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SOME NEW AND OTHERWISE NOTEWORTHY SPECIES OF *ONTHOPHAGUS* LATREILLE FROM THE INDO-AUSTRALIAN ARCHIPELAGO (COLEOPTERA: SCARABAEIDAE)

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With 25 text-figures and one plate

ABSTRACT

Five new species of the genus *Onthophagus* Latreille are described and figured: *O. calamophilus* (New Guinea), *gajo* (Sumatra), *sisyphoides* (New Guinea), *vethi* (Sumatra), *wiebesi* (Luzon). Notes on other species concern: *O. bomberaianus* Balthasar (new record; variation, figured), *deflexicollis* Lansberge (new to New Guinea), *luctuosus* Boucomont (new record; figured), *malangensis* Boucomont (lectotype designation).

INTRODUCTION

The collections of the Leiden museum contain several taxonomically interesting representatives of the nearly cosmopolitan scarab genus *Onthophagus* Latreille. Currently the number of species described in this genus is rapidly increasing to 2000. At least 250 are known to occur in the Indo-Australian archipelago, here understood as including the islands from Sumatra and Luzon to the Solomon Islands. Many archipelagic *Onthophagus* are still undescribed; many of those described need a diagnostic reappraisal. The majority of the named species have been reported from but a limited number of localities, in many cases from the type-locality only. This immature state of our knowledge is undoubtedly largely due to undercollecting on most of the islands, Java being a notable exception. A faunal analysis of the Indo-Australian transition based on the information available would therefore be of a very temporary nature, which in fact holds for nearly all the groups of scarabaeoid beetles living in the islands. In order to reduce the amount of indirectly-relevant detail in such a future analysis, I have treated below

nine *Onthophagus* species, five of them being new to science. Further papers on *Onthophagus* and other laparostict scarabs from the Indo-Australian archipelago and adjacent regions will follow.

A reliable subdivision of *Onthophagus*, also on a regional basis, is notoriously difficult, and the establishment of a natural system of worldwide applicability seems illusive. Several subgenera have been proposed (reviewed by Balthasar, 1963: 158-172), but these accommodate a trifling fraction of the total number of species, and some of them are most doubtfully monophyletic. Other authors of regional revisions have adopted their own systems of species-groups, the one by Boucomont (1915) being still well applicable to the Sundanese forms; a useful sequel to this paper is his key (1924) to the Philippine species. Recent synoptic work to be consulted in dealing with *Onthophagus* from the Indo-Australian archipelago are the revisions of Balthasar (1963, 1970) and Matthews (1972). Literature references in the aforesaid works are not necessarily repeated in this series of papers.

I have only indicated species-groups if I am convinced that they form monophyletic entities, i.e. those which can be based on some synapomorphy (usually character 12 of the list given below). Otherwise the species are arranged according to a survey of 11 characters not necessarily indicative of a close phylogenetic affinity.

Table 1. Some key characters of 9 species of *Onthophagus* treated below, and occurrence in major faunal provinces.

character no.		1	2	3	4	5	6	7	8	9	10	11	12
<i>sisyphoides</i>	PA	a	a	a	a	a	b	a	b	a	a-c	a	b
<i>bomberaianus</i>	PA	a	a/b	a	a	a	b	a	b	a	c	a	b
<i>vethi</i>	S	b	a	a	a	a	b	a	a	a	b	a	a
<i>calamophilus</i>	PA	b	a	a	a	a	a	a	b	a	a	b	c
<i>wiebesi</i>	PI	b	a	(b)	a	a	a	a	b	a	a	a-b	a
<i>deflexicollis</i>	S/PA	c	a	a	a	a	b	a	b	a	c	a-b	a
<i>luctuosus</i>	S	c	a	a	a	a	b	a	a	a	a	b	a
<i>gajo</i>	S	b	a	b	b	a	a	a	a	a	a	b	a
<i>malangensis</i>	S	b	a	b	b	a	a	a	a	a	a	b	a

Explanation of table: some key characters of *Onthophagus*.

- 1 a, clypeal margin (δ) anteriorly bidentate, bisinuate, emarginate; b, simply truncate or rounded off; c, distinctly lobate, or otherwise projecting (projection longer than eye length).
- 2 a, clypeus (δ), apart from clypeofrontal ridge, entirely devoid of non-marginal protrusions; b, with non-marginal protrusion(s).
- 3 a, frontovertex (δ) entirely devoid of protrusions; b, with pair of (lateral) protrusions or with extensive transverse ridge; c, with single median protrusion or otherwise different from a and b.

- 4 a, clypeofrontal ridge (δ) absent or obsolescent; b, curvilinear, anteriorly convex; c, rectilinear, not reaching genal border; d, rectilinear, reaching genal border.
- 5 a, eyes in dorsal view small, more or less luniform or narrowly elliptic; b, very large, circular or widely elliptic.
- 6 a, pronotum (δ) evenly convex, unmodified; b, with distinct impressions and/or protrusion(s).
- 7 a, pronotum smooth or punctate; b, granulate or heavily rugulate throughout.
- 8 a, elytra glabrous or with microsetae; b, distinctly setose (visible at low magnification of $\times 5$).
- 9 a, fore tibia (δ) with unmodified apex; b, with thumb-like process or otherwise modified.
- 10 a, colour of dorsum entirely black or dark brown; b, lighter but uniform (yellowish, reddish, medium- or light-brown); c, patterned; d, at least pronotum distinctly metallic.
- 11 a, total length less than 6 mm; b, 6-12 mm; c, over 12 mm.
- 12 a, unusual properties absent; b, c, etc., unusual properties b, c, etc., present (see information under taxon concerned).

Between parentheses: character poorly pronounced; oblique dash: both states occur; hyphen: intermediate state occurs.

