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Orammoecius, a new genus for four new Asian species of the tribe Aphodiini (Coleoptera: Scarabaeidae: Aphodiinae: Aphodiini)

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Taxonomy, new genus, new species, new combination, Coleoptera, Scarabaeoidea, Aphodiinae, Aphodiini, *Guanyinaphodius*, *Orammoecius*, China, India, Laos, Palaearctic Region, Oriental Region

Abstract. Based on Asian material of Aphodiini from Palaearctic and Oriental Regions, a new genus, *Orammoecius* gen. nov. is proposed to include the following four new species: *O. arunachalensis* sp. nov. from India (Arunachal Pradesh), *O. huaphanensis* sp. nov. from Laos (Hua Phan Province), *O. phongsalyensis* sp. nov. from Laos (Phongsaly Province), and *O. russulae* sp. nov. from China (Yunnan Province). For comparison, the holotype of a superficially similar species, *Aphodius* (*Guanyinaphodius*) *kishimotoi* Masumoto et Kiuchi, 2001, was studied, the subgenus *Guanyinaphodius* was raised to genus and a new combination, *G. kishimotoi* (Masumoto et Kiuchi, 2001) comb. nov. was thus proposed. The diagnosis of the new genus, *Orammoecius* gen. nov., descriptions of the four new species, appropriate illustrations and key to species are presented. Supplementary illustrations of the holotype of *Guanyinaphodius kishimotoi* comb. nov. are also included.

INTRODUCTION

The authors of the work presented here had a chance to examine very characteristic Asian specimens (from China, India and Laos) of species from the subfamily Aphodiinae, tribe Aphodiini. As shown below in the description and discussion of their characters, the species belonged to a new genus, *Orammoecius* gen. nov., which is proposed here to include four new species.

These species are habitually rather similar to a species of the subgenus described from China (Sichuan). The subgenus *Guanyinaphodius* of the genus *Aphodius* was relatively recently proposed by Masumoto & Kiuchi (2001). The taxon *Aphodius* (*Guanyinaphodius*) *kishimotoi* Masumoto et Kiuchi, 2001 (type of the genus) was also mentioned in this way in the Catalogue of Palaearctic Coleoptera (Dellacasa et al. 2006), but in the present work, the subgenus *Guanyinaphodius* is raised to genus to provide adhering to the concept of genera for most previously considered subgenera of the genus *Aphodius* Hellwig, 1798 by Dellacasa et al. (2001).

Results of studying specimens of the four new species of the new genus *Orammoecius* and the holotype of the monotypical genus *Guanyinaphodius* type species are summarized and analysed in the parts Taxonomy and Discussion, respectively.

MATERIAL AND METHODS

Specimens were examined with Olympus SZ61, MBS-10 and SZP 1120-T stereomicroscopes. Measurements were taken with an ocular grid. The elytra length is considered as a distance between a line connecting humeri and elytral apex (along the elytral suture). The photographs published here were taken by using a Meopta laboratory microscope and CMOS 5 digital camera with the Helicon Focus 3.20.2 Pro software.

Male genitalia (aedeagi) were treated by boiling with a 10% sodium hydroxide solution.

Each specimen of the newly described species is provided with a printed red label: "name of the taxon sp. nov., HOLOTYPUS ♂ or ♀ [or] ALLOTYPUS ♀ [or] PARATYPUS, ♂ or ♀, David Král, Miloslav Rakovič & Ladislav Mencl det. 2015" and with a pale green label specifying numbers related to a photo-documentation system by the third author (LM). Exact label data (as shown on white labels) are cited for the material examined. Individual lines within each label are separated by slashes "/"; double slash "//" stands for the separation of individual labels. Information in quotation marks indicates the original spelling. Our remarks and additional comments are found in brackets. Morphological terminology concerning the epipharyngeal structures was adopted from Dellacasa et al. (2001).

The following acronyms identify the collections housing the material examined (curators names are in parentheses):

DKCP David Král collection, deposited in NMPC;
LMCT Ladislav Mencl, private collection, Týnec nad Labem, Czech Republic;
NMPC National Museum Praha, Czech Republic (Jiří Hájek);
NSMT National Science Museum (Natural History), Tokyo, Japan;
VKCB Vítězslav Kubáň, private collection, Brno, Czech Republic;
ZFMK Zoologisches Forschungsmuseum Alexander Koenig, Bonn, Germany (Dirk Ahrens).

TAXONOMY

Orammoecius gen. nov.

Type species. *Orammoecius russulae* sp. nov. by the original designation.

Diagnosis. Small (3.00-4.35 mm), oblong oval (length-to-width ratio between 1.25 and 1.31), dorsal surface fairly shining, mostly glabrous (but with setigerous punctures adjacent to lateral edges of pronotum and bearing minute macrosetae, sometimes also situated in some of lateral elytral striae); brown to black. Head relatively wide, with genae protruding considerably more than eyes but anteriorly aligned or nearly aligned with clypeus lateral margins; clypeus anteriorly with broad, anteromedian emargination, broadly rounded on each side, margins quite glabrous, finely bordered; area above anteromedian emargination rather steeply ascending backward to distinct epistomal gibbosity; frontoclypeal suture at most in the form of very fine line, never tuberculate; head surface punctate, arrangement of punctures as described below in particular species. Epipharynx with anterior margin

shallowly bisinuate, regularly rounded anterolaterally; epitorma broadly triangular; corypha considerably exceeding anterior margin, with two long, stout spinules and tuft of slender, acute macrosetae; acropariae with dense macrosetation; prophobae densely macrosetaceous; chaetoparia slender, densely macrosetaceous. Pronotum convex transversal, with non-bordered anterior margin and bordered lateral and basal margins (basal margin bordered by coarsely punctate furrow) as well as truncate and more or less emarginate posterior angles, but lateral margins also very slightly to quite distinctly sinuate just before these angles; pronotum surface with considerably large and deep punctures (as related to the body size), distributed sparsely or missing on pronotal disc and becoming denser toward lateral margins. Scutellum small, ogival or pentagonal. Elytra subparallel, broader behind or ovate (egg-shaped) their length-to-width ratio between 1.08 and 1.31, with ten striae, ten intervals and quite distinct humeral denticles; punctures in striae large, crenating intervals. Upper face of protibia impunctate; metatibia apex fringed with few short, not very dense, blunt and equal spinules. Profemora glabrous, impunctate. Metaventrite punctate and macrosetaceous anteriorly, impunctate and glabrous posteriorly. Abdominal ventrites and pygidium with setigerous small, but rough ("rasp-like") punctures bearing long setae. Aedeagus relatively long, bent in lateral aspect; parameres considerably short, stout, strongly bent inward in dorsal aspect.

Name derivation. Combination of "*Or-*" (*Oriental*, meaning eastern) and "*Ammoecius*" (name of a similar genus). Masculine in gender.

Distribution. China (Yunnan Prov.), India (Arunachal Pradesh), Laos (Phongsaly Prov., Hua Phan Prov.).

