral margin and posterior one very narrowly bordered with black-brown. Venation reticulate with main longitudinal veins barely distinct basally and numerous cross-veinlets.

**LEGS** (Fig. 20A–D). Elongate and slender, yellow-brown with darker and paler markings. Tarsi, broad longitudinal zones on femora, carinae and apex of anterior and median tibiae, and lateral spines of posterior tibiae, dark brown. Posterior tibiae with 2 lateral spines on apical  $\frac{1}{3}$  and 6 apical spines. Metatibiotarsal formula: (2) 6 / 8 / 2.

**ABDOMEN** (Fig. 20B). Yellow-brown ventrally with posterior margin of sternites bordered with blackish line followed with fine yellowish line.

**MALE TERMINALIA.** Pygofer (*Py* – Fig. 21A–D) about 2.7 times as high as long at mid-height and with posterior margin strongly sinuate and roundly projecting posteriorly in middle portion in lateral view (Fig. 21A); more or less round in caudal view. Gonostyli (*G* – Fig. 21A–B, D) rather short with apical margin rounded and forming abrupt straight angle at base of capitulum in lateral view; capitulum (*ca*) well developed, elongate and projecting mesodorsad, with 2 somewhat laminate hooked processes on dorsal margin separated by round emargination, basolateral laminate process hooked anteroventrally and deep basal transverse groove. Anal tube (*An* – Fig. 21A–D) 1.2 times as long in midline as wide, curved ventrad in lateral view, dorsoventrally flattened with sides broadly rounded, diverging from base to  $\frac{2}{3}$  of length and with posterior margin moderately bisinuate. Aedeagus (Fig. 21E–J) strongly upcurved, U-shaped and rather simple. Periandrium with lateral strongly recurved hook-shaped lateroventral process projecting cephalad at about half length (*lvp* – Fig. 21E–F); distal portion of process slightly sinuate in lateral and ventral aspect (Fig. 21G–H); laminate lateral process on each side terminated with an inner weak tooth surpassing ventral lobe of periandrium (*vl* – Fig. 21E–G). Ventral lobe of periandrium broad, truncate apically with median minute emargination and with apicolateral angles rounded. Dorsal lobe of periandrium strongly bisinuate apically in dorsal view (*dl* – Fig. 21I).

### Biology

*Neogergithoides scapularis* sp. nov. was collected in August on lower vegetation and bushes, in moist evergreen tropical forest at about 550 m in altitude (Figs 1B, 2H).

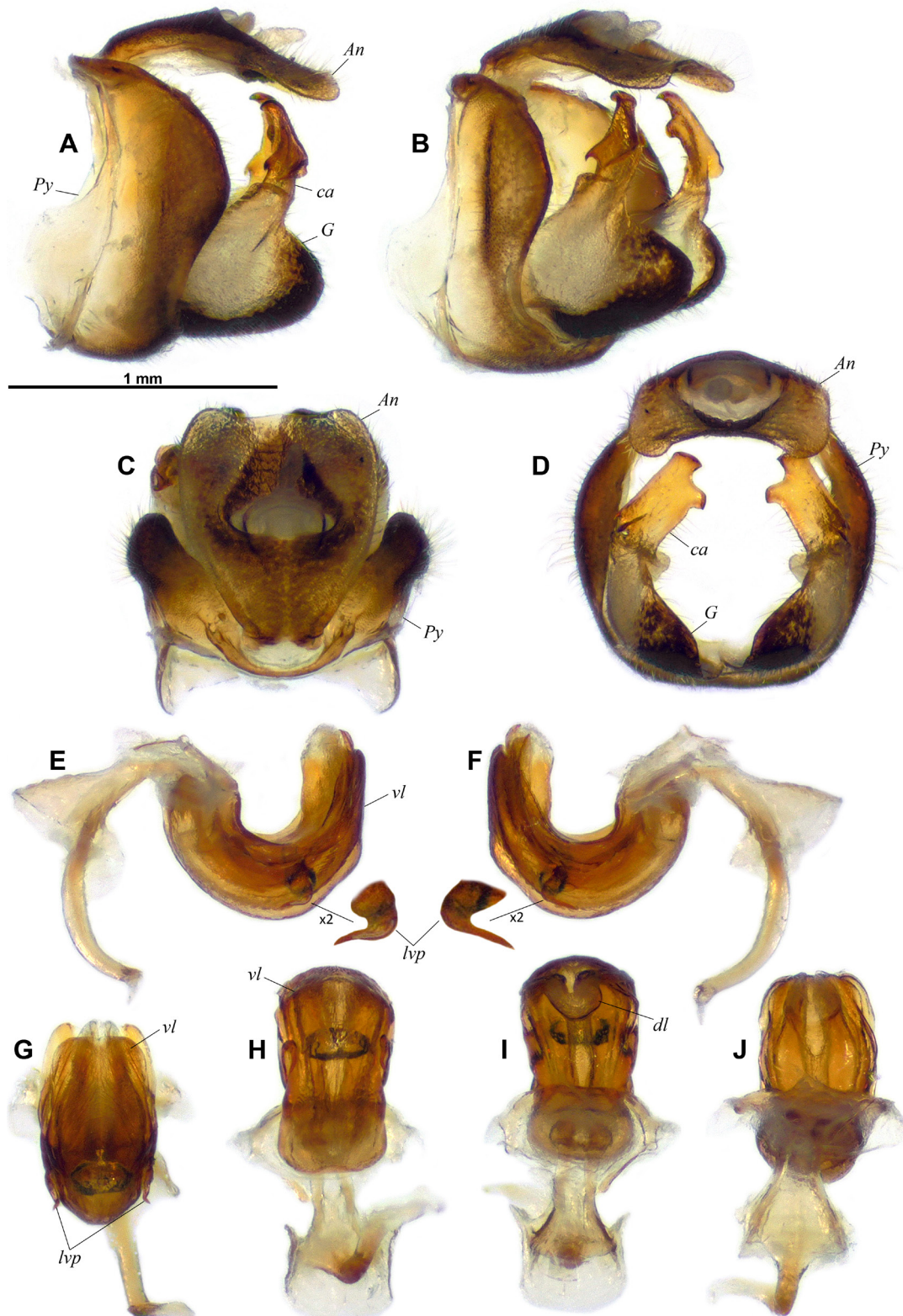
### Distribution

Vietnam: Quang Ninh Province, Dong Son-Ky Thuong Nature Reserve (Fig. 1A).



**Fig. 20.** *Neogergithoides scapularis* sp. nov., dissected holotype, ♂ (RBINS). A. Habitus, dorsal view. B. Habitus, ventral view. C. Habitus, lateral view. D. Habitus, perpendicular view of frons.





**Fig. 21.** *Neogergithoides scapularis* sp. nov., holotype, ♂ (RBINS), terminalia. **A–D.** Pygofer, anal tube and gonostyli. **A.** Lateral view. **B.** Laterocaudal view. **C.** Dorsal view. **D.** Caudal view. **E–J.** Aedeagus and connective. **E.** Left lateral view. **F.** Right lateral view. **G.** Caudal view. **H.** Ventral view. **I.** Dorsal view. **J.** Anterodorsal view. Abbreviations: see Material and methods.

Subtribe Mongolianina Wang, Zhang & Bourgoïn, 2016

Genus *Mongoliana* Distant, 1909

*Mongoliana* Distant, 1909: 87. Type species. *Hemisphaerius chilocorides* Walker, 1851, by original designation.

### Diagnosis

The genus *Mongoliana* Distant, 1909 can be separated from the other genera of Mongolianina by the following combination of characters:

- (1) the tegmina with venation indistinct and with their basal angle projecting anteriorly and forming a rounded lobe beside the head;
- (2) the vertex wider than long;
- (3) the frons rugulose, weakly convex and often with a row of tubercles along lateral and upper margins;
- (4) the clypeus slightly elevated in midline but not sharply carinate and not produced anteriorly;
- (5) the hind wings only slightly shorter than the tegmina.

### Note

The genus was reviewed and redescribed by Meng *et al.* (2016). More recently, Zhang *et al.* (2020) transferred *Hemisphaerius signifer* Walker, 1851 to the genus *Mongoliana*, hence indirectly providing the first record of the genus in Vietnam as *H. signifer* was recorded from Thanh-Ha, Hoa Binh Province, by Fennah (1978). However, Fennah's record is based on a female specimen, so a record of *M. signifer* in Vietnam still needs to be confirmed by a reliable identification based on male terminalia characters.

### Species included (16)

*Mongoliana albimaculata* Meng, Wang & Qin, 2016  
*Mongoliana arcuata* Meng, Wang & Qin, 2016  
*Mongoliana bistriata* Meng, Wang & Qin, 2016  
*Mongoliana chilocorides* (Walker, 1851)  
*Mongoliana contusa* (Walker, 1851)  
*Mongoliana lanceolata* Che, Wang & Chou, 2003  
*Mongoliana latistriata* Meng, Wang & Qin, 2016  
*Mongoliana naevia* Che, Wang & Chou, 2003  
*Mongoliana pianmaensis* Chen, Zhang & Chang, 2014  
*Mongoliana qiana* Chen, Zhang & Chang, 2014  
*Mongoliana recurrens* (Butler, 1875)  
*Mongoliana serrata* Che, Wang & Chou, 2003  
*Mongoliana signifer* (Walker, 1851)  
*Mongoliana sinuata* Che, Wang & Chou, 2003  
*Mongoliana triangularis* Che, Wang & Chou, 2003  
*Mongoliana vietnamica* sp. nov.

*Mongoliana vietnamica* sp. nov.

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Figs 1, 22–23

### Diagnosis

*Mongoliana vietnamica* sp. nov. can be recognized by

- (1) the frons with a row of tubercles along lateral margins (Fig. 22D);
- (2) the frontoclypeal suture marginated dorsally with a narrow black line and a slightly wider pale yellowish line, and ventrally by a pale yellowish line preceding the black clypeus (Fig. 22B, D);
- (3) the tegmina uniformly olivaceous, without marking (Fig. 22A, C);
- (4) the lateroventral processes of the aedeagus elongate, first directed ventrocephalad, then strongly recurved posterodorsad in basal half, and weakly curved posteromesad and showing a helical groove in distal half (*lvp* – Fig. 23D–E, H);
- (5) the rather short gonostyli with squarish apical margin (*G* – Fig. 23A);
- (6) the posterior margin of the anal tube weakly rounded (*An* – Fig. 23C).

### Differential diagnosis

The closest species are *M. chilocorides* (Walker, 1851), *M. lanceolata* Che, Wang & Chou, 2003, *M. qiana* Chen, Zhang & Chang, 2014 and *M. recurrens* (Butler, 1875), sharing with *M. vietnamica* sp. nov. the uniformly coloured tegmina, and, more or less, the pattern of the frons and clypeus (Chen *et al.* 2014; Meng *et al.* 2016; Zhang *et al.* 2020). However, *M. vietnamica* can be separated from all the other species by the characters of the male terminalia, especially the shape of the lateroventral processes of the aedeagus, strongly recurved and with helical groove in distal half, the squarish apical margin of the gonostyli in lateral view and the subtriangular, roundly truncate apically, anal tube.

### Etymology

The species epithet refers to the country where the new species was found.

### Type material

#### Holotype

VIETNAM • ♂ (dissected – Figs 22–23); Quang Ninh Province, Dong Son-Ky Thuong Nature Reserve; 21°08'29" N, 107°04'53" E; 27 Aug. 2022; 550 m a.s.l.; secondary forest; GTI Project; J. Constant, J. Bresseel and L. Semeraro leg.; I.G.: 34.518; RBINS.

#### Paratypes

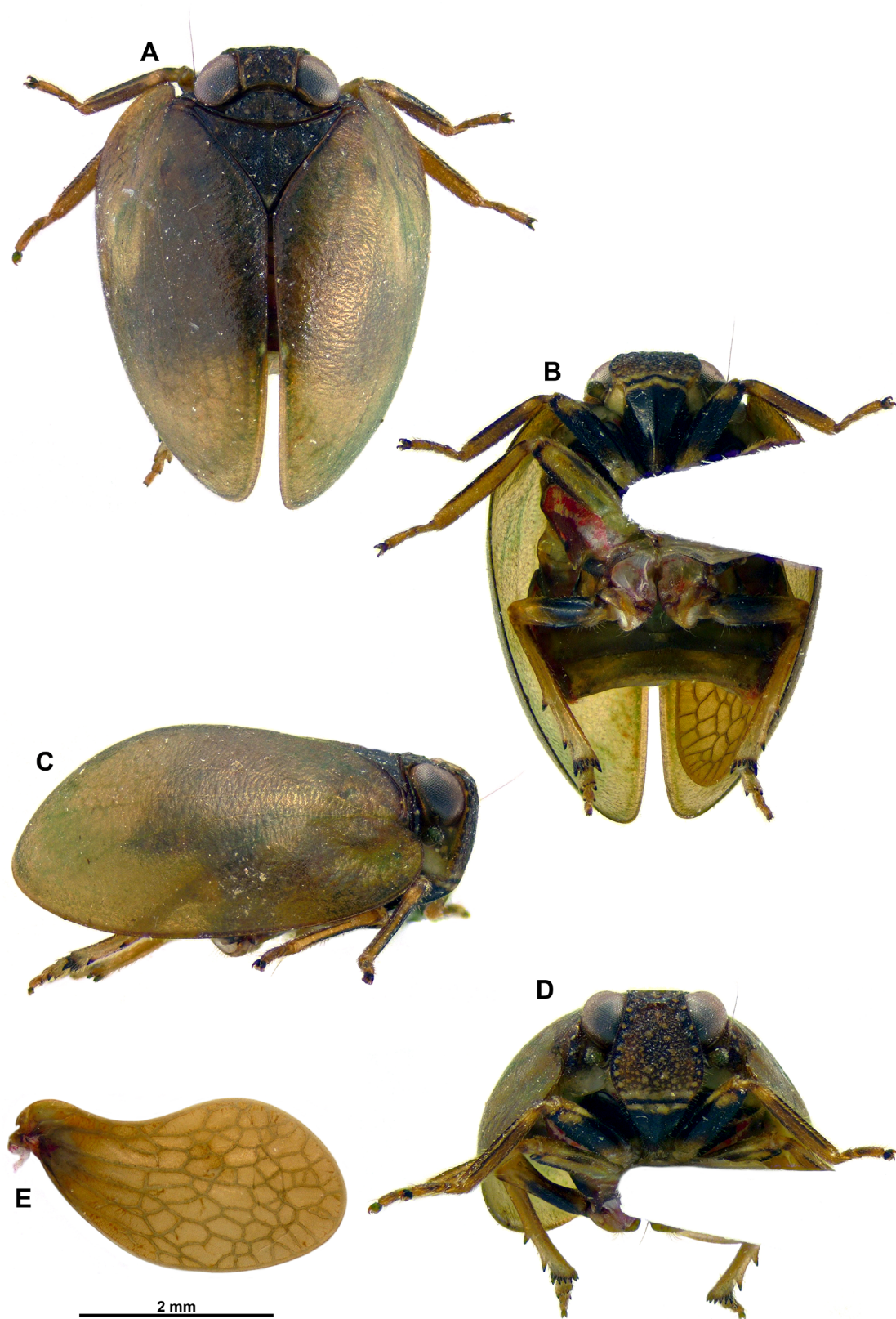
VIETNAM • 1 ♂ (dissected); same collection data as for holotype; VNMN.

### Description

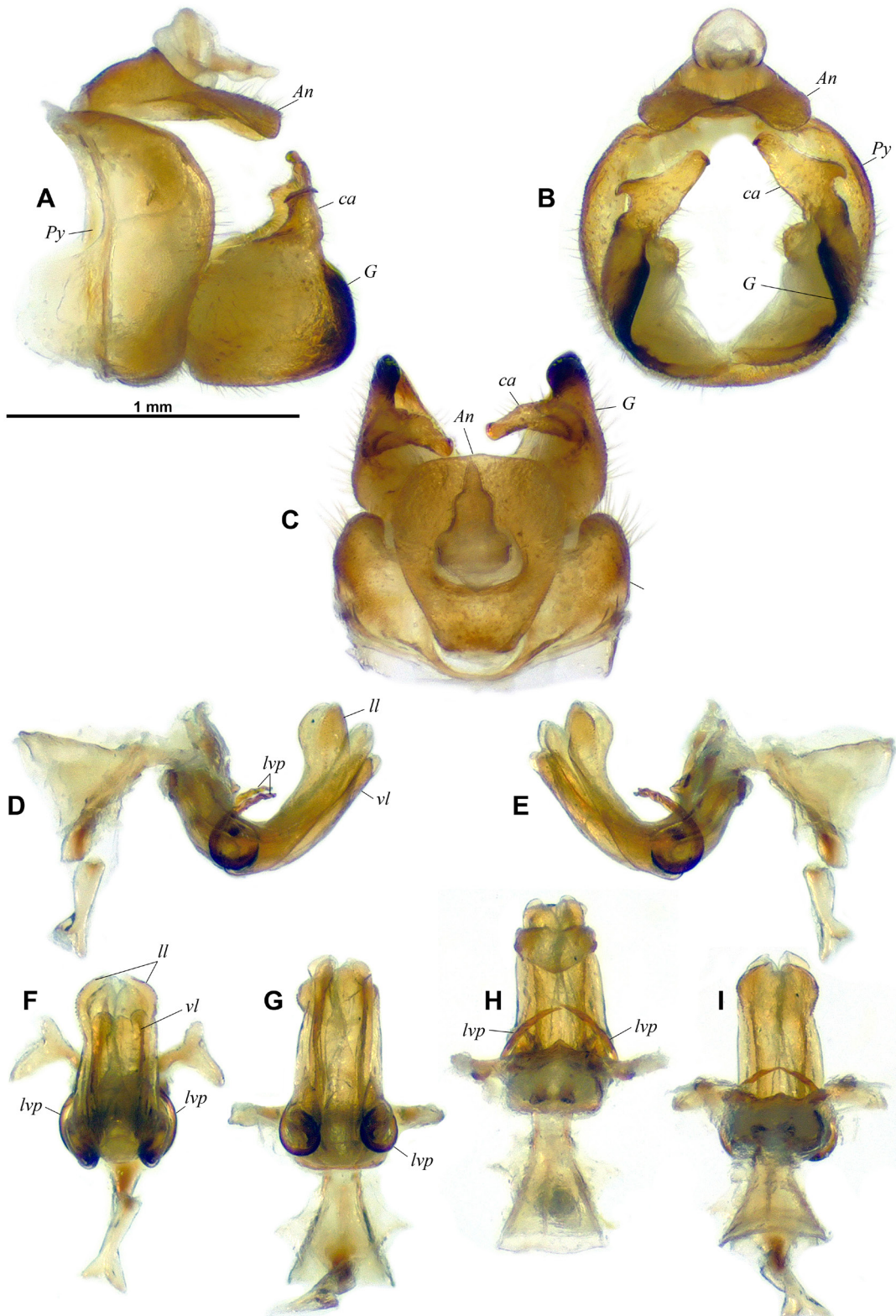
MEASUREMENTS AND RATIOS. LT: ♂ (n = 2): 4.6–4.8 mm; LT/BB = 1.37; LTg/BTg = 1.75; LW/BW = 1.9; BV/LV = 2.0; LF/BF = 1.1.

