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Research article

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First report of little-known cylapine genera *Mimofulvius* Schmitz and *Rhinophrus* Hsiao (Insecta: Hemiptera: Heteroptera: Miridae) from Thailand, with description of a new species

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Abstract. Two little-known genera, *Mimofulvius* Schmitz, 1978 and *Rhinophrus* Hsiao, 1944, are reported from Thailand for the first time. A new species of *Mimofulvius*, *M. castaneus* sp. nov., is described, and the male of the type species of the genus, *M. pentatomus* Schmitz, 1978, is documented for the first time. A key to species of *Mimofulvius* is given. Habitus images of the adult of all treated species and illustrations of the male genitalic structures of *M. castaneus* and *M. pentatomus* are also provided. The female genitalia of *Rhinophrus borneensis* Hsiao, 1944 are documented for the first time. Scanning electron micrographs of selected structures of *M. castaneus*, *M. pentatomus*, and *Rhinophrus borneensis* are provided. The systematic position is also discussed for *Mimofulvius* and *Rhinophrus*.

Keywords. Taxonomy, Cylapinae, plant bugs, new species, SEM documentation.

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Introduction

Mimofulvius was established by Schmitz (1978) to accommodate a single species *M. pentatomus*, described in the same paper from India. Subsequently, Yeshwanth *et al*. (2016) provided diagnosis of the genus and redescription of *M. pentatomus* based on the female specimen collected in India. Until now, this genus remained monotypic and was known only from the female. Herein, we present first report of the genus from Thailand with a new species – *M. castaneus* sp. nov. Male characteristics of the genus *Mimofulvius* and *M. pentatomus* are documented for the first time.

Rhinophrus was described by Hsiao (1944) to accommodate a single species *R. borneensis* from Malaysian Borneo. Subsequently, Gorczyca (1996) added a new species *R. hsiaoi*, also from Borneo. In this paper,

R. borneensis is reported from Thailand for the first time, and habitus images, SEM micrographs of the selected structures, and descriptions and illustrations of the female genitalia are provided.

Material and methods

Observations were made using an Olympus SZX12 stereo microscope and an Olympus BX50 optical microscope. Dorsal habitus images were taken using Canon EOS 200 D and Canon EOS 750 D digital cameras and concatenated with Helicon Focus software (http://www.heliconsoft.com/heliconsoft-products/helicon-focus/). Scanning electron micrographs were taken, using Hitachi S-3400N, Hitachi Miniscope® TM3030 and Phenom XL Measurements were taken using an eyepiece (ocular) micrometer; all measurements are given in millimeters but some of those on SEM images are in micrometers (μm). The genitalia were kept in 10% KOH solution before dissection. The female genitalia were stained with chlorazol-black.

The terminology of male genitalic structures follows, when applicable, Kerzhner & Konstantinov (1999), Konstantinov (2003) and Cassis (2008). The terminology of the female genitalia follows Davis (1955) and Taszakowski *et al.* (2022a).

The study was based on the materi al deposited in the following institutions or personal collection:

BMNH = Natural History Museum, London, UK
DOAT = Insect Collection, Entomology & Zoology Group, Plant Protection Research and Development Office, Department of Agriculture, Bangkok, Thailand
GKVK = College of Agriculture, Bangalore, India
NMTU = Natural History Museum, Tribhuvan University, Kathmandu, Nepal
TYCN = T. Yasunaga Collection, Nagasaki, Japan
USNM = Systematic Entomology Laboratory [SEL], ARS, USDA, c/o National Museum of Natural History, Smithsonian Institution, Washington, D.C., USA

Results

Taxonomy

Class Insecta Linnaeus, 1758
Order Hemiptera Linnaeus, 1758
Suborder Heteroptera Latreille, 1810
Family Miridae Hahn, 1831
Subfamily Cylapinae Kirkaldy, 1903
Tribe Fulviini Uhler, 1886

Genus ***Mimofulvius*** Schmitz, 1978

Mimofulvius Schmitz, 1978: 185.

Mimofulvius – Schuh 1995: 31 (catalog); 2002–2013 (online catalog). — Gorczyca 2000: 9 (list); 2006: 53 (catalog). — Yeshwanth *et al*. (2016): 315 (diagnosis).

Type species

Mimofulvius pentatomus Schmitz, 1978 (original designation).

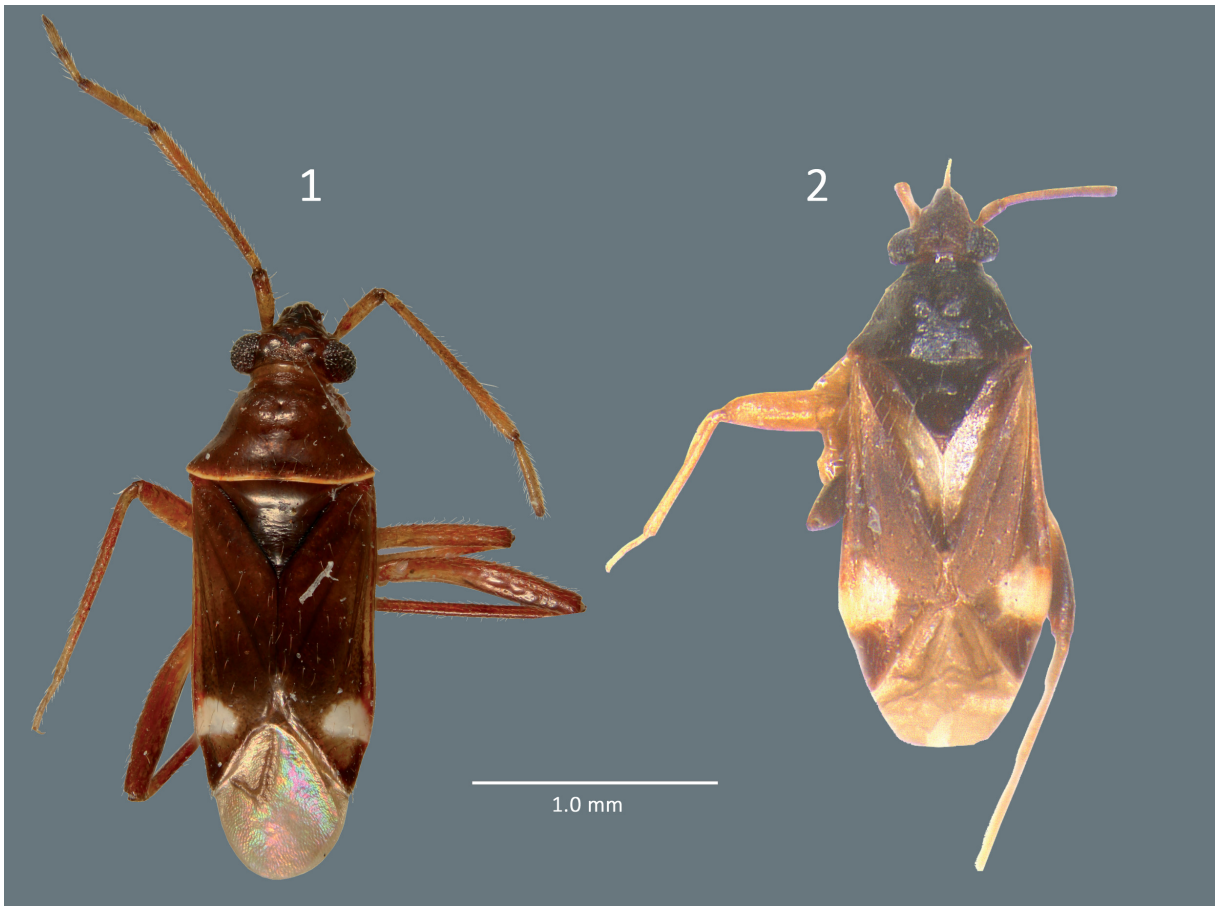
Diagnosis

In addition to the characters presented by Schmitz (1978) and Yeshwanth *et al*. (2016) for defining *Mimofulvius*, this genus can be distinguished from other cylapine genera by having the rudimentary stridulatory device (exocorium edge-hind femur, cf. Figs 8, 12–13) and the endosoma with lobal sclerites (Figs 4, 33).

