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New and poorly known species of the termitophilous genus *Orthogonius* Macleay, 1825, from Vietnam (Coleoptera: Carabidae: Orthogoniini)

Mingyi TIAN¹ & Thierry DEUVE²

¹ Department of Entomology, College of Agriculture, South China Agricultural University, Wushan, Guangzhou, 510640, China (e-mail: mytian@scau.edu.cn)

² Muséum national d'Histoire naturelle, Département de Systématique & Évolution, Entomologie, C.P. 50, 57 rue Cuvier, F-5231 Paris cedex 05, France (e-mail: deuve@mnhn.fr)

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New and poorly known species of the termitophilous genus

Orthogonius Macleay, 1825, from Vietnam

(Coleoptera: Carabidae: Orthogoniini)

Mingyi TIAN¹ & Thierry DEUVE²

¹ Department of Entomology, College of Agriculture, South China Agricultural University, Wushan, Guangzhou, 510640, China (e-mail: mytian@scau.edu.cn)

² Muséum national d'Histoire naturelle, Département de Systématique & Évolution, Entomologie, C.P. 50, 57 rue Cuvier, F-5231 Paris cedex 05, France (e-mail: deuve@mnhn.fr)

Abstract

Two new species, *Orthogonius pectinatus* sp. nov. and *O. punctum* sp. nov., are described and illustrated from Vietnam. Descriptions are also provided for *O. picipennis* Chaudoir, 1871, *O. nigripes* Tian & Deuve, 2000 and *O. angustus* Chaudoir, 1871 which are reported from Vietnam for the first time. Male specimens of *O. macrophthalmus* Tian & Deuve, 2013 are firstly reported, with the description of the male genital characters. In addition, the type specimen of *O. picipennis* is confirmed to be a female rather than a male; the unique type specimen of *O. angustus* is presumed to be from Thailand, instead of, Malaysia, and new records of *O. pseudocheni* Tian & Deuve, 2006 are given.

Keywords: ground beetle, taxonomy, Oriental Region.

Introduction

Vietnam holds a very rich biodiversity (NGUYEN *et al.*, 2007), but the Carabidae fauna is still poorly known (PARK *et al.*, 2006). In terms of the termitophilous ground beetle genus *Orthogonius* Macleay, 1825 (WASSMANN, 1920), which is composed of approximately 300 species in the Oriental and Ethiopian Regions, about thirty species are recorded from this country (ANDREWES, 1930; CSIKI, 1932; LORENZ, 2005; TIAN & DEUVE, 2006, 2010, 2013). Thanks to our good friend Alain Drumont, Coleoptera curator at the Royal Belgian Institute of Natural Sciences, Brussels (RBINS), we had the chance to study many interesting Orthogoniine specimens recently collected from Vietnam by Jérôme Constant and Joachim Bresseel (RBINS) in the framework of the Global Taxonomy Initiative project “A step further in the Entomodiversity of Vietnam”. As part of our study result, we describe two new species and provide records for other four poorly known species from this country.

Material and methods

All beetle material used for this study was dry mounted specimens. The *Orthogonius* specimens were collected by Malaise trap or by net in the forest at night. Studying methods follow TIAN & DEUVE (2013). The length of the body is measured from the apex of the right mandible (in opened position) to the apices of the elytra.

Abbreviations of measurements used in the text are:

HL = length of head (from apex of right mandible to base of vertex)

HW = width of head across eyes

PL = length of pronotum along median line

PW = greatest width of pronotum

EL = length of elytra, from base to apices of elytra along the suture

EW = greatest width of combined elytra

Abbreviations used for the depositories:

CDW = Collection of Dr. David Wrase, Berlin, Germany

CIB = Collection of Prof. Dr. Ingo Brunk, Dresden, Germany

ENHM = Naturkundemuseum Erfurt, Germany

MNHN = Muséum national d'Histoire naturelle, Paris, France

NHNV = Naturhistorisches Museum Wien, Vienna, Austria

RBINS = Royal Belgian Institute of Natural Sciences, Brussels, Belgium

SCAU = South China Agricultural University, Guangzhou, China

Taxonomy

Family **Carabidae**

Subfamily **Orthogoniinae** Schaum, 1857

Tribe **Orthogoniini** Schaum, 1857

Genus **Orthogonius** Macleay, 1825

Orthogonius MACLEAY, 1825: 26.

Type species: *Carabus duplicatus* Wiedemann, 1819.

***Orthogonius pectinatus* sp. nov.**

Figs 1–3

ETYMOLOGY. Refers to the pectinated tarsal claws of this new species.

TYPE MATERIAL. Holotype ♂: Vietnam: [S. Vietnam, Nam Cat Tien Nat. Park, 1-15.V.1994, Pacholatko & Dembicky/Mus. Wien/*Orthogonius lieftincki* Andrewes, det. Kirschenhofer, 2006] (NHMV).

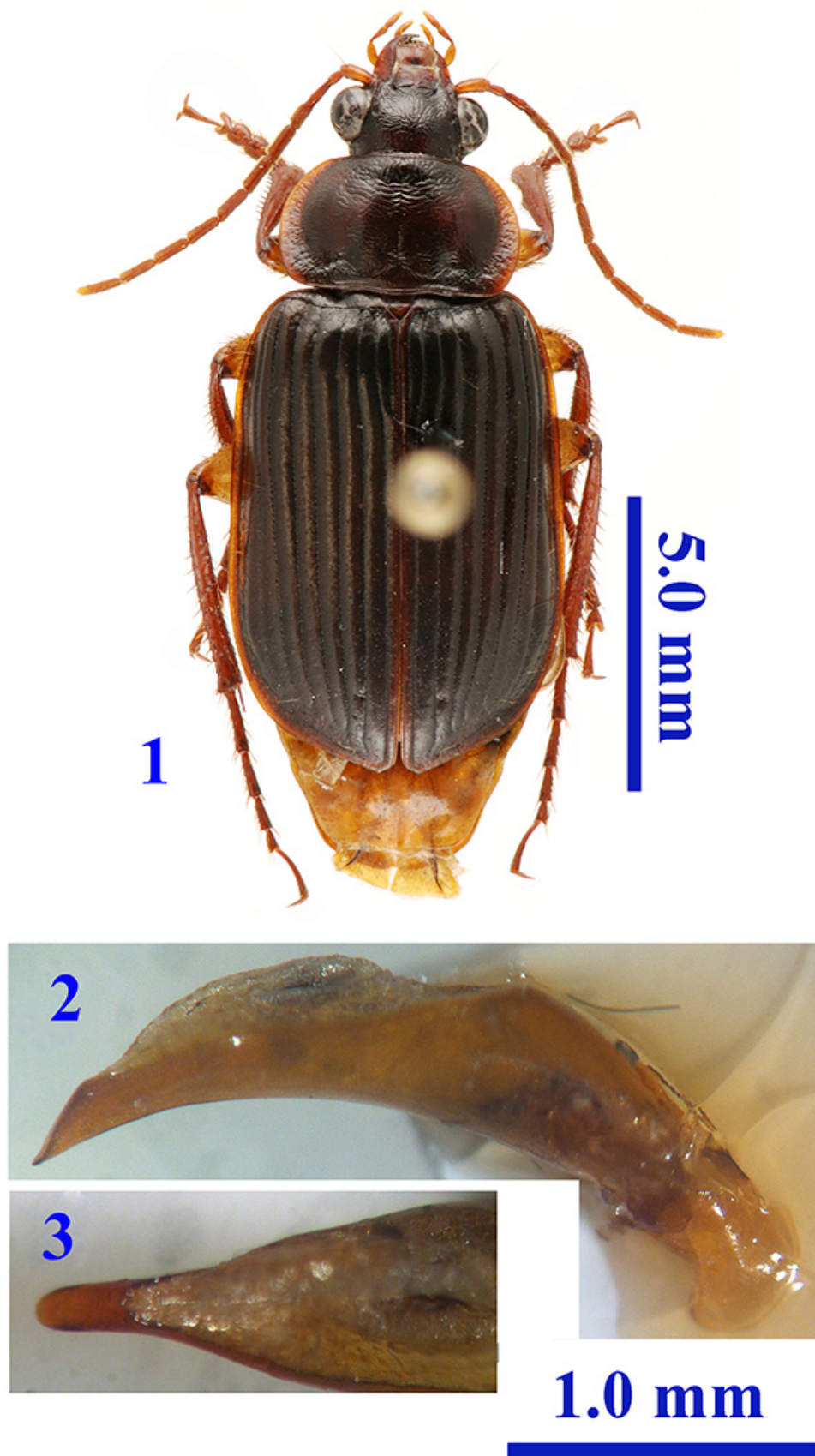
Paratypes 1♂: [Thailand, Nakhon Ratchasima, S Khao Luk Chang, 400-470 m, 101.21 E/14.31.50 N, 28.VIII-6.XI.1998, I. Fritzsche/Coll. Wrase BERLIN] (CDW); 1♂: [Coll. I.R.Sc.N.B./Vietnam: Ninh Thuan Province, Phuoc Binh N. P., 12°04' N, 108°45' E 26.VII-1.VIII.2014, Mal. Trap/Leg. J. Constant & J. Bresseel/GTI project, 32.779] (RBINS).

