

New species of the genus *Anomala* Samouelle from mainland South East Asia and South China (Coleoptera: Scarabaeidae: Rutelinae)

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Abstract

Twelve new species of the genus *Anomala* Samouelle, 1819 (Coleoptera: Scarabaeidae: Rutelinae) are described and illustrated: *A. mausonica* n. sp., *A. atriventris* n. sp., *A. rubida* n. sp., *A. pacholatkoii* n. sp., *A. langbianensis* n. sp., *A. cognata* n. sp., *A. ahrensi* n. sp. from Vietnam, *A. oehlerii* n. sp. from Laos, *A. limbourgi* n. sp. from Cambodia, *A. porrecta* n. sp., *A. monogramma* n. sp., and *A. keithi* n. sp. from South China. *Mimela kuatuna* Machatschke, 1955 is transferred to the genus *Anomala* (n. comb.).

Key words: Systematics, Rutelinae, new species, new combination, Vietnam, Cambodia, Laos, China.

Zusammenfassung

Zwölf neue Arten der Gattung *Anomala* Samouelle, 1819 (Coleoptera: Scarabaeidae: Rutelinae) werden beschrieben und abgebildet: *A. mausonica* n. sp., *A. atriventris* n. sp., *A. rubida* n. sp., *A. pacholatkoii* n. sp., *A. langbianensis* n. sp., *A. cognata* n. sp., *A. ahrensi* n. sp. aus Vietnam, *A. oehlerii* n. sp. aus Laos, *A. limbourgi* n. sp. aus Kambodscha, *A. porrecta* n. sp., *A. monogramma* n. sp. und *A. keithi* n. sp. aus Südchina. *Mimela kuatuna* Machatschke, 1955 wird in die Gattung *Anomala* gestellt (n. comb.).

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1 Introduction

Approximately 270 species of the almost globally distributed genus *Anomala* (see SAMOUELLE 1819) were described from China and mainland South East Asia so far. A systematic review of the Rutelinae of Indochina was published by PAULIAN (1959). In the course of the examination of unidentified Asian *Anomala* material of various institutional and private insect collections (see below) several new species from South East Asia and China could be identified. In this paper, twelve of them are described.

Although it is desirable to present new species in the framework of revisions of greater entities like genera, species groups, or a geographical unit, such approach is sometimes opposed by ordinary obstacles like loan expirations in connection with limited time for scientific work. Therefore, the descriptions here appear not in a greater context.

Acknowledgements

I am greatly indebted to JOHANNES FRISCH, JOACHIM WILLERS and BERNDT JAEGER (all MNHB), PATRICK GROOTAERT and POL LIMBOURG (both IRSNB), and MATTHIAS NUSS and OLAF JÄGER (both SMTD) for supporting my studies of material in their collections. I also thank DIRK AHRENS (Bonn), DENIS KEITH (Chartres),

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In addition, I studied material collected by A. NAPOLOV in 1997 and in 1998 during baseline biological surveys in protected areas of North Vietnam carried out as a joint venture between the Society for Environmental Exploration (London) and the Institute for Ecology and Biological Resources (Hanoi) through the SEE-Vietnam Forest research Project.

I express my cordial thanks to ALEŠ BEZDĚK (České Budějovice) who provided some 'hard to get' literature, and to PAUL LAGO (Oxford, Mississippi) for correcting the English and improving the manuscript with many helpful comments.

2 Methods

Characters and specimens were examined using a dissecting stereo microscope (ZEISS) and fiber optic illumination. The terminology is described in detail by ZORN (2006). Habitus images were modified with stacking and graphics software (CombineZP, Adobe Photoshop CS3).

Type specimens of the species described in this paper bear the following labels: "Holo-/Paratypus *Anomala* [species epithet] sp. nov. det. ZORN [year]". Different labels are separated by "|". Labels are cited in their original spelling, except for the

following adaptations according to the general format requirements of the journal: names of persons (except authors of species) in small capitals, scientific names of genera and species in italics, dates with the months always in Roman numbers.

Acronyms of depositories

ANPC	Collection Alexander Napolov, Riga
ARPC	Collection ANDREAS REICHENBACH, Leipzig
CZPC	Collection CARSTEN ZORN, Gnoien
IRSNB	Institut royal des Sciences naturelles de Belgique, Brussels
JSPC	Collection JAN STRNAD, Prague
KWPC	Collection KAORU WADA, Tokyo
MNHB	Museum für Naturkunde der Humboldt Universität, Berlin
NMPC	National Museum, Prague [Národní muzeum v Praze]
SMTD	Staatliches Museum für Tierkunde, Dresden
TICB	Tammin Insect Collection, Brno

3 Descriptions of new species

Anomala mausonica n. sp.

(Figs. 1, 15)

Holotype ♂: “Tonkin, Montes Mauson, April, Mai, 2–3000’, H. FRUHSTORFER” (MNHB).

Etymology

The new species is named after the type locality Mt. Mau Son (Vietnam).

Description

Body shape. Elongate ovoid; sides of elytra subparallel. Length 15.5 mm. Width 8.6 mm.

Color. Entirely orange brown with rather strong iridescent shine (color might be more red in living or fresh specimens); legs light brown; metasternum, metacoxae and abdominal sternites dark castaneous.

Head. Clypeus trapezoidal, corners strongly rounded; with anterior margin reflexed; very densely and partly confluent punctate; frons punctate like the clypeus, with a shallow impression; vertex sparsely punctate; ratio interocular width/width of head ca. 0.62; antennal club longer than segments 2–7 combined.

Pronotum. Sides slightly sinuate before posterior angles, subparallel in the middle, strongly convergent in the anterior third; anterior angles acute and strongly produced; posterior angles obtuse; middle line slightly sulcate; basal marginal line almost complete, somewhat indistinct anterior to scutellum; punctation very dense on disc, becoming partly coalescent laterally; with distinct micropunctation.

Elytra. Regularly striate; intervals convex; striae punctures distinct, sometimes longitudinally coalescing; secondary row of punctures in subsutural interstice anteriorly doubled, that of the second and third interstice sometimes

with longer distances between punctures; elytral surface with additional sparse micropunctation; hind margin evenly rounded.

Pygidium. Tumorid; with strongly transverse, partly coalescing punctures.

Abdominal sternites. Sides not carinate.

Metasternum. Laterally with dense, ocellated punctation and moderately long suberect setae.

Legs. Slender; metatibia weakly fusiform; lateral tooth of protibia acute; protarsomere 5 thickened; modified pro- and mesotarsal claw apically bifid, the former with a small tooth ventrally.

Aedeagus. See Fig. 15.

Differential diagnosis

The external appearance and the shape of the aedeagus of the new species are very similar to those of *A. longicarcara* Lin, 2002, but the apices of the parameres are more asymmetrical and more strongly hooked inward in the new species. The apex of the ventral plate is strongly bent and lacking the large hook found in *A. longicarcara*. The iridescent sheen of the elytra is more distinct in the holotype of *A. mausonica* than in all specimens of *A. longicarcara* examined. Moreover, both species are probably related to *A. spatuliformis* Lin, 2002 (see LIN 2002) which, besides an overall similarity, exhibits similar aedeagal structure with typical asymmetric extensions of the parameres and a strong hook of the ventral plate.

Distribution

The new species is known only from the type locality Mt. Mau Son in northeastern Vietnam.

Anomala atriventris n. sp.

(Figs. 2, 16)

Holotype ♂: “N Viet Nam (Tonkin), pr. Hoang Lien Son, SA PA, 11.–15.V.1990, P. PACHOLÁTKO leg. | AV 70” (TICB, later NMPC).

Etymology

The epithet refers to the predominantly black ventral surface of this species.

Description

Body shape. Elongate ovoid. Length 14.8 mm. Width 8.4 mm.

Color. Dorsal surface including propygidium, pygidium and sides of abdominal sternites orange brown (color might be more red in living or fresh specimens); antennal club dark brown; ventral surface and legs black; central parts of meso- and metafemora and metasternum dark castaneous.

Head. Clypeus subrectangular, corners strongly rounded; anterior margin moderately reflexed; clypeus and frons very densely punctate, partly rugose; vertex with sparser and finer punctation; ratio interocular width/width of head ca. 0.62; antennal club longer than segments 2–7 combined.