HEAD (Fig. 22A–D). Vertex twice as broad as long in midline, brown with paler markings along anterior and lateral margins; middle portion of anterior margin straight, lateral portions oblique, posterior margin concave; lateral and posterior margins weakly carinate; disc weakly concave. Side of head yellowish with brown area anterior to antenna. Frons elongate and rugose, brown with more or less developed minute yellowish dots; dark brown narrow band with yellowish tubercles along lateral margins; narrow black line above frontoclypeal suture with wider pale yellowish line above it. Clypeus black with pale yellowish band under frontoclypeal suture and anteclypeus brown, elevated medially. Labium pale yellowish. Scape short, ring-shaped, brown; pedicel slightly elongate, subcylindrical, brown.

THORAX (Fig. 22A, C–D). Brown. Pronotum very short with obsolete median carina marked by pale yellowish line, and anterior and posterior margins weakly carinate; posterior margin curved; disc more or less flat with 2 impressed points; row of yellowish tubercles along anterior margin and 2 tubercles along posterior margin; very narrow, laminate, behind eyes; paranotal fields subtriangular, pale yellowish with laterodorsal brown area extending behind antenna. Mesonotum subtriangular with anterior margin concave, rugulose with weakly marked to obsolete median carina and weak impressed point on each



**Fig. 22.** *Mongoliana vietnamica* sp. nov., dissected holotype, ♂ (RBINS). **A.** Habitus, dorsal view. **B.** Habitus, ventral view. **C.** Habitus, lateral view. **D.** Habitus, perpendicular view of frons. **E.** Right hind wing.



**Fig. 23.** *Mongoliana vietnamica* sp. nov., holotype, ♂ (RBINS), terminalia. **A–C.** Pygofer, anal tube and gonostyli. **A.** Lateral view. **B.** Caudal view. **C.** Dorsal view. **D–I.** Aedeagus and connective. **D.** Left lateral view. **E.** Right lateral view. **F.** Caudal view. **G.** Ventral view. **H.** Dorsal view. **I.** Anterodorsal view. Abbreviations: see Material and methods.

side of disc; lateral carinae of disc indistinct, sometimes marked by pale line, like median carina; curved transverse carina along anterior margin; apex of scutellum marked with pale yellowish. Tegulae brown.

TEGMINA (Fig. 22A, C). Strongly convex, olivaceous; distinctly longer than broad when taken together in dorsal view; weakly impressed at basocostal angle and with margin of basicostal angle produced anteriorly in a round lobe; smooth with indistinct veins; costal margin broadly rounded in dorsal view and in lateral view; apex narrowly rounded.

HIND WINGS (Fig. 22E). Brown, unilobed, with veins darker, slightly shorter than tegmina. Venation reticulate with main longitudinal veins distinct basally (C, ScP+R, MP, CuA); numerous cross-veinlets. Anal area absent. Costal margin strongly sinuate, cubital and distal margins rounded.

LEGS (Fig. 22A–D) Moderately elongate and slender, greenish yellow-brown with coxae, large middle portion of pro- and mesofemora, longitudinal markings on mesofemora and spines of metatibiae, black. Posterior tibiae with 2 lateral spines in apical  $\frac{1}{2}$  and 6 apical spines. Metatibiotarsal formula: (2) 6 / 8 / 2.

MALE TERMINALIA. Pygofer (*Py* – Fig. 23A–C) in lateral view 2.4 times as high as broad and with posterior margin rounded in dorsal  $\frac{1}{2}$  and weakly sinuate in ventral  $\frac{1}{2}$ ; ventral margin rounded in lateral view; anterior margin weakly curved in dorsal portion. Gonostyli (*G* – Fig. 23A–C) in lateral view rather short and subquadrate with ventral margin weakly rounded and posterior margin at more or less straight angle to ventral one, truncate with upper and lower angles rounded; capitulum well developed, elongate, projecting dorsomesad, with neck rather short and broad, and basal hump; with small tooth on dorsal margin pointing ventromesad, and basolateral laminate process curved lateroventrad, appearing as hook in caudal view. Anal tube (*An* – Fig. 23A–C) slightly (1.15 times) longer in midline than wide, moderately curved ventrally in lateral view, dorsoventrally flattened with sides evenly diverging along basal  $\frac{2}{3}$ , then rounded to apicolateral angles; apical margin weakly rounded, with small protruding portion in middle; apicolateral angles slightly curved ventrad. Aedeagus (Fig. 23D–I) strongly curved posterodorsally, rather simple, with elongate lateroventral processes (*lvp*) at about basal  $\frac{2}{5}$ , first directed ventrocephalad, then strongly recurved posterodorsad in basal half, and weakly curved posteromesad and showing a helical groove in distal half; ventral lobe of periandrium (*vl*) truncate apically with lateral angles rounded, slightly produced; lateral lobes of periandrium (*ll*) surpassing ventral lobe, rounded and with minute teeth on margin in distal portion; phallus membranous, dilated and curved apically.

### Biology

*Mongoliana vietnamica* sp. nov. was collected in August on lower vegetation and bushes, in moist evergreen tropical forest at about 550 m in altitude (Fig. 1B).

### Distribution

Vietnam: Quang Ninh Province, Dong Son-Ky Thuong Nature Reserve (Fig. 1A).

Tribe **Kodaiianellini** Wang, Zhang & Bourgoin, 2016

### Type genus

*Kodaiianella* Fennah, 1956

Genus ***Kodaiianella*** Fennah, 1956

*Kodaiianella* Fennah, 1956: 508. Type species: *Kodaiianella bicinctifrons* Fennah, 1956, by original designation.

### Diagnosis

The genus *Kodaiianella* can be differentiated from all other genera of Kodaiianellini by the following combination of characters:

- (1) the hind wings trilobed, with lobe ScP-R-MP-Cu distinctly wider than Pcu-A<sub>1</sub> and A<sub>2</sub> lobes, the two latter about the same width;
- (2) the hind wings with A<sub>1</sub> vein 2-branched, both branches simple;
- (3) the frons wider than long in midline, with incomplete median carina and without transverse carina;
- (4) the anal tube with maximum width near apical margin in dorsal view;
- (5) the aedeagus with one pair of ventral hooked processes.

### Note

The genus *Kodaiianella* was reviewed by Zhang & Chen (2010) who added two species from China. One of them, *K. macheta* Zhang & Chen, 2010, was later synonymized under *K. damnosa* (Chou & Lu, 1985) by Gnezdilov (2013a), which in turn was transferred to the genus *Dentatissus* Chen, Zhang & Wang, 2014 by Chen *et al.* (2014). More recently, Chang *et al.* (2020) described a new species, *K. furcata* Chang & Chen, 2020 as well as two additional new species in the genus *Sivaloka* Distant, 1906, which were both transferred to *Kodaiianella* by Gnezdilov (2022a).

### Species included

*Kodaiianella arcuata* (Chang & Chen, 2020)

*Kodaiianella bicinctifron* Fennah, 1956

*Kodaiianella bipartita* (Distant, 1906)

*Kodaiianella furcata* Chang & Chen, 2020

*Kodaiianella longispina* Zhang & Chen, 2010

*Kodaiianella mua* sp. nov.

*Kodaiianella trigona* (Chang & Chen, 2020)

***Kodaiianella mua* sp. nov.**

[urn:lsid:zoobank.org:act:5BECEAE4-B7C2-4138-BC82-F16E0D4A0B07](https://doi.org/10.21203/rs.3.rs-1911111/v1)

Figs 1, 2A, 24–25

### Diagnosis

*Kodaiianella mua* sp. nov. can be recognized by

- (1) the short gonostyli, mostly developed vertically (about 1.7 times as high as long in lateral view) and without triangular projection on anterodorsal margin at base of capitulum in lateral view (*G, ca* – Fig. 25A);
- (2) the aedeagus with pair of lateroventral processes shaped as rather short ventral hooks directed mesoanteriorly, rather robust basally then tapering into acute point after half-length (*lvp* – Fig. 25G–I);
- (3) the lateral lobes of periandrium with an apical hook pointing dorsad and an antepical strong triangular tooth directed dorsad (*ll* – Fig. 25E–G).

### Differential diagnosis

Only one other species, *K. furcata*, shares the gonostyli without triangular projection on anterodorsal margin at base of capitulum in lateral view but it can be easily separated from *K. mua* sp. nov. by the ventral hooks of the aedeagus which are very elongate and furcate in *K. furcata* (Chang *et al.* 2020: figs 12–13) as opposed to the short simple hooks in *K. mua*.

### Etymology

The species epithet ‘mua’ is the Vietnamese word for ‘rain’ and refers to the heavy rains which prevented our team from collecting in Dong Son-Ky Thuong Nature Reserve for two days. It is used as a noun in apposition.

### Type material

#### Holotype

VIETNAM • ♂ (dissected – Figs 2A, 24–25); Quang Ninh Province, Dong Son-Ky Thuong Nature Reserve; 21°08'29" N, 107°04'53" E; 27 Aug. 2022; 550 m a.s.l.; secondary forest; GTI Project; J. Constant, J. Bresseel and L. Semeraro leg.; I.G.: 34.518; RBINS.

### Description

MEASUREMENTS AND RATIOS. LT: ♂ (n = 1): 5.7 mm; LT/BB = 1.7; LTg/BTg = 1.60; LW/BW = 1.36; BV/LV = 2.5; LF/BF = 0.64.

HEAD (Fig. 24A–D). Vertex distinctly broader than long in midline but slightly narrower in middle than on sides, brown with margins slightly carinate; anterior margin convex, posterior one concave and lateral subparallel; disc shallowly concave. Side of head brown with pale yellowish line at mid-height from eye to anterior margin. Frons about 1.6 times as wide as long, brown with curved transverse yellowish narrow line, and a darker area along lateral margins, wider along lateroventral angle; row of small yellowish tubercles parallel to lateral margins, two rows along dorsal margin; strong median carina in dorsal half; ventrolateral angle carinate and projecting anteriorly, forming angular projection in lateral view. Clypeus brown, darker apically and elevated medially but not carinate. Labium brown with last segment longer than broad, and shorter than penultimate. Scape short, ring-shaped, black; pedicel bulbous, brown.

THORAX (Fig. 24A, C). Brown. Pronotum rather short, 0.6 times as long as mesonotum in midline; median carina obsolete, with one small, impressed point on each side and some faint tubercles along posterior margin; anterior and posterior margins weakly carinate, disc weakly concave; posterior margin bisinuate; paranotal lobes brown turning to yellowish behind eye. Mesonotum smooth, with weak carina parallel to anterior margin; posterior portion of disc and scutellum slightly elevated. Tegulae yellowish brown.

TEGMINA (Fig. 24A–C). Moderately convex; brown with three darker area: one near base, broad transverse band at midlength, and in distal portion; widest in distal portion with apical margin obliquely truncate and broadly rounded; costal margin slightly reflexed in basal half; distinct hump in fork ScP+RA–RP. Venation: ScP+R forked near base; MP forked slightly beyond basal 1/3; CuA very long, forked at about 3/4 of tegmen length; CuP reaching apicosutural angle; Pcu weakly visible in distal portion, fused with A<sub>1</sub> at about midlength of clavus; A<sub>1</sub> well marked; Pcu+A<sub>1</sub> moderately keeled; continuous row of aligned cross-veins joining main veins, parallel to apical margin.

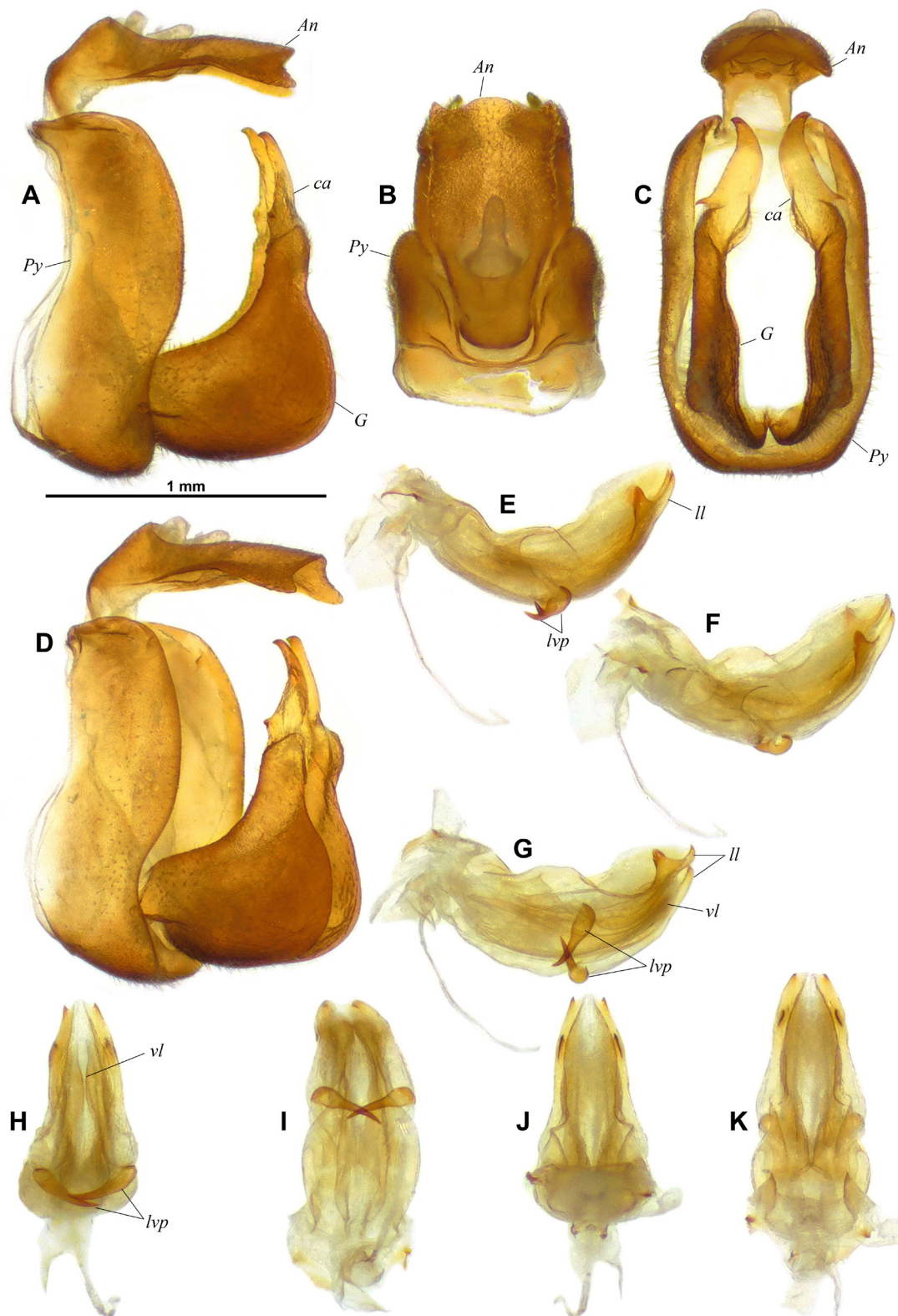
HIND WINGS (Fig. 24E). Dark brown with basicostal portion paler, trilobed, with veins darker, slightly shorter than tegmina. ScP-R-MP-Cu lobe more than twice as broad as Pcu-A<sub>1</sub>, even broader than combined lobe Pcu-A<sub>1</sub> + lobe A<sub>2</sub>; A<sub>2</sub> lobe with anterior and posterior margins subparallel and distinctly surpassing half-length of Pcu-A<sub>1</sub> lobe; Pcu single, subdistally anastomising with 2-branched A<sub>1</sub>; A<sub>2</sub> simple.

LEGS (Fig. 24A–D). Moderately elongate and slender, brown with femora and metatibiae darker, base of metatibiae shortly yellowish. Metatibiae with 2 lateral spines in apical 1/3 and 7 apical spines. Metatibiotarsal formula: (2) 7 / 9 / 2.





**Fig. 24.** *Kodaianella mua* sp. nov., dissected holotype, ♂ (RBINS). **A.** Habitus, dorsal view. **B.** Habitus, ventral view. **C.** Habitus, lateral view. **D.** Habitus, perpendicular view of frons. **E.** Right hind wing.



**Fig. 25.** *Kodaianella mua* sp. nov., holotype, ♂ (RBINS), terminalia. **A–D.** Pygofer, anal tube and gonostyli. **A.** Lateral view. **B.** Dorsal view. **C.** Caudal view. **D.** Laterocaudal view. **E–K.** Aedeagus and connective. **E.** Left lateral view. **F.** Left dorsolateral view. **G.** Left lateroventral view. **H.** Caudal view. **I.** Ventral view. **J.** Anterodorsal view. **K.** Dorsal view. Abbreviations: see Material and methods.