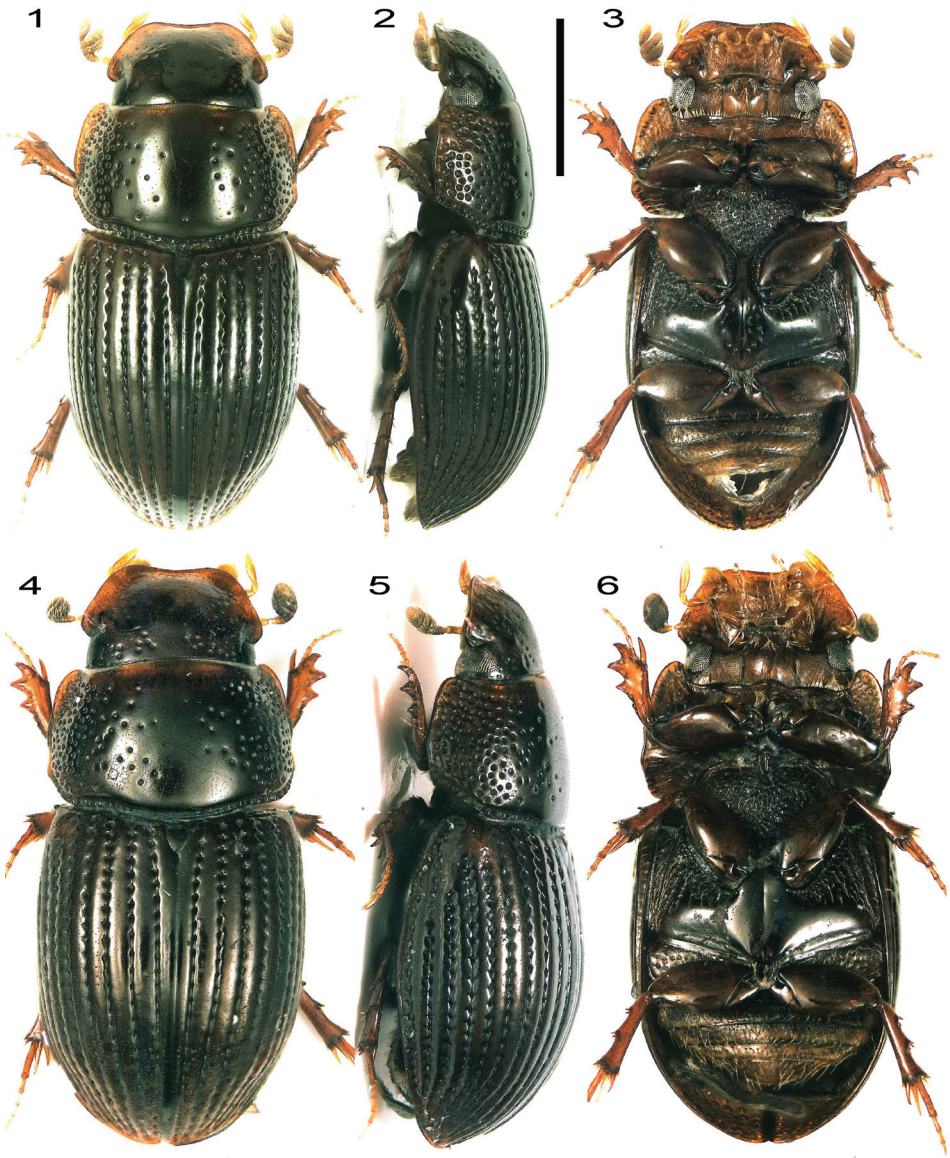
Orammoecius arunachalensis sp. nov.
(Figs. 1-15, 57-58)

Type locality. NE India, Assam-Arunachal border, Bhalukpong, 27°00'48"N 92°39'08"E, 150 m [a. s. l.].

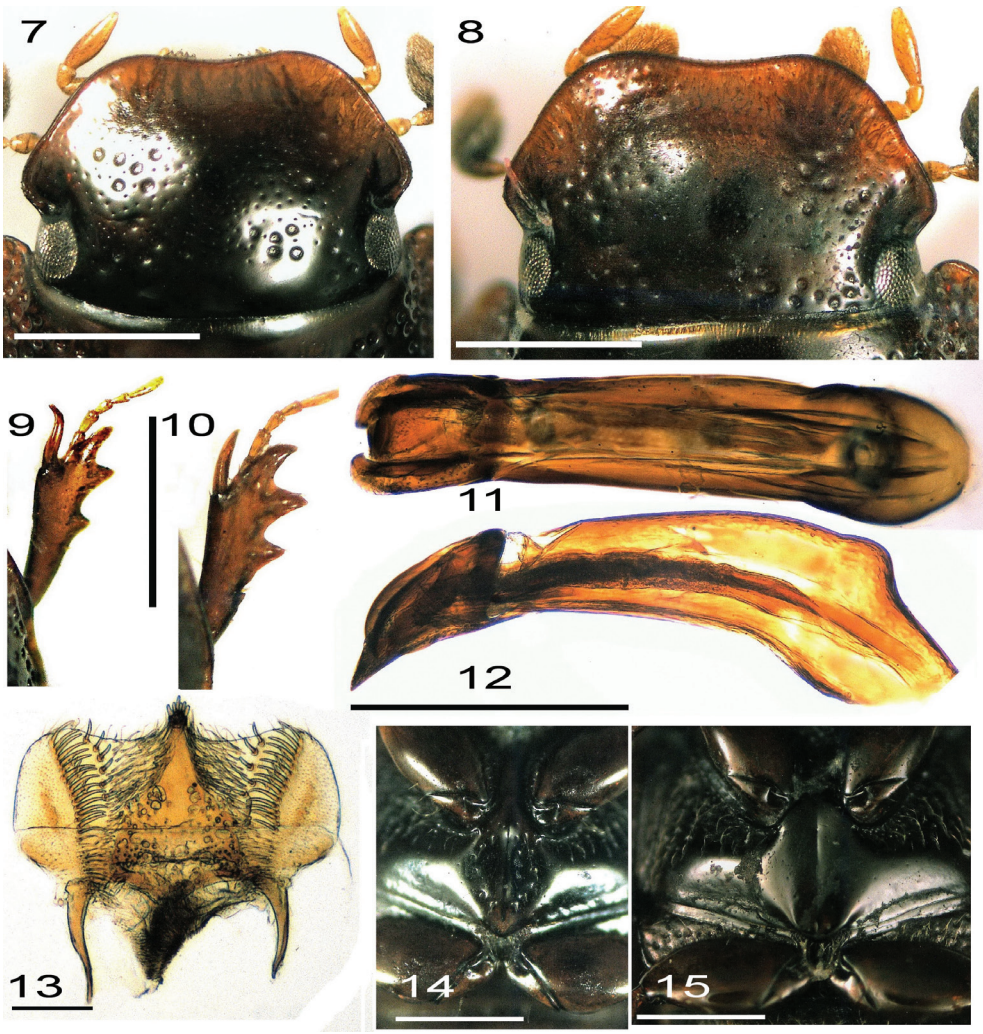
Type material. Holotype (♂) (ZFMK): "NE INDIA, Assam-Arunachal / border, Bhalukpong, 150m / 27°00'48"N 92°39'08"E, / FIT (flight interception trap) / L. Dembický leg., 1.-8.v. 2012 [white, printed label] // Dok. L. Mencl, 2113 [pale green, printed label]". Paratypes: allotype (♀) (ZFMK): same data on white labels as with holotype, number 2116 instead of 2113 on pale green label; (2 ♂♂) (LMCT and NMPC), same data on white labels, numbers 2114 and 2115 on pale green labels.

Description of holotype. Dorsum (Fig. 1). Small (3.20 mm), broader behind (length-to-width ratio 2.12), dorsal surface fairly shining, mostly glabrous (but with rows of setigerous punctures adjacent to lateral edges of pronotum and bearing enormously short macrosetae); mostly blackish brown, clypeus margins and pronotum lateral margins lighter (brown).

Head relatively wide (Fig. 7), with angularly rounded genae protruding considerably more than eyes and anteriorly aligned with clypeus lateral margins; clypeus anteriorly with broad anteromedian emargination, broadly rounded each side of it, margins quite glabrous, finely bordered; frontoclypeal suture in form of very fine line (distinct rather laterally than medially), not tuberculate; head surface with certain coarsely punctate areas on very finely



Figs. 1-6. *Orammoecius arunachalensis* gen. nov., sp. nov., habitus: 1- holotype, ♂, dorsal aspect; 2- holotype, ♂, lateral aspect; 3- holotype, ♂, ventral aspect; 4- allotype, ♀, dorsal aspect; 5- allotype, ♀, lateral aspect; 6- allotype, ♀, ventral aspect. Scale line 1 mm. Photographs by L. Mencl.