Approximate delimitation of major faunal provinces. — Papuasian (PA): East of Celebes; Philippine (PI): North of Borneo; Sundanese (S): Lesser Sunda Islands, Celebes, Borneo, Java, Sumatra, adjacent islands.

DESCRIPTIONS, RECORDS, OTHER NOTES

Onthophagus bomberaianus group

The unusual feature characterizing this group is the presence of more or less trichomatose callosities on the elytral interstriae. The metatarsus of the hind legs is very long, approximately as long as tarsal segments 2-5 combined. Three species, all from New Guinea and closely allied inter se, are known to me, the males of which can be separated as follows.

1. Pronotum anteromedially with pair of dentiform protrusions . . . 2
— Pronotum with at least four more or less trichomatose callosities
. *gorokae* Paulian¹⁾
2. Pronotal disc coarsely, densely punctate. Elytral interstriae sparsely punctate-setose, striae not micromarginate. Elytra lighter, yellow-brown, more or less marmorate. Antennal club yellow-brown. Pronotal tubercles large *bomberaianus* Balth.
- Pronotal disc finely, contiguously punctate. Elytral interstriae scabrous-setose, striae micromarginate. Elytra dark brown. Antennal club dark brown. Pronotal tubercles small *sisyphoides* sp. nov.

Onthophagus sisyphoides sp. nov. (figs. 1-5)

Holotype (male). — Approximate length 5.5, width 3.5, height 2.5 mm.

¹⁾ Recently described (Paulian, 1972: 217).

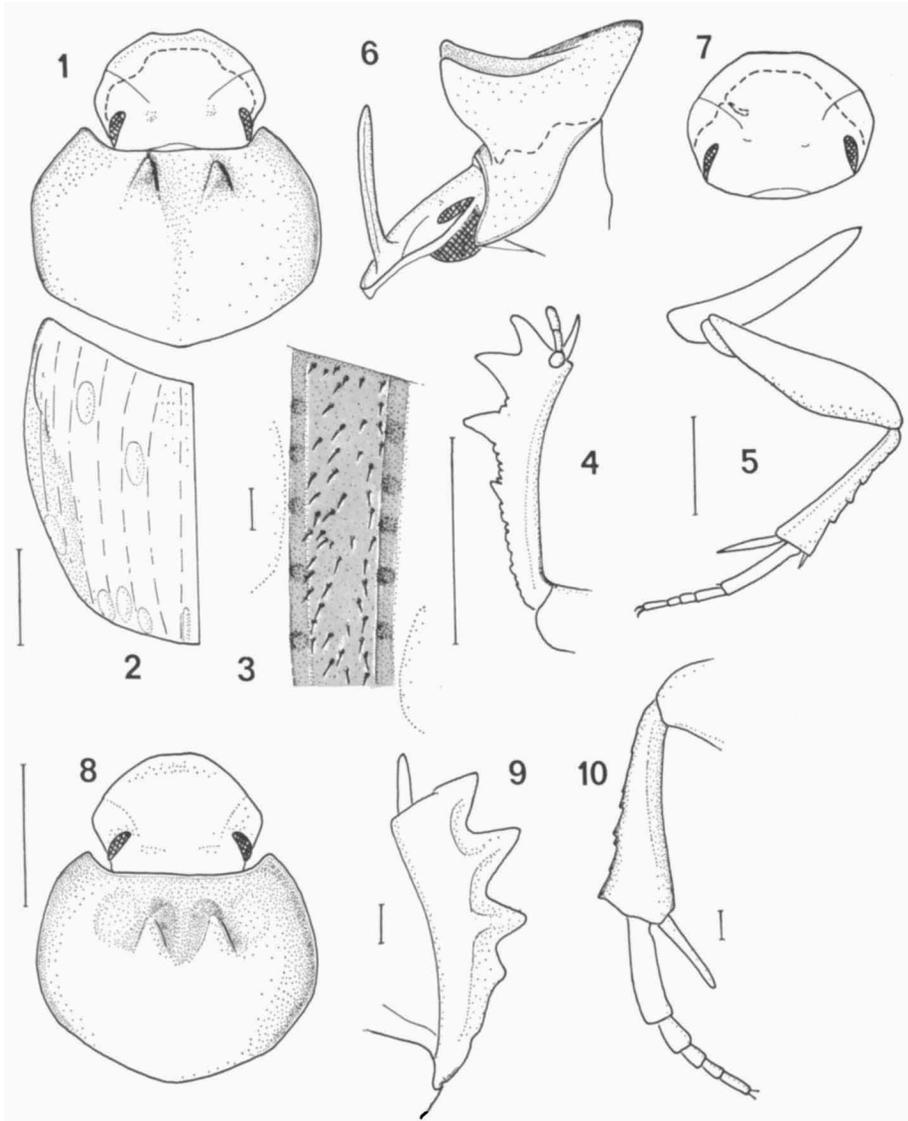
Dorsal side dull greyish brown, margins of clypeus and anterolateral angles of pronotum yellowish; ventral side and legs with yellow, grey and brown markings; antennal club dark brown; pilosity yellowish, bristles of legs brownish; opaque (microreticulation distinct at $\times 50$). Habitus somewhat *Sisyphus*-like, a compact body with slender middle and hind legs.

Cephalic contours, fig. 1. Clypeal margin slightly reflexed, clypeogenal suture distinct. Almost entire cephalic surface densely punctate, punctures approximately isodiametric, more or less annulate, quite evenly distributed, well defined, their diameters ca 0.03 mm, densities on centre of clypeus 30-40 / 0.1 sq. mm. Eyes with 8 facet rows across their widest point. Maximum length of head 1.20 mm, maximum width 1.70 mm; ratio l/w 0.73.

