© 1980 by the Bishop Museum

# THE GENUS LACCOBIUS IN MELANESIA (COLEOPTERA: HYDROPHILIDAE)<sup>1</sup>

### By Elio Gentili<sup>2</sup>

Abstract. Laccobius is represented in Melanesia by 4 subgenera containing at least 20 species. Of these taxa, 12 are described as new species, 1 is described as a new subspecies, and 2 named species are redescribed. All species are keyed and most are illustrated. Distributions of species are shown on maps. Yateberosus, n. status, is synonymized with Laccobius and treated as a subgenus; the remaining subgenera treated are Notoberosus, Microlaccobius and Macrolaccobius.

The genus *Laccobius* Erichson is represented in Melanesia by at least 20 species. Numbers of these species when placed in their respective subgenera are as follows: *Notoberosus* Blackburn (15 species), *Yateberosus* Satô, n. status (1 species), *Microlaccobius* Gentili (2 species), and *Macrolaccobius* Gentili (2 species). Of the few previously named species treated herein, *Laccobius elevatus* Fauvel, 1883 is the earliest described (again described as *Yateberosus novaecaledonicus* Satô, 1966, new synonymy). *Yateberosus maculatus* Satô is the second, and final, named full species treated. Another named species, *Laccobius roseiceps* Régimbart, 1903, is new to Melanesia, where it is represented by a new subspecies. Of the remaining 17 species, 12 are described as new, 5 are treated in the key as *Laccobius* sp. A, B, C, D, and E.

This revision is based on 718 specimens from the following areas: New Guinea (665), New Britain (5), Solomon Is (39) and New Caledonia (9). Collections to which these specimens belong are listed below, along with their names or abbreviations, as used in citations in the text.

AMNH	American Museum of Natural History, New York
Візнор	Bishop Museum, Honolulu
BMNH	British Museum (Natural History), London
BRUXELLES	Institut Royal des Sciences Naturelles de Belgique, Bruxelles
CAS	California Academy of Sciences, San Francisco
Leiden	Rijksmuseum van Naturlijke Historie, Leiden
MILANO	Museo di Storia Naturale, Milano
Nagoya	Nagoya Women's College, Nagoya
OSAKA	Osaka Museum of Natural History, Osaka
PAVIA	Istituto di Entomologia Agraria, Pavia
VERONA	Museo Civico di Storia Naturale, Verona

<sup>1.</sup> Material from Bishop Museum results from fieldwork supported by grants to the Museum from the U.S. National Institutes of Health (E1723, AI-01723), the U.S. Army Medical Research & Development Command (DA-49-193-MD-2789, DA-MD-49-193-62-G65), and the U.S. National Science Foundation (G-4774, G-10734, GB-518, GB-3245, GB-24474).

<sup>2.</sup> Museo A. Stoppani, Seminario Arcivescovile di Milano, 21040 Venegono Inf. (Varese), Italy.

#### Genus Laccobius Erichson

Laccobius Er., 1837, Käf. Mark Brand. 1: 202.

Notoberosus Blackburn, 1895, Trans. R. Soc. S. Aust. 19: 30.—d'Orchymont, 1925, Bull. Ann. Soc. Entomol. Belg. 65: 66 (as subg. of Laccobius). Subgenus.

Yateberosus Satô, 1966, Bull. Osaka Mus. Nat. Hist. 19: 5. New synonymy, new status. Subgenus.

Microlaccobius Gentili, 1974, Mem. Mus. Civ. Stor. Nat. Verona 20: 550. Subgenus.

Macrolaccobius Gentili, 1974, Mem. Mus. Civ. Stor. Nat. Verona 20: 550. Subgenus.

#### KEY TO MELANESIAN SPECIES OF Laccobius

1.	Hind tibiae straight	2
		17
2 (1).	Epipleura extending from base to apex of elytra; metasternum anteriorly keel-shaped in	
	♂; aedeagus as in Fig. 1a, b; body length 2.8–3.2 mm (subgen. Yateberosus) 1. maculati	us
	Epipleura extending to about middle of elytra; metasternum without keel (subgenus Noto-	
	berosus)	3
3 (2).	Each elytron furnished with 11 rows of punctate striae, intervals somewhat convex; body	
	length 2.4–2.5 mm	us
	Elytron without striae or sulci	4
4 (3).	Elytral punctures not arranged in longitudinal rows; a very small tooth prominent near anterior corners of the pronotum	5
	Elytral punctures arranged in longitudinal rows; pronotum without anteriorly prominent	
	teeth	6
5 (4).	Postlabium granulate and slightly undulate; elytral apex slightly acute; 2 longitudinal sulci on underside of hind tibiae; aedeagus as in Fig. 3a, b; body length 2.2–2.5 mm	
		D.
	Postlabium flat and smooth; elytral apex nearly truncate; metatibiae without sulci; aedeagus	Ρ.
	as in Fig. 4a, b; body length 2.2–2.8 mm	D.
6 (4).	Eyes strongly protrudent laterally; elytral rows alternately consisting of large and sparsely	Γ.
- ( -).	set punctures (primary rows) and of very small geminate punctures (secondary rows);	
	aedeagus as in Fig. 5a, b; body length 3.1–3.4 mm	p.
	Eyes slightly protrudent; no rows consisting of geminate punctures on elytra	7
7 (6).	Elytra more convex, nearly vertical at apex, with scattered punctures near scutellum and	
, ,	apex, normally without greenish spots; aedeagus as in Fig. 6a, b; body length 2.3-2.9	
	mm 6. irianicus, n. s	p.
	Elytra more flattened, at least near the apex, with a more elongate shape; punctures set in	-
	rows also near the scutellum; greenish spots often present	8
8 ( 7).	Elytral declivity relatively steep, surface with smaller and scattered punctures not arranged	
	in longitudinal rows	9
	Elytral declivity relatively shallow, with surface more flattened and bearing large punctures;	
		12
9 (8).	Primary elytral puncture rows (10 rows) often consisting of deeper and larger punctures	
	than alternate secondary rows; elytral punctures usually stronger than pronotal punctures	
		10
	Primary rows weaker, resembling secondary rows; elytral punctures similar to pronotal	
	ones	11
10 ( 9).	Secondary elytral rows less punctate than primary, consisting of very small punctures (some-	
	times mixed with large accessory punctures), the difference between primary and sec-	
	ondary rows persisting to the elytral side; form more convex; body length 3.05 mm	
	sp.	A
	Secondary longitudinal rows more punctate than primary, their punctures larger than in	