Figs. 7-15. *Orammoecius arunachalensis* gen. nov., sp. nov.: 7- holotype, ♂, head, dorsal aspect; 8- allotype, ♀, head, dorsal aspect; 9- holotype, ♂, protibia and protarsus, top view; 10- allotype, ♀, protibia and protarsus, top view; 11- holotype, ♂, aedeagus, dorsal aspect; 12- holotype, ♂, aedeagus, lateral aspect; 13- holotype, ♂, epipharynx ; 14- holotype, ♂, metaventrum; 15- allotype, ♀, metaventrum. Scale lines 0.1 mm for Fig. 13, 0.5 mm for other figures. Photographs by L. Mencl.

punctate background: few (about ten) coarse punctures present on head vertex (rather laterally than medially) and few (about five) coarse punctures present on each side, sideward from epistomal gibbosity.

Epipharynx (Fig. 13). Anterior margin shallowly but distintly bisinuate, regularly rounded anterolaterally; epitorma broadly triangular, regularly widened posteriad; corypha considerably exceeding anterior margin, with two long, stout spinules and tuft of slender,

acute macrosetae; acropariae with dense, long macrosetation, prophobae considerably densely macrosetaceous; chaetoparia slender, densely macrosetaceous; tormae short.

Pronotum transversal (length-to-width ratio of 0.660), with non-bordered anterior margin and bordered lateral and posterior margins as well as truncate and distinctly emarginate posterior angles (pronotum base bordered by coarsely punctate furrow); anterior angles rounded; lateral margins moderately explanate, rather straight and diverging backward, but distinctly sinuate in front of truncate and emarginate posterior angles; basal margin slightly sinuate on each side against elytral interval 4; pronotum surface with relatively large and deep punctures, moderately larger than those on head vertex, microscopic fine punctures in intervals between large punctures; wide discal area free of large punctures present along pronotum midline (extending throughout whole pronotum length and having width equal to about 0.28 pronotum width), sparse large punctures present sideward of this area, becoming denser in direction of lateral margins, wide lateral areas being very densely punctate there (distances between punctures about equal to puncture diameter); setigerous punctures (bearing hardly perceptible, very short macrosetae), are adjacent to lateral edges of pronotum.

Scutellum small (its length equals to about 0.10 elytral suture length), ogival, its surface smooth.

Elytra widest at about their midlength (their length-to-width ratio of 1.29), with ten striae, ten intervals and quite distinct, sideward and upward directed humeral denticles; striae narrow, but very distinct, punctate, punctures in striae coarse, crenating outside margins of intervals, distances between punctures smaller than puncture diameter; intervals convex, impunctate (Figs.1, 2).

Protibia (Fig. 9) with three large outer teeth, and in its basal part with only one distinct denticle; its upper face with longitudinal row of minute setigerous punctures extending close to lateral margins, otherwise impunctate and glabrous; apical spine with inward and downward bent tip. Mesotibiae and metatibiae with two pairs of distinct but not very strong oblique ridges each; mesotarsomeres and metatarsomeres narrow (never triangularly widened), basimetatarsomere long (moderately shorter than metatarsomeres 2-4 combined), superior terminal spine of metatibia about as long as basimetatarsomere, inferior spine shorter, metatibia apex fringed with few short, not very dense, blunt and equal spinules.

Venter (Figs. 3, 6). Femora glabrous, impunctate. Metaventrite posteriorly glabrous and impunctate (except for few medium-sized punctures on male metaventral plate impression arranged in arc each side of fine, complete median furrow bearing fine macrosetae); anteriorly with small, but rough ("rasp-like") punctures bearing long, decumbent, backward directed macrosetae. Abdominal ventrites (and also pygidium) with dense, small, but rough ("rasp-like") punctures bearing long, semidecumbent macrosetae.

Aedeagus (Figs. 11-12) relatively long, weakly bent in lateral aspect; parameres considerably short, stout, strongly bent inward in dorsal aspect (Fig. 11), finely beaked and acute apically in lateral aspect (Fig. 12).

Sexual dimorphism. The apical spine of the protibia has an inward and downward bent tip in males (Fig. 9). In females, the protibial apical spine is continuously curved outward from its base to its tip (Fig. 10). On the male (female) metaventral plate medium-sized setigerous punctures are present (absent), as shown in Fig. 14 (Fig. 15). The female allotype is otherwise depicted in Figs. 4-6 and Fig. 8.

Variability. In three male specimens, the body lengths are of 3.00-3.40 mm; in a female specimen, the body length is of 3.50 mm. There are very slight differences in numbers of coarse punctures present on otherwise smooth central area of the pronotum.

Differential diagnosis. The species *Orammoecius arunachalensis* sp. nov. can be differentiated from the remaining three species based on the key to species below, but it is still the smallest species of the genus (the body length up to 3.50 mm). The body lengths of the other three species ranges between 3.90 and 4.35 mm.

Collecting circumstances. Type material was collected by using by a flight intercept trap exposed inside a lowland primary tropical forest (Figs. 57-58; L. Dembický pers. comm. 2015).

Distribution. India, Arunachal Pradesh.

Name derivation. Toponymic (adjective derived from the name of the State Arunachal Pradesh of India where the type material was collected).

Orammoecius huaphanensis sp. nov.
(Figs. 16-25)

Type locality. NE-Laos, Hua Phan Prov., Ban Saleui, Phan (Mt.), ~ 20°12'N 104°01'E, 1300-1900 m [a s. l.].

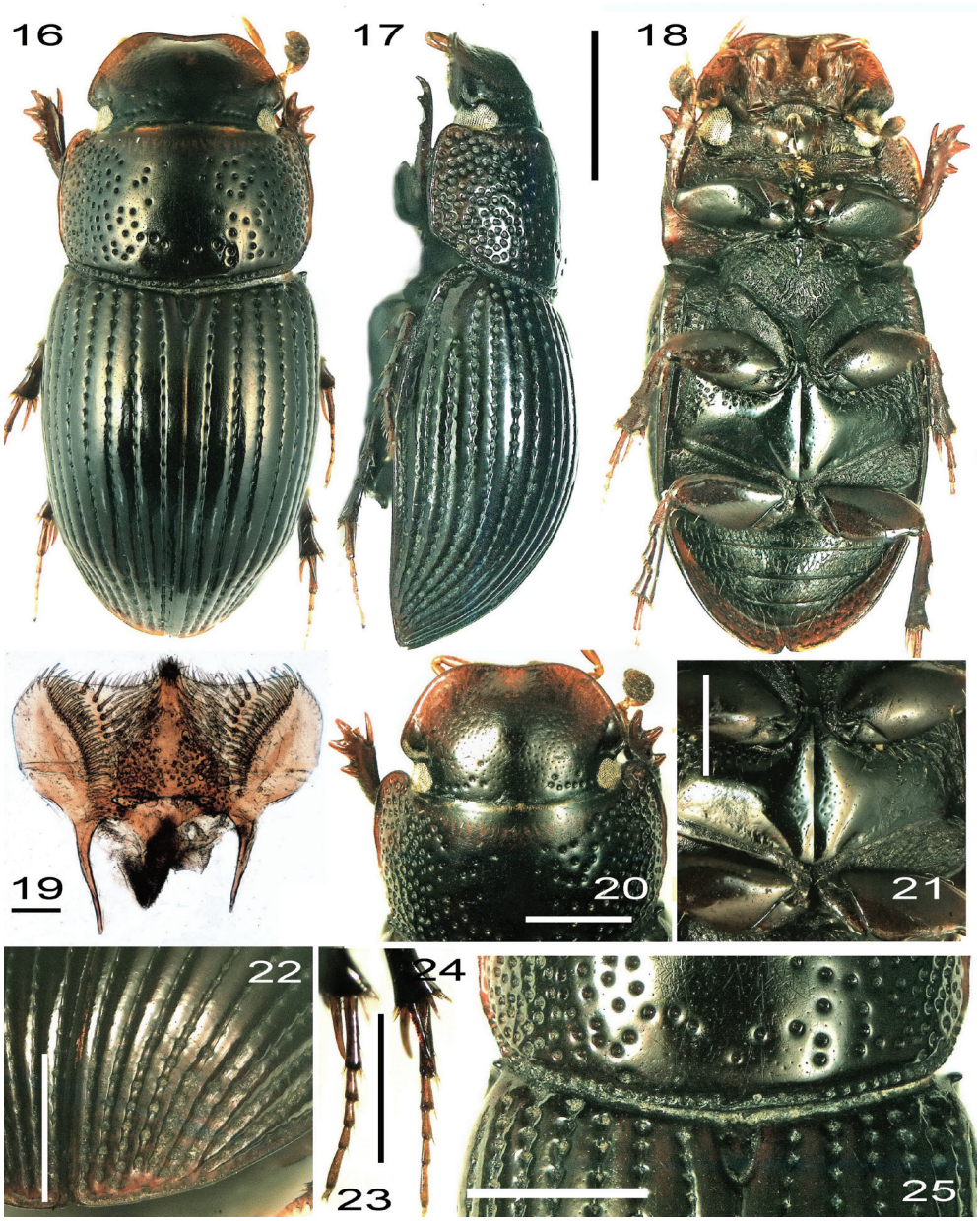
Type material. Holotype (♀) (ZFMK): "NE-LAOS: Hua Phan Prov. Ban / Saleui, Phan (Mt.) ~ 20°12'N, / 104°01'E; 1300-1900 m; 07.iv.- / 25.v.2010; leg. C. Holzschuh / Ankauf ZFMK Bonn 2011 [white, printed label] // Dok. L. Mencl, 1699 [pale green, printed label]".