Redescription

Macropterous; body elongate to elongate-oval (Figs 1–2, 6, 14–16, 24–27). Dorsum shiny, covered with sparse or dense, simple setae (Figs 6–9).

Head. Subhorizontal (Figs 1–2, 6–7, 14–16, 18, 24–27), rugose, covered with long, dense, semirecumbent setae (Figs 1–2, 6–7, 18); clypeal base situated above ventral margin of eye (Fig. 18); mandibular plate without sulcus posteriorly (Fig. 18); antennal insertion contiguous with sulcus between maxillary and mandibular plates (Figs 7, 18); eyes contiguous with pronotal collar, relatively large, reniform in lateral view (Figs 7, 18); antenna short, about ⅔ times as long as total body length; antennal segment I short, weakly surpassing apex of clypeus, cylindrical, weakly narrowed basally, covered with sparse, thick, erect and semirecumbent setae; segment II weakly broadened toward apex, covered with dense, erect and semirecumbent setae; segments III and IV as thick as segment II, covered with setae similar to those present on segment II; segment IV subdivided medially, forming pseudo-5-segmented (Figs 1, 6, 14–17, 25, 27); labial segment I subdivided medially; segment II subdivided subapically (Fig. 7).



Figs 1–2. Dorsal habitus photographs of species of *Mimofulvius* Schmitz, 1978. **1**. *Mimofulvius castaneus* sp. nov., paratype, ♂ (TYCN). **2**. *M. pentatomus* Schmitz, 1978, holotype, ♀ (BMNH).

Thorax. *Pronotum*. Pronotal collar relatively broad, approximately as wide as antennal segment II diameter; pronotal calli from narrow, restricted to medial part of anterior part of pronotum to broad, reaching pronotal lateral margins (Figs 1–2, 6, 14–16); dorsal surface of pronotum shiny, covered with sparse, semirecumbent setae (Figs 6, 18). *Mesoscutum and scutellum*. Covered with sparse, erect or semirecumbent setae; scutellum flat (Figs 1–2). *Thoracic pleura*. Covered with sparse, short, semirecumbent setae (Figs 7, 9, 18–19); metathoracic scent efferent system with narrow evaporative area and ovoid auricula, occupying ventral and posterior margins; peritreme flat, relatively broad (Figs 9, 19). *Hemelytron*. Shiny, covered with sparse or dense, simple setae (Figs 1–2, 7–8); exocorium with notched edge that may represent stridulitrum, or stridulatory device (Figs 8, 20). *Legs*. Short; covered with sort, semirecumbent and recumbent setae (Figs 1–2, 24–27); metafemur with short carina, probably plectrum of stridulatory mechanism (Figs 12–13, 21); pretarsal claw with tiny, subapical tooth (Fig. 10).

Abdomen. Covered with dense, reclining and semirecumbent setae (Fig. 7).

Male genitalia. Genital capsule with dorsal wall long, weakly shorter than ventral wall, genital opening is terminal in orientation (Figs 7, 11, 28). Left and right paramere curved; paramere body covered with relatively dense setae dorsally (Figs 3, 5, 29–32). *Left paramere*. Apical process elongated, inner surface with small swelling basally (Figs 3, 29–30). *Aedeagus*. Seminal duct long and thin, sclerotized part of seminal duct expanded; endosoma membranous, with two long lobal-sclerites and with ovoid, large, membranous lobe basally embraced by expanded sclerotized part of seminal duct (Figs 4, 33).

Female genitalia. As described and depicted by Yeshwanth *et al*. (2016: fig. 30).

Remarks

The present study adds the possession of a (presumed) stridulatory device (a set of a notched margin of the forewing and a metafemoral plectrum or keel) to the diagnostic characters for *Mimofulvius* (Figs 8, 13, 20–21). As stated by Yasunaga *et al*. (2019) and Tamada *et al*. (2020), many epigeic plant bug species of the tribe Hallodapini Van Duzee, 1916 (Phylinae) have a similar stridulatory mechanism which is used for intraspecific communication. However, the actual function of the *Mimofulvius* stridulatory device requires further verification.

Key to known species of *Mimofulvius*

1. Pronotum castaneous; posterior stripe on pronotum well developed; clavus concolorous; metafemoral plectrum composed of 3-rows of narrow keels; from Thailand (Figs 1, 13, 16, 26–27) .... ***Mimofulvius castaneus*** sp. nov.
– Pronotum black; posterior stripe of pronotum weakly developed; clavus with large, whitish patch medially; metafemoral plectrum with a single keel; known from India and Nepal (Figs 2, 15, 21, 24–25) ..... ***Mimofulvius pentatomus*** Schmitz, 1978

Mimofulvius castaneus sp. nov.
urn:lsid:zoobank.org:act:1C3604E4-0AC4-42D9-B521-50EA19F2A5A5
Figs 1, 3–13, 16–17, 26–27, 50; Table 1

Diagnosis

Currently known only by male specimens. Recognized by its shiny castaneous body; pronotum with narrow, distinct, yellow stipe along posterior margin (Figs 1, 16, 26–27); male genitalia as described below (Figs 3–5). These characters enables this species to be readily distinguished from the other congener, *M. pentatomus* (see below).

Etymology

From Latin, '*castaneus*' ('castaneous brown'), referring to the basic body coloration of this new species.

Type material

Holotype

THAILAND • ♂; Nakhon Ratchasima, Wang Nam Khiao, Sakaerat Environmental Research Station (SERS); 14°30′27″ N, 101°55′39″ E; 410 m alt.; 17 Mar. 2010; T. Yasunaga leg.; UV (mercury) light trap; DOAT, AMNH_PBI 00380662.

Paratypes

THAILAND • 1 ♂; same data as for holotype; 18 Mar. 2010; T. Yasunaga leg.; UV light trap; TYCN • 1 ♂; same data as for holotype; 15 Sep. 2008; T. Yasunaga leg.; UV light trap; TYCN • 1 ♂; same data as for holotype; 12–14 Jun. 2009; Yasunaga and Yamada leg.; UV light trap; TYCN.

