

A REVISION OF THE GENUS *PALORUS* (SENS. LAT.) (COLEOPTERA : TENEBRIONIDAE)

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SYNOPSIS

Keys to, and descriptions of, seven genera and fifty species are given. One genus is reinstated and two are raised from subgeneric rank. One new genus and twenty new species are described; one generic and eleven specific synonymies are made. The zoogeography of the species is discussed.

I. INTRODUCTION

BETLES of the genus *Palorus* and of the other genera included in this study belong to the family Tenebrionidae, tribe Ulomini.

Mulsant (1854) erected *Palorus* as a subgenus of *Hypophloeus* to contain *Hypophloeus depressus* Fabricius. Jacquelin du Val (1859-63), in his "Genera des Coléoptères d'Europe", gave *Palorus* full generic rank, placing *Hypophloeus depressus* Fabricius as the type and including *Hypophloeus ratzeburgii* Wissmann. Thomson (1859) described a new genus, *Caenocorse*, with *Hypophloeus depressus* Fabricius as type; *Palorus*, however, has priority. Champion (1896) gave brief systematic notes on the eight described species referable to *Palorus* and described a new one. Fleischer (1900) erected a subgenus, *Circomus*, to contain *Palorus subdepressus* (Wollaston). The only major work on *Palorus* since Champion is that of Blair

(1930) who dealt with the Indian species, erecting three new subgenera and describing twelve new species.

In the present revision subgenera are not used. Two of the subgenera of Blair, *Coelopalorus* and *Palorinus*, are raised to generic rank and one new species of *Palorinus* is described. The genus *Pseudeba* Blackburn, 1903, described originally in the Colydiidae and later synonymized with *Palorus* by Carter & Zeck (1937), is reinstated as a distinct Tenebrionid genus closely related to *Palorus*. Two new species of *Pseudeba* are described. The genus *Platyotus* Gerstaecker, 1871 is placed in synonymy with *Palorus*. One new genus, *Austropalorus*, containing two new species is described. The close relationship of the genera *Prolabrus* Fairmaire and *Astalbus* Fairmaire with *Palorus* (see Ardoin, 1959) is confirmed. The genus *Palorus* (sensu stricto of the present revision) currently contains 32 described species; 10 of these are here placed in synonymy, one species, *Palorus quadricollis* Fairmaire, is removed to *Tribolium* (p. 67) and 15 new species are described.

II. GENERIC AND TRIBAL RELATIONSHIPS

The seven genera *Palorus* Mulsant, *Pseudeba* Blackburn, *Austropalorus* gen. n., *Coelopalorus* Blair stat. n., *Palorinus* Blair stat. n., *Prolabrus* Fairmaire and *Astalbus* Fairmaire have the following characters in common which, combined, distinguish them from the other members of the tribe Ulomini :

- (1) Eyes entire and genae tangential to the eyes.
- (2) Antennae with poorly differentiated, five-segmented club.
- (3) Scutellum transverse and shaped as in Text-fig. 2.
- (4) Metendosternite without lamellae, form similar to that in Text-fig. 4i.
- (5) Males with ¹deep internal pits on the disc of one or more abdominal sternites.
- (6) Elytra striate-punctate.
- (7) Wing venation which could easily be derived from that of *Coelopalorus foveicollis* (Blair) (Text-fig. 55a) by reduction of the anal area.

In addition to these common characters, others are shared by two or more genera (see generic descriptions) and the larvae, where known (in *Coelopalorus* and *Palorus*) are almost identical in form. Because of the above similarities and their common general facies, it is suggested that these seven genera are closely related and they are subsequently referred to as " the *Palorus* genus group ".

The general facies of the genera *Lyphia*, *Latheticus*, *Tribolium* and *Hypophloeus* suggest that, of the seventy-four genera contained in the heterogeneous tribe Ulomini, these four are most closely related to the *Palorus* genus group. The following discussion is based on a knowledge of certain anatomical features (including genitalia, metendosternite and wing venation) of these four genera and of the external characters of the Ulomini in the collection of the British Museum (Natural History), in which a majority of the genera are represented.

The female styli in the genera *Austropalorus*, *Pseudeba*, *Palorus* and *Astalbus* are quite distinct from those of the other Ulomini seen by me. The styli of

¹ Deep pits on the underside of the cuticle, each connecting with the surface by a fine canal (Halstead, 1966).

Latheticus oryzae Waterhouse are basically similar, though very different in shape. The aedeagus, in which the basal piece is much shorter than the paramere tube (except in *Coelopalorus foveicollis*), is a distinctive feature, contrasting with the aedeagi of the other Ulomini studied, in which the converse is true. The form of the aedeagus in *Latheticus* is similar to that in *Coelopalorus foveicollis* but the 9th pleurites in the male are quite different. The metendosternite of the *Palorus* genus group differs from that of the other genera studied (except *Hypophloeus*) in that it lacks lamellae. In *Hypophloeus*, however, the stem is much longer than in the *Palorus* genus group.

Latheticus has an eye ridge very similar to that found in *Tribolium* (*castaneum* species group) and the form of the anterior region of the head is similar to that found in *Lyphia*. Hinton (1948) regards *Lyphia* and *Tribolium* as being very closely related genera. Hafeez & Gardiner (1964), on the basis of studies on internal anatomy, particularly the form of the malpighian tubules, place *Latheticus* very close to *Tribolium*. Larvae of *Tribolium*, *Latheticus*, *Palorus* and *Coelopalorus* have paired urogomphi and the margin of the 9th abdominal segment is without spinules. Paired urogomphi are found in many Ulomini but there are usually associated spinules on the margin of the 9th abdominal segment. The characters postulated by Hinton (1948) for the prototype of *Tribolium* (and *Lyphia*) would serve equally well for a common ancestor of the *Palorus* genus group and since, as has been described above, the genitalia of the latter indicate affinity with *Latheticus*, the following very speculative suggestions may be made :

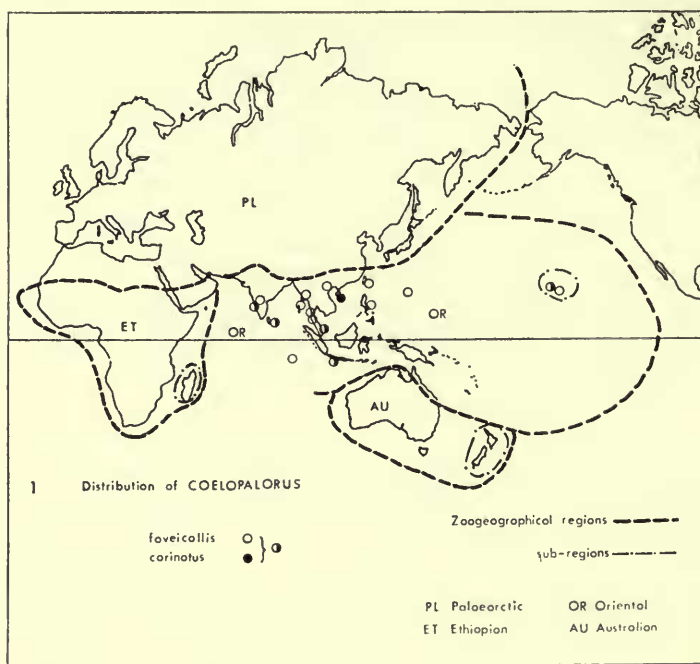
- (i) that *Tribolium*, *Lyphia*, *Latheticus* (World distribution) and the *Palorus* genus group (Old World distribution) shared a common ancestor prior to the development of the Atlantic rift at the beginning of the Cretaceous (Wilson, 1963), and
- (ii) that *Latheticus* diverged from the main line after *Tribolium* and *Lyphia* and before the divergence of the component genera of the *Palorus* group.

III. ZOOGEOGRAPHY

The species of the *Palorus* genus group are all small beetles, varying from 1.5 to 4.0 mm. in length, which, on the evidence of large wings and the frequent light trap records, are probably able to fly. The majority live under the bark of trees or in the galleries of wood-boring beetles but two species, *Palorus subdepressus* (Wollaston) and *Palorus ratzeburgii* (Wissmann), are commonly found in stored products and seven species, *Coelopalorus foveicollis* (Blair), *C. carinatus* (Blair), *Palorinus humeralis* (Gebien), *Palorus genalis* Blair, *P. cerylonoides* (Pascoe), *P. ficicola* (Wollaston) and *P. laesicollis* (Fairmaire) are found there also, but less frequently. Consequently these insects have three methods of dispersal across zoogeographical barriers. They may be carried on air currents associated with tropical storms, on logs or other vegetable materials floating in ocean currents or they may be transported by man in the course of his commercial activities. The distribution of members of the group in the Pacific area appears to be the result of one or more of these dispersal methods (see below).

The apparent absence of small beetles from a particular region may mean that collections have not been made there and distribution maps may reflect chiefly the activity of collectors. The zoogeography described here is inevitably subject to this limitation.

The *Palorus* genus group appears to be absent from the New World, only cosmopolitan species, those associated with stored food products, occurring there. The distribution of the members of this group is discussed under the four main Old World zoogeographic regions, the limits of which are shown in Map 1.



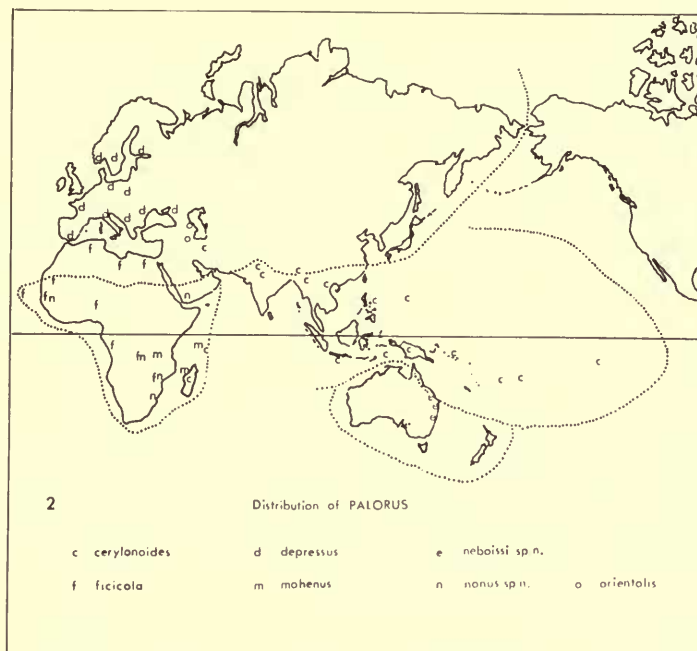
MAP 1. Distribution of *Coelopalorus*

Localities plotted: *foveicollis*, INDIA: Nilgiri Hills, Bangalore; CEYLON; BURMA: Toungoo, Tenasserim; MALAYA: Penang Is., Malacca; COCOS KEELING Is.; JAVA: Bantam; N. VIETNAM: Hoah Binh; FORMOSA: Kuraru; PHILIPPINES: Binalnea; GUAM Is.; OAHU Is.; HAWAII. *carinatus*, INDIA: Nilgiri Hills; CEYLON: Kandy; HAINAN: Tunchan; MALAYA: Pahang; JAVA; HAWAII (introduced).

1. Palearctic Region

Only the genus *Palorus* is represented in this region. Excluding the cosmopolitan *Palorus subdepressus* and *P. ratzeburgii*, and the widespread African species *P. ficicola*, only three species have been found in this vast region. One of these, *P. euphorbiae* (Wollaston), is known only from the Canary Islands. The distribution of the other two, *P. depressus* (Fabricius) and *P. orientalis* Fleischer, is plotted on Map 2.

Palorus euphorbiae, which is closely related to *P. ratzeburgii*, was recorded from four of the Canary Islands (Grand Canary, Tenerife, Hierro and Lanzarote) by Wollaston (1862, 1864, 1865) but recently (Lindberg, 1962) it has been found only on the uninhabited Alegranza and may no longer exist on the other islands.



MAP 2. Distribution of *Palorus*

Localities plotted: *depressus*; NORWAY; FINLAND; SWEDEN; POLAND: Warsaw; N. GERMANY; FRANCE; SPAIN: Gibraltar; SICILY; ITALY; YUGOSLAVIA; ROMANIA; CAUCASUS. *orientalis*, TRANSCAUCASIA (U.S.S.R.); IRAN. *ficicola*, EGYPT; LIBYA; ALGERIA; MAURITANIA; CAPE VERDE IS.; GUINEA; N. NIGERIA; CONGO: Elisabethville; ANGOLA; RHODESIA: Salisbury. *nanus* sp. n., GUINEA; CONGO: Elisabethville; RHODESIA: Salisbury; REPUBLIC OF SOUTH AFRICA: Natal; S. ARABIA: Dhala. *cerylonoides*, IRAN: Abadan; INDIA: Dehra Dun and Central Provinces, Bengal; ASSAM; BURMA; N. VIETNAM: Tonkin; PHILIPPINES; DAMMA IS.; NEW GUINEA; SOLOMON IS.; FIJI; SAMOAN IS.; MARIANAS IS.; MARIANAS IS.: Guam, Saipan; MADAGASCAR; SEYCHELLE IS. *nevoissi* sp. n., AUSTRALIA: Clermont (Q.), Brisbane (Q.), Dorringo (N.S.W.), Sydney (N.S.W.), Morgan (S.A.), Prospect (S.A.). *mahenus*, SEYCHELLES; MADAGASCAR; ZAMBIA.

Palorus depressus is distributed throughout Europe from the Mediterranean to northern Scandinavia (Map 2). In the southern part of its range it occurs most commonly under bark but in Scandinavia it is always associated with the ant, *Formica rufa* L. The Scandinavian form is usually smaller (mean length of 35 specimens was 2.7 mm.) than the general European form (mean length of 44 specimens was 3.0 mm.). It seems possible that this species was able to extend its range northwards to 62° lat. (limit indicated in Lindroth, 1960) only by developing

an association with *Formica*. The beetle is seldom myrmecophilous in Southern Europe.

The *Palorus* genus group is not indigenous to Britain. *Palorus ratzeburgii*, an importation, is established in food stores.

2. Ethiopian Region

Three genera, *Palorus* and the Madagascan genera *Prolabrus* and *Astalbus* are represented in the Ethiopian region. Most of the *Palorus* species occur in the rain forests of west and central Africa, but two are widespread. *P. ficicola*, which was originally described from the Cape Verde Is., extends into the southern Palaearctic (N. Africa) (Map 2). It is often associated with stored products in Africa and has been found in stored products in Asia. The distribution of *P. ficicola* in Africa may therefore be, to some extent, artificial. *P. nanus* sp. n. however, although widely distributed (Map 2), has not so far been found on stored products.

In Madagascar in addition to the endemic genera (which are related to the oriental genera *Coelopalorus* and *Palorinus*) there are two species of *Palorus*, *P. cerylonoides* and *P. mahenus* Gebien, which are also present in the Seychelles (Map 2). The oriental *cerylonoides* may have been imported by man but *mahenus* is present in Zambia and is probably more widespread in East Africa than at present known. The Malagasy insect fauna is considered to be derived from that of Africa but oriental affinities have been recorded in the mosquitoes (Mattingly, 1962) and the Laemphloeinae (Coleoptera) (Lefkovitch, 1964).

3. Oriental Region

Wallace's zoogeographical line (and other associated zoogeographical limits) do not appear to have significance for *Palorus* and its allies.

The distribution of the Indian species *Palorus sinuaticollis* Blair and *P. shoreae* Blair, and perhaps also that of *Coelopalorus foveicollis*, indicate that as far as this group is concerned Formosa should be retained in the Oriental region. Gressitt (1958) includes the higher mountains of Formosa in the Palaearctic region.

Both species of *Coelopalorus*, *C. foveicollis* and *C. carinatus*, are sometimes found associated with stored products in their native countries and are occasionally imported, alive, into Great Britain. The very wide distribution of these species (Map 1), particularly in the islands of the Pacific, may thus have been influenced by the activities of man. In Hawaii *Coelopalorus foveicollis* is well established, occurring in dead branches of *Acacia* etc., associated with wood-boring beetles. This species has been imported into Kenya and Trinidad.

Palorinus humeralis has a wide oriental distribution, though to date it has not been recorded further north than Ceylon. It extends through Malaya, Sumatra, Borneo and Java to New Guinea.

Palorus cerylonoides (Map 2) is sometimes associated with stored products in Japan and has been found on stored products imported into Great Britain from the Orient and, rarely, apparently from Africa. It has been caught in light traps, so

both wind (hurricanes etc.) and man (stored products and possibly silviculture) have probably been responsible for the wide distribution of this species.

4. Australian Region

Although north-eastern Australia is normally included in the Oriental region (as shown in the maps), for the present purpose the separation is not recognized.

The apparently endemic genera, *Pseudeba* and *Austropalorus*, appear to be confined to the northern perimeter of Australia (Derby to Townsville). The genus *Palorus* is represented in Australia by four known (and probably other undiscovered) endemic species and one, *P. laxipunctus* Fauvel, which occurs also in New Guinea and New Caledonia. The endemic Australian *Palorus* are morphologically similar to Palearctic and Pacific (Oriental) species. It seems probable that *P. laxipunctus* originated in New Guinea, as Papuan elements have been recognized in the faunas of Australia and New Caledonia.

New Zealand apparently lacks representatives of the genus group.

IV. THE GENUS *PALORUS*

This genus is the largest of the group with thirty-seven known species and probably many more await discovery. The species cannot be readily grouped on morphological grounds and therefore, although close relationships between certain species are manifest, grouping has not been attempted. Certain *Palorus* species exhibit sexual dimorphism of the genal margin (not found elsewhere in the genus group), most of the Indo-Malayan species and two (or three, if a unique male specimen is included) of the sixteen African species having more strongly developed genae in the male. The Oriental and Ethiopian regions contain the largest number of species and in each region there is an elongate sub-cylindrical species, *hypophloeoides* Blair (Oriental) and *acutangulus* sp. n. (Ethiopian), apparently evolved in association with the habitat provided by the galleries of wood-boring beetles.

V. *TRIBOLIUM QUADRICOLLIS* (FAIRMAIRE) AND SPECIES INQUIRENDAE

Tribolium quadricollis (Fairmaire) **comb. n.**

Palorus quadricollis Fairmaire, 1902, *Annls Soc. ent. Fr.* **71**: 331.

Tribolium dolon Hinton, 1948, *Bull. ent. Res.* **39**: 47, **syn. n.**

LECTOTYPE, present designation, ♀. MADAGASCAR: Andrahomana, bearing labels as follows: "Madagascar (Sud) Andrahomana Alluauud 1900 38/Palorus quadricoll. Fm n. sp. [Fairmaire's MS] TYPE [printed red cap's]" the right hand specimen of the pair, in the Paris Museum.

Paralectotype ♀ mounted on the same card as the lectotype.

This species is a member of the genus *Tribolium* and is conspecific with *Tribolium dolon* Hinton of which it is a senior synonym.

The holotype of *dolon* (length 5.3 mm. breadth 1.7 mm.) is larger than the syntypes of *quadricollis* (length 4.9 mm., breadth 1.4 mm. (both specimens)).

Palorus delicatulus Reitter, 1877, *Mitt. münch. ent. Ver.* 1 : 140.

Champion (1896) and Blair (1930) failed to recognize *Palorus delicatulus* Reitter. Champion noted that the type was represented solely by an abdomen and Blair said "It is doubtful whether it is a *Palorus* at all..." Reitter described *Palorus delicatulus* from India and said of the pronotum "ante basin foveolis punctiformibus minutis quatuor leviter impressis". I have not seen an Indian *Palorus* with this character. Specimens of *P. beesoni* Blair have been sent to me labelled "*P. delicatulus* Reitter".

Palorus shikhae Sarup, Chatterji & Menon, 1960, *Indian J. Ent.* 22 : 239.

Sarup, Chatterji & Menon (1960) described a new Indian species, *Palorus shikhae* and subsequently Chatterji, Sarup & Menon (1961) described secondary sexual dimorphism of the tarsi and hind tibiae in *P. shikhae*. The type material was unobtainable. The authors figure the whole beetle, antenna, mouth parts, male genitalia and (in the 1961 paper) tarsi and hind tibiae of both sexes. These figures bear no resemblance to the structures as found in the *Palorus* genus group and therefore I believe that *shikhae* can not be correctly assigned to the genus *Palorus* or to the other members of the *Palorus* group.

Platyotus glabratus Gerstaecker, see p. 80.

VI. SYSTEMATICS, KEY CHARACTERS AND INTRA-SPECIFIC VARIATION

The raising of Blair's subgenera, *Coelopalorus* and *Palorinus*, to generic rank is based primarily on their distinctive genitalia (see Text-figs. 4b-e, 49b-d, 55c-f, 56b-e) and is supported by head, elytral and other external morphological characters (see generic descriptions). If, however, genitalia alone are considered as being indicative of generic limits, the genera *Palorus*, *Pseudeba* and *Austropalorus* gen. n. form a single genus and the two species placed in *Coelopalorus* could represent two genera; a consideration of the external morphology of the species concerned (see key to genera and generic descriptions) clarifies the relationships and the reasons for the present arrangement.

Genae and pronotum frequently afford useful specific characters. Dorsal puncturation and micro-reticulation of interspaces are sometimes diagnostic, but intra-specific variation occurs. Ventrally the body is more or less uniform within a genus. Because of intra-specific variation, puncturation of the sclerites is only rarely useful as a key character. In *Palorus* and *Palorinus* the genitalia are of little or no use in separating closely related species.

Body length, pronotal form and genal development are subject to much intra-specific variation in certain species of *Palorus*. For example in *hypophloeoides* the body length varies from 2.1 to 3.2 mm., in *ficicola* pronotal form varies as in Text-figs. 16a-d and in *subdepressus* genal development varies as in Text-figs. 9a-g. In *Palorus carinicollis* (Gebien) and *Palorus crampeli* Pic the males bear genal horns which show striking size variation (see Text-figs. 5 and 6). This variation appears

to be allometric, being dependent on absolute body size, and in *carinicollis* is associated with development of a medial horizontal prominence of the pronotal apical margin (as in Text-fig. 5). This variation in genal and pronotal development in the male is similar to that found in the family Scarabaeidae (see Arrow, 1951).

VII. NOTES ON KEYS, DESCRIPTIONS AND LABELLING

In descriptions of species "length" is the distance from the anterior margin of the clypeus to the elytral apex, and "breadth" is the maximum elytral breadth. All measurements and ratios are given correct to the first decimal place. In a description of elytral interstitial puncturation "approximating to two rows" means that if the total puncturation is considered the majority of the punctures form that number of irregular longitudinal rows. Micro-reticulation was studied at a magnification of $\times 180$. Mandibles and labrum, although usually visible dorsally, have been omitted from figures except Text-figs. 1 and 2 where structures referred to in keys and descriptions are labelled.

All types designated or selected in this study have been labelled with the author's determination labels which have been given coloured borders as follows:

HOLOTYPE, red-bordered; PARATYPE, yellow-bordered; LECTOTYPE, violet-bordered; PARALECTOTYPE, violet and yellow-bordered.

"Standard B.M. (Nat. Hist.) type labels", used in description of labels, means circular red-bordered labels.

Abbreviations used for names of institutions etc., are as follows:

Ardoin Coll.	Collection of Monsieur P. Ardoin, Arcachon (20 Rue du Casino 20, Arcachon, Gironde, France).
B.M. (Nat. Hist).	British Museum (Natural History), London.
Frey Mus.	Museum G. Frey, Tützing.
Hung. Nat. Hist. Mus.	Természettudományi Múzeum (Hungarian Natural History Museum) Budapest.
Paris Mus. or Paris Museum	Muséum National d'Histoire Naturelle, Paris.
P.I.L. Coll.	Collection of the Pest Infestation Laboratory, Slough (London Road, Slough, Bucks, England).
S.A. Museum (abbreviation on museum label)	South Australian Museum, Adelaide.

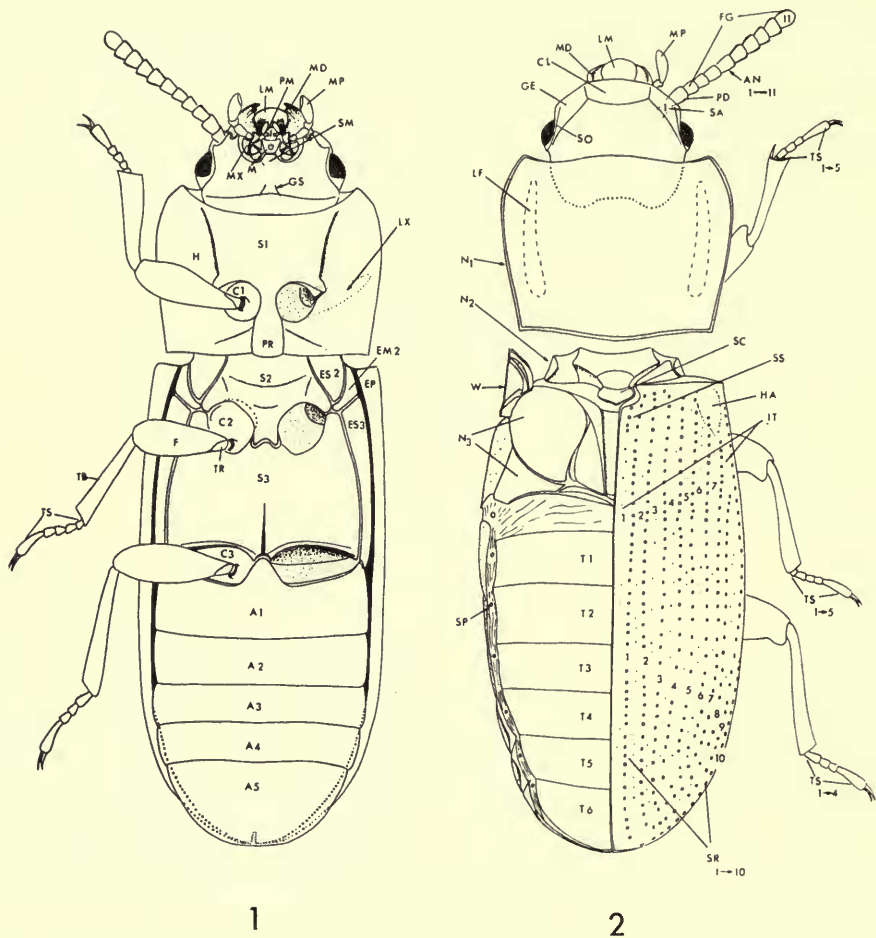
VIII. KEY TO GENERA

1	All elytral interstices carinate (Text-fig. 45a)	6
-	Elytral interstices not carinate or only interstice 7 carinate	2
2	Elytra with interstice 7 (humeral interstice) carinate (Text-fig. 54a) Oriental	
	COELOPALORUS Blair (p. 140)	
-	Elytra without carinae	3
3	Elytral interstices distinctly raised above striae (Text-fig. 53a); head form characteristic (Text-figs. 52a, 53a) Madagascar	
	PROLABRUS Fairmaire and ASTALBUS Fairmaire (p. 137)	
-	Elytral interstices not or slightly raised above striae; head form not as in Text-figs. 52a, 53a	4

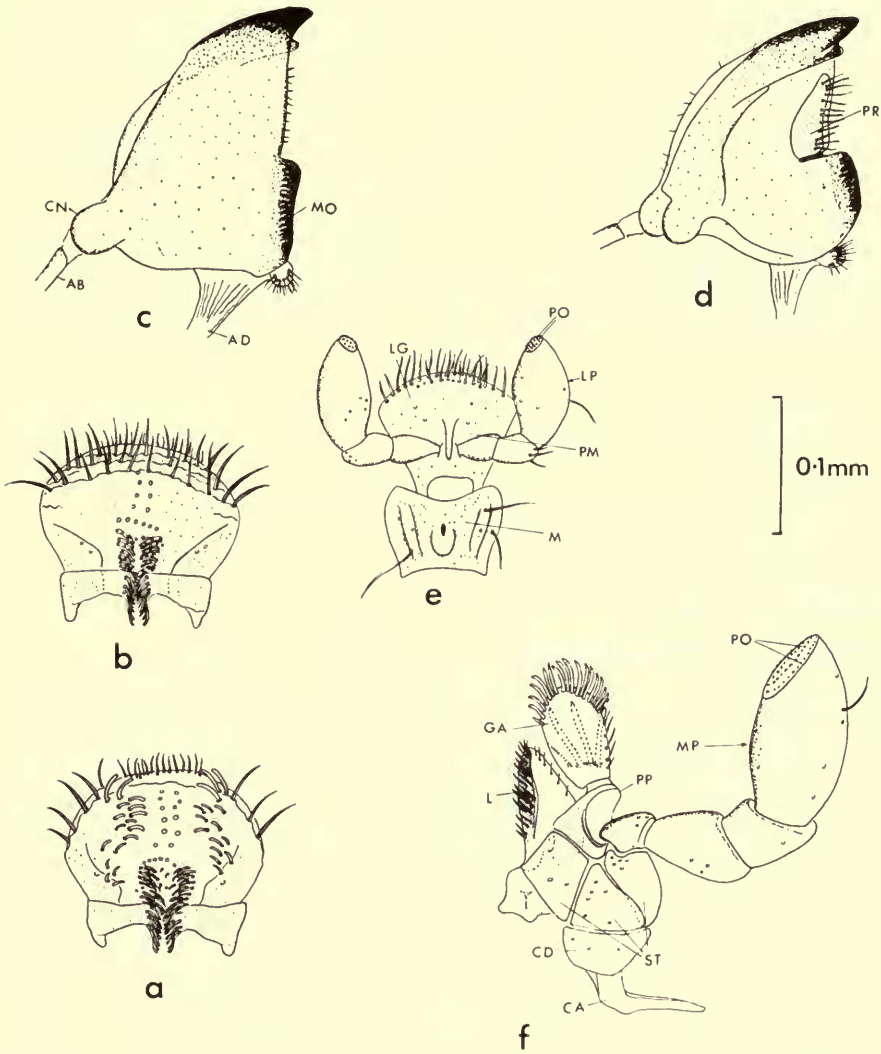
- 4 Anterior margin of clypeus obtusely angled laterally (Text-figs. 48a, 49, 50) ; head puncturation sometimes longitudinally rugose on vertex. Oriental

PALORINUS Blair (p. 132)

- Anterior margin of clypeus straight or emarginate, not obtusely angled laterally ; head never with longitudinal rugosity on vertex 5



FIGS. 1-2. *Palorus laeicollis* (Fairmaire). (1) ventral side, A 1-5, visible abdominal sternites ; C 1-3, pro-, meso- and metacoxae ; E S 2, E S 3, episternites of meso- and metasterna ; E M 2, epimerite of mesosternum ; E P, epipleuron of elytron ; F, femur ; G S, gular suture ; H, hypomeron ; L X, lateral extension of procoxa ; M, mentum ; M D, mandible ; M P, maxillary palp ; M X, maxilla ; P M, prementum ; P R, prosternal process ; S 1-3, prosternum, mesosternum and metasternum ; S M, submentum ; T, tibia ; T S, tarsus. (2) dorsal side, A N, antenna of 11 segments ; C L, clypeus ; F G, flagellum ; G E, gena ; H A, humeral angle of elytron ; I T, interstices ; L F, lateral fovea ; L M, labrum ; M D, mandible ; M P, maxillary palp ; N 1-3, pro-, meso- and metanota ; P D, pedicel ; S A, scape ; S C, scutellum ; S O, supra-orbital carina ; S P, spiracle ; S R, striae, 10 present ; S S, scutellary striae ; T S, tarsus ; W, wing base.



3

FIG. 3. *Palorus laesicollis* (Fairmaire). Mouth parts. (a, b) labrum, (a) ventral, (b) dorsal; (c) left mandible, dorsal; (d) right mandible, ventral; (e) labium, ventral; (f) maxilla, left ventral.