	species A, the difference between primary and secondary rows disappearing on elytral sides; aedeagus as in Fig. 7a, b; body length 2.6–3.2 mm
11 ( 9).	Form elongate, gradually narrowed on posterior ½; broader pale area surrounding elytra;
	aedeagus as in Fig. 8a, b; body length 2.3–3.0 mm
	Form more broadened posteriorly, narrowed only in the posterior 1/3; only a narrow pale
	stripe surrounding elytra; pronotum densely punctate; aedeagus as in Fig. 9a, b; body length 2.4–2.9 mm
12 ( 8).	Sides and hind \(^2\) of pronotum smooth, shining, without micropunctures; aedeagus as in
12 ( 0).	Fig. 10a, b; body length 3.2 mm
	Pronotum shagreened or micropunctate (sometimes with scattered small smooth areas) 13
13 (12).	Labium extended posteriorly in the shape of a V towards the postlabium
13 (12).	Hind margin of labium straight
14 (13).	Sides of pronotum subevenly curved; apices of elytra rounded; aedeagus as in Fig. 14a–c;
(/	body length 2.8–3.3 mm
	Sides of pronotum curved only in the anterior 1/3, remainder nearly straight (see laterally);
	apices of elytra more acute; aedeagus as in Fig. 12a, b; body length 2.7–3.2 mm
15 (13).	Sides of pronotum curved only in the anterior ½, remainder nearly straight (see laterally), hind corners forming a right angle; aedeagus as in Fig. 11a, b; body length 2.7–2.8 mm
	12. novaebritanniae, n. sp.
	Sides of pronotum subevenly curved
16 (15).	Elytral punctures much larger and deeper than pronotal punctures; aedeagus as in Fig.
	13a, b; body length 2.5–3.4 mm
	Elytral punctures fainter and smaller, like those of the pronotum; aedeagus as in Fig. 15a,
	b; body length 2.7–3.2 mm
17 (1).	Primary rows of elytral punctures (10 rows) more regular, impressed and punctate; the
	alternate longitudinal rows (secondary rows) not regular, weakly impressed and scarcely
	punctate (subgenus Microlaccobius)
	Primary rows of elytral punctures partly irregular, with mixed small and large punctures
10 (17)	(subgenus <i>Macrolaccobius</i> )
18 (17).	1.8–2.5 mm
	Mesosternal keel with a large parrot-bill-shaped tooth; body length 2.9 mm sp. C
19 (17).	Aedeagus as in Fig. 16a, b: median lobe broader and uniform, parameres with acute apices;
10 (11).	body length 2.8 mm
	Aedeagus as in Fig. 17a, b: median lobe straightened before apex; parameres with hooked
	apices; body length 2.7 mm sp. E

## Subgenus Yateberosus Satô, new status

Tribe Hydrobiini. Hind tibiae straight, epipleuron extending to apex of elytron; metasternum keel-shaped anteriorly in  $\delta$ .

Originally placed near *Berosus* Leach and *Hemiosus* Sharp (Berosini) but differs from Berosini: eyes not particularly convex and prominent; scutellum nearly equilateral instead of elongate; 6 visible abdominal sternites instead of 4–5; pronotum not narrower behind than hind body, nor nearly vertical at the rest.

#### 1. Laccobius (Yateberosus) maculatus (Satô), new combination Fig. 1a, b; 21

Yateberosus maculatus Satô, 1966, Bull. Osaka Mus. Nat. Hist. 19: 5-6.

Body length 2.8–3.2 mm; breadth 1.4–1.5 mm (holotype:  $3.06\times1.5$  mm). Form elongate, more than  $2\times$  as long as broad, oval, slightly convex.

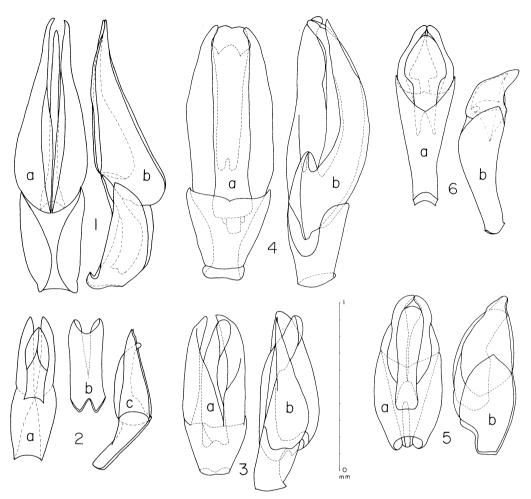


Fig. 1-6. Aedeagi. 1, Laccobius (Yateberosus) maculatus (La Crouen): a, dorsal view; b, lateral view. 2a, c, L. (Microlaccobius) roseiceps melanesiae, paratype (Malmalwan-Wunakanau): a, ventral view; c, lateral view; 2b, L. (Notoberosus) elevatus, holotype: tegmen. 3, L. (Notoberosus) solomonicus, holotype: a, dorsal view; b, lateral view. 4, L. (N.) tenebricosus, holotype: a, ventral view; b, lateral view. 5, L. (N.) mirus, holotype: a, ventral view; b, lateral view. 6, L. (N.) irianicus, holotype: a, ventral view; b, lateral view. All to scale.

Labium and head dark brown, with metallic reflections and with 2 preocular testaceous spots reaching Y-suture. Head microreticulate, distinctly punctate on vertex, punctures becoming finer anteriorly, posteriorly like larger elytral punctures. In frontal view, ratio between breadths of eyes to interocular distance about 0.75:1. Pronotum pale on sides and behind eyes, with a central dark patch reaching the external level of eyes; microreticulate, distinctly and closely punctate; about 2.2× as broad as long, broadest at basal ½, then strongly narrowed anteriorly, slightly posteriorly. Scutellum triangular, nearly equilateral, minutely and sparsely punctate. Elytra testaceous, with indistinct dark patches, chiefly near the humeri and center; distinctly punctate-striate, striae becoming deeper posteriorly, each interval moderately convex, 5th, 7th, and 9th distinctly elevated; broadest at basal ½, then moderately narrowed anteriorly and posteriorly. Underside dark, slightly shagreened. Labium without specula, but provided, in 3, with 3 small bright notches. Postlabium pubescent, with fore margin deeply sinuous. Prosternum tectiform; mesoster-

num with a longitudinal keel; metasternum of  $\delta$  anteriorly keel-shaped, of  $\mathfrak P$  elevated in center. Six visible abdominal sternites, 2nd to 4th shining and indistinctly reticulate, 5th feebly emarginate. Elytral epipleura beginning at base and ending nearly at apex. Legs dark, fore tibiae and all tarsi testaceous; middle femora without tufts of hairs; approximate ratios of tarsal segments as follows: 1:4:3:3:8; 2:9:5:4:8; 3:10:7:5:8. Aedeagus (Fig. 1a, b)  $\frac{1}{2}$ s of body length; median lobe shorter and narrower than parameres, apices acute.