MALE TERMINALIA. Pygofer (*Py* – Fig. 25A–D) in lateral view about 3.1 times as high as long and with anterior and posterior margins subparallel, moderately curved in dorsal half, sinuate in ventral half; in caudal view subrectangular, about 1.7 times as high as wide. Gonostyli (*G* – Fig. 25A, C–D) about 1.7 times as high as long in lateral view, with anterodorsal margin roundly, evenly emarginate, posterior margin moderately sinuate, broadly rounded in ventral portion, and ventral margin broadly rounded; mostly vertical in caudal view with capitulum projecting dorsomesad; capitulum (*ca*) elongate and with neck rather wide in lateral view, distal portion anteroposteriorly laminate and subcrescent-shaped in caudal view (Fig. 25C). Anal tube (*An* – Fig. 25A–D) elongate and dorsoventrally flattened; in dorsal view 1.9 times as long in midline, as wide, with lateral margins diverging from base to basal  $\frac{1}{3}$ , then distinctly bisinuate; apical margin distinctly bisinuate with lateral angles acute; anal opening in basal  $\frac{1}{4}$ ; in lateral view moderately curved posteroventrad and with posterior margin distinctly emarginate. Aedeagus (Fig. 25E–K) moderately curved posterodorsad, moderately tapering towards apex in dorsal view and with pair of lateroventral processes (*lvp*) as rather short ventral hooks directed mesoanteriorly, rather robust basally then tapering into acute point after half-length; ventral lobe of periandrium (*vl*) broad, abruptly narrowing at level of ventral hooks then slowly tapering to narrowly rounded apex; lateral lobes of periandrium (*ll*) with triangular subapical tooth directed posterodorsad and apical tooth curved dorsad.

### Biology

*Kodaiianella mua* sp. nov. was collected in August on lower vegetation and bushes, in moist evergreen tropical forest at about 550 m in altitude (Fig. 1B, 2A).

### Distribution

Vietnam: Quang Ninh Province, Dong Son-Ky Thuong Nature Reserve (Fig. 1A).

Tribe Parahiraciini Cheng & Yang, 1991

Subtribe **Parahiraciina** Cheng & Yang, 1991

### Type genus

*Parahiracia* Ôuchi, 1940 (junior synonym of *Fortunia* Distant, 1909).

Genus ***Pusulissus*** Bourgoin & Wang, 2020

*Pusulissus* Bourgoin & Wang, 2020: 73. Type species: *P. phiaoacensis* Bourgoin & Wang, 2020, by original designation.

*Flatiforma* Meng, Qin & Wang, 2020 in Zhang *et al.* 2020: 353. Type species: *F. guizhouensis* Meng, Qin & Wang, 2020, by original designation. Synonymized by Gnezdilov (2022a: 47).

### Diagnosis

The genus *Pusulissus* can be differentiated from all other genera of Parahiraciina by the following combination of characters:

- (1) the elongate frons (at least 1.2 times as long in midline as wide) with median carina extending from dorsal margin almost to frontoclypeal suture and without a black tubercle in the middle of the disc;
- (2) the tegmina distinctly widest in the basal  $\frac{1}{3}$ , not subparallel nor regularly rounded;
- (3) the vertex with anterior margin in dorsal view only very slightly angularly convex or straight;
- (4) the anal tube of male dorsoventrally flattened and wide at midlength;
- (5) the aedeagus rather simple, with a single pair of ventral processes curved anterodorsad.

## Note

The genus was described by Bourgoïn & Wang (2020) to include two new species from North Vietnam (Cao Bang Province) and southern China (Guangxi Province), respectively. By synonymizing the genus *Flatiforma* Meng, Qin & Wang, 2020 under *Pusulissus*, Gnezdilov (2022a) transferred three additional species from China into the genus.

## Species included

*Pusulissus coronomensis* Bourgoïn & Wang, 2020  
*Pusulissus guizhouensis* (Meng, Qin & Wang, 2020)  
*Pusulissus menglaensis* (Che, Zhang & Wang, 2020)  
*Pusulissus phiaoacensis* Bourgoïn & Wang, 2020  
*Pusulissus quangninhensis* sp. nov.  
*Pusulissus ruiliensis* (Che, Zhang & Wang, 2020)

*Pusulissus quangninhensis* sp. nov.

[urn:lsid:zoobank.org:act:A5D5064C-EAB2-4C1A-809A-DA2074260167](https://zoobank.org/urn:lsid:zoobank.org:act:A5D5064C-EAB2-4C1A-809A-DA2074260167)

Figs 26–27

## Diagnosis

*Pusulissus quangninhensis* sp. nov. can be recognized by

- (1) the anal tube widely subrhomboidal as wide as long in midline with apical margin truncate and slightly emarginate in middle, with lateral flaps distinctly reflexed ventrad with lateral angles angularly rounded (*An* – Fig. 27A–B);
- (2) the neck of the capitulum of the gonostyli rather high (*ca* – Fig. 27A);
- (3) the shape of the lateroventral processes of the aedeagus directed mesocephalad in basal  $\frac{1}{3}$ , then strongly upcurved and sinuate as to wrap around aedeagus, and with apical  $\frac{1}{3}$  indistinctly curved cephalad, but not surpassing dorsal margin of aedeagus in lateral view (*lvp* – Fig. 27E–G).

## Differential diagnosis

The closest species is *P. phiaoacensis*, which differs by a less wide anal tube (Bourgoïn & Wang 2020: figs 8–9), a shorter neck of the capitulum of the gonostyli (Bourgoïn & Wang 2020: fig. 10) and the shape of the medioventral processes of the aedeagus, not directed mesad (subparallel) in basal portion, then strongly recurved with apex surpassing dorsal margin of aedeagus and directed posterodorsad (Bourgoïn & Wang 2020: figs 11–13).

## Etymology

The species epithet refers to ‘Quang Ninh’, the province where Dong Son-Ky Thuong Nature Reserve, the type locality, is located.

## Type material

### Holotype

VIETNAM • ♂ (dissected – Figs 26–27); Quang Ninh Province, Dong Son-Ky Thuong Nature Reserve; 21°08'29" N, 107°04'53" E; 27 Aug. 2022; 550 m a.s.l.; secondary forest; GTI Project; J. Constant, J. Bresseel and L. Semeraro leg.; I.G.: 34.518; RBINS.

### Paratype

VIETNAM • 1 ♀; same collection data as for holotype; VNMN.

## Description

MEASUREMENTS AND RATIOS. LT: ♂ (n = 1): 6.9 mm, ♀ (n = 1): 7.1 mm; LT/BB = 1.44; LTg/BTg = 2.0; LW/BW = 1.30; BV/LV = 2.15; LF/BF = 1.20.

HEAD (Fig. 26A–D). Vertex variegated brown, distinctly broader than long in midline and with lateral margins longer than midline, with all margins carinate; anterior margin weakly convex, posterior one deeply angularly concave and lateral ones subparallel; disc shallowly excavate with obsolete median carina. Side of head yellowish with triangular black marking at anterodorsal angle; anteroventral angle projecting anteriorly in a small round lobe. Frons elongate and generally smooth, brown with band along dorsal margin and narrower band subparallel to lateral margins, blackish, distinct yellowish spot in middle on each side of median carina and yellowish band along frontoclypeal suture; median carina extending from dorsal margin down nearly to rounded frontoclypeal suture, orangish on disc; row of irregular yellowish tubercles along dorsal and lateral margins (in black bands); dorsal margin distinctly concave, lateral margins distinctly sinuate. Clypeus variegated black-brown, weakly elevated medially. Labium brown with last segment longer than broad, and shorter than penultimate. Scape short, ring-shaped, brown; pedicel bulbous, yellowish brown.

THORAX (Fig. 26A, C–D). Pronotum variegated yellowish brown; about 0.6 times as long as mesonotum in midline; anterior margin carinate, strongly sinuate and strongly, angularly protruding anteriorly between eyes, with carinae directed obliquely posteriorly, not reaching hind margin of pronotum; posterior margin weakly bisinuate; no median carina but with impressed point on each side of median line; lateral portion behind eye very narrow, laminate; blunt, pale yellowish tubercles along posterior margin; paranotal lobes (lateral view) broad, brown in outer portion, yellowish in inner portion and with large black marking behind lower margin of eye, and with posteroventral angle straight. Mesonotum variegated yellowish brown with longitudinal carinae obsolete but marked by dark brown lines; smooth, slightly depressed before scutellum; nearly complete transverse carina along anterior margin. Tegulae yellowish brown.

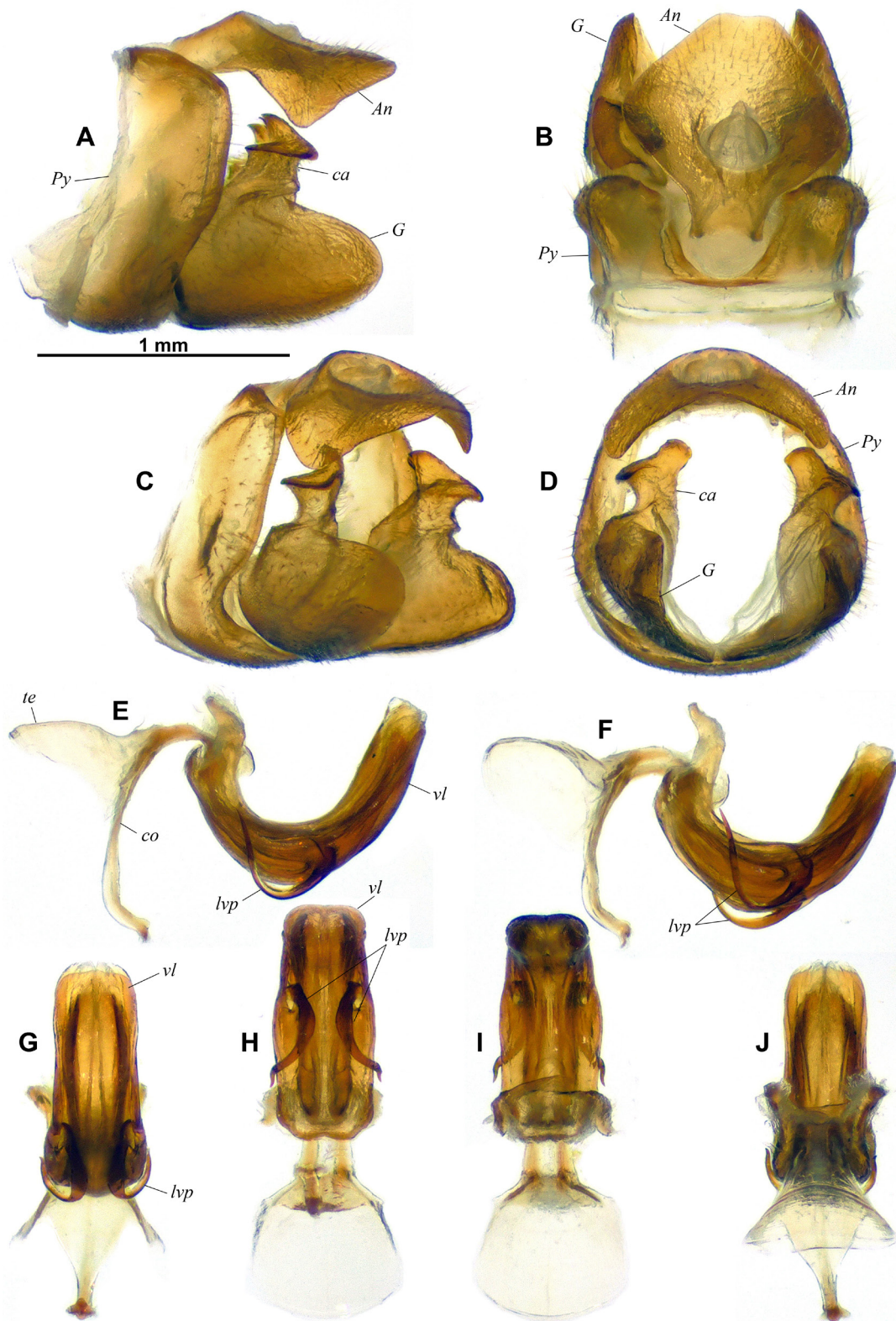
TEGMINA (Fig. 26A–B, D). Variegated yellowish brown (greener in live specimens) with darker area along costal margin, sometimes darker basal marking between ScP+RA and RP and more or less distinct transverse band at midlength; subcoriaceous with longitudinal veins yellow, elevated and with dense reticulum of pale yellow veinlets; shape elongate and convex with sides broadly rounded, widest at basal  $\frac{1}{3}$ , about 2.4 times as long as broad; narrowly rounded apically. Postclaval margin weakly rounded on distal half and weakly notched at apex of clavus. Clavus closed, reaching about midlength of tegmen. Venation: ScP+R forking close to base after short common stem, ScP+RA and RP running more or less parallel to costal margin and not forked; MP forked close to base after short common stem, resulting veins both forked again further; CuA simple, sinuate, more or less parallel to claval joint, then to sutural margin towards apex of tegmen; Pcu and  $A_1$  fused at apical  $\frac{1}{3}$  of clavus, resulting Pcu+ $A_1$  reaching apex of clavus.

HIND WINGS (Fig. 26E). Brown with large basicostal portion of lobe Sc-R-MP-CuA and base of lobe CuP-Pcu- $A_1$  yellow-brown; venation slightly darker than corresponding background; wing broader than tegmen and deeply bilobed at CuP; costal margin moderately sinuate; CuP-Pcu- $A_1$  lobe broadly rounded along postclaval margin and about 1.4 times as wide as Sc-R-MP-CuA lobe, the latter slightly shorter and with apical margin obliquely rounded;  $A_2$  lobe reduced and narrow. Venation: longitudinal veins ScP-R-MP-Cu well distinct; Pcu and  $A_1$  separated; numerous cross-veins;  $A_2$  distinct.

LEGS (Fig. 26A–D). Moderately elongate and slender, brown femora darker than corresponding tibiae; posterior margin of pro- and mesofemora with row of acute irregular small teeth. Metatibiae with 2 lateral spines in distal half and 8 apical spines. Metatibiotarsal formula: (2) 8 / 8 / 2.



**Fig. 26.** *Pusulissus quangninhensis* sp. nov., dissected holotype, ♂ (RBINS). **A.** Habitus, dorsal view. **B.** Habitus, ventral view. **C.** Habitus, perpendicular view of frons. **D.** Habitus, lateral view. **E.** Right hind wing.



**Fig. 27.** *Pusulissus quangninhensis* sp. nov., holotype, ♂ (RBINS), terminalia. **A–D.** Pygofer, anal tube and gonostyli. **A.** Lateral view. **B.** Dorsal view. **C.** Laterocaudal view. **D.** Caudal view. **E–J.** Aedeagus and connective. **E.** Left lateral view. **F.** Left ventrolateral view. **G.** Caudal view. **H.** Ventral view. **I.** Dorsal view. **J.** Anterodorsal view. Abbreviations: see Material and methods.

ABDOMEN (Fig. 26B). Black brown, each tergite with a yellowish, crescent-shaped marking on each side.

MALE TERMINALIA. Pygofer (*Py* – Fig. 27A–D) about 2.5 times as high as long in lateral view, with anterior margin weakly concave and posterior margin more or less straight on both sides of an obtuse angle under half height. Gonostyli (*G* – Fig. 27A, C–D) (in lateral view) about as long as high (with dorsal capitulum), projecting posteriorly in distinct lobe rounded apically, and concave; capitulum (*ca*) with wide neck, directed dorsad, with distal portion anteroposteriorly flattened, with apical hook directed cephalad and with lateral laminate projection in dorsal half with outer margin under it strongly concave in caudal view. Aedeagus (Fig. 27E–J) symmetrical, strongly curved dorsad (in lateral view), but with distal  $\frac{1}{3}$  more or less straight; pair of elongate lateroventral processes (*lvp*) directed mesocephalad in basal  $\frac{1}{3}$ , then strongly upcurved and sinuate as to wrap around aedeagus and with apical  $\frac{1}{3}$  weakly curved cephalad, but not surpassing dorsal margin of aedeagus in lateral view; ventral lobe of periandrium (*vl*) evenly widening posterior to medioventral processes, then more or less parallel-sided, apical margin truncate with small round projection in middle. Connective (*co*) elongate, curved, with tecduductus (*te*) well developed. Anal tube (*An* – Fig. 27A–D) dorsoventrally flattened, in dorsal view subrhomboidal with rather short parallel-sided base, and apical margin truncate and slightly emarginate in middle, as wide as long in midline, with lateral flaps distinctly reflexed ventrad with lateral angles angularly rounded; anal opening at about basal  $\frac{1}{4}$ .

### Biology

*Pusulissus quangninhensis* sp. nov. was collected in August on lower vegetation and bushes, in moist evergreen tropical forest at about 550 m in altitude (Fig. 1B).

### Distribution

Vietnam: Quang Ninh Province, Dong Son-Ky Thuong Nature Reserve (Fig. 1A).

Genus *Rostrolatium* Che, Zhang & Wang, 2020

*Rostrolatium* Che, Zhang & Wang, 2020 in Zhang *et al.* 2020: 335. Type species: *Rostrolatium separatum* Che, Zhang & Wang, 2020, by original designation.

### Diagnosis

The genus *Rostrolatium* can be differentiated from all other genera of Parahiraciina by the following combination of characters:

- (1) the head elongate with a more or less conical cephalic process curved anteroventrally;
- (2) the vertex with lateral margins concave and with incomplete median carina;
- (3) the tegmina evenly rounded along lateral margin in dorsal view;
- (4) the anal tube of male dorsoventrally flattened and with apical margin roundly emarginate;
- (5) the aedeagus rather simple, moderately curved in lateral view and with a single pair of ventral processes curved anterodorsad.

### Note

The genus was recently described in Zhang *et al.* (2020) to include a new species from Hainan Island, and it is here recorded from Vietnam for the first time.

### Species included

*Rostrolatium curviceps* sp. nov.

*Rostrolatium separatum* Che, Zhang & Wang, 2020



*Rostrolatum curviceps* sp. nov.

[urn:lsid:zoobank.org:act:A2D342C3-2312-4072-953D-2E39ECE3291F](https://zoobank.org/urn:lsid:zoobank.org:act:A2D342C3-2312-4072-953D-2E39ECE3291F)

Figs 2C–D, 28–30

**Diagnosis**

*Rostrolatum curviceps* sp. nov. can be recognized by

- (1) the elongate vertex, about 1.7 times as long in midline, as wide basally (Fig. 28A);
- (2) the posterior margin of the pygofer with a distinct angular projection in upper third (Fig. 29A);
- (3) the elongate, strongly recurved ventral processes of the aedeagus overlapping ventrally (Fig. 29E–F, H).