AB, tendon of abductor muscle; AD, tendon of adductor muscle; CA, cardo apodeme; CD, cardo; CN, condyle; GA, galea; L, lacinia; LG, ligula; LP, labial palp; M, mentum; MO, molar lobe; MP, maxillary palp; PM, prementum; PO, peg organs; PP, palpiger; PR, prostheca; ST, stipes.

- 5 Maxillary palps moderately securiform (Text-fig. 46b) ; antennae loosely articulated (Text-fig. 46a) ; head form as in Text-fig. 46. Australian
AUSTROPALORUS gen. nov. (p. 129)
- Maxillary palps elongate, not securiform (Text-fig. 3f) ; antennae compact (Text-figs. 13, 43a) ; head form rarely similar to that in Text-fig. 46 6
- 6 Dorsal margin of eye lower than side margin of head, not margined dorsally by a supra-orbital carina ; front of head flat ; elytra with interstitial punctures comparatively large, equal to one quarter to two thirds diameter of striae punctures, or with longitudinal carinae. Australian
PSEUDEBA Blackburn gen. rev. (p. 124)
- Dorsal margin of eye level with side margin of head (apical region may be concealed dorsally by gena), usually distinctly margined by a supra-orbital carina ; front of head flat or raised ; elytra with interstitial punctures usually much finer than striae punctures, elytra not carinate **PALORUS** Mulsant (p. 72)

IX. DESCRIPTIONS OF GENERA AND SPECIES, KEYS TO SPECIES

PALORUS Mulsant, 1854

Hypophloeus (*Palorus*) Mulsant, 1854, *Hist. nat. Col. France* 5, *Latigenes* : 250.

Palorus Mulsant ; J. du Val, 1859–63, *Genera Coléopt. Europe* 3 : 308.

Caenocorse Thomson, 1859, *Skand. Coleopt.* 1 : 117.

Eba Pascoe, 1863, *J. Ent.*, Lond. 2 : 129.

Platyotus Gerstaecker, 1871, *Arch. Naturgesch.* 37 (1) : 62, **syn. n.**

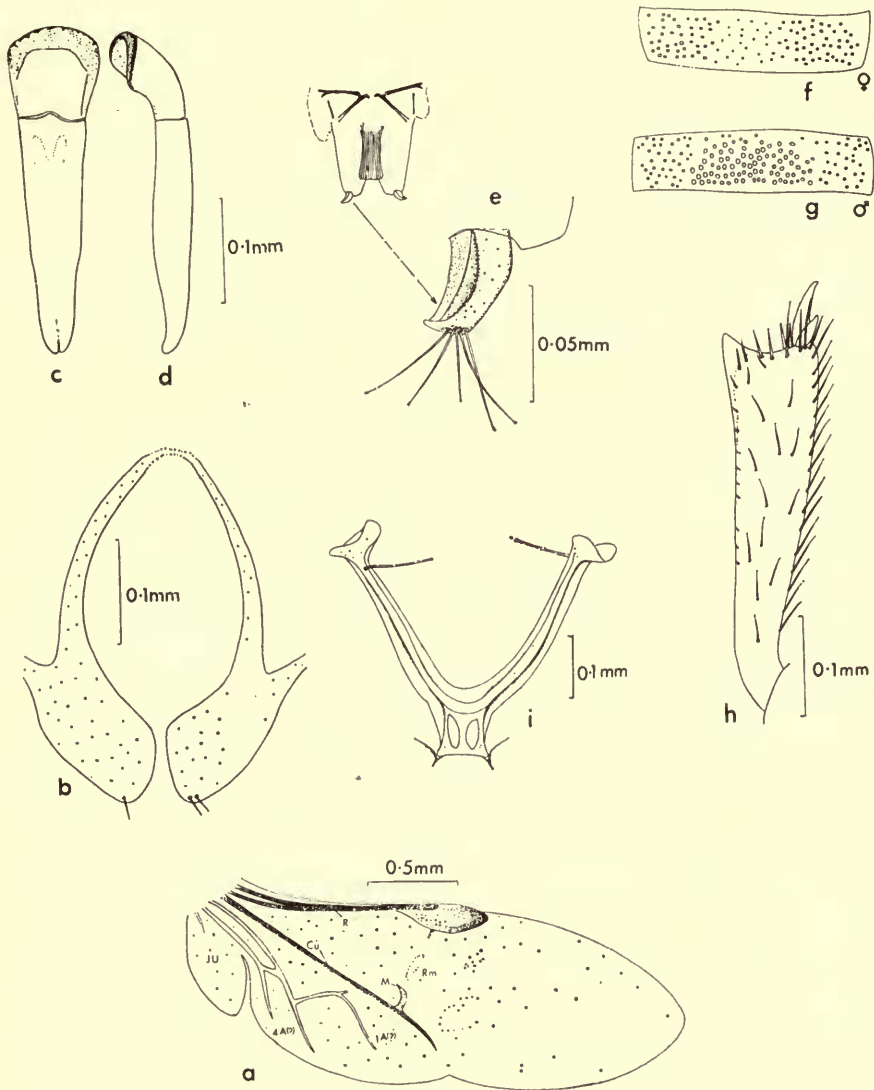
Type-species : *Hypophloeus depressus* Fabricius, 1790 (by monotypy).

Length 1.9–3.8 mm. ; body moderately depressed to cylindrical, brownish yellow to dark brown, often with head and pronotum slightly darker than elytra, strongly shining to dull ; cuticle with micro-reticulation varying from weak and ill-defined to strong and distinct.

Head. Usually moderately densely punctured ; clypeus flat or raised in middle, clypeo-genal sutures more or less distinct ; genae tangential to eye, often raised above level of clypeus, usually slightly raised above antennal insertions, often moderately produced antero-dorsally, sometimes forming horns in males ; eye latero-ventral, usually large, not emarginate, separated from dorsal surface of head by a supra-orbital carina and limited postero-laterally by small projection of head (see Text-figs. 23a–b). Antennae 11-segmented, rather compact and tightly articulated, inserted beneath genae ; scape usually concealed dorsally by genae, pedicel slightly longer than first flagellar segment, five apical segments forming very indistinct club. Labrum prominent, with dorsal, transverse ridges bearing rows of setae (Text-fig. 3b) ; mandibles with two apical teeth, slightly larger on right mandible than on left (Text-figs. 3c, d) ; mentum with two lateral ridges ventrally and a median protuberance bearing a puncture (? canal) ; labial palps with apical segment ovoid (Text-fig. 3e) ; lacinia without apical tooth or teeth or specialized setae (present in *Alphitobius*, *Tribolium*, etc.) ; maxillary palps with apical segment ovoid (Text-fig. 3f). [Description of mouthparts based on those of *laescollis* (Text-figs. 3a–f) which appear to be typical for genus ; detailed examination of all species was not possible.]

Thorax. Pronotum transverse to elongate, trapezoid (widest at base or apex), quadrate, rectangular, cordiform or with sides evenly arcuate, margined at base, sides and anteriorly on lateral sixth ; sublaterally with narrow almost vertical lenticular flat region (see Text-fig. 6b), lateral margins rarely narrowly explanate ; puncturation moderately dense, becoming coarser towards sides. Scutellum slightly angled apically, usually strongly transverse but only moderately so in cylindrical species (*hypophloeoides* and *acutangulus*). Prosternum with median process elongate, margined laterally and apically. Metendosternite (Text-fig. 4i) with stem short, almost quadrate, base narrow, lamellae absent, with tendons near apices. Procoxae with long, lateral, concealed extensions (Text-fig. 1) ; femora simple ; protibiae (Text-fig. 4h) with

apical external angle forming broad tooth, external margin with irregular row of fine setae ventrally, internal margin bearing row of long setae, internal apical angle with two articulated teeth, one large and one small; tarsal formula 5-5-4 in both sexes; tarsi simple, apical segment usually longer than combined basal segments, first segment of pro- and meso-tarsi very small.



4

FIG. 4. *Palorus laesicollis* (Fairmaire). (a) wing—1A, first anal vein?; 4A, fourth anal vein?; Cu, cubitus; Ju, jugum; M, media; R, radius; Rm, radio-medial cross vein. (b) pleurites of ♂ 9th abdominal segment; (c, d) aedeagus (c) dorsal (d) lateral view; (e) ♀ genitalia, stylus enlarged; (f, g) 2nd abdominal sternites (f) ♀, (g) ♂ (cleared preparations); (h) right tibia, ventral; (i) metendosternite.

Elytra. Free, covering abdomen, with more or less pronounced humeral angles, each elytron usually with 10 punctured striae and short scutellary striole; interstices with punctures smaller than striae punctures, forming 1, 2, 3 or, in *tenuipunctatus*, 4 irregular rows; epipleura inclined, tapered to apical eighth then narrow to apex. Wings well developed, venation reduced (Text-fig. 4a).

Abdomen. Tergites—6 visible but ill-defined; sternites—5 visible, in cleared preparations 2nd of female bearing fine and diffuse punctures on disc (Text-fig. 4f), that of male appearing to have large deep punctures (= internal pits) sometimes tending to form two patches (Text-fig. 4g).

Genitalia. ♂ with aedeagus (Text-figs. 4c, d; 15b; 23e; 37e; 38e) moderately sclerotized, composed of short basal piece, tubular at base, and long parameres fused dorsally and closed ventrally by narrow membrane, forming paramere tube, partially articulated with basal piece, and with slit-like opening apically; paramere tube distinctly tapered to apex (Text-fig. 23e), moderately tapered (Text-figs. 4c, d) or moderately or strongly sinuate (Text-fig. 15b); median lobe inconspicuous but short basal struts often visible within, and towards base of, paramere tube; pleurites of 9th segment (= 9th sternite of El-Kifl, 1953, in *Tribolium* spp.) forming sclerotized ring surrounding aedeagus, bearing few small setae basally (Text-fig. 4b), base more or less rounded, becoming membranous apically. ♀ with styli (Text-fig. 4e) sclerotized, bearing setae apically, and somewhat triangular in cross section, with dorsal edge carinate.

KEY TO SPECIES OF *PALORUS*

- | | | |
|---|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|
| 1 | Genal horns present (Text-figs. 5, 6) or genae petaloid (Text-fig. 8) | 37 |
| — | Genae not forming horns, not petaloid | 2 |
| 2 | Pronotum expanded anteriorly and somewhat globose, lateral margin narrowly explanate from basal to apical sixth (Text-fig. 19); antennae appearing very short (Text-fig. 19); length 2.2–3.0 mm. Ethiopian (Seychelles, Madagascar, Zambia) | <i>mahenus</i> Gebien (p. 96) |
| — | Pronotum not as above; antennae not appearing very short | 3 |
| 3 | Pronotum with lateral margins distinctly explanate (Text-fig. 27) and moderately to weakly rounded from base to apex; eyes large; length 3.1–3.7 mm. Ethiopian | <i>marginatus</i> sp. n. (p. 104) |
| — | Pronotum with lateral margins not distinctly explanate | 4 |
| 4 | Apical pronotal angles very strongly acute (Text-fig. 30); body elongate; genal breadth half that of clypeus; eyes large with small facets (Text-fig. 30); facies characteristic; length 2.8 mm. Ethiopian | <i>acutangulus</i> sp. n. (p. 108) |
| — | Apical pronotal angles not very strongly acute; other characters not present combined | 5 |
| 5 | Antennal length equal to or greater than pronotal length; pronotum cordiform or elongate (length 2.2–2.6 mm.) | 6 |
| — | Antennae not as long as pronotum, if nearly as long then pronotum not cordiform or elongate | 7 |
| 6 | Pronotum cordiform with a distinct fovea medially near base; puncturation sparse and fine; supra-orbital carinae ill-defined; antennae longer than pronotum (antennal length: pronotal length, 1:0.9); length 2.2–2.4 mm. Ethiopian (Text-fig. 15) | <i>nanus</i> sp. n. (p. 91) |
| — | Pronotum elongate, frequently with sides evenly arcuate, without a basal fovea; puncturation moderately dense; supra-orbital carinae very strongly developed; antennae as long as pronotum; length 2.2–2.6 mm. Canary Islands (Text-fig. 18) | <i>euphorbiae</i> (Wollaston) (p. 94) |
| 7 | Head with a median somewhat triangular depression producing two low pyramidal prominences traversing the frons (Text-fig. 29); pronotum elongate, apical angles strongly acute (Text-fig. 29); length 2.6–2.7 mm. Ethiopian | <i>baphiae</i> sp. n. (p. 106) |
| — | Head not as above; if pronotum elongate, apical angles not strongly acute | 8 |

- 8 Body cylindrical and elongate (Text-fig. 34a) ; male with frontal tubercles and genae with small projections at clypeo-genal suture ; female without tubercles or projections (though frons with two feebly raised areas) ; facies distinctive ; length 2.1-3.2 mm. Oriental *hypophloeoides* Blair (p. 114)
- Facies not as above 9
- 9 Pronotum with *deep* lateral longitudinal foveae (Text-figs. 13, 14) ; genae (Text-figs. 13, 14) not produced antero-dorsally to form a semicircular or somewhat triangular flange (or horns) 10
- Pronotum without deep lateral foveae or, if present, head with genae produced antero-dorsally to form a semicircular or somewhat triangular flange (or horns) (Text-figs. 5a-f) 11
- 10 Body more elongate and cylindrical ; pronotal foveae more elongate ; eyes larger, dorsal length equal to or slightly less than breadth of scutellum ; pronotum elongate to quadrate ; elytra more elongate, breadth : length, 1 : 2 ; length 2.2-2.5 mm. Ethiopian (Text-fig. 14) *bobiriensis* sp. n. (p. 90)
- Body less elongate, moderately depressed (Text-fig. 13) ; pronotal foveae usually less elongate (Text-fig. 13) ; eyes small, dorsal length approximate to two-thirds scutellum breadth ; pronotum transverse to quadrate ; elytra less elongate, breadth : length, 1 : 1.8 ; length 2.2-2.9 mm. Ethiopian *laescollis* (Fairmaire) (p. 89)
- 11 Pronotum widest near apex, without longitudinal shallow depressions (punctures of lateral third mostly separated by more than a puncture diameter) ; dorsal punctures without fine setae ; eyes very small, dorsal length equal to half breadth of clypeal margin ; supra-orbital carina very strongly developed, distinct from apex to base of eye (Text-fig. 23a) ; length 2.4-3.0 mm. Cosmopolitan in stored products, under bark in Europe *ratzeburgii* (Wissmann) (p. 96)
- Without above characters combined. Supra-orbital carina not very strongly developed, may be very distinct apically but not basally 12
- 12 Pronotum widest near apex, with lateral shallow depressions which are broad apically becoming obsolete at base, apical angles as in Text-fig. 25 ; head and pronotum coarsely and densely punctured, all dorsal punctures bearing fine setae ; elytra with comparatively broad lateral rim from base to apex (Text-fig. 25) ; eyes small, dorsal length equal to two-thirds of clypeal breadth ; length 2.8-2.9 mm. Australian *grossi* sp. n. (p. 102)
- If pronotum widest near apex, apical angles not as in Text-fig. 25 13
- 13 Pronotum broadest at or close to base (between basal quarter and base) (Text-figs. 10, 11, 12) ; body form as in Text-fig. 10 or 12 14
- Pronotum not broadest at or close to base, or body form not as above 16
- 14 Pronotal lateral apices obtuse, not produced to form distinct angle (Text-fig. 12), base strongly sinuate ; moderately dull ; body form as in Text-fig. 12 ; length 2.6 mm. Fiji *obtusus* sp. n. (p. 88)
- Pronotum with distinct apical angles (Text-figs. 10, 11), base almost straight to moderately sinuate ; shining ; body elongate-ovate, strongly convex (Text-fig. 10). Australian and Oriental (Pacific) 15
- 15 Larger species, usually longer than 2.8 mm. ; elytra longer, elytral length : pronotal length, 2.4-2.5 : 1 ; antennae shorter, antennal length : elytral breadth 1 : 2.1-2.4 (mean 2.3) ; lateral marginal rim of elytron usually much broader basally than at middle (Text-fig. 10). Australian and Oriental.
- Smaller species, length 2.4-2.8 mm. ; elytra shorter, elytral length : pronotal length 2.2-2.3 : 1 ; antennae longer, antennal length : elytral breadth, 1 : 2 ; lateral marginal rim of elytron only slightly broader basally than at middle ; (pronotal sides less convergent (Text-fig. 11) than in normal *laxipunctus* (Text-fig. 10)). Oriental *upoluensis* Blair (p. 88)

- 16 Pronotal apex very strongly sinuate (Text-fig. 35) ; large elongate-ovate species ; genae strongly raised above level of clypeus, those of male very prominent (Text-fig. 35a), of female moderately prominent (Text-fig. 35b) ; dull ; length 3.3-3.8 mm. Oriental *sinuaticollis* Blair (p. 115)
- Pronotal apex if appearing strongly sinuate then form not as above and moderately or strongly shining 17
- 17 Elytra with very distinct, long pubescence, strial setae twice as long as strial punctures (Text-fig. 36, inset) ; (pronotum distinctly pubescent, setae twice as long as punctures (Text-fig. 36, inset), moderately sinuate apically, apical angles strongly produced) ; length 2.8 mm. Oriental (Philippines) *kaszabi* sp. n. (p. 117)
- Elytra without very distinct long pubescence, if pubescent strial setae only slightly longer than strial punctures 18
- 18 Elytral interstices 2, 3 and 4 with at least three irregular rows of punctures, four in some regions (Text-fig. 41) ; pronotal apical angles as in Text-fig. 36, acute ; micro-reticulation between punctures of pronotum and elytra deep and dense (Text-fig. 41) ; dull ; length 2.8-3.0 mm. Oriental *tenuipunctatus* Blair (p. 122)
- Elytral interstices 2, 3 and 4, if with more than two rows of punctures (i.e. with three in some regions), pronotum not with apical angles as in Text-fig. 36 19
- 19 Large species, length 3.3-3.6 mm. ; pronotum almost quadrate and strongly convex but with disc depressed, basal rim distinctly lower than disc (Text-fig. 39a) ; distinct scutellary striole of 6-7 punctures ; (genae of male angular (Text-fig. 39a), of female straight to slightly rounded (Text-fig. 39b)). India *longifoliae* Blair (p. 122)
- Smaller species or, if as large, without the above characters combined, genae variable 20
- 20 Length 3.1-3.4 mm. ; pronotum transverse with very distinct pubescence (setae twice as long as punctures) ; dorsal eye length equal to or slightly greater than breadth of clypeal margin. Oriental *shoreae* Blair (p. 116)
- Length less than 3.1 mm. or, if 3.1 mm. or more and pronotum with distinct pubescence, dorsal eye length less than breadth of clypeal margin 21
- 21 Elytra short and broad, elytra : pronotum, 2.0-2.2 : 1, (Text-fig. 42a) ; pronotum darker than elytra ; margin of head above eye distinctly sinuate ; (male genae produced and angular (Text-fig. 42a), female genae with margin strongly thickened (Text-fig. 42b)) ; length 2.0-2.8 mm. Oriental *andrewesi* Blair (p. 124)
- Elytra not short and broad, without the above characters combined, genae variable 22
- 22 Elytral disc usually distinctly depressed (best seen at low magnification) ; pronotum with lateral longitudinal shallow depressions which, combined with the lateral vertically flattened regions, produce raised borders (Text-fig. 24) ; head as in Text-fig. 24 ; whole body moderately depressed ; length 2.5-3.2 mm. Australian *neboissi* sp. n. (p. 101)
- Elytral disc not distinctly depressed ; if pronotum with shallow lateral longitudinal depressions, head form (i.e. genae or eye size) not as in Text-fig. 24 23
- 23 Pronotum strongly transverse, breadth : length, 1.4 : 1 and somewhat rectangular (Text-fig. 28) ; vertex with a small median depression ; length 2.9-3.3 mm. Ethiopian *ardoimi* sp. n. (p. 106)
- Pronotum not strongly transverse, breadth : length ratio less than 1.4 : 1, if somewhat rectangular then vertex without a median depression 24
- 24 Strongly shining, small species 2.2-2.4 mm. ; pronotum appearing almost quadrate, apical angles as in Text-fig. 26 ("straight-obtuse"). Ethiopian *camerouniensis* sp. n. (p. 104)
- Larger species or if small and pronotum almost quadrate then not strongly shining and apical angles not as in Text-fig. 26 25
- 25 Clypeus raised medially and slightly higher than genae (Text-fig. 16a) (length

- 2·2–2·8 mm.) or if clypeus not raised medially then length 1·9–2·2 mm. and body moderately cylindrical 26
- Clypeus not raised medially or, if slightly raised, not higher than genae, body not moderately cylindrical; length 2·3–3·3 mm. 27
- 26 Clypeus raised medially and slightly higher than genae; body moderately elongate and depressed (length 2·2–2·8 mm.; breadth 0·8–0·9 mm.); pronotum with sides moderately to strongly convergent to base (often somewhat cordiform) and usually with a small lateral tooth near base (Text-figs. 16a–d); basal margin of pronotum not as in Text-fig. 17. Ethiopian (and associated with stored products from W. Africa and rarely from Asia) . . . *ficicola* (Wollaston) (p. 92)
- Clypeus not higher than genae; body moderately cylindrical and elongate (length 1·9–2·2 mm., breadth 0·5–0·6 mm.); pronotum more or less quadrate, sides subparallel or slightly convergent to base; basal margin of pronotum usually as Text-fig. 17, rarely with indentations ill defined. Oriental, and Madagascan subregions of Ethiopian. (Often associated with stored produce from the Orient—rarely in African produce) . . . *cerylonoides* (Pascoe) (p. 108)
- 27 Genal margin—(i) produced antero-dorsally forming a triangular (Text-fig. 38a, b) or rounded projection (Text-fig. 40), or (ii) produced anteriorly and angularly (Text-fig. 37b), or (iii) forming a slightly lenticular (Text-fig. 7) to semicircular (Text-fig. 5e) flange with hind margin produced posteriorly and covering a large apical fraction of eye, or (iv) genal horns (triangular to strongly tapered) present or genae petaloid (Text-figs. 5a–d, 6a–d, 8) 28
- Genal margin not produced but strongly (Text-fig. 38d) to slightly thickened or flat; not triangular, rounded, angular, forming a flange or horns or petaloid
- 28 Body moderately to strongly shining; lateral pronotal punctures without distinct setae; pronotum *may* be produced medially and *may* have deep lateral longitudinal foveae; genal margin as in couplet 27. (iii) or (iv) 37
- Body moderately shining to dull; pronotum laterally with distinct fine pubescence; pronotum not produced medially and without deep lateral longitudinal foveae; genal margin as in couplet 27 (i) or (ii) 35
- 29 Genal margin distinctly thickened, forming a low arcuate ridge (Text-fig. 38d); clypeus clearly differentiated from the genae, strongly shining and comparatively sparsely punctured; eye length equal to or (usually) greater than breadth of clypeal margin; length not greater than 2·6 mm.; pronotum not broadest towards apex, but with distinct fine setae. Oriental (sometimes associated with stored products) *genalis* Blair (♀) (p. 118)
- Genal margin slightly thickened or flat; without the above characters combined 30
- 30 Facies distinctive (Text-fig. 33); pronotum slightly cordiform; head flat anteriorly; micro-reticulation deep and very distinct (Text-fig. 33, inset); dull; length of holotype 2·5 mm. Australian . . . *reticulatus* sp. n. (p. 112)
- Facies not as in Text-fig. 33; head may be flat anteriorly; pronotum not somewhat cordiform; micro-reticulation variable; shining or dull 31
- 31 Clypeus distinctly differentiated from the genae, strongly shining and sparsely punctured; eye length less than breadth of clypeal margin; *either* length 2·3–3·2 mm. and pronotum coarsely and densely punctured laterally *or* length 3·1–3·3 mm. and elytral base broader than pronotal base. Palaeartic 32
- Clypeus not distinctly differentiated from the genae, approximately equally shining and only slightly less densely punctured; eye length greater than or slightly less than breadth of clypeal margin; pronotum not coarsely and densely punctured; length 2·3–2·9 mm. Not Palaeartic 33
- 32 Larger species, 3·1–3·3 mm.; pronotum somewhat quadrate, lateral third moderately densely punctured (punctures mostly separated by about or more than a puncture diameter) strongly shining, apical angles usually more strongly produced anteriorly (Text-fig. 21); elytra distinctly raised along sutural

- margin (at least on middle half) ; antennae slightly longer and broader ; eyes larger. Transcaucasia and Iran **orientalis** Fleischer (p. 100)
- Smaller species, 2.3-3.2 mm. ; pronotum usually distinctly transverse (rarely somewhat quadrate), lateral third coarsely and densely punctured (punctures mostly separated by much less than a puncture diameter—sometimes puncturation somewhat rugose), moderately shining to dull, apical angles less strongly produced anteriorly (Text-fig. 22) ; antennae shorter and narrower ; eyes smaller ; elytra usually not distinctly raised along sutural margin. Europe and Fennoscandia **depressus** (Fabricius) (p. 99)
33. Apical pronotal angles less obtuse, more strongly produced anteriorly (Text-fig. 31) ; eyes prominent ; side margin of pronotum (seen from side) very slightly raised from basal third or half (Text-fig. 31, inset) to base or straight from apex to base ; sides subparallel or very slightly convergent to base ; strongly to moderately shining ; length 2.2-2.6 mm. Australian **intermedius** sp. n. (p. 110)
- Apical pronotal angles more obtuse, less strongly produced anteriorly (Text-figs. 32, 37a) ; eyes variable ; side margin of pronotum (seen from side) usually moderately (Text-fig. 32 inset) or strongly raised from basal half or third to base (rarely almost straight) ; sides subparallel to distinctly convergent to base ; moderately shining to dull 34
34. Pronotum with more or less distinct, very shallow, lateral longitudinal depressions extending from approximately apical to basal fifth (Text-fig. 32) ; apical angles of pronotum obtuse, very weakly produced anteriorly ; eyes not prominent ; setae of lateral pronotal punctures usually not very distinct ; form more elongate (Text-fig. 32) ; length 2.3-2.8 mm. Oriental : Pacific (and North W. Australia) **austrinus** Champion (p. 109)
- Pronotum without lateral depressions ; apical angles of pronotum less obtuse (Text-fig. 37a) ; eyes usually prominent ; setae of lateral pronotal punctures usually very distinct ; form less elongate (more as in Text-fig. 31) ; length 2.2-2.9 mm. Oriental **beesoni** Blair (♂♀) (p. 119)
35. Eyes prominent with large facets ; pronotal sides moderately rounded from base to apex (Text-fig. 40) ; male genae rounded (Text-fig. 40), female unknown ; antennae comparatively long ; length 2.4 mm. (holotype). Oriental (Malay Peninsula) **auranteus** sp. n. (p. 121)
- If eyes prominent, pronotal sides not moderately rounded from base to apex ; genae not rounded ; antennae comparatively short. Oriental 36
36. Genae triangular (Text-fig. 38a, b) ; other characters as in couplet 29 (sometimes associated with stored products) **genalis** Blair (♂) (p. 118)
- Genae angled at clypeo-genal suture (Text-fig. 37b) **beesoni** Blair (♂, see also couplet 34) (p. 119)
37. Pronotum transverse, laterally with deep, or well-defined shallow, longitudinal foveae (in male, anterior pronotal margin with median horizontal apical prominence of variable size (Text-figs. 5a-d), or sinuate as in female) ; male genae forming horns of variable size which (seen from side) have distinct angle above eye (Text-fig. 5b-d) ; female genae semi-circular, maximum expansion equal to twice dorsal breadth of eye (Text-fig. 5e) ; usually strongly shining ; Length 2.4-3.1 mm. Ethiopian **carinicollis** (Gebien) (p. 79)
- Pronotum laterally without deep longitudinal foveae but ill-defined, shallow, depressed areas may be present ; genal horns, when present, without a distinct angle above eye (Text-figs. 6b-d) 38
38. Metatarsal segment ratio, apical segment : basal segments, not greater than 1.5 : 1 ; pronotal apical margin slightly to moderately sinuate 39
- Metatarsal segment ratio greater than 1.5 : 1 (i.e. 1.7-1.8 : 1) ; male with pronotal apical margin produced horizontally and medially ; genae petaloid (Text-fig. 8) ; length 2.7 mm. Ethiopian **longitarsus** sp. n. (p. 85)

- 39 *Mesosternum* very strongly longitudinally rugose (i.e. medial interspaces raised and confluent forming longitudinal rounded ridges, mostly extending from apex to base of mesosternum); pronotum quadrate to slightly transverse; head with vertex always comparatively high with moderately deep depression at base; male with genal horns of variable size (Text-figs. 6a-d), margin of horn continuous with supra-orbital carina (i.e. without an angle above eye); female genal expansion (maximum) equal to or slightly greater than dorsal breadth of eye (Text-figs. 6e, f); length 2.5-3.1 mm. Ethiopian *crampeli* Pic (p. 81)
- *Mesosternum* sometimes with coarse and rugose puncturation but not longitudinally rugose; pronotum transverse; head with vertex usually comparatively low but variable (Text-fig. 9a-b), basal depression usually shallow; genae not sexually dimorphic, never as strongly developed as *crampeli* in males but sometimes approaching the form of *crampeli* in females (Text-fig. 9g); length 2.7-3.0 mm. Almost Cosmopolitan (in stored products); apparently indigenous to Ethiopian region (Text-fig. 7) *subdepressus* (Wollaston) (p. 82)

***Palorus carinicollis* (Gebien) comb. n.**

(Text-figs. 5a-e)

Platyotus carinicollis Gebien, 1907, *Mems. R. Soc. esp. Hist. nat.* **1**: 405.

Palorus diversicornis Pic, 1924, *Mélang. exot.-ent.* **41**: 26, **syn. n.**

? *Platyotus glabratus* Gerstaecker (see p. 80).

Length 2.4-3.1 mm.; breadth 0.7-1.1 mm.; usually dark brown, sometimes with dark pronotum and lighter elytra, usually strongly shining; micro-reticulation variable, usually shallow and often distinct on pronotum.

Head. ♂. Genae produced into triangular to strongly tapered horns of variable size (apparently dependent on absolute size of individual) (Text-figs. 5a-d), forming distinct angle above eye (seen from side); eyes large but apical region covered dorsally by horns to greater or lesser extent and appearing small; a distinct depression on each side of head and at base of vertex forming a somewhat triangular region at front of head.

♀. Genae (Text-fig. 5e) well developed, forming rounded semicircular flange-like prominences; eyes large but apical region covered by genae and appearing small dorsally; maximum dorsal breadth of eye equal to half or less of maximum genal expansion; with distinct depression at base of vertex but lateral depressions not as deep as in male although usually distinct.

Pronotum. Transverse, normally with deep lateral longitudinal foveae but sometimes only with moderately shallow but distinct depressions; in ♂ anterior margin produced horizontally in midline to a greater or lesser extent dependent on absolute size of individual, rarely only sinuate (Text-figs. 5b, c, and d); in ♀ anterior margin sinuate (Text-fig. 5e); anterior angles strongly produced anteriorly.

Elytra. Interstitial puncturation rather confused and variable but usually approximating to double rows on interstices 2, 3 and 4.

LECTOTYPE of *carinicollis* Gebien, present designation, ♂. GABON: Nkogo, bearing labels as follows: "♂/Congo Francese Nkogo XII 1902 L. Fea [blue label]/*Platyotus carinicollis* Geb./Cotype No. 47 [orange label]", Frey Mus.

Paralectotype of *carinicollis* Gebien, ♂ GABON: Fernan Vaz, bearing labels as follows: "♀ [but is ♂]/Congo Francese Fernand-Vaz IX-X 1902 Fea/Cotype No. 47 [orange label]", Frey Mus.

LECTOTYPE of *diversicornis* Pic, present designation, ♂. SIERRA LEONE, bearing labels as follows: "Sierra Leone/*Palorus diversicornis* n. sp." (Pic's MS), Paris Mus.

Paralectotypes of *diversicornis* Pic, two examples, SIERRA LEONE, labels in Pic's manuscript, Paris Mus.