Material examined. NEW CALEDONIA (Fig. 21): South: holotype ♀, Yaté Riv, 3.X.1958, Y. Shibata (NAGOYA); Central: 1♀, headwaters of Houailou Riv, 26.X.1958, C.R. Joyce (VERONA); 1♂, La Crouen, W of Canala, 21°30′S, 165°53′E, 12.III.1961, J. Sedlacek (BISHOP).

*Discussion.* This is the only species in the genus having the epipleuron extending to the apex of the elytron, and therefore belonging to the subgenus *Yateberosus*.

#### Subgenus Notoberosus Blackburn

#### 2. Laccobius (Notoberosus) elevatus Fauvel

Fig. 2b; 21

Laccobius elevatus Fauvel, 1883, Rev. Entomol. 2: 355.

Yateberosus novaecaledonicus Satô, 1966, Bull. Osaka Mus. Nat. Hist. 19: 6-7. New synonymy.

Body length 2.4–2.5 mm; breadth 1.2–1.3 mm (holotype:  $2.45 \times 1.3$  mm). Body form oval, slightly convex, elongate, nearly  $2 \times$  as long as broad.

Labium dark testaceous, with conspicuous preocular pale spots exceeding the Y-suture but not reaching eyes; head also dark testaceous, with purplish, greenish or violet sheen visible only in more recently collected specimens. Head broader than long, microreticulate, with several punctures similar to punctures of secondary elytral rows. In frontal view, ratio between breadths of eyes to interocular distance about 0.7:1. Pronotum dark on disc, pale on sides, border of the colors indistinct; breadth about  $2.3 \times$  as long as length; front angles rectangular, less prominent than those of maculatus; sides subevenly rounded; posterior edge sinuous, concealing in part the scutellum; punctures as on head, shagreen more faint. Scutellum equilateral, with very fine and densely set punctures. Elytra piceous with sparse paler or darker spots; about 1.3× as long as broad, broadest at basal 1/3; evidently punctate-striate, striae becoming deeper towards apices, intervals distinctly convex, sparsely and minutely punctate. Underside dark. Labium anteriorly curved, without specula. Postlabium flat, microgranulate and pubescent. Prosternum tectiform; mesosternum gibbous, with an anteriorly tooth-shaped keel; metasternum with a glabrous central area. The apex of 5th abdominal sternite deeply notched in \(\varphi\). Epipleura normally ending near middle of elytra. Antennae, palpi and legs testaceous, antennal club darkened; approximate ratios of tarsal segments 1:2:2:2:5; 1:5:4:4:7; 2:6:5:3:6. Aedeagus (Fig. 2b) of the sole ♂ examined broken and represented only by the tegmen.

Material examined. NEW CALEDONIA (Fig. 21): holotype &, Yahoué, X.?year, ruisseaux, E. Deplanche, Coll. Fauvel (Bruxelles); 1 \nabla, Koé, Savès (Bruxelles); 1 \nabla, headwaters of Houailou Riv, 26.X.1958, C.R. Joyce (Bishop); 1 \nabla, La Crouen, W of Canala, 21°30′S, 165°53′E, 12.III.1961, J. Sedlacek (Bishop); 1 \nabla, Oua Tom, 21°48′S, 165°52′E, 17.IX.1940, F.X. Williams (Verona); 1 \nabla, Yaté Riv, 3.X.1958, Y. Tsutsui (Osaka).

Discussion. Differs from other Notoberosus by having striae or sulci corresponding to primary elytral rows. Differs from Yateberosus by having normally short elytral epipleura. The holotypes of Yateberosus novaecaledonicus Satô and elevatus differ in size (novaecaledonicus:  $2.5 \times 1.3$  mm) and in sexual characters; other features are quite similar. The drawings of Satô (1966) are typical of the genus Laccobius (habitus; antenna).

#### 3. Laccobius (Notoberosus) solomonicus Gentili, new species

Fig. 3a, b; 21

Body length 2.2–2.5 mm; breadth 1.3–1.5 mm (holotype  $2.4 \times 1.45$  mm). Form oval, moderately elongate, less than  $2 \times$  as long as broad.

Dark, excepting reddish testaceous sides of pronotum, epipleura, antennae, palpi, and legs. Head, pronotum, and elytra without shagreen, smooth and bright, with many scattered punctures, finer on anterior part of head. Y-suture and periocular grooves conspicuous only at  $60 \times$ . Fore and hind edges of pronotum sinuous in center; fore corners with a blunt tooth pointing anteriorly; sides normally curved. Scutellum equilateral, with faint and sparsely set punctures. Lateral and hind borders of elytra slightly elevated as a gutter. Underside dark. Male without specula but with 3 small bright notches on labium, the central notch being the largest. Fore margin of labium sinuous in center. Postlabium undulate, granulate, with a feeble median groove. Gula also granulate, without conspicuous grooves, scarcely longer than postlabium. Prosternum keel-shaped; mesosternum with a keel forming a tooth anteriorly; metasternum glabrous in center. Anterior femora normally pubescent near base, tarsi slightly expanded in  $\delta$ ; mid femora glabrous as all *Notoberosus*; hind tibiae nearly straight, with 2 longitudinal grooves inferiorly; claws strongly curved, but not so hooked as in *albipes* Kuwert. Approximate ratios of  $\delta$  tarsal segments: 1:4:2:2:7; 2:6:5:5:7; 4:7:6:4:7; similar ratios in the following *Notoberosus*. Aedeagus (Fig. 3a, b) nearly ¼ of body length; ratio tegmen/parameres 2/5; median lobe dorsally open, as a gutter.

Holotype & (BMNH), SOLOMON IS: Choiseul: Malangone, 25.VIII.1963, P.J.M. Greenslade; allotype  $\mathcal{P}$  (BMNH), same data as holotype;  $2\mathcal{F},4\mathcal{P}$ , paratypes, same data as holotype (BMNH, VERONA, BISHOP); Guadalcanal:  $1\mathcal{F}$ , paratype, Monitor Crk, up to 1.6 km from Gallego Camp 1, 4.VI.1965, R. Umasani (BMNH). (Fig. 21.)

Discussion. This and the following species, tenebricosus, n. sp., are the only 2 Notoberosus with scattered punctures on the elytra. Differing chiefly from tenebricosus, n. sp. in the shape of the aedeagus; minor differences are larger size, elytral apex nearly acute instead of nearly truncate, postlabium granulate instead of smooth, and hind tibia with grooves on undersurface.

#### 4. Laccobius (Notoberosus) tenebricosus Gentili, new species Fig. 4a, b; 21

Body length 2.2–2.8 mm; breadth 1.45–1.6 mm (holotype  $2.8 \times 1.6$  mm). Color and shape as in *solo-monicus*, n. sp.

