

New *Anomala* species from Vietnam (Coleoptera: Scarabaeidae: Rutelinae)

Новые виды *Anomala* из Вьетнама (Coleoptera: Scarabaeidae: Rutelinae)

A.M. Prokofiev
А.М. Прокофьев

Institute for Ecology and Evolution, Russian Academy of Sciences, Leninsky prospect 33, Moscow 119071, Russia.
Институт проблем экологии и эволюции РАН — ИПЭЭ, Ленинский проспект 33, Москва 119071, Россия.

KEY WORDS: Rutelinae, *Anomala*, new species, Vietnam.

КЛЮЧЕВЫЕ СЛОВА: Rutelinae, *Anomala*, новые виды, Вьетнам.

ABSTRACT. Seven new species of the genus *Anomala* are described from Dalat Highlands (*A. accincta*, *A. bulbicaula*, *A. esmeralda*, *A. haliaeetus*, *A. sorortertia* and *A. yersini* **spp.n.**) and from Phu Quoc Island (*A. phuquocica* **sp.n.**), Vietnam.

РЕЗЮМЕ. Семь новых видов рода *Anomala* описаны с Далатского нагорья (*A. accincta*, *A. bulbicaula*, *A. esmeralda*, *A. haliaeetus*, *A. sorortertia* и *A. yersini* **spp.n.**) и с о. Фукуок (*A. phuquocica* **sp.n.**), Вьетнам.

During investigations of the ruteline fauna of Bi Doup — Nui Ba National Park in Lam Dong province and the neighbouring areas in Dalat Highlands, Vietnam, I had collected the numerous species belonging to the very diverse genus *Anomala* Samouelle, 1819. Many of them represent the undescribed species, and the present paper based on the partly processed samples of the years 2009–2012 is devoted to the formal description of six of them. Also I add here one new species collected on Phu Quoc Island during a short trip in November 2010.

All the type series from the author's reference collection will be submitted to the Zoological Museum, Moscow University; part of the paratypes, when they numerous, will be donated to the other museums; some paratypes came from the collections of Petr Pacholátko (Brno, Czech Republic — CP) and Carsten Zorn (Gnoien, Germany — CZ).

Anomala bulbicaula Prokofiev **sp.n.**

Figs 1–5

MATERIAL. Holotype, ♂, Vietnam, Lam Dong prov., boundary with Khanh Hoa prov., Lac Duong distr., DT 723/652, Bi Doup — Nui Ba National Park, Hon Giao Pass, 12°10'58"N, 106°42'50"E, alt. 1625 m, 18–19.04.2010, on light, A.M. Prokofiev leg.

Paratypes, 3♂♂, 2♀♀, the same data as for holotype, but 22–24.04.2010; 1♂, 1♀, Bi Doup — Nui Ba National Park, between Hon Giao and Da Nhim, 12°10.75'N, 108°40.65'E, 54 km E Dalat, alt. 1435 m, 29–30.05.2012, on light, A.M. Prokofiev leg.; 2♂♂, 3♀♀, Bi Doup — Nui Ba National Park, DT 723/652, between Giang Ly and Hon Giao, 12°10.94'N, 108°41.47'E, alt. 1500 m, 30–31.05.2012,

on light, A.M. Prokofiev leg.; 3♂♂, 2♀♀, Lam Dong prov., DT 722, ~ 5 km before Dinh K'Nó, ~ 46 km from Dalat, 12°08'25"N, 108°23'24"E, alt. 1510–1520 m, 19–21.04.2010, on light, A.M. Prokofiev leg.

DESCRIPTION. **Male**, holotype (Fig. 1). Length 14.5 mm; greatest width 7.0 mm. Elongate ovoid, moderately convex, strongly declivious from base of elytra to apex of clypeus. Head, pronotum, scutellum, underside and legs metallic greenish brown; hind legs with slightly stronger green luster; pygidium reddish brown; elytra yellowish brown with transverse rows of irregular blackish marks just behind mid-length and immediately before apical knobs; each row consisting of two pairs of marks, inner pair larger; mid-elytral row much more pronounced than subapical one.

Clypeus transverse, with broadly rounded front angles and moderately raised anterior margin; front and clypeus densely and rugosely punctate; punctures slightly smaller and sparser on vertex. Antennal club slightly longer than segments 2–6 combined. Pronotum 1.75 times as broad as long. Sides of pronotum convergent, much stronger in anterior half; front angles pointed, hind angles straight; basis with markedly produced mesial third having the straight margin; thus, pronotum having a nearly pentagonal shape, but not incised before scutellum. Basis unbordered. Scutellum large, coarsely and densely punctate. Elytra almost parallel-sided, 1.4 times as long as broad, sulcate, punctate rows distinctly impressed and interspaces moderately convex; second interspace broad, with two secondary ribs; fourth interspace with a secondary rib; interspaces coarsely and densely rugoso-punctate. Lateral margin of elytra slightly callose in basal half; epipleura long, bare; membranous apical border narrow. Propygidium completely covered by elytra. Pygidium elongate and produced posteriad, smoothly declivious, apically bulging, coarsely transversely rugose, with sparse long setae along outer margin, more numerous at apex. Sterna tightly rugoso-punctate, covered with moderately dense and rather long pale hairs. Prosternal and mesometasternal processes absent. Abdominal sternites tightly and rugosely punctate at sides, punctures becoming small and sparse mesially; each sternite possessing a transverse row of sparse erect setae becoming longer and much denser on posteriormost sternite. Sides of abdominal sternites almost non-carinate.

Legs rather long and thin. Fore tibia with two teeth, rather pulled together; inner spur orientated forward and laterad,

attached at the level of basal tooth. Last joint of fore tarsi moderately thickened apically, with small subbasal tooth; inner fore claw clefted at apical third, with lower lobe broader; its lower margin toothed just behind middle (Fig. 2). Outer middle claw clefted, lower lobe broader. Meso- and metatibia narrow.

Parameres subdivided onto short basal portion and large tube-shaped distal portion; basal portion of right paramere produced into strong process having bulbous subapical expansion (Figs 3–5).

Female. Length 13 mm, greatest width 6.5 mm. Green color on head, pronotum, scutellum, legs and underside replaced by dark reddish brown, but middle and hind tibiae retain strong metallic green luster; submedial dark band on elytra very faint, while subapical one broad and very pronounced. Pronotum about twice as broad as long. Elytra 1.4 times as long as broad. Pygidium flat. Teeth on fore tibiae blunter, apical one longer, tongue-shaped. Last joint of fore tarsi gracile, lacking denticle on ventral rim. Inner fore claw deeply clefted, with lobes almost equal. Vaginal palpi flat, subtriangular, densely pilose.

VARIATIONS. Length 12.0–13.5, greatest width 6–7 mm (both sexes). Pronotum 1.8–2.1 as broad as long, elytra 1.4–1.5 times as long as broad. All males and females excluding allotype with head, pronotum and scutellum having strong green luster. Medial and subapical transverse rows of dark spots (which sometimes confluent to bands) very variably expressed.

ETYMOLOGY. This species is named from a very peculiar shape of its male genitalia (“bulbus”, a bulb; “caulos”, a process).

DIFFERENTIAL DIAGNOSIS. This and the next species (*A. accincta* sp.n.) being very similar in external features

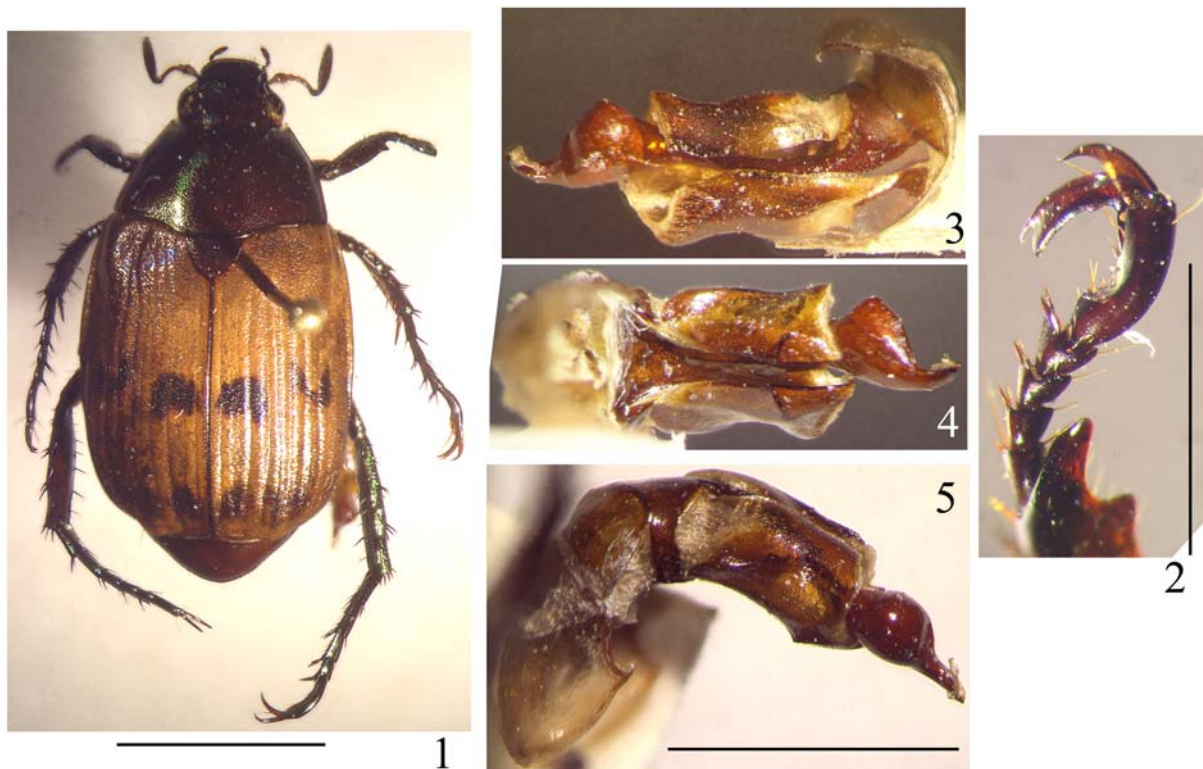
forms a separated lineage due to their highly apomorphic structure of the parameres. The parameres are fused into wide tube and are partly or mostly membranous, but with the well-sclerotized long and narrow dorsal process. The fusion of the parameres into tube occurs within members of the “*hirsutula*”-group, but they are always well-sclerotized and lacking the dorsal process in the latter; also the members of the “*hirsutula*”-group can be easily separated in the presence of the dense short pubescence over whole dorsal surface. In external features *A. bulbicaula* and *A. accincta* sp.n. are very similar to *A. bivirgulata* Fairmaire, 1893, *A. spiloptera* Burmeister, 1855 and *A. projecta* Lin, 2002; moreover, the coloration of *A. bulbicaula* sp.n. shows only minor differences from this of *A. bivirgulata*, as well as the color pattern of *A. accincta* sp.n. resembles those of *A. spiloptera* and *A. projecta* (Figs 6–8) [see also Lin, 2002]. However, the structure of the parameres of these species is extremely different, and even the parameres being highly modified they are never fused in all the compared species (Figs 7, 9–10).