Distribution. Ethiopian. GUINEA: N'Zérékoré and Kindia region. SIERRA LEONE. GHANA: Sunyani. TOGOLAND: Bismarckburg. CAMEROUN: N'Kongsamba. SPANISH GUINEA: N'Kolentangan. GABON (see type designation above). CONGO: Haut Uélé; Ifuri; Elizabethville. ANGOLA.

Habitat. Dr. G. H. Thompson collected this species in Ghana under the dry loose bark of a dead tree (*Ficus exasperata* Vahl) heavily attacked by bark beetles (Scolytidae) and with many species of Ambrosia beetle (Platypodidae) in the wood.

***Platyotus glabratus* Gerstaecker, 1871, Arch. Naturgesch. 37: 62.**

Platyotus glabratus was described from Ugono (Zanzibar) by Gerstaecker (gen. nov. sp. nov.). Gebien (1907) when describing *Platyotus carinicollis*, stated that he

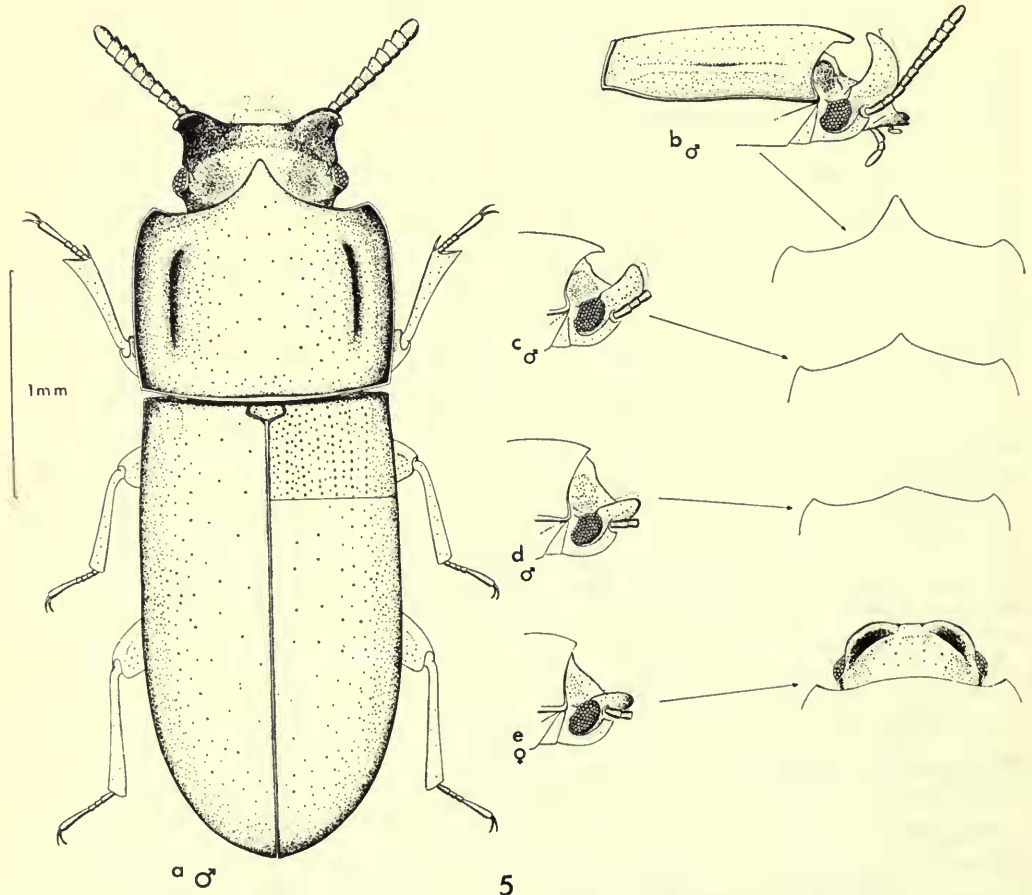


FIG. 5. *Palorus carinicollis* (Gebien). (a) ♂; (b) head and pronotum side view, pronotal apex dorsal view—all of (a); (c, d) ♂, head side view, pronotal apex side and dorsal view; (e) ♀, head and pronotal apex side and dorsal view.

did not know *glabratus* but that Gerstaecker did not mention anything suggestive of the characteristic features of the prothorax or the basal impression of the elytral stria such as are found in *carinicollis*. I believe, however, that the possibility of *glabratus* and *carinicollis* being synonymous cannot be ruled out altogether. I have failed to get the type material of *glabratus* and am therefore unable to place *Platyotus glabratus* Gerstaecker.

I would like to thank Dr. F. Hieke of the Zoological Museum, Humboldt University, for the trouble he has taken in searching through the Gerstaecker collections for me.

Palorus crampeli Pic

(Text-figs. 6a-f)

Palorus crampeli Pic, 1924, *Mélang. exot.-ent.*, **41** : 26.

²*Palorus crampeli* var. *bicornutus* Pic, 1924. *Ibid.*

Length 2.5-3.1 mm. ; breadth 0.9-1.1 mm. ; brown to dark brown, usually strongly shining ; micro-reticulation very shallow and indistinct, absent or almost absent on pronotum.

Head. ♂. Genae produced into triangular to strongly tapered horns of variable size dependent on absolute size of individual (Text-figs. 6a-d), horns continuous with supra-orbital carinae (not angled before meeting carinae) ; supra-orbital carina and outer edge of gena forming a straight line ; eyes large, only a small region covered dorsally by genal horn ; vertex with shallow but distinct depression on each side and shallow depression at base.

♀: Genae only moderately produced, shape somewhat variable, dependent on breadth of head (Text-figs. 6e, f) ; shallow but usually distinct depression at base of vertex ; eyes generally large, separated ventrally by 2.4-2.8 diameters ; maximum dorsal breadth of eye equal to or very slightly less than maximum genal expansion.

Pronotum. Quadrate to transverse ; anterior margin only slightly sinuate in both sexes ; sides almost parallel ; towards sides rarely with shallow, ill-defined, longitudinal depressed areas. Mesosternum very strongly longitudinally rugose.

Elytra. Slightly more elongate than in *carinicollis* (Text-figs. 5a and 6a) ; interstitial puncturation somewhat variable and confused, puncturation of interstice 3 and frequently of 2 approximating to a single row.

LECTOTYPE, present designation, ♂. CENTRAL AFRICAN REPUBLIC : Ft. Crampel, bearing labels as follows : " Fort Crampel Congo-Français Coll. Le Moulst Naturaliste, Paris/Coll. K./Palorus ou voisin/Palorus crampeli n. sp. " (the latter two labels in Pic's MS) Paris Museum.

Comparative notes. Antennae slightly longer and pronotum more elongate than in *carinicollis*. Longitudinal rugosity of mesosternum slightly stronger than in *carinicollis*. Colour usually darker than in *subdepressus*. See also key and comparative notes on *subdepressus*.

Distribution. Ethiopian. GUINEA : Fouta Djallon and Kindia regions. SIERRA LEONE. GHANA : Mpraeso. CENTRAL AFRICAN REPUBLIC (lectotype). ETHIOPIA. UGANDA : Budongo.

Habitat. A specimen from Uganda was found in Scolytid borings in mahogany.

² The var. *bicornutus* of Pic is a ♂ *P. crampeli* Pic.

Palorus subdepressus (Wollaston)

(Text-figs. 7, 9a-g)

Hypophloeus subdepressus Wollaston, 1864, *Cat. Col. Ins. Canaries B.M.* : 499.*Palorus subdepressus* (Wollaston) Champion, 1896, *Entomologist's mon. Mag.* **32** : 27.*Palorus bifoveolatus* Baudi (nec Duftschmidt). Syn. teste Champion, 1896, *Entomologist's mon. Mag.* **32** : 27.*Palorus (Circomus) subdepressus* (Wollaston) ; Fleischer, 1900, *Wien. ent. Ztg* **19** ; 236.*Palorus subdepressus* (Wollaston) was frequently confused with *P. depressus* (Fabricius) by early European entomologists.

Length 2.7-3.0 mm.; breadth 0.9-1.0 mm.; red-brown, moderately shining; microreticulation shallow but usually distinct.

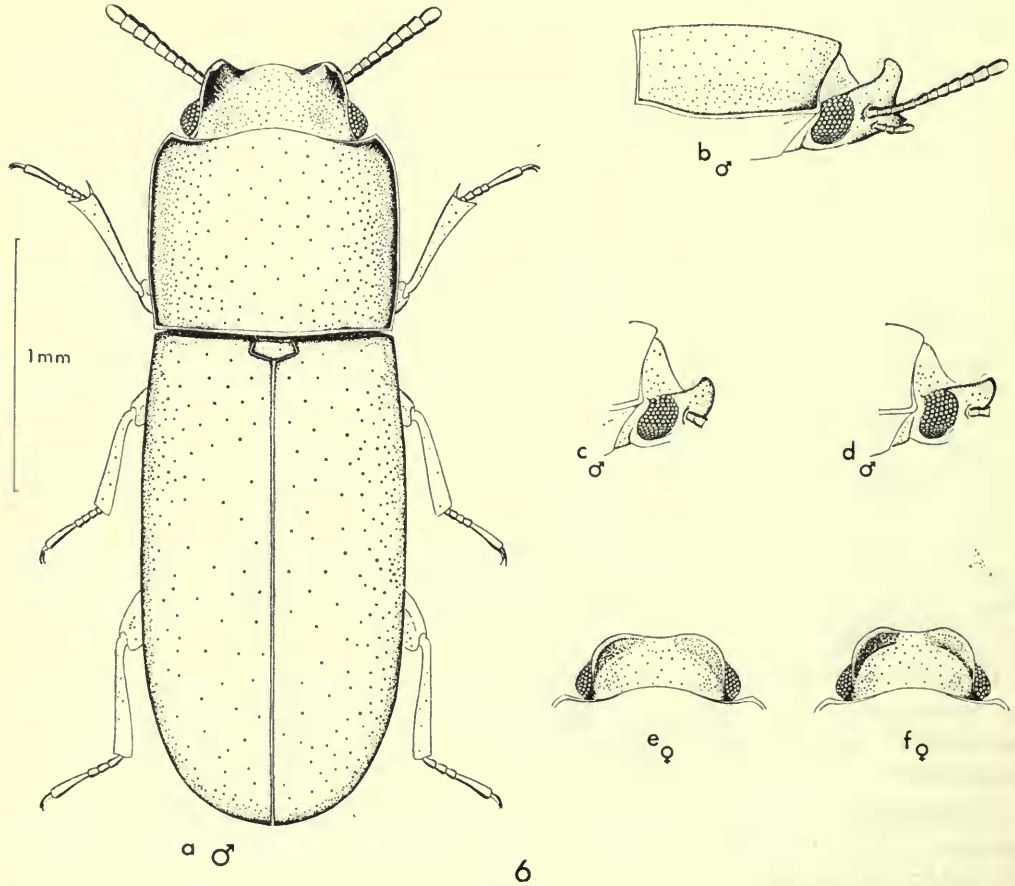
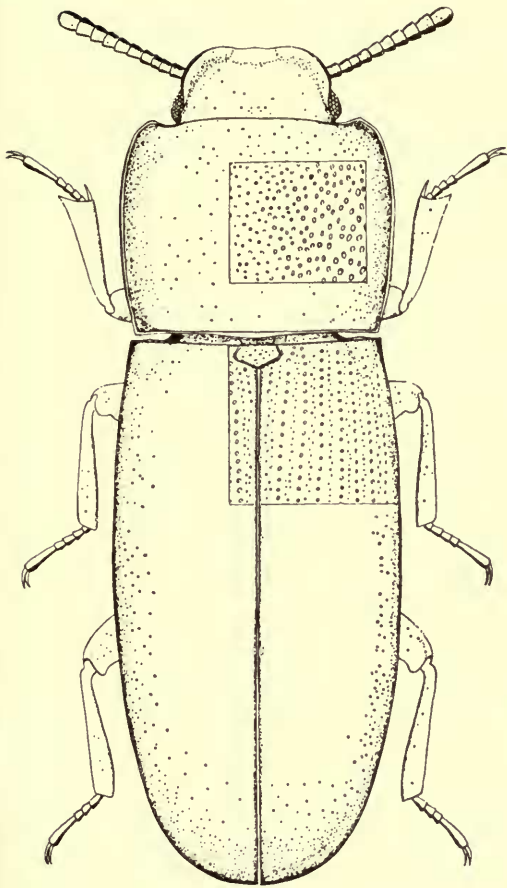
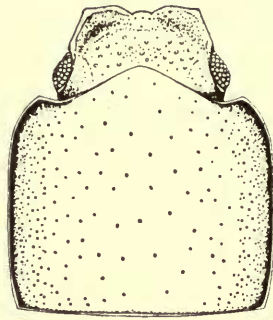


FIG. 6. *Palorus crampeli* Pic. (a) ♂ ; (b) head and pronotum of (a) side view ; (c, d) ♂, head and pronotal apex side view ; (e, f) ♀, head and pronotal apex dorsal view.



7



8

FIGS. 7, 8. 7, *Palorus subdepressus* (Wollaston). 8, *Palorus longitarsus* sp. n., head and pronotum.

*Head.*³ Usually with more or less distinct shallow median depression towards base—see Text-figs. 9a–g, profile outline; genae raised above clypeus, developed to a greater or lesser extent independently of sex or head size (Text-figs. 9a–g, dorsal), posteriorly produced back-

³ Text-figs. 9a–g.

The form of the head is variable, the depth of the depression at the base of the vertex, the development of the genae and the eye size varying as shown in Text-fig. 9. The figures were drawn from photographs (dorsal and ventral views to the same scale, profile to a larger scale) and are of specimens from the following localities: 9a, ♀, from culture P.I.L., Slough (stock from Mersin, S. Turkey); 9b, ♂, Sarawak, Sarikei, in spillage of rice etc., (P.I.L. Coll.); 9c, ♂, "Tangier/G.C. Champion Coll. B.M. 1927–409" (B.M. (Nat. Hist.)); 9d, ♀, "Exped. Mus. G. Frey Franz. Guinea 1951 W. Afr. leg Bechyne/Région Kindia Seguía 10.5.51". (Frey Mus.); 9e, ♂, N. Nigeria, on *Sorghum* (P.I.L. Coll.); 9f, "Salisbury Mashonald Dec. 1900 GAKM. [under card mount]/Marshall Coll. 1911–263" (B.M. (Nat. Hist.)); 9g, ♂, "Leopoldville Belg. Kongo G. Frey 1. 1952" (Frey Mus.).

The magnitude of difference between heads a, b and f, g is very great, suggesting specific difference but intermediate forms exist between these (heads c, d, e).

wards covering apical region of eyes to a variable extent and continuous in a straight line with supra-orbital carinae ; eyes variable in size, separated ventrally by 2.7-4.1 diameters (Text-figs. 9a-g, ventral).

Pronotum. Transverse, sides slightly rounded to almost parallel ; larger specimens sometimes with very shallow, ill-defined, lateral longitudinal depressions ; a very small impunctate

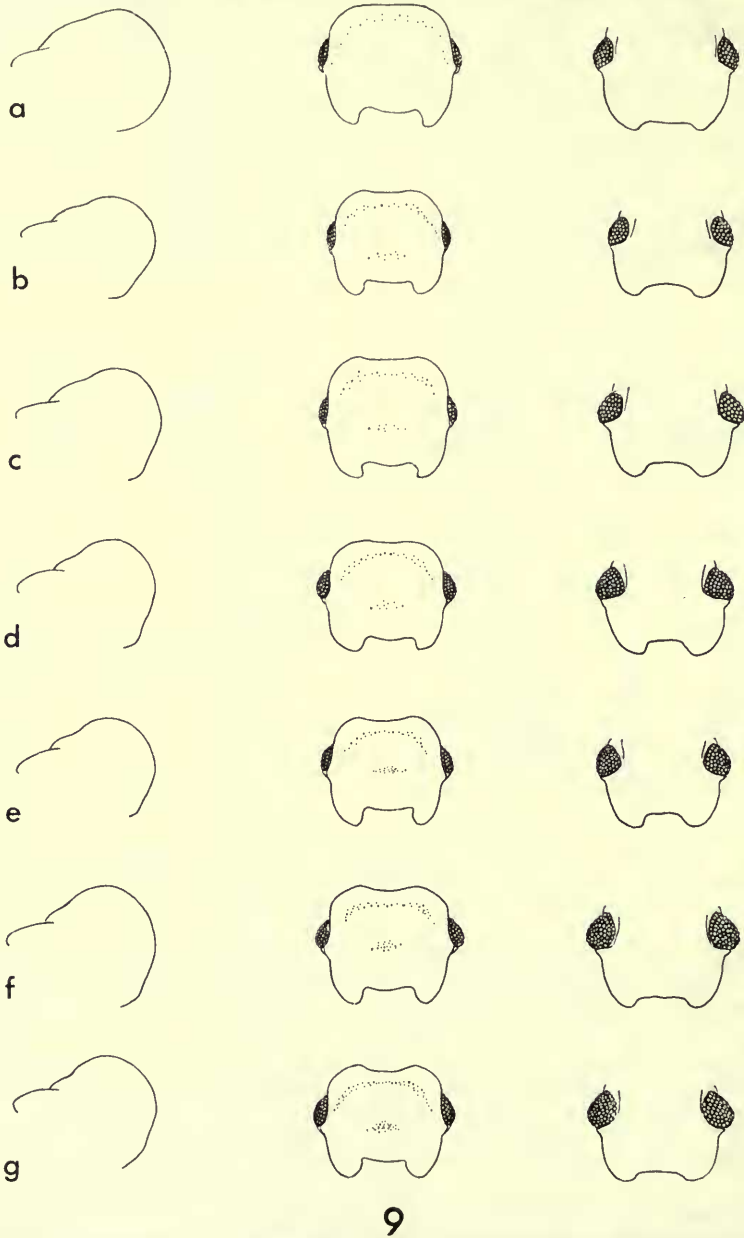


FIG. 9. *Palorus subdepressus* (Wollaston). (a-g) heads, profile, dorsal and ventral views (latter to show eyes) (see p. 83).

region on either side on basal half is often present. Mesosternum usually with coarse, rarely rugose but not longitudinally rugose, puncturation.

Elytra. Very slightly depressed.

Holotype in British Museum (Nat. Hist.)

The cosmopolitan *P. subdepressus* of stored-products usually has a head form similar to that illustrated in Text-figs. 9a and b, i.e., eyes tend to be small and genae poorly developed. African *P. subdepressus* from the field and from stored-products in West Africa have head forms as illustrated in Text-figs. 9c-g, i.e., eyes tend to be large and genae well developed. In any one series from an African locality a large part of the range can be seen. The holotype, collected under camel dung in the Canary Is., approximates to Text-figs. 9b-c in head form.

Comparative notes. The form of the genae (i.e. forming a flange covering part of the eye and continuous with the supra-orbital carina) separates this species from all others except females of the African species *crampeli* and *carinicollis*. Female *carinicollis*, however, have genae more strongly developed than in *subdepressus* and usually distinct lateral pronotal foveae. *P. subdepressus* is not always easily distinguished from female *crampeli* on head characters but may be separated on characters of the mesosternum—see key. In addition, *subdepressus* is usually only moderately shining whereas *crampeli* and *carinicollis* are usually strongly shining.

Distribution. Cosmopolitan—in stored products. The forms with larger eyes appear to be restricted to Africa.

P. subdepressus probably originated in Africa, judging from the close relationship with *carinicollis* and *crampeli* and the apparent lack of closely related forms elsewhere in the world.

Habitat. In Africa *subdepressus* has been collected at light in large numbers and a colleague, Mr. J. M. Lyall, has collected it under bark of *Parkia*? stumps in Nigeria with other *Palorus* species. Beeson, in Blair (1930), includes *subdepressus* in a list of species collected in the forest (India), definitely under or on the bark of trees attacked by bark beetles or sapwood borers. The under-bark habitat must be the natural one. The Indian record, above, seemingly represents a return to the natural habitat from stored products.

In stored products *P. subdepressus* is a secondary pest frequently associated with the grain weevil, *Sitophilus*. Hence it is most frequently recorded on cereals and cereal products, often in spillage. Other commodities on which *subdepressus* has been found are ginger, groundnuts, copra, illipe nuts etc.

***Palorus longitarsus* sp. n.**

(Text-fig. 8)

♂ (♀ unknown). Length 2.7 mm.; breadth 1.0 mm.; dark brown, pronotum strongly shining; elytra moderately shining; micro-reticulation shallow and indistinct.

Head. Genae petaloid (Text-fig. 8) and elevated above level of clypeus; clypeus and frons strongly shining, clypeus with a few small punctures; frons towards vertex with a few large punctures (see Text-fig. 8); vertex with strong sparse puncturation and a large, moderately deep depression; eyes large.

Pronotum (Text-fig. 8). Somewhat transverse, anterior margin produced horizontally; puncturation strong and dense, punctures separated by one diameter or less, finer on projection. Mesosternum with large punctures but not longitudinally rugose.

Elytra. Strial punctures large and deep (deeper than in the related *crampeli* and *carinicollis*); interstitial punctures fine and shallow, puncturation somewhat confused, approximate to at most two rows in interstices 2 and 3, and one in 4.

Legs. Apical segments of tarsi long, metatarsal apical segment nearly equal to twice length of three basal segments, apical segment : basal segments, 1.8 : 1 (basal segments measured from dorsal basal notch of basal segment to apex of third segment); tibiae comparatively short, ratio of length of metatibia and metatarsus, 1.3 : 1.

Holotype ♂ (dissected). CAMEROONS: Victoria, bearing labels as follows: "N.W. Kamerun Holiwe, b. Victoria" in the Hungarian Natural History Museum, Budapest.

Comparative notes. The form of the genae and the pronotum readily distinguish this species from other *Palorus*. This species, however, probably exhibits allometric growth, as seen in *crampeli* and *carinicollis*, and these characters may therefore prove to be variable.

Palorus laxipunctus Fauvel

(Text-fig. 10)

Palorus laxipunctus Fauvel, 1904, *Revue. Ent.* **23** : 176.

Achiosus pygmaeus Carter, 1914, *Trans R. Soc. S. Aust.* **38** : 225, **syn. n.**

Palorus pygmaeus (Carter) Carter, 1926, *Aust. Zool.* **4** : 136.

Length 2.8–3.1 mm. (one syntype, see below, 2.6 mm.); breadth 1.2–1.4 mm.; elongate-ovate (Text-fig. 10); red-brown, shining; micro-reticulation shallow but distinct; punctures of head and pronotum sometimes with quite distinct setae.

Head. Moderately densely punctured, punctures separated by 1–2 diameters; genae forming more or less distinct prominences, in large males similar to *genalis*, usually raised above level of clypeus; eyes large and protuberant; antennal length : elytral breadth, 1 : 2.1–2.4 (mean 2.3).

Pronotum. Widest at base, transverse, length : maximum breadth, 1 : 1.4–1.5; sides moderately convergent to approximately apical fifth then curved to apex; apical angles obtuse but sharply defined; basal margin slightly sinuate, slightly expanded in the middle (less so than in *upoluensis*); transversely very convex.

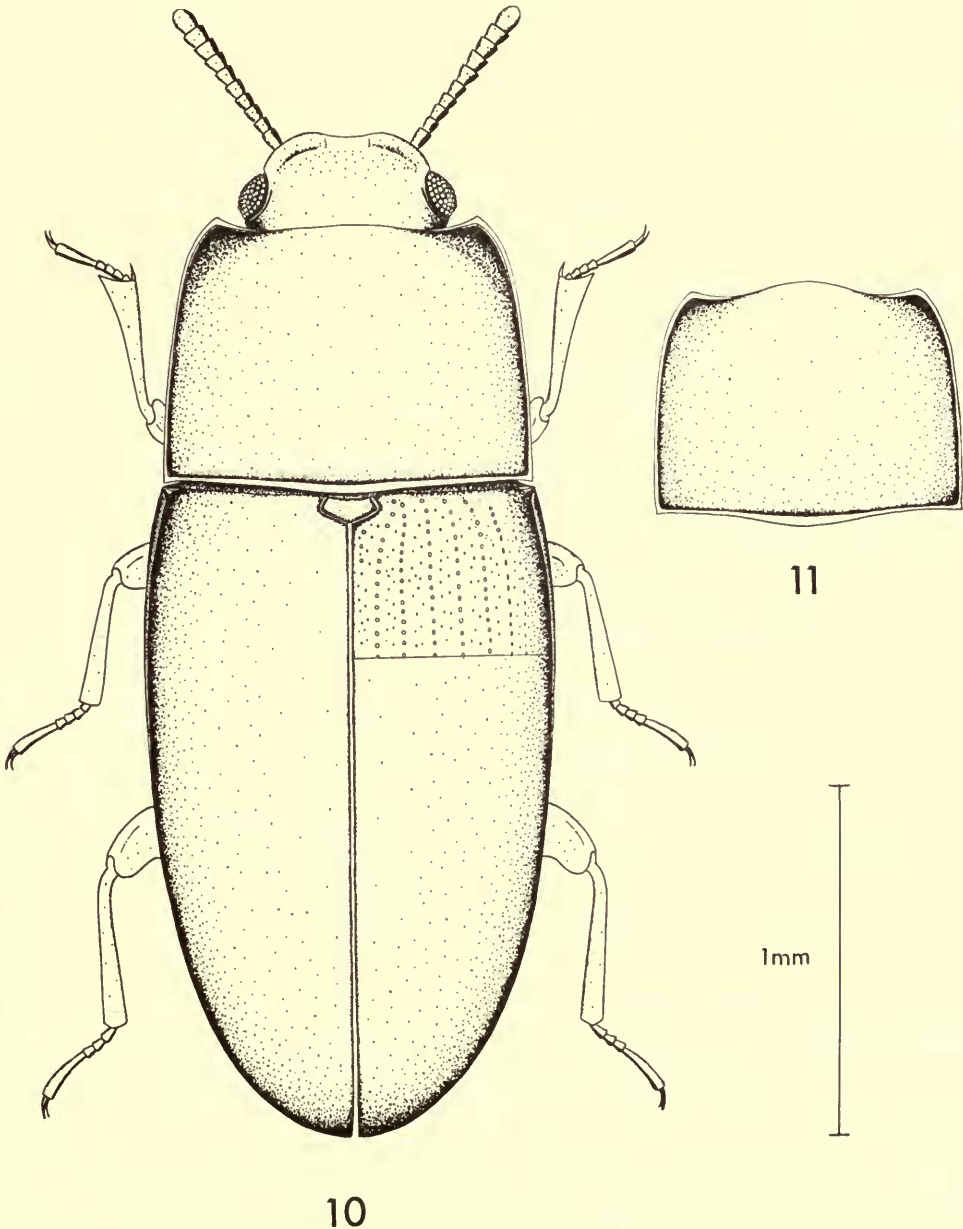
Elytra. Elytral length : pronotal length, 2.4–2.5 : 1; side margin usually much broader basally than at the middle (seen best with light directed onto side of elytron); interstitial puncturation somewhat confused but approximating to two rows in interstices 2–4; scutellary striae ill-defined, represented by three to six punctures, often all indistinct; strial punctures moderately deep (slightly deeper in Australian than in New Caledonian type specimens).

LECTOTYPE, present designation, ♀. NEW CALEDONIA : Noumea, bearing a label as follows: "Noumea F" (Fauvel's MS), left hand specimen of the pair, in the collection of Fauvel in the Institut Royal des Sciences Naturelles de Belgique, Bruxelles.

Paralectotypes, three: the right hand specimen on the same mount as the lectotype, a specimen without data, and one labelled "Baie du Sud" (Fauvel's MS (a type locality for *laxipunctus*) which does not agree well with Fauvel's description. This specimen is abnormally small for the species (length 2.6 mm.) and has

the head flat anteriorly but I believe that it is conspecific with the rest of the type material.

Holotype of *pygmaeus* (Carter) is in the South Australian Museum, Adelaide. I have not seen this specimen but have seen most of the "cotypes" (paratypes).



FIGS. 10, 11. 10, *Palorus laxipunctus* Fauvel. 11, *Palorus upoluensis* Blair, pronotum.

Mr. Gross of the South Australian Museum has kindly compared paratypes seen by me with the holotype and confirmed their conspecificity.

Comparative notes. The wide pronotal base combined with size, convexity and the elongate-oval, compact form readily distinguish this Australian *Palorus*. The species *upoluensis* has the same general facies but is smaller and has the middle of the pronotal basal rim more strongly expanded (see Text-figs. 10 and 11, and the key for other diagnostic characters).

Distribution. AUSTRALIA: "coastal" Queensland and N.S. Wales, NEW GUINEA and NEW CALEDONIA.

Palorus upoluensis Blair

(Text-fig. 11)

Palorus upoluensis Blair, 1928, *Insects Samoa* 4: 75.

Length 2.4–2.8 mm.; breadth 1.0–1.1 mm.; facies, puncturation and micro-reticulation similar to that of *laxipunctus*; brown, shining.

Head. More or less rounded anteriorly, some specimens have genae slightly prominent anteriorly; genae slightly raised above level of clypeus; antennal length: elytral breadth, 1:2 (comparatively longer than in *laxipunctus*).

Pronotum (Text-fig. 11). Widest at base, usually slightly less transverse than in *laxipunctus* and with sides usually more distinctly convergent to approximately apical fifth then curved to apex; apical margin slightly sinuate; anterior angles obtuse but sharply defined; basal margin sinuate, expanded in the middle.

Elytra. Facies as in *laxipunctus* but shorter, elytral length: pronotal length, 2.2–2.3:1; side margin not much broader basally than at middle.

Holotype in British Museum (Nat. Hist.)

Comparative notes. This somewhat variable species is very closely related to *laxipunctus*—see key and *laxipunctus* "Comparative notes" for separation.

Distribution. Oriental (Pacific Area). N. MOLUCCAS, NEW GUINEA, MOA IS. (off N. Coast of Australia), NEW BRITAIN, SOLOMON IS. and SAMOAN IS.

Habitat. It has been collected under dead bark and at light in Samoa and at light in New Britain.

Palorus obtusus sp. n.

(Text-fig. 12)

♂ (♀ unknown). Length 2.6 mm.; breadth 1.1 mm.; red-brown, moderately dull; micro-reticulation distinct.

Head. Moderately densely punctured, punctures separated by one diameter or less and bearing setae; clypeus slightly lower than genae; genae very slightly raised along margin; eyes large and prominent; supra-orbital carina distinct.

Pronotum. Moderately transverse, length: maximum breadth 1:1.3, widest towards base; moderately densely punctured, towards sides punctures bearing long fine setae (length nearly twice the diameter of the larger punctures); apical margin straight; apical angles very obtuse, somewhat rounded; sides slightly convergent to apex; basal margin distinctly sinuate (see Text-fig. 12) slightly broader in the middle.

Elytra. Scutellary striole not differentiated; interstitial puncturation confused, approximating to one or two rows.

Holotype ♂. FIJI ISLANDS: Lovonivonu, bearing labels as follows: "Fiji Is. Lovonivonu 7. vi. 1924 Dr. H. S. Evans/1672.24", B.M. (Nat. Hist.).

Paratype ♂. NEW HEBRIDES: Malekula, bearing labels as follows: "New Hebrides: Malekula, Ounua iv. v. 1929 Miss L. E. Cheesman: B.M. 1929-37", B.M. (Nat. Hist.)

Comparative notes. The obtuse rounded apical angles of the pronotum, the narrow medial region of the basal margin and its form distinguish this species from the rather similarly shaped *upoluensis*.

Palorus laesicollis (Fairmaire)

(Text-figs. 2a, b, 3a-f, 4a-i, 13)

Hypophloeus laesicollis Fairmaire, 1893, *Annls Soc. ent. Belg.* **37**: 28.

Palorus laesicollis (Fairmaire) Blair, 1930, *Indian Forest Rec.* Ent. Ser. **14** (5): 136.

Palorus (*Coelopalorus*) *laesicollis* (Fairmaire); Gebien, 1940, *Mitt. münch. ent. Ges.* **30**: 766.

Length 2.2-2.9 mm.; breadth 0.8-1.0 mm.; brown, head and pronotum darker than elytra, moderately shining; micro-reticulation variable (usually more distinct than in *bobiriensis* sp. n.).