Pronotal contours, fig. 1; anterior declivity of pronotum with pair of dentiform tubercles, separated by about half the interocular distance; lateral and apical margins of pronotum raised, anterolateral angle shortly rounded, slightly less than 90° ; border in front of rounded posterolateral angle feebly sinuate. Pronotal derm contiguously punctate, punctures annulate, isodiametric, well defined, generally bearing a short, semierect seta; diameters of discal punctures ca 0.02 mm. Median length of pronotum 1.90, maximum width 2.80 mm; ratio l/w 0.67. Scutellum invisible.

Elytral contours, disposition of striae and callosities, fig. 2; elytra with shallow discal depression on either side of suture; humeral umbone well developed, surface behind it distinctly impressed. Striae shiny, moderately impressed, well defined by fine ridge; with isodiametric, shallow, poorly defined punctures, which slightly affect interstrial borders; diameters of punctures in discal striae ca 0.05 mm, separated by about 2-3 times this diameter. Interstriae very distinctly microreticulate; juxtasutural interstria with sparse, non-descript seta-bearing punctulation; interstriae 2 and following densely asperate-granulate, a variably long seta behind each granule (fig. 3), setae on distal and lateral callosities longer, curved. Length of elytral suture 1.50, maximum width of elytra combined 3.30 mm; ratio l/w 0.46.

Antenna unmodified. Lateral elements of pro-, meso-, metapectus finely shagreened, punctate, seta-bearing. Metasternum microreticulate ($\times 75$), disc punctate, lateral wings ditto, setose. Abdominal sternites 1-5 with distinct transverse series of closely set hemipunctures, medially along basal border, laterally shifting to middle of sternite, each puncture bearing a short semierect seta; this feature is indistinct on anal sternite (6). Propyidium microgranulate ($\times 75$), opaque. Base of pygidium marginate, surface shagreened, opaque, densely punctate, punctures annulate, shallow but distinct, many of them with a short semierect seta; apical punctures with



Figs. 1-10. *Onthophagus* species. 1-5, *sisyphoides*, holotype; 6, 7, *bomberaianus*, Jayapura, ♂♂; 8-10, *vethi*, holotype. — 1, 6, 8, fore body ♂; 2, left elytron; 3, details from base of interstria 4; 4, right fore tibia; 5, 10, hind leg, ventral view; 7, head. Area outside dashes yellow-brown, inside dashes darker. Scale line with 3, 9, 10 = 0.1 mm, others 1 mm; 1, 2, 6, 7, same scale.

longer, curved seta, those of basal-lateral margins ditto; diameters of punctures ca 0.05 mm, their density apically ca 13/0.1 sq. mm.

Fore tibia, fig. 4; terminal spur acuminate, slightly curved. Inferior

side of fore femur densely punctate; anterior side with ca 10 long setae, intermediate ones longest. Middle and hind tibiae (fig. 5) with obsolescent spinose fossorial elevations; apical edge of hind tibia externally with ca 13 short spines, 3 longer ones superiorly. Middle and hind tarsi (fig. 5) long and slender, approximate length proportions of terminal tibial spur and tarsal segments 1-5 of hind leg 6//10/3/2/1.5/2.5.

Phallus not showing obvious modifications.

Material examined. — Holotype male only, from West Irian: Rattan Camp, 1200 m, ii-iii.1939, L. J. Toxopeus (see Toxopeus, 1940).

***Onthophagus bomberaianus* Balthasar (figs. 6-7, plate 1)**

Notes. — With the present record this species is known from three coastal localities in West Irian. Apparently the cephalic armature of this species is extremely variable, the small series recorded here including one male major (with a very long clypeal horn, fig. 6, plate) and two male minors (without a clypeal horn, fig. 7), no intermediates. Length ♂ 5.5-6.5, ♀ 6.5 mm.

Material examined. — 3 males, 2 females, from West Irian: Jajapura (formerly Hollandia), from P. H. van Doesburg Sr collection.

Ungrouped species

***Onthophagus vethi* sp. nov. (figs. 8-10)**

Holotype (male). — Approximate length 4, width 2, height 1.5 mm. Largely shiny reddish brown; antennal club brown; pilosity pale-yellow.

Cephalic contours, fig. 8. Anteromedian part of clypeus slightly reflexed, border non-marginate; clypeofrontal and frontal ridges obsolete; clypeofrontal suture vague. Cephalic surface sparsely punctate; most punctures coarse, well defined, scattered, isodiametric, their diameters slightly varying; punctures on genae and vertex with an erect seta; diameters of clypeal punctures ca 0.04 mm, total number on clypeus between 30 and 40. Eyes with ca 8 facet rows across their widest point. Maximum length of head 0.85, maximum width 1.20 mm; ratio l/w 0.70.

Pronotal contours, fig. 8; pronotal pair of protrusions laterally limited by shallow depression; lateral profile of protrusions approximately rectangular, angle shortly rounded off; border in front of posterolateral angle feebly sinuate; lateral border marginate, anterior border very vaguely marginate; base of pronotum immarginate, closely fitting against elytra. Pronotal punctation double; primary punctation dense, punctures evenly distributed, well defined, isodiametric to slightly elliptic, each with suberect seta; densities of primary punctures on disc ca 12/0.1 sq. mm, diameters ca 0.05 mm; secondary punctures very fine (just distinct at $\times 25$), very sparse. Median

length of pronotum 1.40, maximum width 1.95 mm; ratio l/w 0.72. Scutellum invisible.

General surface of elytra strongly convex; humeral umbone low; epipleuron with row of outstanding setae. Striae well defined, wide, with shallow punctures slightly crenulating interstrial borders; punctural diameters ca 0.04 mm, separated by twice this diameter. Interstriae scarcely convex, juxtasutural one with single, others with double series of distinct seta-bearing punctures, their diameters ca 0.02 mm, longitudinally separated by about four times this diameter; secondary punctation absent ($\times 100$). Length of elytral suture 1.30, width 2.10 mm; ratio l/w 0.62.