Pronotum. Sides slightly sinuate before posterior angles, strongly and almost evenly convergent towards acute and very strongly produced anterior angles; posterior angles square; anterior and posterior angles slightly rounded; middle line slightly sulcate; basal marginal line almost complete, somewhat indistinct anterior to scutellum; punctation fine, shallow, moderately dense; micropunctation very sparse and shallow.

Elytra. With regular, shallow stria; intervals nearly flat; stria punctures distinct; subsutural interstice with two partly irregular secondary striae that unite towards the apex; secondary stria of the second interstice entire, that of the third interstice somewhat irregular; elytral surface with additional sparse and very shallow micropunctation; hind margin evenly rounded.

Pygidium. Tumid; with shallow, transverse, partly coalescing punctures.

Abdominal sternites. Sides not carinate; nearly glabrous.

Metasternum. Laterally with dense, shallow punctation and moderately long, suberect setae.

Legs. Middle and hind legs very slender; metatibia very weakly fusiform; lateral tooth of protibia acute; protarsomere 5 thickened; modified pro- and mesotarsal claw apically bifid, the former with a small tooth ventrally.

Aedeagus. See Fig. 16.

Differential diagnosis

Anomala atriventris is very distinctive in its coloration: orange brown (probably more red in fresh specimens) dorsally, predominantly black ventrally. In contrast to all similar species (striate elytra, slender legs, tumid pygidium), the elytral striae are very inconspicuous, the surface appearing to be smooth. The aedeagus is almost symmetrical, and the parameres are conspicuously compressed.

Distribution

Anomala atriventris is only known from the type locality Sa Pa in North Vietnam.

Anomala oehleri n. sp. (Figs. 3, 17)

H o l o t y p e ♂: “Laos-NE, Hua Phan prov., Ban Saluei, Phu Phan Mt., 20°15'N 104°02'E, 1500–2000 m, 26.IV.–11.V.2001, J. BEZDĚK & D. HAUCK leg.” (CZPC).

P a r a t y p e s: 4 ♂♂, 2 ♀♀, same data as holotype (CZPC). – 8 ♂♂, same data as holotype, but J. BEZDĚK leg. (ARPC, CZPC, MNHB).

Etymology

The new species is named after my mentor, the neurobiologist Prof. Dr. JOCHEN OEHLER (Dresden).

Description

H o l o t y p e ♂. Body shape. Elongate ovoid; strongly convex. Length 16.0 mm. Width 9.1 mm.

Color. Pronotum, elytra and femora testaceous with weak metallic green shine; elytra slightly lighter and somewhat iridescent; head, pygidium and remaining part of the ventral surface including tibiae and tarsi dark castaneous with metallic green shine; clypeus and distal margins of abdominal sternites with purplish reflections.

Head. Clypeus trapezoidal with broadly rounded front angles, moderately reflexed; frons and clypeus densely and rugosely punctate; vertex with fine and sparse punctation; ratio interocular distance/width of head: 0.59; antennal club slightly longer than segments 2–7 combined.

Pronotum. Sides weakly convergent in the posterior half, more strongly convergent before the acute and produced anterior angles; posterior angles obtuse, rounded; basal marginal line broadly interrupted medially; surface with dense, fine punctation and additional, hardly visible micropunctation.

Elytra. Regularly striate with weakly convex intervals; subsutural interstice with two irregular secondary striae that coalesce before the apex; second and third interstice with a secondary stria, the latter somewhat irregular; fourth interstice with some additional punctures in the posterior third; elytral surface with distinct, sparse micropunctation.

Pygidium. Strongly tumid; with striolation which is arranged concentrically around the apex.

Abdominal sternites. Sides of sternites 1–3 carinate.

Metasternum. Laterally with very dense, ocellated punctation and long suberect setae; lateral margins strongly carinate.

Legs. Slender; metatibia weakly fusiform; lateral tooth of protibia acute; modified pro- and mesotarsal claw apically bifid, the former slightly enlarged ventrally.

Aedeagus. See Fig. 17.

♀♀. Length of antennal club and funicle subequal. Pygidium weakly tumid. Bifid protarsal claw more slender.

Variability

Body length 15.8–17.1 mm. Body width 8.8–9.4 mm. The faint metallic hue of the dorsal surface varies between greenish and pinkish.

Differential diagnosis

The strongly asymmetrical aedeagus with the deeply incised, thus two branched left paramere characteristic of *A. oehleri* is also present in *A. machatschkei* Frey,

1972, *A. triancistris* Lin, 1999 (see LIN 1999), *A. rubida* n. sp., *A. monogramma* n. sp., *A. porrecta* n. sp., *A. pacholatkoii* n. sp., *A. limbourgi* n. sp., and *A. punctulicollis* sensu PAULIAN (1959) (the latter is probably not the same species as the female type on which the description of *A. punctulicollis* was based by FAIRMAIRE 1893). Although this derived character might represent a synapomorphy of the mentioned species, it is possible that this basic structure developed independently more than once. However, *A. oehlerii* is probably a very close relative of *A. machatschkei* and *A. triancistris*. These extremely similar species are easily separated from *A. oehlerii* by the shape of the aedeagus. In dorsal view, the apex of the right paramere projects medially (Fig. 17b), whereas it projects laterally in *A. triancistris* and posteriorly in *A. machatschkei*.

Distribution

Anomala oehlerii is only known from the type locality Mt. Phu Phan in northern Laos.

Anomala rubida n. sp.

(Figs. 4, 18)

Holotype ♂: “N Viet Nam (Tonkin), pr. Hoang Lien Son, SA PA, 11.–15.V.1990, P. PACHOLÁTKO leg. | Coll. P. PACHOLÁTKO Invt. No.” (TICB, later NMPC).

Paratypes: 6 ♂♂, 7 ♀♀, same data as holotype (CZPC, TICB). – 1 ♂, same data as holotype, but additional label “AV 74” (TICB). – 1 ♂, “Vietnam N (Sa Pa), Lao Cai Province, 250 km from Hanoi bearing 310°, Sa Pa vill. env., Hoang Lien Son Nat. Res., 30.V.–10.VI.1998, h=1250 m, leg. A. NÁPOLOV | *Anomala* sp., det. O. KABÁKOV, 2001” (ANPC). – 1 ♀, same data as before, but without identification label of KABÁKOV (ANPC). 1 ♀, same data as before, but “27.–31.V.1998 | ♀” (ANPC).

Etymology

The Latin adjective “rubidus” stands for “deep red” and refers to the red dorsum of this species.

Description

Holotype ♂. Body shape. Elongate ovoid. Length 14.0 mm. Width 8.0 mm.

Color. Pronotum, elytra and pygidium red; remaining part of the body including the distal margin of the pygidium dark brown to black.

Head. Clypeus rectangular with rounded front angles; very densely, somewhat rugosely punctate; punctuation of frons similar to that of the clypeus, with shallow impression; vertex finely and moderately densely punctate; ratio interocular distance/width of head: 0.61; antennal club distinctly longer than segments 2–7 combined.

Pronotum. Sides slightly convergent in the posterior two-thirds, strongly convergent in the anterior third; anterior angles acute and produced; posterior angles obtuse;

basal marginal line interrupted in the middle; punctuation shallow, fine and moderately dense.

Elytra. Regularly striate; intervals convex; subsutural interstice with a secondary stria which becomes irregular in the anterior third, therefore subsutural interstice forming two secondary costae posteriorly; second and third interstice with weakly developed secondary stria; hind margin regularly rounded; whole elytral surface with distinct, sparse micropunctuation.

Pygidium. Tumid; punctures coalescing to a fine transverse reticulation which is arranged concentrically around the apex; apex with scattered long setae.

Abdominal sternites. Sides not carinate.

Metasternum. Laterally with dense, ocellated punctuation and long suberect setae; lateral margins carinate.

Legs. Slender; metatibia weakly fusiform; lateral tooth of protibia acute; modified pro- and mesotarsal claw apically bifid; the lower branch of the former very broad and apically somewhat truncated.

Aedeagus. See Fig. 18.

♀♀. Body somewhat broader than in males (see below).

Antennal club slightly longer than antennomeres 2–7 combined. Sides of pronotum parallel in the posterior half. Pygidium not tumid. Bifid protarsal claw more slender.

Variability

♂♂: Body length 12.8–14.6 mm, body width 7.2–7.7 mm. ♀♀: Body length 13.9–15.2 mm, body width 7.5–8.5 mm. Secondary stria of subsutural interstice sometimes irregular; secondary stria of third interstice can be reduced to a few scattered punctures. Shape of the parameres without notable variation.