**Differential diagnosis**

The new species can be separated from *R. separatum* by its more elongate vertex (only 1.2 times as long in midline, as wide basally in *R. separatum*, as compared to 1.7 – ratio extrapolated from Zhang *et al.* 2020: pl. 25j), and a more developed, angularly lobous posterior projection along dorsal half of the posterior margin of the pygofer (Zhang *et al.* 2020: fig. 133f) as opposed to a triangular projection in *R. curviceps* sp. nov.

**Etymology**

The species epithet derives from the Latin adjective ‘*curvus*’ meaning ‘curved’, and the Latin suffix ‘*-ceps*’ meaning ‘headed’. It refers to the shape of the head of the new species in lateral view.

**Type material**

**Holotype**

VIETNAM • ♂ (dissected – Figs 2C–D, 28–29); Quang Ninh Province, Dong Son-Ky Thuong Nature Reserve; 21°08'29" N, 107°04'53" E; 27 Aug. 2022; 550 m a.s.l.; secondary forest; GTI Project; J. Constant, J. Bresseel and L. Semeraro leg.; I.G.: 34.518; RBINS.

**Paratypes**

VIETNAM • 1 ♀; same collection data as for holotype; RBINS • 1 ♂ (dissected); Lang Son Province, Mau Son Summit; 21°50'17" N, 106°54'49" E; 19–24 Aug. 2022; J. Constant, J. Bresseel and L. Semeraro leg.; I.G.: 34.518; VNMN.

**Description**

MEASUREMENTS AND RATIOS. LT: ♂ (n = 2): 6.2 mm, ♀ (n = 1): 6.9 mm; LT/BB = 2.16; LTg/BTg = 2.34; LW/BW = 1.6; BV/LV = 0.58; LF/BF = 1.41.

HEAD (Fig. 28A–D). Narrower than thorax and elongate, with more than half of vertex length surpassing eyes. Vertex brown, curved anteroventrad in lateral view; shallowly concave basally, shortly convex at level of anterior margin of eyes, then grooved on remaining distal portion, about 1.7 times as long in midline as broad basally, with sides concave, converging towards narrowly rounded, paler apex; yellowish median carina in basal ¼; posterior margin carinate; lateral margins carinate, yellowish in basal portion and more elevated in distal half; posterior margin angularly concave. Frons slightly convex in cross-section, strongly curved cephalad at level of eyes in lateral view, widest just above curved frontoclypeal suture; lateral margins sinuate before process; brown more or less densely covered in minute yellowish points, darker on underside of cephalic process and with yellowish pustules along lateral margins; thin median yellowish carina more strongly marked on underside of process. Posterior side of head dark brown with yellowish median line. Genae brown with contrasted yellowish marking basoventrally and a smaller one under eye; strong carina parallel to anterior margin of eye; side of cephalic process brown

punctured with yellowish, visible in dorsal view. Clypeus subtriangular, variegated yellowish brown with sides darker. Labium dark brown, elongate and narrow, with apical segment elongate, shorter than penultimate. Eyes subcircular (not emarginate), protruding laterally; ocelli absent. Antennae brown, rather short with scape ring-shaped and pedicel globular.

**THORAX** (Fig. 28A, C–D). Pronotum variegated yellowish brown, darker in middle of disc and with large black-brown marking on anterolateral portion (behind eye); about 0.66 times as long as mesonotum in midline; anterior margin carinate, strongly sinuate and strongly, roundly protruding anteriorly between eyes, with carinae extending down to ventral margin of paranotal lobes, sinuate on lobes; posterior margin weakly bisinuate; median carina obsolete anteriorly with impressed point on each side; rather large blunt, pale yellowish tubercles along anterior margin's carina and on disc and lateral fields; paranotal lobes (lateral view) moderately broad, posterior to carina brown with pale yellowish tubercles, sometimes turning into short, blunt, longitudinal carinae along posterior margin, anterior to carina black-brown as behind head with transverse pale yellowish marking at mid-height. Mesonotum variegated yellowish brown, darker in middle portion; subtriangular with anterior margin finely carinate; obsolete median carina and two incomplete lateral carinae; disc smooth; some blunt, pale yellowish tubercles in lateral fields of mesonotum. Tegulae yellowish brown.

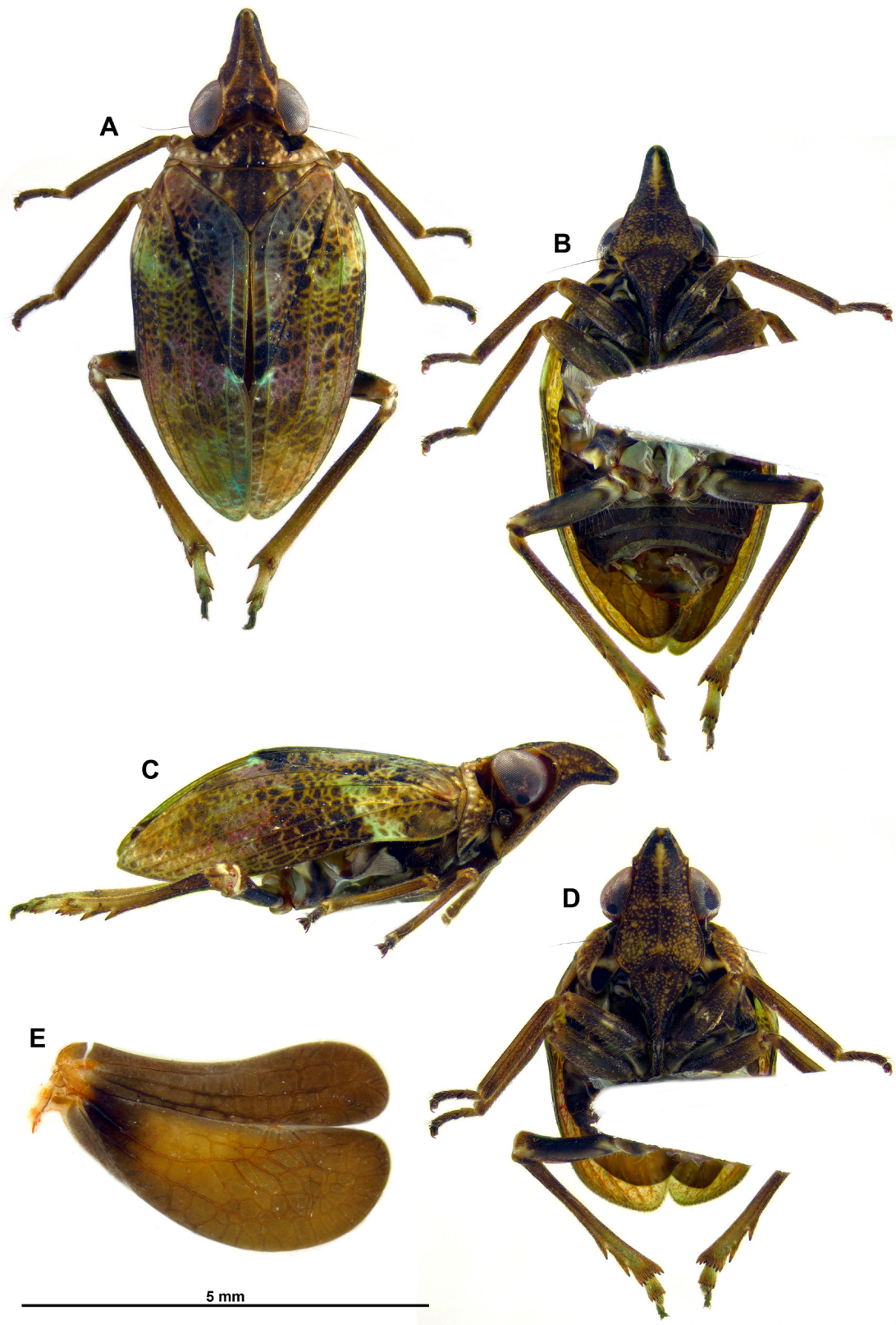
**TEGMINA** (Figs 2C–D, 28A–C). Mostly variegated olivaceous green with whitish markings; clavus rosy brown with large blackish patch, itself containing whitish area along claval suture; claval suture marked with a black line along most length; transverse whitish band at about basal  $\frac{1}{4}$ , from costal margin to claval suture; cross-veins usually paler than background; subcoriaceous with longitudinal veins moderately elevated, with A1-Pcu+A1 distinctly raised in distal portion, and with a dense reticulum of veinlets; shape elongate and convex with sides broadly rounded, about 2.3 times as long as broad; narrowly rounded apically; postclaval margin slightly notched at apex of clavus. Clavus closed, reaching about  $\frac{3}{5}$  of tegmen length. Venation: ScP+R moderately developed, forking into ScP+RA and RP; RP forking rather shortly after Sc+RA–RP fork; MP forking at about half of tegmen length; CuA not forked; Pcu fused with A1 at  $\frac{3}{4}$  of clavus length; Pcu+A1 fused with CuP slightly before apex of clavus.

**HIND WINGS** (Fig. 28E). Brown with yellowish zone in CuP-Pcu-A1 lobe, venation slightly darker than background; wing broader than tegmen and deeply bilobed at CuP; costal margin sinuate; CuP-Pcu-A1 lobe about 1.5 times as wide as Sc-R-MP-CuA lobe, both lobes of same length and rounded apically; postclaval margin broadly rounded; A2 lobe brown, reduced and narrow. Venation: main veins present; ScP+R, MP and CuA running more or less parallel, slightly diverging towards apex, with numerous cross-veins; Pcu curved around basal third of wing towards CuP but not reaching the latter; A1 curved, more or less parallel to postclaval margin; CuP-Pcu-A1 lobe with numerous cross-veins; A2 vein obsolete.

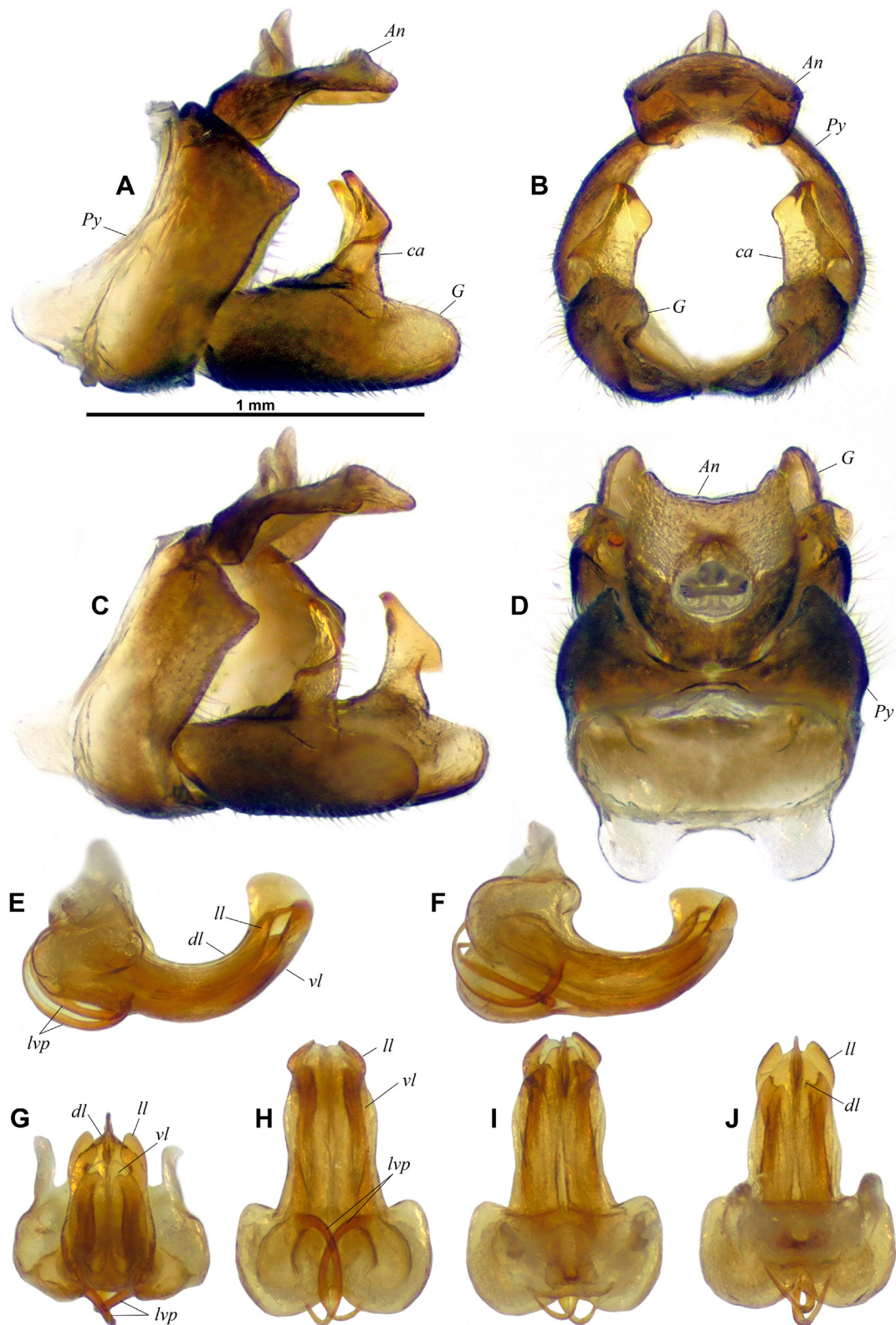
**LEGS** (Fig. 28A–D). Elongate and slender, olivaceous with femora slightly darker than corresponding tibiae; pro- and mesofemora with more or less distinct pale ring at midlength; metafemora paler at base and apex; apex of spines of metatibiae and -tarsi black; metatibiae with 2 lateral teeth on distal third and 8 apical teeth; first metatarsomere elongate and slender, with strong spine at each side and row of 5 smaller spines in between ventrally along posterior margin; second metatarsomere short with one tooth at each side. Metatibiotarsal formula: (2) 8 / 7 / 2.

**ABDOMEN** (Fig. 28B). Dark brown.

**MALE TERMINALIA**. Pygofer (*Py* – Fig. 29A–D) about 2.7 times as high as long at mid-height in lateral view, with anterior margin weakly concave and posterior margin oblique in dorsal  $\frac{1}{3}$  to posterior triangular projection (directed caudad), then more or less straight under projection, subparallel to anterior margin. Gonostyli (*G* – Fig. 29A–C) (in lateral view) concave, elongate, about 2.4 times as long as high (without dorsal capitulum), projecting posteriorly to capitulum in distinct lobe rounded apically; capitulum



**Fig. 28.** *Rostrolatum curviceps* sp. nov., dissected holotype, ♂ (RBINS). A. Habitus, dorsal view. B. Habitus, ventral view. C. Habitus, lateral view. D. Habitus, perpendicular view of frons. E. Right hind wing.



**Fig. 29.** *Rostrilatium curviceps* sp. nov., holotype, ♂ (RBINS), terminalia. **A–D.** Pygofer, anal tube and gonostyli. **A.** Lateral view. **B.** Caudal view. **C.** Laterocaudal view. **D.** Dorsal view. **E–J.** Aedeagus and connective. **E.** Left lateral view. **F.** Left ventrolateral view. **G.** Ventrocaudal view. **H.** Ventral view. **I.** Dorsal view. **J.** Anterodorsal view. Abbreviations: see Material and methods.

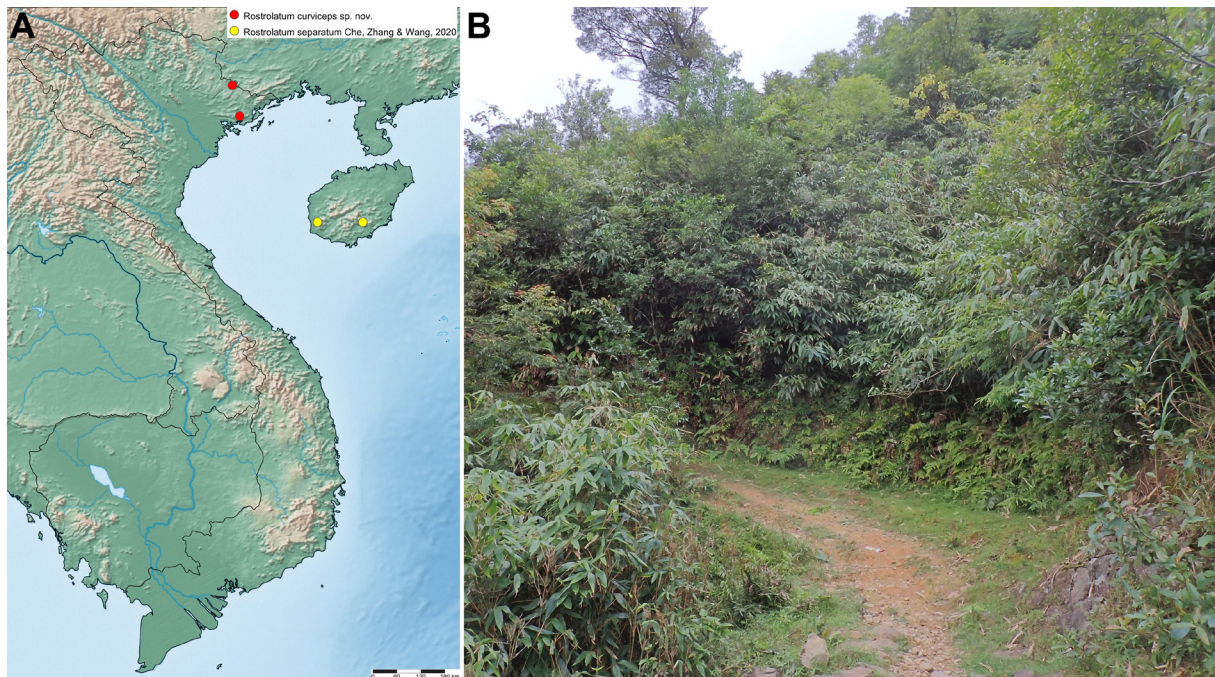
(*ca*) strongly developed, with wide neck, directed dorsad, twisted with distal portion anteroposteriorly flattened, with apical hook directed mesocephalad and with lateral laminate projection in basal half curved lateroventrad, hook-shaped in caudal view. Aedeagus (Fig. 29 E–J) symmetrical, moderately curved dorsad (in lateral view); pair of elongate lateroventral processes (*lvp*) directed mesocephalad, evenly, strongly recurved and overlapping ventrally, reaching beyond anterior margin of periandrium; periandrium strongly developed, wider than remaining part of aedeagus; dorsal lobe of periandrium (*dl*) dorsoventrally flattened, tapering and with lateral lobe (*ll*) sinuate in distal portion, and with distal middle portion developed as a vertically protruding disc; phallus with elongate lateral shafts with inner margin indented subapically; ventral lobe of periandrium (*vl*) laminate, rather thin and tapering towards roundly acute apex. Anal tube (*An* – Fig. 29A–D) dorsoventrally flattened, about as wide as long in midline, in dorsal view suboval with posterior margin deeply, roundly emarginate, the posterior angles projecting posteroventrad and narrowly rounded; lateral margin in basal portion, expanded into a moderately developed lobe curved ventrad; anal opening at about basal  $\frac{1}{3}$ .