Antenna unmodified. Lateral elements of propectus sparsely setose, finely scabrous in front, coarsely scabrous behind; mesepimeron coarsely scabrous, metepisternum shiny, each with a few setae; metasternal disc convex, only posteriorly with indication of medial depression; metasternal punctation abundant, consisting of various types: finer non-seta-bearing punctures on disc, larger seta-bearing punctures restricted to discal periphery, and ocellate seta-bearing punctures on lateral wings. Abdominal sternites partly shiny, posterolateral margins of proximal sternites and entire lateral surface of distal sternites finely scabrous; sternites with transverse row of seta-bearing punctures, length of setae increasing laterad. Pygidium with marginate base; anal margination fine; surface entirely evenly densely punctate; punctures well defined, isodiametric, with erect seta.

Fore tibia, fig. 9. Underside of femora shiny, sparsely punctate, larger punctures with seta. Middle and hind tibiae (fig. 10) with four obsolescent fossorial elevations; ratio total length / apical width of left middle tibia 3.0. Middle and hind tarsi normal; approximate length proportions of terminal tibial spur and tarsal segments 1-5 of hind leg 15//10/4.5/3/1.5/4.5.

Phallus not showing obvious modifications.

Material examined. — Holotype male only, from Sumatra: Manna, M. Knappert, from the Veth collection.

Identification. — The two protrusions on the pronotum are very characteristic, and certainly in combination with the properties mentioned in table 1, this species should be easily identifiable.

In Balthasar's key (1963) *O. vethi* runs down to *funebri* Boucomont from Yunnan (point 81), but differs from that species in its pronotal armature (pronotum of *funebri* simply, strongly convex) and other characters.

***Onthophagus calamophilus* sp. nov. (figs. 11-14)**

Holotype (male). — Approximate length 7, width 4, height 3.5 mm. Black, opaque; certain parts with tinge of brown-red; antennal club brown; fire

pilosity pale-white, bristles of legs brownish. Most punctures more or less distinctly ocellate. Microreticulation on dorsal side of fore-body and parts of pectus and legs effaced ($\times 50$). Habitus deplanate.

Cephalic contours, fig. 11. Anteromedian part of clypeus slightly re-flexed; border non-marginate; clypeogenal suture obsolescent proximad; clypeal apex indistinctly punctate, remaining parts of head closely punctate throughout; punctures approximately isodiametric, evenly distributed, deep, well defined; punctural diameters ca 0.04 mm, density on centre of head 23-27/0.1 sq. mm. Eyes with ca 10 facet rows across their widest point. Maximum length of head 1.90, maximum width 2.50 mm; ratio l/w 0.76.

Pronotal contours, fig. 11; pronotum evenly convex, lateral and anterior borders marginate; anterolateral angles virtually rectangular, shortly rounded, posterolateral angle subobsolete, border widely rounded. Pronotal surface closely punctate, punctures approximately isodiametric, evenly distributed, deep, well defined, their diameters slightly decreasing laterad and cephalad, mostly with pale stubble; diameters of discal punctures ca 0.04 mm, their densities 15-20/0.1 sq. mm. Median length of pronotum 2.30, maximum width 3.75 mm; ratio l/w 0.61. Scutellum invisible.

General surface of elytra unmodified; microreticulation very distinct; juxtasutural interstria slightly but distinctly elevated, humeral umbone slightly extended caudad. Elytral striae distinctly impressed, well defined, with shiny edges; punctures very poorly defined, widely spaced (discally separated by 1-2 times their diameter), distinctly crenulating interstitial borders; diameters of punctures ca 0.05 mm. Elytral interstriae flat, with three irregular rows of shiny superficial callosities (fig. 14), the medial row on interstriae 3, 5, 7 more or less elongate and confluent; isolated callosities associated with short seta; lateral interstria granulose. Sutural length of elytra 3.75, maximum width combined 4.25 mm, ratio l/w 0.88. Scutellum invisible.

Antenna unmodified. Most of pectus and femora sparsely to moderately densely punctate, a few very long setae and a few stubbles noticeable; punctures resembling those of head and thorax, though partly anisodiametric and locally effaced. Abdominal sternites heavily microreticulate, base of sternites with row of pustules. (Pygidium and propygidium missing).

Fore tibia, fig. 12; tarsus short but slender; inferior ridge of tibia with ca 15 setae; tibial apex with tufts of hairs; terminal spur acuminate, reaching tarsal segment 4. Punctures on inferior side of femora slightly elongate, longitudinal diameter 0.04 mm, densities ca 6/0.1 sq. mm. Middle and hind tibiae (fig. 13) with 3 obsolescent spine-bearing fossorial crest; proximal part of tibiae narrow, more or less cylindrical, apex strongly dila-

ted, length / apical width ratio of right middle tibia 2.1. Middle and hind tarsi normal; approximate length proportions of terminal spur and tarsal segments 1-5 of hind leg 7//10/4.5/2.5/2/2.5.

Parameres with sharp apex and angulate lateral flap.

Identification. — The unusual character mentioned in table 1 is the microsculpture of the elytral interstriae, these being strewn with granules and superficial callosities.

In Balthasar's key (1970) *O. calamophilus* easily runs down to point 55, but does not fit the subsequent diagnosis of *latenasutus* Arrow and *parryi* Harold, i.a. because of the different elytral microsculpture.

Material examined. — Holotype male only, from West Irian: Rattan Camp, 1150 m, ii-iii.1939, L. J. Toxopeus (see Toxopeus, 1940).