Description of holotype. Dorsum (Fig. 16). Small (4.00 mm), egg-shaped (length-to-width ratio of 2.11), dorsal surface fairly shining, mostly glabrous (but with rows of setigerous punctures adjacent to lateral edges of pronotum, bearing enormously short macrosetae); mostly blackish brown, clypeus margins and pronotum lateral margins lighter (brown).

Head relatively wide (Figs. 16, 20), with rounded genae protruding considerably more than eyes and anteriorly aligned with clypeus lateral margins; clypeus anteriorly with broad anteromedian emargination, broadly rounded each side of it, margins quite glabrous, finely bordered; frontoclypeal suture in form of very fine line (distinct rather laterally than medially), not tuberculate; head vertex with few coarse punctures on very finely punctate background: few (about fourteen) coarse punctures present on head vertex (most of them absent medially but arranged in short transversal rows extending leftward and rightward from midline).

Epipharynx (Fig. 19). Anterior margin shallowly but distintly bisinuate, regularly rounded anterolaterally; epitorma broadly triangular, regularly widened posteriad; corypha considerably exceeding anterior margin, with two long, stout spinules and tuft of slender, acute macrosetae; acropariae with dense, long macrosetation, prophobae considerably densely macrosetaceous; chaetoparia slender, densely macrosetaceous; tormae short.

Pronotum transversal (length-to-width ratio of 0.614), with non-bordered anterior margin and bordered lateral and posterior margins as well as truncate and distinctly emarginate posterior angles; anterior angles rounded; lateral margins moderately explanate, nearly straight and slightly converging backward but quite distinctly sinuate still before truncate



Figs. 16-25. *Orammoecius huaphanensis* gen. nov., sp. nov., holotype, ♀: 16- dorsal aspect; 17- lateral aspect; 18- ventral aspect; 19- epipharynx; 20- head and pronotum, dorsal aspect; 21- metaventrum, ventral aspect; 22- elytral apex, dorsocaudal aspect; 23- mesotibia top view; 24- metatibia top view; 25- bases of pronotum and elytra, dorsal aspect. Scale lines 1 mm for Figs. 16-18, 0.1 mm for Fig. 19, 0.5 mm for Figs. 20-25. Photographs by L. Mencl.

and emarginate posterior angles, basal margin not sinuate; pronotum base bordered by coarsely punctate furrow (Figs. 16, 25); pronotum surface with relatively large and deep punctures, moderately larger than those on head vertex (Fig. 20), microscopic punctures in intervals between large punctures enormously fine, nearly indistinct; first discal area free of large punctures situated just behind pronotum anterior margin, across middle two thirds of pronotum; another area of this type present approximately around pronotum centre, its length and width being about 0.58 pronotum length and 0.36 pronotum width, respectively; sparse large punctures present around this area, becoming denser in direction of lateral margins, wide lateral areas being very densely punctate there (distances between punctures about equal to puncture diameter); setigerous punctures (bearing hardly perceptible, very short macrosetae), are present on anterior corners of pronotum.

Scutellum small (its length equals to about 0.11 elytral suture length), rather pentagonal than narrowly ogival, its length-to-width ratio of 1.90, its surface smooth.

Elytra widest at about their midlength (their length-to-width ratio of 1.31), with ten striae, ten intervals and quite distinct, sideward and upward directed humeral denticles; striae narrow, but very distinct, punctate, punctures in striae coarse, crenating outside margins of intervals, distances between punctures smaller than puncture diameter; intervals convex (Figs. 16, 17), impunctate; their arrangement on elytral apex as in Fig. 22.

Protibia with three large outer teeth, and in its basal part with only first and second quite distinct denticles and third rather indistinct one; its upper face with longitudinal row of minute setigerous punctures extending close to lateral margins, otherwise impunctate and glabrous. Mesotibiae and metatibiae with two pairs of distinct but not very strong oblique ridges each; mesotarsomeres and metatarsomeres narrow (never triangularly widened), basimetatarsomere long (about as long as metatarsomeres 2-4 combined), length of superior terminal spine of metatibia of about 0.75 basimetatarsomere length, inferior spine shorter, metatibia apex fringed with few short, not very dense, blunt and fairly equal spinules (Fig. 24). For mesotibia apex and mesotarsite see Fig. 23.

Venter (Fig. 18). Femora glabrous, impunctate (or at most with few hardly perceptible microscopic punctures). Metaventrite posteriorly glabrous and impunctate (except for fine, but distinct punctures in metaventral plate impression, sparsely distributed throughout the impression having narrow, complete median furrow (Fig. 21); anteriorly with small, but rough ("rasp-like") punctures bearing long, decumbent, backward directed macrosetae. Abdominal ventrites (and also pygidium) with dense, small, but rough ("rasp-like") punctures bearing long, semidecumbent macrosetae.

Sexual dimorphism. Male unknown. Based on male specimens of two other species described here, inward bent tips of apical spines of male protibiae can be expected in males.

Differential diagnosis. The species *Orammoecius huaphanensis* sp. nov. exerts a very characteristic (oviform) body shape. The other three species described here are either subparallel or distinctly broader behind. The pronotum basal margin is not sinuate, whereas in the other three new species, it is moderately sinuate against elytral interval 4. To distinguish all four species, use the key below.

Collecting circumstances. Unknown.

Distribution. Laos, Hua Phan Province.

Name derivation. Toponymic (adjective derived from the name of the Hua Phan Province in Laos where the holotype was collected).

Orammoecius phongsalyensis sp. nov.
(Figs. 26-35)

Type locality. Lao, Phongsaly prov., Ban Samo Mai, 21°41-21'N 102°03'E , ~ 1150 m [a s. l.].