Upper side similar to solomonicus, n. sp. but with elytra nearly truncate at apices. Underside dark. Labium nearly straight anteriorly, in 3 with 3 small notches. Postlabium flat and smooth, not granulate. Prosternum keel-shaped; mesosternum with a longitudinal keel and anteriorly a tooth; metasternum pubescent with glabrous center. Apical ½3 of metafemora inferiorly wrinkled; metatibiae without longitudinal sulci on undersurface. Aedeagus (Fig. 4a, b) nearly ½3 of body length, quite different from solomonicus, n. sp. in shape, having a strong keel joining the bases of parameres.

Holotype & (BMNH), SOLOMON IS: San Cristobal: Warabito Riv, 84 m, 28.VII.1965, P.J.M. Greenslade, at light; allotype ♀ (BISHOP 11,840a), San Cristobal: Wairahu Riv, 100 m, 9–15.V.1964, J. Sedlacek, pressure lamp. Paratype: 1&, same data as allotype (VERONA).

Discussion. See the discussion for solomonicus, n. sp.

#### 5. Laccobius (Notoberosus) mirus Gentili, new species

Fig. 5a, b; 19

Body length 3.1–3.4 mm; breadth 1.4–1.7 mm (holotype  $3.1\times1.4$  mm). Form oval, elongate, more than  $2\times$  as long as broad; legs slender.

Labium and head black, with 2 scarcely visible clear patches before corners of the Y-suture; surface

smooth, abundantly punctured, punctures anteriorly fine, posteriorly mixed large and small; Y-suture very faint posteriorly; periocular grooves strong. Fore part of head nearly rectangular, with blunt corners; eyes strongly protruding. Pronotum testaceous, the black spot covering only the disc in  $\mathfrak{P}$ , anteriorly larger, reaching level of eyes in  $\mathfrak{F}$ ; smooth, with punctures sparser than on head; anterior edge hardly sinuous, front corners blunt. Elytra testaceous, with dark longitudinal stripes more or less confluent, and pale borders; alternate rows of large and sparsely set punctures and of small geminate punctures, here and there confused. Underside dark. Labium of  $\mathfrak{F}$  provided with 3 small bright notches, like nearly all *Notoberosus*. Postlabium trapezoidal, fore margin shorter and deeply sinuous, with a smooth, shining, feebly and scarcely punctate surface. Gula small. Prosternum keel-shaped; mesosternum with a high keel, anteriorly provided with a tooth; metasternum broadly glabrous in center. Palpi, antennae and legs testaceous, antennal club and base of hind femora darkened. Claws regularly curved at base, bent more near apex, shorter than in *pommayi* Bedel. Aedeagus (Fig. 5a, b)  $^{1}/_{5}$  of body length; tegmen scarcely longer than parameres; all apices rounded.

Holotype ♂ (BMNH), PNG: NEW GUINEA (NE): Morobe Prov., Herzog Mts, Vagau, ca 1220 m, 6.I.1965, gravel banks of small clear river in dense forest, M.E. Bacchus; allotype ♀ (BMNH), Morobe Prov., Lae-Bulolo road, Gurakor Crk, 30.XII.1964, Bacchus. (Fig. 19.)

*Discussion.* This is the only species in the subgenus having geminate punctures forming the secondary elytral rows; it also differs from others in the subgenus from New Guinea by the paler color and slender legs.

#### 6. Laccobius (Notoberosus) irianicus Gentili, new species

Fig. 6a, b; 18

Body length 2.3-2.9 mm; breadth 1.2-1.6 mm (holotype  $2.7 \times 1.45$  mm). Form oval, slightly elongate, convex.

Labium and head dark, with greenish sheen, without pale spots; head shagreened and densely punctate, fore edge slightly curved and receding in the center, to receive the labium; cheeks rounded. In frontal view, ratio between breadths of eyes to interocular distance about 0.7:1. Pronotum also dark, borders narrowly testaceous; shagreened and punctate like head; breadth about 2.3× length; fore edge nearly straight, front corners briefly auriculate; sides nearly straight, posteriorly diverging; hind edge hardly sinuous in center. Scutellum equilateral, large, micropunctate. Elytra dark, borders and apex piceous; about 20 longitudinal rows of punctures, alternately with larger deeper punctures (primary rows) and smaller shallower punctures (secondary rows); near scutellum, at apex and near borders the rows become confused. Apex of elytra more steeply declivitous than in following species. Underside dark. Labium anteriorly nearly straight, except at center; in & with 3 notches hardly visible. Postlabium wrinkled or shagreened, with few punctures rather large and deep. Prosternum keel-shaped, anteriorly acute; mesosternum with a strong tooth and behind it a longitudinal keel; metasternum glabrous in center. Antennae, palpi and legs reddish, antennal club and femora darker. Approximate ratios of \$\gamma\$ tarsal segments 1:2:1:1:4; 1:4:3:3:4; 2:4:3:3:4. Aedeagus (Fig. 6a, b) nearly ½ body length, curved, ratio tegmen/parameres more than 2.

Holotype & (Bishop 11,841), IRIAN JAYA: NEW GUINEA (NW): Bodem, 11 km SE of Oerberfaren, S of Sarmi, 1°58′S, 138°44′E, 100 m, 7–17.VIII.1959, at light, T.C. Maa; allotype ♀ (Bishop), same data as holotype. Paratypes: 44♂,29♀, same data as holotype (Bishop, Verona, Milano). (Fig. 18.)

Discussion. This species is the first of a series of Notoberosus having alternate rows of larger and finer punctures on elytra. The differences between the species are difficult to appreciate without study of the aedeagus. With reference to external characters, I arranged them in 3 groups: (1) with confused puncturation near scu-

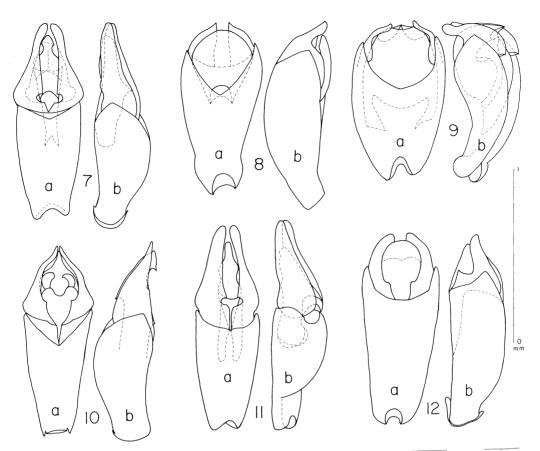


FIG. 7–12. Aedeagi. 7, Laccobius (Notoberosus) novaeguineae, holotype: a, dorsal view; b, lateral view. 8, L. (N.) photophilus, holotype: a, ventral view; b, lateral view. 9, L. (N.) hollandiae, paratype (Waris): a, dorsal view; b, lateral view. 10, L. (N.) sp. B (Feramin): a, dorsal view; b, lateral view. 11, L. (N.) novaebritanniae, holotype: a, dorsal view; b, lateral view. 12, L. (N.) wewaki, holotype: a, dorsal view; b, lateral view. All to scale.

tellum and apex of elytra: *irianicus*; (2) with confused puncturation only near elytral apex: *novaeguineae* group; (3) with regular rows of punctures elsewhere: *papuensis* group. *L. irianicus* is also characterized by its small size, the steepness of elytral apex, and the normal absence of green elytral spots.