Head. Supra-orbital carina moderately pronounced; eye small, dorsal length approximately equal to two-thirds to one half of scutellum breadth.

Pronotum. Quadrate to transverse; laterally with deep longitudinal foveae, deepest towards or at middle (rarely shallower than illustrated, Text-fig. 13); basal margin weakly sinuate.

Elytra. Breadth: length, 1: 1.8; single rows of interstitial punctures.

Genitalia as in Text-figs. 4b-e.

Comparative notes. By means of the deep pronotal foveae this species is readily separated from all others except the closely related *bobiriensis* sp. n., which, however, is more elongate and has comparatively larger eyes than *laesicollis*.

LECTOTYPE, present designation, sex indet. ETHIOPIA: Shoa, bearing labels as follows: "Choa [Fairmaire's MS]/72 [printed]/*Hypophloeus laesicollis* Fairm 1892 Choa [Fairmaire's MS]", Paris Mus.

Fairmaire's description in "Note sur les Coléoptères du Choa" does not include a particular type locality nor the number of specimens on which the description was based.

Distribution. Ethiopian. ETHIOPIA: Shoa and Djem-Djem Forest; KENYA, widely distributed in the Highlands (6-9000 ft.) on stored produce on farms, Messrs C. W. Coombs and J. A. McFarlane (personal communications).

Habitat. Under bark of *Mimosa*, both dead and living trees (Djem-Djem Forest). In Kenya, where it has been found only in stored produce, *laesicollis* occurred on kibbled (broken) maize cob core, broken maize, oats (4 years in store) and other detritus, often in very large numbers and usually associated with other stored products beetles, particularly *Sitophilus* spp.

Palorus bobiriensis sp. n.

(Text-fig. 14)

Length 2.2–2.5 mm.; breadth 0.7–0.8 mm.; facies similar to *laesicollis* but more elongate and less depressed; brown, distinctly bicoloured, head and pronotum darker than elytra, shining; micro-reticulation very sparse and ill-defined, almost absent on pronotum.

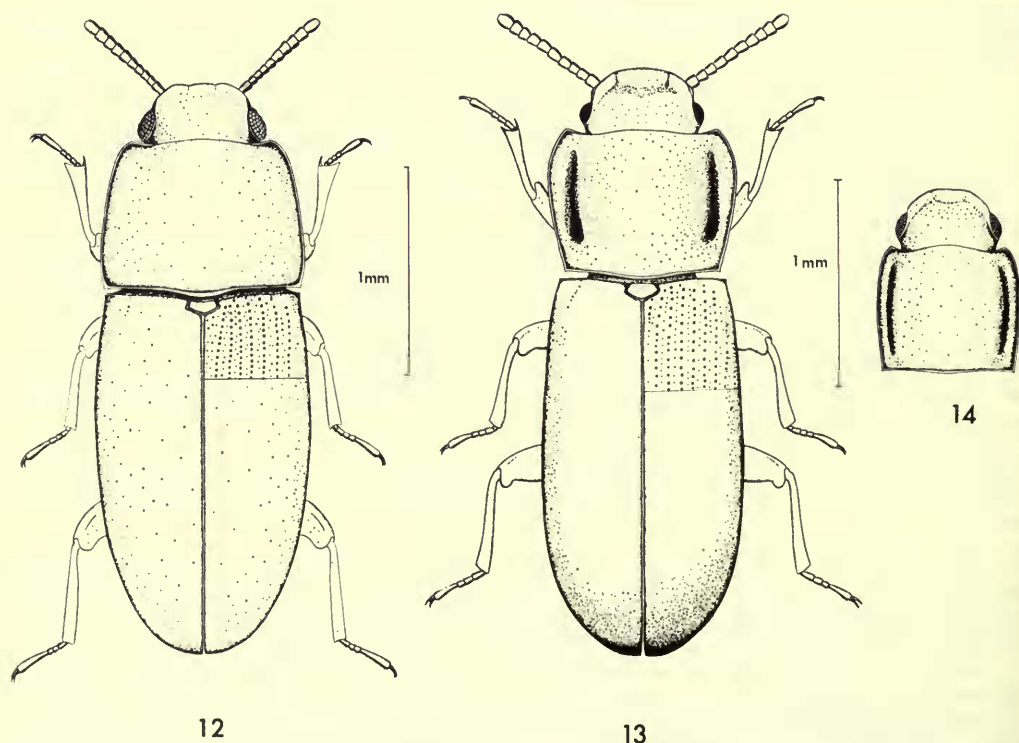
Head. Eyes with dorsal length equal to or slightly less than breadth of scutellum; supra-orbital carina well developed; antennal length 0.5–0.6 mm.

Pronotum. Elongate to quadrate; with deep lateral elongate foveae deepening slightly towards base (Text-fig. 14); sides subparallel to very slightly rounded for apical two-thirds then slightly convergent to base: base more or less sinuate; strongly shining.

Elytra. Elongate, length: breadth, 2:1; interstitial puncturation in single rows.

Holotype ♂ (dissected, left middle leg absent). CONGO: Elisabethville, bearing labels as follows: "Belgian Congo 18m S.W. of Elisabethville 1928/Dr. H. S. Evans/Pres. by Imp. Inst. Ent. Brit. Mus. 1932-147" and, on the card, the pencilled number 817-28, B.M. (Nat. Hist.).

Paratypes: four examples, three with same locality data as holotype but collected 13.xi.1927 and with the following pencilled numbers on the card mounts: 559/27, 560/27, 561/27; 1 ex., GHANA: Kumasi, bearing labels as follows: "Imperial



FIGS. 12-14. 12, *Palorus obtusus* sp. n. 13, *Palorus laesicollis* (Fairmaire). 14, *Palorus bobiriensis* sp. n., head and pronotum.

College Ghana Expdn. 1960 7.8.60 Bobiri Forest, Kumasi, Ashanti", all paratypes in B.M. (Nat. Hist.).

***Palorus nanus* sp. n.**

(Text-figs. 15a, b, Map 2)

Length 2.2–2.4 mm.; breadth 0.7–0.8 mm.; elongate and moderately depressed; yellow-brown to brown, shining; micro-reticulation sparse and indistinct.

Head. Genae slightly raised above antennal insertions; clypeus raised medially; eyes protuberant; supra-orbital carina indistinct, visible only at a magnification of $\times 180$; antennae very long, antennal length : pronotal length, 1 : 0.9.

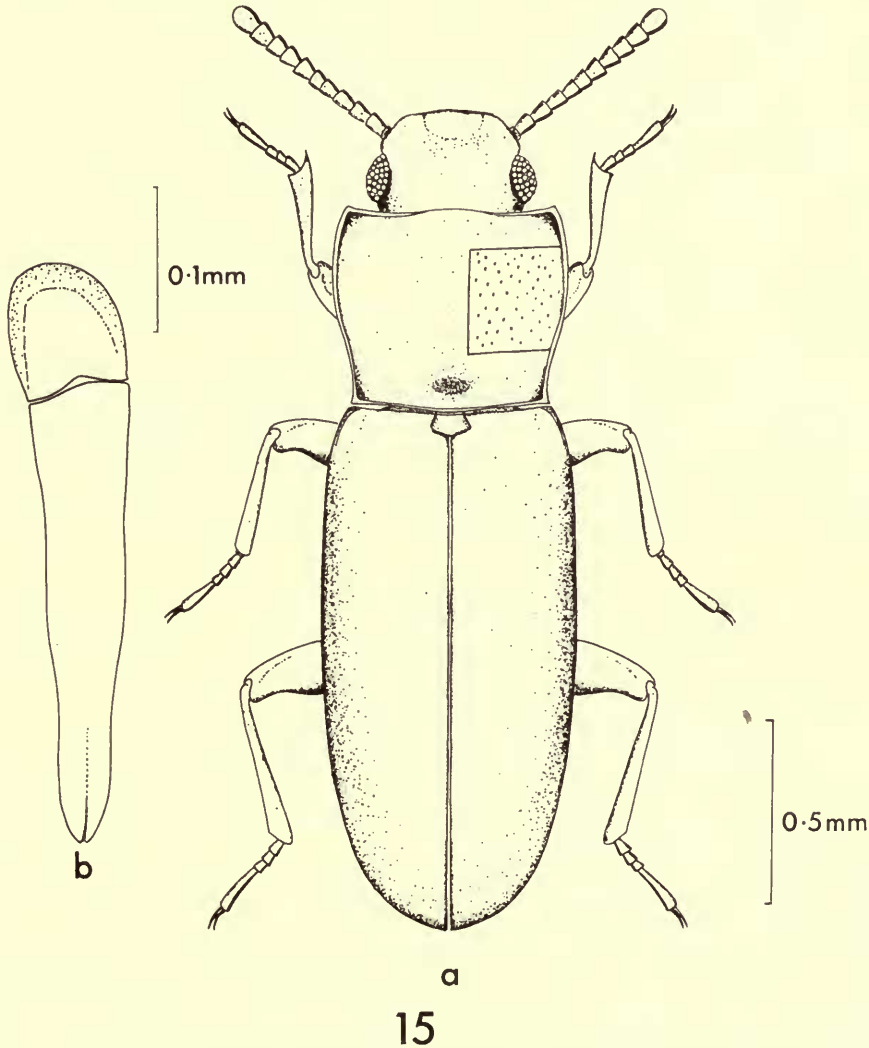


FIG. 15. *Palorus nanus* sp. n. (a) ♂; (b) aedeagus, dorsal view.

Pronotum. Cordiform, slightly depressed; puncturation sparse and fine (see Text-fig. 15a); a small distinct fovea towards base; sides sinuate.

Elytra. Elongate, interstitial puncturation in single rows; strial punctures larger than pronotal punctures.

Aedeagus. Text-fig. 15b.

Holotype ♂. GUINEA: Kindia region, bearing labels as follows: "Exped. Mus. G. Frey Franz. Guinea 1951 W. Afr. leg Bechyne/Région Kindia Seguéia 10.5.51", Frey Mus.

Paratypes: eight examples, three with same data as holotype, Frey Mus., B.M. (Nat. Hist.) and Ardoin Coll.; 1 ex., GUINEA: Fouta Djallon, bearing labels as follows: "Exped Mus. G. Frey Franz Guinea 1951 W. Afr. leg Bechyne/Fouta Djallon Dalaba 1200m 16.6.51", Frey Mus.; 1 ex., CONGO: Elisabethville, bearing labels as follows: "Belgian Congo 18m S.W. of Elisabethville 17.xi.1927 Dr. H. S. Evans/Pres by Imp. Inst. Ent. 1932-147" and, on card mount, pencilled number 696·27; 1 ex., RHODESIA: Salisbury, under card mount "Salisbury Dec. 98 under bark G.A.K.M.", data label: "Salisbury Mashonaland G. A. K. Marshall xii.1898/Brit. Mus. 1922-431; 1 ex., REPUBLIC OF SOUTH AFRICA: Natal, bearing labels as follows: "Malvern Natal 8.97 8642/Malvern, Natal G. A. K. Marshall/Brit. Mus. 1922-431", this and the previous two specimens in the B.M. (Nat. Hist.); 1 ex., S. ARABIA: Dhala, bearing labels as follows: "Taken at moth-screen near rest-house/W. Aden Prot. Dhala, 4,800 ft. 14.ix.1937/B.M. Exp. to S.W. Arabia, H. Scott & E. B. Britton, B.M. 1938-246", P.I.L. Coll.

Comparative notes. Similar to *ficicola* but easily separated from this species by the long antennae (longer than in all other species though only slightly longer than in *euphorbiae*), indistinct supra-orbital carinae, smaller size, form of aedeagus etc.

Distribution. Ethiopian. See Map 2.

Habitat. Under bark (Salisbury).

Palorus ficicola (Wollaston)

(Text-figs. 16a-d, Map 2)

Hypophloeus ficicola Wollaston, 1867, *Col. Hesperidum*: 205.

Palorus ficicola (Wollaston) Champion, 1896, *Entomologist's mon. Mag.* 32: 29.

Palorus subfilum Fleischer, 1900, *Wien. ent. Ztg* 19: 237, **syn. n.**

Palorus deserticola Sahlberg, 1913, *Öfvers finska VetenskSoc. Förh.* 55 (8): 51, **syn. n.**

(Andres, 1931, placed *subfilum* Fleischer, in synonymy with *deserticola* Sahlberg, but Gebien, 1940, did not follow Andres.)

Length 2·2-2·8 mm.; breadth 0·8-0·9 mm; elongate; yellow-brown to red-brown, moderately shining to dull; micro-reticulation distinct.

Head. Genae slightly rounded, not produced anteriorly; clypeus raised medially, punctured as genae; vertex almost flat, usually with a small apical depression; dorsal length of eye normally greater than breadth of scutellum, supra-orbital carina distinct; antennal length: pronotal length, 1:1·3, in largest specimen seen antennae were slightly shorter.

Pronotum. Variable in shape (Text-fig. 16a-d), cordiform to trapezoid (widest near apex), typical form Text-fig. 16a, extreme form Text-fig. 16d, extreme form occurs in the largest

specimens; punctures of disc small, separated by 2–3 diameters, towards sides larger and denser; moderately depressed and usually with a very shallow ill-defined fovea towards base (see Text-fig. 16a); side margin usually with a more or less distinct tooth, sometimes indistinct or absent.

Elytra. Parallel-sided (as *nanus* sp. n., Text-fig. 15a); interstices with single rows of punctures; scutellary striole ill-defined and variable, represented by 4–7 punctures.

LECTOTYPE of *ficicola* Wollaston, present designation (sex indet.). No locality data, in Wollaston's Cape Verde collection in the B.M. (Nat. Hist.), a small black paint mark traversing the right hand corner of the card mount—Wollaston's mark denoting S. Iago as the locality, bearing the following labels: "Type [standard B.M. (Nat. Hist.) type label]/*ficicola* Woll [Wollaston's MS]".

Paralectotypes of *ficicola* Wollaston, two examples, without locality data, with a black paint mark as in the lectotype, B.M. (Nat. Hist.) general collection.

LECTOTYPE of *subfilum* Fleischer, present designation, (sex indet.). ALGERIA: Biskra, bearing the following labels: "Biskra [MS]/Dr. Puton [MS]/Typus *Palorus subfilum* Fleischer [Hungarian Museum type label]/*Palorus subfilum* Fleischer det. dr. Kaszab", mounted on a bent micro-pin, Hung. Nat. Hist. Mus. Fleischer (1900) in his description of this species makes the following statement "In Reitter's Sammlung zwei Exemplars aus Biskra als *Ratzeburgi* von Dr. Puton determinirt". I have located only one specimen.

The lectotype of *subfilum* has a pronotum of the form illustrated in Text-fig. 16c.

LECTOTYPE of *deserticola* Sahlberg, present designation (sex indet.). EGYPT: Cairo, bearing labels as follows: "Cairo/J. Sahlb [printed]/*deserticola* J. Sahlb. Type Heliopolis [MS]/Typus *Palorus deserticola* Sahlberg [Hungarian Museum type label]" Hung. Nat. Hist. Mus.

Paralectotypes of *deserticola* Sahlberg, five examples, the same locality and kind of card mount as the lectotype, all bearing the printed labels: "Cairo/J. Sahlb", four in Hung. Nat. Hist. Mus. and one in Frey Mus.

Comparative notes. Similar to *ratzeburgii* in head structure but eyes larger, body more elongate and usually smaller. General facies similar also to that of *cerylonoides* but *ficicola* is a larger, more depressed species, often with comparatively smaller striae punctures. The pronotal shape is usually distinctive for *ficicola*.

Distribution. (see Map 2). AFRICA (Ethiopian and Palaearctic of N. Africa); Colombo (Ceylon) and W. Pakistan in stored products. This species has previously been recorded from Cape Verde (type locality of *ficicola*), Egypt (*deserticola*), Algeria and Morocco (*subfilum*) but its association with stored-products has not previously been recognized. I have seen specimens from Haiti, WEST INDIES, 1899, which must represent an importation. Specimens have been seen from the following additional African localities: LIBYA, Kufa Oases; MAURITANIA, Bafrechie; GUINEA, Dalba; NIGERIA, Gwoza, Yandev, Kano, Ibadan; CONGO (S.W. of Elisabethville); RHODESIA; ANGOLA.

Habitat. Under the bark of various trees—*Acacia* (Algeria), *Ficus* (Cape Verde), *Jatropha* (Cape Verde, Lindberg, 1962), *Poinciana* (Egypt). It has been recorded from *Poinciana* attacked by *Sinoxylon* (Andres, 1931) and was collected under the

bark of a dead *Parkia* with the Colydiid *Cicones squamosus* Grouv., and the Scolytid *Xylophagus ferrugineus* (F.) by a colleague, Mr. J. M. Lyall, in Nigeria.

Associated with stored products I have seen the following: a long series from threshed sorghum heads, N. Nigeria; two specimens from stored sorghum, Pokoase, Ghana; one specimen from groundnuts, Kano, Nigeria; two specimens from Senegal—collected in milling machinery by Dr. J. A. Freeman (M.A.F.F.); two specimens collected in spillage in a rice store, Colombo, Ceylon; ten specimens collected from roller mill hinges, mill at Dacca and five from white Pacific wheat in a warehouse, Chittagong. Both these W. Pakistan collections made by Dr. Freeman.

Palorus euphorbiae (Wollaston)

(Text-fig. 18)

Hypophloeus euphorbiae Wollaston, 1862, *Trans. ent. Soc. Lond.* **1**: 186.

Palorus euphorbiae (Wollaston) Champion, 1896, *Entomologist's mon. Mag.* **32**: 29.

Length 2.2–2.6 mm.; breadth 0.7–0.8 mm.; elongate; brown, moderately shining to dull; micro-reticulation shallow but distinct.

Head. As in Text-fig. 18; almost flat anteriorly; clypeo-genal sutures ill-defined, clypeus slightly raised medially; eyes small; supra-orbital carina well developed, almost as pronounced as in *ratzeburgii*; antennae very long, equal to length of pronotum.

Pronotum. Elongate; sides sub-parallel to slightly rounded (Text-fig. 18).

Elytra. Strial punctures much smaller than pronotal punctures; interstices with single rows of punctures.

LECTOTYPE, present designation (sex indet.). No locality label, in Wollaston's Canary Island Coleoptera collection in the B.M. (Nat. Hist.), the card mount of the specimen is without a coloured basal margin—denoting Teneriffe as locality, bearing labels as follows: "Hypophloeus euphorbiae Woll. type [Arrow's MS]/Type [standard B.M. (Nat. Hist.) type label]" card mount held on a "gold" pin.

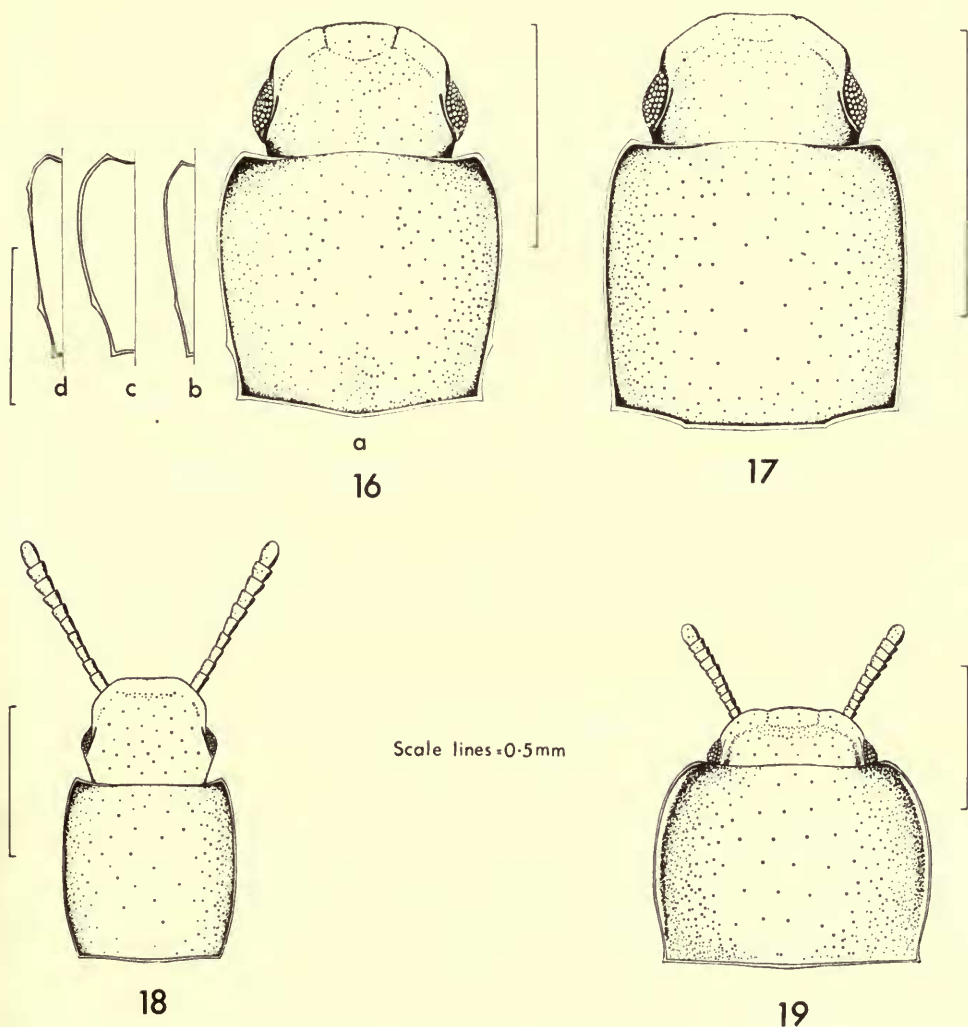
Paralectotypes, ten examples as follows: 1, labelled "Hypophloeus euphorbiae Woll. type" (Arrow's MS—as on the lectotype, also card mount without a coloured basal margin) B.M. (Nat. Hist.) general collection. 1, no data labels, basal margin of card mount red—denoting Lanzarote as locality, mount held on a "gold" pin, B.M. (Nat. Hist.) Wollaston collection. 1, as above but with a blue basal margin on the card mount—denoting Grand Canary as the locality. 3, basal margin on card mounts red (Lanzarote) and bearing labels as follows "Canary Is. 99–203" not on "gold" pins, B.M. (Nat. Hist.) general collection. 4, no data labels, without a coloured basal margin on the card mount (meaning?), on "gold" pins in the Wollaston collection of Canary Island Coleoptera in the Hope Department of Entomology, Oxford.

Comparative notes. The form of the pronotum, head and the long antennae (longer than in other *Palorus* species except *nanus* sp. n.) readily distinguish *euphorbiae*.

Distribution. CANARY ISLANDS: Grand Canary, Teneriffe, Hierro, Lanzarote (Wollaston 1862, 1864, 1865) Alegranza (Coll. Gonzalez, 1953—Lindberg, 1962).

Habitat. Wollaston, 1864, said of this species "... seems to be peculiar to the rotten stems of various *Euphorbias*—beneath the loose bark of which I have taken it ..."

Lindberg, 1962, observes that although Wollaston collected this species in four of the Canary Islands (see above) it is rarely collected in the Canaries today. He suggests that this is due to the activity of the inhabitants who collect all dead wood for kindling. Alegranza is a small uninhabited island.



FIGS. 16-19. 16, *Palorus ficicola* (Wollaston): (a) head and pronotum; (b-d) different forms of pronotal side margin. 17, *Palorus cerylonoides* (Pascoe), pronotum and head. 18, *Palorus euphorbiae* (Wollaston), pronotum and head. 19, *Palorus mahenus* Gebien, pronotum and head.

Palorus mahenus Gebien

(Text-fig. 19, Map 2)

Palorus mahenus Gebien, 1922, *Trans. Linn. Soc. Lond.* **18**: 303.

Length 2.2–3.0 mm.; breadth 0.8–1.2 mm.; short ovate; brown, sometimes with a darker pronotum, shining to dull; micro-reticulation variable.

Head. Flat anteriorly; clypeus very slightly raised above level of genae; genae slightly produced anteriorly; supra-orbital carina distinct; antennae short.

Pronotum. Expanded anteriorly and somewhat globose (Text-fig. 19); side margin sinuate and distinctly explanate from approximately basal to apical sixth, where explanation tapers off.

Elytra. Short, subparallel for basal half, then gradually rounded to apex.

LECTOTYPE, present designation (sex indet.). SEYCHELLES: Long Island, bearing labels as follows: "Mahé 335 [MS, on card mount] Type [standard B.M. (Nat. Hist.) type label]/Mahé 1908–9 Seychelles Exp./Percy Sladen Trust Exped. Brit. Mus. 1926–246/*Palorus mahenus* Geb type! [MS] H. Gebien det 1920/Long Island, Mahe VII. 1908 found in decayed log together with the ant *Pheidole punctulata* Mayr. other Coleops., and Lepismatidae [MS, H. Scott]", B.M. (Nat. Hist.).

Paralectotypes: two examples, SEYCHELLES: Mahé (Long Island), B.M. (Nat. Hist.) and Frey Mus.

Comparative notes. The form of the pronotum and the short antennae readily distinguish this species.

Distribution. Ethiopian (including the Malagasy subregion). ZAMBIA: Mwingwa; SEYCHELLES: Long Island (type); MADAGASCAR. Previously only recorded from the Seychelles. See Map 2.

Habitat. The short antennae and compact form suggest a myrmecophilous association (see "Lectotype designation" above). Specimens from Zambia were collected at bark sap.

Palorus ratzeburgii (Wissmann)⁴

(Text-figs. 20, 23a, b)

⁵ *Hypophloeus ratzeburgii* Wissmann, 1848, *Stettin. ent. Ztg* **9**: 77.

Hypophloeus depressus Stephens (nec Fabricius), 1832, *Illustr. British Ent. (Coleopt. 5)*: 7.

Hypophloeus ambiguus Wollaston, 1857, *Cat. Coleopt. Ins. Madeira B.M.*: 152.

Palorus ratzeburgii (Wissmann) Jacquelin du Val, 1859–63, *Gen. Coléopt. Europe* **3**: 308.

Palorus floricola Marseul, 1876, *Annls Soc. ent. Fr.* **6** (5): 112.

Palorus galilaea Sahlberg, 1913, *Öfvers. finska Vetensk Soc. Förh.* **55**: 49, **syn. n.**

⁴ Reversion to the original spelling is required by Article 32 of the International Code of Zoological Nomenclature 2nd Edition, 1964.

⁵ I have failed to locate the type material of *Hypophloeus ratzeburgii* Wissmann. Through the kindness of Dr. E. Schimitschek, I have seen one specimen in Wissmann's collection (in the Forstzoologische Institut der Universität Göttingen, Hann. Münden) collected in Nordheim and determined as *H. ratzeburgii* (manuscript label, presumed to be in Wissmann's MS). This specimen conforms to the current concept of *P. ratzeburgii* (Wissmann).

Length 2.4–3 mm. ; breadth 0.9–1.1 mm. ; brown to dark brown, moderately shining rarely dull ; micro-reticulation distinct.

Head. Moderately densely punctured ; genae not produced or raised, almost level with clypeus, slightly raised above antennal insertions, puncturation a little finer than that of vertex ; clypeus raised medially, puncturation similar to genal puncturation ; eyes small (Text-fig. 23b), dorsal length equal to or less than breadth of scutellum ; supra-orbital carinae very strongly developed (Text-fig. 23a).

Pronotum. Usually widest near apex (see Text-fig. 20) but sometimes with sides more parallel ; punctures not bearing distinct setae, small on disc, separated by 4–5 diameters, coarser laterally, separated by 1–2 diameters (usually much finer and sparser than in *depressus*) ; usually shining.

Elytra. Scutellary striole represented by five or less, ill-defined punctures ; interstices with single rows of punctures.

LECTOTYPE of *ambiguus* Wollaston, present designation (sex indet.). No locality labels, in Wollaston's Coleoptera collection from MADEIRA in the B.M. (Nat. Hist.), bearing labels as follows : " Type [standard B.M. (Nat. Hist.) type label]/ambiguus, Woll [Wollaston's MS] ".

Paralectotypes of *ambiguus* Wollaston, two examples, without data labels, in Wollaston's Coleoptera collection from MADEIRA, in the Hope Department of Entomology, Oxford.

LECTOTYPE of *floricola* Marseul, present designation (sex indet.). JAPAN, bearing labels as follows : " Type H.T. [standard B.M. (Nat. Hist.) holotype label]/Japan C. Lewis 1910–320/ratzeburgi Wissm [Champion's MS]/M. Lewis 58 Hypophloeus floricola [MS] ", left hand specimen, B.M. (Nat. Hist.).

Paralectotype of *floricola* Marseul, on the same card as the lectotype, right hand specimen of the pair.

LECTOTYPE of *galilaea* Sahlberg, present designation (sex indet.). ISRAEL : Nazareth, bearing labels as follows : " Nazareth [printed]/U. Sahlb [printed]/galilaea J. Sg [MS] Spec. typ [printed]/Palorus galilaea Sahlberg/Palorus galilaea Sahlb det dr. Kaszab ", Hung. Nat. Hist. Mus.

Paralectotypes of *galilaea* Sahlberg, two examples, locality as lectotype bearing the printed labels : " Nazareth/U. Sahlb " and on the same form of card mount as the lectotype, Hung. Nat. Hist. Mus. and Frey Mus.

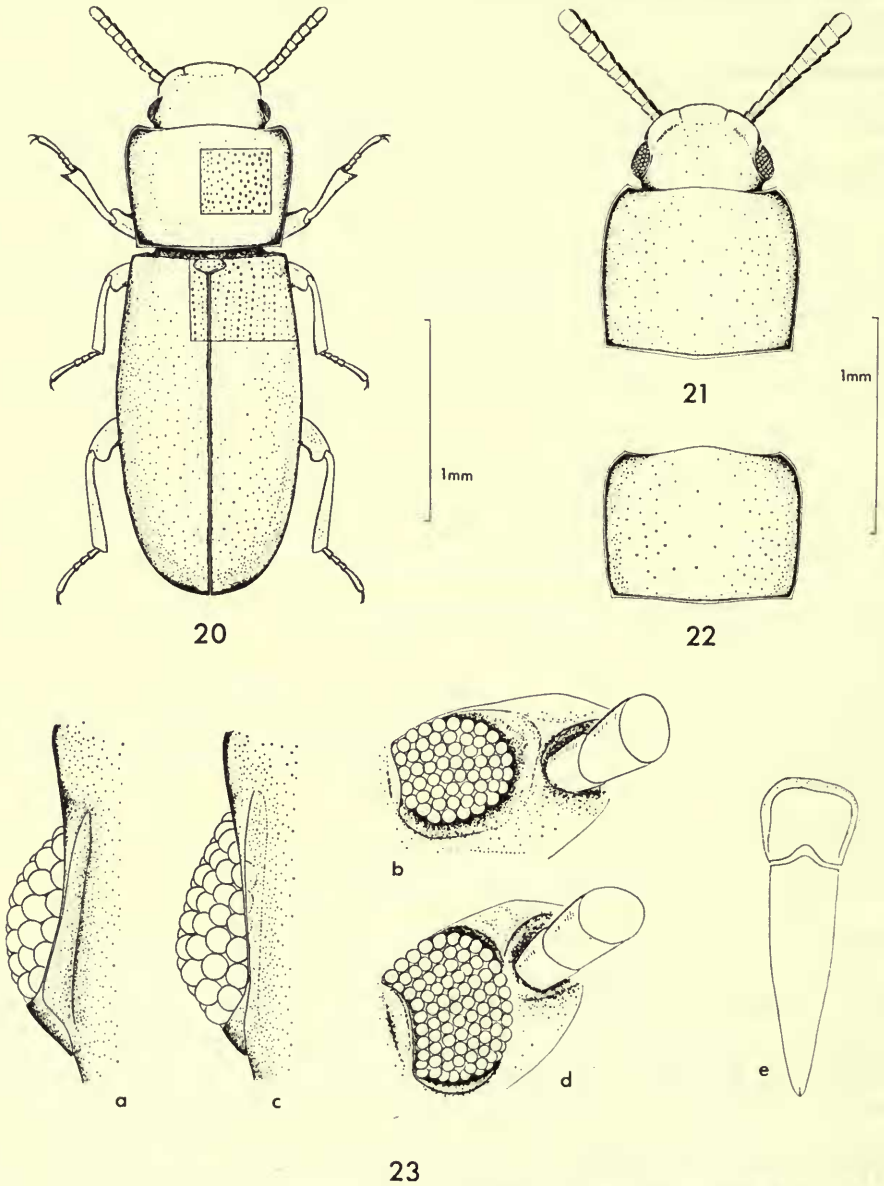
Comparative notes. Closely related and similar to *depressus*, *orientalis* and *ficicola* from which it is easily separated on eye size. The strongly pronounced supra-orbital carina distinguishes this species from other *Palorus* except *P. euphorbiae*.