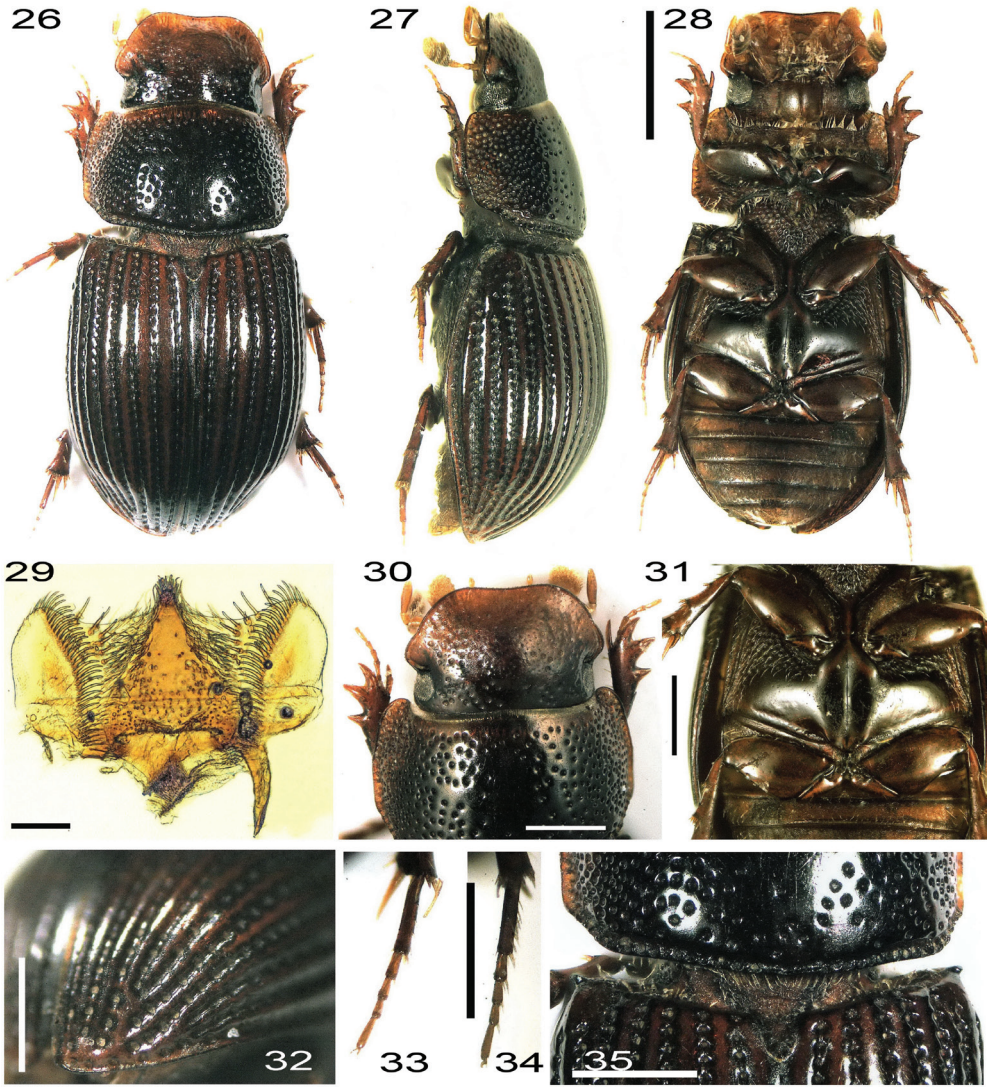
Type material. Holotype (♀) (VKCB): "LAO, Phongsaly prov., / 21°41-21'N 102°03'E, / BAN SANO MAI, / 19.-25.v.2004,~ 1150 m, / Vít Kubáň leg., [white, printed label] // Dok.L.Mencl, 1308 [pale green, printed label]".

Description of holotype (♀)**.** Dorsum (Fig. 26). Small (3.90 mm), broader behind (length-to-width ratio of 2.05), dorsal surface fairly shining, mostly glabrous (but with rows of setigerous punctures present close to lateral edges of pronotum and also in some lateral elytral striae, bearing very short macrosetae); brown to blackish brown (pronotum and head vertex darker than clypeus and elytra).

Head relatively wide (Figs. 26, 30), with angularly rounded genae protruding considerably more than eyes and anteriorly only slightly differentiated from clypeus lateral margins; clypeus anteriorly with broad anteromedian emargination, broadly rounded each side of it, margins quite glabrous, finely bordered; frontoclypeal suture in form of very fine line, not tuberculate; head surface doubly punctate: very fine punctures present on epistomal gibbosity and in medial area of head vertex and much larger punctures distributed rather irregularly (on lateral areas in front of and behind frontoclypeal suture).

Epipharynx (Fig. 29). Anterior margin shallowly but distintly bisinuate, regularly rounded anterolaterally; epitorma broadly triangular, regularly widened posteriad; corypha considerably exceeding anterior margin, with two long, stout spinules and tuft of slender, acute macrosetae; acropariae with dense, long macrosetation, prophobae considerably densely macrosetaceous; chaetoparia slender, densely macrosetaceous; tormae short.

Pronotum transversal (length-to-width ratio of 0.606), with non-bordered anterior margin and bordered lateral and posterior margins (pronotum base bordered by coarsely punctate furrow) as well as truncate and distinctly emarginate posterior angles; lateral margins moderately explanate, moderately arcuate and converging from half their length forward to anterior pronotum margin, essentially parallel from half their length backward to truncate and emarginate posterior angles, but very slightly sinuate before these angles; basal margin slightly sinuate on each side against elytral interval 4; pronotum surface with relatively large and deep punctures comparable to those on head vertex, microscopic fine punctures in intervals between large punctures even less perceptible compared to those on head; small discal area free of large punctures present around pronotum centre (length of this area equals to 0.50 pronotum length, its width equals to 0.22 pronotum width), sparse large punctures present around this area, becoming denser in direction of lateral margins, wide lateral areas being very densely punctate there (individual punctures distinct, but being essentially in contact each with neighbouring ones); setigerous punctures (bearing hardly perceptible, very short macrosetae), are adjacent to lateral edges of pronotum.



Figs. 26-35. *Orammoecius phongsalyensis* gen. nov., sp. nov., holotype, ♀: 26- dorsal aspect; 27- lateral aspect; 28- ventral aspect; 29- epipharynx; 30- head and pronotum, dorsal aspect; 31- metaventrum, ventral aspect; 32- elytral apex, dorsocaudal aspect; 33- mesotibia top view; 34- metatibia top view; 35- bases of pronotum and elytra, dorsal aspect. Scale lines 1 mm for Figs. 26-28, 0.1 mm for Fig. 29, 0.5 mm for Figs. 30-35. Photographs by L. Mencl.

Scutellum (Fig. 35) small (its length equals to about 0.10 elytral suture length), ogival, nearly as wide as long, with moderately uneven surface if observed under high magnification.

Elytra widest at about their midlength (their length-to-width ratio of 1.25), with ten striae, ten intervals and quite distinct, sideward and upward directed humeral denticles; striae narrow, but very distinct, punctate, punctures in striae large, crenating outside margins of intervals,

distances between punctures smaller than puncture diameter, some punctures in lateral striae bearing pale, very short, hardly perceptible macrosetae; intervals convex, impunctate (Figs. 26, 27); their arrangement on elytral apex as in Fig. 32.

Protibia with three large outer teeth and only one distinct denticle in basal part; its upper face with longitudinal row of minute setigerous punctures extending close to lateral margins, otherwise impunctate and glabrous. Mesotibiae and metatibiae with two pairs of distinct but not very strong oblique ridges each; mesotarsomeres and metatarsomeres (Figs. 33 and 34, respectively) narrow (never triangularly widened), basimetatarsomere long (about as long as metatarsomeres 2-4 combined), length of superior terminal spine of metatibia of about 0.75 basimetatarsite length, inferior spine shorter, metatibia apex fringed with short, not very dense, blunt and fairly equal spinules.

Venter (Fig. 28). Femora glabrous, impunctate. Metaventrite posteriorly glabrous and impunctate, metaventral plate with narrow, distinct, posteriorly moderately shortened longitudinal furrow; anteriorly with small, but rough ("rasp-like") punctures bearing long, decumbent, backward directed macrosetae. Abdominal ventrites and pygidium with dense, small, but rough ("rasp-like") punctures bearing long, semidecumbent macrosetae.

Sexual dimorphism. Male unknown. Based on male specimens of other species described here, inward bent tips of apical spines of male protibiae can be expected in males.

Differential diagnosis. The species *Orammoecius phongsalyensis* sp. nov. can be differentiated from the other three species based on the Key to species below. It is most similar to the species *Orammoecius russulae* sp. nov. The former species is, however, broader behind (elytra length-to-elytra width ratio of 1.25); the latter one is subparallel (elytra length-to-elytra width ratio of 1.29).

Collecting circumstances. The only known specimen of the new species was probably collected by using flight intercept trap or randomly at flight in primary mountain forest complex, but surely not from excrements (V. Kubáň pers. comm. 2015).

Distribution. Laos, Phongsaly Province.

Name derivation. Toponymic (adjective derived from the name of the Phongsaly province in Laos, where the holotype was collected).

Orammoecius russulae sp. nov.