DIAGNOSIS. This new species is probably allied to *O. medanensis* Tian & Deuve, 2006, but differs in: body broader, claws strongly pectinated and aedeagus more bent ventrally, the apical lamella longer and narrower.

DESCRIPTION.

Length: 11.5 mm; width: 4.5 mm. Habitus as in Fig 1. Head, ventral side of head and thorax black; pronotum, elytra, tibiae and abdominal ventrites dark brown; clypeus, labrum, mandibles, palpi, mentum, antennae, pronotal side margins and tarsi brown; femora yellow; body moderately shiny, rather broad; head and pronotum faintly striate, surface covered with small and sparse punctures; microsculptural meshes isodiametric on surface.

Head: wider than long, HL/HW=1.1; eyes very large; vertex moderately convex; frontal impressions faint; clypeus bisetose, surface even; labrum six setose, slightly emarginated at apical margin; ligula small, not expanded at apex, bisetose; palpi slender, subcylindrical, 3rd maxillary palpomere as long as 4th, glabrous; 2nd labial palpomere as long as 3rd, bisetose inner margin, and with two additional setae at subapex and apex; 3rd labial palpomere sparsely



Figs 1–3. *Orthogonius pectinatus* sp. nov. 1. habitus, holotype, male; 2–3. aedeagus, lateral view and apical lamella, dorsal view.

pubescent; palpi setose, mentum without tooth; mentum and submentum each with one pair of setae (but left side of mentum with an additional seta); antennae long, reaching basal third of elytra, pubescent from apical two third of 4th antennomere; 3rd antennomere shorter than 4th.

Pronotum: transverse, PW/PL=1.6, sides evenly rounded, widest at mid-length; both basal and fore margins beaded; lateral expanded margins well defined, flat; fore and hind angles broadly rounded; disc moderately convex; fore and hind transversal impressions well marked; basal foveae small but deep.

Elytra: elongate ovate, EL/EW=1.3, convex; basal border complete; sides parallel at middle; widest at about mid-length; striae deep; intervals distinctly convex, subequal to each other in width in middle; apex broad; inner angle rather acute; 3rd interval with three setiferous pores.

Legs: legs moderately developed; middle and hind coxae smooth and glabrous; fore tibiae slightly dilated and obliquely truncate at apex, with outer apical angle nearly rectangular and outer margin subserrate; middle tibiae rather straight; apex of hind tibiae hardly dilated, with apical spurs long and sharp; 3rd hind tarsomere much longer than 4th which is faintly emarginate at apex; all claws strongly pectinate.

Ventral side: prosternal process well bordered at apex; ventrite VII finely emarginated at apical margin in male.

Male genitalia (Figs 2–3): median lobe of aedeagus rather stout, bent ventrally, with apex gradually pointed; apical lamella long and narrow.

Female. Unknown.

DISTRIBUTION. South Vietnam and southern Thailand.

***Orthogonius punctum* sp. nov.**

Figs 4–9

ETYMOLOGY. Refers the punctate head of the new species.

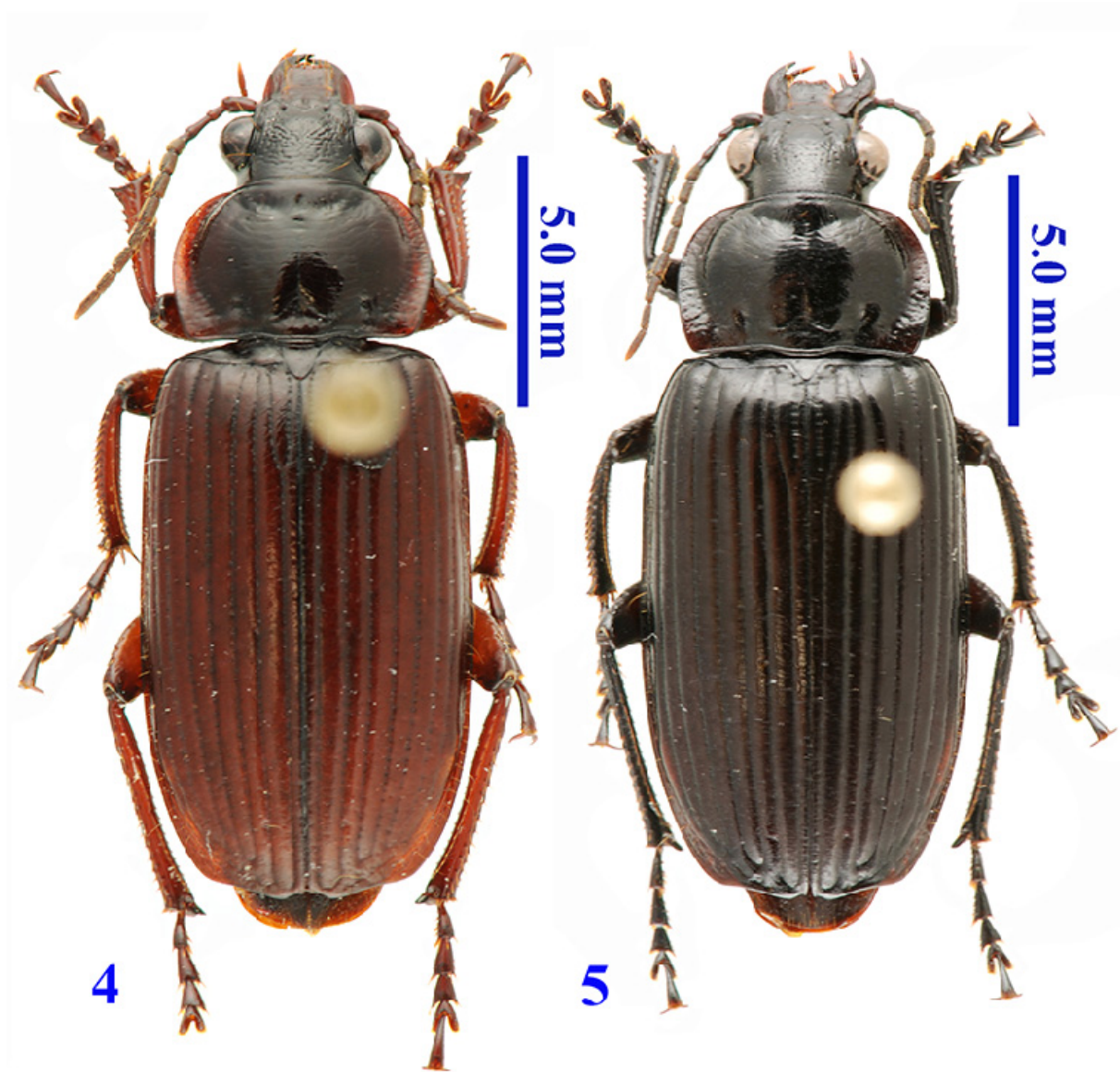
DIAGNOSIS. Similar to *O. deletus* Schmidt-Göbel, 1846, but *O. punctum* sp. nov. is easily recognized by its broad hind angle of pronotum and stouter aedeagus.