## 7. Laccobius (Notoberosus) novaeguineae Gentili, new species Fig. 7a, b; 18

Body length 2.6–3.2 mm; breadth 1.3–1.7 mm (holotype  $2.7 \times 1.3$  mm). Form oval, elongate, convex, more flattened posteriorly than in *irianicus*, n. sp.

Upper side dark with greenish reflections and scattered greenish spots; only sides of pronotum, sides and apex of elytra testaceous. Head and pronotum shagreened and densely punctate; in frontal view, ratio between breadths of eyes to interocular distance about 0.8:1; ratio breadth-length of pronotum about 2.5:1. Elytra smooth and bright; primary rows evidently different from secondary, with many punctures

larger than punctures of pronotum, rows becoming small and scattered only on elytral apex. Underside dark. The 3 notches on  $\delta$  labium not conspicuous; other characters like *irianicus*. Aedeagus (Fig. 7a, b) nearly straight, the ratio tegmen/parameres less than 2, the median lobe different from *irianicus*, being narrowed before the apex.

Holotype & (BISHOP 11,842), PNG: NEW GUINEA (SE): Milne Bay, 14-28.II.1969, J. Sedlacek; allotype ♀ (Візнор), NEW GUINEA (NE): Bulldog Rd, 20 km S of Wau, 680 m, 9.III.1962, Sedlacek. Paratypes: NEW GUINEA (NE): 2♂,2♀, Bena Riv, 20 km E of Goroka, 1500 m, 30.VIII.1971, J. Sedlacek (Візнор); 4♂,8♀, Goroka, 4.II.1974, M. Pavan & A. Fanfani (PAVIA, VERONA); 13, Arau, 40 km E of Kainantu, 1400 m, 15.X.1959, T.C. Maa (BISHOP); 1♀, Mt Missim, 7°15′S, 146°48′E, 1600 m, 6.II.1970, J. & M. Sedlacek (Візнор); 1 д, Sibog Vill, Saidor, Finisterre Range, 27.V-5.VI.1958, W.W. Brandt (BISHOP); 3 \, Bulem Rd, 64 km N of Lae, 30 m, 29.IV.1963, J. Sedlacek (Візнор); 1 д, Buins Crk, 2.5 km W of Lae, 28.XII.1964, ex sand and gravel banks of clear fast river, M.E. Bacchus (BMNH); 8♂,7♀, Gurakor Crk, Lae-Bulolo road, 30.XII.1964, ex gravel banks, Bacchus (BMNH, VERONA); 54♂,90♀, Herzog Mts, Vagau, Snake Riv, 1220 m, 15.I.1965, ex muddy gravel banks of large slow river, Bacchus (BMNH, VERONA, MILANO); 13, nr same locality, 1128 m, 8.I.1965, ex gravel banks, swift shallow clear river, Bacchus (BMNH); 1 &, Bulolo, 700 m, 9.XI.1972, J. & M. Sedlacek (BISHOP);  $3 \, \delta \, , 3 \, \circ$ , Wau, 1200 m, 17.I.1970, M. Sedlacek (Bishop, Verona); 2♂,1♀, Bulldog Rd, 19-25 km S of Wau, 680 m, 9.III.1962, J. Sedlacek (BISHOP); NEW GUINEA (SE): 1♂,1♀, Sogeri Plateau, Musgrave Riv, nr Port Moresby, 16.III.1965, ex gravel banks, Bacchus (BMNH). (Fig. 18.)

Discussion. The species is well characterized by the aedeagus. Externally it belongs to novaeguineae group (see discussion of *irianicus*, n. sp.), but with primary and secondary rows clearly different (differing from *photophilus*, n. sp. and *hollandiae*, n. sp.), the secondary being more punctate than primary, and with shagreen on the whole pronotum (differing from *Laccobius* sp. A).

#### 8. Laccobius (Notoberosus) photophilus Gentili, new species Fig. 8a, b; 18

Body length 2.3-3.0 mm; breadth 1.3-1.6 mm (holotype  $2.7 \times 1.45$  mm). Form oval, moderately elongate, less convex than in *irianicus*, n. sp.

Upper side dark, with greenish reflections and spots, only the sides of pronotum and elytra, and elytral apex testaceous. Labium and head shagreened and punctured, the shagreen more conspicuous before the Y-suture, punctures nearly uniform in size; in frontal view, ratio between breadths of eyes to interocular distance about 0.5:1. Pronotum shagreened and punctured like hind part of head; ratio breadth-length nearly 2.2:1; sides curved along entire length, but more anteriorly. Elytra less shining than in *Laccobius* sp. A; primary and secondary puncture rows differing little from each other, the size of their punctures nearly like those of pronotum. Underside dark. Labium very slightly sinuous, with 3 scarcely visible notches in  $\delta$ ; other characters like *irianicus*, n. sp. Antennae, palpi and legs testaceous (not reddish). Aedeagus (Fig. 8a, b) nearly ¼ of body length, moderately curved, the ratio tegmen/parameres more than 4, the median lobe short and broad, the parameres acute.

Holotype ♂ (BISHOP 11,843), IRIAN JAYA: NEW GUINEA (NW): Waris, S of Hollandia, 3°30′S, 140°55′E, 450–500 m, 1–31.VIII.1959, at light, T.C. Maa; allotype

 $\circ$  (BISHOP), same data as holotype. Paratypes: NEW GUINEA (NW):  $44 \circ 52 \circ$ , same data as holotype, mostly at light, 1 by sweeping (BISHOP, VERONA, MILANO);  $1 \circ$ , W Sentani, Cyclops Mts, Hollandia area,  $50{\text -}100 \text{ m}$ ,  $22{\text -}24.\text{VI}.1959$ , at light, Maa (BISHOP). (Fig. 18.)

Discussion. The species belongs to the novaeguineae group (see discussion of irianicus, n. sp.). It differs from Laccobius sp. A and novaeguineae, n. sp. by having elytral rows of punctures more uniform. From hollandiae, n. sp. it has rather slight external differences: the narrower apical region of body, the hind corners of pronotum more obtuse, the paler apices of elytra, and the greater distance between eyes; the aedeagus, however, is very characteristic.

## 9. Laccobius (Notoberosus) hollandiae Gentili, new species Fig. 9a, b; 19

Body length 2.4-2.9 mm; breadth 1.3-1.6 mm (holotype  $2.8 \times 1.5$  mm). Form similar to that of *photo-philus*, n. sp., but slightly broadened posteriorly.