Description

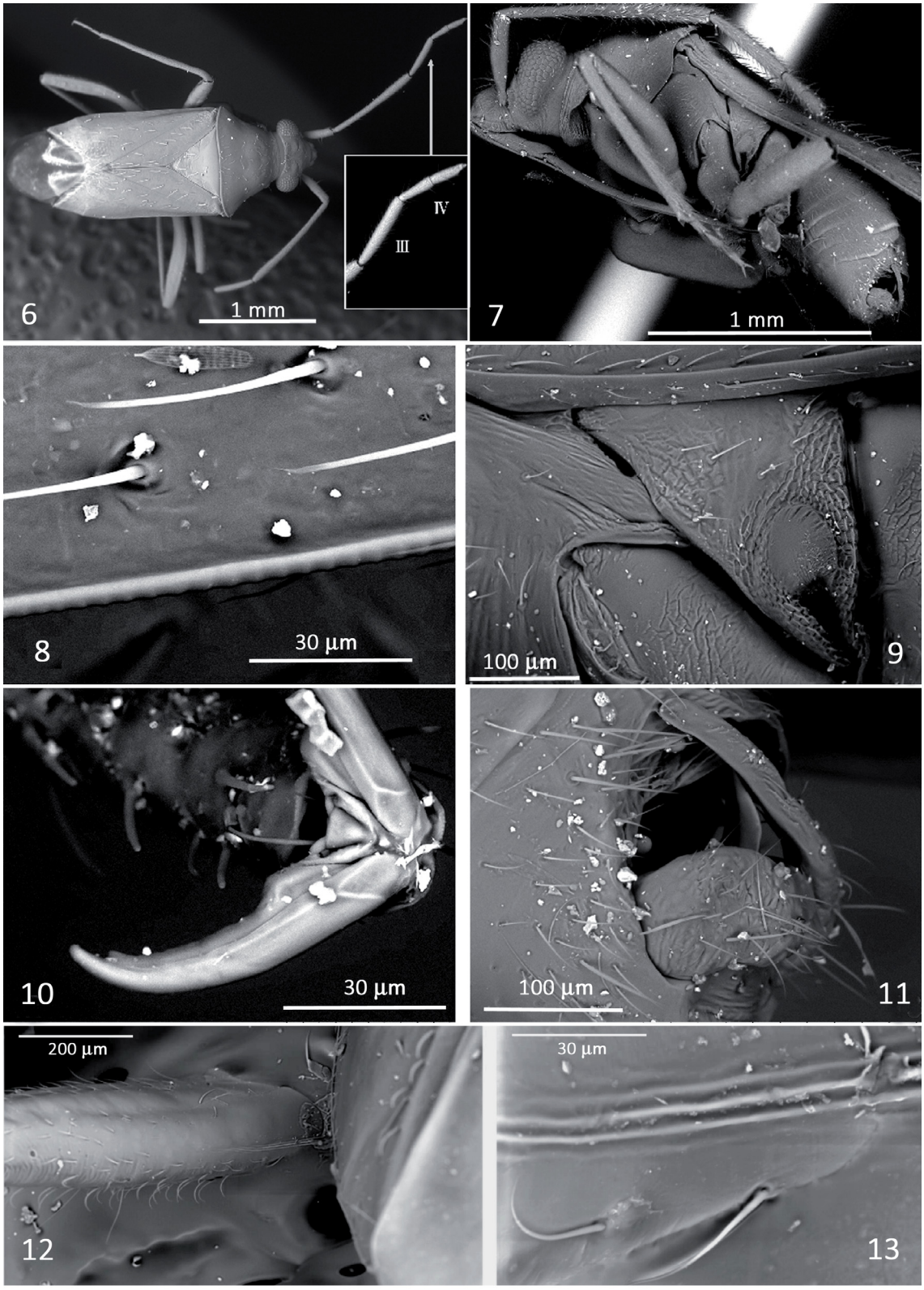
Male

Coloration. Dorsum castaneous with yellow areas (Figs 1, 16, 26–27).

Head. Castaneous broadly tinged with dark brown on vertex, frons, and clypeus (Figs 1, 16–17, 26–27); antenna dark yellowish brown with dark brown, narrow annulations on apices of all segments and apex of basal half of subdivided segment IV (Figs 1, 16–17, 26–27); labium yellowish brown (Fig. 17).

Thorax. *Pronotum*. Castaneous with distinct, narrow, yellow stipe along posterior margin (Figs 1, 16, 26–27). *Mesoscutum and scutellum*. Dark castaneous (Figs 1, 16, 26–27). *Thoracic pleura*. Proepimeron and proepisternum castaneous; remaining pleura dark yellowish brown; metathoracic scent gland evaporative areas and peritreme contrastingly yellow (Fig. 17). *Hemelytron*. Castaneous, with large

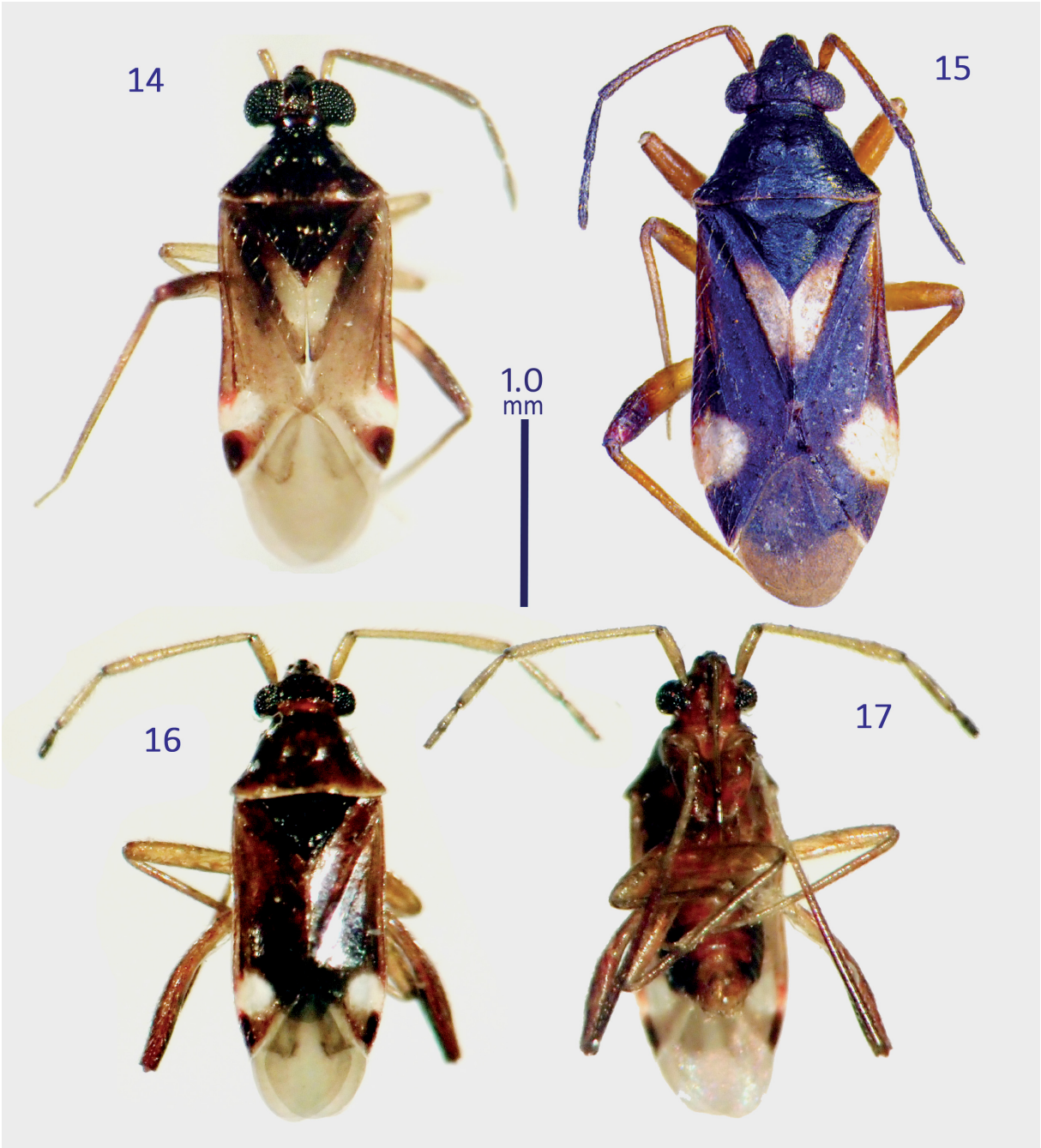
Figs 3–5. Male genitalia of *Mimofulvius castaneus* sp. nov., paratype (TYCN). **3**. Left paramere (right lateral view). **4**. Endosoma (dorsal view). **5**. Right paramere (left lateral view). Abbreviations: ls = left sclerite; rs = right sclerite.