TYPE MATERIAL. Holotype ♂: [Coll. I.R.Sc.N.B./Vietnam: Dong Nai Biosphere Res.; 11°18'N, 107°06'E/25.VI.-6.VII.2012, night collecting/Leg. J. Constant & J. Bresseel/I.G. 32.161] (RBINS).

Paratypes: 17♂, 17♀: idem, all in IRSNB; 3♂, 3♀: ibid (MNHN); 3♂, 3♀: ibid (SCAU); 1♂: [S. Thailand, Phang-nga Prov. Takuapa Distr., vic. Khao Lak, 40-80 m, 03-16.VII.2012, 08°37'N/98°15'E, leg. A. Weigel] (ENHM); 1♂, same data as above, but [5 km S. Khao Lak, 10-50 m, 03-16.VII.2012, 08°37'N/98°15'E] (MNHN); 1♀: ibid (ENHM); 1♂, [Vietnam: Laichun Prov., Banpobai, EL:102.60, NL 22.00, 6-12.VI.2009, local collector"] (CIB); 1♂, ibid (MNHN).

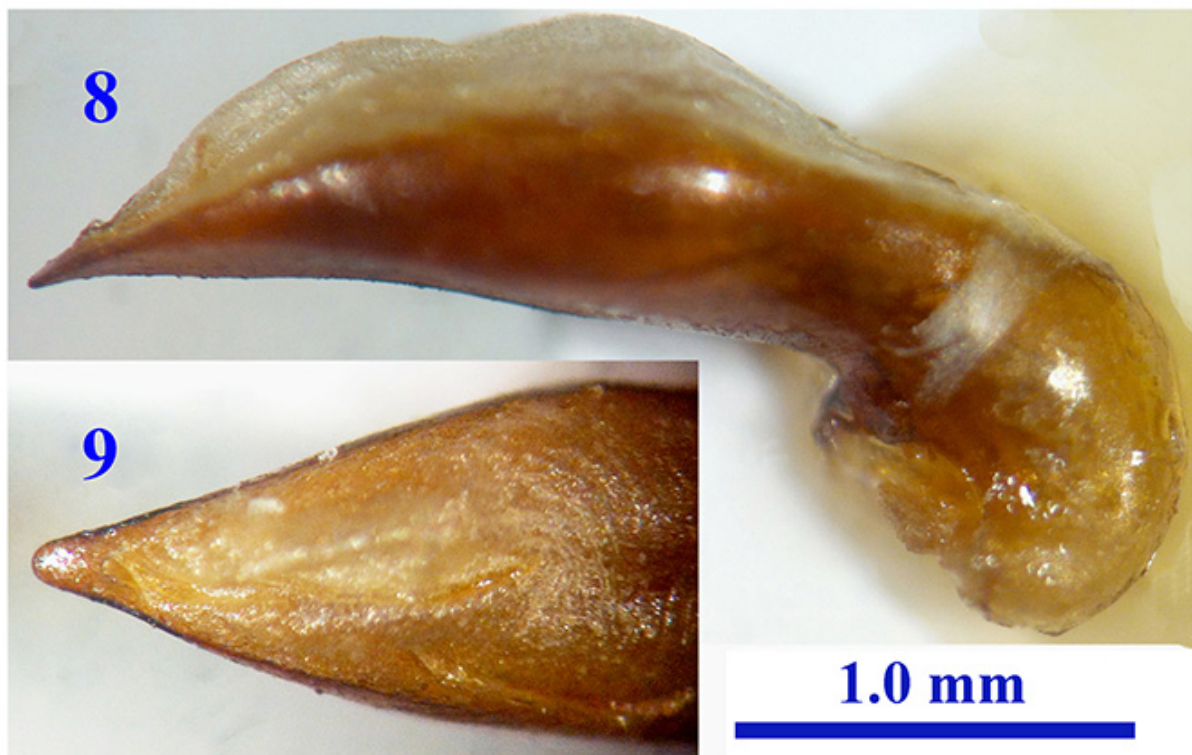
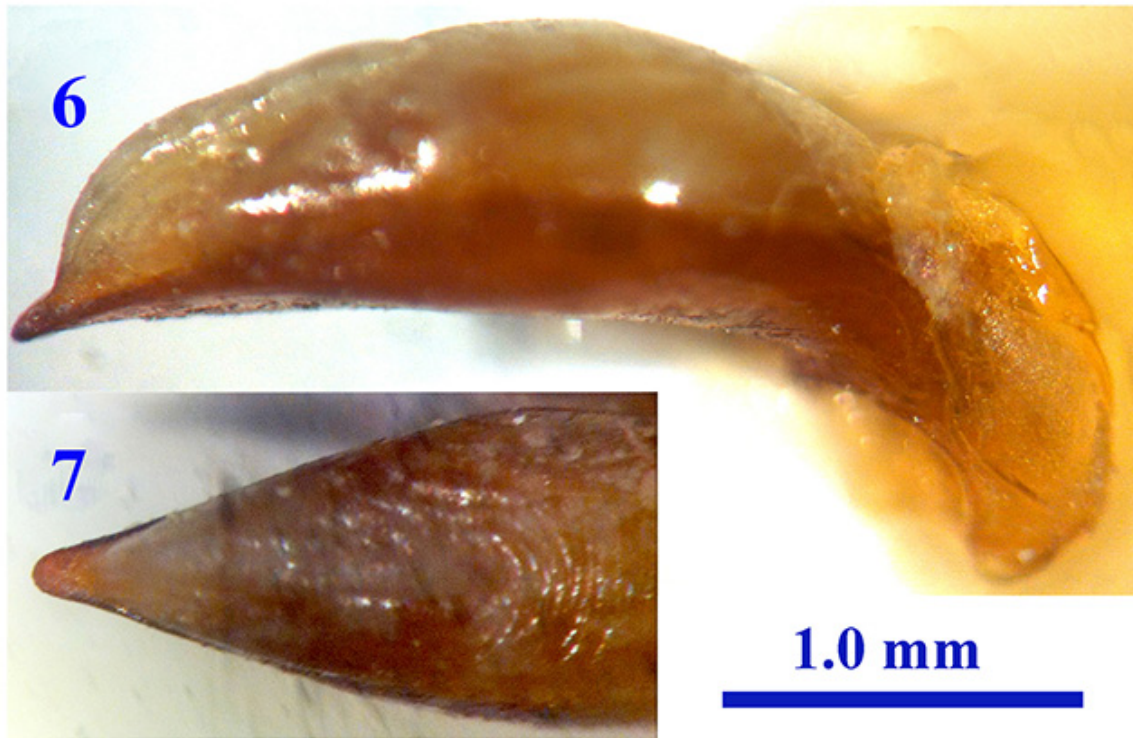
DESCRIPTION