Differential diagnosis

Anomala rubida belongs to the Chinese and South East Asian group of *Anomala* species with a very asymmetric aedeagus with a strongly bifid left paramere. Assigned to this group are *A. machatschkei* Frey, 1972, *A. triancistris* Lin, 1999, *A. rubida* n. sp., *A. monogramma* n. sp., *A. porrecta* n. sp., *A. pacholatkoii* n. sp., *A. limbourgi* n. sp., and *A. punctulicollis* sensu PAULIAN (1959) (see diagnosis of *A. oehlerii*). Because of the similarity of the genitalia and the weakly sulcate elytra, *A. rubida* probably is most closely related to *A. oehlerii*, *A. triancistris*, and *A. machatschkei* from which it is separated by the typical coloration (red dorsum and a black venter), smaller body size, and unique shape of the parameres.

Distribution

Anomala rubida is only known from the type locality Sa Pa in North Vietnam.

Anomala monogramma n. sp.

(Figs. 5, 19)

Holotype ♂: “S China, NE Guangxi Baogai Mt., 1376 m, VI.2009, N 25°31.594' E 110°57.263', lgt. R. SEHNAL & M. HÄCKEL” (CZPC).

Paratypes: 1 ♂, 3 ♀♀, same data as holotype (CZPC, MNHB). – 1 ♂ “Museum Paris, Kouy-Tchéou, P. CAVALERIE 1910” (MNHB).

Etymology

The epithet of the new species refers to the M-shaped marking of the pronotum.

Description

Holotype ♂. Body shape. Elongate ovoid; sides of elytra subparallel. Length 15.4 mm. Width 8.5 mm.

Color. Entirely light brown with weak metallic shine; pronotum somewhat paler; hind part of clypeus, frons, vertex, hind margin of scutellum, elytral suture, hind margin of pygidium including a small transverse patch connected with the latter on each side, metatibia, distal parts of meso- and metatarsomeres and abdominal sternites black, partly with metallic green shine; pronotum with a M-shaped marking consisting of a broad diagonal black patch on each side and two narrow black longitudinal lines framing the middle furrow.

Head. Clypeus short, subrectangular, corners rounded; anterior margin strongly reflexed; clypeus with dense, moderately fine, partly confluent punctures; frons somewhat flattened with the same punctation as the clypeus; vertex more sparsely and finely punctate; ratio interocular distance/width of head: 0.59; antennal club almost as long as funicle and scape combined.

Pronotum. Sides evenly rounded towards the acute and produced anterior angles; posterior angles obtuse, slightly rounded; midline weakly sulcate; basal marginal line interrupted anterior to scutellum; punctation moderately fine, dense, rarely coalescing.

Elytra. Intervals weakly convex; subsutural interstice with irregular punctation forming a regular row in the posterior half; secondary rows of punctures in the second and third interstice developed, forming interrupted striae; hind margin regularly rounded.

Pygidium. Tumid; punctures coalescing to fine transverse reticulation which is arranged concentrically around tumidity; long erect setae present along hind margin.

Abdominal sternites. Sides of abdominal sternites 1–4 strongly carinate.

Metasternum. Laterally with dense, ocellated punctation and suberect setae.

Legs. Slender; meso- and metatibia weakly fusiform; lateral tooth of protibia distinct, acute; modified pro- and mesotarsal claw apically bifid; modified protarsal claw widened on the ventral margin, but without obtuse angle or tooth.

Aedeagus. See Fig. 19.

♀♀. Antennal club slightly longer than antennomeres 2–7 combined. Sides of pronotum parallel in the posterior two-thirds. Pygidium moderately tumid. Terminal tooth of protibia tongue-shaped. Bifid protarsal claw more slender.

Variability

Body length 13.0–15.0 mm. Body width 6.9–8.4 mm. The dark marks of the pronotum vary slightly in size and shape, whereas frons and vertex are constantly black. The specimen from “Kouy-Tchéou” [Guizhou] appears to be somewhat aberrant since it is distinctly smaller and darker than the other specimens and almost lacking the pronotal marks. However, the shape of the aedeagus, which shows almost no variability among all male specimens examined, does not differ from the other specimens.

Differential diagnosis

When exhibiting the typical color pattern (only missing in one paratype), *A. monogramma* is easily separated from all other Chinese and South East Asian species by the M-shaped mark of the pronotum combined with regularly striate elytra. Moreover, the new species is remarkable for the strongly reflexed clypeus which is slightly or moderately reflexed in all similar species and by the modified protarsal claw in males which is lacking a tooth or angle. The very asymmetrical aedeagus with a deeply incised left paramere is characteristic.

Remarks

In addition to the type material, several more specimens from South China with questionable locality data were examined, but not included in the type series.

Distribution

Anomala monogramma is known from the Chinese province Guizhou and northeastern Guanxi.

Anomala porrecta n. sp.

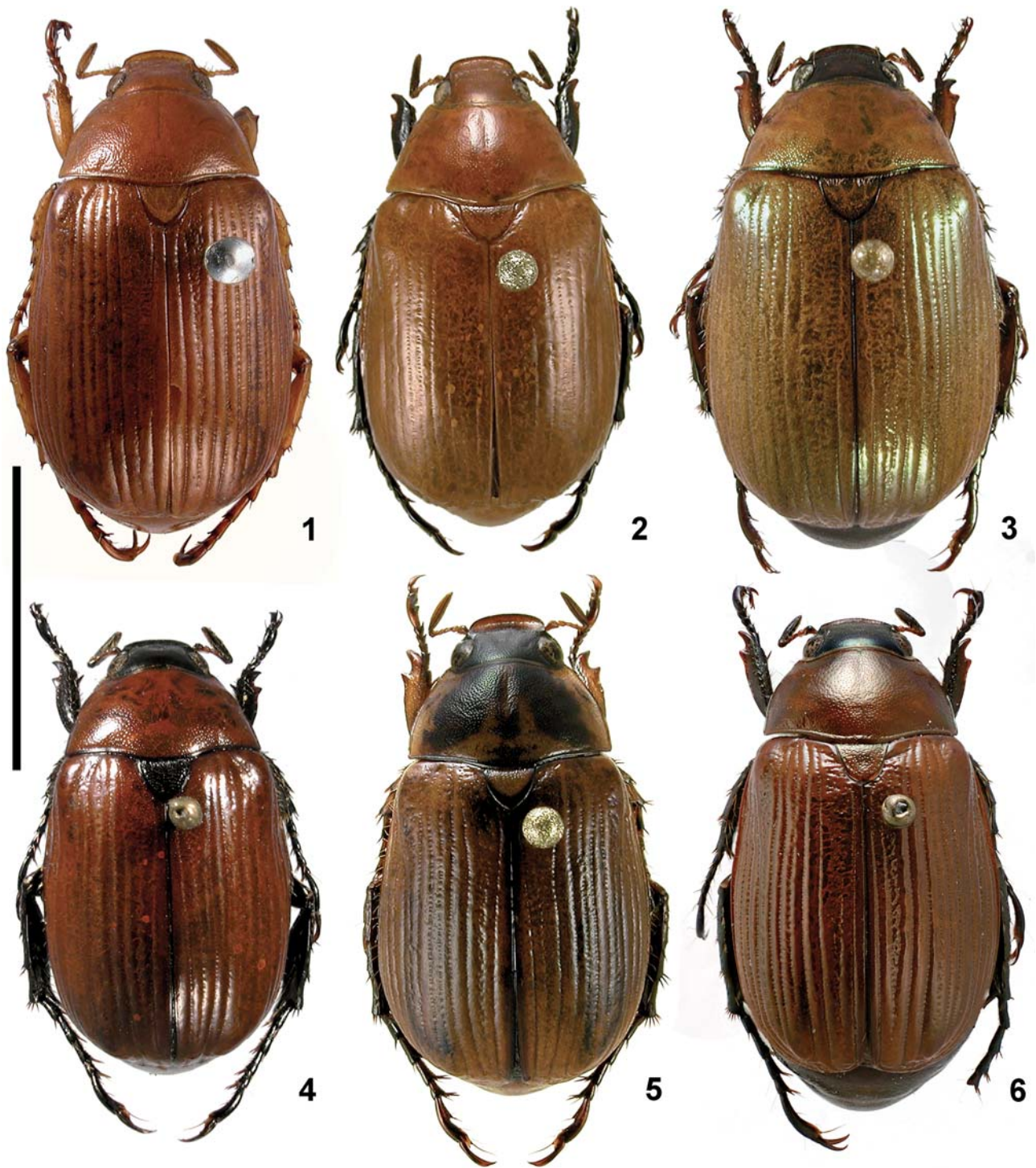
(Figs. 6, 20)

Holotype ♂: “Hongkong China” (MNHB).