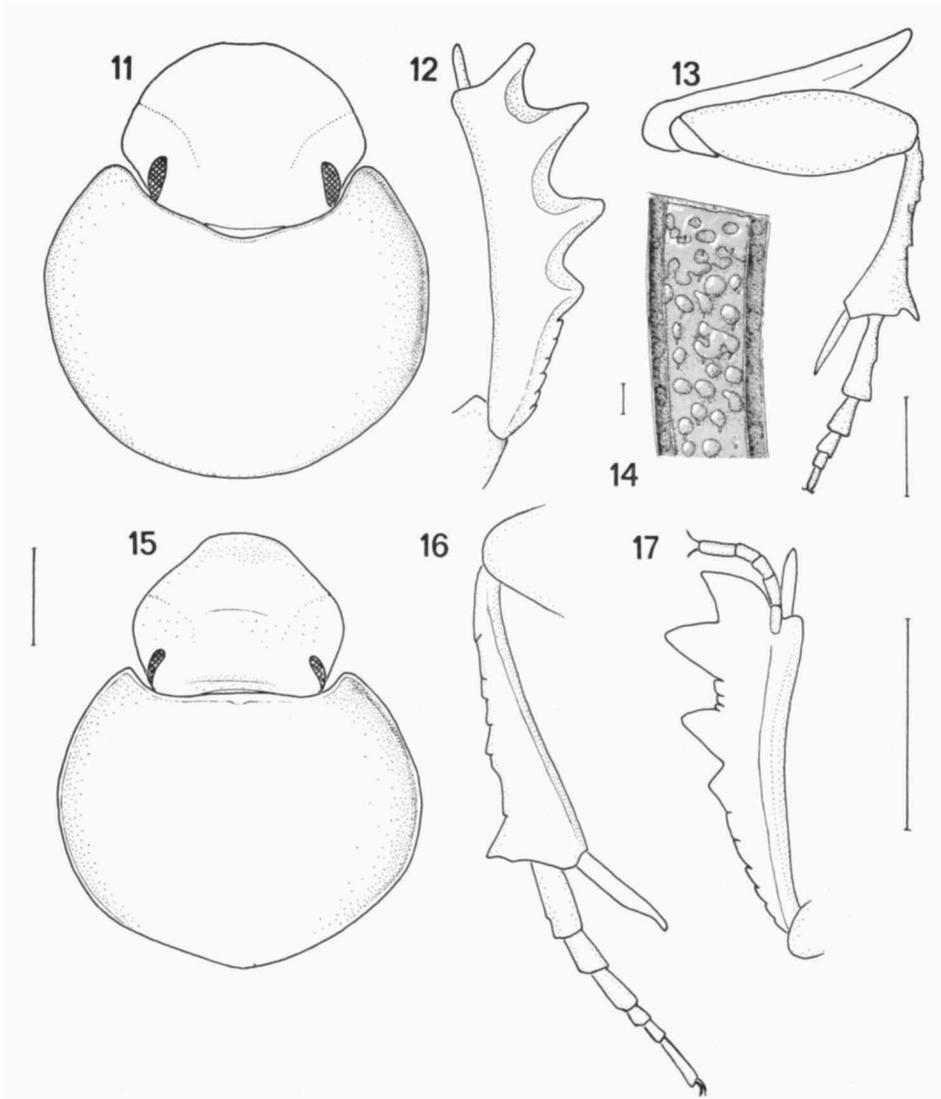
***Onthophagus wiebesi* sp. nov. (figs. 15-17)**

Holotype (male). — Approximate length 6.5, width 3.5, height 2.5 mm. Shiny brown, dorsal side darker than ventral side, head and pronotum with faint tinge of metallic green; antennal club light brown; pilosity whitish, bristles of legs brownish.

Cephalic contours, disposition of two obsolescent ridges, fig. 15. Antero-medial part of clypeus reflexed, border immarginate; clypeogenal suture obsolescent; entire cephalic surface very closely punctate, punctures isodiametric or slightly elliptic, quite evenly distributed, well defined, their diameters ca 0.05 mm, density in front of clypeofrontal ridge 30-35/0.1 sq. mm. Eyes with ca 8 facet rows across their widest point. Maximum length of head 1.7, maximum width 2.1 mm; ratio l/w 0.79.

Pronotal contours, fig. 15; general surface of pronotum evenly convex, lateral and anterior borders marginate, anterolateral angle virtually rectangular, very shortly rounded; border in front of rounded posterolateral angle feebly sinuate; base medially feebly angulate. Pronotal surface closely punctate, primary punctures approximately isodiametric, well defined, their diameters increasing laterad from ca 0.05 (disc) to 0.075 mm (lateral declivity), densities on both places 10-15/sq. mm; secondary punctation ($\times 50$) indistinct and sparse, laterally crowded out by primary punctures; anterolateral surface with microreticulation ($\times 75$); many punctures, particularly on the lateral declivities, with a short, semierect seta. Median length of pronotum 2.6, maximum width 3.5 mm; ratio l/w 0.74. Scutellum invisible.

General surface of elytra unmodified; base of juxtasutural interstriae depressed, humeral umbone low. Striae feebly impressed, well defined, with isodiametric, shallow, ill defined punctures, which very slightly affect interstitial borders; diameters of punctures in discal striae ca 0.05 mm,



Figs. 11-17. *Onthophagus* species. 11-14, *calamophilus*, holotype; 15-17, *wiebesi*, holotype. — 11, 15, fore body; 12, 17, right fore tibia; 13, 16, hind leg, ventral view; 14, details from base of interstria 4. Scale line with 14 = 0.1 mm, others 1 mm; 11, 13, 15, same scale; 12, 16, 17, same scale.

separated by 1.5-2 times this diameter. Interstriae scarcely convex, densely punctate, primary punctures approximately isodiametric, well defined, irregularly distributed; diameters of primary punctures increasing laterad from slightly less than 0.05 (disc) to slightly more than 0.05 mm (lateral declivity),

their densities 10-15/sq. mm; majority of lateral and caudal punctures with a short erect seta; secondary punctation ($\times 50$) distinct but sparse on the disc. Sutural length of elytron 2.5, maximum width of elytra combined 3.7 mm; ratio l/w 0.69.