Length: 14.0–18.0 mm; width: 4.5–5.5 mm. Habitus as in Figs 4–5. Body elongate, strongly shiny, smooth and glabrous; brownish to light dark brown, head and disc of pronotum darker, elytra lighter; almost black for the two specimens from southern Thailand; macrosculpture: head moderately punctate, pronotum impunctate, elytra with a few finely and sparse punctures on odd intervals only; microsculptural meshes isodiametric on elytra and neck, unclear on frons and moderately transverse on pronotum.



Figs 4–5. Habitus of *Orthogonius punctum* sp. nov. 4. paratype, male, from NongNai, S. Vietnam; 5. paratype, male, from Khao Lak, S. Thailand.

Head: moderately broad, slightly longer than wide, HL/HW=1.1–1.2; eyes rather small but prominent; frons and vertex moderately convex; frontal impressions narrow but deep, extending beyond the level of anterior supraorbital pores; clypeus bisetose, basal portion with three short furrows along sides and on the median, linking frontoclypeal suture and frontal impressions; labrum six setose, shallowly but widely emarginate at apical margin; palpi slender, subcylindrical, 3rd maxillary palpomere as long as 4th which is glabrous, 3rd with several short setae at apex; 2nd labial palpomere slightly longer than 3rd, bisetose on inner margin, with several additional setae at subapex and apex, 3rd with a few short setae; ligula small, slightly dilated at apex, bisetose; mentum edentate; both mentum and submentum bisetose; palpigerae setose; antennae quite short and stout, extending to base of elytra; pubescent from basal third of 4th antennomere, slightly expanded at pubescent portion; 3rd antennomere slightly longer than 4th but slightly shorter than 1st.



Figs 6–9. Adeagus of *Orthogonius punctum* sp. nov., lateral view and dorsal view for apical lamella. 6–7. paratype, from NongNai, S. Vietnam; 8–9. paratype, male, from Khao Lak, S. Thailand.

Pronotum: strongly transverse, $PW/PL=1.6-1.7$, with disc moderately convex; fore (except for median portion) and basal margins well beaded, sides evenly expanded, widest at mid-length; base slightly wider than front, bisinuate, making median part of posterior margin more or less protruded backwards; anterior margin nearly straight; fore angle rounded off, hind one

obtusely broad; lateral expanded margin well defined, narrow, slightly reflexed; both transversal impressions more or less distinct; basal foveae small and deep.

Elytra: elongate, moderately convex; EL/EW=1.6–1.7; widest at about middle, nearly parallel-sided at mid-length; basal border complete; apex bisinuate, reversely and shortly concave before tip which is evidently denticulate; striae rather shallow, punctate-striate, with intervals slightly convex, subequal in width to each other in middle portion; 3rd interval with three setiferous pores, normally sited (basal one close to 3rd stria and other two to 2nd stria); 7th interval simple.

Legs: rather stout; fore tibiae strongly expanded at apex, with outer angle strongly protruded and outer margin serrate; hind femora moderately expanded, with 5 posterior setae; middle coxae with two setae medially; hind coxae smooth and glabrous; middle tibiae quite short, slightly curved, not dilated medially in male, enlarged at apex with outer margin with two rows of setae, distinctly serrate; hind tibiae slender, suddenly dilated at apex; apical spurs very short, flat and broad, more or less ear-shaped; fore tarsi distinctly wider than mid- and hind ones; 1st hind tarsomere as long as 2nd, 3rd slightly shorter than 4th which is symmetrically bilobed at apex; all tarsal claws moderately pectinated.

Ventral side: prosternal process bordered at apex; ventrite VII complete in male, with two pairs of setae on either side of apical margin in both sexes.

Male genitalia (Figs 6–9): stout, dorsal opening wide and long, dilated in middle portion; ventral margin nearly straight; apex blunt in profile; apical lamella short, triangular, slightly longer than wide, with apex broad.

DISTRIBUTION. Southern Vietnam and southern Thailand.

***Orthogonius picipennis* Chaudoir, 1871**

Figs 10–12

CHAUDOIR, 1871: 100

MATERIAL EXAMINED. Type material: holotype ♀, Cambodia: [*picipennis* Chaud./ Cambodge, Mouhot] (MNHN).