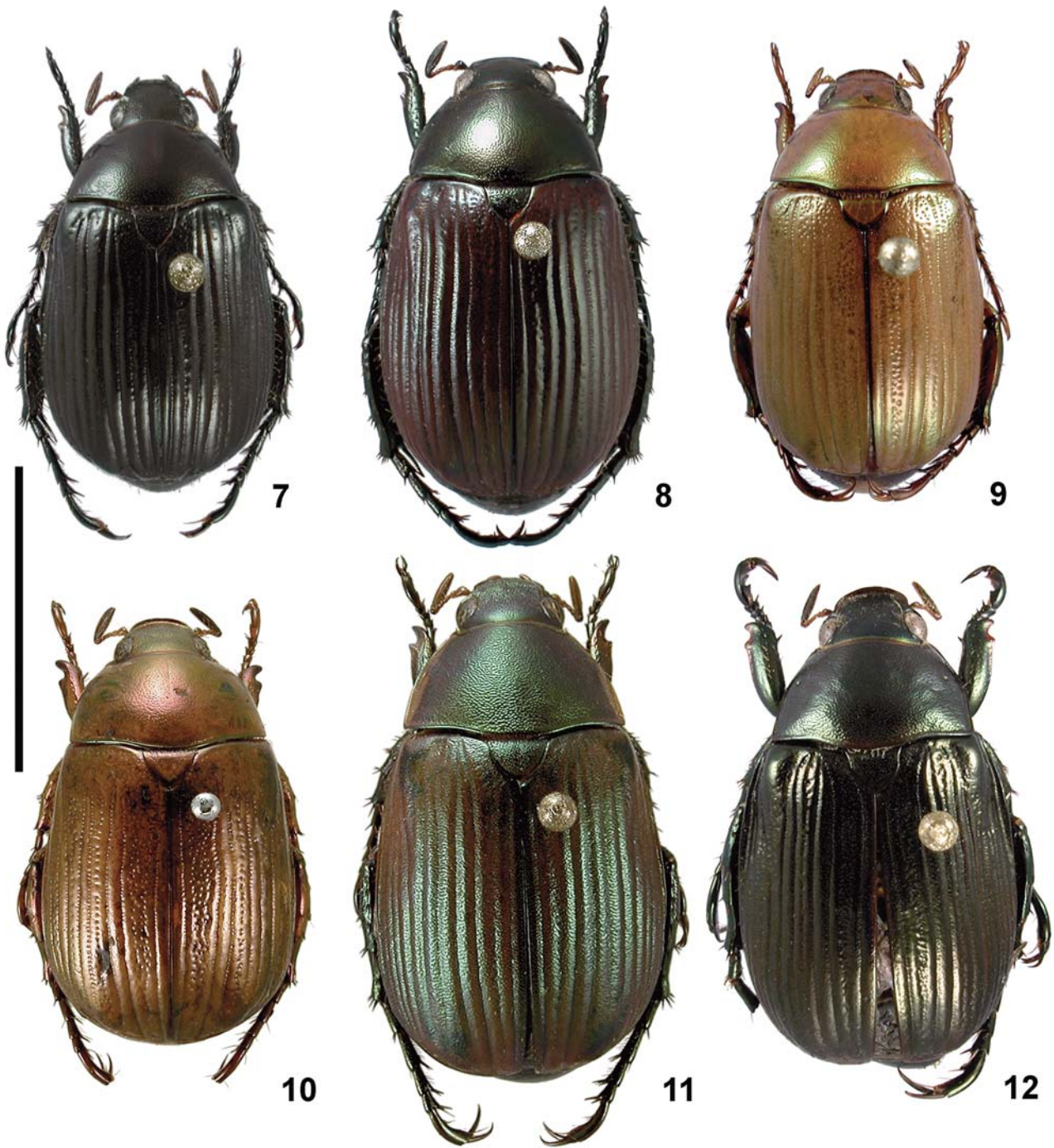
Paratypes: 2 ♂♂, same data as holotype (CZPC, MNHB). – 1 ♀, same data as holotype and separate label “♀” (MNHB). – 1 ♂, “China Canton, LEHMANN S.” (MNHB). – 2 ♂♂, same data as before, and “| ♂ | 87866” (CZPC, MNHB). – 1 ♀, same data as before, and “| ♀ | 87866” (MNHB). – 1 ♀, “China | ♀” (MNHB).

Etymology

The epithet refers to the extensions of the parameres (porrectio, Latin = extension).



Figs. 1–6. *Anomala* spp. – 1. *A. mausonica* n. sp., holotype. 2. *A. atriventris* n. sp., holotype. 3. *A. oehleri* n. sp., holotype. 4. *A. rubida* n. sp., holotype. 5. *A. monogramma* n. sp., holotype. 6. *A. porrecta* n. sp., paratype (Guangdong). – Scale: 10 mm.



Figs. 7–12. *Anomala* spp. – 7. *A. pacholatkoii* n. sp., holotype. 8. *A. limbourgi* n. sp., holotype. 9. *A. langbianensis* n. sp., paratype (Lang Bian). 10. *A. cognata* n. sp., holotype. 11. *A. ahrensi* n. sp., holotype. 12. *A. keithi* n. sp., holotype. – Scale: 10 mm.



Figs. 13–14. *Anomala* spp., vaginal palps. – **13.** *A. langbianensis* n. sp., paratype (Lang Bian). **14.** *A. cognata* n. sp., paratype (Dalat). – Scales: 1 mm.

Description

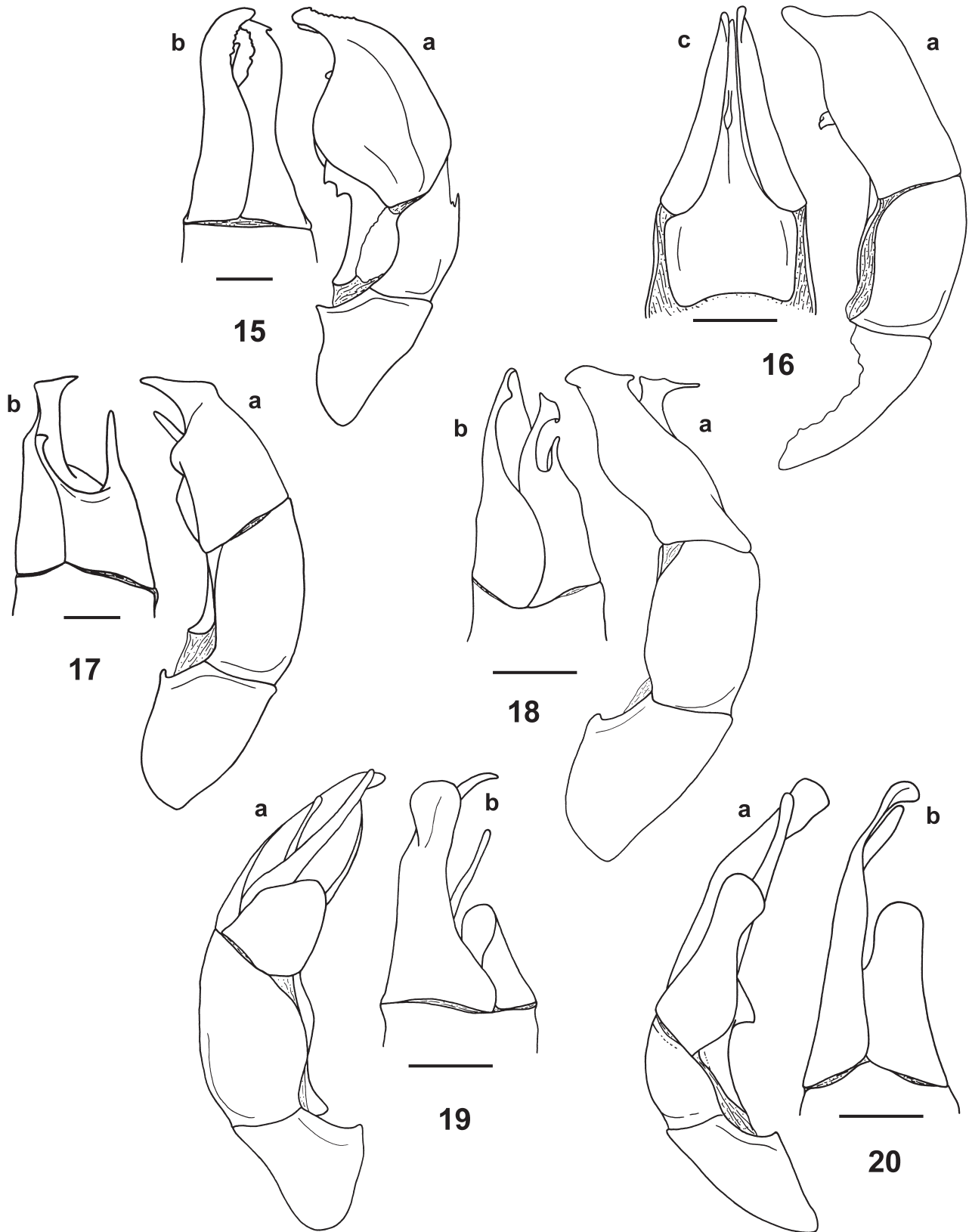
Holotype ♂. Body shape. Elongate ovoid. Length 15.0 mm. Width 8.3 mm.