Antennal scapus distally with very finely serrate carinula. Lateral elements of pro-, meso-, and metapectus very finely shagreened but shiny, with numerous large seta-bearing punctures. Metasternal disc very finely shagreened, shiny, densely punctate, punctures small, distinct, moderately defined, many bearing a short, erect seta; metasternal wings also densely punctate, but punctures larger, very distinct, most of them well defined and with a short semierect seta. Abdominal sternites very finely shagreened, shiny, a series of short, semierect setae across their middle. Propygidium strongly shagreened, dull. Base of pygidium marginate, surface shiny, entirely, irregularly, closely punctate, punctures isodiametric to elliptic, well defined, most of them with a suberect, short seta; diameters of punctures 0.025-0.05 mm, their densities 10-15/sq. mm.

Fore tibia and tarsus, fig. 17; pilosity normal; length / apical width ratio of right middle tibia 2.7. Inferior side of the femora with 20-25 small, scattered, seta-bearing punctures, and with numerous secondary punctures. Fore and middle coxae microreticulate, dull. Middle and hind tibiae (fig. 16) with three poorly pronounced spinose fossorial elevations; apical edge of middle tibia fringed with ca 12 equal-sized spines mixed with ca 5 setae. Middle and hind tarsi normal; approximate length proportions of terminal tibial spur and tarsal segments 1-5 of hind leg 7//10/3/2.5/1.5/3.5.

Phallus lacking obvious modifications.

Variation and sexual dimorphism. — The other male available is very similar to the holotype (approximate length 7 mm). The female paratype (length 7 mm) is also very similar, apart from the usual sexual dimorphism; the clypeal punctation has a slightly transversely rugulate aspect.

Identification. — With Balthasar's key (1963) point 203 is reached, after which several species have to be considered. *Onthophagus sulci* Balthasar from China seems the closest relative of *wiebesi*, and they can be separated as follows:

1. Dorsum coarsely, very densely punctate-setose. Clypeal margin entirely reflexed. Clypeofrontal ridge well pronounced. Pronotal base (medially) marginate. Smaller, length 5-6 mm *sulci* Balth.
 - Dorsum finely, densely punctate-setose. Clypeal margin anteriorly reflexed. Clypeofrontal ridge obsolescent (δ) or poorly pronounced (♀). Pronotal base immarginate. Larger, length 6-7 mm . . . *wiebesi* sp. nov.
- Material examined. — Holotype male, paratype female, from the Philip-

pinus: Luzon: Los Baños: Laguna, 29-xii-1964, J. T. Wiebes, from *Artocarpus* fruit; paratype male with similar data, but 31-xii-1964.

Note. — Named after the collector, professor of systematic zoology and evolutionary biology in the State University of Leiden.

***Onthophagus deflexicollis* Lansberge**

Notes. — This species is mentioned here because of a first New Guinea record. So far *O. deflexicollis* was known to range from India and South China to Java. I have seen numerous specimens, and the species appears very variable in both shape and coloration; this variability seems not correlated with geographic regions, but a detailed analysis should confirm this impression. Zunino (1976: 88, 100) has proposed a new name for one of the syntypes, and selected a lectotype for *deflexicollis* Lansberge; he did not consider the type-material in Leiden mentioned below.

Onthophagus deflexicollis is found in a wide range of vegetation types in rotting fruit, in detritus, and in inflorescences (so far I have not seen records from dung), which may explain its extensive distribution.

Material examined. — 12 specimens (many others merely identified).

"Java/ Blume" (round labels, handwriting of C. Ritsema and S. C. Snellen van Vollenhoven), name labels in Van Lansberge's handwriting (5♂, 3♀, paralectotypes, Leiden). Sumatra: Alas River valley: Gumpang, 11.vi.1972, J. Krikken, ca 650 m, multistratal evergreen forest, from inflorescence of *Nicolaia* (Zingiberaceae) (1♂, 1♀ collected, more seen). West Irian: Sorong, 5.vi.7.vii.1948, M. A. Lieftinck (1♂, 1♀, Leiden).