Figs 6–13. Scanning electron micrographs of *Mimofulvius castaneus* sp. nov., paratype, ♂ (TYCN). **6**. Dorsal habitus (with two apical antennomeres). **7**. Left lateral habitus. **8**. Margin of hemelytron (exocorium). **9**. Thoracic pleura with scent efferent system. **10**. Pretarsal structure of hind leg. **11**. Apical part of pygophore (left lateral view). **12–13**. Keels (plectrum) on metafemur.

pale-yellow patch above cuneus (Figs 1, 16, 26–27). *Legs*. Procoxa castaneous; meso- and metacoxae yellow; remaining segments dark yellowish brown (Figs 1, 16–17, 26–27).

Abdomen. Dark castaneous (Fig. 17).



Figs 14–17. Habitus photographs of species of *Mimofulvius* Schmitz, 1978. **14**. *M. pentatomus* Schmitz, 1978 (dorsal view), ♂ (NMTU). **15**. Same, ♀ (GKVK, Bangalore, India, after Yeshwanth *et al*. 2016). **16**. *Mimofulvius castaneus* sp. nov. (♂) (TYCN), dorsal view. **17**. Same, ventral view.

Table 1. Fourteen measurements for two species of *Mimofulvius* Schmitz, 1978.

	Body		**Head**		**Vertex**	**Pronotum**	
	length	width	width	length	width	width	length
***M. castaneus* holotype, ♂**	**3,19**	**1,10**	**0,71**	**0,60**	**0,30**	**1,02**	**0,47**
M. castaneus paratype, ♂	2,84	0,96	0,62	0,57	0,32	0,95	0,60
M. pentatomus ♂	2,94	0,99	0,62	0,53	0,38	0,93	0,57
	Antennomere length				**Labium length**	**Metaleg length**	
	I	II	III	IV		Femur	Tibia
***M. castaneus* holotype, ♂**	**0,24**	**1,01**	**0,35**	**0,38**	**1,55**	**0,93**	**1,50**
M. castaneus paratype, ♂	0,35	0,95	0,42	0,33	1,44	1,11	1,62
M. pentatomus ♂	0,34	0,92	0,44	0,32	1,59	1,07	1,58

Structure, texture, and vestiture. Body 2.8–3.1 times as long as wide, 3.1 times as long as posterior width of pronotum. Dorsum shiny, covered with sparse, erect and semirecumbent setae (Figs 1, 6–8). *Thorax*. As in generic description. *Hemelytron*. Exocorial edge as in Fig. 8. *Legs*. Relatively long; metafemur with three narrow keels that are considered as plectra for stridulation (Fig. 13).

Male genitalia. *Left paramere*. Apical process narrowed toward apex, sharply pointed (Fig. 3). *Endosoma*. Membranous medial lobe occupying half of endosoma; left sclerite (ls) short, narrowed toward apex; right sclerite (rs) long, originating near base of sclerotized portion of seminal duct and terminating at basal two thirds of endosoma (Fig. 4).

Measurements

See Table 1.

Female

Unknown.

Biology

Unknown; all available specimens (e.g., Figs 26–27) were collected by UV lighting method (using mercury lamps).

Distribution

Thailand (Nakhon Ratchasima) (Fig. 50).

Mimofulvius pentatomus Schmitz, 1978
Figs 2, 14–15, 18–25, 28–34, 50

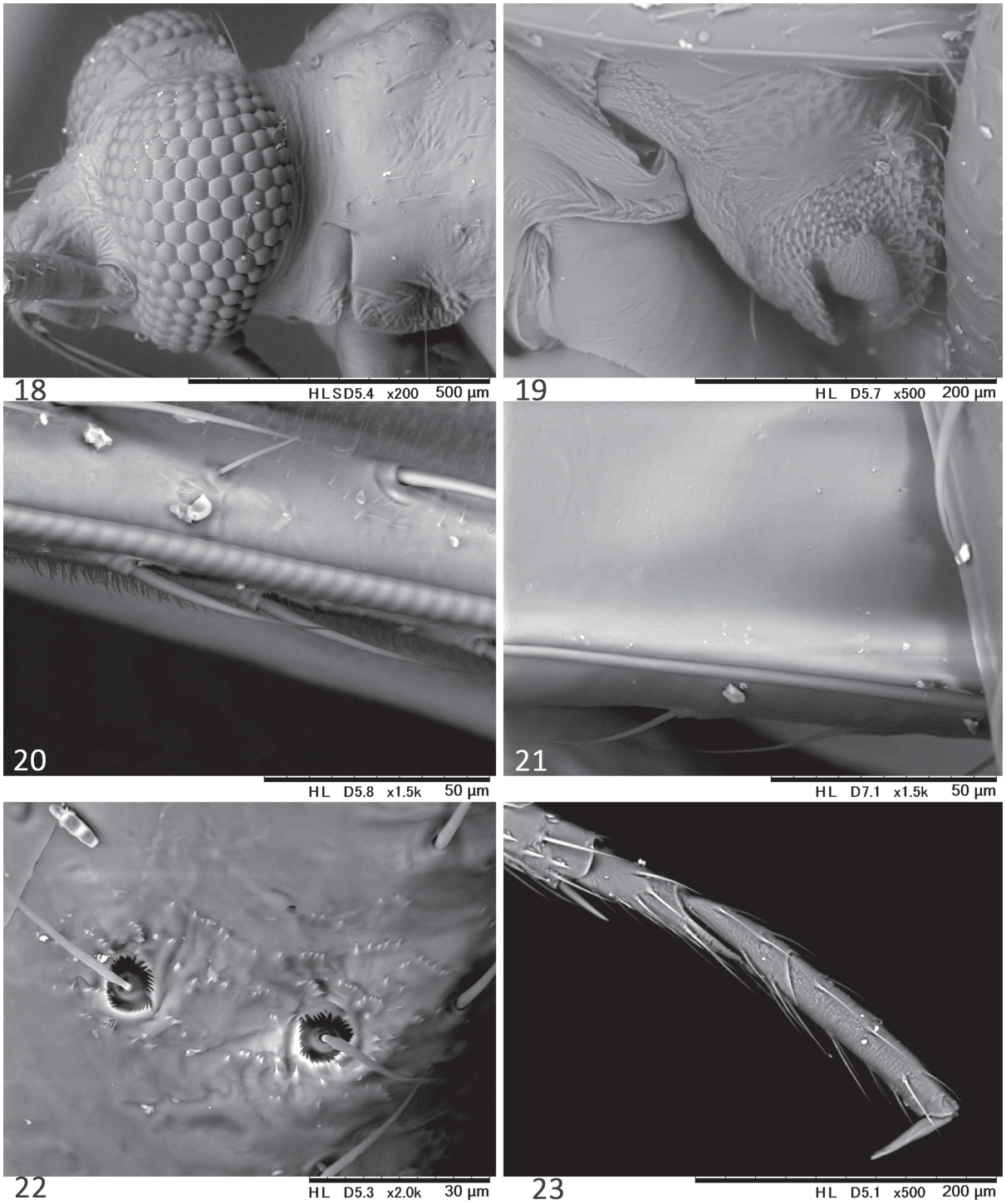
Mimofulvius pentatomus Schmitz, 1978: 186.