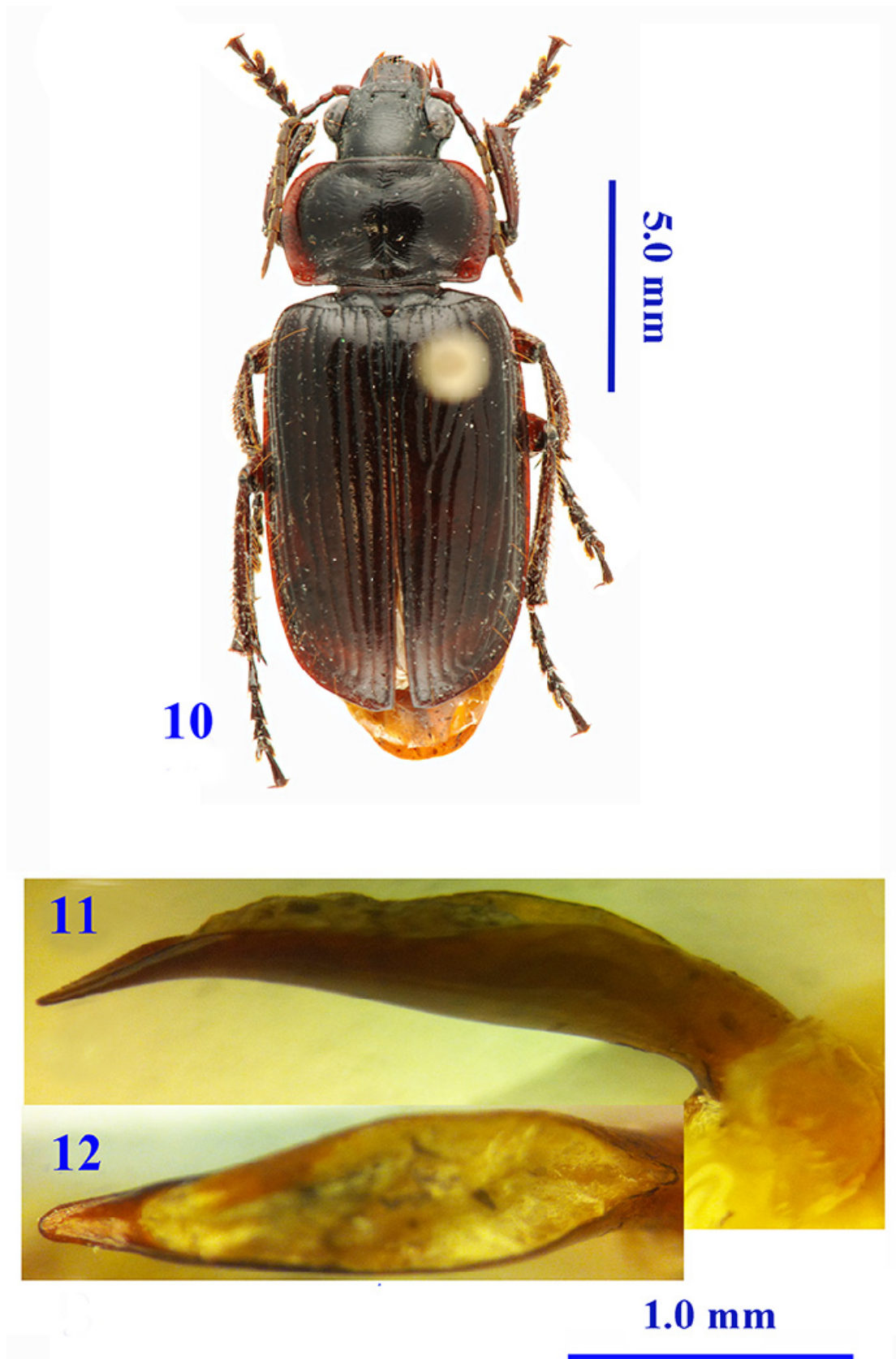
Additional material: 1 ♂: Vietnam: [Coll. I.R.Sc.N.B./Vietnam, Cat Tien N.P./11°26'N, 107°26'E/6-16.VIII.2012, Malaise trap/Leg. J. Constant & J. Bresseel/I.G. 32.161] (RBINS); 1 ♀: Vietnam: [S. Vietnam, 5-19.VI.95, NNE Ho Chi Min, env. Cat Tien vill, leg. Napolov A.", "Ex. coll. Ilya Osipov"] (CIB).

DESCRIPTION.

Length: 16.0 mm; width: 6.1 mm. Habitus as in Fig 10. Head and pronotum densely and intricately wrinkled (rather faint on pronotum), impunctate; elytra coarsely punctate on even intervals; microsculptural meshes dense and isodiametric on head, pronotum and elytra.

Head: moderately broad, slightly longer than wide, HL/HW=1.1; eyes rather small, moderately prominent; labrum distinctly emarginate at frontal margin, sexsetose; clypeus bisetose; maxillary palpomere 3 longer than 4, with several sparsely thin setae; labial palpomere 2 as long as 3, bisetose on inner margin though with a few additional short setae; palpomere 3 with more fine and short setae on basal half; ligula thin and narrow, bisetose; mentum and submentum each with a pair of setae; palpigerae setose; antennae short, extended to the shoulders of elytra, densely pubescent from basal 1/3 of 4th antennomere to 11th.

Pronotum: strongly transverse, PW/PL=1.67, widest at about mid-length; fore angles broadly rounded, hind angles rectangular, though obtuse; lateral expanded margins wide and well defined, almost of equal width throughout, not reflexed; basal transverse impressions well marked, frontal one faint; median line clear; basal foveae shallow and not well marked; disc moderately convex.



Figs 10–12. *Orthogonius picipennis* Chaudoir, 1871. 10. habitus, holotype, male; 11–12. aedeagus, lateral view and apical lamella, dorsal view.

Elytra: broad, moderately convex, EL/EW=1.64, nearly parallel-sided, widest at about mid-length; apex roundly truncate, with reverse sinuate near apex, making inner angle nearly right, and a shallow, wide sutural angle; base bordered, though partly interrupted against 1st, 3rd and 4th intervals; striae deep, punctate-striate; intervals convex, even intervals much wider than odd ones (but less than twice as broad) and with coarser punctures which are clear and extend to apical 1/3 of elytra on 4th and 6th intervals, but fewer and fainter on 2nd interval on which they extend to about mid-length; 3rd interval without setiferous pores; 5th interval with only one seta near base; 7th interval rather wide, not carinate, with 15 setiferous pores throughout.

Legs: rather stout and with developed spines, in particular on tibiae, long and sited in more or less regular row; middle coxae with several setae laterally; fore tibiae with outer angle very sharp and strongly protruded, and outer margin strongly serrate; middle tibiae stout, suddenly and distinctly dilated at apex, and slightly curved in median portion; hind tibiae longer than the middle ones, more elongate, and suddenly dilated at apex (almost as dilated as in middle ones), with tibial spurs short, sword-like but broad; hind femora moderately dilated, with four posterior setae; 3rd hind tarsomere almost as long as 4th which is bilobed; all tarsal claws simple.

Ventral side: prosternal process well bordered at apex; ventrite VII complete at apex and bisetose in male.

Male genitalia (Figs 11–12): rather stout, ventral margin widely sinuate, median portion moderately expanded, apex gently bent ventral, gradually narrowed towards apex in profile; slightly twisted in dorsal view, dorsal opening very wide and long; apical lamella long and broad, spade-shaped, longer than broad, rounded at apex.

REMARKS. In the original description, CHAUDOIR (1871) mentioned that the single type is a male, but it is actually a female.

DISTRIBUTION. Cambodia and southern Vietnam. It is here recorded from Vietnam for the first time.

***Orthogonius nigripes* Tian & Deuve, 2000**

Figs 13–15

TIAN & DEUVE, 2000: 295

MATERIAL EXAMINED. 1♂, 1♀: [Coll. I.R.Sc.N.B/Vietnam, Cuc Phuong N. P., 20.1900 N/105.3630 E; 19-23.VII.2011, night collecting, leg. J. Constant & J. Bresseel, I. G. 31.933] (RBINS).

DESCRIPTION.

Length: 18.5 mm (male), or 20.0 mm (female); width: 7.0 mm (male), or 8.0 mm (female). Habitus as in Fig 13. Body broad, strongly shiny and glabrous, black; male slightly smaller than female; antennae, palpi, lateral expanded margins of pronotum, coxae, trochanters and femora of all legs reddish brown; underside light dark brown; head densely and coarsely punctate; sparsely and coarsely punctate on pronotum (except disc); base of intervals 4 and 6 with three or four punctures, all intervals with faint and irregular punctures; head with rough sculptures or wrinkles; pronotum moderately striate; elytra glabrous; microsculptural meshes isodiametric on pronotum, indistinct on head, and strongly transverse on elytra.