Color. Ventral surface dark castaneous with very weak metallic green shine; only tibiae and tarsi stronger dark metallic green; head, pronotum and scutellum castaneous with weak iridescent metallic shine; frons and vertex somewhat darker, almost black; clypeus with coppery luster; elytra medium brown.

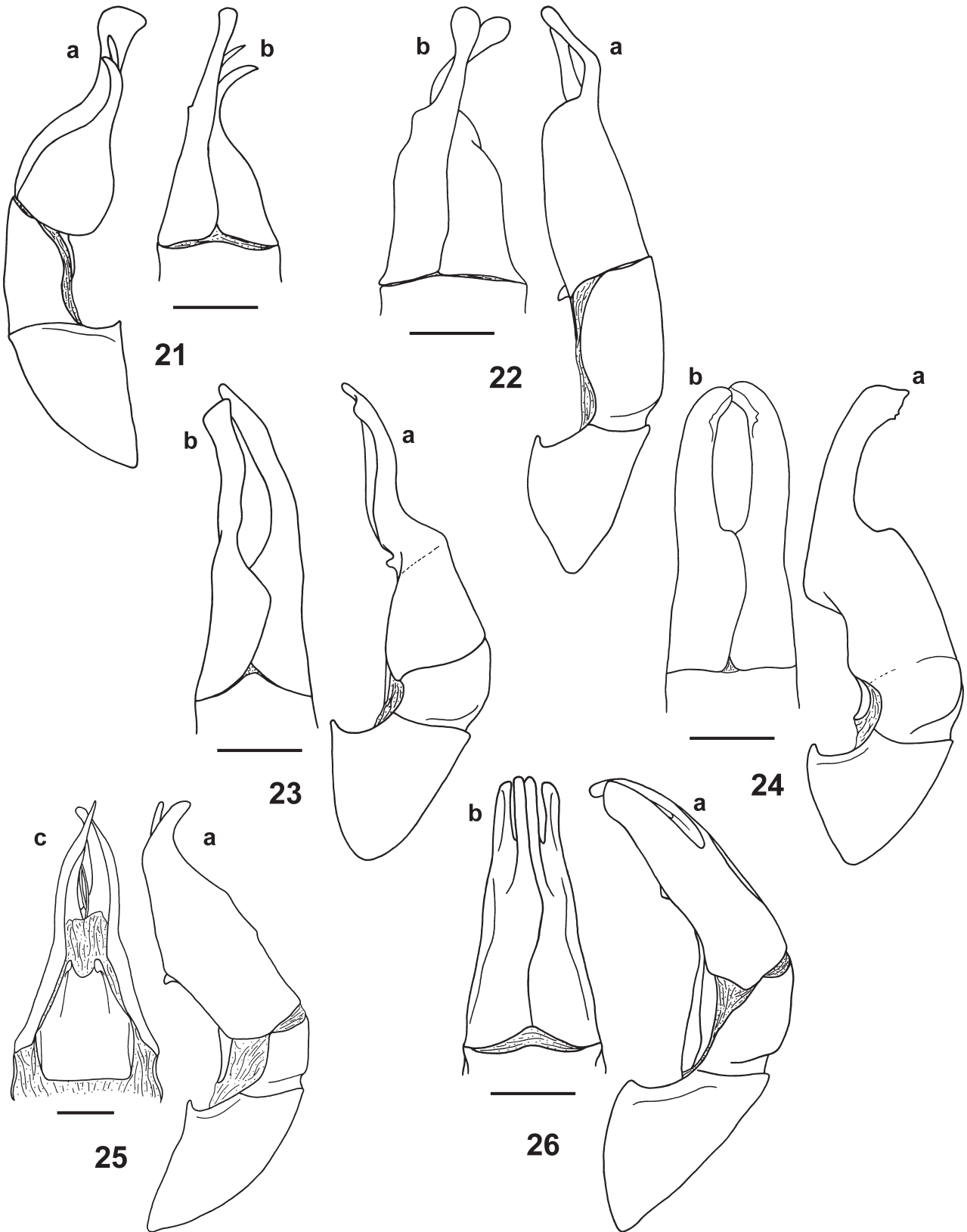
Head. Clypeus subrectangular with rounded corners, moderately reflexed; punctation dense and partly coalescing; frons with a densely punctate shallow impression; vertex sparsely and finely punctate; ratio interocular distance/width of head: 0.64; antennal club distinctly longer than segments 2–7 combined.

Pronotum. Sides subparallel in the posterior two-thirds; strongly convergent in the anterior third; anterior angles square and produced; posterior angles obtuse, rounded; middle weakly sulcate in the anterior part; basal marginal line interrupted anterior to scutellum; punctation moderately fine and moderately dense.

Elytra. Regularly striate-sulcate with convex primary and secondary costae; subsutural interstice with two very irregular secondary striae which unite before the apex and several additional irregular punctures near the scutellum; secondary rows of punctures in the second and third interstices show longer distances between the punctures than those of the primary rows; hind margin regularly rounded; whole elytral surface with additional sparse micro-punctuation.



Figs. 15–20. *Anomala* spp., holotypes, aedeagi in lateral (a), dorsal (b) and ventral (c) views. – 15. *A. mausonica* n. sp. 16. *A. atriventris* n. sp. 17. *A. oehlerii* n. sp. 18. *A. rubida* n. sp. 19. *A. monogramma* n. sp. 20. *A. porrecta* n. sp. – Scales: 1 mm.



Figs. 21–26. *Anomala* spp., holotypes, aedeagi in lateral (a), dorsal (b) and ventral (c) views. – 21. *A. pacholatko* n. sp. 22. *A. limbourgi* n. sp. 23. *A. langbianensis* n. sp. 24. *A. cognata* n. sp. 25. *A. ahrensi* n. sp. 26. *A. keithi* n. sp. – Scales: 1 mm.

Pygidium. Strongly tumid; with dense, transversely confluent punctures which are arranged concentrically around the tumidity; with sparse, long, erect setae.

Abdominal sternites. Sides not carinate.

Metasternum. Laterally with dense, ocellated punctures and moderately long suberect setae.

Legs. Slender; metatibia weakly fusiform; lateral tooth of protibia distinct, acute; modified pro- and mesotarsal claw apically bifid; the former with an obtuse angle at its ventral margin.

Aedeagus. See Fig. 20.

♀♀. Antennal club slightly longer than antennomeres 2–7 combined. Sides of pronotum parallel in the posterior two-thirds. Pygidium moderately tumid. Terminal tooth of protibia long, curved outwards. Bifid protarsal claw more slender.

Variability

Body length 12.5–15.0 mm. Body width 6.9–8.5 mm. Sides of pronotum slightly sinuate before the posterior angles. Subsutural interstice sometimes entirely irregularly punctate in the anterior three-fourths.

Differential diagnosis

Anomala porrecta has regularly striate elytra in combination with a strongly asymmetric aedeagus with a deeply incised left paramere. From other Asian species with these characters (*A. oehleri* n. sp., *A. machatschkei*, *A. triancistris*, *A. rubida* n. sp., *A. monogramma* n. sp., *A. pacholatko* n. sp., *A. limbourgi* n. sp., and *A. punctulicollis* sensu PAULIAN 1959), *A. porrecta* is separated by the ventral plate bearing a strong hook and by the right paramere being very elongate. Moreover, the body color (castaneous, elytra medium brown) is not found in any of the aforementioned species.