(Figs. 36-50, 59-60)

Type locality. China, S. Yunnan, Mts. NE of Tengchong, 25°01'54"N98°31'47"E, 1700 m [a s. l.].

Type material. China: Yunnan Prov.: Holotype (♂) (DKCP): "China, S Yunnan, 1.vii.2010 /Mts NE of TENGCHONG / 25°01'54"N98°31'47"E, / 1700 m, litter under Russula sp. / David Král lgt [white, printed label] // ex coll David Král / National Museum / Prague, Czech Republic [white, printed label] // Dok.L.Mencl, 1701 [pale green, printed label]". Paratypes: allotype (♀) (DKCP): same data on white labels as with holotype, number 1700 instead of 1701 on pale green label.

Description of holotype (♂)**.** Dorsum (Fig. 36). Small (4.00 mm), broader behind (length-to-width ratio of 2.11), dorsal surface fairly shining, mostly glabrous (but with rows of setigerous

punctures adjacent to lateral edges of pronotum and in some lateral elytral striae, bearing very short, nearly imperceptible macrosetae); blackish brown, some areas (particularly clypeus margin) lighter (brown).

Head relatively wide (Fig. 42), with rounded genae protruding more than eyes and anteriorly aligned with clypeus lateral margins; clypeus anteriorly with broad anteromedian emargination, broadly rounded each side of it, margins quite glabrous, finely bordered; frontoclypeal suture in form of very fine line, not tuberculate; head surface with distinct medium-sized punctures present on area behind frontoclypeal suture and on wide areas along lateral margins (epistomal gibbosity rather smooth anteriorly, with only shallow and thus poorly distinct punctures).

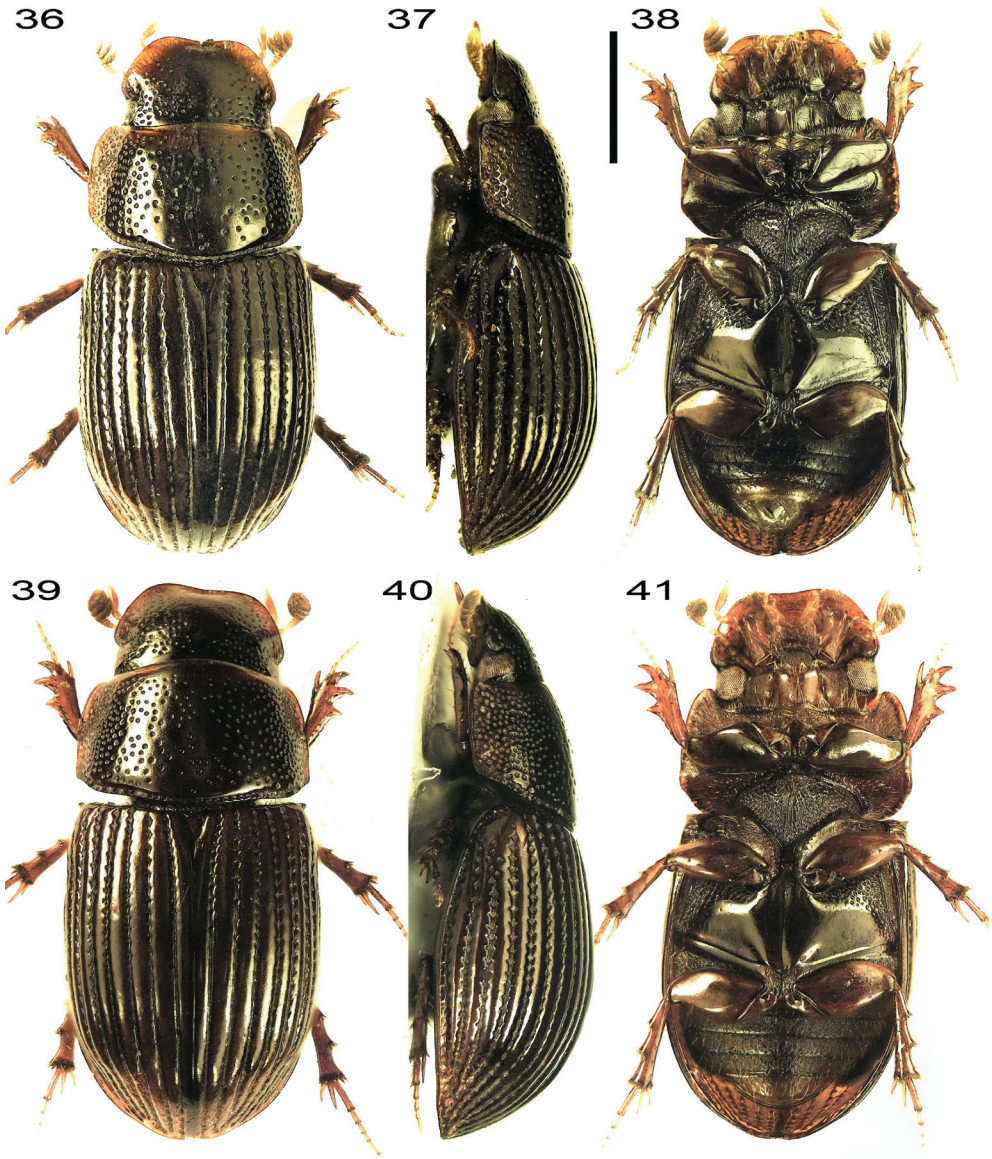
Epipharynx (Fig. 48). Anterior margin shallowly but distintly bisinuate, regularly rounded anterolaterally; epitorma broadly triangular, regularly widened posteriad; corypha considerably exceeding anterior margin, with two long, stout spinules and tuft of slender, acute macrosetae; acropariae with dense, long macrosetation, prophobae considerably densely macrosetaceous; chaetoparia slender, densely macrosetaceous; tormae short.

Pronotum transversal (length-to-width ratio of 0.59), with non-bordered anterior margin and bordered lateral and posterior margins (pronotum base bordered by coarsely punctate furrow) as well as truncate and distinctly emarginate posterior angles, lateral margins moderately explanate, moderately arcuate and converging in anterior third, essentially parallel from half their length backward to truncate and emarginate posterior angles but also very slightly sinuate before these angles, basal margin slightly sinuate on each side against elytral interval 4; pronotum surface with relatively large and deep punctures, comparable to those on head vertex, microscopic punctures in intervals between large punctures enormously fine; small discal area free of large punctures present rather posteriorly around pronotum midline very small (length of this area equals to about 0.32 pronotum length, its width equals to 0.14 pronotum width), sparse large punctures present around this area, becoming denser in direction of lateral margins, wide lateral areas being very densely punctate there (distances between punctures about equal to puncture diameter); setigerous punctures (bearing hardly perceptible, very short macrosetae), are adjacent to lateral edges of pronotum.