Head: slightly wider than long, HW/HL=1.07-1.09; eyes very large and strongly prominent; frons and vertex moderately convex, frontal impressions well defined, small and short, not beyond level of mid-eyes; clypeus quadrisetose, basal portion raised, with a median



Figs 13–15. *Orthogonius nigripes* Tian & Deuve, 2000. 13. habitus, male; 14–15. aedeagus, lateral view and apical lamella, dorsal view.

longitudinal impression in base, joined to clypeal-frontal suture; labrum six setose, straight at apical margin; palpi stout, subcylindrical; 3rd maxillary palpomere as long as 4th, both glabrous; 2nd labial palpomere dilated on apical half, bisetose in inner margin and with a few short setae near or at apex; 2nd palpomere as long as 3rd which is evenly expanded medially; ligula small, bisetose at apex; mentum edentate, asetose; palpigers setose; antennae short, extending over base of elytra; pubescent from basal 1/3 of 4th antennomere, slightly expanded at pubescent portion of the joint; 3rd antennomere as long as 4th, and 5th.

Pronotum: strongly transverse, PW/PL=1.75-1.80, widest at about mid-length; disc moderately convex; sides extraordinarily and evenly expanded; fore angles protruding beyond fore margin; anterior and posterior margins well beaded, anterior one wider than posterior one; base distinctly bisinuate; lateral expanded margin well defined, evenly widen throughout, flat and rough, widely reflexed; both transversal impressions distinct, basal foveae big and deep, median line clear.

Elytra: elongate ovate, EL/EW=1.53–1.55, widest at about mid-length, moderately convex; sides nearly parallel at mid-length; basal border incomplete, interrupted against 1st-5th intervals; apex roundly truncate, inner apical angle small, denticulate; striae moderately deep; intervals convex, subequal in width; 3rd interval without setiferous pore; 7th interval not carinate.

Legs: fore tibiae slender, slightly expanded at apex, with apical margin arcuate, and nearly obliquely truncate near outer angle, outer angle nearly rectangular, outer margin distinctly serrate; middle and hind coxae smooth and glabrous; middle tibiae slender, not dilated in male, hardly expanded at apex; hind tibiae slender, slightly expanded at apex, with apical spurs long and sharp; 1st hind tarsomere much longer than 2nd; 3rd tarsomere slightly longer than 4th which is nearly bilobed at apex (lobe 2/3 as long as joint); all claws weakly pectinate (each claw with three small teeth).

Ventral side: prosternal process bordered at apex; abdominal ventrite VII complete in male; ventrite VII with two pairs of setae on either side of apical margin in both sexes.

Male genitalia (Figs 14–15): small and stout; dorsal opening very wide and long; base slightly dilated; ventral margin nearly straight towards apex, which is more or less blunt; apical lamella very short and small, hardly visible from above (concealed by dorsal membranous).

SEXUAL DIMORPHISM. 1st-3rd Protarsomeres covered with two longitudinal rows of spongy, scale-like setae in male along middle portion; female broader and stouter than male.

DISTRIBUTION. China (Hainan Island) and northern Vietnam. It is recorded from Vietnam for the first time.

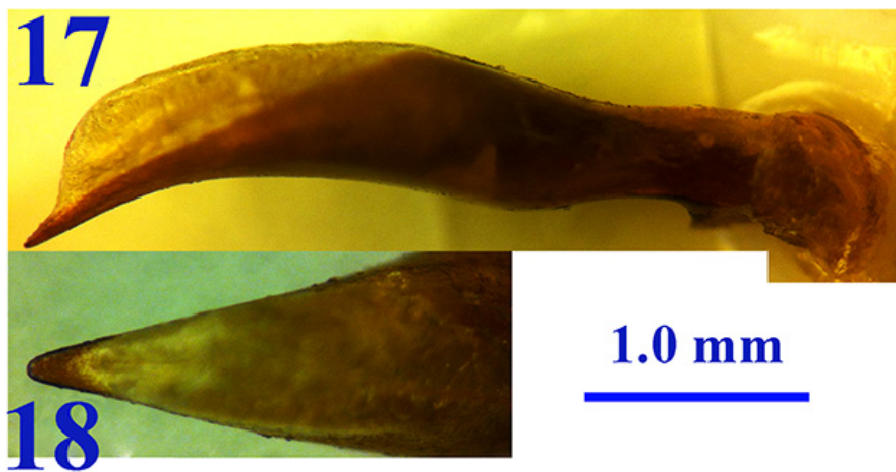
***Orthogonius angustus* Chaudoir, 1871**

Figs 16–18

CHAUDOIR, 1871: 114

MATERIAL EXAMINED. Type material: 1♂, holotype: [*angustus*Chaud. / Malaisie/ Siam? Castelnau] (MNHN).

Additional material. 6♂: [Coll. I.R.Sc.N.B./Vietnam: Dong Nai Biosphere Res.; 11°18' N, 107°06' E/25.VI.-6.VII.2012, night collecting/Leg. J. Constant & J. Bresseel/I.G. 32.161] (RBINS); 1♂, ibid (MNHN); 1♂, ibid (SCAU); 10♂, 3♀: [Coll. I.R.Sc.N.B./Vietnam, Cat Tien N.P./11°26' N, 107°26' E/ 6-16.VIII.2012, Malaise trap/Leg. J. Constant & J. Bresseel/I.G. 32.161](RBINS); 3♂, 1♀: ibid (MNHN); 2♂, 1♀: ibid (SCAU).



Figs 16–18. *Orthogonius angustus* Chaudoir, 1871. 16. habitus, male; 17–18. aedeagus, lateral view and apical lamella, dorsal view.

DESCRIPTION.

Length: 13.0–14.0 mm; width: 4.8–5.0 mm; Habitus as in Fig. 16. Body small, moderately shiny; brownish to dark brown, head darker than pronotum and elytra; head and pronotum impunctate; elytra finely and sparsely punctured; head and pronotum faintly and indistinctly wrinkled; microsculptures: engraved meshes isodiametric, clear on elytra, unclear on head and pronotum.

Head: stout, as long as wide; eyes very large and prominent; frons and vertex slightly convex, frontal impressions pit-like, small; clypeus bisetose, basal portion with short furrows on both sides and median linking frontoclypeal suture and frontal impressions respectively; labrum six setose, shallowly but widely emarginate at apical margin; palpi slender, subcylindrical, 3rd maxillary palpomere as long as 4th which is glabrous; 3rd one with several short setae at apex; 2nd labial palpomere as long as 3rd, bisetose on inner margin, with several additional setae near apex; 3rd one with a few short setae; ligula small, slightly dilated at apex, bisetose; mentum edentate, both mentum and submentum bisetose; palpigers setose; antennae quite short and rather slender, extending to base of elytra; pubescent from basal 1/3 of 4th antennomere, slightly expanded at pubescent portion; 3rd antennomere as long as 4th, slightly shorter than 1st.