### Biology

*Rostrolatium curviceps* sp. nov. was collected in August, on lower vegetation and bushes, in moist evergreen tropical forest at about 550 m in altitude (Fig. 1B) in Dong Son-Ky Thuong Nature Reserve, and in moist evergreen tropical mountain forest at about 1000 m in altitude (Fig. 30B) on Mount Mau Son.

### Distribution

The species is currently recorded from Dong Son-Ky Thuong Nature Reserve, Quang Ninh Province and Mount Mau Son, Lang Son Province (Fig. 30A).



**Fig. 30.** A. *Rostrolatium* spp., distribution map. B. Habitat of *R. curviceps* sp. nov. on Mount Mau Son, 23 Aug. 2022.

Tribe **Sarimini** Wang, Zhang & Bourgoin, 2016

### Type genus

*Sarima* Melichar, 1903.

Genus ***Longieusarima*** Wang, Bourgoin & Zhang, 2017

*Longieusarima* Wang, Bourgoin & Zhang, 2017: 362. Type species: *L. lunulia* Wang, Bourgoin & Zhang, 2017, by original designation.

### Diagnosis

The genus *Longieusarima* can be differentiated from the other genera of Sarimini by the following combination of characters:

- (1) the vertex about as long as wide in dorsal view;
- (2) the median and lateral carinae of frons limited to dorsal half;
- (3) the tegmina elongate, at least 2.5 times as long as wide, with distinct lateral hump at basal  $\frac{1}{3}$  hiding costal margin in dorsal aspect;
- (4) the vein scP of the tegmen rather short, curved and not extending beyond midlength of tegmen;
- (5) the first fork of MP more basal than first fork of CuA;
- (6) the aedeagus with a single pair of elongate ventral processes;
- (7) the dorsal lobe of the periandrium with a pair of apicolateral processes directed cephalad.

### Species included

*Longieusarima lunulia* Wang, Bourgoin & Zhang, 2017

***Longieusarima lunulia*** Wang, Bourgoin & Zhang, 2017  
Figs 1, 2B, 31–32

### Diagnosis

*Longieusarima lunulia* is the only species in the genus.

### Material examined

VIETNAM • 3 ♂♂ (dissected – Figs 31–32), 1 ♀; Quang Ninh Province, Dong Son-Ky Thuong Nature Reserve; 21°08'29" N, 107°04'53" E; 27 Aug. 2022; 550 m a.s.l.; secondary forest; GTI Project; J. Constant, J. Bresseel and L. Semeraro leg.; I.G.: 34.518; RBINS • 1 ♂ (dissected), 1 ♀; same collection data as for preceding; VNMN.

### Supplementary description

MEASUREMENTS AND RATIOS. LT: ♂ (n = 4): 6.4 mm (6.3–6.6), ♀ (n = 2): 7.1 (7.0–7.2); LT/BB = 2.36; LTg/BTg = 2.54; LW/BW = 1.37; BV/LV = 1.20; LF/BF = 0.92.

HEAD (Fig. 31A–D). Vertex 1.2 times as broad as long in midline, brown often with paler obsolete fine median groove; anterior margin convex, posterior one angularly concave and lateral subparallel; all margins weakly carinate; disc more or less flat. Side of head yellowish brown. Frons slightly wider than long in midline, brown with dorsal angles darker; yellowish curved transverse narrow line in middle of disc; widest under level of antennae and slightly convex; upper margin weakly convex; median carina well marked in dorsal portion then getting weaker ventrad and disappearing at about ventral  $\frac{1}{3}$ ; laterodorsal carinae from middle of dorsal margin obliquely to about middle of eye but not reaching lateral margin; lateral and dorsal margins weakly carinate; frontoclypeal suture moderately rounded.

Clypeus brown, subtriangular, without carina. Labium brown with last segment longer than broad, and shorter than penultimate. Antennae with scape short, ring-shaped, brown; pedicel bulbous, brown.

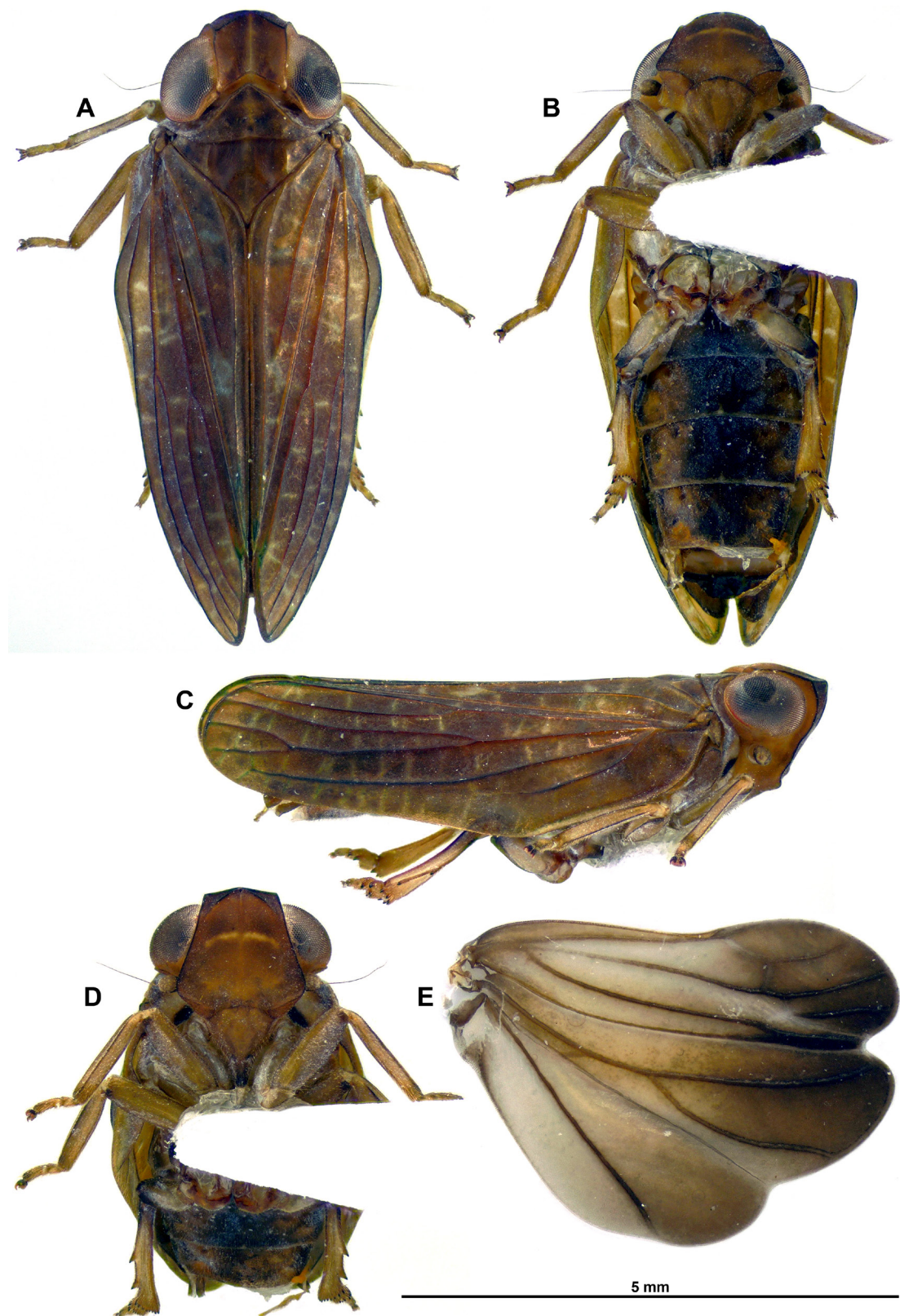
THORAX (Fig. 31A, C–D). Brown. Pronotum in midline 0.6 times as long as mesonotum in midline; paler median line with impressed point on each side, in middle; anterior margin carinate, angularly projecting cephalad, posterior margin straight, weakly incurved in middle; lateral fields very narrow; paranotal lobes paler behind antennae and with transverse black marking along ventral margin. Mesonotum subtriangular with median paler line and longitudinal blunt carina on each side; shallowly depressed at base of scutellum. Tegulae brown.

TEGMINA (Fig. 31A–C). Brown with pale yellowish transverse veinlets and irregular spots; strong lateral hump in basal  $\frac{1}{3}$  at level of ScP+R vein, hiding costal margin in dorsal view; longitudinal veins raised; hypocostal plate well developed; about 1.9 times as long as wide when taken together in dorsal view; clavus very elongate, closed. Venation: ScP+R dividing close to base; ScP+RA curved, rather short, disappearing before middle of costal margin; RP very long, weakly curved, nearly reaching to outer margin of tegmen; MP vein first fork slightly before half length; MP<sub>1+2</sub> forked at about apical  $\frac{1}{5}$ , MP<sub>3</sub> simple, reaching apical margin; CuA vein first fork at about midlength of tegmen, posterior to MP first fork; veins Pcu and A1 fused near midlength of tegmen, Pcu+A1 reaching apex of clavus.

HIND WINGS (Fig. 31E) Brown, darker along apical and posterior margins; veins generally darker than background; well developed, with 3 distinct lobes (Sarimini type) more or less equal in width; indentation between ScP-R-MP-Cu and Pcu-A1 lobes moderately deep. Venation: ScP+R and CuA furcate, MP simple; second branch of CuA fused with CuP distally; Pcu and A1 fused on basal half, Pcu and A2 simple; one transverse vein between second branch of ScP+R and MP and between MP and first branch of CuA; A2 not forked.

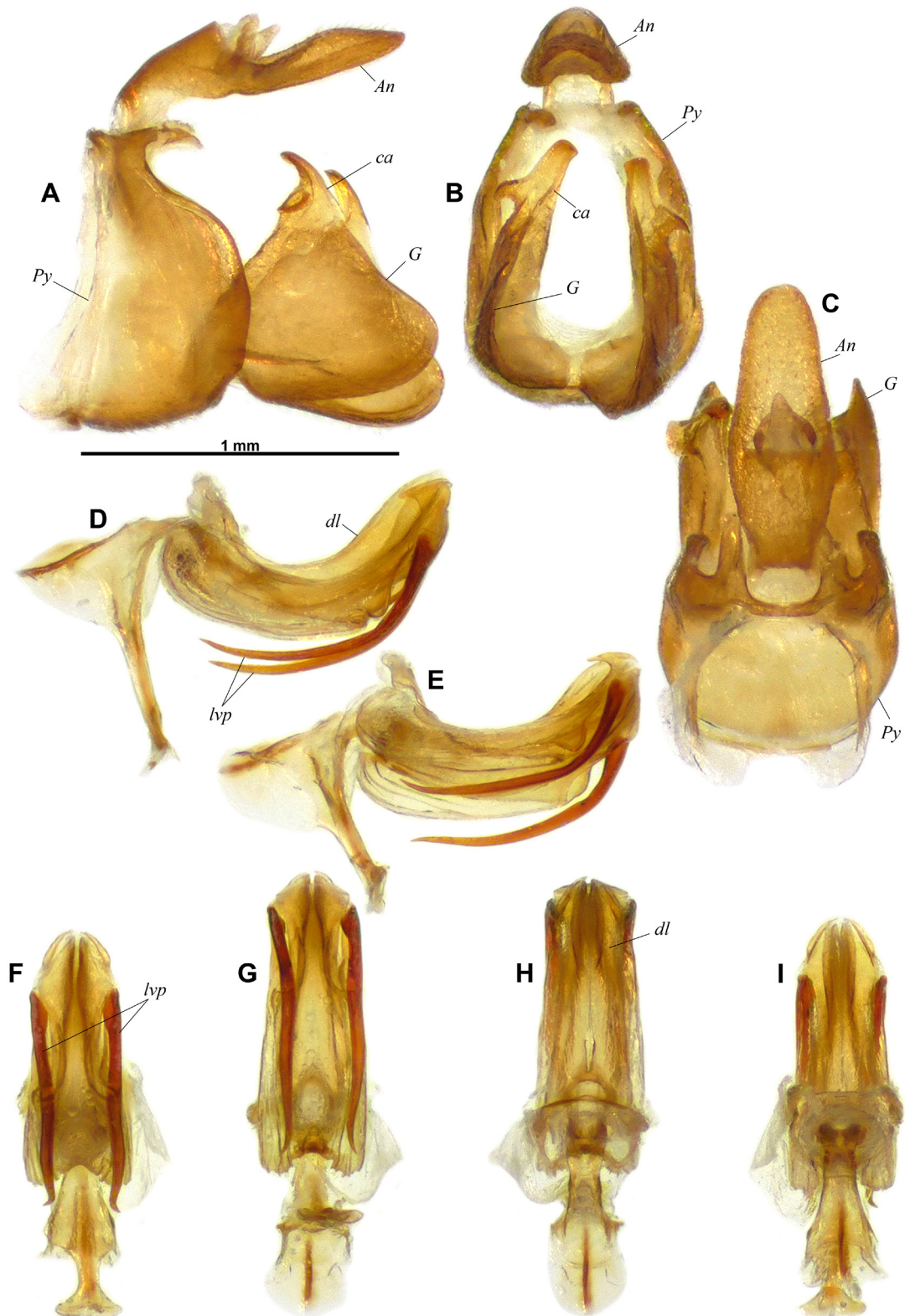
LEGS (Fig. 31A–D). Slender and moderately long, yellowish brown with the following dark brown: apex of metafemora and base of metatibiae, and apex of spines of metatibiae and metatarsi. Metatibiae with 2 lateral spines on distal  $\frac{1}{2}$  and 7 apical spines; first metatarsus with row of 6 minute teeth along posteroventral margin, limited with a larger tooth on each side. Metatibiotarsal formula: (2) 7 / 8 / 2.

MALE TERMINALIA. Pygofer (*Py* – Fig. 32A–C) massive, 2.0 times as high as long at maximum length in lateral view; in lateral view, anterior margin weakly concave, posterior margin with ventral  $\frac{2}{3}$  portion strongly projecting caudad in a round lobe, dorsal  $\frac{1}{3}$  portion strongly sinuate and tapering to dorsal digitiform process directed caudad; in caudal view, 1.25 times as high as wide. Gonostyli (*G* – Fig. 32A–B) (in lateral view) concave, subtriangular, about 1.1 times as high as long (including capitulum), with moderately developed, rounded, posterior lobe; capitulum (*ca*) with wide, undefined neck, with antepical lateral obliquely flattened process hooked lateroventrad (in caudal view) and anteroposteriorly flattened, rather strongly curved anterodorsad, with external angle rounded and inner angle straight in caudal view. Aedeagus (Fig. 32D–I) symmetrical, moderately curved dorsad (in lateral view); pair of slender, very elongate lateroventral processes (*lvp*) derived from apical  $\frac{1}{9}$ , directed ventrocephalad, evenly curved in lateral view, subparallel, weakly undulate with apex curved laterad and reaching nearly to base of periandrium, in ventral view; dorsal lobe of periandrium (*dl*) with moderately developed apical triangular process directed mesocephalad. Anal tube (*An* – Fig. 32A–C) curved basally then generally straight, elongate in lateral view; strongly convex basally, then more or less dorsoventrally flattened behind anal opening (in basal  $\frac{1}{3}$ ), about 2.6 times as long in midline, as wide in dorsal view, suboval with maximum width at anal opening and with apical margin rounded.



**Fig. 31.** *Longieusarima lunulia* Wang, Bourgoïn & Zhang, 2017, dissected ♂ (RBINS). **A.** Habitus, dorsal view. **B.** Habitus, ventral view. **C.** Habitus, lateral view. **D.** Habitus, perpendicular view of frons. **E.** Right hind wing.





**Fig. 32.** *Longieusarima lunulia* Wang, Bourgoïn & Zhang, 2017, ♂ (RBINS), terminalia. **A–C.** Pygofer, anal tube and gonostylus. **A.** Lateral view. **B.** Caudal view. **C.** Dorsal view. **D–I.** Aedeagus and connective. **D.** Left lateral view. **E.** Left ventrolateral view. **F.** Ventrocaudal view. **G.** Ventral view. **H.** Dorsal view. **I.** Anterodorsal view. Abbreviations: see Material and methods.

### Note on intraspecific variation

Some differences were observed between the Vietnamese specimens and those from China as described and illustrated by Wang *et al.* (2017): the ratio of the vertex as long as wide in midline in the latter (Wang *et al.* 2017: fig. 29 – 1.2 times in Vietnamese specimens), the tegmina 2.8 times as long as wide (Wang *et al.* 2017: fig. 31 – 2.5 times in Vietnamese specimens) as well as the triangular shape of the gonostyli with apparently less developed posterior lobe and weakly curved apex of capitulum (Wang *et al.* 2017: fig. 35 – posterior lobe moderately developed and apex of capitulum more distinctly curved in Vietnamese specimens). The characters of the male terminalia were regarded too similar to justify the description of a new species for the Vietnamese population; however, we provide a full supplementary description for these specimens. The genus seems to be rather widely spread at least in the northern half of Vietnam (Constant & Pham unpubl. data) and molecular data will surely help to understand how the different populations / species articulate.

### Biology

*Longieusarima lineolata* sp. nov. was collected in August, on lower vegetation and bushes (Fig. 2B), in moist evergreen tropical forest at about 550 m in altitude (Fig. 1B) in Dong Son-Ky Thuong Nature Reserve.

### Distribution

Vietnam: Quang Ninh Province, Dong Son-Ky Thuong Nature Reserve (Fig. 1A).