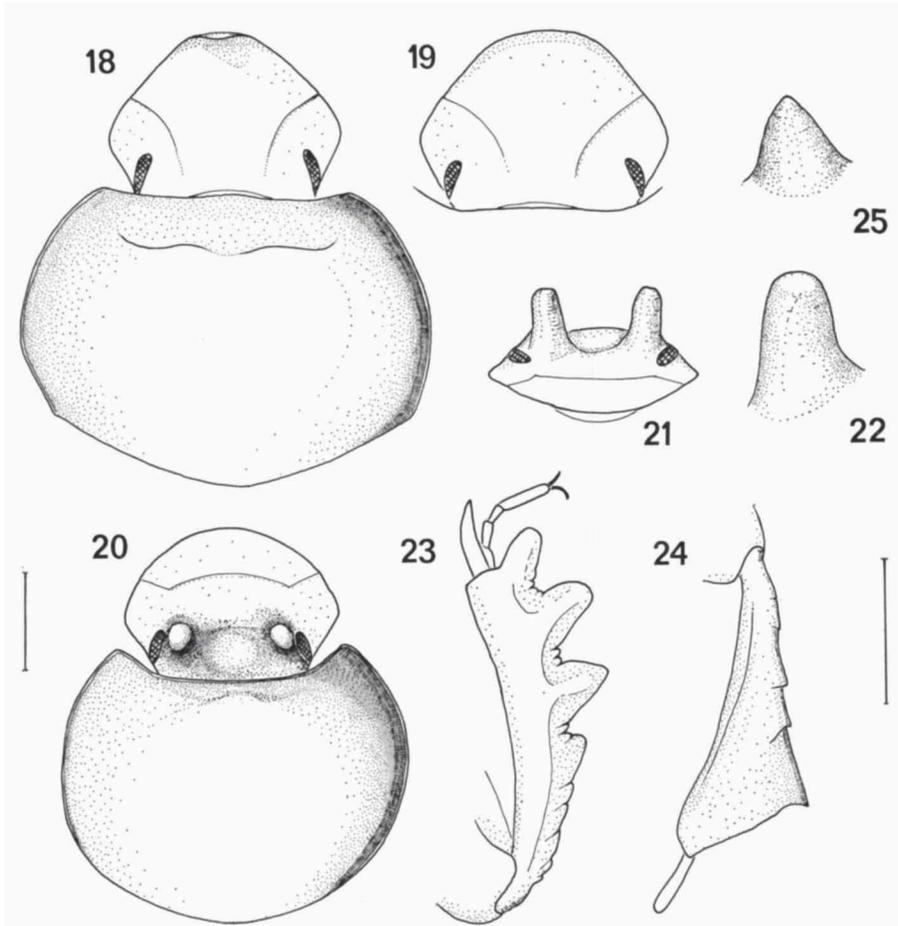
***Onthophagus luctuosus* Boucomont (figs. 18-19)**

Notes. — This is, contrary to the preceding species, a rare *Onthophagus*, hitherto recorded only from the type-locality Si-Rambé, directly East of Lake Toba. I found a pair during my ascent of the Gunung Bandahara, and, as *luctuosus* has not yet been illustrated, drawings of head and pronotum are given here. Total length of specimens ca 8 mm. Entirely black, opaque; femora partly yellow-brown, antenna light-brown.

Material examined. — 1♂, 1♀ from North Sumatra: Mt Bandahara Bivouac Two, 1430 m, 5-10.vii.1972, J. Krikken; multistratal evergreen forest, from human faeces; location 3°44'N—97°43'E.

***Onthophagus gajo* sp. nov. (figs. 20-24)**

Holotype (male). — Approximate length 9.5, width 5, height 4.5 mm. Black, fore-body opaque, elytra moderately shiny; antennal club light brown. Dorsal side completely glabrous, pilosity of ventral side and legs light reddish



Figs. 18-25. *Onthophagus* species. 18, 19, *luctuosus*, ♂, ♀ Bandahara; 20-24, *gajo*, holotype; 25, *malangensis*, lectotype. — 18, 20, fore body ♂; 19, head ♀; 21, head, frontal view; 22, 25, left frontal tubercle, frontolateral view; 23, right fore tibia; 24, left hind tibia. Scale lines = 1 mm; 18-21, same scale; 23-24, same scale.

brown, bristles darker reddish brown. Entire body with reticulate microsculpture, distinct at $\times 50$ magnification. Habitus compact.

Cephalic contours and disposition of elevations, figs. 20-21. Clypeal border ca 130° of a circle, virtually continuous with obtusely angular genae; anteromedian part of clypeus level with general cephalic surface, neither marginate, nor reflexed; clypeal sculpture consisting of transverse rugulae mixed with fine punctures. Frons abundantly punctate, punctures fine, distinct, isodiametric, quite evenly distributed, their diameters 0.025-0.05 mm, densities behind clypeofrontal ridge 15-20/0.1 sq. mm. Surface between

interocular horns and pronotal border distinctly concave; horns (fig. 22) erect, straight, thick, apex rounded off. Eyes with ca 10 facet rows across their widest point. Maximum length of head 2.1, maximum width 3.0 mm; ratio l/w 0.70.

Pronotal contours, fig. 20; pronotal disc evenly convex, protruding in front, with steep declivity to anterior border; lateral and anterior borders marginate, anterolateral angle slightly over 90° , shortly rounded off; border in front of posterolateral angle feebly sinuate. Pronotal disc with secondary punctures only ($\times 50$), their diameters ca 0.01 mm, densities 20-25/0.1 sq. mm; primary punctation dense on anterior and lateral declivities, punctures approximately isodiametric, well defined, shallow, their diameters increasing distad to ca 0.05 mm, densities laterally 15-20/0.1 sq. mm. Median length of pronotum 7.0, maximum width 10.3 mm; ratio l/w 0.68. Scutellum invisible.

General surface of elytra unmodified; humeral umbone low; epipleuron setose. Striae distinctly, shallowly impressed, with isodiametric, shallow, in striae 1 and 2 vague punctures, which very slightly affect interstriae; diameters of punctures in discal striae ca 0.05 mm, separated by approximately thrice this diameter. Interstriae very slightly convex, with abundant, evenly distributed, isodiametric, fine but distinct punctures; diameters of discal punctures ca 0.02 mm, their densities 13-18/0.1 sq. mm. Elytral sutural length 4.2, maximum width of elytra combined 5.3 mm; ratio l/w 0.79.

Antennal scapus with simple carinula. Lateral elements of propectus, mesopectus and metapectus with numerous coarse seta-bearing punctures, mesepisternum punctate-rugulate. Metasternum densely punctate-setose on intercoxal lobe and lateral wings, disc virtually smooth. Abdominal sternites more or less shiny, reddish laterally, distal ones with coarse seta-bearing punctures along their base, medial surface glabrous. Pygidium with base marginate; elevated anal margin wider than medial width of anal sternite; pygidial surface entirely, evenly densely to closely punctate; punctures ocellate, approximately isodiametric, distinct, shallow, laterally with short suberect seta, medially with inconspicuous stubble; punctural diameters ca 0.05 mm, their densities 7-12/0.1 sq. mm.