Anomala accincta Prokofiev sp.n.

Figs 11–15

MATERIAL. Holotype, ♂, Vietnam, Lam Dong prov., Bi Doup — Nui Ba National Park, between Hon Giao and Da Nhim, 12°10.75'N, 108°40.65'E, 54 km E Dalat, alt. 1435 m, 29–30.05.2012, on light, A.M. Prokofiev leg.

Paratypes, 5♂♂, 8♀♀, collected with holotype; 5♂♂, 7♀♀, Bi Doup — Nui Ba National Park, DT 723/652, between Giang Ly and Hon Giao, 12°10.94'N, 108°41.47'E, alt. 1500 m, 30–31.05.2012, on light, A.M. Prokofiev leg.; 1♀, Lam Dong prov., Bi Doup — Nui Ba National Park, Hon Giao Pass, 12°10'58'N, 106°42'50''E, alt. 1625 m, 22–24.04.2010, on light, A.M. Prokofiev leg.



Figs 1–5. *Anomala bulbicaula* sp.n., holotype, male: 1 — habitus; 2 — fore tarsus; 3–5 — aedeagus; 1–3 — dorsal view, 4 — ventral view; 5 — lateral view. Scale bars: 1 — 5 mm; 2–5 — 3 mm.

Рис. 1–5. *Anomala bulbicaula* sp.n., голотип, самец: 1 — габитус; 2 — передняя лапка; 3–5 — эдеагус; 1–3 — сверху; 4 — снизу; 5 — сбоку. Масштаб: 1 — 5 мм; 2–5 — 3 мм.

DESCRIPTION. This species is identical in many structural characters with the preceding one; thus, only the different characters are mentioned here.

Male, holotype (Fig. 11). Length 14 mm, greatest width 7 mm. Dark cherry-red from above and below, shining, with slightly iridescent luster on elytra and with greenish luster on legs; elytra with broad medial transverse zigzag-shaped yellow band margined by black; scutellum narrowly margined by black.

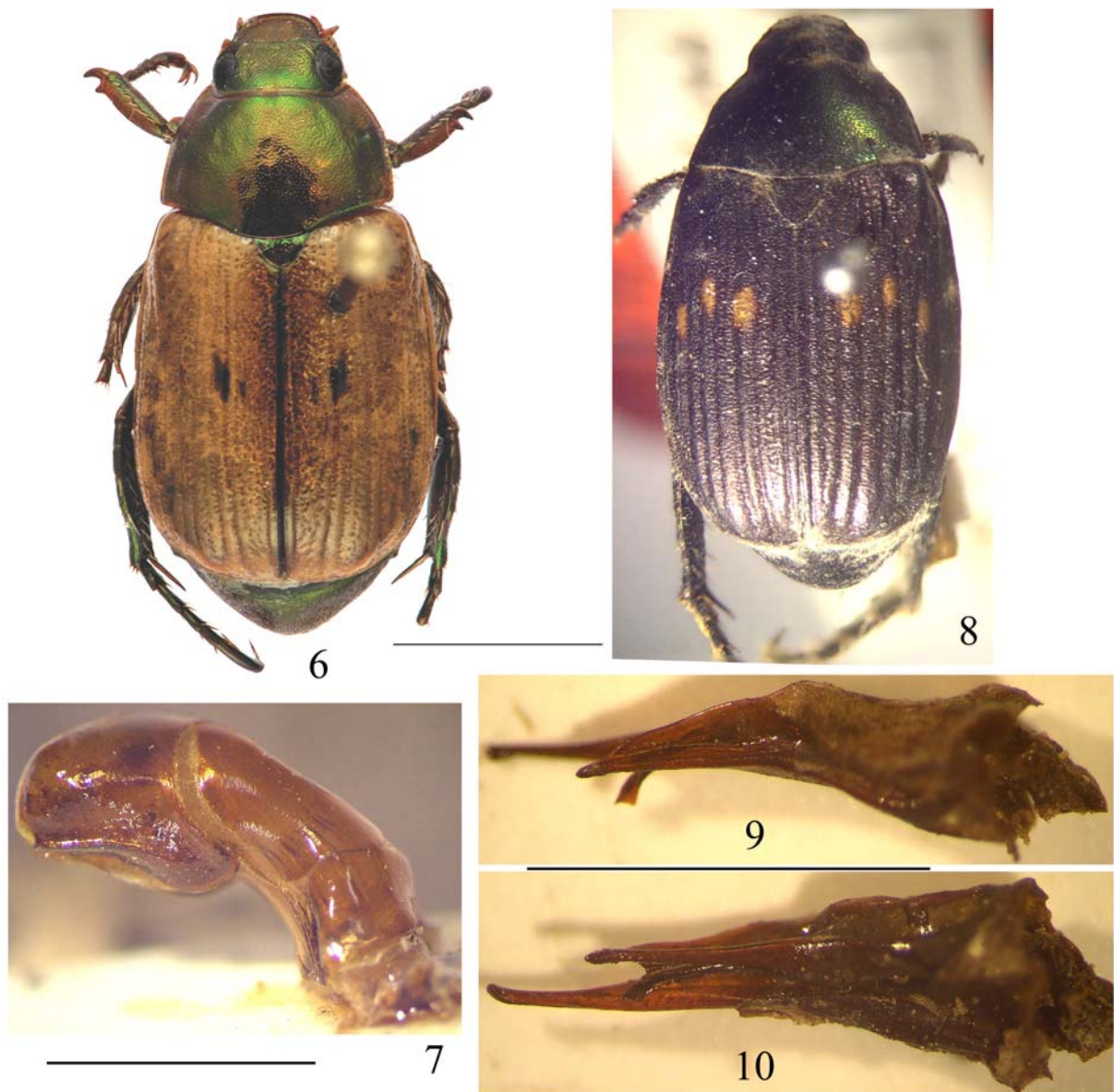
Pronotum 1.8 times as broad as long; elytra 1.3 times as long as broad; pronotum coarsely and densely punctured, with punctures transversely extended, somewhat striolate; elytra strongly transversely striolate, especially toward the sides; upper reaches of abdominal sternites 1–3 sharply car-

inate. Last joint of fore tarsi moderately thickened, with small submedial tooth on its ventral rim (Fig. 12).

Parameres only basally and ventrally sclerotized, largely membranous, but with well-sclerotized thin long and curved dorsal process bifurcated at tip and with narrow membranous outgrowth (Figs 13–14).

Female. Length 13.5 mm, greatest width 7 mm. Pronotum 2.1 times as broad as long; elytra 1.2 times as long as broad. Sexual differences are the same as described for *A. bulbicaula* sp.n., but apical tooth of fore tibiae rather short, obliquely truncated (Fig. 15).

VARIATIONS. Length 13.0–14.5 mm, greatest width 6.5–7.0 mm (both sexes). Breadth and brightness of transverse yellow band of elytra vary at some degree.



Figs 6–10. *Anomala* spp.: 6–7 — *A. bivirgulata* Fairmaire, 1893 (syntype, Tonkin); 8–10 — *A. spiloptera* Burmeister, 1855 (syntype of *A. densestrigosa* Fairmaire, 1888, China, A. David leg.); 6, 8 — habitus; 7, 9–10 — aedeagi; 6, 8 — dorsal view; 7, 9 — lateral view; 10 — ventral view. Scale bars: 6, 8 — 5 mm; 7, 9–10 — 3 mm.

Рис. 6–10. *Anomala* spp.: 6–7 — *A. bivirgulata* Fairmaire, 1893 (синтип, Тонкин); 8–10 — *A. spiloptera* Burmeister, 1855 (синтип *A. densestrigosa* Fairmaire, 1888, Китай, сборы А. Давида); 6, 8 — габитус; 7, 9–10 — эдеагус; 6, 8 — сверху; 7, 9 — сбоку; 10 — снизу. Масштаб: 6, 8 — 5 мм; 7, 9–10 — 3 мм.

ETYMOLOGY. The species epithet meaning a possession of belt is given in allusion to the characteristic transverse yellow band on elytra of this species.