Pronotum: strongly transverse, PW/PL=1.5–1.6; disc moderately convex; fore (except for median portion) and basal margins well beaded, sides evenly and roundly expanded, widest at mid-length; posterior margin slightly wider than anterior one, bisinuate, with median portion slightly protruded backwards; anterior margin nearly straight; both fore and hind angles rounded off, but fore angle more rounded; lateral expanded margin well defined, narrow, distinctly reflexed; fore transversal impression faint, hind one well marked; basal foveae large and deep; median line clear.

Elytra: elongate ovate, moderately convex; EL/EW=1.6; widest and not parallel-sided at mid-length; basal border complete; apex obliquely sinuate towards apex, but suddenly and shortly truncate before tip, making inner angle nearly rectangular, without denticle; sutural angle wide and shallow; striae deep, punctate-striate; intervals distinctly convex, subequal in width in middle portion; 3rd interval with three setiferous pores; 7th interval simple.

Legs: rather stout, strongly setose; fore tibiae strongly expanded at apex, with outer angle strongly protruded, apical margin concave and outer margin subserrate; middle coxae with several rather long setae medially; hind coxae smooth and glabrous; hind femora strongly expanded, with 4 (male) or 7 (female) posterior setae; middle tibiae short and stout, stouter in female than in male, distinctly curved, with outer margin with two rows of setae, distinctly and strongly serrate; hind tibiae gradually dilated towards apex, with apical spurs very short and broad; fore and midtarsi stout, hind ones much slender; 1st hind tarsomere much longer than 2nd (1.3–1.4 times), 3rd slightly longer than 4th (1.1–1.2 times) which is asymmetrically bilobed at apex (outer lobe distinctly longer than inner one); fore and midtarsal claws moderately pectinate, hind ones simple.

Ventral side: prosternal process bordered at apex; abdominal ventrite VII evenly and shallowly bisinuate in male; ventrite VII with two pairs of setae on either side of apical margin in both sexes.

Male genitalia (Figs 17–18): very elongate, slender, with median portion enlarged; ventral margin widely bisinuate, gradually narrowed towards apex which is sharp, deeply and suddenly cut near base; dorsal opening long and wide; in dorsal view, apical lamella more or less triangular, longer than wide, apex very broad.

DISTRIBUTION. Southern Vietnam and Thailand. It is here recorded from Vietnam for the first time.

NOTE. There is a confusion concerning the type locality of *O. angustus*. According to CHAUDOIR (1871), the unique type specimen was given by M. de Castelnau who said that it was collected from “Ngami Lake (Siam)” (possibly Nong Ngam Lake as the Ngami Lake does not exist in Thailand). But M. de Mniszech told Chaudoir that he had a similar individual which was from Malaysia and only different from the type specimen by coloration. So, Chaudoir presumed that the specimen was actually collected from Malaysia, and added a question mark behind “Siam” on the label. Based on the recent discovery of this species in Vietnam, we believe that the type specimen was collected from Thailand.

***Orthogonius macrophthalmus* Tian & Deuve, 2013**

Figs 19–21

TIAN & DEUVE, 2013: 96

MATERIAL EXAMINED. 1♂, 1♀: Vietnam: [I.R.Sc.N.B./Vietnam: Tam Dao N.P., 21.31 N/105.33 E; 25-30.VII.2011, Malaise trap, leg. J. Constant & J. Bresseel, I.G. 31.933 GTI project](RBINS); 1♀: *ibid* (MNHN).

DIAGNOSIS. It is close to *O. carinatus* Tian & Deuve, 2013, but eyes distinctly larger, labrum straight at frontal margin (convex in the latter); lateral expanded margin of pronotum much wider near base than front; inner angle of elytra finely denticulate; and middle tibiae slightly expanded medially instead of thin and curved medially (as in *O. carinatus*).

Length of male: 14.5 mm; habitus of male as in Fig. 19.

Male genitalia (Figs 20–21): median lobe of aedeagus stout, bisinuate ventrally, gently arcuate at apical 1/3, evidently expanded in middle portion; dorsal opening large, gently and gradually narrowed from subapex towards apex, broadly obtuse at apex; in dorsal view, apical lamella thin, longer than wide, gradually narrowed towards apex which is blunt.

SEXUAL DIMORPHISM. Male smaller than female; labrum straight at frontal margin (convex in female); densely punctate on head, and also on pronotum and elytra (only on head in female); middle tibiae slightly expanded medially in male.

DISTRIBUTION. Northern Vietnam.

***Orthogonius pseudocheni* Tian & Deuve, 2006**

Figs 22–24

TIAN & DEUVE, 2006: 79

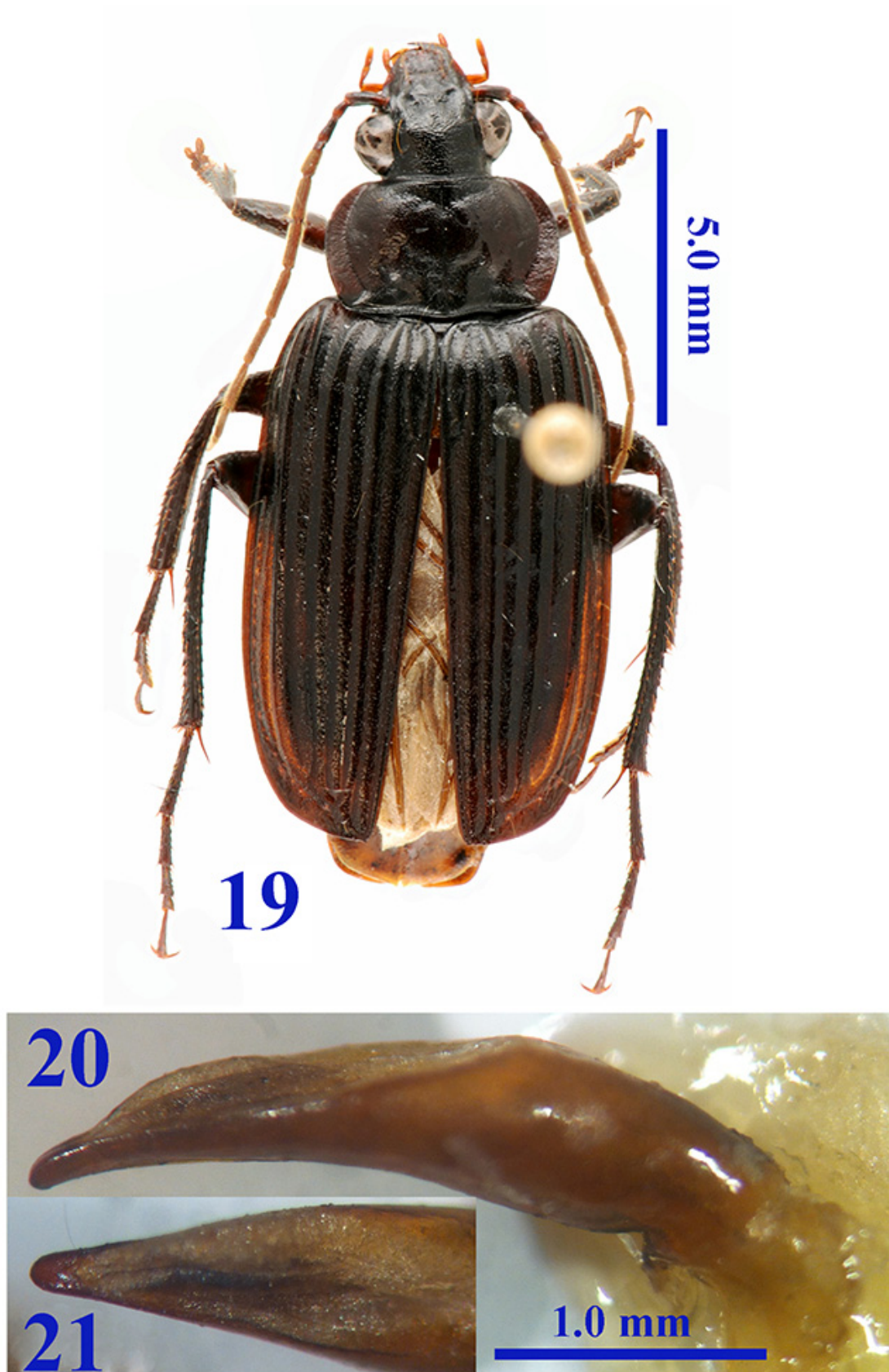
MATERIAL EXAMINED. 1♂: Vietnam: [Coll. I.R.Sc.N.B./Vietnam, Ninh Thuan Prov., Phuoc Binh N.P., 12°04' N/108°45' E, 26.VII-1.VIII. 2015, light trap, Leg. J. Constant & J. Bresseel, GTI Project, I.G.: 32.779] (RBINS); 4♂, 1♀: Vietnam: [Annam, Ben Tram, Basse Riv. De Quang-Tri, M. Poilane, 1924](MNHN); 1♂: *ibid* (SCAU).