Mimofulvius pentatomus – Schuh 1995: 31 (catalog); 2002–2013 (online catalog). — Gorczyca 2006: 53 (catalog). — Yeshwanth *et al*. 2016: 315–317 (redescription), figs 29–31.

Diagnosis

Distinguished by the pronotum black with narrow, indistinct, yellowish stripe along the posterior margin (Figs 2, 14–15, 24–25); clavus with large, whitish stripe medially, occupying most of the claval surface

(Figs 2, 14–15, 24–25); the female genitalia as presented and depicted by Yeshwanth *et al*. (2016: fig. 30). The male is herein documented for the first time (Figs 28–34).



Figs 18–23. Scanning electron micrographs of *Mimofulvius pentatomus* Schmitz, 1978, ♂ (NMTU). **18**. Head and anterior pronotum (left lateral view). **19**. Thoracic pleura with scent efferent system. **20**. Margin of hemelytron (exocorium). **21**. Metafemoral keel (plectra). **22**. Metafemoral trichobothria. **23**. Metatarsus.

Type material

Holotype

INDIA • ♀; Mysore State, Chikkaballapura; 3000 ft.; Apr. 1917; Brit. Mus.; 1928-503, Pr? 679-120; BMNH.

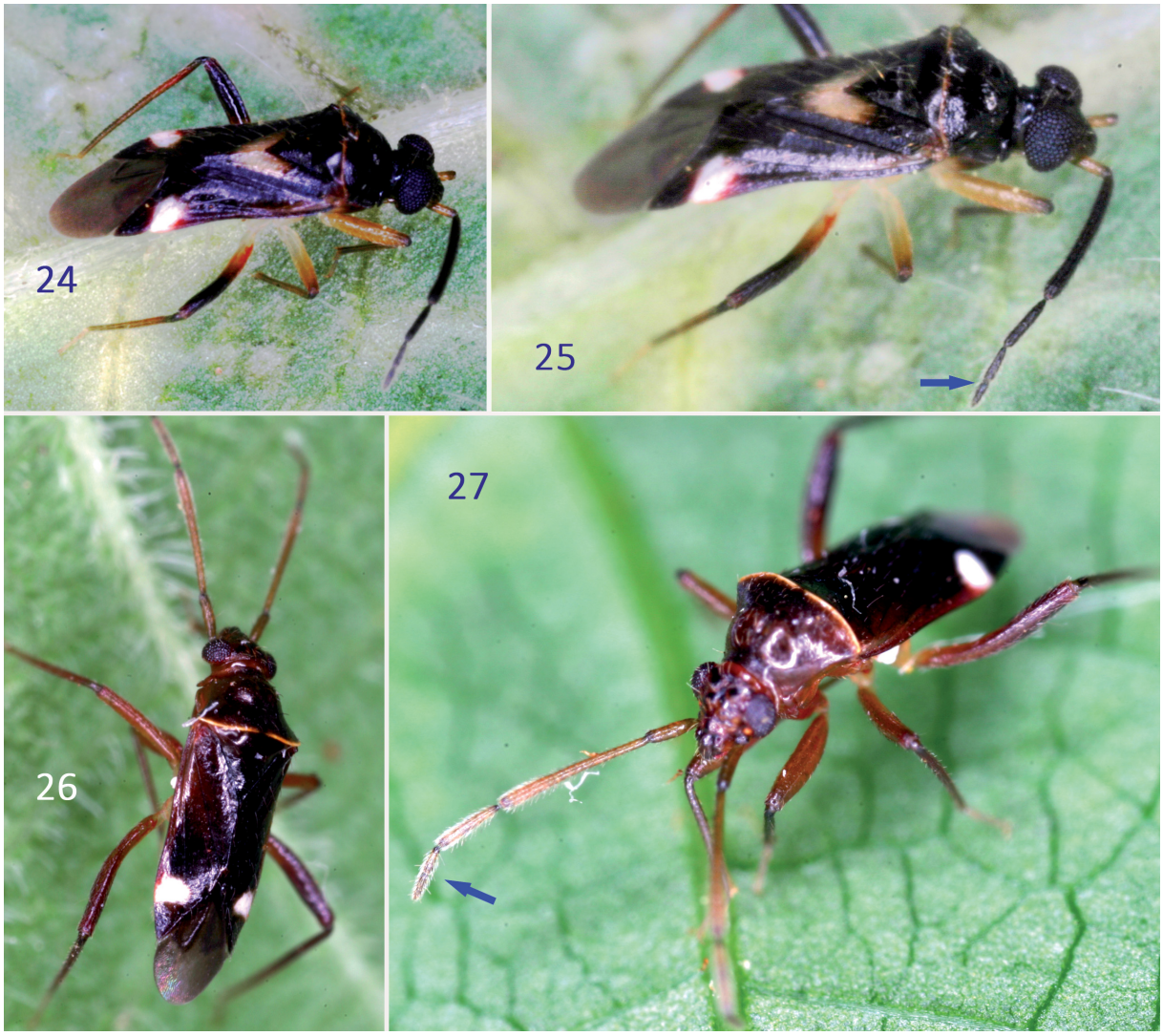
Additional examined material

NEPAL • 1 ♂; Makawanpur District, Chitwan National Park, Machan Wildlife Resort; 27°32′06″ N, 84°44′17″ E; 7–9 Nov. 2005; T. Yasunaga *et al.* leg.; UV light trap; NMTU, AMNH_PBI 00380661.

Redescription

Male

Overall coloration and basic structure as in female (Figs 14, 24–25), but body more elongate and slenderer, parallel-sided (Figs 14, 24–25); basic coloration coffee brown; dorsum comparatively shining



Figs 24–27. Dorsal habitus photographs of species of *Mimofulvius* Schmitz, 1978, live individuals (blue arrows indicating divided antennomere IV). **24–25**. *M. pentatomus* Schmitz, 1978, ♂. **26–27**. *Mimofulvius castaneus* sp. nov. (♂).

(Figs 14, 24–25); head weakly porrect, with eyes enlarged, reminiscent of those in Psallopinae Schuh, 1976 (Figs 14, 24–25; apical corium and anterior margin of cuneus tinged with red around white macula; posterior margin of metafemur with a keel (Fig. 21).

Genitalia. Apex of pygophore as in Fig. 28; left paramere elongate, C-shaped, with a median tooth inward (Figs 29–30); right paramere broadly margined apically (Figs 31–32); endosoma with two rather developed lobal-sclerites (Fig. 33).

Measurements

See Table 1.