Fore tibia and tarsus, fig. 23. Inferior side of fore femur with ca 30 scattered, coarse, seta-bearing primary punctures and numerous fine secondary punctures. Inferior side of middle and hind femora with similar punctures, but primary ones restricted to anterior surface. Middle and hind tibiae (fig. 24) with four fossorial elevations, proximal one poorly pronounced; pilosity normal; apical edge of middle tibia with ca 13 short spines and 6 long setae; ratio length / apical width of this tibia 2.3. Middle and

hind tarsi non-modified; approximate length proportions of terminal spur and tarsal segments 1-4 of hind leg 10//10/3/1.5/3 (segment 5 missing).

Parameres distally with subangulate lateral lobe.

Sexual dimorphism. — The female paratype is very similar to the holotype. The abdominal sternites are less strongly compressed, as usual. The frontal horns are smaller, subconical. Pronotal and elytral punctation are slightly stronger. Anterior declivity of pronotum lower than in male.

Identification. — *Onthophagus gajo* is closely allied with *malangensis* Boucomont, both having, in addition to other similarities (see also table 1), a concavity between the frontal horns.

In Balthasar's key (1963) this species runs down to point 197, but does not fit either of the subsequent alternatives. If the trifling pygidial ridge of *malangensis* (point 194) is disregarded, however, *gajo* would easily key to that species. The differences may be summarized as follows.

1. Pronotal disc densely, strongly punctate, punctures separated by their own diameters or less; derm generally shiny. Frontal horns (in frontolateral aspect) tapering, subtriangular (fig. 25). Elytral interstriae moderately, very densely punctate, almost rugulate-punctate. Metasternal disc with distinctly impressed midline, generally more strongly punctate *malangensis* Boucomont
- Pronotal disc opaque, minutely punctate (magnifications over $\times 25$), punctures separated by many times their diameters. Frontal horns parallel-sided, with semiglobular tip (fig. 22). Elytral interstriae abundantly finely punctate, punctures separated by a few times their diameters. Metasternal disc at most with trace of impression, abundantly finely punctate *gajo* sp. nov.

Material examined. — Holotype male and paratype female, both from North Sumatra: Mt Bandahara Bivouac Two, 1430 m, 5-10.vii.1972, J. Krikken; multi-stratal evergreen forest, from human faeces; location $3^{\circ}44'N-97^{\circ}43'E$.

Note. — This species is dedicated to the Gajo people inhabiting the mountainous inland of the northern tip of Sumatra; several have served excellently as my porters during the ascent of the Gunung Bandahara.

***Onthophagus malangensis* Boucomont (fig. 25)**

Onthophagus malangensis Boucomont, 1915: 273 (in key), 274 (diagnosis, type-loc. Malang). Balthasar, 1963: 210 (in key), 429 (diagnosis).

Notes. — Diagnostic information is given under the preceding species. I studied a male type from the Boucomont collection in Paris, which has a locality label reading "JAVA/ MALANG/ H. ROUYER, 1903" plus Boucomont's name label. This specimen is here designated lectotype.

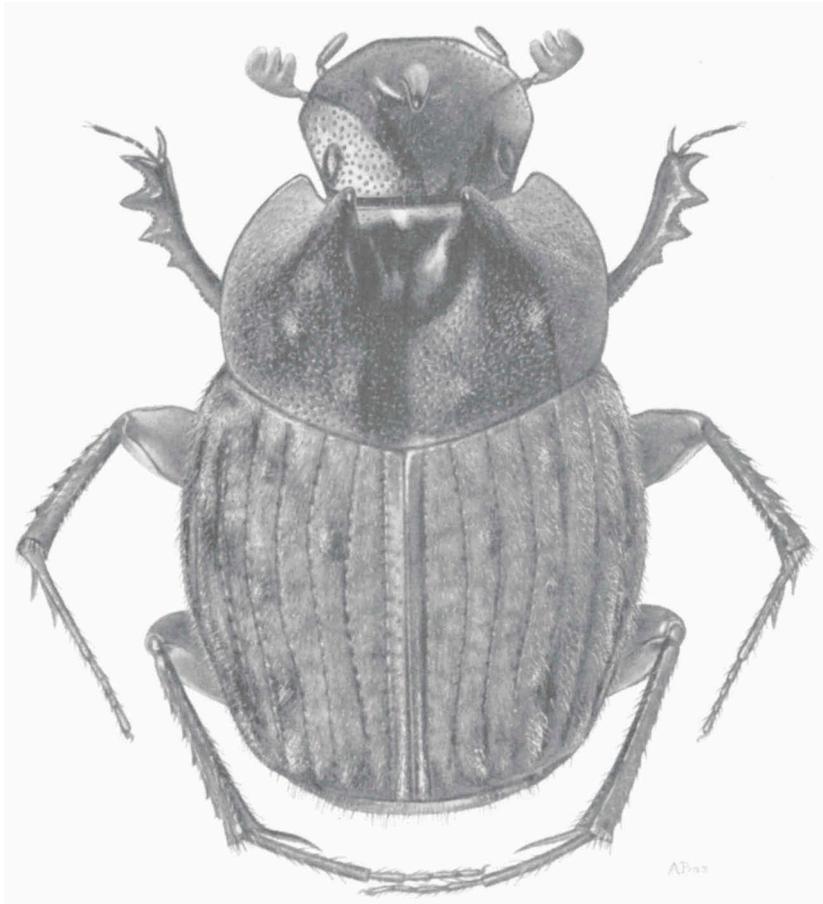
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The plate was drawn by A. Bos, staff artist of the Leiden museum.

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Onthophagus bomberaianus, representative of a New Guinea species-group characterized by trichomatose clytral callosities. Male, Jayapura, length 7 mm.