DIAGNOSIS. Dark brown to light dark brown, appendages yellowish, medium-sized; eyes moderately developed; labrum deeply emarginated at front; mentum and submentum bisetose; palpi setose; even elytral intervals much wider than odds; prosternal process bordered at apex; middle and hind coxae setose medially; hind tarsal spurs short and stout, but much longer than wide; hind femora bearing three setae posteriorly.

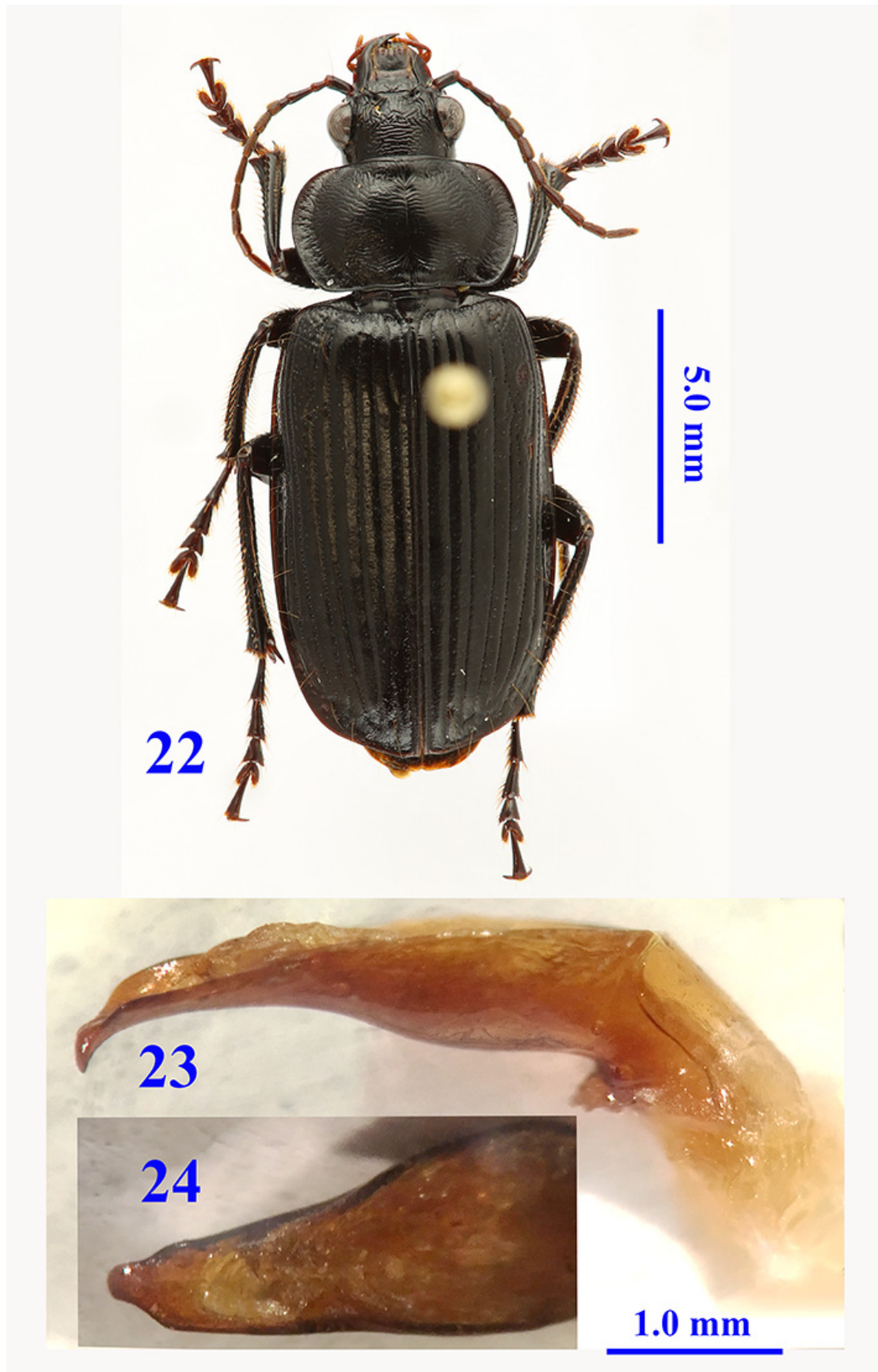
Length: 15.0–17.0 mm; width: 6.5–7.0 mm. Habitus as in Fig. 22.

Male genitalia (Figs 23–24): median lobe of aedeagus strongly twisted ventrally and hooked at apex in lateral view, with a short apical lamella which is broad at apex.

DISTRIBUTION. Central and Southern Vietnam.



Figs 19–21. *Orthogonius macrophthalmus* Tian & Deuve, 2013. 19. habitus, male; 20–21. aedeagus, lateral view and apical lamella, dorsal view.



Figs 22–24. *Orthogonius pseudocheni* Tian & Deuve, 2006. 22. habitus, male; 23–24. aedeagus, lateral view and apical lamella, dorsal view.

Discussion

The larvae of orthogoniine beetles are termitophilous, living in termite nests (WASSMANN, 1920), but the adults are winged and so they can fly. They are particularly active at night, actively flying and foraging on leaves and tree trunks (Jérôme Constant, pers. com.). But detailed information about their biology and ecology still remains unknown.

As Vietnam stretches almost two thousand kilometers from south to north and each of the main three regions (viz. Tonkin, Annam and Cochinchina) has its own orthogoniine fauna. Considering that the knowledge on this group is still limited at present, it is expected that numerous new species are still to be discovered in the future.

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