DIFFERENTIAL DIAGNOSIS. This new species is closely related to *A. bulbicaula* **sp.n.** but differs in coloration, in

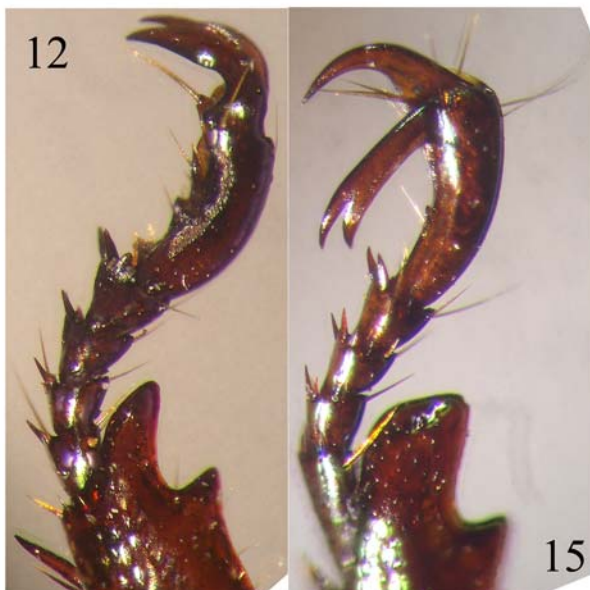
striolate (vs simply punctured) punctuation of the pronotum and especially of the elytra, and in the shape of the male parameres (compare Figs 3–5 and 13–14). The parameral tube is membranous except its basal and ventral portions (vs only small membranous parts on sides in *A. bulbicaula* **sp.n.**), and the dorsal process has no bulbous expansion in the new species.



11



13



12

15



14

Figs 11–15. *Anomala accincta* **sp.n.**: 11 — habitus; 12, 15 — fore tarsus; 13–14 — aedeagus; 11–14 — male, holotype; 15 — female, paratype; 11–12, 15 — dorsal view; 13 — lateral view; 14 — frontal view. Scale bars: 11 — 5 mm; 12–13, 15 — 3 mm; 14 — 1.5 mm.

Рис. 11–15. *Anomala accincta* **sp.n.**: 11 — габитус; 12, 15 — передняя лапка; 13–14 — эдеагус; 11–12, 15 — сверху; 13 — сбоку; 14 — спереди; 11–14 — самец, голотип; 15 — самка, паратип. Масштаб: 11 — 5 мм; 12–13, 15 — 3 мм; 14 — 1.5 мм.

***Anomala esmeralda* Prokofiev sp.n.**

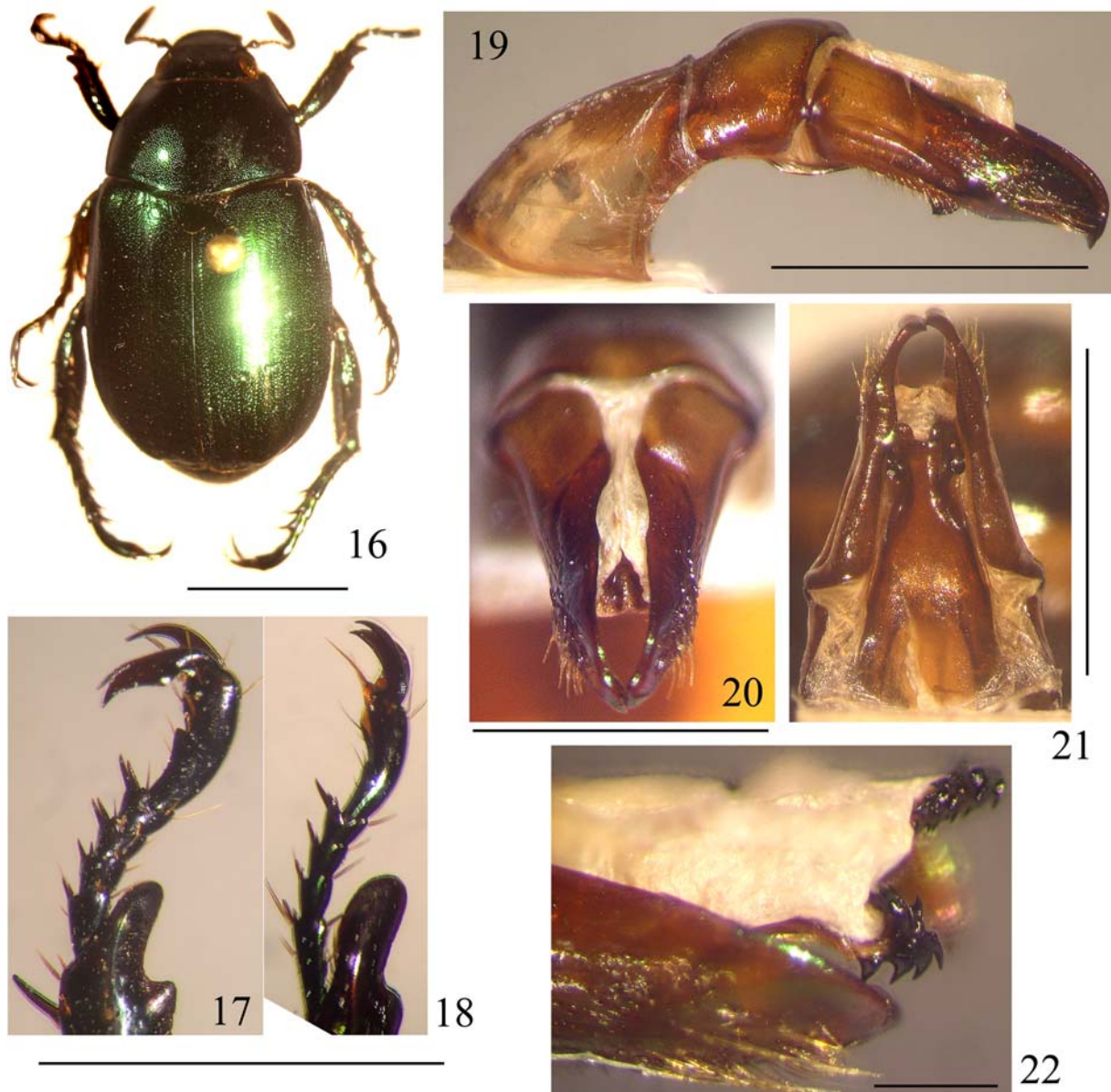
Figs 16–22

MATERIAL. Holotype, ♂, Vietnam, Khanh Hoa prov., Khanh Vinh distr., DT 652, 12°13.55'N, 108°46.02' E, alt. 877–879 m, 24–26.04.2012, on light, A.M. Prokofiev leg.

Paratypes, 12♂♂, 10♀♀, the same data as for holotype; 1♂, Lam Dong prov., boundary with Khanh Hoa prov., Lac Duong distr., DT 723/652, Bi Doup — Nui Ba National Park, Hon Giao Pass, 12°10'58''N, 106°42'50''E, alt. 1625 m, 18–19.04.2010, on light, A.M. Prokofiev leg.; 18♂♂, 11♀♀, Khanh Hoa prov., Khanh Vinh distr., 12°14'08''N, 108°46'14'' E, alt. 787–800 m, 27–29.04.2010, on light, A.M. Prokofiev leg.; 8♂♂, 5♀♀, the same data as for previous series, but 22–23.04.2012; 6♂♂, 14°10'N, 108°30'E 40 km NW of An Khe Buon Luoi, 620–750 m, 28.03.-12.04.1995, P. Pacholátko and L. Dembicki leg. (4♂♂ — CP, 2♂♂ — CZ).

DESCRIPTION. **Male**, holotype (Fig. 16). Length 16 mm, greatest width 9 mm. Elongate ovoid, moderately convex. Bright deep-green, strongly metallic; underside darker; fore tarsi black, middle and hind tarsi black with metallic-green luster; antennae and palpi reddish-brown.

Clypeus transverse, with broadly rounded and moderately reflexed anterior margin; anterior angles not developed. Frontoclypeal suture distinct. Front and clypeus very densely and coarsely punctate; punctures becoming slightly smaller and sparser on vertex. Antennal club slightly longer than antennomeres 2–6 combined. Pronotum 1.7 times as broad as long, with maximum width near mid-length; sides very weakly convergent posteriorly, but very strongly in anterior third; anterior angles acute, posterior angles blunt and rounded; basal



Figs 16–22. *Anomala esmeralda* sp.n.: 16 — habitus; 17–18 — fore tarsus; 19–21 — aedeagus; 22 — sclerites of inner sac; 16–18 — dorsal view; 19 — lateral view; 20 — ventral view; 21 — ventral view; 16–17, 19–22 — male; 18 — female; 16–17, 19–21 — holotype; 18, 22 — paratype. Scale bars: 16–18 — 5 mm; 19–21 — 3 mm; 22 — 0.2 mm.

Рис 16–22. *Anomala esmeralda* sp.n.: 16 — габитус; 17–18 — передняя лапка; 19–21 — эдеагус; 22 — склериты внутреннего мешка; 16–18 — сверху; 19 — сбоку; 20 — спереди; 21 — снизу; 16–17, 19–22 — самец; 18 — самка; 16–17, 19–21 — голотип; 18, 22 — паратип. Масштаб: 16–18 — 5 мм; 19–21 — 3 мм; 22 — 0.2 мм.

border widely interrupted before scutellum. Pronotum very densely and coarsely punctured. Scutellum broad, with rounded posterior margin, tightly punctured. Elytra somewhat expanded posteriad, 1.1 times as long as broad, very densely and coarsely punctured; punctures becoming smaller toward sides; punctate rows very faintly discernible; first (sutural) interval somewhat convex. Epipleura with a longitudinal row of short erect setae; membranous apical border narrow, but long, extending anteriorly to level of mid-length of hind coxae. Propygidium transversely striolate, completely covered by elytra. Pygidium moderately convex, rugoso-punctate, sparsely covered with rather long pale hairs on sides and apex. Sterna and hind coxae tightly punctured; punctures setigerous except disc of metasternum, which being bare, impressed, with minute punctures; pale hairs on sides of sterna much longer than on hind coxae. No prosternal and mesometasternal processes. Abdomen tightly punctured, with transverse subapical row of short and sparse setae on each sternite except the last one bearing a row of longer and more densely sitting setae on apical margin; row of setae replacing by short adpressed hairs in few rows on upper sides of each abdominal sternite. Upper sides of abdominal sternites with carinae very weakly expressed on first two segments only.