Upper side dark, with greenish reflections and spots, the sides of pronotum and elytra, and apices of elytra scarcely testaceous. Labium and head shagreened and punctured; in frontal view, ratio between breadths of eyes to interocular distance about 0.7:1. Pronotum with conspicuous shagreen and punctures; ratio breadth-length nearly 2.2:1; the hind corners nearly 90°. Elytra with puncture rows differing little from each other. Underside dark, with characters like *photophilus*, n. sp. Antennae, palpi and legs testaceous. Aedeagus (Fig. 9a, b) nearly  $\frac{1}{5}$  of body length, broad, short, with narrow parameres.

Holotype & (BISHOP 11,844), PNG: NEW GUINEA (NE): Torricelli Mts, Sugoitei Vill, 900 m, 10–28.II.1959, W.W. Brandt; allotype ♀ (BISHOP), same data as holotype. Paratypes: NEW GUINEA (NE): 2♂,3♀, same data as holotype (BISHOP, VERONA); 1♀, Bainyik, S of Maprik, 150 m, 4.I.1960, Maa (BISHOP); IRIAN JAYA: NEW GUINEA (NW): 3♂,6♀, Waris, S of Hollandia, 3°30′S, 140°55′E, 450–500 m, 1–23.VIII.1959, light trap, T.C. Maa (BISHOP, VERONA). (FIG. 19.)

Discussion. Differs from photophilus, n. sp. by the broader and shorter aedeagus, very characteristic in the novaeguineae group; and by the hind corners of the pronotum being less obtuse, the darker apices of elytra, the posteriorly broadened body, the shorter interocular distance.

#### 10. Laccobius (Notoberosus) lucernaris Gentili, new species Fig. 14a-c; 20

Body length 2.8-3.3 mm; breadth 1.4-1.7 mm (holotype  $3.1 \times 1.6$  mm). Form elongate, oval, slightly convex.

Upper side dark, with green sheen and green spots, sides of pronotum and elytra, and apex broadly testaceous. Head and labium with uniform shagreen and punctures; in frontal view, ratio between breadths of eyes to interocular distance about 0.8:1. Pronotum with a faint shagreen and with uniform punctures; about  $2.5 \times$  as broad as long; sides almost uniformly curved. Primary and secondary elytral rows with punctures clearly differing in size; rows also regular and straight near scutellum and apex; near apex some punctures very large and deeply engraved. Elytra broadest in first ½, then narrower, with rounded apices. Underside dark, with V-shaped labium, 3 small notches on 3 labium, postlabium shagreened, large tooth on mesosternum. Aedeagus (Fig. 14a–c) 0.22 of body length, with a long tegmen and a short median lobe. Many specimens collected by T.C. Maa were in copula and showed parameres drawn closer as in Fig. 14c.

Holotype ♂ (BISHOP 11,845), IRIAN JAYA: NEW GUINEA (NW): Waris, S of

Discussion. The species belongs to the papuensis group (see discussion of *irianicus*). It is distinguished by the pattern of its aedeagus, the V-shaped labium, the regularly curved sides of pronotum, the clearly different primary and secondary elytral rows, and the singularly rounded apices of elytra.

#### 11. Laccobius (Notoberosus) wewaki Gentili, new species

Fig. 12a, b; 18

Body length 2.7–3.2 mm; breadth 1.45–1.7 mm (holotype  $2.7 \times 1.45$  mm). Form moderately elongate, oval, slightly convex.

Upper side dark, with green sheen and green spots, the sides of pronotum and elytra, and the apex narrowly testaceous. Head and labium with a shagreen more conspicuous before than behind the Y-suture, and with uniform punctures; in frontal view, ratio between breadths of eyes to interocular distance about 0.7:1. Pronotum with a faint shagreen and uniform punctures; about  $2.3\times$  as broad as long; sides, in vertical view, nearly straight, curved only in fore  $\frac{1}{3}$ . Elytra with clearly different primary and secondary rows of punctures, rows also regular and straight near scutellum and apex; broadest near center; with acute apices. Underside dark; notches on  $\delta$  labium scarcely visible; hind edge of labium V-shaped; postlabium micropunctate and with large punctures engraved; remaining characters as *lucernaris*, n. sp. Aedeagus (Fig. 12a, b) somewhat like *lucernaris*, n. sp., but with different parameres, rounded at apices and hollow at basis.

Holotype & (CAS), PNG: NEW GUINEA (NE): Nagam Riv, 28 km SE of Wewak, 6.VII.1969, Ira La Rivers; allotype  $\mathcal{P}$  (CAS), same data as holotype. Paratypes:  $\mathcal{S}\mathcal{P}$ , same data as holotype (CAS, BISHOP, VERONA). (FIG. 18.)

Discussion. The species belongs to the papuensis group (see discussion of irianicus, n. sp.); its distinctive characters are the pattern of the aedeagus, the V-shaped labium (like lucernaris, n. sp., but differing from novaebritanniae, n. sp., niger, n. sp., papuensis, n. sp.), the shagreen on pronotum (differing from Laccobius sp. B), the nearly straight sides of pronotum (differing from lucernaris, n. sp., niger, n. sp., papuensis, n. sp.), the clearly different elytral rows (differing from papuensis, n. sp., and novaebritanniae, n. sp.), the apices of elytra singularly acute (differing from lucernaris, n. sp., and other species).

#### 12. Laccobius (Notoberosus) novaebritanniae Gentili, new species Fig. 11a, b; 21

Body length 2.7–2.8 mm; breadth 1.5–1.6 mm (holotype  $2.7 \times 1.5$  mm). Form moderately elongate, oval, slightly convex.

Upper side dark, without green reflections and spots, sides of pronotum, elytra, and apex testaceous. Head and labium with uniform shagreen, and with punctures denser and larger behind Y-suture; in frontal view, ratio between breadths of eyes to interocular distance about 0.7:1. Pronotum with conspicuous shagreen and punctures; sides nearly straight, curved only in fore  $\frac{1}{3}$ ; about  $2.1 \times$  as broad as long. Primary and secondary elytral rows of punctures not so different, rows being not so regular apically as in the 3 preceding species; elytra broadest at basal  $\frac{1}{3}$ , with apices less rounded than in *lucernaris*, n. sp. Underside dark.  $\frac{3}{3}$  labium with 3 bright notches evident, the external ones with a stiff hair; hind border of labium straight. Postlabium and other features like *lucernaris*, n. sp. Aedeagus (Fig. 11a, b) similar to *novaeguineae*, n. sp., but with a narrower median lobe of different shape.

Holotype & (BISHOP 11,846), PNG: NEW BRITAIN: Upper Warangoi, 1250–1450 m, 5.XII.1972, J. Sedlacek; allotype  $\ \$  (BISHOP), same locality, 250–600 m, 28–30.XI.1962, Sedlacek. (Fig. 21.)