Distribution. Cosmopolitan (although described from Europe and found in the field there, it is probably of N. African origin). There is a specimen in the Paris Natural History Museum that was collected by Goudot in Madagascar during 1834.

Habitat. In Europe *ratzeburgii* is sometimes found under bark of beech (*Fagus*) etc. The under bark habitat is apparently the natural one. Specimens have been collected under bark in N. America and represent a recolonization (as in Europe?) of the natural habitat from stored-products.

This species, spread to all parts of the world by commerce, occurs as a secondary

pest in granaries, warehouses, flour mills etc., where it is found in cereals and cereal products (often in spillage), and less commonly in other stored produce. It is associated with other pests, particularly the weevils, *Sitophilus* species.



FIGS. 20-23. 20, *Palorus ratzeburgii* (Wissmann). 21, *Palorus orientalis* Fleischer, pronotum and head. 22, *Palorus depressus* (Fabricius), pronotum. 23a, b, *P. ratzeburgii*, eye (a) dorsal, (b) lateral view. 23c-e, *P. depressus*, (c) eye dorsal view; (d) eye lateral view; (e) aedeagus.

Palorus depressus (Fabricius)

(Text-figs. 22, 23c-e, Map 2).

Hypophloeus depressus Fabricius, 1790, *Skr. nat. Selsk.* 1 (1) : 223.*Ips unicolor* Olivier, 1790, *Entomologie* 2 (18) : 12. Syn. *teste* Fabricius, 1790, *Ent. Syst.* 2 (1) : 501.*Hypophloeus (Palorus) depressus* Fabricius; Mulsant, 1854, *Hist. nat. Col. France* 5, Latigenes : 250.*Palorus depressus* (Fabricius) Jacquelin du Val, 1859-63, *Gen. Coléop. Europe* 3 : 308.*Caenocorse depressus* (Fabricius) Thomson, 1859, *Skand. Coleop.* 1 : 117.*Palorus melinus* auctt. (nec Herbst). Syn. *teste* Champion, 1896, *Entomologist's mon. Mag.* 32 : 29.*Palorus depressus* var. *formiceticola* Munster, 1928, *Norsk ent. Tidsskr.* 2 : 296.Length 2.3-3.2 mm.; breadth 0.9-1.2 mm.; facies similar to *ratzeburgii*; brown to dark brown, usually moderately dull; micro-reticulation distinct, usually deep.*Head.* Densely punctured; genae slightly raised above the level of the clypeus, densely punctured; clypeus flat, sparsely punctured, shining; eyes large (Text-fig. 23d); supra-orbital carinae distinct but not as strongly developed as in *ratzeburgii* (Text-fig. 23c, *ratzeburgii* Text-fig. 23a); antennae appearing slightly thicker than in most species.*Pronotum* (Text-fig. 22). Widest towards the apex (usually less so than in *ratzeburgii*), transverse to somewhat quadrate; usually coarsely and densely punctured, disc less so than sides; sides sometimes almost rugosely punctured, punctures usually larger than striae punctures and bearing distinct setae; apical angles as in Text-fig. 22, obtuse but moderately sharply defined; apical margin weakly to moderately sinuate; base slightly to distinctly (in small specimens) narrower than elytral base.*Elytra.* Scutellary striole of up to 8 (but usually 6) punctures; puncturation of interstices 2 and 3 variable, one or two rows, puncturation of interstice 3 usually approximating to two rows basally in large specimens but to one in very small specimens (including the "type" of var. *formiceticola*); very slightly raised at suture.*Aedeagus* as in Text-fig. 23e, distinctly tapered from basal half to apex.

LECTOTYPE, present designation (sex indet.). No locality labels, labelled "2" (type-written label), right elytron missing, in the Fabrician collection, the University Museum, Copenhagen.

In addition to the lectotype there are three specimens, numbered "1", "3" and "4" (type-written labels) no other data labels, placed above the name *Hypophloeus depressus* in the Fabrician collection. I have been able to examine two of these, "1" and "4". Specimen "4" is *Palorus subdepressus* (Woll.) and probably does not represent part of the original type series. Specimen "1" is conspecific with the lectotype but it is in a very poor state of preservation, consisting of an assortment of parts attached to a pin.

I would like to thank Dr. S. G. Larsson for making examination of this material possible.

The var. *formiceticola* was described by Munster (1928) as smaller, lighter in colour and with a single row of punctures in the third interstice, occurring in ants' nests in coastal areas of Norway. In Fennoscandian *depressus* the colour varies, as does the puncturation of the third interstice (see above) but specimens from this area are smaller. The length range of 35 *depressus* from Fennoscandia was 2.3-3.1 mm., mean 2.7 mm. and that of 44 specimens from Europe and the Mediterranean area was

2.5–3.2 mm., mean 3.0 mm. The overlap of length studied in these 79 specimens was far too great for subspecific differentiation—suggested by distribution and limited habitat. The distribution, habitat and smaller size distinguish this variety.

Comparative notes. Similar to *orientalis* and *ratzeburgii*. It is readily separated from *ratzeburgii* on eye size, supra-orbital carina (Text-fig. 23a–d) and pronotal puncturation (coarse in *depressus*). From *orientalis* it may be distinguished by size and the form of the pronotal apical angles (Text-figs. 22 and 21, and key (p. 78)).

Distribution. Palaearctic. FENNOSCANDIA as far north as 62° lat. (var. *formiceticola*). EUROPE, MEDITERRANEAN and east to CAUCASUS, Map 2. One specimen was seen from Australia, “Sunshine, Victoria (c. oke)” undoubtedly an importation. Kocher (1958) records this species from Forêt des Zaer, S. Rabat, Morocco (unfortunately I have been unable to obtain the specimen as it is not in Dr. Kocher’s collection).

Habitat. Found in nests of *Formica rufa* L. in Fennoscandia (var. *formiceticola*). Elsewhere usually under bark especially of oak (*Quercus*) but sometimes associated with *F. rufa*.

Palorus orientalis Fleischer

(Text-fig. 21, Map 2)

Palorus orientalis Fleischer, 1900, *Wien. ent. Ztg* 19 : 237.

Length 3.1–3.3 mm.; breadth 1.1–1.2 mm.; facies similar to *depressus* (to which it is very closely related) but body form appearing slightly more elongate; brown to dark brown, shining, (pronotum always more strongly shining than in *depressus*); micro-reticulation usually shallow but always distinct.

Head (Text-fig. 21). Eyes large, slightly larger than in *depressus*; antennae very robust and moderately long (see Text-fig. 21).

Pronotum (Text-fig. 21). Somewhat elongate, widest towards apex; puncturation moderately dense; punctures at sides equal to or slightly larger than strial punctures, punctures bearing setae (not as distinct as in *depressus*); apical angle as in Text-fig. 21, usually more strongly produced than in *depressus*; apical margin weakly sinuate to almost straight; base distinctly narrower than elytral base.

Elytra. Scutellary striole ill-defined or represented by 5–6 punctures; interstitial puncturation somewhat confused, interstices 2 and 3 with punctures approximating to one or two rows; distinctly raised at suture.

LECTOTYPE, present designation (sex indet.). TRANSCAUCASIA: Talish Mts, bearing labels as follows: “Talyschgeb. Transcaucas, Leder, Reitt [printed]/*orientalis* Fleisch typ [MS on blue-bordered type label]/Typus *Palorus orientalis* Fleisch/*Palorus orientalis* Fleisch det dr. Kaszab”, Hung. Nat. Hist. Mus.

Paralectotype (sex indet.) “Lenkoran, Leder (Reitter)/Typus *Palorus orientalis* Fleischer [red-bordered label]”, Hung. Nat. Hist. Mus.

Fleischer, in his original description, makes the following statement: “In Reitter’s Sammlung vier ubereinstimmende Example mit Patria; Transkaukasus, Talysch und Lenkoran; als *Ratzeburgi* determinirt.” There are a number of specimens in the Hungarian Natural History Museum and in the Frey Museum, Tutzing, labelled (Reitter) or coll. Reitter and bearing the locality data indicated by Fleischer—any of these may represent syntypes.

Distribution. Palaearctic, as for types and one specimen in the Frey Museum from IRAN (Map 2).

Comparative notes. See key and *depressus*, "Comparative notes".

Palorus nevoissi sp. n.

(Text-fig. 24, Map 2)

Length 2.5–3.2 mm.; breadth 1.0–1.1 mm.; brown, usually dark, pronotum moderately shining to dull, elytra moderately shining; micro-reticulation variable, on pronotum deep and distinct (as in holotype) to shallow and indistinct, on elytra shallow but distinct.

Head. Rounded anteriorly, moderately densely punctured, punctures with short setae; genae only slightly raised above level of clypeus, not produced anteriorly; clypeal and genal region almost flat; supra-orbital carinae distinct; eyes small, dorsal length equal to or less than clypeal breadth.

Pronotum. Slightly transverse (Text-fig. 24), often widest near apex, moderately depressed (a median narrow impunctate region is often present); distinct longitudinal depression at each side of disc which, combined with the lateral vertical flattened region, produces a lateral raised border; apical angles obtuse, not sharply defined, very slightly produced anteriorly; lateral margins almost straight, parallel or slightly convergent to base; basal margin straight.

Elytra. Disc usually distinctly depressed, rarely only moderately so; scutellary striae of 2 or 3 punctures—often indistinct; interstices with single row of punctures.

Holotype ♂. AUSTRALIA: Queensland, bearing labels as follows: "Brisbane: H. Hacker 24.6.18/Queensland Museum/*Palorus depressus* F Id by A. M. Lea Introduced", in Queensland Museum type No T 6353.

Paratypes: 20 examples, AUSTRALIA: Queensland, N.S.W., and South Australia 1, bearing labels as follows: 1, "Wyreema O. W. Tiegs/S.A. Museum specimen"; "Wyreema O. W. Tiegs/Queensland Museum", Queensland Museum type No T 6354; 1, "Dorrigo N.S.W. Jan 19 [0?] 1, National Museum of Victoria Melbourne"; 2 (same card) "Sydney W. du Boulay/H. J. Carter Coll. P. 20.4.22./National Museum of Victoria Melbourne"; 4 (two cards on same pin) "Sydney viii 31 N.S. Wales Dr. K. K. Spense/K. K. Spense Collection/*Palorus depressus* F Id by H. J. Carter" in Australian Museum, Sydney; 4 (same card) "Morgan S. Australia A. M. Lea/*Palorus?* *austrinus* Champ det H. J. Carter/S.A. Museum specimen"; 1, "Windsor N.S.W., Lea/S.A. Museum specimen"; 1, "Yanco N.S.W. 26 Spt. 26 Oct '32 K. C. McKeown/K 65681/*Palorus?* *depressus* F. Det. H. J. Carter"; 1, "Prospect 9.03 H.J.C. K 67.16", this and the previous specimen both in the Australian Museum, Sydney; 1, "Clermont X 29 Queensland Dr. K. K. Spense/*Palorus* (*Acthosus*) *pygmaeus* 11.7.13 Carter" (label with many pin holes!); 1, "Bogan R. N.S. Wales/31/x,25/*pygmaeus*"; 1, "Blue Mts N.S. Wales/E. W. Ferguson Collection/*Palorus ratzeburgi* Wissm (introduced)"; 1, "Wahr'ngs 8-19 W. Du B", this and the previous three specimens in the National Collection, Canberra.

Comparative notes. This species is somewhat similar to *austrinus*. It is, however, larger, has smaller eyes, comparatively deep lateral foveae, deeper striae punctures and has the elytra distinctly depressed on the disc.

Distribution. Australian. See Map 2.

Species named after Mr. A. Neboiss, National Museum of Victoria, Melbourne.

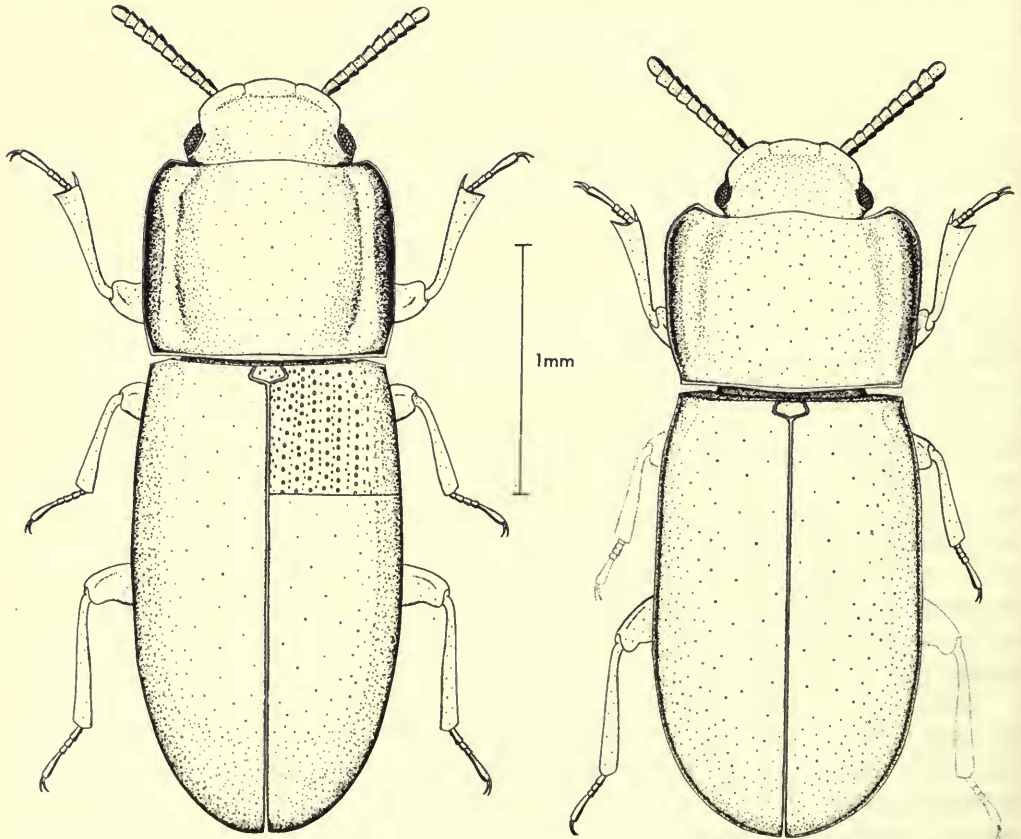
Palorus grossi sp. n.

(Text-fig. 25)

Length 2.8–2.9 mm.; breadth 1.1 mm.; brown, moderately shining; micro-reticulation shallow, more or less distinct.

Head. Almost flat anteriorly (clypeus and genae), moderately densely and coarsely punctured (puncturation of paratype slightly coarser than that of holotype), punctures with fine setae; clypeus very slightly raised in the middle with puncturation very slightly sparser than that of genae; genae very slightly produced at clypeo-genal suture; eyes small; supra-orbital carinae distinct; vertex moderately high.

Pronotum. Transverse, sides with lateral rim broad, moderately densely punctured, punctures with fine setae; apical margin sinuate; lateral margin expanded, rim appearing somewhat serrate due to the presence of coarse punctures (see Text-fig. 25); with a shallow lateral



24

25

FIGS. 24, 25. 24, *Palorus nevoissi* sp. n. 25, *Palorus grossi* sp. n.

longitudinal depression at each side of disc, deepest towards apex (deeper in paratype than holotype).

Elytra. With a comparatively broad lateral rim (broader than in other *Palorus* spp., see Text-fig. 25) from base to apex; striae punctures deep; interstitial puncturation somewhat confused but approximating to single rows.

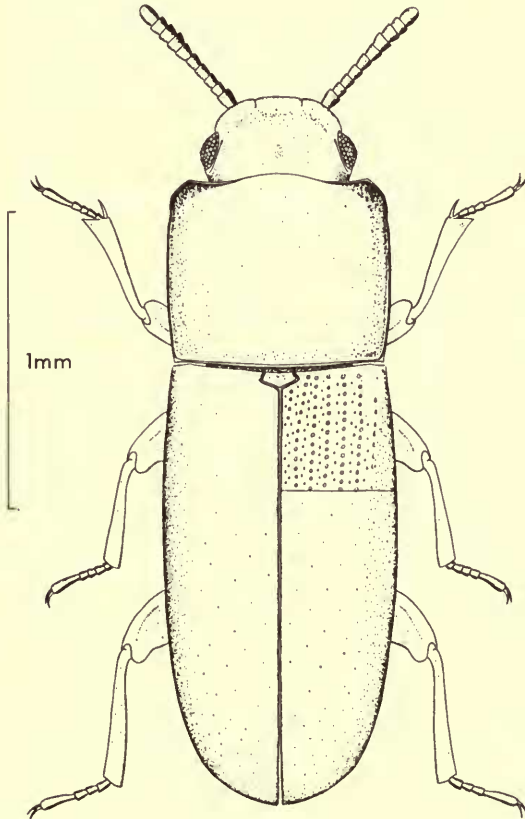
Holotype ♂. AUSTRALIA: Victoria, bearing labels as follows: "Wallan. Vic. C. Oke/*Palorus austrinus* Champ/National Museum of Victoria Melbourne" (Text-fig. 25—limbs are absent as indicated by dotted lines).

Paratype: ♂ AUSTRALIA: N.S.W., bearing labels as follows: "Gosford H. W. Cox/H. J. Carter Coll. P. 20.4.22/*Palorus austrinus* Champ Id by H. J. Carter/National Museum of Victoria Melbourne".

Comparative notes. Rather similar to *austrinus* and *neboissi* sp. n but readily distinguished by the form of the pronotum and the broad lateral rim of the elytra.

Distribution. Australian—as above.

Species named after Mr. G. F. Gross, the South Australian Museum, Adelaide.



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FIG. 26. *Palorus camerouniensis* sp. n.

Palorus camerouniensis sp. n.

(Text-fig. 26)

Length 2.2–2.4 mm.; breadth 0.8 mm.; a small moderately elongate species; brown, head and pronotum slightly or distinctly darker than elytra, shining; micro-reticulation shallow, ill-defined.

Head. Moderately densely punctured; clypeus almost flat, slightly less densely punctured than genae; genae very slightly raised above level of clypeus, not produced, slightly wider than dorsal length of eye; vertex with a median depression.

Pronotum. Almost quadrate, moderately densely punctured, punctures separated by one or two diameters; apical margin moderately sinuate; apical angles straight—obtuse (Text-fig. 26), with a very slight emargination posteriorly (see Text-fig. 26) in all specimens except one ♀ paratype; sides subparallel; basal margin almost straight.

Elytra. Scutellary striole of 2–4 punctures; interstices with single rows of fine punctures.

Holotype ♂. CAMEROUN: N’Kongsamba, bearing labels as follows: “AVR 1957 N’Kongsamba Cameroun, J. Cantaloube”, Paris Mus.

Paratypes: 4 (2 ♂, 2 ♀) with the same data, three in the Paris Museum, one in P.I.L. Coll.

Comparative notes. General facies similar to *ratzeburgii* but smaller, more elongate, with larger eyes and a more quadrate pronotum.

Distribution. Ethiopian. CAMEROUN.

Palorus marginatus sp. n.

(Text-fig. 27)

Length 3.1–3.7 mm.; breadth 1.2–1.4 mm.; a large robust species; brown, moderately dark, pronotum usually darker than elytra, dull, rarely moderately shining; micro-reticulation usually distinct, especially on head and pronotum.

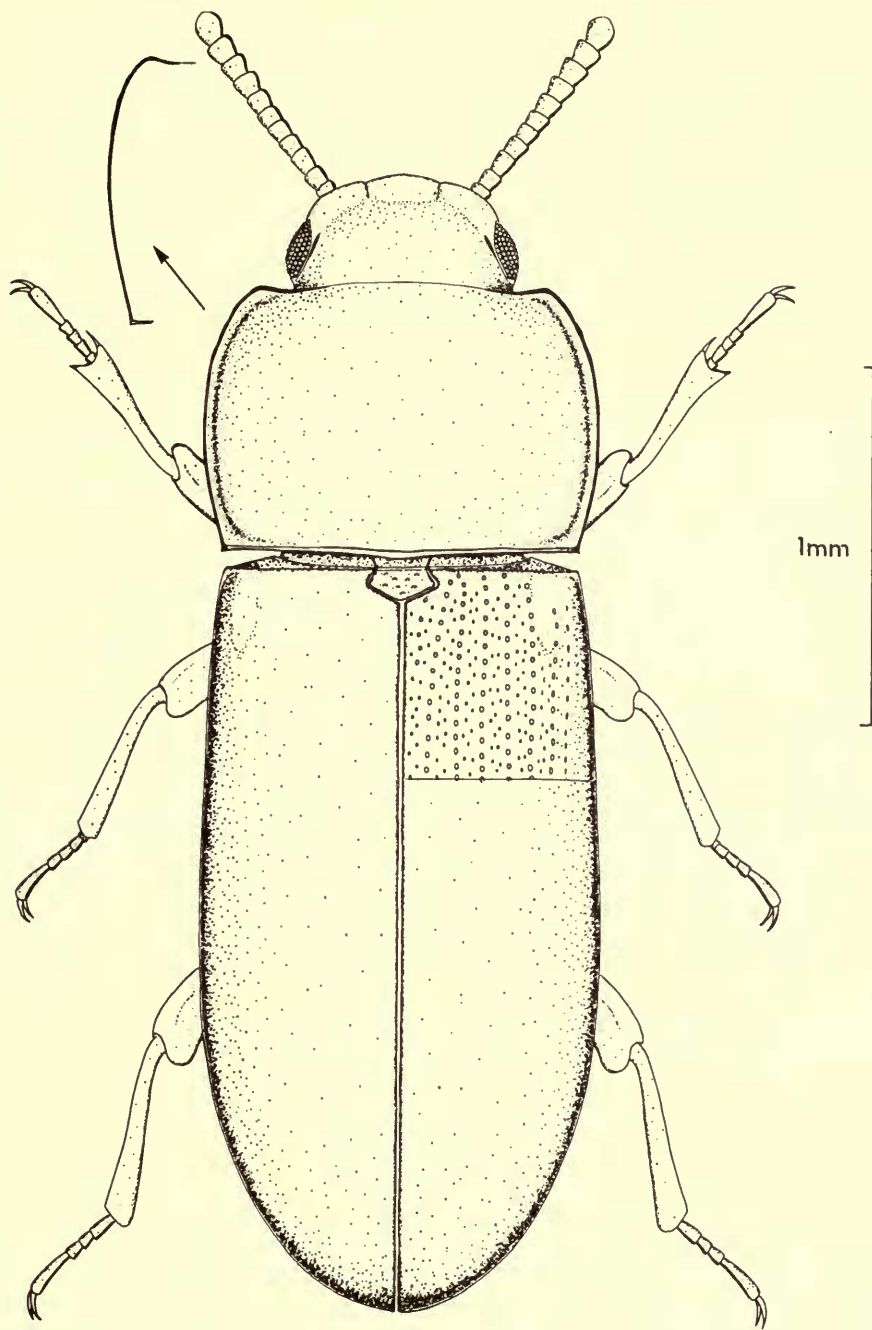
Head. Punctures separated by one diameter; clypeus slightly raised above level of genae, puncturation much as that of genae; genae not raised or produced; eyes large with comparatively small facets; supra-orbital carinae distinct; very slight depression at base of vertex.

Pronotum. Transverse; moderately densely punctured, punctures becoming coarse towards the sides; apical margin slightly sinuate or straight; apical angles obtuse, very slightly produced; lateral margins distinctly explanate, very slightly crenulate, moderately (Text-fig. 27) to slightly (Text-fig. 27, inset) rounded from base to apex; basal margin slightly rounded.

Elytra. Scutellary striole of 3–6 punctures; interstitial puncturation confused, approximating to two rows; lateral margin with rim slightly broader than usual.

Holotype ♂ (dissected). ETHIOPIA: Beica, bearing labels as follows: “–ix–1960, Beica Wellega Ethiopiae Leg P. Jolivet” (Text-fig. 27) in the Paris Museum.

Paratypes: eleven examples, three with the same data as the holotype, two in Paris Mus. (♂, ♀) one in P.I.L. Coll. (♀); eight, ETHIOPIA, bearing the following data: 4, “Box 31/Under bark of decaying *Mimosa*/Abyssinia: Djem-Djem Forest nearly 9,000 ft. 1. x. 1926 Dr. H. Scott”; three in B.M. (Nat. Hist.) Coll., one in P.I.L. Coll.; 1, “Beaten from grass-thatch of hayricks/Abyssinia: Djem-Djem circa 8,000 ft. 6. x. 1926 Dr. H. Scott”; 1, “From decaying parts of tree *Euphorbia abyssinica* Räusch/Abyssinia: Djem-Djem Forest circa 8,000 ft. 5–7. x. 1926 Dr. H. Scott”;



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FIG. 27. *Palorus marginatus* sp. n. Inset variant of pronotal lateral margin.

1, " Abyssinia : British Legation Pond No. 1 8,100 ft. 8.ix.1926 J. Omer-Cooper ", the previous 4 specimens in the B.M. (Nat. Hist.).

Comparative notes. The explanate margin of the pronotum and the size readily distinguish this species from other African and Palaearctic species. The large eyes, pronotal shape, etc., separate it from the Australian *P. grossi* sp. n. which has a broad lateral pronotal rim.

Distribution. Ethiopian. ETHIOPIA.

Palorus ardoini sp. n.

(Text-fig. 28)

N'Kongsamba specimens (incl. holotype). Length 3.2–3.3 mm.; breadth 1.3 mm.; Ibadan specimen—length 2.9 mm.; breadth 1.1 mm.; brown, head and pronotum slightly darker than elytra, moderately shining; micro-reticulation distinct.

Head. Moderately densely punctured; clypeus slightly narrower than genae, almost flat; genae slightly raised above level of clypeus, slightly produced anteriorly; eyes large with large facets; vertex with a median depression.

Pronotum. Distinctly transverse, length: breadth, circa 1:1.4 and somewhat rectangular; moderately densely punctured; apical margin slightly sinuate; apical angles somewhat obtuse, weakly produced; sides subparallel; basal margin almost straight.

Elytra. Scutellary striole usually of 5 or 6 punctures; interstitial puncturation somewhat confused but approximating to two rows in interstices 2–4.

Holotype ♂. CAMEROUN: N'Kongsamba, bearing labels as follows: "Fevrier 57 N'Kongsamba Cameroun J. Cantaloube" in the Paris Museum.

Paratypes: five examples, four with the same data as the holotype but collected on different dates, November 56 (♂ dissected) in P.I.L. Coll., AVR 1957 (♂ dissected and 2 ♀) all in the Paris Museum, and one (a small, less robust specimen) NIGERIA: Ibadan, bearing data as follows: "Nigeria Ibadan at light 26.i.1956/G. H. Caswell Coll. B.M. 1956–673" in the British Museum (Nat. Hist.)

Comparative notes. The very transverse rectangular pronotum readily distinguishes this species.

Distribution. Ethiopian. CAMEROUN and NIGERIA.

Species named after Mons. P. Ardoin, Arcachon, France.

Palorus baphiae sp. n.

(Text-fig. 29)

♂ (♀ unknown). Length 2.6–2.7 mm.; breadth 0.8 mm.; elongate; brown, pronotum slightly darker than elytra, somewhat dull to moderately shining; micro-reticulation strong and distinct.

Head. Moderately densely punctured; clypeus slightly raised in the middle, slightly less densely punctured than genae and more strongly shining; genae very slightly raised, very slightly produced anteriorly; vertex with a deep, somewhat triangular depression—producing two low pyramidal prominences traversing the frons (Text-fig. 29); eyes large with small facets; supra-orbital carinae distinct.

Pronotum. Elongate; moderately densely punctured; a shallow depression towards base, apical margin sinuate; apical angles acute; sides almost parallel for apical three-quarters, then convergent to base; basal margin slightly rounded.

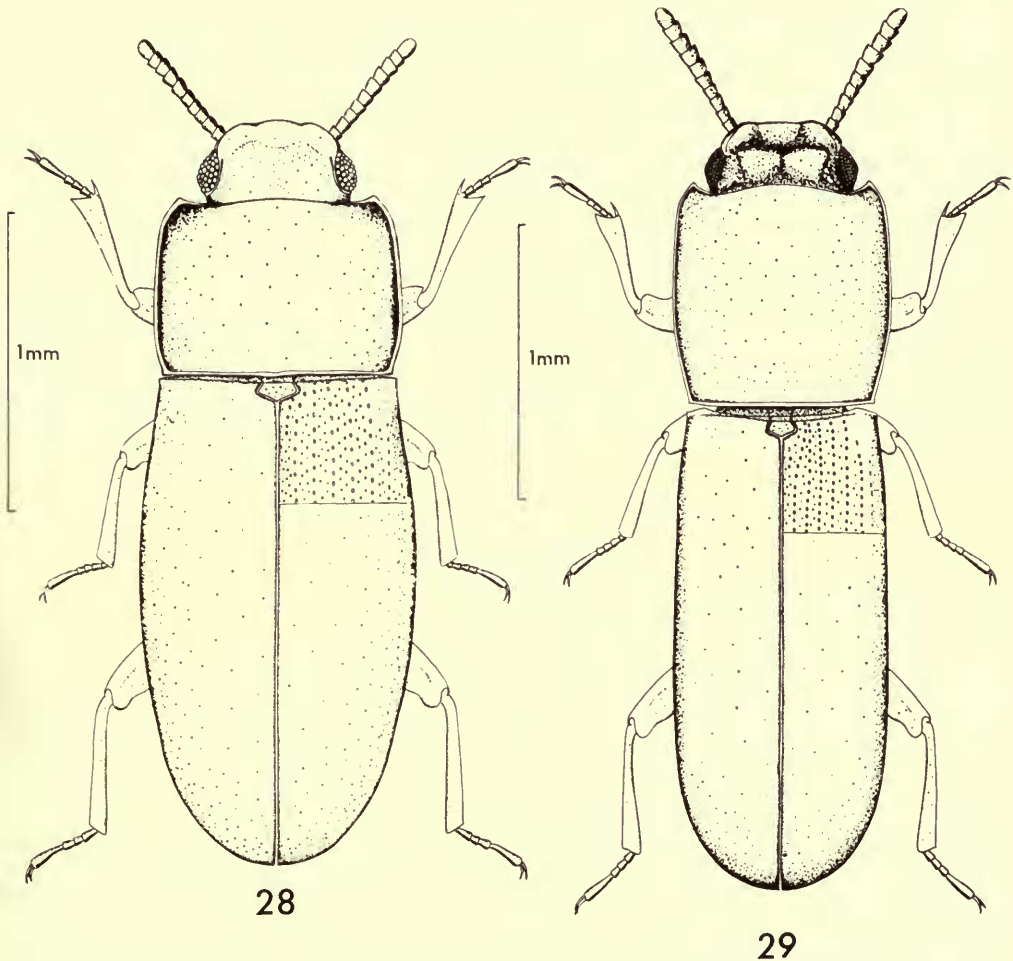
Elytra. Scutellary striole ill-defined, of approximately three punctures; interstices with single rows of punctures.

Holotype ♂. GHANA: Mpraeso, bearing labels as follows: "A.W. 34 1:3:46 Gold Coast, Mpraeso, 1945-46 G. H. Thompson" B.M. (Nat. Hist.).