Front tibiae bidentate; inner spur long, attached at level of basal tooth, oriented forward and laterad. Last joint of fore tarsi somewhat thickened, with a strong denticle at mid-length of its ventral rim; inner fore claw clefted, with upper lobe shorter and spine-shaped; ventral margin of lower lobe deeply excavated at base, with pronounced point before excavation (Fig. 17). Outer claw of middle tarsi weakly incised, with upper lobe very short; hind claws entire. Middle and hind tibiae weakly expanded in middle; middle and hind tarsi longer than tibiae.

Parameres symmetrical, pilose on sides, with apices pointed and hooked, in lateral view gradually decreasing to tips (Figs 19–21). Basal plate deeply emarginated in middle, with angles strongly reflexed downward (Fig. 21). Inner sac with a pair of spinulose plates (Fig. 22).



Figs 23–24. Aedeagus of *Anomala russiventris* Fairmaire, 1893 (syntype, Tonkin): 23 — frontal view; 24 — lateral view. Scale bar: 2 mm.

Рис. 23–24. Эдеагус *Anomala russiventris* Fairmaire, 1893 (синтип, Тонкин): 23 — спереди; 24 — сбоку. Масштаб: 2 мм.

Female. Length 16 mm, greatest width 8 mm. Pronotum twice as broad as long. Elytra 1.4 times as long as broad. Pygidium weakly convex, sparsely pilose; hairs clearly longer and somewhat more dense on sides and apex, than on disc. Apical tooth of fore tibiae longer than in male, tongue-shaped; inner spur shorter than in male, attached well behind level of basal tooth and oriented somewhat more downward than in male. Last joint of fore tarsi thinner, lacking tooth on ventral margin; inner fore claw deeply clefted, with lobes of equal length, but with lower lobe being about 1.5 times broader (Fig. 18). Outer claw of middle tarsi deeply and nearly equally clefted. Vaginal palpi pilose, finger-like, with ventral rim distinctly convex subapically.

VARIATIONS. Length and greatest width 15–16 and 8–9 mm (males), 15–17 and 8–10 mm (females). Underside sometimes with dark cherry-brown tint. Tarsi varying in color from black to dark metallic-green. Pronotum 1.7–2.0 times as broad as long. Elytra 1.1–1.4 times as long as broad. Outer claw of middle tarsi variably clefted (from 1/5 to 1/3 of claw length).

ETYMOLOGY. This species is named from Esmeralda, a character of V. Hugo's classic novel, whose name meaning "an emerald" well apply to coloration of the described species. The species epithet is noun in apposition.

DIFFERENTIAL DIAGNOSIS. This new species is very similar to *A. russiventris* Fairmaire, 1893, but differs in its mainly green color of underside and legs (vs. reddish-brown without any greenish tint), uniformly green pygidium (vs. green on disc, reddish-brown on sides and apex) and in the shape of the male parameres. The parameres are similar in both species; however, their apices are deeper in *A. russiventris*, are broadly truncated in lateral view, and are not hooked downward; also the pilosity of the parameres is longer than in the new species (Figs 23–24).

Anomala haliaetus Prokofiev sp.n.

Figs 25–29

MATERIAL. Holotype, ♂, Vietnam, Lam Dong prov., boundary with Khanh Hoa prov., Lac Duong distr., DT 723/652, Bi Doup — Nui Ba National Park, Hon Giao Pass, 12°10'58" N, 106°42'50" E, alt. 1625 m, 18–19.04.2010, on light, A.M. Prokofiev leg.

Paratypes, 7♂♂, 6♀♀, the same data as for holotype; 16♂♂, 5♀♀, the same data as for holotype, but 13.05.2009; 1♀, the same data as for holotype, but 14–15.04.2010; 44♂♂, 37♀♀, the same data as for holotype, but 22–24.04.2010; 1♂, the same data as for holotype, but 26.05.2012; 4♂♂, 4♀♀, Bi Doup — Nui Ba National Park, between Hon Giao and Da Nhim, 12°10.75' N, 108°40.65' E, 54 km E Dalat, alt. 1435 m, 29–30.05.2012, on light, A.M. Prokofiev leg.; 17♂♂, 16♀♀, Bi Doup — Nui Ba National Park, DT 723/652, between Giang Ly and Hon Giao, 12°10.94' N, 108°41.47' E, alt. 1500 m, 30–31.05.2012, on light, A.M. Prokofiev leg.; 4♂♂, 3♀♀, 12 km N of Dalat — LangBian, 28–30.04.1994, P. Pacholátko and L. Dembicki leg. (2♂♂, 2♀♀—CP, 2♂♂, 1♀—CZ); 11♂♂, 29♀♀, 12°03' N, 108°27' E, 12 km N of Dalat — LangBian, 1580–1750 m, 17–21.04.1995, P. Pacholátko and L. Dembicki leg. (6♂♂, 19♀♀—CP, 5♂♂, 10♀♀—CZ); 10♀♀, 14°10' N, 108°30' E, 40 km NW of An Khe Buon Luoi, 620–750 m, 28.03–12.04.1995, P. Pacholátko and L. Dembicki leg. (5♀♀—CP, 5♀♀—CZ).

DESCRIPTION. Male, holotype (Fig. 25). Length 19 mm, greatest width 10.5 mm. Elongate ovoid, moderately convex. Grass-green, lustrous, underside somewhat darker, pronotum and elytra with very faint rosy-brownish tint; sides of scutellum narrowly margined by black; medial tibiae with indistinct and hind tibiae with conspicuous reddish luster.

Clypeus transverse, with broadly rounded front angles and moderately raised anterior margin; anterior half of front and clypeus tightly rugoso-punctate, punctures becoming smaller and sparser from posterior half of front to vertex. Antennal club as long as segments 2–6 combined. Pronotum

1.65 times as broad as long. Sides of pronotum almost parallel at basal half, distinctly convergent anteriorly; front angles pointed, hind angles obtuse; basal margin strongly convex, with border widely interrupted before scutellum. Pronotum regularly and densely, but minutely punctated. Scutellum triangular, with pointed tip, feebly and sparsely punctated. Elytra 1.2 times as long as broad, very weakly expanded posteriorly. Elytra regularly and rather densely but minutely punctate; punctures slightly smaller and somewhat sparser than on pronotum; punctate rows being indistinguishable. Epipleura of elytra long, membranous apical border moderately developed. Propygidium almost completely covered by elytra, tightly rugoso-punctate; pygidium moderately convex, coarsely transversely rugoso-punctate, with few moderately long hairs on margins. Sterna densely punctate, quite densely covered with rather long decumbent pale hairs. Prosternal process absent. Mesometasternal process weakly developed, blunt, not extending in front of middle coxae, but mesometasternal suture obliterated between the coxae. Disc of metasternum weakly impressed, bearing medial furrow. Abdominal sternites tightly punctate and rugose, each with a transverse row of rather sparse semi-erect setae becoming denser and arranging in few several rows on uppersides; setigerous punctures being much coarser and larger than the others. Sides of abdomen almost non-carinate.

Fore tibia with two teeth; basal tooth well discernible; inner spur orientated forward and laterad, attached at the level of basal tooth. Last joint of fore tarsi with sharply produced ventro-apical angle and with small subbasal tooth; inner fore claw deeply clefted, lower lobe broader, lower edge angularly excavated at base (Fig. 26). Outer middle claw

incised, lower lobe twice broader. Middle and hind tibiae not broadened. Hind tarsi as long as tibiae.

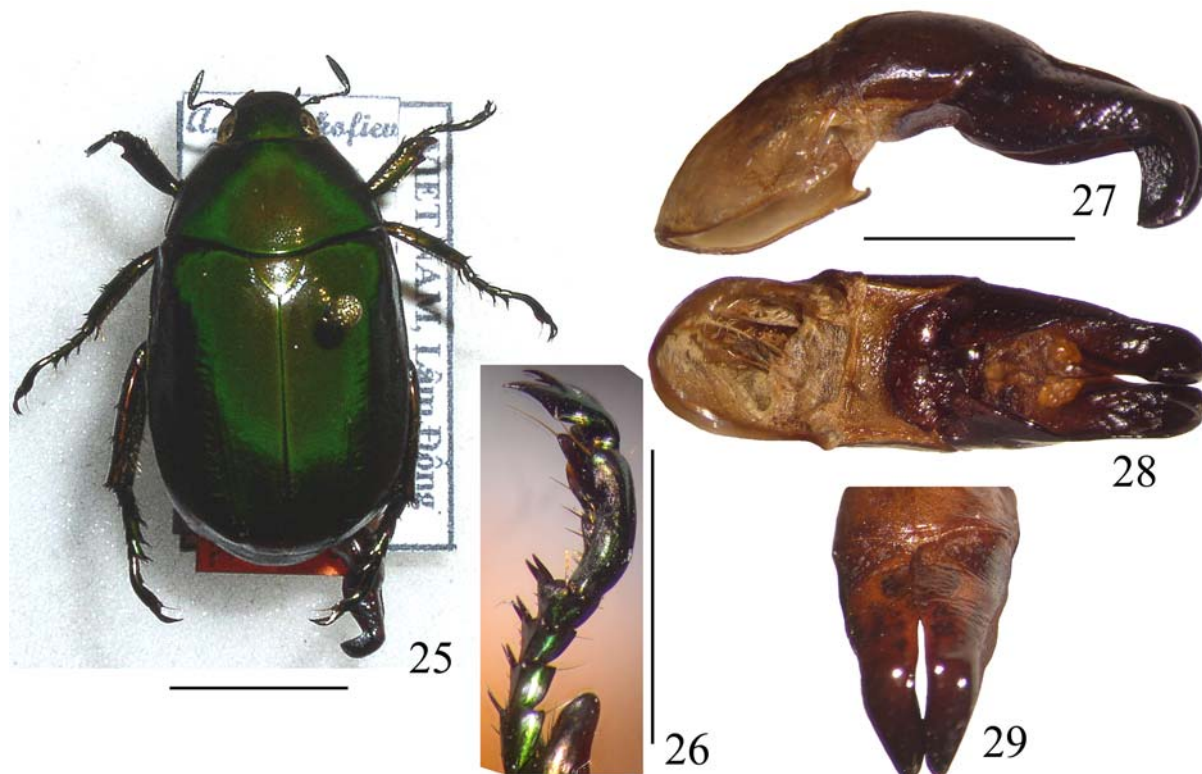
Parameres sharply bent downward apically, pointed at tips (Figs 27–29).