Biology

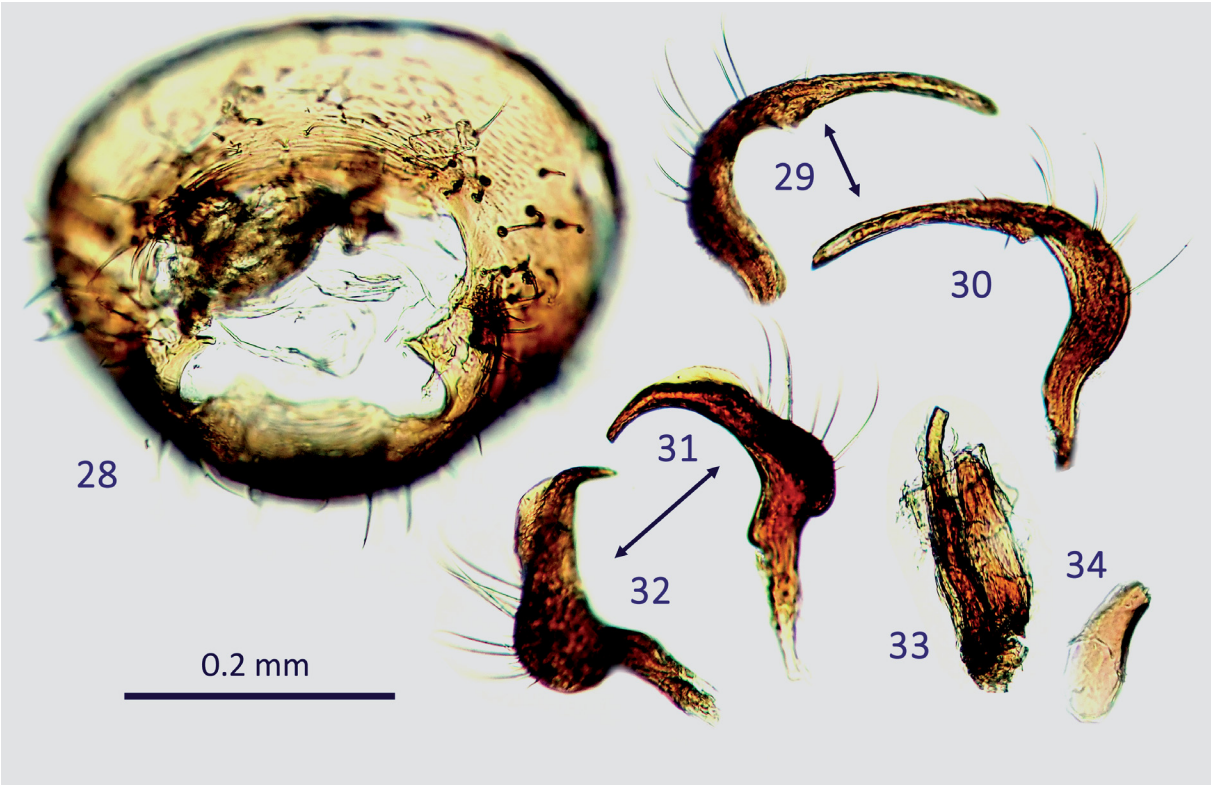
Unknown; a male individual (e.g., Figs 24–25) was collected by UV lighting method (using fluorescent lamps).

Distribution

India (Yeshwanth *et al*. 2016) and Nepal (Makawanpur) (this paper) (Fig. 50).

Remarks

Mimofulvius pentatomus is distinguished from *M. castaneus* by the black pronotum and large, medial, whitish patch on the clavus, and shape of the metafemoral plectrum (a single narrow keel) (Figs 2, 14–15, 21, 24–25).



Figs 28–34. Male genitalia of *Mimofulvius pentatomus* Schmitz, 1978 (TYCN). **28**. Pygophore. **29–30**. Left paramere. **31–32**. Right paramere. **33**. Endosoma. **34**. Phallotheca.

Genus ***Rhinophrus*** Hsiao, 1944

Rhinophrus Hsiao, 1944: 382.

Rhinophrus – Carvalho 1957: 33 (catalog). — Gorczyca 1994: 181 (discussion); 1996: 332 (discussion); 2000: 49 (list); 2006: 66 (catalog). — Schuh 1995: 37 (catalog); 2002–2013 (online catalog).

non *Acrorrhinium* Noualhier, 1895 – Gorczyca 1994: 181.

Diagnosis

Easily distinguished from other cylapines by the following combination of characters: body strongly elongate (Figs 35, 43); head with protruding, pointed frons and compressed clypeus (Figs 43–45); procoxae much longer than meso- and metacoxae (Fig. 44); scent gland efferent system weakly developed, restricted to posterior angle of metepisternum (Fig. 46); central row of tiles on pretarsal unguitractor absent (Fig. 47).

Remarks

As misplaced previously under a unique hallodapine genus *Acrorrhinium* (Gorczyca 1994), *Rhinophrus* is characterized primarily by the remarkably slender body shape (Fig. 43) and a projection on the frons (Fig 44). However, the plausible systematic position of *Rhinophorus* is yet to be determined (see Discussion below).

Rhinophrus borneensis Hsiao, 1944

Figs 35–50

Rhinophrus borneensis Hsiao, 1944: 383.

Acrorrhinium borneensis – Gorczyca 1994: 182.

Type material examined

Holotype

Malaysia • ♀; Sandakan Borneo (Baker); no further data; USNM.

Additional material examined

THAILAND • 1 ♀; Nakhon Ratchasima, Wang Nam Khiao, Sakaerat Environmental Research Station (SERS); 14°30′27″ N, 101°55′39″ E; 410 m alt.; 19–21 Aug. 2008; Yasunaga and Shishido leg.; UV light trap; DOAT.

Description

See Hsiao (1944) for further diagnostic characters.

Female genitalia. Bursa copulatrix nearly ovoid; sclerotized ring rounded; dorsal labiate plate (DLP) narrow, elongate toward caudal direction; seminal depository strongly inflated, globose, with pair of large, ovoid rings (Figs 37, 39–40); posterior wall of bursa copulatrix membranous, covered with minute, brush-like microprocesses (Fig. 38); gonapophysis 8 broadened subapically and distinctly pointed apically (Fig. 41); gonapophysis 9 pointed apically, strongly serrate subapically (Fig. 42).

Rhinophrus borneensis can be distinguished from *R. hsiaoi* by black antennal segment I (brown in *R. hsiaoi*) and the shape of the parameres (Gorczyca 1996).

Distribution

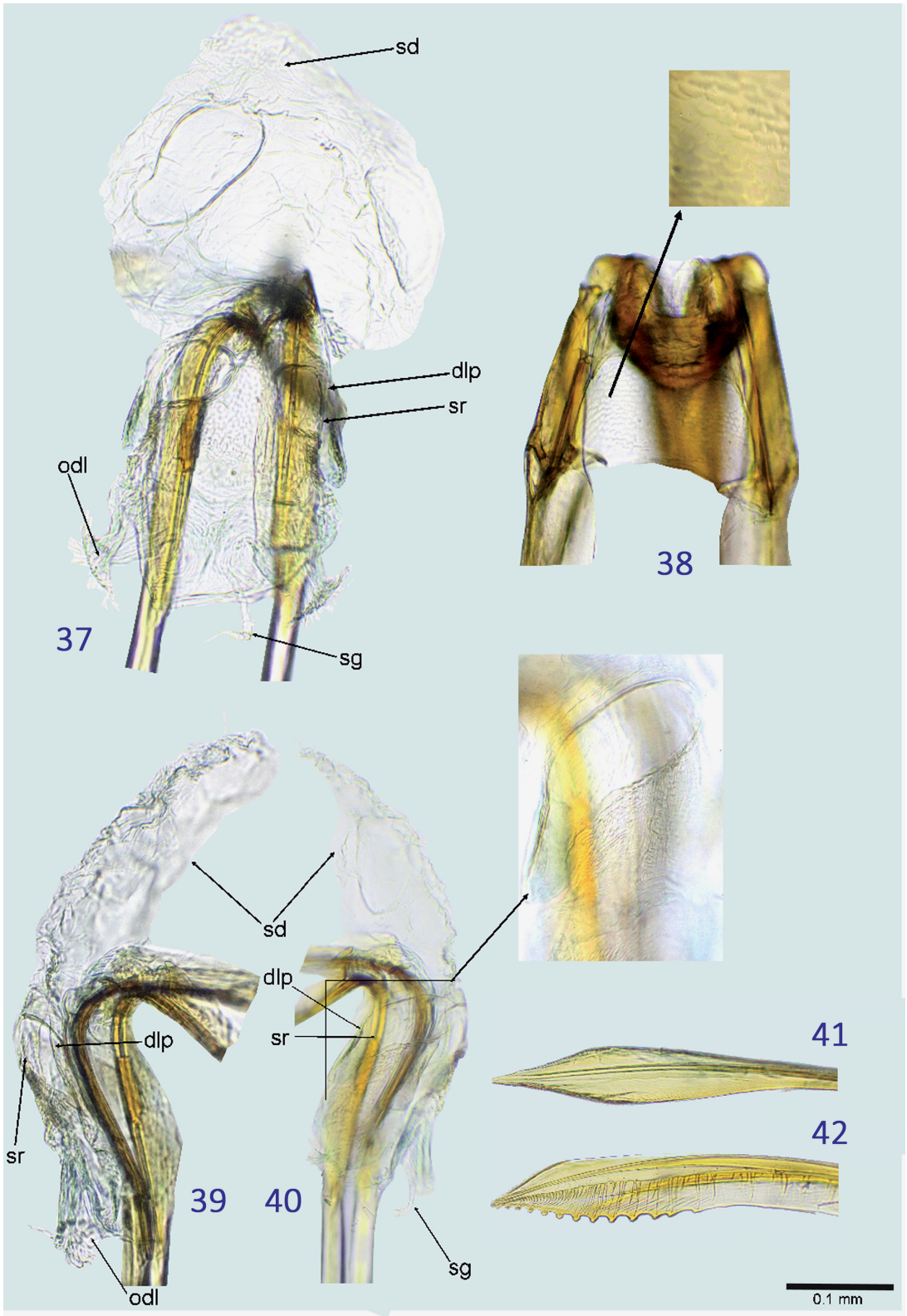
Malaysia (Sandakan, Borneo) (Hsiao 1944); Thailand (Nakhon Ratchasima) (this paper) (Fig. 50).