Paratypes: two (♂) with the same data, in the B.M. (Nat. Hist.).

Comparative notes. The form of the head and the elongate body readily distinguish this species.

Distribution. Ethiopian. GHANA.



FIGS. 28, 29. 28, *Palorus ardoini* sp. n. 29, *Palorus baphiae* sp. n.

Habitat. Dr. G. H. Thompson has kindly given me the following information about these specimens :

" A.W. 34 : *Baphia pubescens* Hook. f. Adults and one pupa were in the wood of a small tree that had been felled 5 months previously in a teak plantation at Kwahu Tafo, Mpraeso Forest District, which is in the semi-deciduous high forest. Cerambycid and Bostrychid larvae were also in the wood. "

Palorus acutangulus sp. n.

(Text-fig. 30)

♂ (♀ unknown). Length 2.8 mm.; breadth 0.7 mm.; elongate, moderately cylindrical; yellow-brown, shining; micro-reticulation ill-defined.

Head. Punctures separated by one to two diameters; clypeus very large, breadth greater than dorsal length of eye, slightly raised medially, slightly raised above level of genae; genae small, not produced, equal to approximately half breadth of clypeus; genae and clypeus moderately shining, puncturation of approximately equal density; frontal region with two slightly raised areas; vertex with a depression towards base; eyes large with small facets; supra-orbital carinae long and distinct.

Pronotum. Elongate, depressed on disc, moderately densely punctured, punctures approximately equal in size to those of elytral striae; apical margin very slightly bi-arcuate; apical angles very strongly acute; sides subparallel, slightly convergent towards base; basal margin very slightly rounded.

Elytra. Scutellary striole of 8-10 punctures; interstices with single rows of punctures, punctures only slightly smaller than striae punctures.

Holotype ♂ (dissected). CAMEROUN : N'Kongsamba, bearing labels as follows : "AOU 1957 N'Kongsamba Cameroun J. Cantaloube", in the Paris Museum.

Comparative notes. This species is readily recognised by the very acute apical pronotal angles, the large eyes with small facets and the elongate form. It is somewhat similar, in general facies, to certain *Hypophloeus* (sens. lat.).

Palorus cerylonoides (Pascoe)

(Text-fig. 17, Map 2)

Eba cerylonoides Pascoe, 1863, *J. Ent., Lond.* **2** : 129.

Palorus exilis Marseul, 1876, *Annls Soc. ent. Fr.* **6** (5) : 116.

Palorus minor Waterhouse, 1894, *Ann. Mag. nat. Hist.* **14** (6) : 71.

Palorus prasinensis Gebien, 1922, *Trans. Linn. Soc. Lond.* **18** : 304, **syn. n.**

Palorus cerylonoides (Pascoe) Blair, 1930, *Indian Forest Rec.* Ent. Ser. **14** (5) : 141.

Palorus papuanus Kaszab, 1939, *Nova Guinea* (n.s.) **3** : 218, **syn. n.**

Palorus zimmermani Kaszab, 1955, *Proc. Hawaii. ent. Soc.* **15** (3) : 657, **syn. n.**

Length 1.9-2.2 mm.; breadth 0.5-0.6 mm.; elongate, moderately cylindrical; brown to yellow-brown, shining; micro-reticulation shallow and ill-defined.

Head (Text-fig. 17). Moderately densely punctured, punctures bearing fine setae; anterior margin somewhat angulate; clypeus broad and flat, broader than dorsal length of eye, sparsely punctured, shining; genae not raised above level of clypeus, anterior margin straight; vertex strongly convex.

Pronotum. Quadrate to slightly elongate (Text-fig. 17); sides subparallel or very slightly convergent to base; basal margin usually as in Text-fig. 17 rarely with indentations ill-defined; an ill-defined, shallow, depressed area is sometimes present towards base of disc.

Elytra. Elongate, convex; striae punctures deep; interstices with single rows of punctures; scutellary striae ill-defined, may be represented by 4-7 small punctures.

Holotypes of *cerylonoides* Pascoe (New Guinea), *exilis* Marseul (Japan) and *praslinensis* Gebien (Seychelles) are in the British Museum (Nat. Hist.), those of *papuanus* Kaszab (New Guinea) and *zimmermani* Kaszab (Upolu) are in the Hungarian Natural History Museum, Budapest—all have been examined by the author.

LECTOTYPE of *minor* Waterhouse, present designation (sex indet.). DAMMA ISLAND bearing labels as follows: "Damma Is. 92-20/5873", left hand specimen, B.M. (Nat. Hist.)

Paralectotype of *minor* Waterhouse on same card mount as type, right hand specimen of the pair.

Comparative notes. General facies similar to *ficicola* (see *ficicola* "Comparative notes"). The small size and sub-cylindrical form combined with the shape of the pronotal basal margin (Text-fig. 17) distinguish this species.

Distribution. Oriental and Ethiopian (Malagasy sub-region—Seychelles and Madagascar) illustrated in Map 2, probably of Indo-Malayan origin. The wide distribution of this species in the Oriental region may be partly due to commerce. In the Pacific Island distribution wind (typhoons etc.) may have combined with man. The islands appear to have been used as stepping-stones.

I have seen single specimens, presumably representing importations, from Iran, Abadan (Corporaal Coll.) and French W. Africa, Yapo.

Habitat. Occurs under bark of a wide variety of trees. In India it is most frequently recorded from sal (*Shorea robusta*), Blair (1930). It is not infrequently found in produce, illipe nuts, rice etc., from the Orient arriving in Great Britain. In Japan this species is sometimes found in flour mills. One specimen from Assam, identified by Blair, was collected in a cave.

Palorus austrinus Champion

(Text-fig. 32)

Palorus austrinus Champion, 1896, *Entomologist's mon. Mag.* **32**: 30.

Length 2.3-2.8 mm.; breadth 0.9-1.0 mm.; brown, moderately shining to dull; micro-reticulation shallow, frequently distinct.

Head. Flat anteriorly (clypeus and genae); clypeus with puncturation slightly sparser than genae; eyes large, not protuberant.

Pronotum. Transverse, often slightly broader towards apex, a very narrow (breadth of approx. 3 punctures) longitudinal median impunctate region, from base to apex, is present but often indistinct; apical angles obtuse, rounded, dorsally (see Text-fig. 32) and ventrally weakly produced; apical margin almost straight; lateral margins subparallel or slightly convergent to base, in lateral view moderately (Text-fig. 32 inset) or strongly raised from basal half or third to base (sometimes more so on one side than on the other); with a more or less distinct, very shallow depression on each side extending from approximately apical to basal fifth (Text-fig. 32); basal margin nearly as wide as base of elytra.

Elytra. Usually elongate (as Text-fig. 32); interstices 2 and 3 with puncturation somewhat confused but approximating to single rows.

LECTOTYPE, present designation (sex indet.). AUSTRALIA: Roebuck Bay, bearing labels as follows: "TYPE [standard B.M. (Nat. Hist.) type label]/Roebuck Bay N.W. Australia J. J. Walker/G. C. Champion Coll. B.M. 1927-409/Palorus austrinus Ch. [Champion's MS]" left hand specimen, B.M. (Nat. Hist.).

Paralectotypes: nine examples: the right hand specimen on the same card as the lectotype and eight others from Roebuck Bay and Damma Island, seven in the B.M. (Nat. Hist.) and two in the Australian Museum, Sydney.

Champion (1896) gives the following localities in his description of *austrinus*: "N.W. Australia, Roebuck Bay and Port Darwin; Damma Island." I am placing the syntype material from Port Darwin (six specimens) in *intermedius* sp. n.

Comparative notes. *P. austrinus* is easily confused with female *genalis* if the form of the genae is overlooked and on pronotal shape some individuals resemble *ratzeburgii*. The larger eyes of *austrinus*, however, immediately separate it from *ratzeburgii*. It is also close to *intermedius* sp. n. and *beesoni*—see key for separation.

Distribution. Oriental. PHILIPPINES, BRUNEI and NORTH WESTERN AUSTRALIA. *Palorus upoluensis*, *genalis* and *ratzeburgii* have been mis-determined as *austrinus* in the past⁶ and therefore I am including full details of data on specimens (in addition to syntypes) seen by me. 2, "Broome/N.V. Austr. Mjoberg/Museum Frey Tutzing"; 1, "Roebuck Bay/S.A. Museum specimen"; 6, "Philippines, Basilan" (Hung. Nat. Hist. Mus.); 1, "Davao, Mindanao Baker" (in Smithsonian Institute, Washington); 1, "P. Princesa Palawan Baker/Museum Frey, Tutzing"; 5, "Mt. Makiling, Luzon Baker" (3 in Smithsonian Institute and 2 in Museum Frey); 5 "Los Banos, P. I. Baker" (2 in Smithsonian Institute, 2 in Frey Museum and 1 in Australian National Collection, Canberra); 1, "Borneo, Brunei" (Hung. Nat. Hist. Mus.).

Habitat. Champion (1896) said of *austrinus* (sens. Champion) "... the insect occurred in Australia under bark and away from habitations".

Palorus intermedius sp. n.

(Text-fig. 31)

Length 2.2-2.6 mm.; breadth 0.8-0.9 mm.; brown, usually light, shining; micro-reticulation shallow and indistinct.

Head. Almost flat anteriorly (clypeus and genae); clypeus with puncturation slightly sparser than genal puncturation; genae very slightly rounded, very slightly raised above level of clypeus; eyes large, moderately protuberant.

Pronotum. Transverse; apical angles obtuse, sharply defined and usually moderately produced (Text-fig. 31) (rarely, in very small specimens, they are only weakly produced), ventrally moderately produced; apical margin slightly sinuate; lateral margins sub-parallel

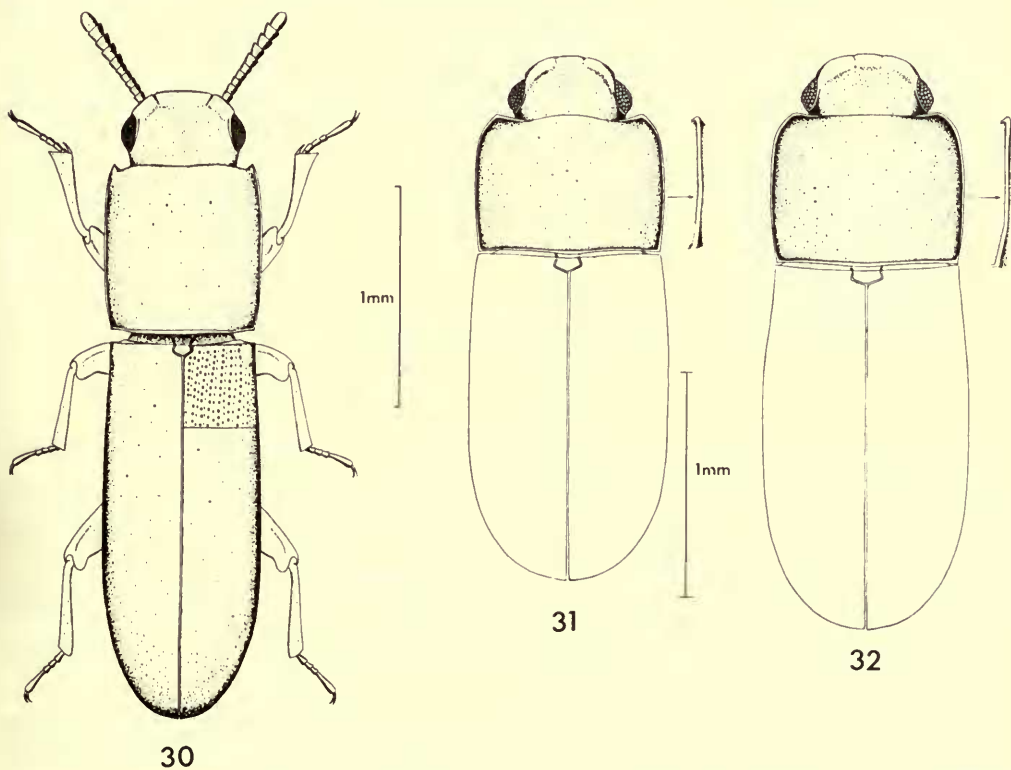
⁶ Blair (1935) records *austrinus* from the Marquesas, Hivasa; I have seen two specimens, which I believe form part of the series of five seen by Blair, and these are *P. genalis* Blair. A specimen labelled by Blair as *austrinus* from Samoa was also *P. genalis* Blair (see Blair, 1935). Blair, in the same publication, records *austrinus* from the Gilbert Islands and from Dehra Dun (India); I have not located these specimens. I have not seen the *austrinus* recorded from New Guinea by Gebien (1920). The specimens recorded as *austrinus* from New Guinea by Dr. Kaszab (1939) were *upoluensis* Blair.

from approximately apical eighth (apical angle) to base, in lateral view straight to basal half or third then slightly raised to base (Text-fig. 31, inset) (rarely moderately raised) or straight from base to apex; basal margin straight; base as wide as base of elytra.

Elytra. Usually comparatively short (when compared with *austrius*) (see Text-figs. 31, 32); interstices 2 and 3 with single rows of punctures usually becoming irregular towards base.

Holotype ♂. AUSTRALIA: Queensland, bearing labels as follows: "Cairns distr. A. M. Lea/K 67015", in the Australian Museum, Sydney.

Paratypes: fifty-five examples; AUSTRALIA: Northern Territory, Queensland and N.S.W., bearing labels as follows: 1, "Cairns distr. A. M. Lea/Attracted to light/K 67015", (in the Australian Museum, Sydney); 3, "Cairns distr. A. M. Lea" (2, B.M. (Nat. Hist.) and 1, National Collection, Canberra); 1, "Cairns E. Allen" (National Collection, Canberra); 1, "Cairns distr. J. A. Anderson/Queensland Museum" Queensland Museum type No. T6352; 1, "Cairns Hacker/S.A. Museum specimen"; 1, "Clermont vii.28, Queensland Dr. K. K. Spense" (Australian Museum, Sydney); 1, "Yeppoon Q. H.J.C. x/24"; 3 (on same card), "Kuranda N. Q. Hacker"; 1, "Qloomba, Queensland F. H. Saylor" (this and the previous



FIGS. 30-32. 30, *Palorus acutangulus* sp. n. 31, *Palorus intermedius* sp. n. Inset lateral view of pronotal side margin. 32, *Palorus austrius* Champion. Inset lateral view of pronotal side margin.

4 in the National Collection, Canberra); 1, "Queensland Rockhampton/Museum Frey, Tutzing"; 1, "Queensland P. P. Dodd 1904-27/Townsville" (B.M. (Nat. Hist.)); 1, "Gladstone Q, Lea/S.A. Museum specimen"; 2 (same card) "Port Darwin, N.W. Australia J. J. Walker/Palorus austrinus Ch [Champion's MS]" (= syntypes of *austrinus* Champion); 2 (same card) "Port Darwin 92-2/4734" (= syntypes of *austrinus* Champion); *ibid.* "/4735" (= syntypes of *austrinus* Champion); 1, "Adelaide River 91-49/979"; 2 (same card) "Adelaide River 92-20/5605"; 1, "Adelaide River N.W. Australia J. J. Walker/Palorus austrinus Ch. [Champion's MS]" (this and the previous nine specimens in the B.M. (Nat. Hist.)); 1, "Adelaide River N.W. Australia J. J. Walker/S.A. Museum specimen"; 8 (5 specimens on one pin and 3 on one pin), "Groote Eylandt A. H. Elston Collection" (in the Australian Museum, Sydney); 2 (both on same pin) "Melville I. W. D. Dodd/S.A. Museum specimen"; 6 (2 on one pin, 4 on another), "Milingimbi, Crocodile Is. N. Austr. C. Barrett/F. E. Wilson Collection/National Museum of Victoria, Melbourne"; 1, "Richmond R. N.S. Wales 1909-174" (in B.M. (Nat. Hist.)).

Comparative notes. This species is very close to *austrinus*. It may be separated from this species by characters of the pronotum (see key) and is usually shorter than *austrinus* due to comparatively shorter elytra.

In addition certain individuals resemble *upoluensis* but the pronotum is more parallel sided and its basal rim is not as strongly expanded in the middle as in *upoluensis*.

Distribution. Australian. NORTHERN TERRITORY to NEW SOUTH WALES—as above.

Palorus reticulatus sp. n.

(Text-fig. 33)

♀ (♂ unknown). Length 2.5 mm.; breadth 0.9 mm.; brown, dull; micro-reticulation deep, uniform and distinct over dorsal surface (see Text-fig. 33).

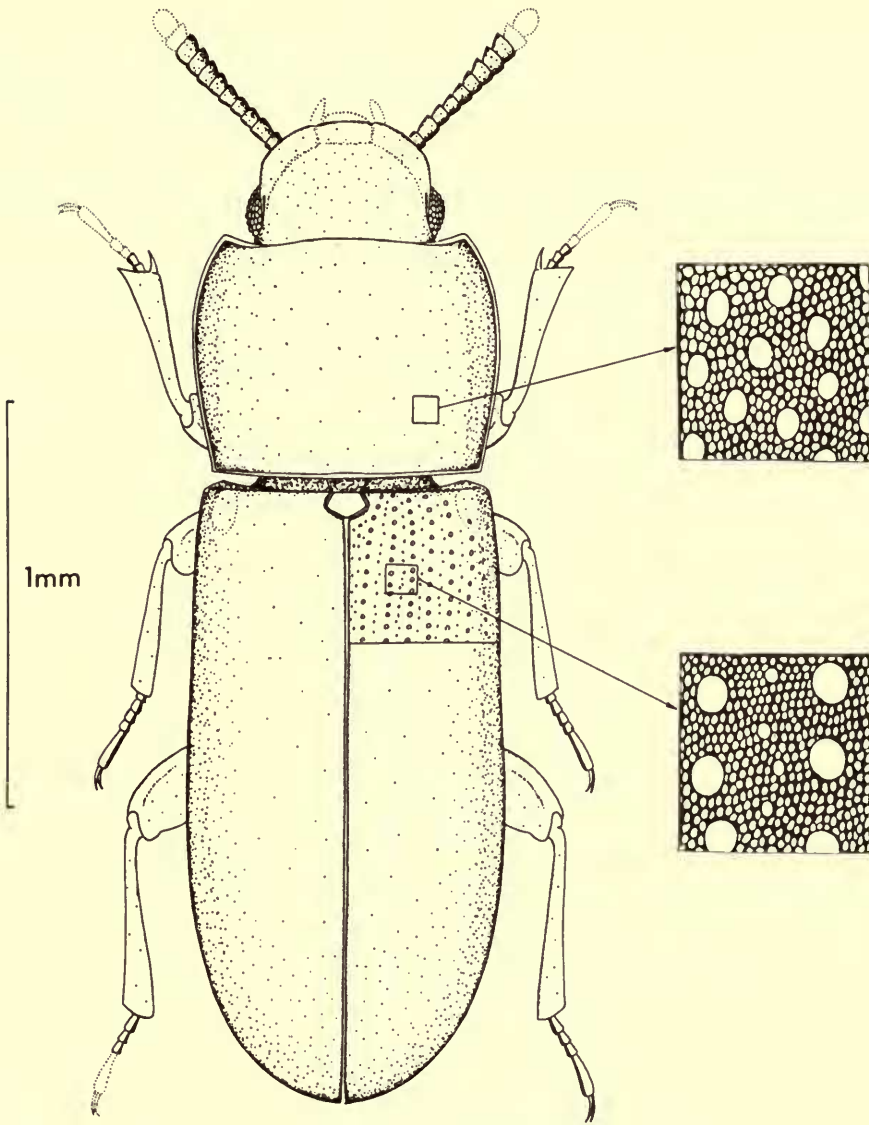
Head. Flat anteriorly; moderately densely punctured, punctures with fine setae; clypeus slightly raised medially; genae slightly lower than top of clypeus; eyes comparatively large, not prominent; supra-orbital carinae distinct.

Pronotum. Moderately transverse, slightly cordiform, puncturation as head; apical margin, excluding apical angles, almost straight; apical angles sharply defined; lateral margin gradually rounded and convergent to base; basal margin almost straight.

Elytra. Scutellary striole not differentiated; striae punctures with fine setae—as pronotal punctures (setae not illustrated); interstices with single rows of punctures.

Holotype ♀. AUSTRALIA: Queensland, bearing labels as follows: "Clermont ix 29 Queensland Dr. K. K. Spense/K. K. Spense Collection/Palorus sp. prob. new A. Neboiss, 1959" in the collection of the Australian Museum, Sydney.

Comparative notes. The uniform distinct micro-reticulation and the "flat" head combined with the pronotal form distinguish this species.



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FIG. 33. *Palorus reticulatus* sp. n. Inset small areas of pronotum and elytron to show micro-reticulation.

Palorus hypophloeoides Blair

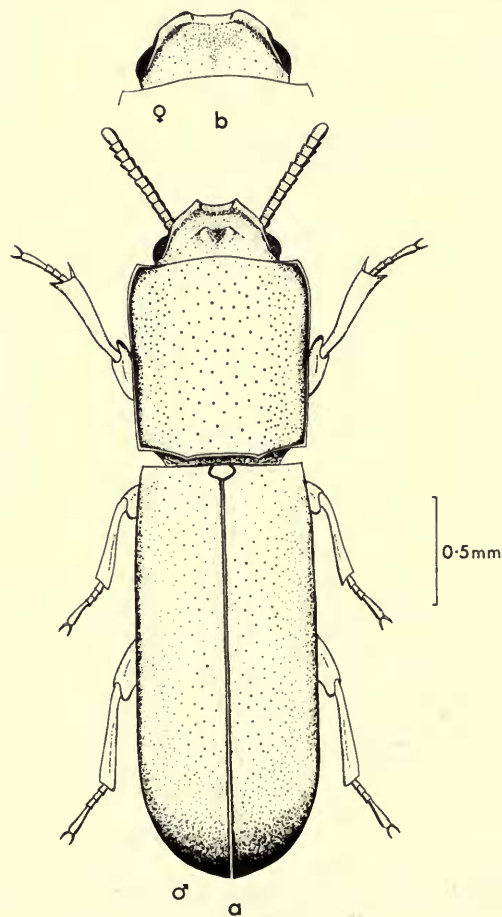
(Text-figs. 34a, b)

Palorus (Stenopalorus) hypophloeoides Blair, 1930, *Indian Forest Rec. Ent. Ser.* **14** (5) : 136.

Length 2.1–3.2 mm. ; breadth 0.5–0.8 mm. ; very elongate and cylindrical ; brown, pronotum shining, elytra somewhat dull ; micro-reticulation very shallow and ill-defined, absent from some regions of pronotum.

Head. Moderately densely punctured, supra-orbital carinae well developed ; ♂ with a pair of prominent frontal tubercles and small projections of genae at clypeo-genal sutures (Text-fig. 34a) ; ♀ (only one specimen seen) with frontal tubercles represented by two very weakly raised areas (Text-fig. 34b).

Pronotum. Elongate, disc slightly depressed ; punctures moderately deep, separated by 2–3 diameters ; basal margin straight for approximately median third, then angled to sides.



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FIG. 34. *Palorus hypophloeoides* Blair, (a) ♂ ; (b) ♀ head.

Elytra. With deep stria punctures; scutellary striole of 4 to 5 punctures—often becoming very shallow at apex; interstitial puncturation approximating to single rows.

LECTOTYPE, present designation, ♂. INDIA: Dehra Dun, bearing labels as follows: "Type [standard B.M. (Nat. Hist.) type label]/Cannt Road Dehra Dun C. F. C. Beeson 8.x.1926/R.R.D. 499 B.C.R. 163 Cage 290/ex Dalbergia Sissoo/489/hypophloeoides [MS]", B.M. (Nat. Hist.).

Blair (1930) gives two records for the type material (i.e. at least two specimens). In the British Museum (Nat. Hist.) there is only the above specimen with type locality data.

Comparative notes. This species is quite distinct from all other *Palorus* on external dorsal morphology and for this reason Blair placed it in the subgenus *Stenopalorus*. I have not chosen to place it in a distinct genus and have not used subgenera. *P. hypophloeoides* has normal genitalia and a series of deep punctures on the 2nd sternite in the male—typical of *Palorus*.

Distribution. Oriental. In addition to the lectotype, from INDIA: Dehra Dun, I have seen specimens from SINGAPORE and INDIA: Kumaun with the following data, 3 ♂, 1, "Bi 6/22 [1, 9/22 and 1, 2/22]/Singapore C. J. Saunders B.M. 1933-227"; 1, ♀, "R. Sarda Gorge Kumaon U.P. Dec. 1918 H.G.C./2683" (B.M. (Nat. Hist.)).

Habitat. According to Blair, from *Dalbergia sissoo* and *Pinus longifolia* (specimen from *Pinus* not seen by me).

Palorus sinuaticollis Blair

(Text-figs. 35a, b)

Palorus sinuaticollis Blair, 1930, *Indian Forest Rec. Ent. Ser.* **14** (5): 137.

Palorus fuhoshoanus Kaszab, 1941, *Stettin. ent. Ztg* **102**: 56, **syn. n.**

Length 3.3-3.8 mm.; breadth 1.3-1.5 mm.; large robust species; red-brown to dark brown, dull; micro-reticulation deep and distinct.

Head. Anteriorly emarginate; eyes large and prominent, dorsal length greater than breadth of clypeus.

In ♂ (Text-fig. 35a) with deep median depression; punctures generally separated by slightly more than one diameter; clypeus ill-defined, clypeal area sparsely punctured and shining; genae strongly raised above level of clypeus and eye (form characteristic see Text-fig. 35a). Only one large specimen seen, small males probably approach the female in development of genae.

In ♀ (Text-fig. 35b) with a shallow ill-defined median depression; punctures on vertex separated by one diameter or less; clypeus sparsely punctured and moderately shining in the middle; genae raised above level of clypeus and moderately prominent.

Pronotum. Transverse; moderately densely punctured, punctures on disc fine (punctures without long setae); apical margin strongly sinuate; apical angles not sharply defined; lateral margin slightly rounded from base to apex; basal margin almost straight.

Elytra. Scutellary striole of 5 or 6 punctures, more or less distinct; interstices with punctures approximating to two rows, three rows in some areas.

LECTOTYPE, present designation, ♀. BURMA: Pyinmana, bearing labels as follows: "Type [standard B.M. (Nat. Hist.) type label]/For. Zool. Coll. Yananngmyin R. Pyinmana, Burma 17.iv.1919 C. F. C. Beeson/Tectona grandis/Ex. Coll. Dehra

Dun B.M. 1924-219 256/P. sinuaticollis Blr Type det K. G. Blair", B.M. (Nat. Hist.).

Paralectotype ♀. TONKIN: Hoabinh, as recorded by Blair (1930), B.M. (Nat. Hist.).

The specimen recorded by Blair from Inthabaing Reserve, Insein has not been found.

Holotype of *fuhoshoanus* Kaszab is in the Deutsches Entomologisches Institut, Berlin.

Comparative notes. The form of the head and pronotum, combined with size distinguish this species.

Distribution. Oriental. INDIA, VIETNAM, FORMOSA.

In addition to the types (from India and Formosa (*fuhoshoanus*)) I have seen the following: 1, ♀, "Formosa Polisha" (in the Hung. Nat. Hist. Mus.); 1, ♂, (specimen figured) "Hoah Binh Tonkin 12.1934 A de Cooman/Museum Frey Tutzing".

Habitat. Recorded from *Tectona grandis* and *Mangifera* sp. by Blair (1930).

Palorus shoreae Blair

Palorus shoreae Blair, 1930, *Indian Forest Rec. Ent. Ser.* **14** (5) : 138.

Length 3.1-3.4 mm.; breadth 1.2-1.3 mm.; large, moderately elongate species similar to *beesoni* and *kaszabi* sp. n.; red-brown to dark brown, somewhat dull; micro-reticulation very deep and distinct to shallow and indistinct.

Head. Moderately densely punctured, punctures bearing short indistinct setae; clypeus slightly less densely punctured than genae; eyes large, dorsal length equal to breadth of clypeus; male with genae rounded, slightly to distinctly raised above level of clypeus and slightly prominent anteriorly (similar to angular form of *beesoni* Text-fig. 37b); female with head anteriorly almost flat or genae very slightly raised above level of clypeus, genae rounded, not prominent anteriorly.

Pronotum. Transverse; moderately densely punctured, punctures bearing long fine setae, equal in length to two diameters of largest punctures; apical margin straight to slightly sinuate; apical angles more or less obtuse; lateral margin subparallel for apical half or two thirds then slightly rounded and convergent to base; basal margin almost straight; sides with very shallow, diffuse depression towards base.

Elytra. Somewhat elongate, equal to about 2.25 times the pronotal length; strial and interstitial punctures with setae, not as long as pronotal setae; scutellary striole indistinct, represented by two or three shallow, ill-defined punctures, sometimes absent on one or both elytra; interstitial puncturation variable and confused, third interstice with punctures approximating to two rows.

LECTOTYPE, present designation (sex indet.). INDIA: Manipur, bearing labels as follows: "Type [standard B.M. (Nat. Hist.) type label]/Shugnu 3000' Manipur S. N. Chatterjee 30.iii.1924/Under bark/497/shoreae/*Palorus shoreae* Blr Type det K. G. Blair", B.M. (Nat. Hist.).

Paralectotypes: nine examples, two in the Hungarian Natural History Museum, Budapest and seven in the British Museum (Nat. Hist.), locality data as in Blair (1930).

Comparative notes. *P. shoreae* has the general facies of *kaszabi* sp. n. and *beesoni* and is also somewhat similar to *genalis*; it is distinguished in the key.

Distribution. Oriental. INDIA and VIETNAM.

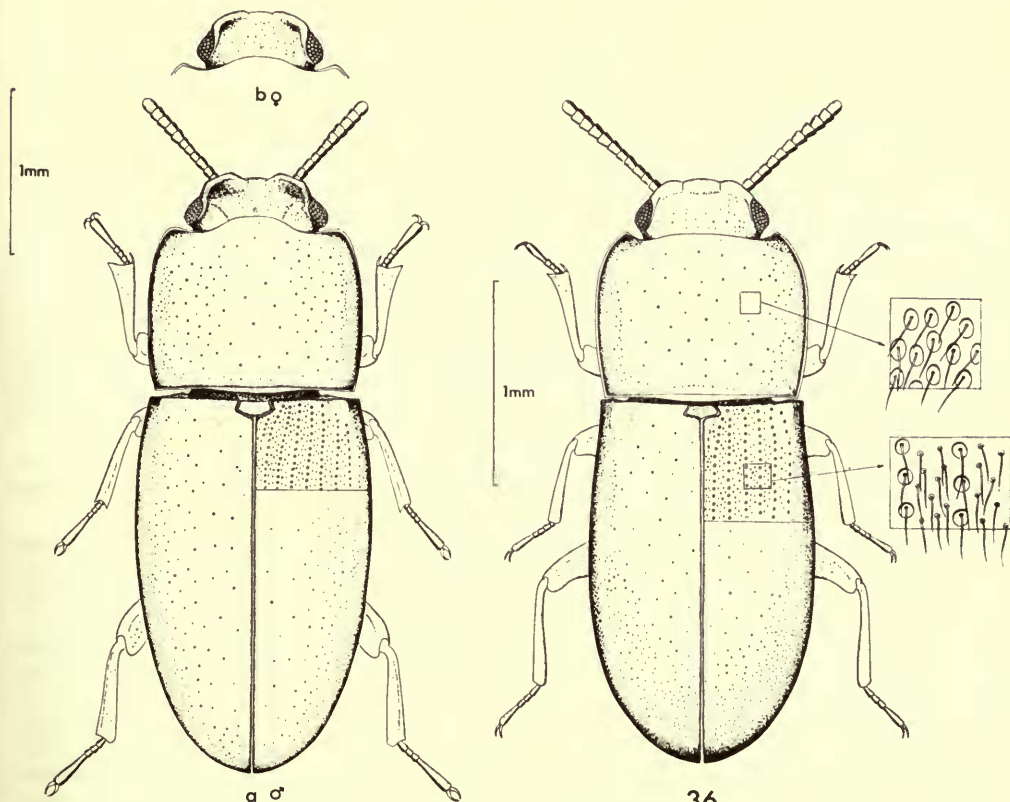
In addition to the types from India I have seen specimens labelled, "Anamalai Hills Cinchona S. India" (♂, ♀—♂ in Frey Mus. ♀ in Ardoin Coll.); "Tonkin Hoabinh Aug 1918 R. V. de Salvaza/Indo. China R. V. de Salvaza 1918. 1" (in B.M. (Nat. Hist.)).