Female. Length 21 mm, greatest width 11 mm. Pronotum 1.7 times as broad as long. Elytra 1.4 times as long as broad. Pygidium similarly convex as in male. Last joint of fore tarsi elongate; inner fore claw and outer middle claw clefted, lower lobe 1.5 times broader; lower edge of inner fore claw regularly concave. Vaginal palpi lacking membranous internal area.

VARIATIONS. Length and greatest width 18.5–22 mm and 9–11 mm (males), 19–23 mm and 10–12 mm (females). Brownish tint from above and reddish luster on underside and legs are very variably expressed. Pronotum 1.90–2.25 times as broad as long. Elytra almost parallel-sided along most of its length to weakly expanded posteriorly, 1.2–1.4 times as long as broad. Pilosity on pygidium sometimes completely absent.

ETYMOLOGY. This species is named from the kind of the birds of prey, as the shape of its male aedeagus is very similar in lateral view to the bird-of-prey's bill; the species epithet is noun in apposition.

DIFFERENTIAL DIAGNOSIS. Except the presence of the small mesometasternal process all the characters of the new species well correspond to the “*sinica*”-group (formerly called “*Euchlora*” Macleay, 1819), not to “*Spilota*” Burmeister, 1844 (the latter now is known as the genus *Calistethus* Blanchard, 1851, which validity is very doubtful in my opinion). Thus, I conclude that the mesosternal process is independently derived in the new species, as also occasionally occurs within some other *Anomala* lineages. With few exceptions the species of the “*sinica*”-group can be adequate-



Figs 25–29. *Anomala haliaetus* sp.n., holotype, male: 25 — habitus; 26 — fore tarsus; 27–29 — aedeagus; 25–26 — dorsal view; 27 — lateral view; 28 — ventral view; 29 — frontal view. Scale bars: 25 — 5 mm; 26–29 — 3 mm.

Рис. 25–29. *Anomala haliaetus* sp.n., голотип, самец: 25 — габитус; 26 — передняя лапка; 27–29 — эдеагус; 25–26 — сверху; 27 — сбоку; 28 — снизу; 29 — спереди. Масштаб: 25 — 5 мм; 26–29 — 3 мм.

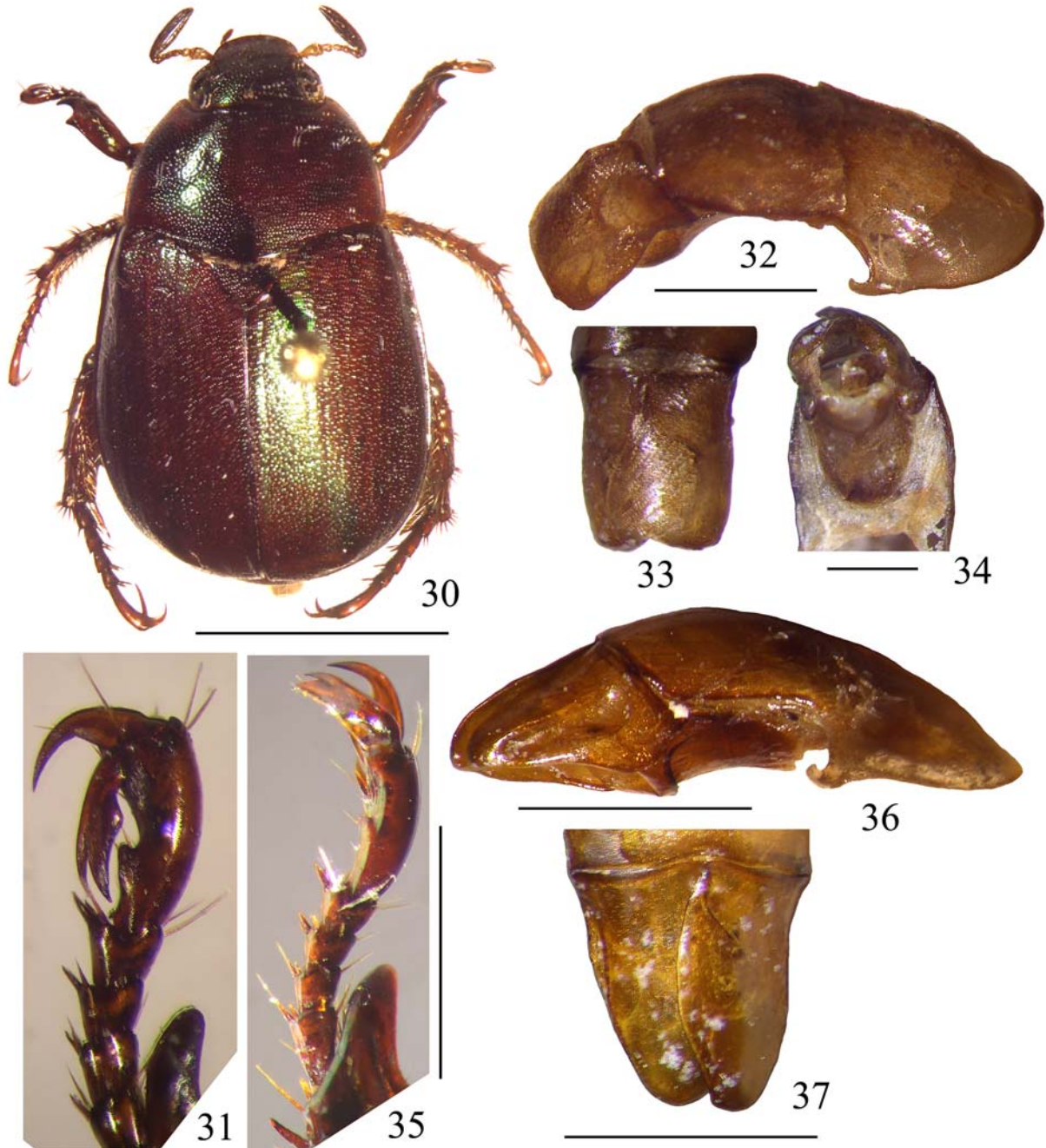
ly separated from each other in the shape of the male aedeagi only. The structure of the parameres in the new species is sharply different from all the other Oriental *Anomala* species. *A. cariniventris* Lin, 2002 from Hainan I. is the most similar species in the genitalic structures [see Lin, 2002: Fig. 1], but with the parameres being more gracile and less strongly hooked; it is further different from the new species in the sharply carinate abdominal sternites 1–3 and in the dark brown color of the underside and legs [Lin, 2002].

Anomala phuquocica Prokofiev sp.n.

Figs 30–37

MATERIAL. Holotype, ♂, Vietnam, Phu Quoc I., TL 47, 4–5 km W Ham Ninh, 24–25.11.2010, on light, A.M. Prokofiev leg.

DESCRIPTION. **Male**, holotype (Fig. 30). Length 12 mm, greatest width 7 mm. Moderately elongate, oval, convex. Greenish-brown, metallic shining from above; underside and legs bronze to yellowish-brown, shining; metastern-



Figs 30–37. *Anomala* spp., male: 30–34 — *A. phuquocica* sp.n.; 35–37 — *A. obsoleta* Blanchard, 1850; 30 — habitus; 31, 35 — fore tarsus; 32–34, 36–37 — aedeagus; 30, 33, 37 — dorsal view; 32, 36 — lateral view; 34 — ventral view; 30–34 — holotype. Scale bars: 30 — 5 mm; 31, 35 — 2 mm; 32–34, 36–37 — 1 mm.

Рис. 30–37. *Anomala* spp., самцы: 30–34 — *A. phuquocica* sp.n.; 35–37 — *A. obsoleta* Blanchard, 1850; 30 — габитус; 31, 35 — передняя лапка; 32–34, 36–37 — эдеагус; 30, 33, 37 — сверху; 32, 36 — сбоку; 34 — снизу. Масштаб: 30 — 5 мм; 31, 35 — 2 мм; 32–34, 36–37 — 1 мм.

num mostly dark green. Green luster very strong on head, pronotum and elytra, indistinct on pygidium.

Clypeus transverse, with broadly rounded front angles and moderately raised anterior margin; front and clypeus closely and rugosely punctate; punctures on vertex similarly coarse but more separated. Antennal club slightly longer than segments 2–6 combined. Pronotum 1.7 times as broad as long. Sides of pronotum almost parallel at base, gradually but considerably convergent anteriorly; front angles short but acute, hind angles straight; basal margin moderately convex at middle, with border widely interrupted before scutellum. Pronotum coarsely and densely punctured; interspaces between punctures clearly smaller than their diameter; sides of pronotum with several long and widely spaced setae. Scutellum large, triangular, with rounded tip, tightly punctured. Elytra as long as broad, coarsely and densely punctured; punctures generally becoming somewhat smaller to sides; punctate rows indistinguishable. Epipleura long, bare; membranous apical border moderately developed but long, extending in front to the level of mid-length of hind coxae. Propygidium completely covered by elytra, tightly rugoso-punctate. Pygidium coarsely transversely rugose, with sparse adpressed hairs at base and along margins, but with disc bare. Sterna tightly punctured and rather densely covered with moderately long pale hairs; disc of metasternum impressed; no prosternal and mesometasternal processes. Abdominal sternites tightly rugoso-punctate, sides almost non-carinate. Uppersides of abdominal sternites with non-dense patches of adpressed pale hairs reducing medially to a single transverse row of widely-spaced hairs on each sternite.