Discussion

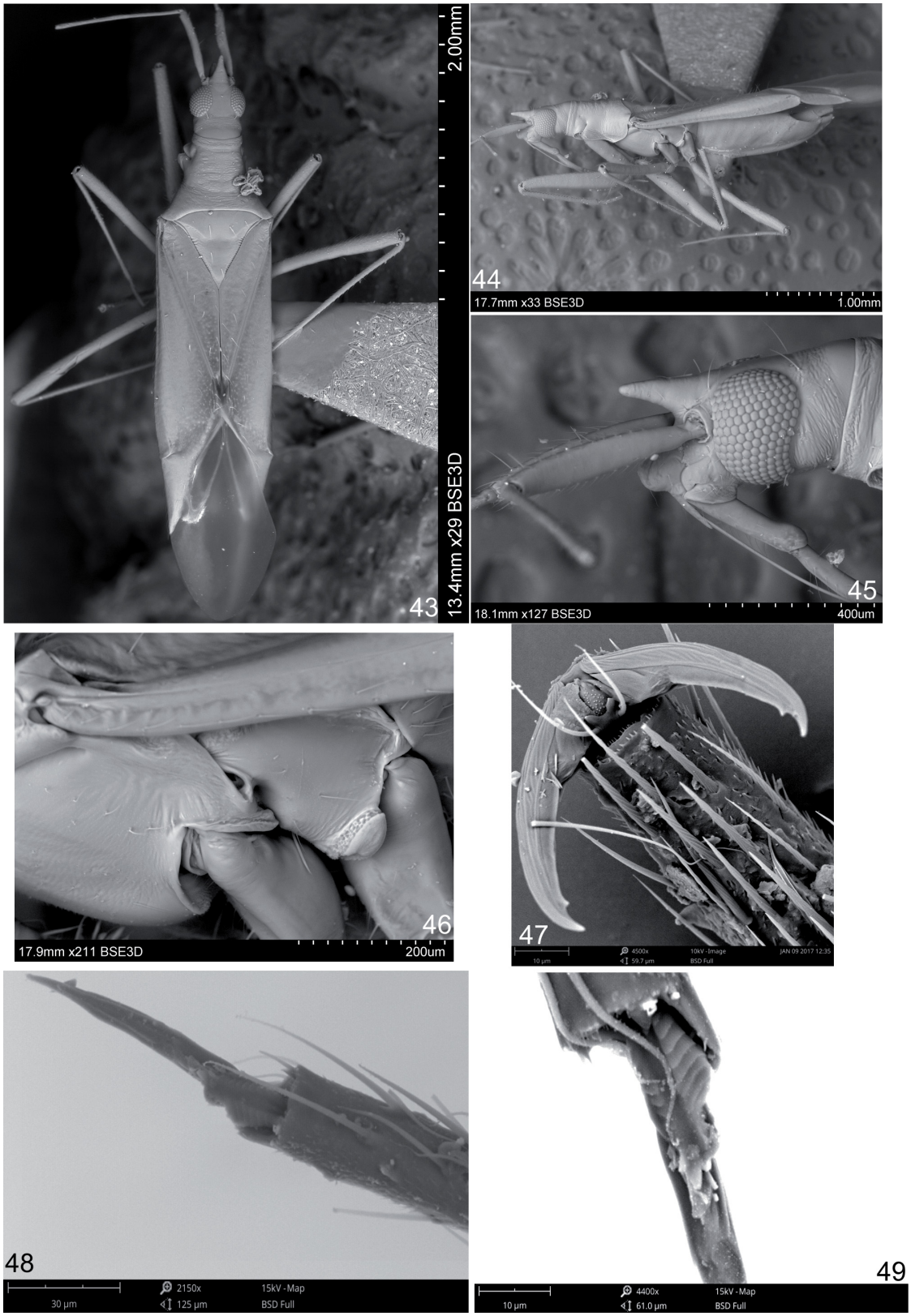
The cylapine genus treated in the present work, *Mimofulvius* and *Rhinophrus*, are each represented by two members which are currently considered to consist of Oriental-Sundaland elements.

Mimofulvius is similar and possibly closely related to *Mimofulviella* Wolski, 2008 in sharing the thickened third and fourth antennal segments, rugose head and pronotal collar, and broad, moderately upraised pronotal calli. Additionally, both genera share the endosoma with two regularly distributed sclerites and long ovoid sclerotized lobe originating from sclerotized portion of seminal duct (Fig. 6; Wolski 2008: fig. 4), the left paramere with long apical process with distinct spine situated basally (Figs 5, 32–33; Wolski 2008: fig. 2), and the right paramere with semicircular lobe on the basal part of the apical process and apical portion of the paramere body (Figs 7, 35–36; Wolski 2008: fig. 3). *Mimofulvius* can, however, be distinguished by the broader pronotal calli, reaching lateral margins of pronotum and by possessing the rudimentary stridulatory exocorium edge-hind femur mechanism.

Figs 35–36. Habitus images of *Rhinophrus borneensis* Hsiao, 1944, holotype, ♀ (USNM).



Figs 37–42. Female genitalia of *Rhinophrus borneensis* Hsiao, 1944 (DOAT). **37**. Bursa copulatrix (dorsal view). **38**. Posterior wall. **39**. Bursa copulatrix (lateral view). **40**. Bursa copulatrix (dorsolateral view). **41**. Ovipositor (gonapophysis 8). **42**. Gonapophysis 9. Abbreviations: dlp = dorsal labiate plate; odl = lateral oviduct; sd = seminal depository; sg = spermathecal gland; sr = sclerotized ring.



Figs 43–49. Scanning electron micrographs of *Rhinophrus borneensis* Hsiao, 1944, ♀ (DOAT). **43**. Dorsal habitus. **44**. Left lateral habitus. **45**. Head (left lateral view). **46**. Thoracic pleura. **47**. Tarsus. **48–49**. Pretarsal structure.