Genus *Parallelissus* Meng, Qin & Wang, 2020

*Parallelissus* Meng, Qin & Wang, 2020 in Zhang *et al.* 2020: 435. Type species: *P. furvus* Meng, Qin & Wang, 2020, by original designation.

### Diagnosis

The genus *Parallelissus* can be differentiated from the other genera of Sarimini by the following combination of characters:

- (1) the vein ScP of the tegmen long, largely surpassing midlength and nearly reaching apex;
- (2) the veins M and CuA with first fork at about midlength of tegmen, MP triforked with MP<sub>1+2</sub> separated subapically;
- (3) the gonostyli with capitulum elongate, strongly projecting dorsad and with poorly distinct neck;
- (4) the aedeagus with a single pair of lateral processes;
- (5) the dorsal lobe of the perianthrium with a pair of subapical, lateral processes directed cephalad.

### Species included

*Parallelissus furvus* Meng, Qin & Wang, 2020

*Parallelissus fuscus* Meng, Qin & Wang, 2020

*Parallelissus fuscus* Meng, Qin & Wang, 2020

Figs 1, 33–34

*Parallelissus fuscus* Meng, Qin & Wang, 2020 in Zhang *et al.* (2020): 436 (keyed in Chinese), 437 (described), 606 (keyed in English), 607 (described in English), fig. 183 (head, wings, male terminalia), pl. XXXVI, g–i (habitus).

### Diagnosis

*Parallelissus fuscus* Meng, Qin & Wang, 2020 can be recognized by

- (1) the basically variegated brown colour of the body (Fig. 33A, C);

- (2) the subrectangular pygofer in lateral view (Fig. 34A);
- (3) the posterior margin of the capitulum of the gonostylus in lateral view with distinct hump at mid height (*ca*, *G* – Fig. 34A);
- (4) the pair of lateroventral processes of aedeagus tapering in distal portion projecting dorsocephalad (*lvp* – Fig. 34F–G).

### Material examined

VIETNAM • 1 ♂ (dissected, Figs 33–34), 2 ♀♀; Quang Ninh Province, Dong Son-Ky Thuong Nature Reserve; 21°08'29" N, 107°04'53" E; 27 Aug. 2022; 550 m a.s.l.; secondary forest; GTI Project; J. Constant, J. Bresseel and L. Semeraro leg.; I.G.: 34.518; RBINS • 2 ♀♀; same collection data as for preceding; VNMN.

### Note

The male holotype illustrated in Zhang *et al.* (2020) seems somewhat faded in colour and illustration, hence description of a fresh specimen is provided here (Fig. 33). The terminalia (Fig. 34) of the male from Vietnam show the aedeagus with lateroventral processes (*lvp*) directed dorsocephalad, which is not the case in the specimen from China illustrated in Zhang *et al.* (2020) but these processes are movable and this must be kept in mind when identifying species in this group.

### Supplementary description

MEASUREMENTS AND RATIOS. LT: ♂ (n = 1): 5.4 mm, ♀ (n = 4): 5.9 (5.6–6.2); LT/BB = 2.00; LTg/BTg = 2.30; LW/BW = 1.25; BV/LV = 2.00; LF/BF = 0.90.

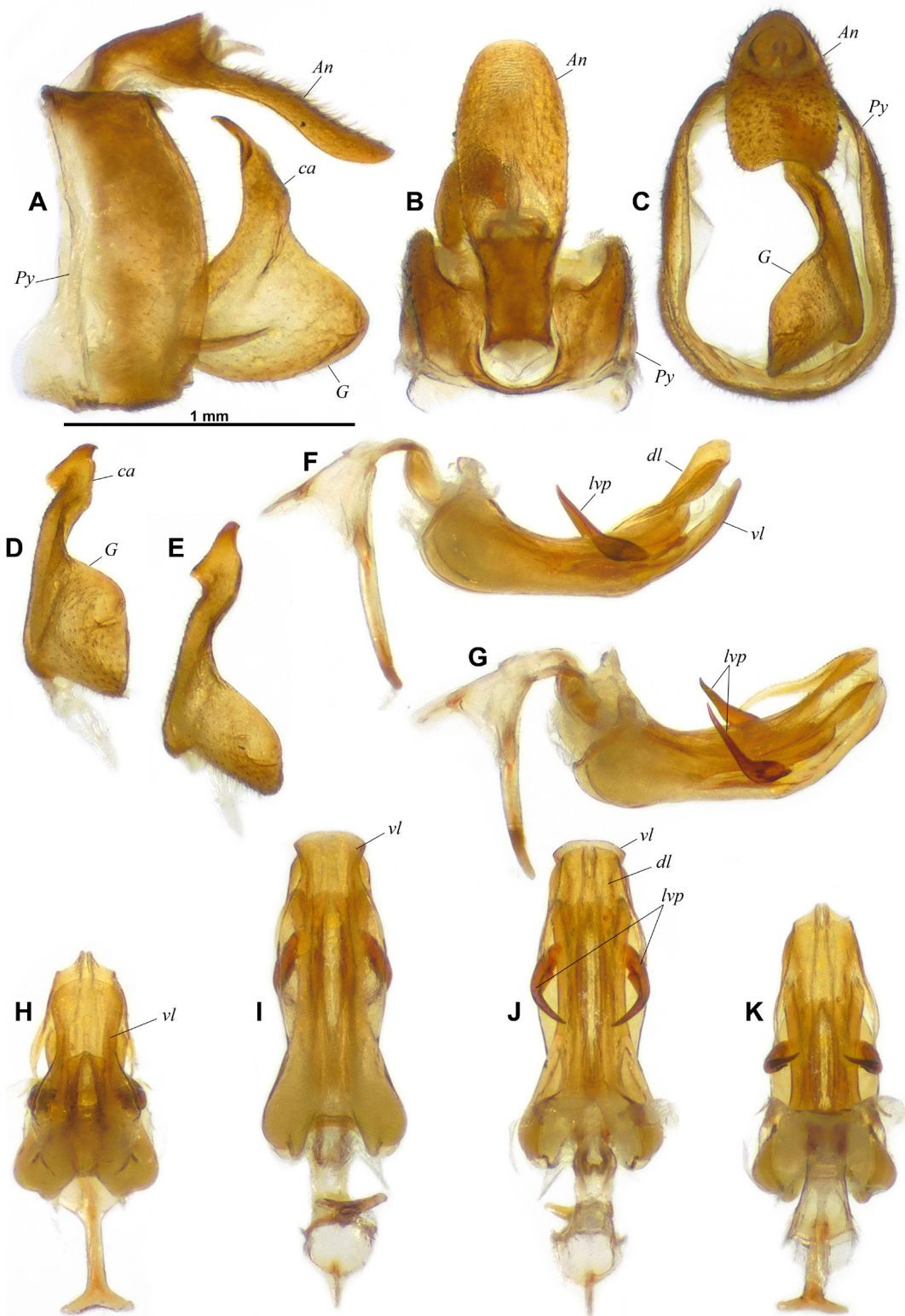
HEAD (Fig. 33A–D). Vertex twice as broad as long in midline, variegated brown, paler towards basal angles and along median obsolete carina; margins carinate; anterior margin moderately, angularly convex, posterior one deeply, roundly concave and lateral ones subparallel; disc excavate. Side of head yellowish brown. Frons subquadrate, widest in ventral  $\frac{1}{3}$ , variegated brown, darker along upper margin and with 2 paler markings in middle; incomplete median carina limited to upper half, yellowish; row of yellowish tubercles (sometimes double row) along dorsal and lateral margins; lateral margins sinuate, upper margin concave, frontoclypeal suture incurved. Clypeus pale brown, darker towards apex. Labium brown with last segment longer than broad, and shorter than penultimate. Scape short, ring-shaped, black; pedicel cylindrical, moderately elongate, brown.

THORAX (Fig. 33C–D). Variegated brown. Pronotum  $\frac{2}{3}$  the length of mesonotum in midline with obsolete, yellowish median carina; anterior margin carinate, strongly, angularly protruding cephalad in middle; very narrow on sides, behind eyes; posterior margin weakly bisinuate; disc weakly concave with yellowish tubercles, forming row along posterior margin; paranotal lobes yellowish brown with dark brown marking behind eye and yellowish tubercles along lateral margin. Mesonotum rather short with yellowish median carina, and longitudinal carina on each side; one yellowish tubercle at each external angle; apex of scutellum yellowish. Tegulae pale brown.

TEGMINA (Fig. 33A–C). Convex, variegated brown and yellowish, with irregular darker patches in basal portion of clavus, in basal portion of radial and median cells and along transverse area about  $\frac{2}{3}$  of tegmen length; 1.65 times as broad as long when taken together in dorsal view; distinct hump laterally on ScP vein at about basal  $\frac{1}{3}$ ; subcoriaceous with longitudinal veins raised and dense reticulum of slightly raised transverse veinlets in distal half; costal area rather wide; hypocostal plate absent; costal margin broadly rounded, apical margin rounded. Venation: ScP+RA and RP fused along short common stem; ScP+RA long, reaching to about  $\frac{4}{5}$  of tegmen length, RP very long, nearly reaching to apical margin of tegmen; MP forked at about half length, MP<sub>1+2</sub> forked near apex of tegmen, MP<sub>3</sub> unforked; CuA forking slightly after MP, CuA1 and CuA2 unforked; clavus closed, elongate, reaching to about distal  $\frac{4}{5}$  of tegmen, Pcu and A1 fused at middle of clavus.



**Fig. 33.** *Parallelissus fuscus* Meng, Qin & Wang, 2020, dissected ♂ (RBINS). A. Habitus, dorsal view. B. Habitus, ventral view. C. Habitus, lateral view. D. Habitus, perpendicular view of frons. E. Right hind wing.



**Fig. 34.** *Parallelissus fuscus* Meng, Qin & Wang, 2020, ♂ (RBINS), terminalia. A–C. Pygofer, anal tube and gonostylus. A. Lateral view (flipped). B. Dorsal view. C. Caudal view. D–E. Left gonostylus. D. Caudal view. E. Dorsocaudal view. F–K. Aedeagus and connective. F. Left lateral view. G. Left dorsolateral view. H. Ventrocaudal view. I. Ventral view. J. Dorsal view. K. Anterodorsal view. Abbreviations: see Material and methods.

**HIND WINGS** (Fig. 33E). Well developed, with 3 distinct lobes (Sarimini type) more or less equal in width; blackish brown with paler area in basal half between costal margin and CuA, around angle between Pcu-A1 and A2 lobes, and between A2 and posteroclaval margin. Venation: ScP+R and CuA furcate, MP simple, second branch of CuA and CuP fused distally, Pcu and A1 fused on basal half, Pcu biforked and A2 simple; one transverse vein between second branch of ScP+R and MP, and between MP and first branch of CuA.

**LEGS** (Fig. 33A–D). Slender and moderately long, yellowish with the following dark brown: preapical ring and apical ring on pro- and mesofemora, apical ring on pro and mesotibiae, large marking on dorsal portion of metafemora, and apex of spines of metatibiae and metatarsi. Metatibiae with 2 lateral spines on distal ½ and 6 apical spines; first metatarsus with row of 8 minute teeth along posteroventral margin, limited with larger tooth on each side. Metatibiotarsal formula: (2) 6 / 10 / 2.

**MALE TERMINALIA.** Pygofer (*Py* – Fig. 34A–C) about 2.3 times as high as long at mid-height, subrectangular in lateral view, with anterior margin weakly concave, upper margin nearly horizontal and posterior margin weakly rounded; about 1.4 times as high as wide in caudal view. Gonostyli (*G* – Fig. 34A, C–E) (in lateral view) concave, rather short with capitulum strongly developed dorsad, projecting posteriorly to capitulum in distinct lobe rounded apically; capitulum (*ca*) with wide neck, with anterior margin prolongating that of body of gonostylus, evenly, moderately sinuate when taken together, posterior margin with 2 distinct humps; moderately developed preapical lateral tooth, apical hook projecting cephalad; in caudal view strongly tapering at base of capitulum, inner margin of capitulum bisinuate. Aedeagus (Fig. 34F–K) symmetrical, moderately curved dorsad (in lateral view); pair of strong, elongate lateroventral processes (*lvp*) directed mesocephalodorsad, distinctly tapered and curved dorsad after basal ⅓, then evenly tapering to pointed apex (see notes); dorsal lobe of periandrium (*dl*) slightly narrowing in middle portion, with median ridge in distal portion, projecting posterodorsad apically with rather deep narrow median notch, lateral margins recurved dorsad in distal portion, generating sinuate ribbon-like process directed cephalad and with minute teeth on dorsal margin; ventral lobe (*vl*) dorsoventrally flattened, slightly shorter than dorsal lobe and well separated from latter, with lateral margin bisinuate in ventral view, expanded laterally in middle portion and with distal portion spatulate, with apical margin rounded; phallus membranous. Anal tube (*An* – Fig. 34A–C) curved posteroventrad, dorsoventrally flattened behind anal opening (in basal ⅓), strongly elongate; in dorsal view, about 2.65 times as long in midline, as wide, suboval with lateral margin weakly sinuate in basal portion and apical margin rounded.

### Biology

*Parallelissus fuscus* was collected in August, on lower vegetation and bushes, in moist evergreen tropical forest at about 550 m in altitude (Fig. 1B) in Dong Son-Ky Thuong Nature Reserve.

### Distribution

China: Guangxi, Shiwandashan Forest; Vietnam: Quang Ninh Province, Dong Son-Ky Thuong Nature Reserve (Fig. 1A).

### Genus *Pseudocoruncanius* Meng, Qin & Wang, 2020

*Pseudocoruncanius* Meng, Qin & Wang, 2020 in Zhang *et al.* 2020: 433. Type species: *Pseudocoruncanius flavostriatus* Meng, Qin & Wang, 2020 by original designation.

*Pseudocoruncanius* – Gnezdilov 2022c: 306 (diagnosed, nomenclatural remarks, key to species, one new species from Vietnam).

### Diagnosis

The genus *Pseudocoruncanius* can be differentiated from the other genera of Sarimini by the following combination of characters:

- (1) the wide frons, at least 1.5 times as wide as long in midlength;
- (2) the median carina of frons restricted to upper portion, not reaching the frontoclypeal suture;
- (3) the elongate tegmina, moderately tapering distally, brown to dark brown with wide white or white yellowish stripes;
- (4) the hind wings with CuA2 and CuP fused apically, and Pcu and A1 fused in basal half;
- (5) the aedeagus with a pair of long lateroventral processes arising in its apical part and directed cephalad;
- (6) the dorsal lobe of the periandrium with a pair of slender, elongate processes derived from distal portion and directed cephalad;
- (7) the female anal tube long and very narrow.

### Species included

*Pseudocoruncanius flavostriatus* Meng, Qin & Wang, 2020

*Pseudocoruncanius nigrifrons* Gnezdilov, 2022

*Pseudocoruncanius obliquus* sp. nov.

*Pseudocoruncanius obliquus* sp. nov.

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Figs 1, 35–36

### Diagnosis

*Pseudocoruncanius obliquus* sp. nov. can be recognized by

- (1) the colour of the frons with ventral  $\frac{2}{3}$  brown and dorsal  $\frac{1}{3}$  black with median transverse yellowish line (Fig. 35D);
- (2) the yellowish white oblique band in middle portion of tegmina, between cubital cell and vein  $MP_{1+2}$  (Fig. 35A, C);
- (3) the black marking inside the apical cells of the tegmina (Fig. 35C);
- (4) the very elongate anal tube of the male in dorsal view, 2.9 times as long in midline, as wide (at widest point) (*An* – Fig. 36C);
- (5) the gonostyli in lateral view with posterior portion forming a rather elongate lobe rounded apically (*G* – Fig. 36A);
- (6) the dorsal lobe of periandrium evenly curved, without hump, in lateral view (*dl* – Fig. 36D).

### Differential diagnosis

The new species is close to both *P. flavostriatus* and *P. nigrifrons*. However, *P. obliquus* sp. nov. differs from *P. flavostriatus* by the oblique yellowish white band in middle portion of tegmina (white band in cubital cell extending straight to costal margin in *P. flavostriatus* – Zhang *et al.* 2020: pl. 36a, c), the anal tube 2.9 times as long in midline, as wide (at widest point) (2.7 times in *P. flavostriatus* – Zhang *et al.* 2020: fig. 181c) and the dorsal lobe of periandrium without hump in lateral view (distinct hump in *P. flavostriatus* – Zhang *et al.* 2020: fig. 181i). Furthermore, *P. obliquus* differs from *P. nigrifrons* by the brown ventral  $\frac{2}{3}$  of the frons (frons black in ventral  $\frac{2}{3}$  in *P. nigrifrons* – Gnezdilov 2022c: fig. 3), the black marking in the apical cells of the tegmina (cells brown in *P. nigrifrons* – Gnezdilov 2022c: fig. 1) and the anal tube 2.9 times as long in midline, as wide (at widest point) (2.3 times in *P. nigrifrons* – Gnezdilov 2022c: fig. 10).

### Etymology

The species epithet '*obliquus*' is a Latin adjective meaning 'oblique', and refers to the oblique pale band in the middle portion of the tegmina.

### Type material

#### Holotype

VIETNAM • ♂ (dissected, Figs 35–36); Quang Ninh Province, Dong Son-Ky Thuong Nature Reserve; 21°08'29" N, 107°04'53" E; 27 Aug. 2022; 550 m a.s.l.; secondary forest; GTI Project; J. Constant, J. Bresseel and L. Semeraro leg.; I.G.: 34.518; RBINS.

#### Paratypes

VIETNAM • 1 ♂ (dissected); same collection data as for holotype; VNMN.

### Description

MEASUREMENTS AND RATIOS. LT: ♂ (n = 2): 6.4 mm (6.3–6.5); LT/BB = 2.43; LTg/BTg = 2.64; LW/BW = 1.36; BV/LV = 2.13; LF/BF = 0.66.