Discussion. The species belongs to the papuensis group but with some differences in the pattern of puncturation of elytral apex. Its aedeagus is characteristic; other features distinguishing it are the uniform black color without green, and the slight contrast between the primary and secondary elytral rows (see also papuensis, n. sp.).

#### 13. Laccobius (Notoberosus) niger Gentili, new species

Fig. 13a, b; 19

Body length 2.5–3.4 mm; breadth 1.3–1.7 mm (holotype  $2.7 \times 1.45$  mm). Form elongate, oval, slightly convex.

Upper side dark, with green sheen and green spots, the sides of pronotum and elytra, and the apex broadly testaceous. Head, labium and pronotum with uniform shagreen and punctures. In frontal view, ratio between breadths of eyes to interocular distance about 0.9:1; pronotum about  $2.1 \times$  as broad as long, with regularly curved sides. Elytra broadest near center, with regular rows of punctures, the primary clearly different from secondary; regular rows also persisting nearly to apices, which are rounded. Underside dark; notches on  $\delta$  labium scarcely visible; hind edge of labium straight; postlabium with large punctures and with or without shagreen. Other characters as in *Notoberosus* above; tarsi with approximate ratios 1:3:2:2:5; 3:5:5:4:7; 2:6:5:5:8. Aedeagus (Fig. 13a, b) nearly  $\frac{1}{4}$  of body length, with long basal piece and an exclusive shape of median lobe and parameres.

Holotype & (Bishop 11,847), PNG: NEW GUINEA (SE): Mt Lamington, 8°50′S, 148°08′E, 500 m, VI.1966, P. Shanahan & E. Lippert; allotype ♀ (Bishop), same data as holotype. Paratypes: NEW GUINEA (SE): 3 & ,14 ♀, same data as holotype (Bishop, Verona, Milano); 6 & ,9♀, Popondetta, 60 m, 30.VIII–4.IX.1963, J. Sedlacek, light trap (Bishop, Verona, Milano); 1 & , Peria Crk, Kwagira Riv, 50 m, 1–3.IX.1953, G.M. Tate, 4th Archbold Exped. (AMNH). (Fig. 19.)

Discussion. The species belongs clearly to the papuensis group and is identified by its aedeagus. Other minor differences, useful in the determination of the  $\Im$ , are the regular and alternately more and less engraved elytral rows, the regularly rounded sides of the pronotum, the straight hind edge of the labium, and the shagreen uniformly distributed on the head and pronotum.

#### 14. Laccobius (Notoberosus) papuensis Gentili, new species Fig. 15a, b; 20

Body length 2.7–3.2 mm; breadth 1.3–1.7 mm (holotype  $2.9 \times 1.4$  mm). Form elongate, oval, slightly convex.

Upper side dark, with green reflections and green spots, the sides of pronotum and elytra, and the apex broadly testaceous. Head, labium and pronotum with uniform shagreen and punctures. In frontal view, ratio between breadths of eyes to interocular distance about 0.7:1. Pronotum about  $2.2\times$  as broad as long; sides regularly curved. Elytra with regular rows of punctures, secondary almost as strong as primary, rows persisting also near the apex; broadest at basal  $\frac{1}{3}$ , then progressively narrowed, with rounded apices. Underside as in *niger*, n. sp.; the 3 notches on 3 labium, however, more conspicuous. Aedeagus (Fig. 15a, b) nearly  $\frac{1}{3}$  of body length; tegmen longer than parameres; median lobe quite different from other species of *Laccobius*.

Holotype ♂ (BMNH), PNG: NEW GUINEA (NE): Morobe Prov., Lae-Bulolo road, 28.XII.1964, ex dead leaves on mud bank, M.E. Bacchus; allotype ♀ (BMNH), same

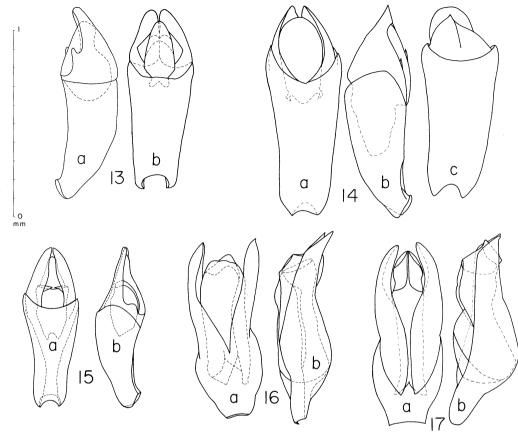


FIG. 13–17. Aedeagi. 13, Laccobius (Notoberosus) niger, holotype: a, ventral view; b, lateral view. 14, L. (N.) lucernaris: a, holotype, ventral view; b, holotype, lateral view; c, coupling position. 15, L. (N.) papuensis, holotype: a, dorsal view; b, lateral view. 16, L. (Macrolaccobius) sp. D (Lae-Bulolo road): a, dorsal view; b, lateral view. 17, L. (M.) sp. E (Bulem Riv, 64 km N of Lae): a, dorsal view; b, lateral view. All to scale.

data as holotype. Paratypes: NEW GUINEA (NE): 36, same data as preceding (BMNH, Verona, Milano); 1, Gurakor Crk, Lae-Bulolo road, 30.XII.1964, ex gravel banks, Bacchus (BMNH); 22, Buins Crk, 2.4 km W of Lae, 28.XII.1964, ex sand and gravel banks of clear fast river, Bacchus (BMNH, Bruxelles, Verona); 7, Lae, Singuawa Riv, 6°45′S, 147°10′E, 30 m, 4.IV.1966, O.R. Wilkes (BISHOP); 5, Lae, VIII.1944, F.E. Skinner (BISHOP). (FIG. 20.)

Discussion. The species is characterized by the aedeagus, which is more like that of Helochares minor d'Orch. than of other Laccobius; by the elytral punctures, in regular rows, with primary rows nearly like secondary (differing from niger, n. sp., wewaki, n. sp., lucernaris, n. sp., and Laccobius sp. B), without scattered punctures near scutellum and apex (differing from irianicus, n. sp., and novaeguineae group); by the uniformly curved sides of pronotum (differing from novaebritanniae, n. sp.).

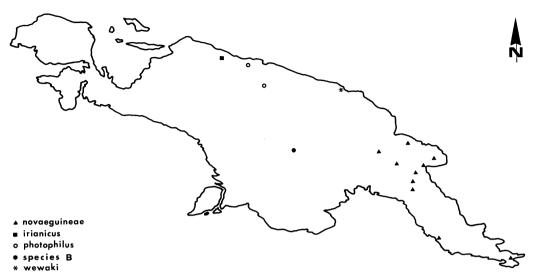


Fig. 18. Geographical distribution of Laccobius novaeguineae, L. irianicus, L. photophilus, L. sp. B, and L. wewaki.