Fore tibia with two teeth; internal spur oriented forward and downward, attached at level of basal tooth. Last joint of fore tarsi strongly thickened distally, with strong submedial tooth on ventral margin; inner fore claw deeply clefted, with lower lobe twice as broad as upper lobe; ventral margin sharply excavated at base (Fig. 31). Outer claws of middle tarsi clefted. Middle and hind tibiae weakly thickened; middle and hind tarsi as long as tibiae.

Parameres short and simple (Figs 32–34).

Female unknown.

ETYMOLOGY. This species is named from the type locality, Phu Quoc Island.

DIFFERENTIAL DIAGNOSIS. The new species is similar to *A. obsoleta* Blanchard, 1850, but slightly broader, more greenish above, with slightly sparser elytral punctation, and with much more reduced pilosity on the pygidium. The last joint of the male fore claws is much thicker apically, with the very strong (vs weak) submedial tooth on its ventral margin in the new species (compare Figs 31 and 35). The parameres are also different (compare Figs 32–34 and 36, 37): shorter, with obliquely truncated and somewhat divergent apices (abruptly truncated in the lateral view), with indistinct groove on sides, and with basal plate deep and completely visible in the lateral view in the new species vs. longer, weakly contracted toward apices, rounded on tips, nearly triangular in the lateral view, with deep and broad lateral groove, and with basal plate flat and incompletely visible laterally in *A. obsoleta*. *A. densepunctata* Frey, 1971 has not been studied by me, but seems to be similar also; however, this species is strikingly different in its quite long and narrow parameres [Frey, 1971: Abb. 1].

***Anomala sorortertia* Prokofiev sp.n.**

Figs 38–41

MATERIAL. Holotype, ♂, Vietnam, Lam Dong prov., Bi Doup — Nui Ba National Park, DT 723/652, between Giang Ly and Hon Giao, 12°10.94'N, 108°41.47'E, alt. 1500 m, 30–31.05.2012, on light, A.M. Prokofiev leg.

Paratypes, 1♂, collected with holotype; 2♂♂, 1♀, Lam Dong prov., DT 722, ~5 km before Dinh K'No, ~46 km from Dalat, 12°08'25"N, 108°23'24"E; alt. 1510–1520 m, 19–21.04.2010, on light, A.M. Prokofiev leg.

DESCRIPTION. Male, holotype (Fig. 38). Length 8.5 mm, greatest width 4 mm. Rather elongated, moderately convex, glabrous. Testaceous; head black from above, with reddish-brown tint on clypeus and anterior portion of front; pronotum with large and pronounced blackish central spot not reaching the basis and with two small and very vague dark spots on sides just before mid-length; scutellum pale, with black outer margin; elytra with large black horseshoe-shaped mark around scutellum, with narrowly blackish suture, with brownish spot on suture somewhat behind mid-length, and with widely but vaguely blackish sides along whole elytral length (from humeral to apical knobs); apices of all tibiae black; middle and hind tarsi reddish-brown to blackish; antennae and palpi testaceous.

Clypeus transverse, with broadly rounded front angles and weakly raised anterior margin. Front and clypeus roughly rugoso-punctate, punctures on vertex similarly coarse but much sparser than on front. Antennal club slightly longer than antennomeres 2–6 combined. Pronotum about twice as broad as long, with maximum width at middle; sides very slightly convergent toward base, but distinctly converging anteriorly; anterior angles sharp, posterior angles weakly obtuse; basis rather regularly convex; basal border complete. Pronotum coarsely and tightly punctured; sides with few long hairs in a row. Scutellum bluntly pointed at tip, tightly punctured. Elytra 1.5 times as long as broad, mostly parallel-sided, very slightly expanded toward apex; punctate rows very distinct but not impressed; interspaces flat, with microsculpture only. Epipleura long and bare; membranous posterior border very narrow. Propygidium completely covered by elytra, rugoso-punctate; pygidium weakly convex, glabrous except few long hairs at apex, coarsely and closely punctured. Sterna finely punctured, almost glabrous; no prosternal and mesometasternal processes; abdomen tightly rugoso-punctate, glabrous except a transverse row of short and widely spaced setae just before posterior margin of each sternite; posterior margin of last abdominal sternite with a row of quite long hairs; upper reaches of abdominal sternites 1–3 carinate.

Fore tibiae tridentate; third tooth well-expressed though small; inner spur attached at level of middle tooth, oriented forward and laterad. Last joint of fore tarsi weakly thickened, with small but distinct tooth near middle of its ventral rim; inner fore claw incised, with upper lobe very narrow and short, with ventral rim angulated at base (Fig. 39). Outer middle claw clefted, with upper lobe short and narrow. Middle and especially hind tibiae moderately expanded in middle; middle and hind tarsi longer than tibiae.

Parameres (Figs 40–41) simple and symmetrical.

Female (Fig. 42). Length 10 mm, greatest width 4 mm. Somewhat larger, more elongated and parallel-sided, slightly less convex than males. Testaceous; clypeus and anterior-most portion of front cherry-brown, head in the rest black from above; black central mark on pronotum smaller than in males and subdivided by very narrow medial pale longitudinal streak; dark markings on elytra consisting of horseshoe-shaped spot around scutellum (occupying slightly smaller area than in males), narrow blackish-brown border of suture and wide blackish border along sides.

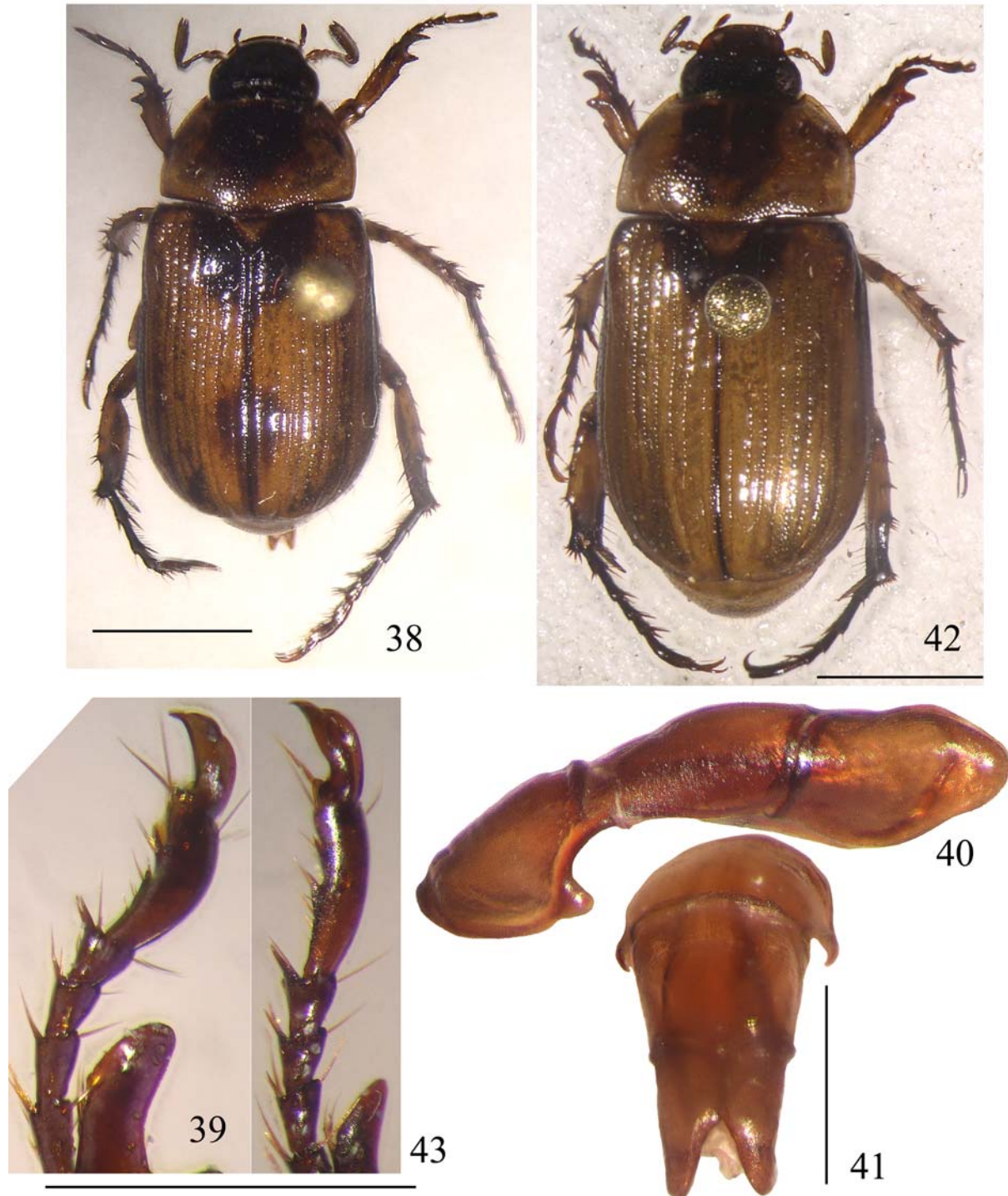
Pronotum 1.8 times as broad as long; elytra 1.6 times as long as broad. Apical tooth of fore tibiae long and tongue-shaped, medial tooth sharp, basal tooth weak; first joint of

fore tarsi elongated; last joint and claws similar to males, but tooth on ventral rim of last tarsomere very weakly expressed (Fig. 43). Vaginal palpi oval, pilose at apices.