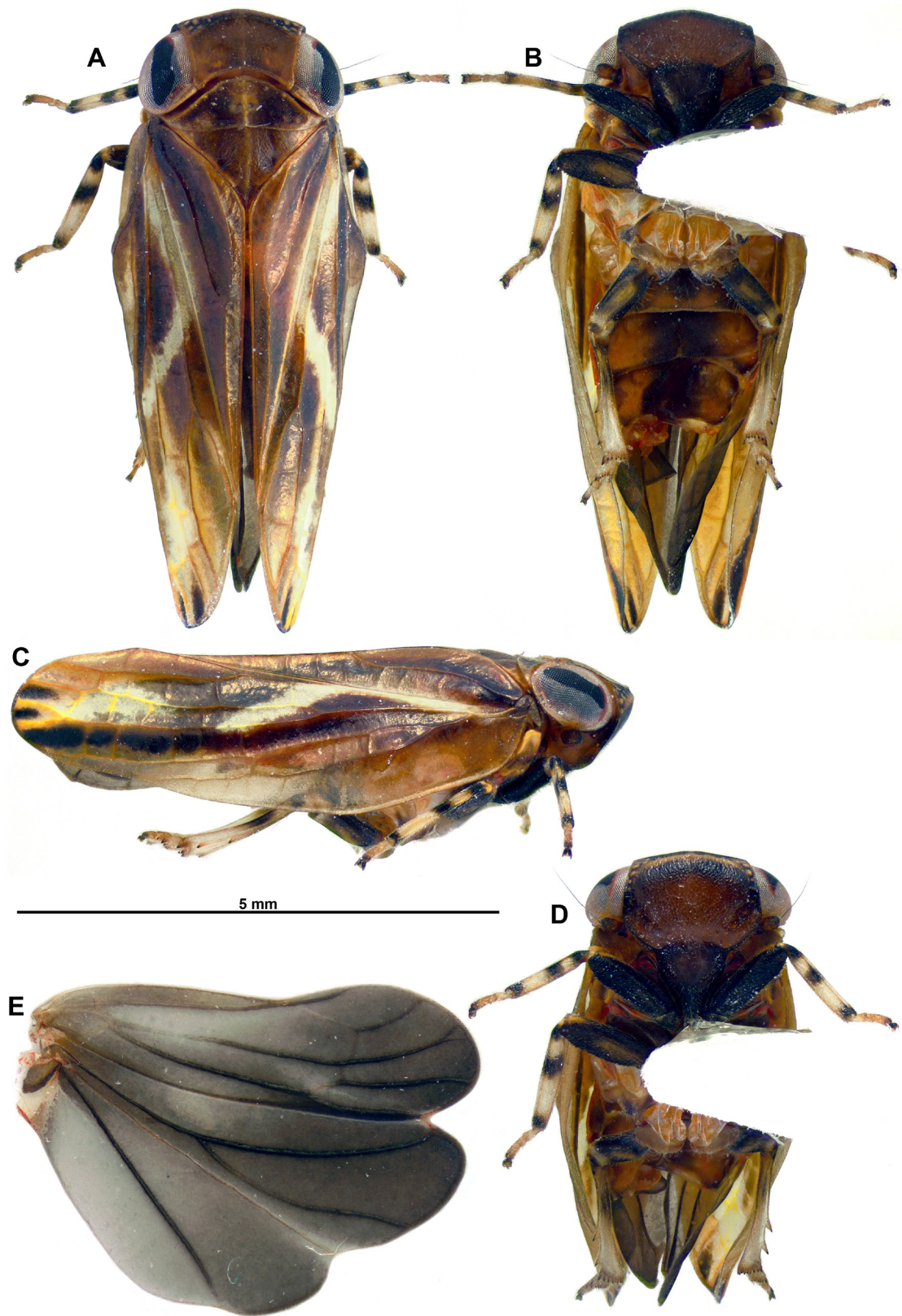
HEAD (Fig. 35A–D). Vertex flat, about 2.1 times as wide as long in midline, brown with margins weakly carinate; anterior margin convex, posterior one roundly concave and lateral weakly diverging anteriorly; obsolete paler median line. Side of head yellowish brown, darker in front of eye and along anteroventral margin; ocellus present under eye. Frons transverse, about 1.5 times as wide as long in midline, rugulose; brown with dorsal  $\frac{1}{3}$  blackish-brown and transverse pale yellowish, strongly contrasted band inside black-brown area, limited dorsally by weak peridiscal carina; pale yellowish tubercles between peridiscal carina and dorsal and lateral margins, in upper  $\frac{1}{3}$ ; median carina poorly distinct, restricted to upper  $\frac{1}{3}$ ; frontoclypeal suture incurved. Clypeus dark brown, darker towards apex, smooth. Labium brown with last segment longer than broad, and shorter than penultimate. Scape short, ring-shaped, dark brown; pedicel barrel-shaped, brown.

THORAX (Fig. 35A, C–D). Brown. Pronotum about  $\frac{2}{3}$  length of mesonotum, with weak, paler median carina with weakly impressed point on each side, and with rounded anterior margin carinate; disc more or less flat, weakly concave in anterior portion; some obsolete tubercles along anterior and undulate posterior margins; lateral fields of pronotum very narrow behind eyes; paranotal lobes weakly developed, rounded, pale brown (nearly translucent). Mesonotum triangular, slightly wrinkled with blunt median carina, distinct hump before scutellum and posterolateral margins carinate. Tegulae brown.

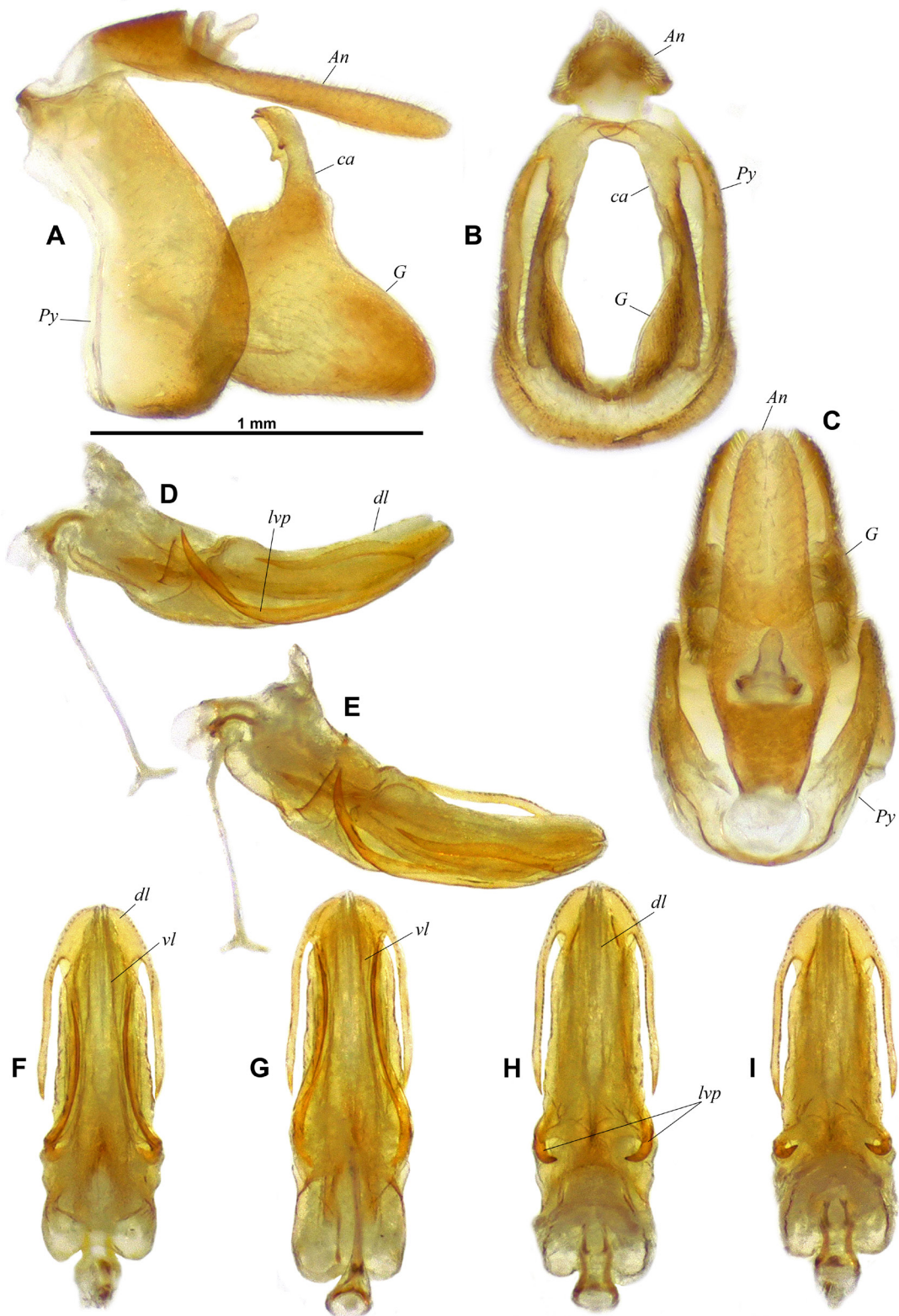
TEGMINA (Fig. 35A–C). Elongate, about 2.0 times as long as wide when taken together in dorsal view; brown with pale yellowish white band in cubital cell to half length, then obliquely reaching to vein  $MP_{1+2}$ , another elongate, yellowish white marking in distal  $\frac{1}{3}$  extending from median cell to posterior margin at veins  $MP_1$ - $MP_2$  (can be fused with white band); radial cell sometimes darker, cells in middle portion of apical margin blackish; strong lateral hump in basal  $\frac{1}{3}$  at level of ScP+R vein, hiding costal margin in dorsal view; longitudinal veins and most cross veins raised; hypocostal plate moderately developed and narrow; clavus very elongate, closed. Venation: ScP+R dividing rather close to base; ScP+RA long, reaching costal margin at about  $\frac{4}{5}$  of tegmen length; RP very long, weakly curved, reaching to apical margin of tegmen; MP vein triforked with first fork around basal  $\frac{1}{3}$ ;  $MP_{1+2}$  forked subapically,  $MP_3$  simple, reaching apical margin; CuA vein first fork at about  $\frac{2}{3}$  of tegmen; veins Pcu and A1 fused near midlength of clavus, Pcu+A1 reaching apex of clavus.

HIND WINGS (Fig. 35E). Black brown; veins generally black, darker than background; well developed, with 3 distinct lobes (Sarimini type) more or less equal in width; indentation between ScP-R-MP-Cu and Pcu-A1 lobes moderately deep. Venation: ScP+R and CuA furcate, MP simple, second branch of CuA





**Fig. 35.** *Pseudocoruncanius obliquus* sp. nov., dissected holotype, ♂ (RBINS). **A.** Habitus, dorsal view. **B.** Habitus, ventral view. **C.** Habitus, lateral view. **D.** Habitus, perpendicular view of frons. **E.** Right hind wing.



**Fig. 36.** *Pseudocoruncanius obliquus* sp. nov., holotype, ♂ (RBINS), terminalia. A–C. Pygofer, anal tube and gonostylus. A. Lateral view. B. Caudal view. C. Dorsal view. D–I. Aedeagus and connective. D. Left lateral view. E. Left dorsolateral view. F. Ventrocaudal view. G. Ventral view. H. Dorsal view. I. Anterodorsal view. Abbreviations: see Material and methods.

and CuP fused distally, Pcu and A1 fused on basal half, Pcu and A2 simple; one transverse vein between second branch of ScP+R and MP and between MP and first branch of CuA; A2 not forked.

LEGS (Fig. 35A–D). Slender and relatively short; femora black, meso- and metafemora with brown median marking, metafemora with apical yellowish white ring; pro- and mesotibiae yellowish white with three black rings, one basal, one apical and one slightly before midlength; metafemora yellowish white with basal black ring and black suffused area in basal half; apex of spines of metatibiae and metatarsi black. Metatibiae with 2 lateral spines on distal ½ and 9 apical spines; first metatarsus with row of 7 minute teeth along posteroventral margin, limited with a larger tooth on each side. Metatibiotarsal formula: (2) 9 / 9 / 2.

MALE TERMINALIA. Pygofer (*Py* – Fig. 36A–C) in lateral view about 2.25 times as high as long at maximum length (about ventral ⅓), curved, with anterior margin concave, upper margin straight, oblique and forming straight angle with posterior margin, and posterior margin rounded, more or less parallel to anterior one; about 1.4 times higher than wide in caudal view. Gonostyli (*G* – Fig. 36A–B) (in lateral view) subtriangular, 1.2 times as high as long (including capitulum); anterior margin vertical, abruptly emarginate at base of neck of capitulum; ventral margin weakly sinuate; posterior portion forming rather elongate lobe rounded apically; posterodorsal margin obliquely sinuate, with distinct hump at base of neck of capitulum; capitulum (*ca*) rather narrow in lateral view, with elongate neck, a tooth in middle of anterior margin and one at anteroapical angle, dorsal portion curved anteromesad. Aedeagus (Fig. 36D–I) symmetrical, elongate and weakly curved dorsad (in lateral view); pair of slender, very elongate lateroventral processes (*lvp*) directed ventrocephalad in basal 3/5, then curved cephalodorsad, with apical portion curved mesad, apically pointed and visible from dorsal view; dorsal lobe of perianthrium (*dl*) evenly curved in lateral view, without hump, lateral margins recurved dorsad in distal portion, generating a long undulate ribbon-like process directed cephalad and with minute teeth on dorsal margin; ventral lobe (*vl*) dorsoventrally flattened, shorter than dorsal lobe, narrow and rounded apically. Anal tube (*An* – Fig. 36A–C) nearly straight in lateral view, abruptly narrowing at basal ¼ at level of anal opening, strongly elongate, about 2.9 times as long in midline, as wide in dorsal view, widest near anal opening, convex dorsally in cross-section and with apical margin narrowly rounded.

### Biology

*Paracoruncanius obliquus* sp. nov. was collected in August, on lower vegetation and bushes, in moist evergreen tropical forest at about 550 m in altitude (Fig. 1B) in Dong Son-Ky Thuong Nature Reserve.

### Distribution

Vietnam: Quang Ninh Province, Dong Son-Ky Thuong Nature Reserve (Fig. 1A).

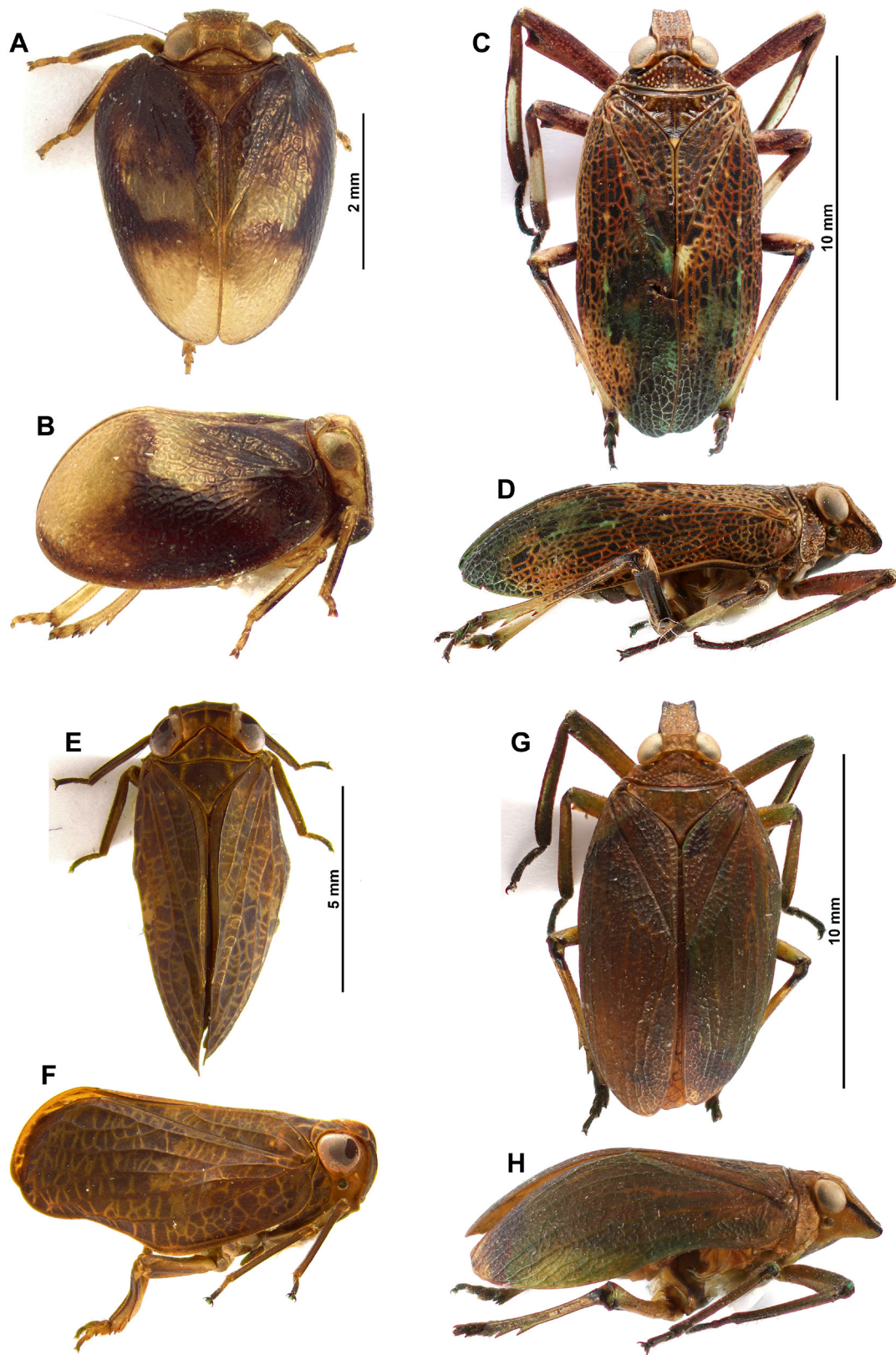
### *Additional unidentified species from Dong Son-Ky Thuong Nature Reserve*

Four additional species were found in Dong Son-Ky Thuong Nature Reserve on 27 August 2022, each represented by a single female, that could not be reliably identified to species.

One belongs to the genus *Clypeosmilus* Gnezdilov & Soulier-Perkins, 2017 (Fig. 37A–B) in the Hemisphaeriini, Mongolianina, described from Vietnam (Gnezdilov & Soulier-Perkins 2017).