## 15. Laccobius (Microlaccobius) roseiceps melanesiae Gentili, new subspecies Fig. 2a, c; 20; 21

Body length 1.8–2.5 mm; breadth 1.0–1.3 mm (holotype 2.0  $\times$  1.1 mm). Form oval, moderately elongate, slightly convex.

Head dark, with green or purplish metallic reflections, and 2 conspicuous pale spots before eyes; surface

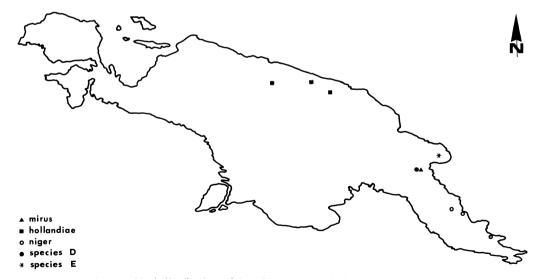


Fig. 19. Geographical distribution of Laccobius mirus, L. hollandiae, L. niger, L. sp. D, and L. sp. E.

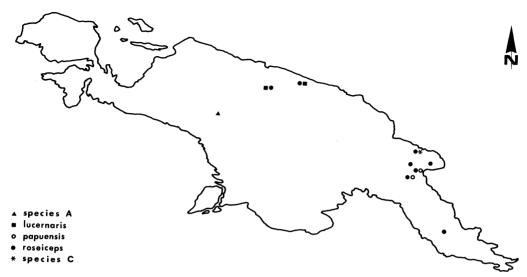


Fig. 20. Geographical distribution of Laccobius sp. A, L. lucernaris, L. papuensis, L. roseiceps melanesiae, and L. sp. C.

distinctly microreticulate at  $60\times$ , and with sparse feeble punctures behind Y-suture; in frontal view, ratio between breadths of eyes to interocular distance about 0.8:1. Pronotum yellowish, with a central dark spot reaching hind border, level of eyes, but not fore border; surface microreticulate, like head, with sparse and feeble punctures; about  $2.2\times$  as long as broad. Elytra smooth, shining, testaceous or yellowish, with nearly 20 rows of punctures, the primary more regular and with more punctures; around the punctures dark halos present, excepting sides and apex. Underside dark. Labium anteriorly curved, without specula

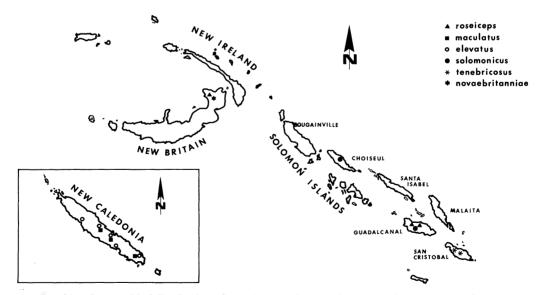


FIG. 21. Geographical distribution of Laccobius maculatus, L. elevatus, L. solomonicus, L. tenebricosus, L. novaebritanniae, and L. roseiceps melanesiae.

or notches, feebly sinuate in center. Postlabium smooth, with few faint punctures. Prosternum keel-shaped; mesosternum with a keel and a tooth on center of keel. Palpi, antennae and legs testaceous; mesofemora without tufts of hairs, metatibiae curved, tarsi with approximate ratios 1:2:2:1:3; 1:4:3:2:3; 1:4:3:2:3. Aedeagus (Fig. 2a, c) nearly ¼ of body length; tegmen longer than parameres; parameres acute at apices and longer than median lobe.

Holotype & (BMNH), SOLOMON IS: Guadalcanal: Kukum, 15.XII.1964, light trap, P.I.M. Greenslade; allotype ♀ (BMNH), Honiara, 18–19.IX.1953, J.D. Bradley. Paratypes: Guadalcanal: 1, same data as holotype (VERONA); 4, same data as allotype (BMNH, Verona); 1, Tambalia, 30 km W of Honiara, 21.V.1964, light trap, R. Straatman (BISHOP). IRIAN JAYA: NEW GUINEA (NW): 2, Waris, S of Hollandia, 3°30'S, 140°55′E, 450-500 m, 16-23.VIII.1959, at light, T.C. Maa (BISHOP). PNG: NEW GUINEA (NE): 1, Torricelli Mts, Siaute, sea level, 9-17.XI.1958, W.W. Brandt (BISHop); 2, Finisterre Mts, Naho Riv Val, Budemu, ca 1265 m, 15–25.X.1964, M.E. Bacchus (BMNH); 3, Markham Riv Val, Watarais, ca 133 km W of Lae, 305 m, 2.XII.1964, on wet mud round puddles, Bacchus (BMNH); 3, Bulem Riv, 64 km N of Lae, 30 m, 29.IV.1963, J. Sedlacek (BISHOP); 5, ca 12 km, Lae-Bulolo road, 26.XII.1964, ex gravel and grass roots on bank of small stream, Bacchus (BMNH); 35, Lae, 28.XII.1964, muddy gravel banks of large slow river, Bacchus (BMNH, VERONA, MILANO); 48, Lae-Bulolo road, 28.XII.1964, ex muddy gravel banks of small shaded stream, 30.XII.1964, ex gravel banks of small clear stream, much algae, Bacchus (BMNH, Bruxelles, Verona). PNG: NEW BRITAIN: 2, Malmalwan-Wunakanau, Gazelle Penin., 5-12.V.1956, J.L. Gressitt (BISHOP, VERONA). PNG: NEW GUINEA (SE): 1, Kokoda, NE of Port Moresby, 366 m, VIII.1933, L.E. Cheesman (BMNH). (Fig. 20, 21.)

Discussion. Differs from the nominate form, L. roseiceps Régimbart, 1903, of Indochina and India, by having smaller pale spots before the eyes, a larger and darker central spot on the pronotum, darker elytra, a smooth (not alutaceous) postlabium. In Melanesia, the only other species belonging to Microlaccobius is Laccobius sp. C; it differs from roseiceps melanesiae, n. ssp. by having the mesosternal tooth more robust, larger body size, and the head and pronotum lacking shagreen.

Acknowledgments. I wish to thank Dr G. A. Samuelson, Bishop Museum, for loan of material. For loan of material or other assistance, I thank Messrs M. E. Bacchus and P. M. Hammond (BMNH); Dr Masataka Satô (Nagoya); Dr Yorio Miyatake (Osaka); Dr D. H. Kavanaugh (CAS); Dr L. H. Herman, Jr. (AMNH); Dr R. Damoiseau (Bruxelles); Dr J. Krikken (Leiden); Mr I. Bucciarelli (Milano). Mr A. Bertocchi (Ganna, Italy) and A. Miramonti (Turbigo, Italy) are gratefully acknowledged for the drawings.