VARIATIONS (males). Length 8.0–8.5 mm, greatest width 4 mm. Pronotum 1.8–2.0 times as broad as long; elytra 1.3–1.5 times as long as broad. Color pattern as described for female, but blackish markings on pronotum and on base and

sides of elytra wider, sometimes with separated black marks on apical knobs. Third tooth of fore tibiae sometimes weakly expressed.

ETYMOLOGY. The species epithet meaning “third sister” is based on the strong external and genitalic similarity between the new species and the closely related *A. bilunulata* and *A. anchoralis*; noun in apposition.



Figs 38–43. *Anomala sorortertia* sp.n.: 38, 42 — habitus; 39, 43 — fore tarsus; 40–41 — aedeagus; 38–39, 41–43 — dorsal view; 40 — lateral view; 38–41 holotype, male; 42–43 — paratype, female. Scale bars: 40–41 — 1.5 mm; others — 2 mm.

Рис 38–43. *Anomala sorortertia* sp.n.: 38, 42 — габитус; 39, 43 — передняя лапка; 40–41 — эдеагус; 38–39, 41–43 — сверху; 40 — сбоку; 38–41 — голотип, самец; 42–43 — паратип, самка. Масштаб: 40–41 — 1.5 мм; другие — 2 мм.

DIFFERENTIAL DIAGNOSIS. This new species is very similar to *A. bilunulata* Fairmaire, 1888 and *A. anchoralis* Lansberge, 1879 both in external features and shape of genitalia, but differs from the former in the coarser puncturing of the pronotum and in the color pattern (pronotum pale unicolorous, elytra dark with two transverse pale opalescent crescent-shaped marks in *A. bilunulata*: Fig. 44) and from the latter in tridentate (vs always bidentate) protibiae. Additionally, the posterior transverse blackish mark on elytra is usually absent (rarely faintly developed) in the new species, while usually large and pronounced, sometimes occupying most of the elytral disc in *A. anchoralis* (Figs 45–46).

C. Zorn [pers. comm.] supposed that this species represents a color morph of *A. bilunulata* due to the high variability of the coloration of the latter; however, I retain *A. so-rortertia* **sp.n.** as a different species because the direct comparison shows the differences in the punctation of the pronotum (coarser in the new species). Also the new species is more parallel-sided than both *A. bilunulata* and *A. anchoralis*.

***Anomala yersini* Prokofiev sp.n.**

Figs 47–53

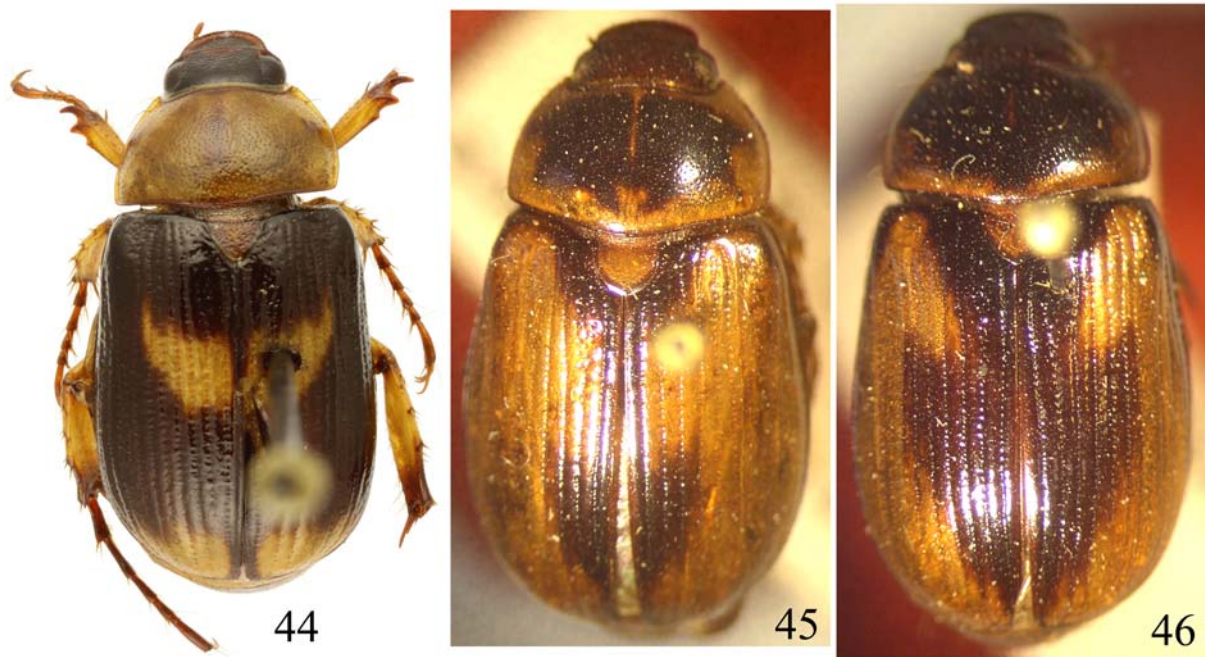
MATERIAL. Holotype, ♂, Vietnam, Lam Dong prov., DT 722, ~5–6 km before Dinh K'No, ~45–46 km from Dalat, 12°08'N, 108°23'E; alt. 1500–1520 m, 20–21.04.2010, on flowers of Onagraceae, A.M. Prokofiev leg.

Paratypes, 1♂, collected with holotype; 4♂♂, 1♀, the same data, but 19–21.04.2010, on light; 2♂♂, 12°03'N, 108°27'E, 12 km N of Dalat — Lang Bian, 1580–1750 m, 17–21.04.1995, P. Pacholátko and L. Dembicki leg. (1♂ — CP, 1♂ — CZ); 1♂, 2♀♀, 12 km N of Dalat — LangBian, 28–30.04.1994, P. Pacholátko and L. Dembicki leg. (1♂, 1♀ — CP; 1♀ — CZ).

DESCRIPTION. **Male**, holotype (Fig. 47). Length 11 mm, greatest width 6 mm. Elongate ovoid, weakly convex; ventral contour of thorax and abdomen gently concave in lateral view. Head, middle third of pronotum, scutellum

black; clypeus with cherry-brown tint; lateral thirds of pronotum yellow, with small vague dark blotch on sides just before mid-length; elytra black, with two broad yellow marks forming a transverse band at base, with transverse zigzag-shaped stripe at mid-length, and with dark cherry-brown apical quarter. Propygidium reddish-brown to black, becoming yellow laterally near posterior margin; pygidium with reddish-brown triangular medial mark, but yellow at sides; sterna black medially and posterolaterally, yellow anterolaterally; abdominal sternites dark reddish-brown to black along anterior borders and medially, yellow in the rest. Tarsi, basal and apical points of fore and middle tibiae and all hind tibiae dark reddish-brown to black; legs yellow in the rest. Antennal club reddish-brown to black, funicle yellow; palpi partly black, partly cherry-brown.

Clypeus transverse, with broadly rounded front angles and straight anterior margin, moderately raised and reflexed. Anterior half of clypeus almost smooth; posterior half and front coarsely and densely punctate; punctures becoming somewhat smaller and sparser on vertex. Antennal club almost equal to antennomeres 2–6 combined. Pronotum twice as broad as long, coarsely and densely punctured; basal border margined at lateral quarters only. Sides almost parallel at basal half, strongly convergent anteriorly, very weakly sinuate before slightly obtuse posterior angles; front angles acute, short; anterior border straight; posterior border strongly convex at middle third. Scutellum large, almost triangular, with bluntly pointed tip, tightly punctured. Elytra weakly expanded toward apex, about 1.1 times as long as broad, strongly sulcate; punctate rows very pronounced, impressed; interspaces convex, of equal size; all interspaces punctured by minute points, regularly and moderately densely distributed. Propygidium and pygidium transversely rugose; pygidium weakly convex, with very sparse erect hairs along outer margin and at apex. Sterna moderately densely punctured



Figs 44–46. *Anomala* spp., habitus, dorsal view: 44 — *A. bilunulata* Fairmaire, 1888 (syntype, Tonkin); 45–46 — *A. anchoralis* Lansberge, 1879 (Malang). Scale bar: 5 mm.

Рис 44–46. *Anomala* spp., габитус, сверху: 44 — *A. bilunulata* Fairmaire, 1888 (синтип, Тонкин); 45–46 — *A. anchoralis* Lansberge, 1879 (Маланг). Масштаб: 5 мм.

with small setigerous punctures; pubescence not dense, rather long, more or less adpressed, pale. No prosternal and mesometasternal processes. Abdominal sternites moderately densely punctured; punctures small; each sternite with a transverse submedial row of sparsely sitting setae. Upper reaches of abdomen non-carinate.

Front tibiae bidentate; inner spur attached at level of basal tooth, oriented forward and laterad; fore tarsi short, with last joint thick, bearing strong and truncated basal projection; inner fore claw twice longer than outer one, clefted at distal quarter; lower lobe longer and about 3 times broader than the upper one, its ventral rim gently and regularly curved (Fig. 50). Outer claw of middle tarsi clefted at distal 1/5 of its length; lower lobe longer and about twice broader than the upper one. Middle and hind tibiae weakly expanded at middle, fusiform; middle and hind tarsi longer than tibiae.

Aedeagus of very peculiar shape (Figs 52–53).