Two belong to the genus *Fortunia* Distant, 1909 (Fig. 37C–D, G–H) in the Parahiraciini, Parahiraciina, a genus known from China, Taiwan, Thailand and Vietnam (Bourgoin 2023).

The last one is in the genus *Kodaiianellissus* Wang, Bourgoin & Zhang, 2017 (Fig. 37E–F) in the Kodaiianellini. The latter represents the first record of this genus in Vietnam, which was described from China (Wang *et al.* 2017) and contains a second species from Pakistan (Sohail *et al.* 2020).



**Fig. 37.** A–B. *Clypeosmilus* sp. (RBINS). A. Dorsal view. B. Lateral view. C–D. *Fortunia* sp. 1. (RBINS). C. Dorsal view. D. Lateral view. E–F. *Kodaiannelissus* sp. (RBINS). E. Dorsal view. F. Lateral view. G–H. *Fortunia* sp. 2. (RBINS). G. Dorsal view. H. Lateral view.

**Checklist of the species of Issidae of Dong Son-Ky Thuong Nature Reserve**

Hemisphaeriini

Hemisphaeriina

*Gergithoides olivaceus* sp. nov.

*Hemisphaerius bresseeli* sp. nov.

*Neogergithoides scapularis* sp. nov.

*Maculergithus luteomaculatus* (Constant & Pham, 2016)

*Melichergithus gravidus* (Melichar, 1906) gen. et comb. nov.

Mongolianina

*Clypeosmilus* sp.

*Mongoliana vietnamica* sp. nov.

Kodaiianellini

*Kodaiianella mua* sp. nov.

*Kodaiianellissus* sp.

Parahiraciini

Parahiraciina

*Fortunia* sp. 1

*Fortunia* sp. 2

*Pusulissus quangninhensis* sp. nov.

*Rostrolatum curviceps* sp. nov.

Sarimini

*Longieusarima lunulia* Wang, Bourgoïn & Zhang, 2017

*Parallelissus fuscus* Meng, Qin & Wang, 2020

*Pseudocoruncanius obliquus* sp. nov.

**Discussion**

**Checklist of the Vietnamese Issidae**

In alphabetical order, tribe given in parentheses and list of province records; doubtful records are marked with an asterisk and discussed.

*Bardunia curvinaso* Gnezdilov, 2011 (Parahiraciini): Hoa Binh Province (Gnezdilov 2011: 229).

*Bolbosphaerius belokobylskiji* Gnezdilov, 2013 (Hemisphaeriini): Hoa Binh Province (Gnezdilov 2013b: 661).

*Brevicopius gorochovi* Gnezdilov, 2017 (Parahiraciini): Gia Lai Province (Gnezdilov 2017a: 435).

*Brevicopius jianfenglingensis* (Chen, Zhang & Chang, 2014) (Parahiraciini): Dak Lak and Lam Dong provinces (Gnezdilov 2017a: 438).

*Clypeosmilus centrodasus* Gnezdilov & Soulier-Perkins, 2017 (Hemisphaeriini): Ninh Binh, Hoa Binh and Hai Phong provinces (Gnezdilov & Soulier-Perkins 2017: 27).

*Dactylissus armillarius* Gnezdilov & Soulier-Perkins, 2014 (Sarimini): Khanh Hoa Province (Gnezdilov *et al.* 2014: 88).

*Darwallia barbata* Gnezdilov & Bourgoïn, 2014 (Sarimini): Khanh Hoa Province (Gnezdilov *et al.* 2014: 82).

*Euxaldar jehucal* Fennah, 1978 (Hemisphaeriini): Ninh Binh, Hanoi, Hai Phong, Hoa Binh and Vinh Phuc provinces (Fennah 1978: 269; Gnezdilov & Constant 2012: 572; Gnezdilov *et al.* 2017: 16).

- Euxaldar lenis* Gnezdilov, Bourgoïn & Wang, 2017 (Hemisphaeriini): Lam Dong Province (Gnezdilov *et al.* 2017: 19).
- Flavina acuta* Ran & Liang, 2006 (Parahiraciini): Lam Dong Province (Ran & Liang 2006: 390).
- Fortunia byrrhoides* (Walker, 1858)\* (Parahiraciini): Ninh Binh Province (Fennah 1978: 271).
- Fortunia viridis* (Lallemand, 1942) (Parahiraciini): Hoa Binh and Hanoi provinces (Lallemand 1942: 77; Gnezdilov *et al.* 2004: 221).
- Gelastystrella litaoensis* Yang, 1994 (Parahiraciini): Hoa Binh Province (Gnezdilov *et al.* 2014: 93).
- Gergithoides gnezdilovi* Constant & Pham, 2017 (Hemisphaeriini): Lam Dong Province (Constant & Pham 2017: 5).
- Gergithoides nui* Constant & Pham, 2017 (Hemisphaeriini): Cao Bang Province (Constant & Pham 2017: 7).
- Gergithoides olivaceus* sp. nov. (Hemisphaeriini): Quang Ninh Province (present study).
- Hemisphaerius bresseeli* sp. nov. (Hemisphaeriini): Quang Ninh, Vinh Phuc, Hoa Binh provinces (present study).
- Hemisphaerius cattienensis* Constant & Pham, 2011 (Hemisphaeriini): Dong Nai Province (Constant & Pham 2011: 110).
- Hemisphaerius hippocrepi* Constant & Pham, 2011 (Hemisphaeriini): Dong Nai Province (Constant & Pham 2011: 112; Gnezdilov 2013b: 661).
- Hemisphaerius interclusus* Noualhier, 1896 (Hemisphaeriini): Dong Nai Province, Ho Chi Minh City (Gnezdilov 2013b: 663; Constant & Jiranaisakul 2020: 12).
- Hemisphaerius lygaeus* Melichar, 1906\* (Hemisphaeriini): Hoa Binh Province (Lallemand 1942: 76).
- Hemisphaerius lysanias* Fennah, 1978 (Hemisphaeriini): Nghe An Province (Fennah 1978: 265).
- Hemisphaerius palaemon* Fennah, 1978 (Hemisphaeriini): Hanoi and Ninh Binh provinces (Fennah 1978: 264).
- Ishiharanus iguchii* (Matsumura, 1916) (Hemisphaeriini): Hoa Binh Province (Meng *et al.* 2017: 18; Gnezdilov 2017b: 1343).
- Kodaiannela mua* sp. nov. (Kadaiannelini): Quang Ninh Province (present study).
- Laohiracia acuta* Constant, 2021 (Parahiraciini): Thanh Hoa Province (Constant & Pham 2023: 116).
- Longieusarima lunulia* Wang, Bourgoïn & Zhang, 2017 (Sarimini): Quang Ninh Province (present study).
- Macrodaruma brevinaso* Constant & Pham, 2014 (Hemisphaeriini): Vinh Phuc Province (Constant & Pham 2014: 4).
- Macrodaruma pertinax* Fennah, 1978 (Hemisphaeriini): Vinh Phuc and Hoa Binh provinces (Fennah 1978: 267; Gnezdilov & Constant 2012: 573; Constant & Pham 2014: 6).
- Maculergithus luteomaculatus* (Constant & Pham, 2016) (Hemisphaeriini): Vinh Phuc and Quang Ninh provinces (Constant & Pham 2016: 6; present study).
- Maculergithus tamdao* (Constant & Pham, 2016) (Hemisphaeriini): Vinh Phuc Province (Constant & Pham 2016: 11).

- Melichergithus gravidus* (Melichar, 1906) gen. et comb. nov. (Hemisphaeriini): Lang Son, Hanoi, Ha Tinh, Hoa Binh, Ninh Binh, Phu Tho, Quang Ninh, Thai Nguyen, Thanh Hoa and Vinh Phuc provinces (Melichar 1906: 61; Fennah 1978: 265; present study).
- Mongoliana signifer* (Walker, 1851)\* (Hemisphaeriini): Hoa Binh Province (Fennah 1978: 263).
- Mongoliana vietnamica* sp. nov. (Hemisphaeriini): Quang Ninh Province (present study).
- Neoergithoides baviana* Constant & Pham, 2015 (Hemisphaeriini): Hanoi Province (Constant & Pham 2015: 5).
- Neoergithoides grootaerti* Constant & Pham 2015 (Hemisphaeriini): Cao Bang Province (Constant & Pham 2015: 10).
- Neoergithoides scapularis* sp. nov. (Hemisphaeriini): Quang Ninh Province (present study).
- Parallelissus fuscus* Meng, Qin & Wang, 2020 (Sarimini): Quang Ninh Province (present study).
- Pseudochoutagus rubens* Gnezdilov & Constant, 2012 (Parahiraciini): Vinh Phuc Province (Gnezdilov & Constant 2012: 572).
- Pseudocoruncanius nigrifrons* Gnezdilov, 2022 (Sarimini): Vinh Phuc Province (Gnezdilov 2022c: 310).
- Pseudocoruncanius obliquus* sp. nov. (Sarimini): Quang Ninh Province (present study).
- Pumatiracia venosa* Constant & Pham, 2023 (Parahiraciini): Nghe An Province (Constant & Pham 2023: 109).
- Pusulissus phiaoacensis* Bourgoïn & Wang, 2020 (Parahiraciini): Cao Bang Province (Bourgoïn & Wang 2020: 76).
- Pusulissus quangninhensis* sp. nov. (Parahiraciini): Quang Ninh Province (present study).
- Rostrolatium curviceps* sp. nov. (Parahiraciini): Quang Ninh Province (present study).
- Sarima illibata* Melichar, 1903\* (Sarimini): Quang Binh Province (Pham & Ta 2009: 246).
- Superciliaris anichkini* Gnezdilov, 2022 (Hemisphaeriini): Lam Dong Province (Gnezdilov 2022b: 82).
- Tetricissus philo* (Fennah, 1978) (Kodaiianellini): Ninh Binh and Hoa Binh provinces (Fennah 1978: 271; Gnezdilov *et al.* 2014: 88).
- Tetricodes pacoensis* Vanslebrouck & Constant, 2018 (Parahiraciini): Hoa Binh Province (Vanslebrouck & Constant 2018: 5).
- Tetricodes tamdaoensis* Vanslebrouck & Constant, 2018 (Parahiraciini): Vinh Phuc Province (Vanslebrouck & Constant 2018: 9).
- Thabena frontocolorata* Gnezdilov, 2015 (Parahiraciini): Lam Dong Province (Gnezdilov 2015b: 333).

## Notes

Critical scrutiny of this list allowed the detection of the following issues that need to be addressed in the future:

- (1) for the five following species described from Vietnam, the male terminalia still need to be described and illustrated in order to ensure accurate identification of additional material:  
*Brevicopius gorochovi* (described from a single female – Gnezdilov 2017a);  
*Darwallia barbata* (described from a single female – Gnezdilov *et al.* 2014);  
*Fortunia viridis* (sex of type specimens not known – Lallemand 1942);  
*Pseudochoutagus rubens* (described from a single female – Gnezdilov & Constant 2012);  
*Thabena frontocolorata* (described from a single female – Gnezdilov 2015b).

- (2) the records by Fennah (1978) of *Fortunia byrrhoides* and *Mongoliana signifer*, both originally described from China (Walker 1851, 1858), were based on female specimens and need to be confirmed from males identified on terminalia characters.
- (3) *Hemisphaerius lygaeus* was described from Mentawai Islands off Sumatra (Melichar 1906) and it is very unlikely that this species is also present in Northern Vietnam as stated by Lallemand (1942); this record needs to be verified based on type material of *H. lygaeus* and the corresponding specimens from Vietnam.
- (4) *Sarima illibata* was described from Sri Lanka (Melichar 1903) and the record from Vietnam by Pham & Ta (2009) is probably due to a misidentification based on the illustration of the species by Melichar (1906); this record needs to be verified based on the study of the terminalia characters of *S. illibata* type material and the corresponding specimens from Vietnam.
- (5) *Vishnuloka deserta* (Melichar, 1906), a species of Sarimini described from Sumatra in Indonesia (Melichar 1906; Gnezdilov 2012), was included in a list by Lallemand (1942) in a paper treating together material from North Vietnam as well as from China. As the species identification was regarded as dubious by Gnezdilov (2012) and Constant & Bartlett (2019), and as Lallemand (1942) failed to provide any collection data, the species is not included in the list of Issidae from Vietnam.

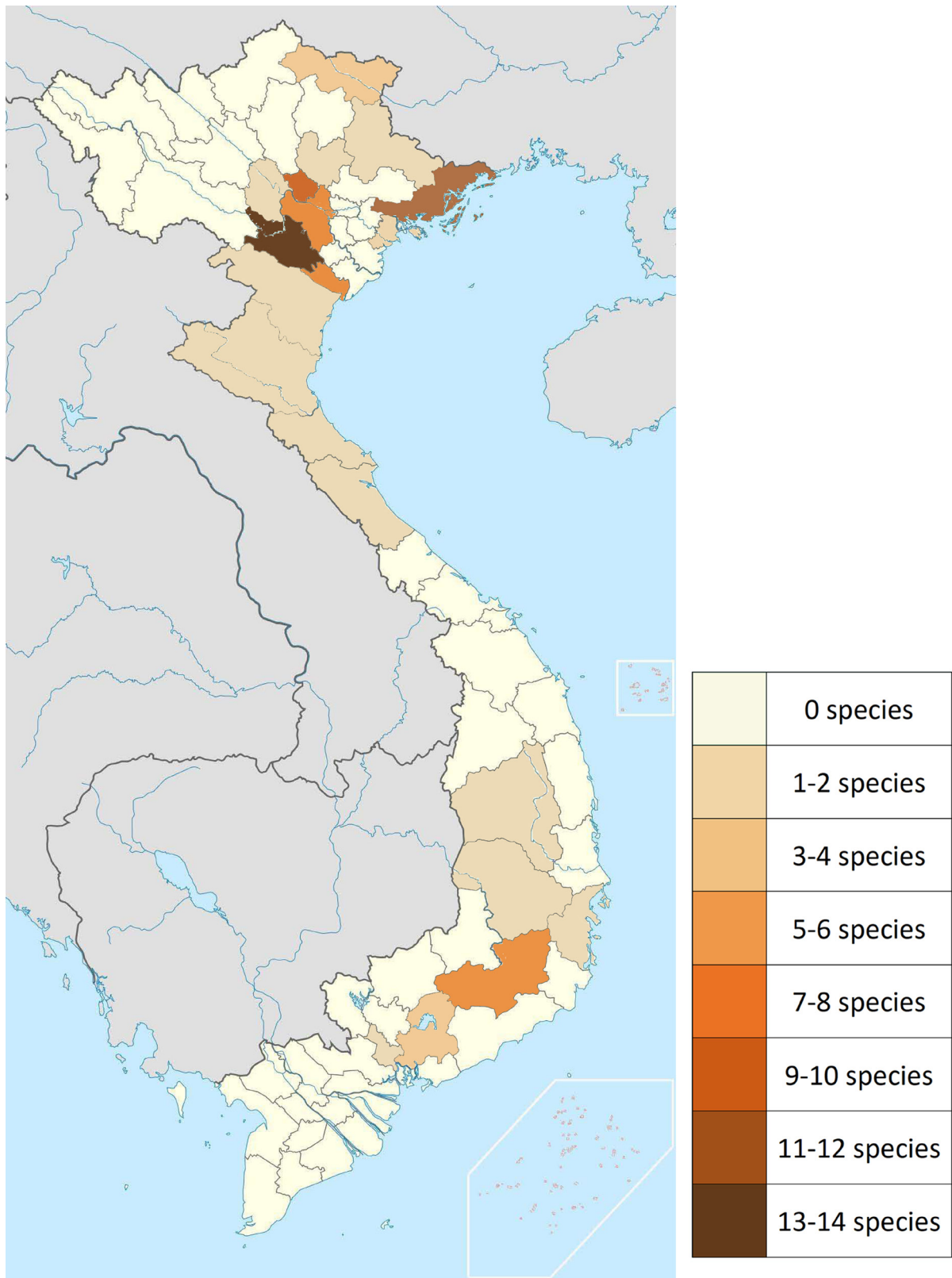
### Issidae diversity in Vietnam

The present study adds ten species to the fauna of Vietnam, which represents a nearly 25% increase in the number of species recorded from the country. We also provide new records for two species, and four additional ones could only be identified to genus level. As a result, twelve species (identified to species level) are currently recorded from Quang Ninh Province, making it the second most diverse province in terms of issid species, although all the material studied was collected on a single day at a single location, Dong Son-Ky Thuong Nature Reserve.

The map of the number of species records per province (Fig. 38) shows that North Vietnam is by far the best documented part of the country, containing the three provinces with ten or more species. In Central Vietnam, only one province in the Central Highlands, Lam Dong, reaches six species records, three of them from Bidoup-Nui Ba National Park. In the North, fourteen species are recorded from Hoa Binh Province, including seven species thanks to the collections by a Belgian missionary and coleopterologist specialised in Histeridae Albert de Cooman (1880–1967), who spent 39 years in the Vietnamese jungle (Gomy 1987) and six from collections by the Russian hymenopterologist, Sergei A. Belokobylskij. Vinh Phuc Province counts ten species, mostly from the entomologically popular Tam Dao National Park not far from Hanoi.

At country level, issid records are available only from 20 out of 63 provinces (less than one third), including eight provinces with a single species documented. The level of endemism reaches nearly 70% but is difficult to estimate accurately due to the fauna of Laos and Cambodia remaining nearly unknown; on the other hand, the fauna of North Vietnam is clearly related to that of Southern China and Hainan (Gnezdilov & Constant 2012; Sun *et al.* 2012; Constant & Pham 2015; Zhang *et al.* 2020; Gnezdilov 2022b, 2022c) and this is confirmed by the five genera newly recorded from Vietnam (originally described from China) in this study: *Kodaiannela*, *Rostrolatum*, *Longieusarima*, *Parallelissus* and *Kodaianelissus*. The recent progress in the documentation of the Vietnamese Issidae fauna was quite spectacular, with more than 70% of the recorded species having been described in the last 20 years. However, from rough extrapolation from above data (81% of provinces with no or a single species record), considering the expected higher endemism rate in mountainous areas, and from material still unidentified/undescribed in the collections (Constant & Pham, unpubl. data), it seems reasonable to estimate that current numbers don't exceed 15% of the actual diversity.





**Fig. 38.** Map of the number of species of Issidae Spinola, 1839 recorded per province in Vietnam.

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