Palorus kaszabi sp. n.

(Text-fig. 36)

Length 2.8 mm.; breadth 1.1 mm.; dark brown, somewhat dull; micro-reticulation distinct (not illustrated).

Head. Punctuation moderately dense, coarse on vertex, punctures bearing fine indistinct setae; clypeus slightly raised in the middle, punctuation slightly less dense than that of genae; genae slightly raised, rounded, not prominent; eyes large.



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FIGS. 35, 36. 35, *Palorus sinuaticollis* Blair, (a) ♂; (b) ♀, head and pronotal apex. 36, *Palorus kaszabi* sp. n. Inset setation of a small region of elytron and pronotum.

Pronotum. Moderately densely punctured, punctures bearing long distinct setae (Text-fig. 36, inset); apical margin sinuate; apical angles sharply defined, slightly more than right angles; lateral margin slightly rounded dorsally, in lateral view raised to base from approximately basal half; shallow longitudinal depressions at sides of disc; basal margin slightly sinuate due to expansion of basal rim medially (Text-fig. 36).

Elytra. Strial and interstitial punctures with long distinct setae (Text-fig. 36, inset); puncturation of interstices somewhat confused but approximating to two or three rows.

Holotype ♂. PHILIPPINES: Binalnan, bearing label as follows: "Philippines, Binalnan".

Paratype, ♂, with the same data as the holotype, both specimens in the Hung. Nat. His. Mus.

Comparative notes. This species is readily distinguished by the very long fine setae on pronotum and elytra and is separated from the closely related *shoreae* by pronotal form etc.—as in key.

Species named after Dr. Z. Kaszab, Hungarian Natural History Museum, Budapest.

Palorus genalis Blair

(Text-figs. 38a-d)

Palorus genalis Blair, 1930, *Indian Forest Rec. Ent. Ser.* **14** (5): 140.

Palorus saipanensis Kulzer, 1957, *Insects Micronesia* **17** (3): 220, **syn. n.**

Length 2.1-2.6 mm.; breadth 0.7-0.9 mm.; brown, moderately shining to dull; microreticulation strong and distinct.

Head. Fairly densely punctured; eyes appearing comparatively flat (when compared with *beesoni* etc.) dorsal length more than twice dorsal breadth; maximum expanse of gena equal to (♀) or greater than (♂) maximum dorsal breadth of eye; clypeus, and a narrow region at base of genae, sparsely punctured and shining.

♂ with genae projecting beyond clypeus, produced medially to form a triangular projection, always distinct but developed to a varying degree dependent on absolute size of individual (see Text-figs. 38a and b); vertex high, frons forming an almost vertical somewhat triangular region, moderately densely punctured as the rest of the head.

♀ with genae very slightly prominent anteriorly, distinctly raised above level of clypeus, margin thickened and forming a low arcuate ridge (Text-fig. 38d); vertex not as high as in the male and frons not somewhat triangular.

Pronotum. More or less transverse (Text-figs. 38a, 38d), punctures bearing fine short setae, often absent (rubbed off?) on disc; sides subparallel to slightly rounded (Text-fig. 38d) in female; very slightly rounded (Text-fig. 38c), or distinctly so in large individuals (Text-fig. 38a), in males.

Elytra. Strial punctures with short fine setae, usually discernible but not very distinct; interstitial puncturation variable and confused, usually approximating to two rows, at least for part of length of interstices 2-4.

Aedeagus as in Text-fig. 38e.

LECTOTYPE, present designation, ♂. CEYLON: Peradeniya, bearing labels as follows: "Type [standard B.M. (Nat. Hist.) type label]/Ceylon E. E. Green 1900-239/From dry paddy Peradeniya [MS]/*Palorus genalis* Blr. det. K. G. Blair T", B.M. (Nat. Hist.).

Paralectotypes: three examples, data as the lectotype.

Blair (1930) includes Ceylon, (E. E. Green), North Andaman (B. M. Bhatia) and Philippine Islands (Semper) in his type localities for this species. I have not been able to find the specimen from N. Andaman and there is a very long series of *genalis* from the Philippines (Semper) whereas Blair said "The short series from the Philippine Islands . . ." I am therefore considering only the Ceylon material, the above four specimens, as syntypes.

Holotype of *saipanensis* Kulzer is in the Chicago Natural History Museum.

Comparative notes. The triangular form of the genae readily distinguishes the male from that of other species. The female is somewhat similar to both sexes of *beesoni* (normal form) and *austrinus* but may be separated on genal form as in the key. Also in both sexes of *genalis* the elytra are slightly more acuminate than in *beesoni* and *austrinus*.

Distribution. Oriental (also Africa and W. Indies, apparently imported). The type locality for *saipanensis* Kulzer is Mariana Islands. Specimens have been seen from the following localities: WEST INDIES, Trinidad (on Paddy var sughandi, 1958) and Guadeloupe (old specimens 1900?); AMERICAS, BRITISH HONDURAS, Rio Temas, 1937; AFRICA, KENYA, Msambareni (1952 on Sorghum) and Lindi (ex Cassava), WEST AFRICA, N'Zérékoré, 1951; CELEBES, (collected by Wallace, 1866); SIAM; MALAYA (Pahang, in stored rice in rice mill 1939); MARQUESAS ISLANDS, Atuoua Hiva Oa, 1929.

Habitat. The types (*genalis*) were collected on dry paddy (Ceylon) and the specimen from N. Andaman (not seen) on *Myristica andamanica*. It is frequently associated with stored products and has been imported into Great Britain in small numbers on cassava root (loaded Zanzibar), cattle food beans (from Mombasa) (see also Kenya records above), illipe nuts and sago flour (from Singapore), tapioca root (from Java), gapek root (from Borneo), rice and groundnut cake (from Burma) and ginger (from W. Indies). Specimens from Saipan and Guam (*saipanensis* paratypes) were collected at light.

Palorus beesoni Blair

(Text-figs. 37a-c)

Palorus beesoni Blair, 1930, *Indian Forest Rec. Ent. Ser.* **14** (5) : 140.

Length 2.2-2.9 mm.; breadth 0.8-1.1 mm.; facies similar to *ratzeburgii*; brown, often dark, moderately shining, rarely dull; micro-reticulation usually distinct but shallow.

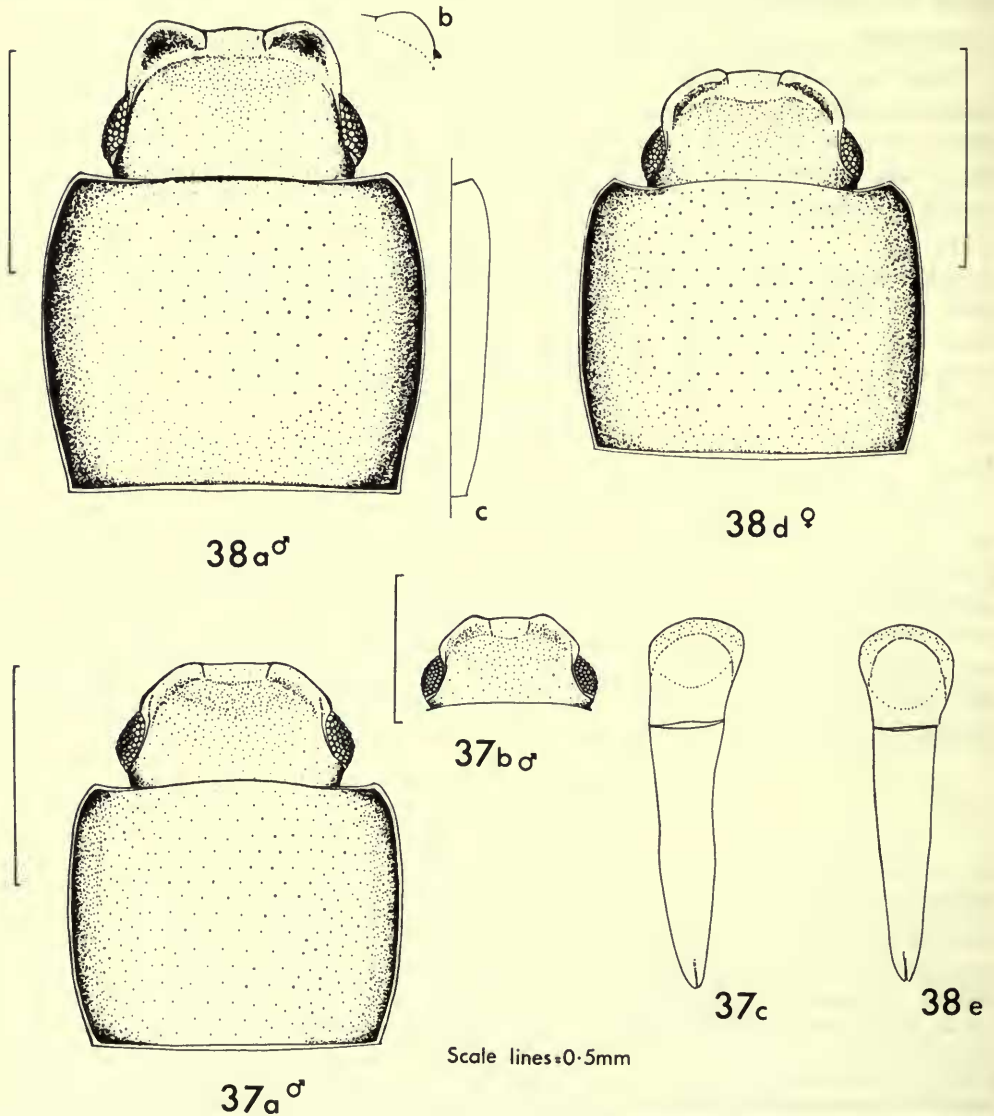
Head. Clypeus with puncturation somewhat sparser than genal puncturation; genae of female and non-angular male form (Text-fig. 37a) almost straight to slightly rounded, usually slightly raised above level of clypeus but sometimes level with clypeus; angular form male with genae sometimes produced anteriorly forming an angle near clypeo-genal suture (as in Text-fig. 37b); this form grades into non-angular form; maximum expanse of gena, at middle, approximately two thirds or less of maximum dorsal breadth of eye; vertex not as high as in *genalis*, frons not somewhat triangular; eye slightly variable in size, large, dorsal length normally approximately twice dorsal breadth (usually more prominent than in *genalis*).

Pronotum. More or less transverse (sometimes nearly quadrate) (Text-fig. 37a), densely and coarsely punctured laterally, punctures bearing fine setae, usually distinct; apical margin

slightly sinuate; apical angles moderately sharply defined; lateral margins, in dorsal view, from approximately basal third slightly convergent to base, in lateral view, raised from basal half or third to base, basal margin slightly narrower than elytral base.

Elytra. Strial punctures moderately deep; interstitial puncturation confused, approximating to one or two rows in interstices 2 and 3.

Aedeagus as in Text-fig. 37c.



FIGS. 37, 38. 37, *Palorus beelsoni* Blair, (a) head and pronotum of normal ♂ (also typical of ♀); (b) head of ♂ with angular genae; (c) aedeagus. 38, *Palorus genalis* Blair, (a) pronotum and head of ♂ with strongly developed genae; (b) moderately developed ♂ gena (outline); (c) straight form of pronotal side; (d) ♀ head and pronotum; (e) aedeagus.

LECTOTYPE, present designation (sex indet.). INDIA: Singhbhum, bearing labels as follows: "Type [standard B.M. (Nat. Hist.) type label]/Singhbhum, Bihar & Orissa C. F. C. Beeson g.i. 1921/Ex Ficus religiosa/34/Ex Coll. Dehra Dun B.M. 1924-219/Palorus besoni Blr. T. det K. G. Blair", B.M. (Nat. Hist.).

Paralectotypes: fourteen examples, data as in Blair (1930), thirteen in B.M. (Nat. Hist.) and one in Hung. Nat. Hist. Mus.

Specimens from the localities "Patri..." and "North Sinhawa range..." (localities given in Blair's original description) have not been found.

Comparative notes. This species is similar to female *genalis* and *austrinus* and apart from eye size could be confused with *ratzeburgii*. From *genalis* females it may be distinguished on genal form (Text-figs. 37a and 38d) and from *austrinus* on pronotal form (more convergent to base in *besoni*). The paramere tube is distinct from that of *genalis* (see Text-figs. 37c, 38e).

Distribution. Oriental. Blair (1930) records this species from INDIA and BURMA; in addition I have seen specimens from CEYLON, CELEBES, JAVA, N. VIETNAM (Hoah-Binh) and CHINA (Kwangtung).

Habitat. Under bark of various trees attacked by bark-beetles or sapwood-borers (Blair, 1930). Blair records the following genera of trees: *Ficus*, *Butea*, *Boswellia* and *Mangifera*. One specimen seen was collected at light.

Palorus auranteus sp. n.

(Text-fig. 40)

♂ (♀ unknown). Length 2.4 mm.; breadth 0.9 mm.; orange-brown, pronotum moderately shining, elytra dull; micro-reticulation shallow, indistinct on pronotum, distinct on elytra.

Head. Moderately densely punctured, punctures bearing fine distinct setae; clypeus flat, sparsely punctured and shining; genae raised above level of clypeus, densely punctured, round and prominent (Text-fig. 40); eyes large, protuberant, with large facets; antennae long (slightly longer than in *besoni*); vertex high.

Pronotum. Transverse; moderately densely punctured, at sides punctures separated by one diameter, punctures bearing fine setae; apical margin almost straight; apical angles not prominent, obtuse, not very sharply defined; lateral margin in dorsal view rounded from base to apex, in lateral view arcuate; with very shallow, ill-defined, longitudinal depressions at sides of disc (Text-fig. 40).

Elytra. Scutellary striole of 4 (or 5?) ill-defined, shallow punctures; interstitial punctures approximating to two rows in interstices 2 and 3.

Holotype, ♂. MALAYA: Fraser's Hill, bearing labels as follows: "Gap (Fraser's Hill) Malay Peninsula A. M. Lea & Wife/S.A[ustralian] Museum specimen" (on each elytron there is the remains of a uropodid mite (Acarina) stalk).

Comparative notes. This species (♂) is very close to *besoni* and has the general facies of *genalis*. It may readily be distinguished by the rounded, moderately prominent genae, the large, coarsely faceted eyes, the long antennae and the pronotal shape (Text-fig. 40).

Palorus tenuipunctatus Blair

Palorus tenuipunctatus Blair, 1930, *Indian Forest Rec. Ent. Ser.* **14** (5) : 140.

Length 2.8–3.0 mm. ; breadth 1.1 mm. ; rather convex transversely ; yellowish brown ; micro-reticulation deep and dense (Text-fig. 41) giving an opaque dull appearance.

Head. Moderately densely punctured, punctures separated by a diameter or less and bearing distinct short setae (exceeding the longitudinal length of a puncture) ; eyes large and close to front of head, dorsal length greater than genal length ; clypeus and genae with puncturation of equal density ; clypeus wide (equal to about 1.2 times the genal length) ; genae small, not distinctly raised or prominent.

Pronotum. Transverse, moderately densely punctured, punctures fine on disc, separated by one or two diameters, becoming coarser towards sides, bearing fine, moderately long, distinct setae ; apical margin slightly sinuate ; apical angles obtuse, sharply defined ; lateral margins almost parallel for middle half then slightly rounded to base and apex ; basal margin slightly rounded.

Elytra (Text-fig. 41). Scutellary striole not differentiated ; strial and interstitial punctures with short setae (very distinct in some lights—not illustrated in Text-fig. 41) ; interstitial puncturation confused but tending to form three or four rows.

LECTOTYPE, present designation (sex indet.). BURMA : Inthabaing Reserve, bearing labels as follows : “ Type [standard B.M. (Nat. Hist.) type label]/Mangifera sp/Inthabaing Res. Insein, Burma. D. J. Atkinson 31.xii.1926/570/*Palorus tenuipunctatus* Type Blr. det. K. G. Blair ”, B.M. (Nat. Hist.).

Although Blair records two examples, both from the same locality, there is only the above specimen in the British Museum (Nat. Hist.).

Comparative notes. The puncturation of the elytra, the micro-reticulation and the narrow genae, combined with size, distinguish this species.

Distribution. Oriental. In addition to the lectotype (BURMA) there is a specimen in the British Museum from MIDDLE ANDAMAN with the following data : “ Middle Andaman, B.M. Bhatia 6.xii.1928/ex *Dipterocarpus turbinatus*/1177 ”.

Palorus longifoliae Blair

(Text-figs. 39a, b)

Palorus longifoliae Blair, 1930, *Indian Forest Rec. Ent. Ser.* **14** (5) : 138.

Length 3.3–3.6 mm. ; breadth 1.1–1.2 mm. ; very large species, red-brown, shining ; micro-reticulation more distinct on elytra than on pronotum.

Head. Eyes large and prominent ; clypeus shining, slightly less densely punctured than genae ; genae of male raised above level of clypeus, angular (Text-fig. 39a), of female not angular, straight to slightly rounded (Text-fig. 39b).

Pronotum (Text-fig. 39a). Slightly transverse ; disc moderately depressed ; lateral margins almost straight and very slightly convergent to base ; apical margins straight ; basal margin straight for medial two thirds, slightly raised at sides.

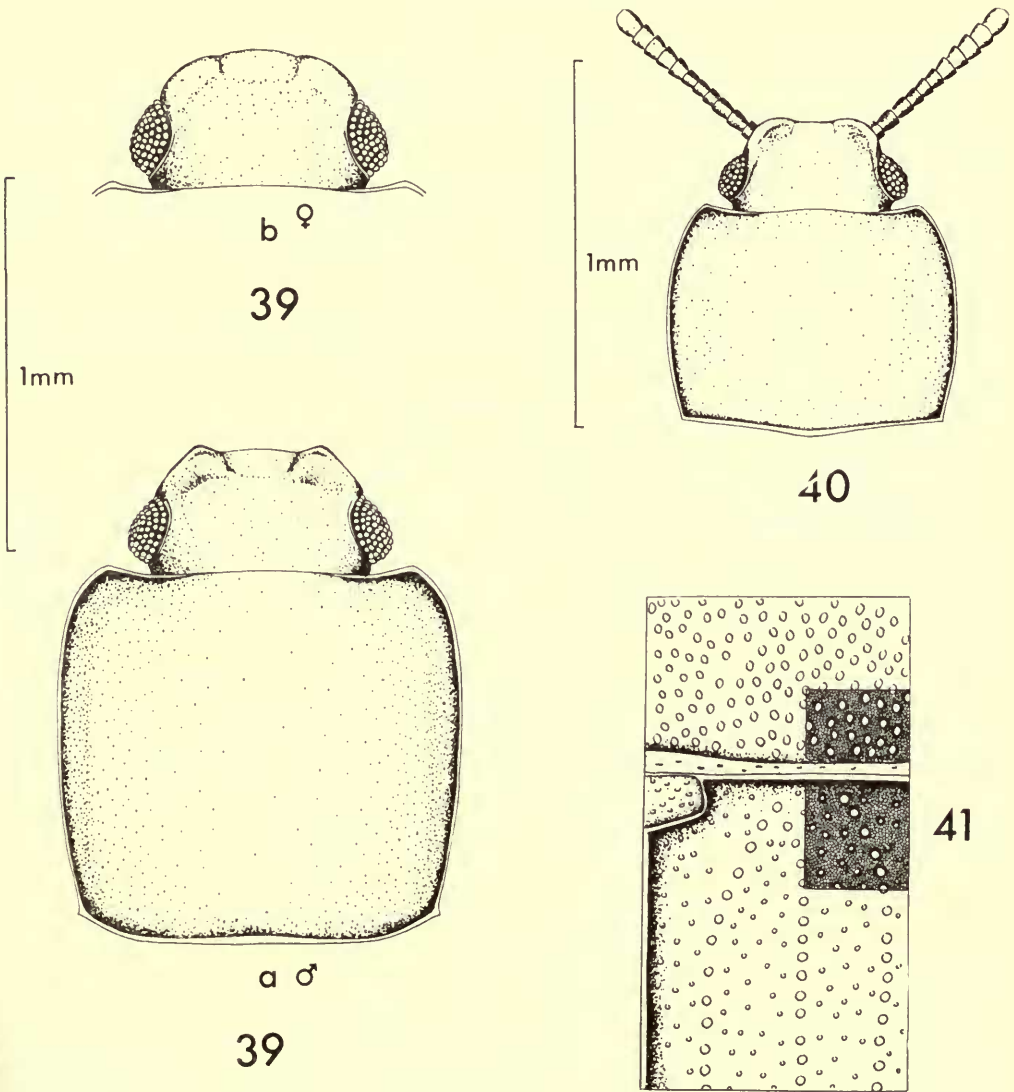
Elytra. Elongate ; strial punctures deep ; scutellary striole of 6–7 comparatively shallow but moderately distinct punctures ; interstitial puncturation approximating to one or two rows.

LECTOTYPE, present designation, ♀. N. INDIA : Trisula, bearing labels as follows : “ Type [standard B.M. (Nat. Hist.) type label]/ex *Pinus longifolia*/Ex

Coll. Dehra Dun 1924-219/For. Zool. Col. Trisula Garhwal U.P. 27.i.1919 A. E. Osmaston", B.M. (Nat. Hist.).

Paralectotypes: thirteen examples, data as in Blair (1930) (two from Trisula and eleven from W. Almora) B.M. (Nat. Hist.) and one W. Almora specimen in P.I.L. Coll.

Comparative notes. This large species is readily distinguished by the pronotal



FIGS. 39-41. 39, *Palorus longifoliae* Blair, (a) ♂ head and pronotum; (b) ♀ head. 40, *Palorus auranteus* sp. n., head and pronotum. 41, *Palorus tenuipunctatus* Blair, small area of pronotum and elytron to show punctation and micro-reticulation.

form (Text-fig. 39a) and comparatively distinct scutellary striole of 6-7 punctures. It is probably most closely related to *beesoni*.

Distribution. N. INDIA.

Habitat. From *Pinus longifolia* (types).

***Palorus andrewesi* Blair**

(Text-fig. 42)

Palorus andrewesi Blair, 1930, *Indian Forest Rec.* Ent. Ser. **14** (5) : 139.

Length 2.0-2.8 mm.; breadth 0.9-1.0 mm.; brown, bicoloured—pronotum much darker than elytra, moderately to strongly shining; micro-reticulation variable, moderately deep and distinct or shallow and more or less distinct.

Head. Moderately densely punctured, punctures separated by 1-2 diameters; clypeus much lower than genae, sparsely punctured, shining; eyes large and prominent; genae of ♂ angular (Text-fig. 42a), degree of development dependent on absolute size, distinctly raised above level of clypeus at an angle of approximately 45° to it; genae of ♀ not angular, raised above level of clypeus, rounded (Text-fig. 42b).

Pronotum. Transverse, punctures of disc separated by 2-3 diameters, puncturation coarser and denser towards sides; apical margin sinuate; apical angles obtuse but sharply defined; lateral margin slightly rounded from base to apex; basal margin almost straight, slightly expanded in the middle.

Elytra. Comparatively short and broad, elytral length : pronotal length, 2-2.2 : 1; scutellary striole of 3-5 small shallow punctures.

Holotype in the British Museum (Nat. Hist.).

Comparative notes. Somewhat similar to *upoluensis* but with pronotum not as convergent (Text-fig. 11); also *andrewesi* is bicoloured with elytra shorter, 2-2.2 : 1 (2.2-2.3 : 1 in *upoluensis*). In addition, the genae, which are angular in the ♂ and with a more strongly raised margin in the ♀, will separate this species from *upoluensis*.

Distribution. Oriental. In addition to the Holotype from INDIA I have seen specimens from SABAH and SINGAPORE with the following data: 1 ♂ "Sandakan Borneo Baker/289/Museum Frey Tutzing"; 2 ♂ and 1 ♀ with the same data in the British Museum (Nat. Hist.) "Singapore C. J. Saunders B.M. 1933-27/Scotland 15.10.22 dry bark [Saunders' MS]"; 1 ♂ in British Museum "Singapore C. J. Saunders B.M. 1933-227/04 Orchd. Rd. 9.22 [Saunders' MS]."

***PSEUDEBA* Blackburn, 1903 gen. rev.**

Pseudeba Blackburn, 1903, *Trans. R. Soc. S. Aust.* **27** : 119.

Type-species: *Pseudeba novica* Blackburn (by monotypy).

(Originally described in the Colydiidae, its true position in the Tenebrionidae was recognised by Carter and Zeck (1937) who synonymized *Pseudeba novica* Blackburn with *Palorus eutermiphilus* Lea).

Length 2.3-2.8 mm.; body moderately depressed; red-brown, moderately dull; cuticle micro-reticulate.

Head. Flat anteriorly, moderately densely punctured; clypeus almost flat to slightly raised in the middle, well- or ill-defined; genae flat, very slightly raised above antennal insertions, continuous with side margin of head; side margin of head higher than dorsal surface of eye (supra-orbital carina absent); eyes not emarginate, small or very small, just below or distinctly below dorsal surface of head, postero-laterally limited by small projections of the head. Antennae 11-segmented, inserted beneath genae, similar to *Palorus* but short in *fossor* sp. n. and thickened, with shallow sulci, in *novica*; mouth parts as in *Palorus*.

Thorax. Pronotum transverse, widest towards apex, sides moderately or strongly rounded to base, margined basally, laterally (may be very narrowly) and apically on apical angles or,

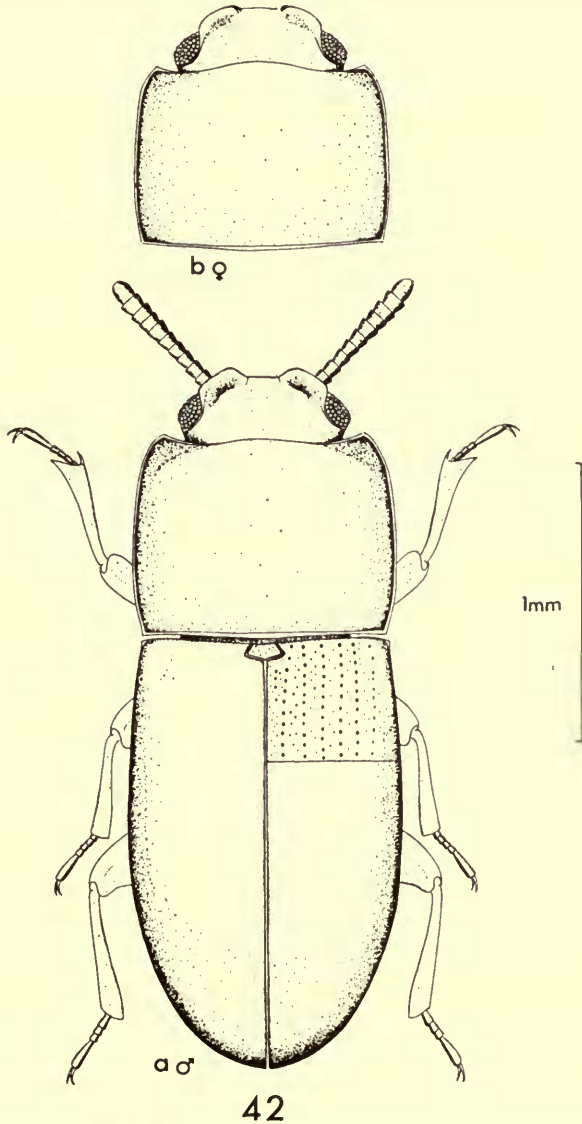


FIG. 42. *Palorus andrewesi* Blair, (a) ♂; (b) ♀ head and pronotum.

apically, margin may extend to median half; sides may have a narrow, somewhat lenticular, almost vertical region as in *Palorus*; puncturation moderately dense, may be very dense laterally; punctures oval, slightly reniform or may be confluent. Scutellum transverse, as in *Palorus* or more rounded (Text-fig. 45—*novica*). Sterna similar to *Palorus*, prosternum highly modified in *novica*, being contracted for reception of head (Text-fig. 45e). Metendosternite as in *Palorus*. Protibiae similar to *Palorus* but in *fossor* sp. n. broad and with elongate scaliform spinules dorsally on external margin (spinule form similar to that found in *Palorinus* and *Coelopalorus* (Text-fig. 53b)); tarsal formula 5-5-4 in *puncticollis* sp. n. and *fossor* sp. n., 4-4-4 in *novica*; apical tarsal segment long, basal segment (except in *novica*) very small.

Elytra. Free, covering abdomen, humeral angle moderately developed; scutellary striae not differentiated; each elytron bearing 10 single rows of striae punctures (concealed by carinae in *novica*); interstices with single rows of small or large punctures; interstices slightly raised for whole length or only slightly raised towards the apex but carinate for the greater part of their length in *novica*; epipleura as in *Palorus*. Wings well developed, venation reduced (Text-fig. 44c), similar to *Palorus*.

Abdomen. Sternites, 5 visible, second of ♂ with deep internal pits on disc (absent in *novica*), of ♀ without deep internal pits.

Genitalia. ♂ aedeagus with basal piece short (Text-figs. 43b, 44b, 45c) and pleurites of 9th sternite similar to *Palorus*; ♀ (*novica*) styli sclerotized and similar to *Palorus*.

KEY TO SPECIES OF *PSEUDEBA*

- 1 Elytral interstices strongly carinate as in Text-fig. 45a; tarsi 4-4-4
novica Blackburn (p. 127)
- Elytral interstices not strongly carinate; tarsi 5-5-4 2
- 2 Front tibiae broadly expanded; eyes very small; pronotum as in Text-fig. 44a,
with oval to reniform punctures, puncturation not very dense at sides
fossor sp. n. (p. 126)
- Front tibiae not broadly expanded; eyes somewhat larger; pronotum as in
Text-fig. 43a, without reniform punctures, puncturation dense at sides where
punctures become longitudinally confluent *puncticollis* sp. n. (p. 129)

Pseudeba fossor sp. n.

(Text-figs. 44a-c)

♂ (♀ unknown). Length 2.3 mm.; breadth 0.9 mm.; yellow-brown, moderately dull; micro-reticulation shallow, distinct.

Head. Almost flat, emarginate anteriorly (apparently normally so), moderately densely punctured, punctures oval; clypeus ill-defined, clypeal area slightly raised medially; genae flat, ill-defined, continuous with hind side margin of head, produced anteriorly at junction with clypeus, (producing the emargination); eyes protuberant, very small, lateral, separated from dorsal surface by approximately half dorsal length, not rounded to base; antennae short, apical segments somewhat flattened and slightly more expanded than usual.

Pronotum. Moderately transverse; puncturation as in Text-fig. 44, with a narrow median impunctate region extending from base to apex, punctures oval to slightly reniform, bearing short indistinct setae; apical margin almost straight; apical angles distinctly acute; lateral margins subparallel from apical sixth to basal third, then convergent to base; basal margin slightly rounded.

Elytra. Strial punctures comparatively large, round and shallow; scutellary striole absent; interstices with large punctures (diameter equal to two thirds that of striae punctures) bearing short setae; interstices slightly raised (as indicated by dotted lines in Text-fig. 44). Protibiae strongly dilated and bearing indistinct, elongate, scaliform spinules dorsally on external margin, the row of spinules curving inwards at apex.

Wing and aedeagus as in Text-fig. 44.

Holotype ♂ (dissected). N. WESTERN AUSTRALIA: Derby, bearing labels as follows: "Derby N.W.A., W. D. Dodd/S.A. Museum specimen", in the South Australian Museum, Adelaide.