Female (Fig. 49). Length 11 mm, greatest width 6 mm, pronotum 1.8 times as broad as long. Front and clypeus dark cherry-red; vertex, middle longitudinal band on pronotum and scutellum brownish; dark pattern on elytra reduced to a pair of marks on each side at humeri and two irregular transverse bands, submedial one and subapical one, the latter

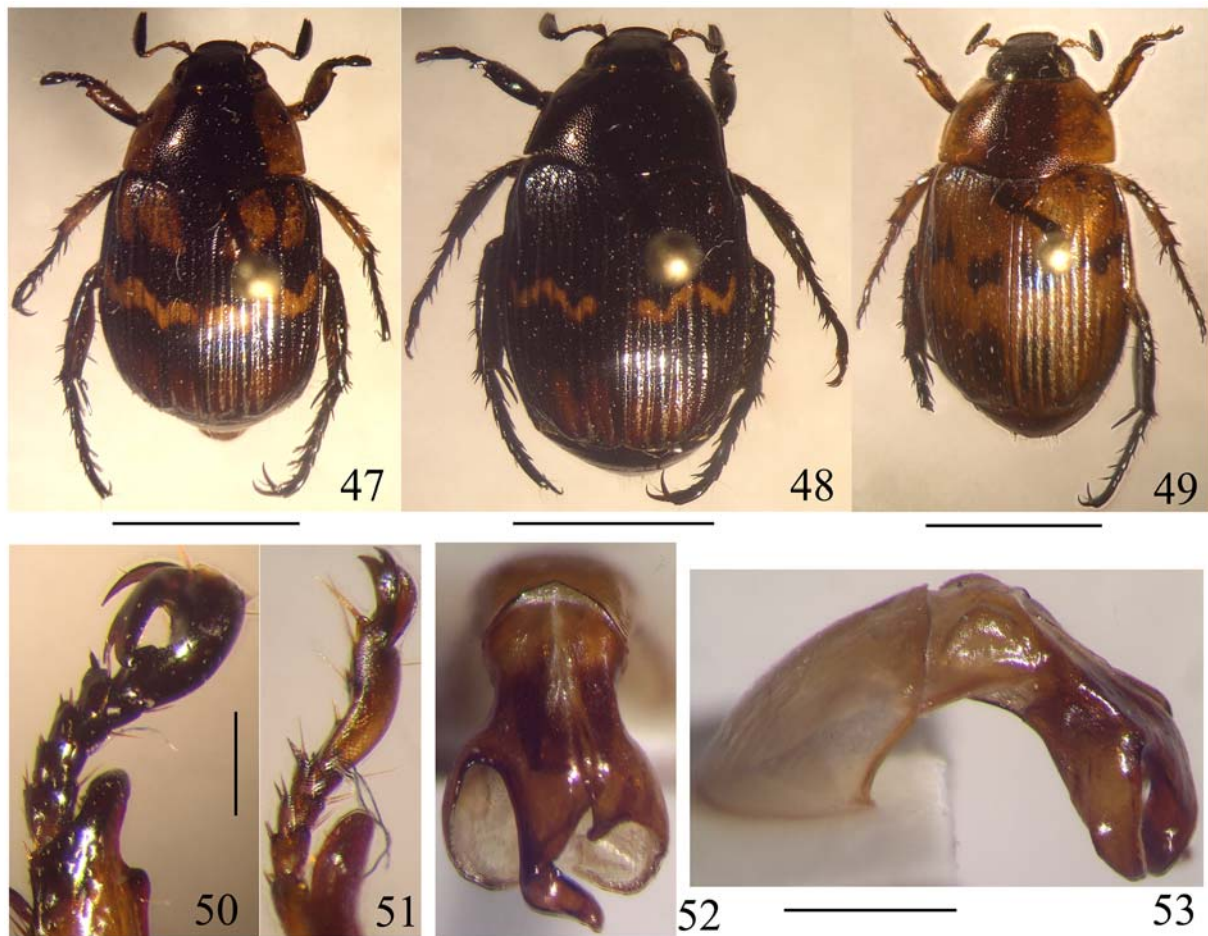
being broader but more vague; propygidium, pygidium and abdomen almost yellowish.

Apical tooth of fore tibiae very long, tongue-shaped; inner spur attached well behind level of basal tooth; basal joint of fore tarsi elongate; last joint gracile; inner fore claw and outer middle claw clefted, with lobes subequal (Fig. 51).

VARIATIONS (males). Length 10.5–11.5 mm, greatest width 6 mm; pronotum 1.7–2.0 times as broad as long; elytra 1.1–1.2 times as long as broad. Development of dark pattern being very variable, especially on elytra, where basal and medial yellow bands sometimes occupying most of anterior two-thirds of elytra; however, one specimen being almost black from above and below except narrow and incomplete orange-yellow zigzag-shaped stripe across middle of elytra and dark cherry-red apical third of elytra (Fig. 48). Genitalia being very constant in shape in all color variants.

ETYMOLOGY. This species is named in the memory of biologist and humanist Alexandre Yersin (22.09.1863–01.03.1943), who has spent much of his life in the area around Dalat.

DIFFERENTIAL DIAGNOSIS. This new species is very similar to *Anomala pagana* Burmeister, 1844 from Java, but can be easily distinguished in the shape of the parameres



Figs 47–53. *Anomala yersini* sp.n.: 47–49 — habitus; 48 — variation of coloration; 50–51 — fore tarsus; 52–53 — aedeagus; 47–51 — dorsal view; 52 — frontal view; 53 — lateral view; 47–48, 50, 52–53 — male; 49, 51 — female; 47, 50, 52–53 — holotype; 48–49, 51 — paratype. Scale bars: 47–49 — 5 mm; 50–51 — 0.5 mm; 52–53 — 1 mm.

Рис. 47–53. *Anomala yersini* sp.n.: 47–49 — габитус; 48 — вариация окраски; 50–51 — передняя лапка; 52–53 — эдеагус; 47–51 — сверху; 52 — спереди; 53 — сбоку; 47–48, 50, 52–53 — самки; 49, 51 — самцы; 47, 50, 52–53 — голотип; 48–49, 51 — паратип. Масштаб: 47–49 — 5 мм; 50–51 — 0.5 мм; 52–53 — 1 мм.

lacking membranous parts but having the dorsal process shorter and less complex (see Figs 52–55).

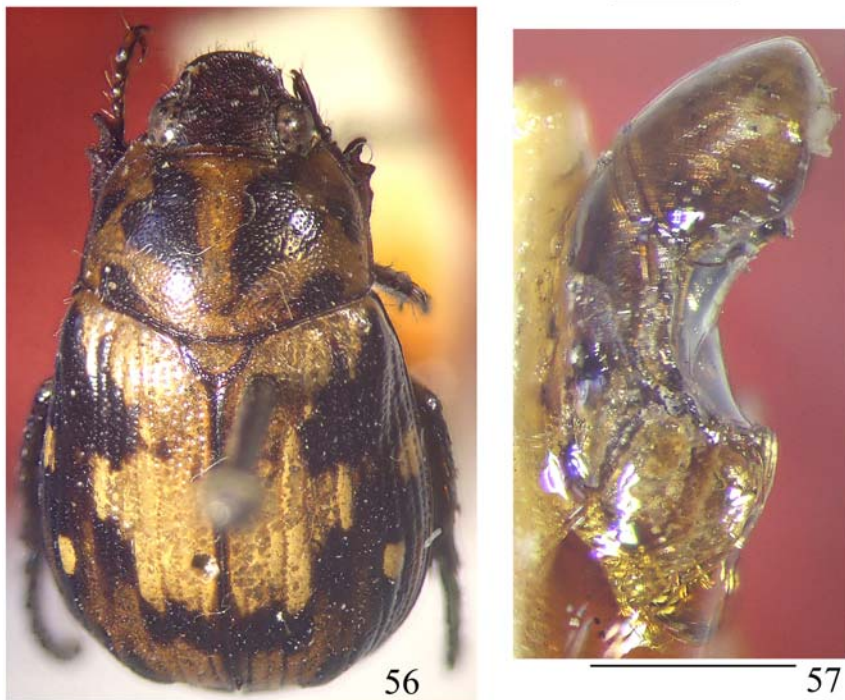
The new species is externally similar to *A. blaisei* Ohaus, 1914 but differs in the bidentate fore tibiae (vs tridentate in *A. blaisei*, though third tooth can be very small), in the details of dark pattern on the dorsal surface (compare Figs 47–49 and 56), and especially in the structure of male genitalia (compare Figs 52–53 and 57), which is very peculiar in the new species.

ACKNOWLEDGEMENTS. I am sincerely grateful to Dr. Carsten Zorn (Gnoien, Germany) for comments on the

species identity and to Drs. Antoine Mantilleri and Olivier Montreuil (Paris Museum, France) for providing of some photographs.

References

- Frey G. 1971. Neue Ruteliden und Melolonthiden aus Indien und Indochina//Entomologische Arbeiten aus dem Museum G. Frey. Bd.22. S.109–133.
 Lin P. 2002. Coleoptera: Rutelidae//Forest insects of Hainan. Beijing: National Natural Science Foundation of China. P.345–355.



Figs 54–57. *Anomala* spp., male: 54–55 — *A. pagana* Burmeister, 1844 (West Java); 56–57 — *A. blaisei* Ohaus, 1914 (Tonkin, Luc Nam); 54–55, 57 — aedeagus; 56 — habitus; 54, 56 — dorsal view; 55, 57 — lateral view. Scale bars: 54, 55, 57 — 1 mm; 56 — 3 mm.

Рис. 54–57. *Anomala* spp., самцы: 54–55 — *A. pagana* Burmeister, 1844 (Западная Ява); 56–57 — *A. blaisei* Ohaus, 1914 (Тонкин, Лукнам); 54–55, 57 — эдеагус; 56 — габитус; 54, 56 — сверху; 55, 57 — сбоку. Масштаб: 54, 55, 57 — 1 мм; 56 — 3 мм.