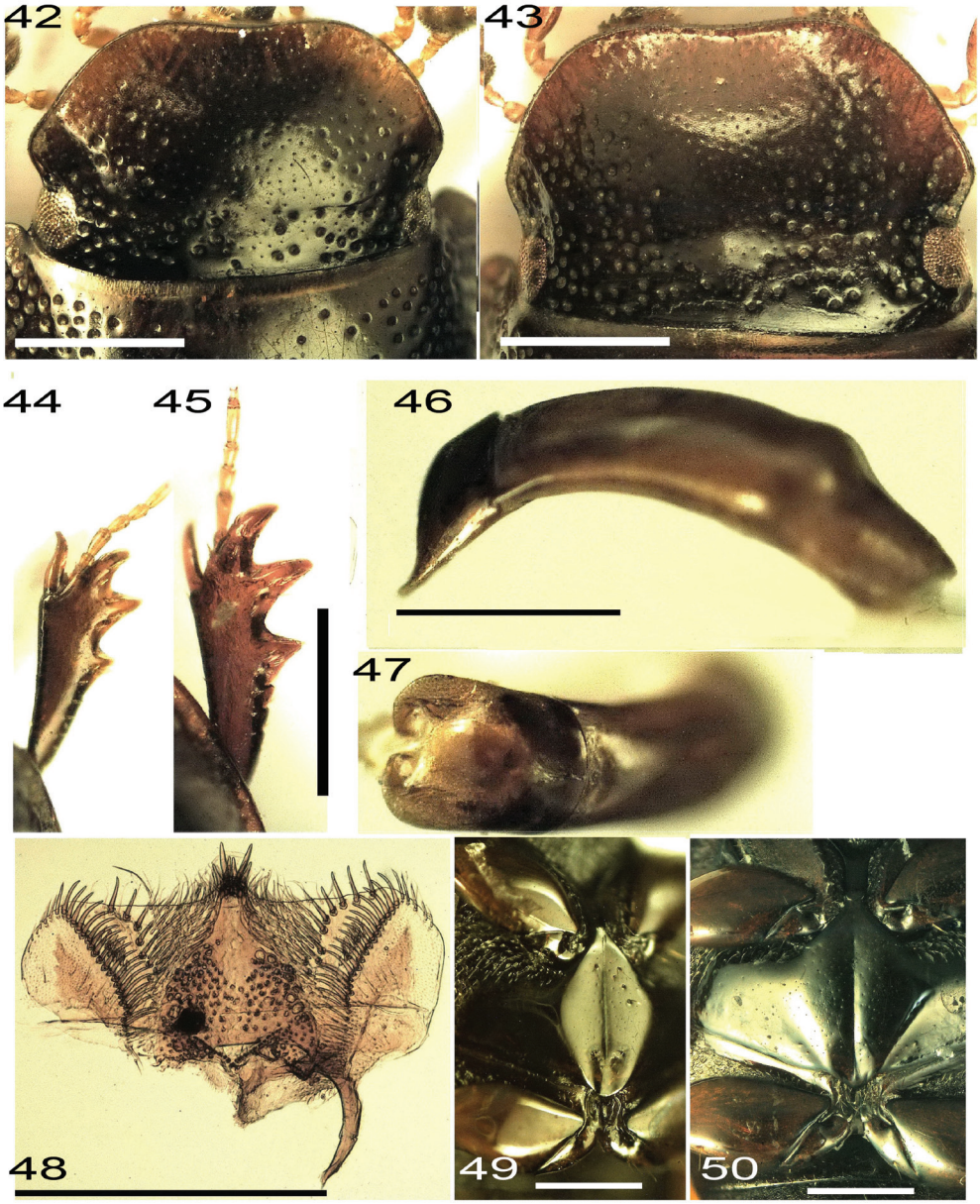
Scutellum small (its length equals to about 0.10 elytral suture length), ogival, nearly as wide as long, with smooth surface.

Elytra subparallel (their length-to-width ratio of 1.29),with ten striae, ten intervals and quite distinct, sideward and upward directed humeral denticles; striae narrow, but very distinct, punctate, punctures in striae large, crenating outside margins of intervals, distances between punctures smaller than puncture diameter; intervals convex (Figs. 36, 37), impunctate.

Protibia with three large outer teeth, and in its basal part with only first (anterior) distinct denticle, second poorly distinct denticle and third only slightly indicated one; its upper face with longitudinal row of minute setigerous punctures extending close to lateral margins, otherwise impunctate and glabrous; apical spine with inward and downward bent tip (Fig. 44). Mesotibiae and metatibiae with two pairs of distinct but not very strong oblique ridges each; mesotarsomeres and metatarsomeres elongate, narrow, only slightly widened apically, basimetatarsomere long (about as long as metatarsomeres 2-4 combined), length of superior terminal spine of metatibia of about 0.75 basimetatarsomere length, inferior spine only moderately shorter, metatibia apex fringed with short, not very dense, blunt and equal spinules.



Figs. 36-41. *Orammoecius russulae* gen. nov., sp. nov., habitus: 36- holotype, ♂, dorsal aspect; 37- holotype, ♂, lateral aspect; 38- holotype, ♂, ventral aspect; 39- allotype, ♀, dorsal aspect; 40- allotype, ♀, lateral aspect; 41- allotype, ♀, ventral aspect. Scale line 1 mm. Photographs by L. Mencl.



Figs. 42-50. *Orammoecius russulae* gen. nov., sp. nov.: 42- holotype, ♂, head, dorsal aspect; 43- allotype, ♀, head, dorsal aspect; 44- holotype, ♂, protibia and protarsus, top view; 45- allotype, ♀, protibia and protarsus, top view; 46- holotype, ♂, aedeagus, lateral aspect; 47- holotype, ♂, parameres, dorsocaudal aspect; 48- holotype, ♂, epipharynx; 49- holotype, ♂, metaventrum, ventral aspect; 50- allotype, ♀, metaventrum, ventral aspect. Scale lines 0.1 mm for Fig. 48, 0.5 mm for other figures. Photographs by L. Mencl.

Venter (Fig. 38). Femora shining, glabrous, impunctate. Metaventrite posteriorly mostly glabrous and impunctate, but metaventral plate (Fig. 49) sparsely, finely punctate, with narrow anteriorly as well as posteriorly shortened longitudinal furrow; anteriorly with small, but rough ("rasp-like") punctures bearing long, decumbent, backward directed macrosetae. Abdominal ventrites (and also pygidium) with dense, small, but rough ("rasp-like") punctures bearing long, semidecumbent macrosetae.

Aedeagus (Figs. 46-47) relatively long, distinctly bent in lateral aspect; parameres considerably short, stout, strongly bent inward in dorsal aspect (Fig. 46), weakly beaked, slightly prolonged and rounded apically in lateral aspect (Fig. 47).

Sexual dimorphism. The apical spine of the protibia has an inward and down ward bent tip in males (Fig. 44). In females, the protibial apical spine is continuously curved outward from its base to its tip (Fig. 45). The midline furrow of the metaventral plate is distinctly reduced in the male, anteriorly as well as posteriorly (Fig. 49), whereas it is less reduced anteriorly and complete posteriorly in the female (Fig. 50). The female allotype is otherwise depicted in Figs. 39-41 and Fig. 43.

Variability. The body length of the male holotype is of 4.00 mm; that of the female allotype is of 4.35 mm.

Differential diagnosis. The species *Orammoecius russulae* sp. nov. can be differentiated from the remaining three species based on the key to species below, but it is an only subparallel species. The other three species are either oviform or distinctly broader behind.

Collecting circumstances. Both specimens were collected from litter under *Russula* sp. mushrooms in ecoton between pasture and secondary woods (Figs. 59-60).

Distribution. China, Yunnan Province.

Name derivation. Based on collecting circumstances: obtained by sifting forest litter under mushrooms *Russula* sp.

KEY TO *ORAMMOECIUS* GEN. NOV. SPECIES

1 (2) Body oviform, elytra considerably narrowed apically (Fig.16), Scutellum pentagonal, elongate (its length-to-width ratio of 1.90). Basal margin of pronotum not sinuate. 3.90 mm. Laos (Hua Phan Prov.). .... *O. huaphanensis* sp. nov.

2 (1) Body shape different (subparallel or broader behind) (Figs. 1, 4, 26, 36, 39). Scutellum ogival, about as long as wide or slightly longer. Basal margin of pronotum moderately sinuate against elytral interval 4.

3 (4) Smaller species (3.00-3.50 mm). Large middle area of pronotum surface free of coarse punctures or at most with few individual punctures (Figs. 1, 4). India (Arunachal Pradesh) ..... *O. arunachalensis* sp. nov.

4 (3) Larger species (3.90-4.35 mm). At most small spots around centre of pronotum free of coarse punctures (Figs. 26, 36, 39).

5(6) Distinctly broader behind (Fig. 26). Genae anteriorly slightly differentiated from lateral clypeus margins (Figs. 30). Dense coarse punctures in lateral areas of pronotum well delimited, but each essentially in contact with neighbouring ones (Fig. 27). 3.90 mm. Laos (Phongsaly Prov.). 3.90 mm. .... *O. phongsalyensis* sp. nov.