Distribution

China: provinces of Guangdong and Hongkong.

Anomala pacholatko n. sp.

(Figs. 7, 21)

Holotype ♂: “S Vietnam, 12.03N 108.27E, 12 km N of Dalat – Lang Bian, 1580–1750 m, 17.–21.IV.1995, PACHOLÁTKO & DEMBICKÝ leg. | Coll. P. PACHOLÁTKO Invt. No.” (TICB, later NMPC).

Paratypes: 3 ♂♂, 3 ♀♀, same data as holotype (CZPC, TICB). – 1 ♂, “Annam Dalat, 1500 m, [underside] 30.III.24 | 22.III. [underside] lensis [sic!]” (MNHB). – 1 ♀ “Annam Dang Kia, 1450 m, [underside] 2.IV.1924. | *Anomala dalatina* Ohs.” (MNHB).

Etymology

The new species is dedicated to the collector of a large part of the type material, the Czech scarabaeidologist PETR PACHOLÁTKO (Brno).

Description

Holotype ♂. Body shape. Elongate ovoid. Length 13.9 mm. Width 7.9 mm.

Color. Entirely dark castaneous to blackish brown with weak metallic green shine; elytra, tibiae and tarsi darker, almost black.

Head. Clypeus almost rectangular with subparallel sides; moderately reflexed, with rounded corners; with very dense, partly coalescing, moderately fine punctures; frons somewhat flattened, less densely punctate than the clypeus; vertex sparsely punctate; ratio interocular distance/width of head: 0.59; antennal club longer than segments 2–7 combined.

Pronotum. Sides slightly convergent in the posterior two-thirds, strongly convergent in the anterior third; anterior angles acute and produced; posterior angles obtuse, weakly rounded; interruption of the basal marginal line broader than the scutellum; with regular, moderately fine, moderately dense punctation; some punctures coalescing at the lateral margins.

Elytra. Regularly striate; striae sulcate; intervals convex; subsutural interstice with a secondary stria which becomes irregular in the anterior third; therefore, subsutural interstice with two secondary costae in the posterior two-thirds; secondary rows of punctures of the second interstice nearly absent, that of the third interstice present but abbreviated and not sulcate; hind margin regularly rounded; whole elytral surface with distinct, sparse micropunctuation.

Pygidium. Strongly tumid; punctures coalescing to fine transverse reticulation which is arranged concentrically around the tumidity; entirely but sparsely covered with long erect setae.

Abdominal sternites. Sides not carinate.

Metasternum. Laterally with dense, ocellated punctation and long suberect setae.

Legs. Slender; metatibia weakly fusiform; lateral tooth of protibia acute; modified pro- and mesotarsal claw apically bifid; modified claw of the protarsi expanded ventrally, but without obtuse angle.

Aedeagus. See Fig. 21.

♀♀. Antennal club subequal in length to antennomeres 2–7 combined. Sides of pronotum parallel. Pygidium moderately tumid. Protarsomere 5 not thickened. Bifid protarsal claw more slender.

Variability

Body length 12.1–13.9 mm. Body width 7.3–7.9 mm. Color ranging from uniformly medium or castaneous brown to black brown. Pronotum sometimes weakly sulcate in the middle. Secondary row of punctures of second interstice sometimes reduced to a few scattered single punctures or nearly absent. Shape of the aedeagus without any notable variation among the specimens examined.

Differential diagnosis

Anomala pacholatko shares the strongly asymmetric aedeagus with a deeply incised left paramere in combination with regularly striate elytra with *A. oehler* n. sp., *A. machatschkei*, *A. triancistris*, *A. rubida* n. sp., *A. monogramma* n. sp., *A. porrecta* n. sp., *A. limbourgi* n. sp., and *A. punctulicollis* sensu PAULIAN (1959). From all these species *A. pacholatko* is separated by the dark coloration and by the specific shape of the parameres. The most similar species is *A. limbourgi* n. sp. with which it has in common the nearly absent secondary stria of the second interstice and the punctation pattern of the subsutural interstice which is divided into two regular secondary costae in the posterior two-thirds. However, in contrast to *A. limbourgi* n. sp., the right paramere is long and drum-stick shaped and the left paramere is apically pointed, the point extending laterally.

Distribution

South Vietnam: Dalat, Dang Kia.

Anomala limbourgi n. sp. (Figs. 8, 22)

Holotype ♂: "Coll. I.R. Sc. N.B., Cambodia, Bokor N.P., Hill Station, scrub, 22.IV.2005, light trap, leg. K. SMETS & I. VAR" (IRSNB).

Etymology

The new species is dedicated to my friend POL LIMBOURG (IRSNB).

Description

Body shape. Elongate ovoid. Length 14.8 mm. Width 8.5 mm.

Color. Entirely dark metallic green with dark castaneous ground color; elytra dark brown with strong iridescent luster; metatibia with weak coppery luster.

Head. Clypeus trapezoidal with subparallel sides; moderately reflexed, with rounded corners; with very dense, partly coalescing, moderately fine punctures; frons somewhat flattened, less densely punctate than the clypeus; vertex finely punctate; ratio interocular distance/width of head: 0.60; antennal club longer than segments 2–7 combined.

Pronotum. Sides slightly convergent in the posterior two-thirds, strongly convergent in the anterior third; anterior angles acute and produced; posterior angles obtuse, weakly rounded; interruption of the basal marginal line broader than the scutellum; with regular, moderately fine, moderately dense punctation; some punctures coalescing at the lateral margins.

Elytra. Regularly striate; striae sulcate; intervals convex; subsutural interstice with a secondary stria that becomes irregular in the anterior third; therefore, subsutural

interstice with two secondary costae in the posterior two-thirds; secondary row of punctures of the second interstice nearly absent, that of the third interstice present but abbreviated and not sulcate; hind margin regularly rounded; entire elytral surface with distinct, sparse micropunctuation.

Pygidium. Tumid; with fine transverse reticulation which is arranged concentrically around the tumidity; with long erect setae at the apex.

Abdominal sternites. Sides not carinate; sternites 2–5 with a regular transverse row of semi-erect setae.

Metasternum. Laterally with dense, ocellated punctation and moderately long suberect setae.

Legs. Slender; metatibia weakly fusiform; lateral tooth of protibia right-angled; terminal tooth moderately long; modified pro- and mesotarsal claw apically bifid; modified claw of the protarsi widened on ventral margin, but without distinct tooth.

Aedeagus. See Fig. 22.

Differential diagnosis

Anomala limbourgi appears to be the nearest known relative of *A. pacholatko*. It is distinguished from that species by the larger body size, the color contrast between elytra and forebody, the more trapezoidal clypeus, the shorter setosity of the lateral metasternum, and distinctly different shape of the aedeagus.

Distribution

Cambodia: Bokor, Dâmrei Mountains.

Anomala langbianensis n. sp. (Figs. 9, 13, 23)

Holotype ♂: "S Vietnam, 30 km NW Dalat Long Lanh v., 1400 m, 12.IV.2007, P. UDOVICHENKO leg." (CZPC).

Paratypes: 4 ♂♂, 9 ♀♀, same data as holotype (ARPC, CZPC, MNHB). – 9 ♂♂, 2 ♀♀, "S Vietnam, 12.03N 108.27E, 12 km N of Dalat – Lang Bian, 1580–1750 m, 17.–21.IV.1995, PACHOLÁTKO & DEMBICKÝ leg. | Coll. P. PACHOLÁTKO Inv. No." (CZPC, TICB).

Etymology

Anomala langbianensis is named after Mt. Lang Bian in southern Vietnam.

Description

Holotype ♂. **Body shape.** Elongate; sides subparallel. Length 13.4 mm. Width 7.3 mm.

Color. Ground color testaceous with green and pinkish metallic luster; pygidium dark metallic green with a central yellow spot; posterior margin of abdominal sternite 2, sternites 3–6 and the central part of the metasternum coppery; sides of metasternum and lateral surface of metatibia dark metallic green.

Head. Clypeus subtrapezoidal to semicircular; very densely, somewhat rugosely punctate; frons and vertex posteriorly with gradually sparser and finer punctation; frons with shallow impression; ratio interocular distance/width of head: 0.66; antennal club longer than segments 2–7 combined.