Mimofulvius and *Mimofulviella*, at first sight, resemble the genus *Peritropis* Uhler, 1891 by having such characters as the antennal segment IV subdivided (Figs 8, 28, 30; Gorczyca 2006), the left paramere C-shaped, with elongate, thin apical process and spine on inner surface of apical portion of paramere body and apical process (Figs 5, 32–33; Yasunaga 2000: 36, 38, 40; Wolski & Henry 2012: 37, 40) and the right paramere with long paramere body and short apical process (Figs 7, 35–36; Yasunaga 2000: figs 37, 39, 43; Wolski & Henry 2012: figs 60, 70).

The position of the genus *Rhinophrus* has always been problematic. It was described by Hsiao (1944) to accommodate *R. borneensis* originally placed in the subfamily Cylapinae. Hsiao noted its resemblance to *Fulvius* Stål, 1862 but he also highlighted its distinct features, like prominent frons and compressed clypeus, suggesting it might warrant classification under a new tribe, Rhinophrini Hsiao, 1944. Subsequently, Gorczyca (1994) transferred *Rhinophrus* to Phylinae Douglas & Scott, 1865 and synonymized it with *Acrorrhinium* Noualhier, 1895, which also possesses the pointed frons. The same author (Gorczyca 1996) restored *Rhinophrus* and treated it again within Cylapinae. The characters favouring the placement of *Rhinophrus* in Cylapinae include the thin tarsus, setiform parempodia and subapical tooth on the pretarsal claw (Figs 44, 47). Gorczyca (2000, 2006) assigned it to Fulviini. However, *Rhinophrus* can't be confidently placed in any of the cylapine tribes based on the current diagnoses (Gorczyca 2000; Cassis *et al*. 2003; Wolski 2017; Namyatova *et al*. 2019). Namyatova *et al*. (2016) observed that most cylapines have the central row of tiles on the pretarsal unguitractor well developed, acute and contiguous with the lateral columns. Our study revealed that the central row of titles is absent in *Rhinophrus* (Figs 48–49) which is unique in the subfamily Cylapinae and is found only in the genus *Palaucoris* Carvalho, 1956 whose placement in Cylapinae is controversial (Namyatova *et al*. 2016). *Rhinophrus* is reminiscent of Fulviini in having the relatively short antenna, not reaching the middle of the body and the horizontal head (Figs 35–36). On the other hand, the labial segment I in *Rhinophrus* undivided (Fig. 45) while in most fulviines the labial segment is subdivided (Wolski & Henry 2012, 2015; Wolski 2021; Namyatova & Cassis 2022; Wolski *et al*. 2023; Namyatova & Tyts 2024). The antennal insertion in *Rhinophrus* is removed from the suture between maxillary and mandibular plates (Fig. 45) whereas in most Fulviini the antennal insertions are placed close to the suture

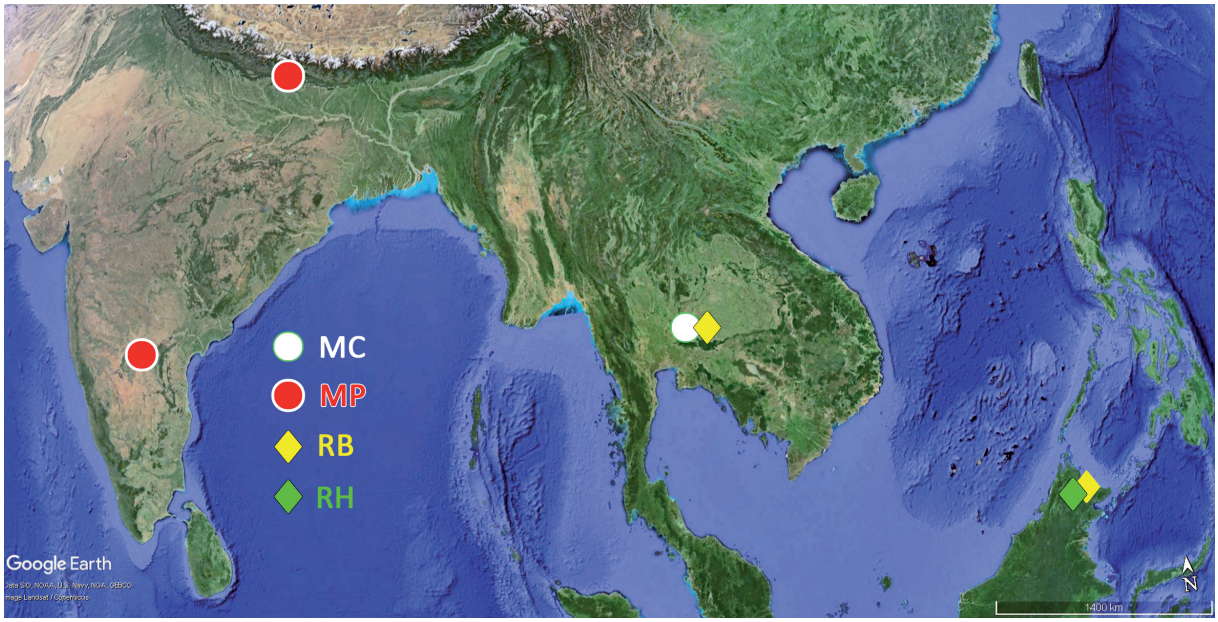


Fig. 50. Map showing distributions of *Mimofulvius castaneus* sp. nov. (abbreviated as MC), *M. pentatomus* Schmitz, 1978 (MP), *Rhinophrus borneensis* Hsiao, 1944 (RB) and *R. hsiaoi* Gorczyca, 1996 (RH).

between maxillary and mandibular plates (Namyatova & Cassis 2021, 2022; Wolski 2021; Taszakowski *et al*. 2022b; Wolski *et al*. 2023; Namyatova & Tyts 2024). Additionally, in *Rhinophrus* the apex of gonapophysis 9 is pointed and strongly serrate (Fig. 42) while in fulviines the gonapophysis 9 apex is usually obtuse, rarely moderately pointed, never with a row of strongly developed teeth (Schmitz & Štys 1973; Sadowska-Woda *et al*. 2008; Kim *et al*. 2019; Wolski 2021; Masłowski *et al*. 2023; Wolski *et al.* 2023).

Within Cylapinae the undivided labial segment I and antennal insertion removed from the maxillary and mandibular plates are present in Bothriomirini Kirkaldy, 1906, Cylapini Kirkaldy, 1906, and Vanniini Gorczyca, 1997 (Namyatova *et al*. 2016; Namyatova & Cassis 2021, 2022; Wolski 2021; Wolski *et al*. 2023; Namyatova & Tyts 2024). Additionally, representatives of Cylapini and Vanniini have a pointed and serrate apex of gonapophysis IX as does *Rhinophrus* (Konstantinov 2012; Wolski 2021). However, bothriomirines (unlike *Rhinophrus*) have a stout, punctate. deraeocorine-like body (Wolski & Gorczyca 2012; Wolski & Yasunaga 2016), which denies inclusion of *Rhinophrus* in the Bothriomirini. Incidentally, Cylapini and Vanniini have an elongate, hypognathous head and antennae longer than body length (Namyatova *et al*. 2016; Wolski 2021). These character states are not present in *Rhinophrus*. Therefore, we currently maintain the placement of *Rhinophrus* in Fulviini, as proposed by Gorczyca (2000, 2006), pending more studies especially for the male genitalia of *Rhinophrus*.

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