6(5) Subparallel (Figs. 36, 39). Genae anteriorly aligned with or at most imperceptibly differentiated from clypeus lateral margins (Figs. 42, 39). Dense coarse punctures in lateral areas of pronotum mostly separated by about puncture diameter (Fig. 37). China (Yunnan Prov.). 4.0-4.35 mm. ..... *O.russulae* sp. nov.

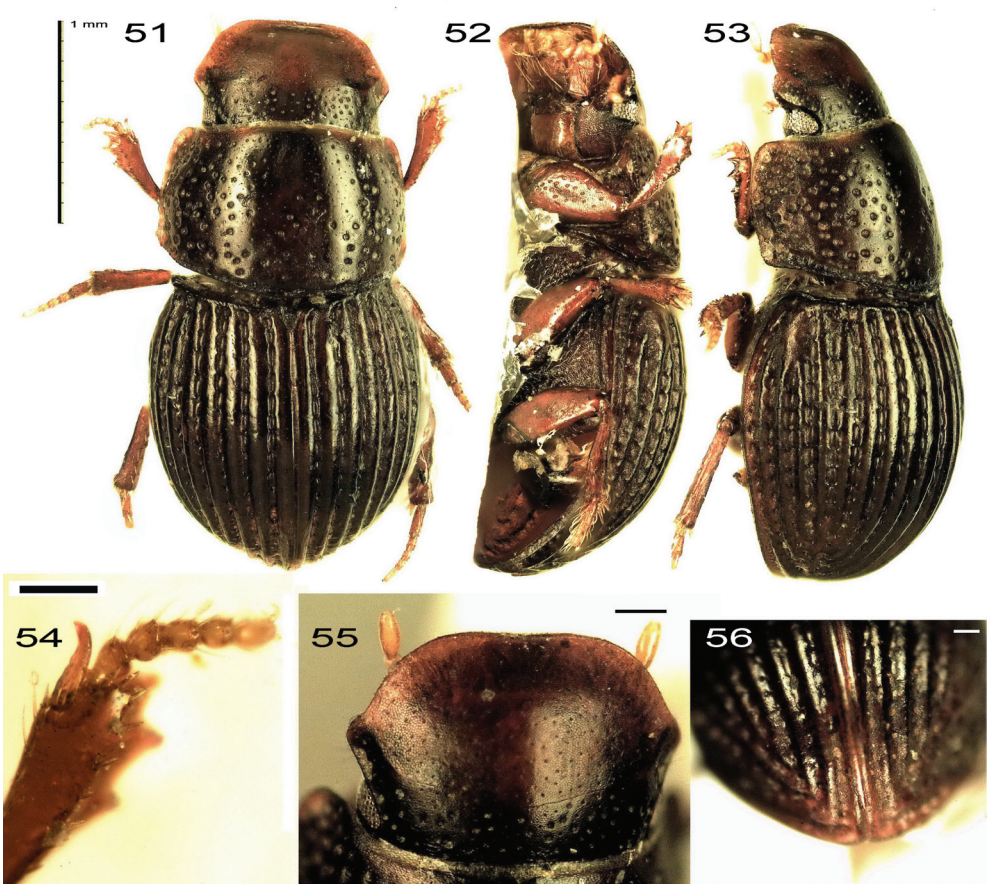
Guanyinaphodius Masumoto et Kiuchi, 2001

Aphodius (*Guanyinaphodius*) Masumoto et Kiuchi, 2001: 119.

Type species. *Guanyinaphodius kishimotoi* (Masumoto et Kiuchi, 2001: 120), by monotypy.

Guanyinaphodius kishimotoi (Masumoto et Kiuchi, 2001) comb. nov.
(Figs. 51-56)

Material examined. Holotype (♂) (NSMT), "Guan'yin Dong / Doline, 1600 m / Longqiao /Longqiao Xiang // Fengjie Xian / E. SICHUAN / 18-X.2000 / T. Kishimoto// Coll. Masumoto / 2000 // 1714 / Dok. L. Mencl, 2013// Holotype [printed] / *Aphodius* / *kishimotoi* Mas. & Kiu. [handwritten]".



Figs. 51-56. *Guanyinaphodius kishimotoi* (Masumoto et Kiuchi, 2001), holotype, ♂: 51- habitus, dorsal aspect; 52- partial view of underside; 53- habitus, lateral aspect; 54- right protibia and protarsus, top view; 55- head, dorsal aspect; 56- elytral apex, dorsocaudal aspect. Scale lines 1 mm for Figs. 51-53, 0.5 mm for Figs. 54-56. Photographs by L. Mencl.

Figs. 57-58. 57- A lowland primary tropical forest near Bhalukpong (Arunachal /Assam border), type locality of *Orammoecius arunachalensis* gen. nov., sp. nov.; 58- detail of habitat with exposed FIT inside. July 2010, photographs by L. Dembický.

Figs. 59-60. 59- A secondary vegetation landscape in the mountains NE of Tengchong (Yunnan), type locality of *Orammoecius russulae* gen. nov., sp. nov.; 60- detail of collecting site. July 2010, photographs by H. Kulíková.

Notes. In the present work, we provided six figures to facilitate future identification of the species and demonstrate certain important features of the genus. Differences between the two genera studied here are considered in the discussion below, with taking the advantages of appropriate figures depicting the following characters concerned: the clypeus shape (Fig. 55), the scutellum shape (Fig. 51), the elytra shape (Fig. 51), vaulting of elytral intervals (Figs. 51, 53, 56), the shape of protarsomeres (Fig. 54), the shape of meso- and metatarsomeres (Fig. 51), the punctation of femora (Fig. 52), and the macrosetation of the metaventrite. The abdomen and aedeagus were lacking in the holotype studied, but the aedeagus shape is discussed below based on figures published by Masumoto & Kiuchi (2001: 120, Figs. 3-4).

DISCUSSION

The species of the new genus *Orammoecius* superficially remind of some Eupariini due to their shape of the clypeus and type of head vaulting, but they belong to the tribe Aphodiini, as can be particularly demonstrated by the nature of (not fluted) abdominal ventrites and insertion of terminal spines of metatibiae - see page 36 in Dellacasa et al. (2001).

Within the tribe Aphodiini, the new genus share some characters with the genus *Guanyinaphodius*, which was also studied here. On the other hand, there are the following differences between the two genera (in the next theses, "in *Guanyinaphodius*" means in the holotype of the genus type species, "in *Orammoecius*" means in all the type specimens of the four new species described above):

- clypeus nearly truncate anteriorly (with only very slight anteromedian emargination) in *Guanyinaphodius*, distinctly emarginate anteriorly in *Orammoecius*;
- scutellum triangular in *Guanyinaphodius*, ogival or pentagonal in *Orammoecius*;
- elytra nearly as wide as long (their length-to-width ratio of 1.08) in *Guanyinaphodius,* fairly longer than wide (their length-to-width ratio of 1.25 to 1.31) in *Orammoecius*;
- elytral intervals very strongly convex, nearly carinate in *Guanyinaphodius,* distinctly convex, but not as much so in *Orammoecius*;
- tarsomeres modified, protarsomeres subglobular, nearly as wide as long, meso- and metatarsomeres cylindrical in *Guanyinaphodius*, not modified (all of them elongate and moderately dilated apically as in most Aphodiini) in *Orammoecius*;
- all femora considerably punctate in *Guanyinaphodius*, impunctate or at most with microscopical, imperceptible punctures in *Orammoecius*;
- metaventrite macrosetaceous throughout in *Guanyinaphodius*, macrosetaceous anteriorly, but glabrous posteriorly in *Orammoecius*;
- parameres of aedeagus long, slim, moderately bent outward apically in *Guanyinaphodius*, very short, stout and strongly bent inward in *Orammoecius.*

The external differences listed above unambiguously demonstrate that the four new species cannot be included in the genus *Guanyinaphodius.* In addition, the shape of parameres is very characteristic and justifies the proposal of a new genus to include the four new species studied.

Bionomics of members of the genus *Guanyinaphodius* is unknown, but when taking into account the fact that we do not know any finding in excrements, it is perhaps possible to consider that they are rather saprophagous than coprophagous. Locality data in particular specimens suggest that members of the new genus are likely to be mountainous species.

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