Pronotum. Sides slightly convergent in the posterior two-thirds, strongly convergent in the anterior third; anterior angles acute and produced; posterior angles broadly rounded; basal marginal line interrupted anterior to scutellum; punctation very fine, moderately dense.

Elytra. Regularly striate; primary striae somewhat sulcate; primary costae slightly more convex than interstices; subsutural interstice with irregular punctation; second and third interstice with secondary stria (irregularly punctate anteriorly); fourth interstice with an indistinct row of punctures; hind margin regularly rounded; whole elytral surface with distinct, sparse micropunctation.

Pygidium. Tumid; with fine transverse reticulation which is arranged concentrically around the tumidity; with scattered long erect setae at the apex.

Abdominal sternites. Sides not carinate.

Metasternum. Laterally with dense, ocellated punctation and long suberect setae.

Legs. Moderately slender; metatibia somewhat fusiform; lateral tooth of protibia small and acute; terminal tooth rather short; modified pro- and mesotarsal claw apically bifid; the former enlarged and bearing a small tooth at its ventral margin.

Aedeagus. See Fig. 23.

♀♀. Sides of pronotum subparallel in the posterior half. Tumidity of pygidium weaker than in males. Metatibia more robust; terminal tooth of protibia spatuliform; bifid protarsal claw more slender. Vaginal palps peculiarly claw-shaped (Fig. 9).

Variability

Body length 11.6–13.4 mm. Body width 6.5–7.4 mm. The shape of the parameres exhibits little variability.

Differential diagnosis

Anomala langbianensis is very similar to *A. cognata* but has a more slender body shape and more extended dark marks on pygidium and ventral face. The aedeagus has a similar structure but is different in detail. The parameres are apically bent right and ventrad.

Because of the ground coloration and the somewhat elongate body shape *A. langbianensis* is superficially similar to *A. viridimicans* Benderitter, 1929, *A. fuscognata* Ohaus, 1905, and *A. luminosa* Benderitter, 1929 (which might be in fact a synonym of *A. fuscognata*). In addition to the fact that based on aedeagal structure these species belong to different species groups, *A. langbianensis* is easily separated from the others by lacking dark markings on the pronotum. There is also some similarity to *A. oehleri*,

A. machatschkei, and *A. triancistris*, but these species are distinctly larger and more ovate than *A. langbianensis*. The claw-shaped, pointed vaginal palps are very distinctive for females of this species.

Distribution

Anomala langbianensis is only known from the Da Lat plateau in southern Vietnam.

Anomala cognata n. sp.

(Figs. 10, 14, 24)

Holotype ♂: “Annam Dalat, 1500 m, [underside] 26.III.1924 | *Anomala susila* Ohs. [OHAUS’s handwriting]” (MNHB).

Paratypes: 1 ♀, “Annam Dalat, 1500 m | ♀” (MNHB). – 2 ♀♀ “S Vietnam, 14.10N 108.30E, 40 km NW of An Khe Buon Luoi, 620–750 m, 28.III.–12.IV.1995, PACHOLÁTKO & DEMBICKÝ leg. | Coll. P. PACHOLÁTKO Invt. No.” (CZPC, TICB).

Etymology

The Latin adjective “cognatus” stands for “similar” or “related” and refers to the close resemblance of *A. cognata* to *A. langbianensis*.

Description

Holotype ♂. Body shape. Stout, sides subparallel. Length 14.0 mm. Width 8.3 mm.

Color. Ground color dark testaceous with green and pinkish metallic luster; head, metatibia and metatarsus weakly coppery.

Head. Clypeus subtrapezoidal to semicircular; very densely, somewhat rugosely punctate; frons and vertex with gradually sparser and finer punctation posteriorly; frons with shallow impression; ratio interocular distance/width of head: 0.67; antennal club longer than segments 2–7 combined.

Pronotum. Sides subparallel in the posterior two-thirds, strongly convergent in the anterior third; anterior angles acute and produced; posterior angles broadly rounded; basal marginal line entire; punctation fine, rather shallow, moderately dense.

Elytra. Regularly striate; primary striae somewhat sulcate; primary costae slightly more convex than interstices; subsutural interstice with irregular punctation; second and third interstice with secondary stria (irregularly punctate anteriorly); fourth interstice with an indistinct row of punctures; hind margin regularly rounded; whole elytral surface with distinct, sparse micropunctation.

Pygidium. Tumid; finely, transversely striolate; striolae arranged concentrically around the tumidity; with scattered long erect setae at apex.

Abdominal sternites. Sides not carinate.

Metasternum. Laterally with dense, ocellated punctation and long suberect setae.

Legs. Moderately slender; metatibia fusiform; lateral tooth of protibia small and acute; terminal tooth rather short; modified pro- and mesotarsal claw apically bifid; the former enlarged and with a blunt angle ventrally.

Aedeagus. See Fig. 24.

♀♀. Pronotum more convex, sides subparallel in the posterior half. Tumidity of pygidium weaker than in males. Metatibia more robust; terminal tooth of protibia spatuliform; bifid protarsal claw more slender. Apex of vaginal palps rounded with crenulate margin (Fig. 14).

Variability

Body length 13.8–14.9 mm. Body width 8.1–8.5 mm. The ground color of the two old specimens (including the holotype) from the MNHB is darker than that of more recently collected specimens from the TICB, but this could also be the result of different preservation techniques. The two females from An Khe Buon Luoi show two dark spots at the base of the pygidium which are missing in the two specimens from Dalat. The intensity and hue of the metallic reflection varies slightly between specimens. The basal marginal line of the pronotum is sometimes indistinct anterior to the scutellum.

Differential diagnosis

Anomala cognata n. sp. is extremely similar to *A. langbianensis* but is easily distinguished by a slightly larger, distinctly stouter body shape. In fact, it appears like a stout “version” of the foregoing species. Moreover, *A. cognata* is separated from *A. langbianensis* by reduced dark coloration on pygidium and ventral surface and by apically rounded vaginal palps. The parameres are distinctly bent upwards and are equipped with a little crenulate ridge apically.

Remarks

It is interesting to note that the probably very closely related species *A. langbianensis* and *A. cognata* occur sympatrically in southern Vietnam; while no other close relative has been discovered among the fauna of south-eastern Asia.

Distribution

Anomala cognata is only known from Buon Luoi (An Khe district, central Vietnam) and the Da Lat plateau in southern Vietnam.

Anomala ahrensi n. sp. (Figs. 11, 25)

Holotype ♂: “N-Vietnam, Tam Dao, Vinh Phu Prov., 21°27'18"N 105°38'58"E, 1050–1200 m, 2.–6.VI.1999, leg. FABRIZI, JÄGER, AHRENS” (SMTD).

Paratypes: 2 ♂♂, “N.-Vietnam, Vinh Phu Prov., Tam Dao, 1.–7.V.1998, Y. ARITA leg.” (CZPC). – 5 ♂♂, 7 ♀♀, “N.-Vietnam, Vinh Phu Prov., Tam Dao, 930 m, VI.–VIII.1997, native collector” (CZPC). – 1 ♂, “N. Vietnam, Vinh Phu, Tam Dao, 28.–30.V.1995, coll. C. L. LI” (CZPC). – 1 ♂, “Vietnam, Hanoi env., 4.–15.V.1990, SVOBODA lgt.” (CZPC). – 1 ♂, “Tam Dao, Vietnam, 8.–22.V.1990, DUDVCHA MILOČ” (CZPC). – 10 ♂♂, 6 ♀♀, “Vietnam, Tam-Dao, 6.–23.V.1990, B. MAKOVSKÝ lgt.” (ARPC, CZPC, SMTD). – 1 ♂, “N.-Vietnam, SAPA env., Lao Cai Prov., 22°19'52"N 103°50'35"E, 1630–1680 m, 23.–27.V.1999, leg. FABRIZI, JÄGER, AHRENS” (CZPC). – 1 ♂, “N Viet Nam (Tonkin), pr. Hoang Lien Son, SA PA, 11.–15.V.1990, P. PACHOLÁTKO leg.” (TICB). – 1 ♂, “Tamdao near Hanoi, Vietnam, 1990, leg. MASAO ITO | K. WADA Col No. 521 | KAORU WADA Collection 2002” (KWPC). – 1 ♂, “Vietnam, Tam Dao, 27.V.–2.VI.1986, Vinh phu prov., JAN HORÁK lgt.” (JSPC). – 1 ♂, “Vietnam, N Tam Dao, 26.V.–3.VI.1986, Vinh phu prov., STRNAD JAN lgt.” (JSPC).

Etymology

The new species is dedicated to my friend DIRK AHRENS (Bonn) who collected the holotype.

Description

Holotype ♂. Body shape. Elongate ovoid. Length 16.6 mm. Width 9.6 mm.

Color. Head, pronotum, tibiae and tarsi dark castaneous with strong metallic green luster; pronotum with yellow sides; elytra medium brown with weaker metallic green luster; suture and a vague spot on humeral and apical umbo dark; basal half of pygidium dark castaneous with strong metallic green luster, apical half yellow with weak metallic green luster; ventral surface including antenna, femora and ventral surface of pro- and mesotibia light brown with weak metallic green shine, abdominal sternites 3–5 somewhat darker; dorsal surface with distinct iridescent hue.

Head. Clypeus trapezoidal, with a weakly reflexed anterior margin; corners rounded; clypeus and frons with fine confluent punctation; vertex with finer, separated punctures; ratio interocular width/width of head ca. 0.63; antennal club distinctly longer than segments 2–7 combined.

Pronotum. Sides subparallel in the posterior half, strongly convergent towards the acute and strongly produced anterior angles; posterior angles obtuse, rounded; basal marginal line absent; with very dense, transversely confluent punctation.

Elytra. Regularly striate-sulcate; intervals moderately convex; subsutural interstice anteriorly with irregular stria-type punctures (without microseta, horseshoe-shaped) which form a secondary stria in the apical third; stria punctation obscured by very dense, moderately fine, irregular punctures.

Pygidium. Tumor; punctation transversely striolate, arranged concentrically around the tumidity; with long erect setae apically.

Abdominal sternites. Sternites 1–3 with weak lateral carina.

Metasternum. With very dense, coalescing punctures and moderately long, suberect setae.

Legs. Middle and hind legs slender; metatibia weakly fusiform; protibia broad and somewhat flattened, bidentate, with short lateral and terminal tooth; protarsi enlarged; modified claw of pro- and mesotarsi apically bifid; the former with a very small upper branch, not enlarged or angulate ventrally.

Aedeagus. See Fig. 25.

♀♀. Antennal club subequal in length to antennomeres 2–7 combined. Pygidium not tumid. Sides of pronotum more evenly rounded. Hind tibia stouter. Terminal tooth of protibia tongue-shaped. Bifid protarsal claw more slender.

Variability

Body length 16.1–18.6 mm. Body width 9.1–10.9 mm. The extension of the dark basal mark of the pygidium varies in size; sometimes it encompasses the basal angles, sometimes it is reduced to a median basal patch. The three specimens from Sa Pa differ from those from Tam Dao in having distinctly darker green elytra; whether this is taxonomically significant or not is uncertain. The male genitalia, however, do not show constant differences.

Differential diagnosis

Anomala ahrensi is very similar and probably closely related to *Mimela kuatuna* Machatschke, 1955. The latter species is here transferred to the genus *Anomala* (**n. comb.**). *A. ahrensi* is slightly larger than *A. kuatuna*, the apices of the parameres are less abruptly bent upwards, and the prosternal process is missing. For further explanation on the generic placement see below in Remarks. Both, *A. ahrensi* and *A. kuatuna* are superficially similar to *A. aulax* (Wiedemann, 1823), *A. delavayi* Fairmaire, 1886, and *A. aulacoides* Ohaus, 1915, but the aedeagal structure does not suggest a close relationship with these species.

Remarks

The genus *Mimela* Kirby, 1823 (type species: *Mimela chinensis* Kirby, 1823) is based on the presence of a prosternal process, and since the revision of the genus by OHAUS (1943) all Anomalini exhibiting a prosternal protrusion are included here (MACHATSCHKE 1952, 1972; ZORN 2004, 2006). However, already OHAUS (1902) found “transitional” forms among afrotropical species, and ARROW (1917) pointed out the fact that strictly placing species with prosternal process in the genus *Mimela* will probably segregate closely related species into different genera.

It is obvious that a prosternal process developed many times independently within the Scarabaeidae since it may be present or absent within several different higher taxa (e. g. Dynastinae, Aphodinae, Melolonthinae, Rutelinae). Probably such processes serve to stiffen the junction between pro- and mesothorax similar to a “door stop”. So far there is no evidence that the prosternal process within the Anoma-

lini is a homologous structure. In contrast, there appear to be “groups” of *Mimela* species which have nothing in common except the prosternal protrusion, but appear to be related to species without prosternal process which are therefore included in the genus *Anomala*. Interestingly, these “odd” species groups of *Mimela* (e. g. *anopunctata*-group sensu MACHATSCHKE 1957, 1972, “*Paramimela*” Ohaus, 1915) usually show a weakly developed or spine-shaped prosternal process in contrast to the “typical” plough-shaped process as found in the type species *M. chinensis*. Recently, a small prosternal process was also found in species included in the genus *Pseudosinghala* Heller, 1891 (ZORN 2000).

The shape of the prosternal protrusion observed in *A. kuatuna* is unlike any other among the Anomalini because its apex is distinctly bifid (MACHATSCHKE 1955: fig. 7a–d). The relation between *A. ahrensi* and *A. kuatuna* provides new evidence that the presence of a prosternal process has limited value for higher level systematics. These two species can hardly be distinguished by external morphology except by *A. kuatuna* having a well developed prosternal process which is missing in *A. ahrensi*. In the latter species there is only a little keel-like structure between the procoxae, which is also present in many other *Anomala* species. Therefore, *A. kuatuna* is obviously a perfect example where the prosternal process is only an autapomorphy on the species level. This finding supports the thesis that the current conception of the genus *Mimela* (OHAUS 1943, MACHATSCHKE 1952, 1957, ZORN 2006) is a polyphyletic entity because the constitutive character is not homologous. The definition of *Mimela* should therefore be subjected to scrutiny in a phylogenetic analysis of the Anomalini.

Distribution

Anomala ahrensi is known from two mountainous localities in North Vietnam (Sa Pa, Tam Dao).

Anomala keithi n. sp.

(Figs. 12, 26)

H o l o t y p e ♂: “China, W-Yunnan, Daxueshan, 2600 m, Yongde, VI.2000, leg. YIN” (CZPC).

Etymology

The new species is dedicated to the scarabaeidologist DENIS KEITH (Chartres) who generously provided the type specimen.

Description

Body shape. Ovoid. Length 15.6 mm. Width 8.8 mm.

Color. Dark castaneous ground color obscured by a strong dark metallic green luster; pronotum strongly iridescent.

Head. Clypeus trapezoidal to semicircular, with a strongly reflexed anterior margin; clypeus and frons with

granulose surface; vertex finely punctate; ratio interocular width/width of head ca. 0.61.

Pronotum. Sides subparallel posteriorly, slightly sinuate before the subrectangular posterior angles, strongly convergent towards the acute and strongly produced anterior angles; basal marginal line present laterally, vanishing towards the middle; punctures transverse, very dense but not coalescent.

Elytra. Regularly striate; primary costae slightly more convex than interstices; subsutural interstice with irregular punctures between smooth secondary costae; second and third interstice with repeatedly interrupted secondary stria; whole elytra with irregular micropunctuation; lateral margins strongly carinate in the anterior half.

Pygidium. Tumid; punctation transversely striolate, arranged concentrically around the tumidity; with long erect setae apically.

Abdominal sternites. Sternites 1–3 with weak lateral carina.

Metasternum. With very dense, coalescing punctures and moderately long, suberect setae.

Legs. Middle and hind legs slender; metatibia weakly fusiform; protibia broad and somewhat flattened (Fig. 12), bidentate, with short, obtuse lateral tooth and short terminal tooth that is approximately as long as broad at its base; protarsi distinctly thickened; protarsomeres 2–4 ca. 1.5 times as wide as long; modified claw of pro- and mesotarsi apically bifid; the former with a very small upper branch and with the lower branch not angulate ventrally.

Aedeagus. See Fig. 26.

Differential diagnosis

Anomala keithi does not appear to be closely related to any of the currently known *Anomala* species. It is remarkable for its enlarged protarsi, somewhat flattened protibia and peculiar aedeagus with the apically bifid parameres.

Distribution

Anomala keithi is only known from the type locality Daxue Shan in western Yunnan (China).

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