Comparative notes. This species has slightly raised interstices, showing a tendency towards the carinate interstices of *novica*. The general facies is distinctive.

Distribution. AUSTRALIA—as above.

Habitat. Unknown but the form of the antenna and the general morphology suggest a myrmecophilous association.

Pseudeba novica Blackburn

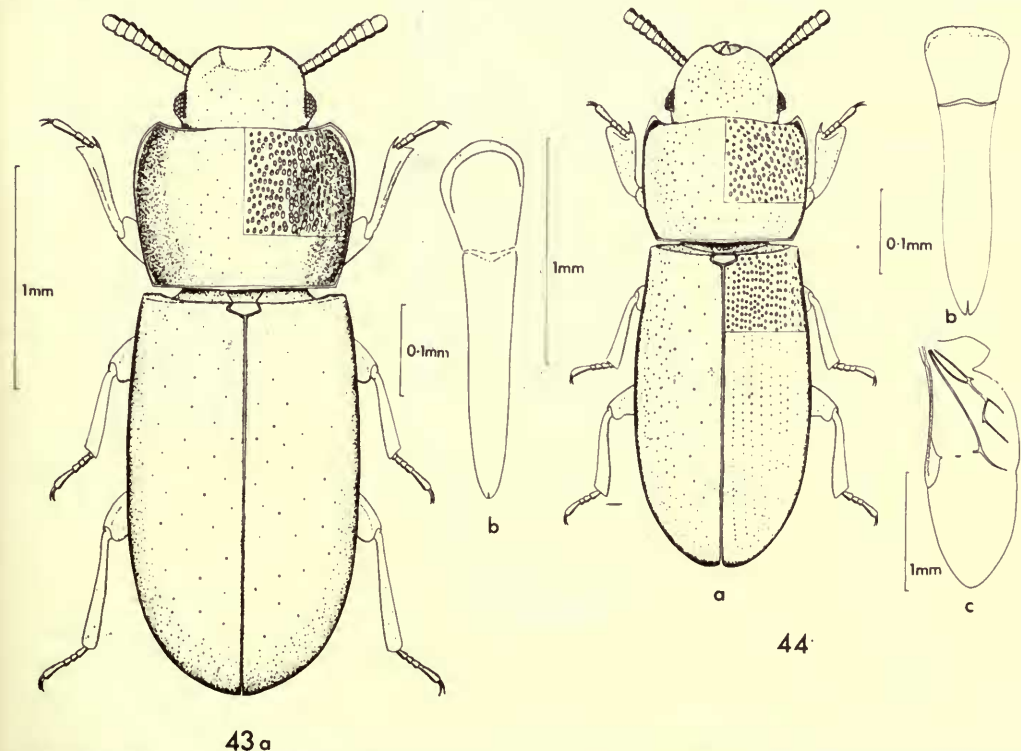
(Text figs. 45a-f)

Pseudeba novica Blackburn, 1903, *Trans. R. Soc. S. Aust.* **27**: 120.

Palorus eutermiphilus Lea, 1921, *Mem. Qd Mus.* **7** (3): 216.

(Carter and Zeck (1937) synonymized *novica* with *eutermiphilus* but Gebien (1940) did not include the species *eutermiphilus* (or this synonymy) in his catalogue).

Length (head retracted as in Text-fig. 45a) 2.4–2.6 mm.; breadth of elytral base 0.9–1.1 mm.; brown, pronotum usually slightly lighter than elytra, dull; micro-reticulation deep, distinct.



FIGS. 43, 44. 43, *Pseudeba puncticollis* sp. n., (a) ♂; (b) aedeagus, dorsal. 44, *Pseudeba fossor* sp. n., (a) ♂; (b) aedeagus, dorsal; (c) wing.

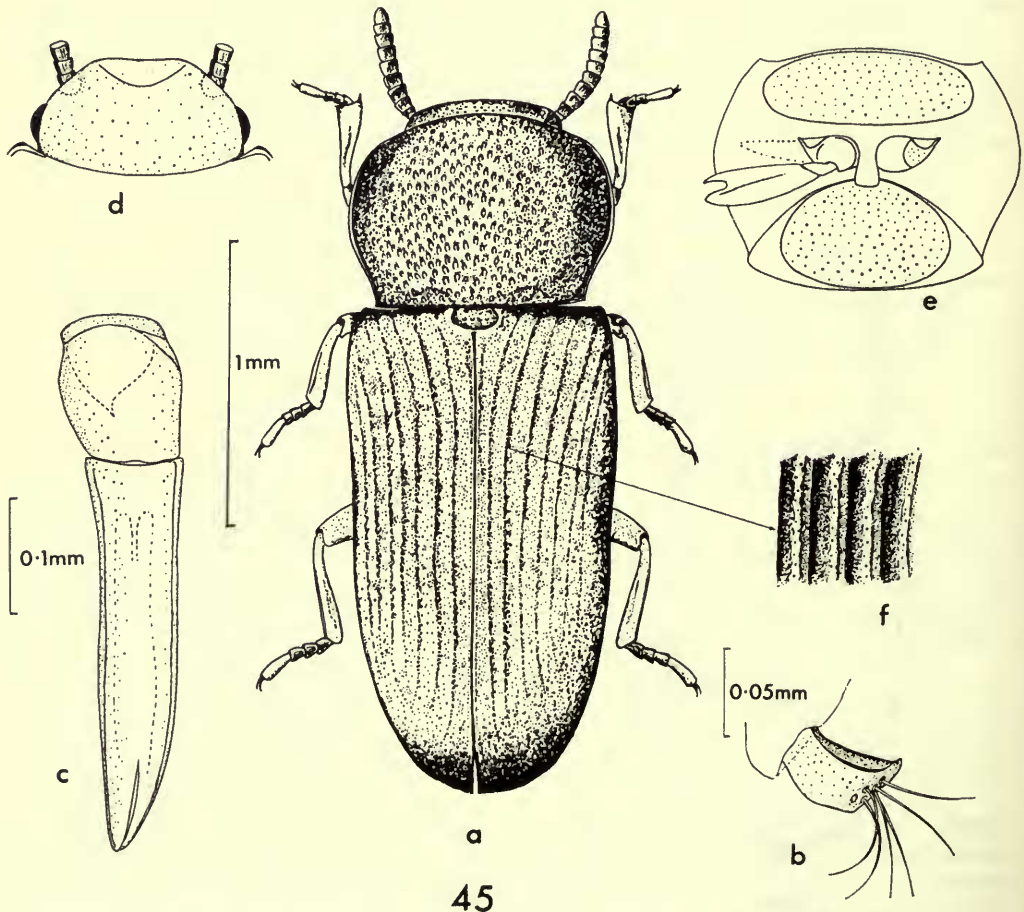
Head. Flat, normally? (at least in museum specimens) retracted into pronotum; puncturation of vertex moderately dense, becoming sparse towards clypeus, with small impunctate region above antennal insertions; punctures oval and bearing short setae; clypeus well-defined, almost flat; genae very slightly raised above antennal insertions, continuous posteriorly with side margin of head; eyes not prominent, on side of head just below dorsal surface; antennae with shallow longitudinal grooves.

Pronotum. Moderately transverse; moderately densely punctured, punctures with short, indistinct setae; sides distinctly sinuate to greater or lesser extent; apical margin almost straight; apical angles not prominent; basal margin distinctly narrower than base of elytra; two very shallow depressions often present on either side at base (see Text-fig. 45a); prosternum very narrow, modified to receive head (Text-fig. 45e).

Elytra. Often slightly sinuate laterally; interstices strongly carinate, each bearing single row of fine punctures (Text-fig. 45f); striae punctures not apparent, replaced by striae which are present between carinae extending from base to approximately apical eighth.

Tibiae and tarsi with shallow longitudinal grooves; tarsal formula 4-4-4.

Genitalia as in Text-figs. 45b, c.



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FIG. 45. *Pseudeba novica* Blackburn, (a) adult; (b) stylus; (c) aedeagus, dorsal; (d) head; (e) pronotum, ventral; (f) part of elytron.

LECTOTYPE, present designation (sex indet.). AUSTRALIA: Townsville, bearing labels as follows: "T 7253 Townsv [MS, on card mount]/Type HT. [standard B.M. (Nat. Hist.) type label]/Australia Blackburn Coll. B.M. 1910-236/Pseudeba novica Blackb", B.M. (Nat. Hist.).

Comparative notes. This species is a highly specialized termitophile and is readily distinguished by the carinate elytral interstices. The 4-4-4 tarsi are rare (if not unique) in the Tenebrionidae.

Distribution. AUSTRALIA—Queensland, Townsville and Morven.

Habitat. In nests of *Nasutitermes exitiosus* (Hill) (termite kindly determined for me by Mr. W. A. Sands of the British Museum) in Townsville and of "*Eutermes magnus*" [= *Nasutitermes magnus* (Froggatt)] in Morven (the latter record according to labels on specimens in the Australian Museum, Sydney).

Pseudeba puncticollis sp. n.

(Text-figs. 43a, b)

♂ (♀ unknown). Length 2.8 mm.; breadth 1.2 mm.; red-brown, somewhat dull; microreticulation shallow but distinct.

Head. Almost flat anteriorly; moderately densely punctured, punctures large and decreasing in size towards genae and clypeus, bearing short setae; clypeus large, slightly raised in the middle, slightly emarginate anteriorly, puncturation sparse; genae lower than top of clypeus, continuous posteriorly with side margin of head and with an impunctate region above insertion of antennae, limits of clypeus/frons not defined; eyes small, on side of head, separated from dorsal surface by approximately one third of dorsal length of eye.

Pronotum. Moderately transverse; punctures deep, becoming large, oval and longitudinally confluent towards the sides, bearing short indistinct setae; pronotum with very narrow median impunctate region from base almost to apex; apical margin almost straight; apical angles obtuse but sharply defined; a shallow, ill-defined depressed area present at side of disc towards base; lateral margins slightly explanate from basal half to apex, rounded and slightly convergent to base; basal margin straight, slightly thickened medially.

Elytra. With deep round stria punctures; interstices with single rows of smaller punctures, diameter equal to half or less of that of stria punctures; scutellary striole not differentiated.

Aedeagus as in Text-fig. 43b.

Holotype ♂ (dissected). AUSTRALIA: Queensland, bearing labels as follows: "Cape York N.Q. J. Farr/Palorus austrinus? Champ/National Museum of Victoria Melbourne".

Distribution. AUSTRALIA—as above.

AUSTROPALORUS gen. n.

Type-species: *Austropalorus planatus* sp. n.

Length 3-3.5 mm.; moderately depressed; brown, moderately dull or dull; microreticulation deep and dense.

Head. Cuticle densely punctured; clypeus slightly raised medially or almost flat; clypeo-genal sutures distinct; genae flat, not produced anteriorly; supra-orbital carinae absent; eye not emarginate, dorsal margin below surface of head (*demarzi* sp. n.) or level with it (*planatus* sp. n.). Antennae 11-segmented, loosely articulated, appearing slender in comparison with

Palorus, inserted beneath genae, scape concealed dorsally, first flagellar segment much longer than pedicel; maxillary palps (Text-fig. 46b) with apical segment slightly securiform; other mouth parts as in *Palorus*.

Thorax. Pronotum transverse, sides explanate, more depressed than in *Palorus*, base margined, apex finely margined except median half; at sides margin extremely narrow (*demarzi*) or absent (*planatus*) on basal two thirds. Scutellum transverse. Prosternal process moderately elongate, margined at sides and apex, as in *Palorus*; metendosternite as in *Palorus*; legs comparatively slightly longer and thinner than in *Palorus*; protibiae as in *Palorus* (i.e., without spinules) but slightly broader; tarsal formula 5-5-4.

Elytra. Free, completely covering abdomen; humeral angle distinct, nine striae distinct, tenth apparent only at base, concealed for greater part of its length by lateral rim; scutellary striole indistinct (represented by 2 or 3 punctures in *demarzi*); interstices with confused puncturation, punctures small, approximating to two rows; micro-tubercles may be present; epipleura comparatively broad (compared with *Palorus*), slightly concave, tapering to apical eighth, then narrow to apex. Wings well developed, venation as in *Palorus*.

Abdomen. Sternites—five visible, disc of 2nd sternite without deep internal pits in ♀ (*demarzi*); in ♂ (*planatus*) disc with small triangular area of deep internal pits, apex of area at middle of sternite and base at basal margin. ♂, aedeagus and 9th pleurites (*planatus*) as in *Palorus*; ♀, styli similar to *Palorus* and *Pseudeba* (Text-fig. 46c).

KEY TO SPECIES OF *AUSTROPALORUS*

- 1 Pronotum slightly convergent to base, sides broadly explanate from base to apex (Text-fig. 47); elytra with micro-tubercles on interstices; eyes with dorsal margins level with dorsal surface of head; length 3.5 mm. *planatus* sp. n. (p. 130)
- Pronotum cordiform, sides explanate only at middle (Text-fig. 46a); elytral interstices without micro-tubercles; eyes with dorsal margins lower than dorsal surface of head: length 3.0 mm. *demarzi* sp. n. (p. 131)

Austropalorus planatus sp. n.

(Text-fig. 47)

♂ (♀ unknown). Length 3.5 mm.; breadth 1.4 mm.; general facies as *demarzi* sp. n.; brown, dull; micro-reticulation very distinct and dense.

Head. Similar to that in Text-fig. 46a; punctures separated by one to two diameters, puncturation finer and less dense than in *demarzi*; clypeal margin shallowly emarginate, clypeus almost level with genae; eye with greater part of dorsal surface level with dorsal surface of head.

Pronotum (Text-fig. 47). Puncturation dense, slightly less so than in *demarzi*, punctures separated by up to a diameter; laterally broadly explanate from base to apex, broader at apex than base; lateral rim present only on apical third, very narrow; apical margin slightly sinuate; basal margin rounded.

Elytra. Strial and interstitial punctures difficult to see due to dense micro-reticulation; interstices with confused puncturation and micro-tubercles; laterally comparatively broadly explanate, explanation as broad as basal breadth of pronotal explanation.

Holotype ♂ (dissected). WESTERN AUSTRALIA: Wyndham, bearing labels as follows: "Wyndham, W. Australia/? Gen. nov. aff. *Palorus*/N.B. Head, Scutellum etc. as in *Palorus* but antennae loosely articulated; slender" in the National Collection, Canberra.

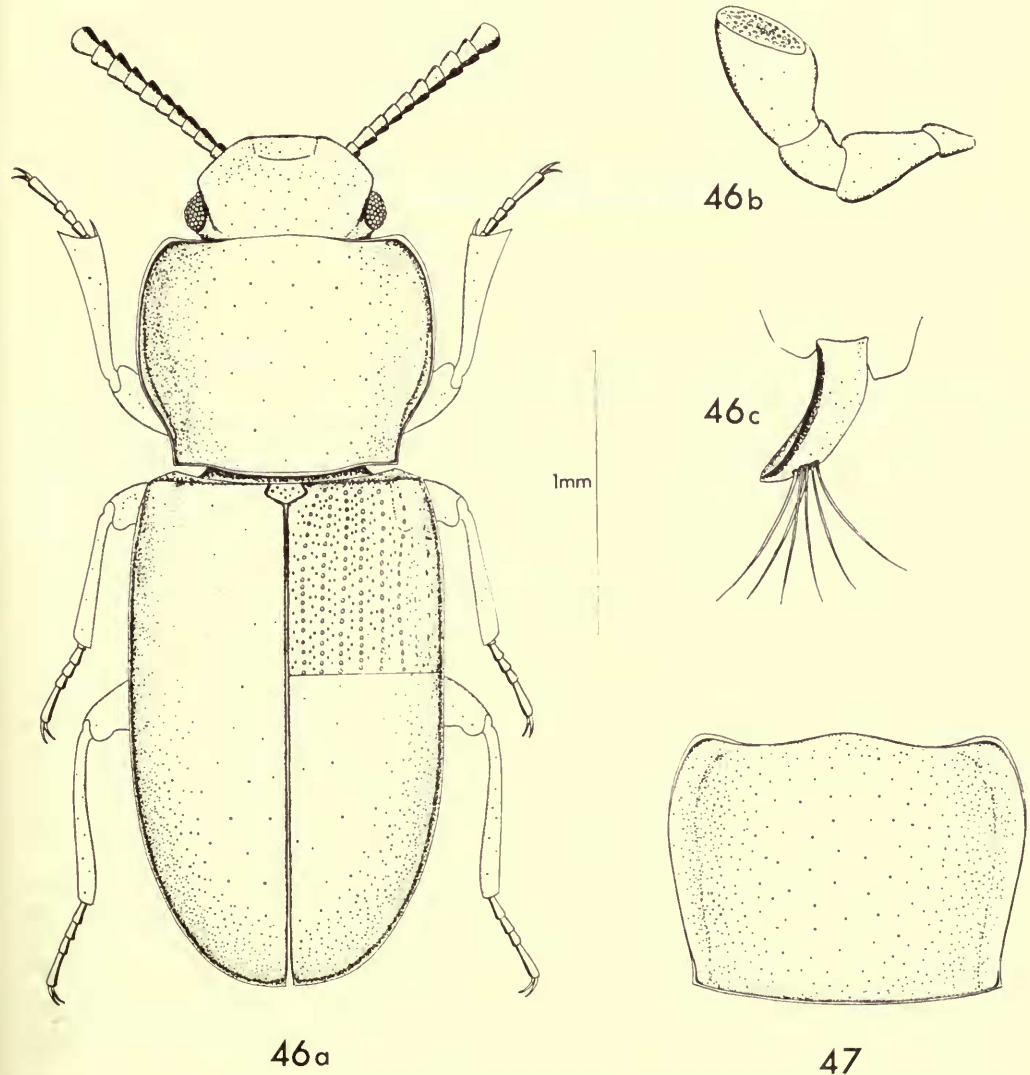
Distribution. AUSTRALIA—as above.

Austropalorus demarzi sp. n.

(Text-figs. 46a-c)

♀ (♂ unknown). Length 3.0 mm.; breadth 1.1 mm.; brown, somewhat dull; microreticulation distinct and moderately dense.

Head. Clypeus slightly less densely punctured than rest of head, punctures of head moderately coarse and separated by one diameter or less; clypeal margin almost straight, clypeus very slightly raised above level of genae; eye lower than surface of head.



FIGS. 46, 47. 46, *Austropalorus demarzi* gen. n. et sp. n., (a) ♀; (b) maxillary palp; (c) stylus. 47, *Austropalorus planatus* gen. n. et sp. n., pronotum.

Pronotum. Somewhat cordiform; puncturation dense, punctures separated by less than a diameter and moderately coarse, at sides nearly equal to diameter of an eye facet; laterally narrowly explanate, depressed at middle, where explanation is broadest; lateral rim extremely narrow on basal two thirds; apical margin almost straight; basal margin rounded.

Elytra. Scutellary striole represented by 2 or 3 ill-defined punctures; interstitial puncturation confused, approximating to two rows; laterally narrowly explanate from base to apex.

Styli as in Text-fig. 46c.

Holotype ♀ (dissected—genitalia and mouth parts (partially)). AUSTRALIA: Northern Territory, bearing label as follows: "Austral. North T. Berry Springs XII.57 leg H. Demarz" in the Frey Museum, Tutzing.

Distribution. AUSTRALIA—as above.

Species named after the collector, H. Demarz.

PALORINUS Blair stat. n.

Palorus (*Palorinus*) Blair, 1930, *Indian Forest Rec. Ent. Ser.* **14** (5): 135.

Type-species: *Palorus humeralis* Gebien, 1914.

Length 2.2–3.3; somewhat elongate, not depressed; red-brown to yellowish brown, dull to moderately shining; densely and coarsely punctured.

Head. Densely or very densely punctured; clypeus broad, very slightly raised medially, obtusely angled before clypeo-genal suture, clypeo-genal sutures distinct; genae tangential to eye, slightly raised above antennal insertions, not produced anteriorly; eyes not emarginate, latero-ventral (in *humeralis* approaching the form in *Coelopalorus* but head behind eye not forming a very distinct, shelf-like prominence); supra-orbital carinae absent. Antennae inserted beneath genae, 11-segmented, five apical segments forming a very poorly differentiated club, apex of scape visible in *bicolor* and *quadraticollis*, pedicel either approximately equal in length to (*bicolor*, *quadraticollis*), or longer than (*humeralis*, *opticus* sp. n.), the first flagellar segment; mouth parts (studied in detail only in *humeralis*) similar to those of *Palorus* but left mandible with a small medial tooth on cutting edge and lacinia with apical setae heavily sclerotized forming lacinial tooth.

Thorax. Pronotum transverse to nearly quadrate, margined basally, laterally and apically at sides, without foveae. Scutellum transverse. Prosternal process somewhat elongate, moderately expanded behind coxal cavities, more or less margined laterally and basally. Metendosternite as in *Palorus*. Protibiae as in *Coelopalorus*, with row of scaliform spinules (*Coelopalorus*, Text-fig. 54b) beneath distal margin (spinules more elongate than in *Coelopalorus*) but differing from *Coelopalorus* in that apical external angle is developed, forming moderate tooth; tarsal formula 5-5-4.

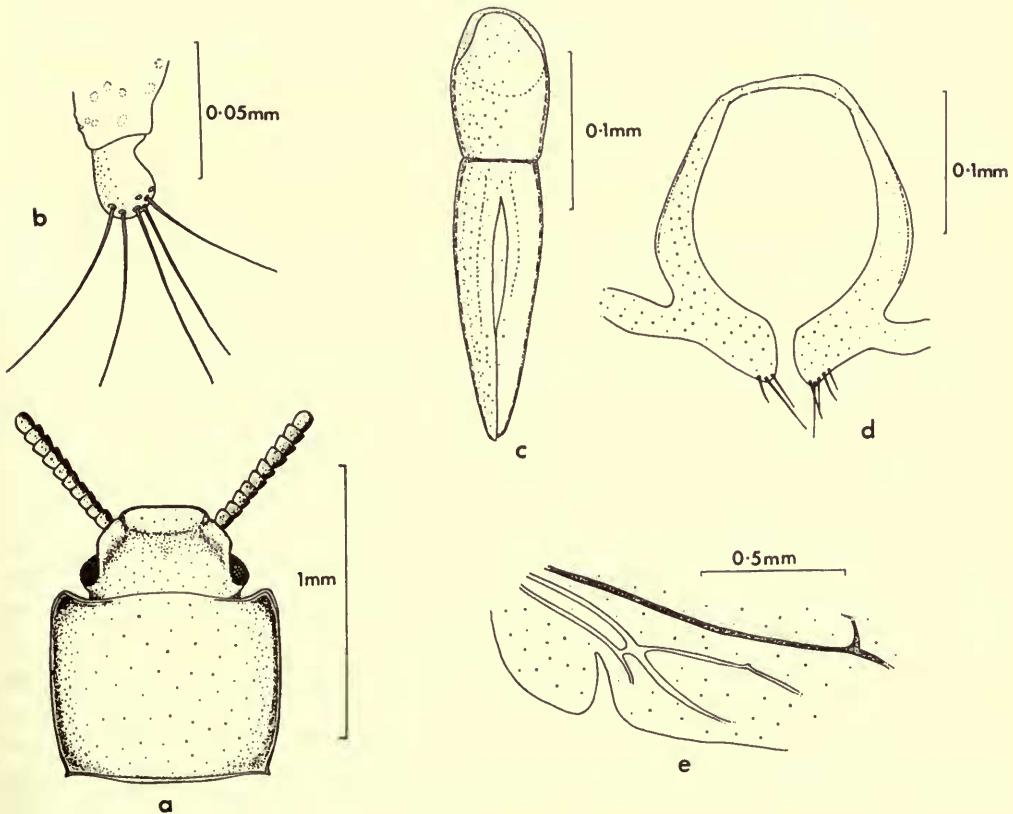
Elytra. Free, covering abdomen; each elytron with 10 single rows of deep striae punctures and a scutellary striole of 5 punctures, interstices slightly raised with single rows of fine punctures; epipleura inclined, abruptly tapered to apical eight, then very narrow to apex. Hind wings well developed—in *humeralis* anal area reduced (Text-fig. 48e) (not critically examined in the other three species).

Abdomen. Ventrally with five visible sternites, in ♂ disc of sternites 2, 3 and 4 (in *humeralis*) or of all sternites except the apical one (in *quadraticollis*) with deep internal pits (♂ of *bicolor* and *opticus* sp. n. not known); in ♀ sternites without deep internal pits.

Genitalia. ♀, (*humeralis*, *bicolor*, *opticus* sp. n.) styli as in Text-fig. 48b, very lightly sclerotized, papillate in shape, with long apical setae; ♂, (*humeralis*, *quadraticollis*) aedeagus as in Text-fig. 48c, pleurites of 9th abdominal segment as in Text-fig. 48d.

KEY TO SPECIES OF *PALORINUS*

- 1 Apical pronotal angles prominent (Text-fig. 48a), basal pronotal angles may form very distinct minute tooth ; length 2.5-3.0 mm. *humeralis* (Gebien) (p. 134)
- Apical pronotal angles not prominent (Text-figs. 49, 50, 51), basal pronotal angles not forming very distinct minute tooth ; length 2.5-3.0 mm. 2
- 2 Larger species, length 3.2-3.3 mm. ; brown, head and pronotum much darker than elytra ; eyes smaller, ratio of dorsal length of eye to distance from apical margin of eye to clypeal suture, 110 : 140 ; pronotum slightly narrowed from apical quarter to apex *bicolor* (Blair) (p. 135)
- Smaller species, length 2.2-2.7 mm. ; unicolorous brown ; eyes larger, ratio of dorsal length of eye to distance from apical margin of eye to clypeal suture, 110 : 80-99 ; pronotum narrowed apically only at apical angles 3
- 3 Head as in Text-fig. 49, with shallow longitudinal median depression ; antenna with pedicel approximately equal in length to first flagellar segment ; length 2.3-2.7 mm. *quadraticollis* (Blair) (p. 135)
- Head as in Text-fig. 51, without shallow longitudinal median depression ; antenna with pedicel longer than first flagellar segment ; length of holotype 2.2 mm. *opticus* sp. n. (p. 136)



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FIG. 48. *Palorinus humeralis* (Gebien), (a) head and pronotum ; (b) stylus ; (c) aedeagus, dorsal ; (d) pleurites of 9th abdominal segment of ♂ ; (e) wing, anal region.

Palorinus humeralis (Gebien) **comb. n.**

(Text-fig. 48)

Palorus humeralis Gebien, 1914, *Sarawak Mus. J.* 2 (5) : 34.*Palorus (Palorinus) humeralis* Gebien; Blair, 1930, *Indian Forest Rec. Ent. Ser.* 14 (5) : 142.

Length 2.5–3.0 mm.; breadth 0.7–0.9 mm.; moderately elongate; yellow-brown to dark red-brown, moderately shining; micro-reticulation shallow and ill-defined where present.

Head (Text-fig. 48a). Densely punctured, punctures separated by one diameter or less but not rugose; clypeus broad, slightly raised medially, less densely punctured than vertex; genae slightly raised above antennal insertions; eyes small, dorsal length less than distance from apex of eye to clypeo-genal suture (in ratio, 5 : 7); antennae rather thick, pedicel slightly longer than first flagellar segment.

Pronotum (Text-fig. 48a). Weakly transverse, disc slightly depressed with punctures separated by 1–2 diameters, lateral punctures separated by one half diameter or less; apex margined to medial half; apical angles prominent, apices rounded; sides subparallel or slightly convergent to basal half or third then convergent to base; basal angles frequently produced forming minute tooth.

Elytra. Striae strongly punctured, scutellary striole of five punctures, often becoming obsolete apically; interstices with single rows of punctures, frequently with a double row on basal half of interstice 4.

Genitalia. ♂, aedeagus as Text-fig. 48c, 9th pleurites as Text-fig. 48d; ♀, styli as Text-fig. 48b.

LECTOTYPE, present designation (sex indet.). SABAH: Kudat, bearing labels as follows: "Type: No. 287 [pink type label]/Br. N. Borneo Kudat [MS]/*Palorus humeralis* Geb.", Frey Mus.

Paralectotypes: two examples, locality as lectotype, bearing labels as follows: "Cotype: 287 [orange label]/Br. N. Borneo Kudat [MS]/*Palorus humeralis* Geb.", Frey Mus.

Comparative notes. The form of the apical pronotal angles readily distinguishes this species.

Distribution. Oriental. *P. humeralis* was originally described from N. BORNEO (SABAH) and later recorded from CEYLON by Blair (1930). I have seen specimens from "E. BORNEO," JAVA, SUMATRA and NEW GUINEA (it was collected in New Guinea in 1866 by Wallace). It has been imported into Britain in produce from Malaya and Singapore where it is probably indigenous.

Habitat. In the British Museum (Natural History) there are specimens from Java with the following data. "In wood with borers and nangas—termites, Buitenzorg 29.vii.1926 Dr. Kalshoven. m. 6 i 9 [?]" This species has been imported in nutmegs from Penang and sago flour from Singapore and there are specimens in the British Museum found in a plant collected on Mt. Kinabalu, N. Borneo in 1949.

Palorinus opticus sp. n.

(Text-fig. 51)

♀ (♂ unknown). Length 2.2 mm.; breadth 0.7 mm.; dark brown, moderately shining; micro-reticulation shallow and ill-defined.

Head. Eyes large, dorsal length slightly greater than distance from apex of eye to clypeo-genal suture, in ratio of 10:9; antenna with pedicel slightly longer and wider than first flagellar segment.

Pronotum. Quadrate; densely punctured; apex nearly straight, margined on lateral thirds; sides subparallel for apical two thirds then very slightly convergent to base; base slightly rounded, basal angles nearly right angles.

Elytra. Striae strongly punctured, scutellary striole of five punctures, interstices with single rows of fine punctures.

Holotype ♀ (right middle and hind legs missing). BORNEO, bearing labels as follows: "Borneo Doherty [ink on upper surface of card mount Sharp's MS]/Sharp Coll. 1905-313" (Text-fig. 51) in British Museum (Nat. Hist.).

Comparative notes. Very close to *humeralis* but may be distinguished by its smaller size, larger eyes and pronotal apical angles.

Palorinus bicolor (Blair) comb. n.

(Text-fig. 50)

Palorus (Palorinus) bicolor Blair, 1930, *Indian Forest Rec.* Ent. Ser. **14** (5): 143.

Length 3.2-3.3 mm.; breadth 1-1.1 mm.; large species; brown, head and pronotum much darker than elytra, dull; micro-reticulation ill-defined.

Head. Puncturation (excluding that of clypeus) dense, longitudinally rugose (Text-fig. 50); clypeus broad with puncturation sparser than on rest of head, not rugose; genae raised above antennal insertions; vertex with shallow longitudinal median depression; eyes small, dorsal length less than distance from apex of eye to clypeo-genal suture in ratio of 11:14.

Pronotum (Text-fig. 50). Densely punctured, base narrower than elytral base, widest towards base; apical angles obtuse; apex margined to medial half; sides slightly convergent apically and distinctly convergent basally.

Elytra. Striae on disc separated laterally by approximately three times a puncture diameter.

LECTOTYPE, present designation (sex indet.). S. INDIA: Nilgiris, bearing labels as follows: "Type [standard B.M. (Nat. Hist.) type label]/Coonor R. Nilgiris, Madras C. F. C. Beeson 7.iv.1924/R.R.D. 198 B.C.R. 136 Cage 201/ex Poinciana elata/471/P (*Palorinus) bicolor* Blr. T. det K. G. Blair", B.M. (Nat. Hist.).

Paralectotype from the same locality as the lectotype, B.M. (Nat. Hist.).

Comparative notes. The slight apical and strong basal convergence of the pronotal sides, the bicoloured body, the body size and the smaller eyes serve to distinguish this species from *quadraticollis*.

Distribution. INDIA. I have seen only the type material—there are no other records of this species.

Palorinus quadraticollis (Blair)

(Text-fig. 49)

Palorus (Palorinus) quadraticollis Blair, 1930, *Indian Forest Rec. Ent. Ser.* **14** (5) : 142.

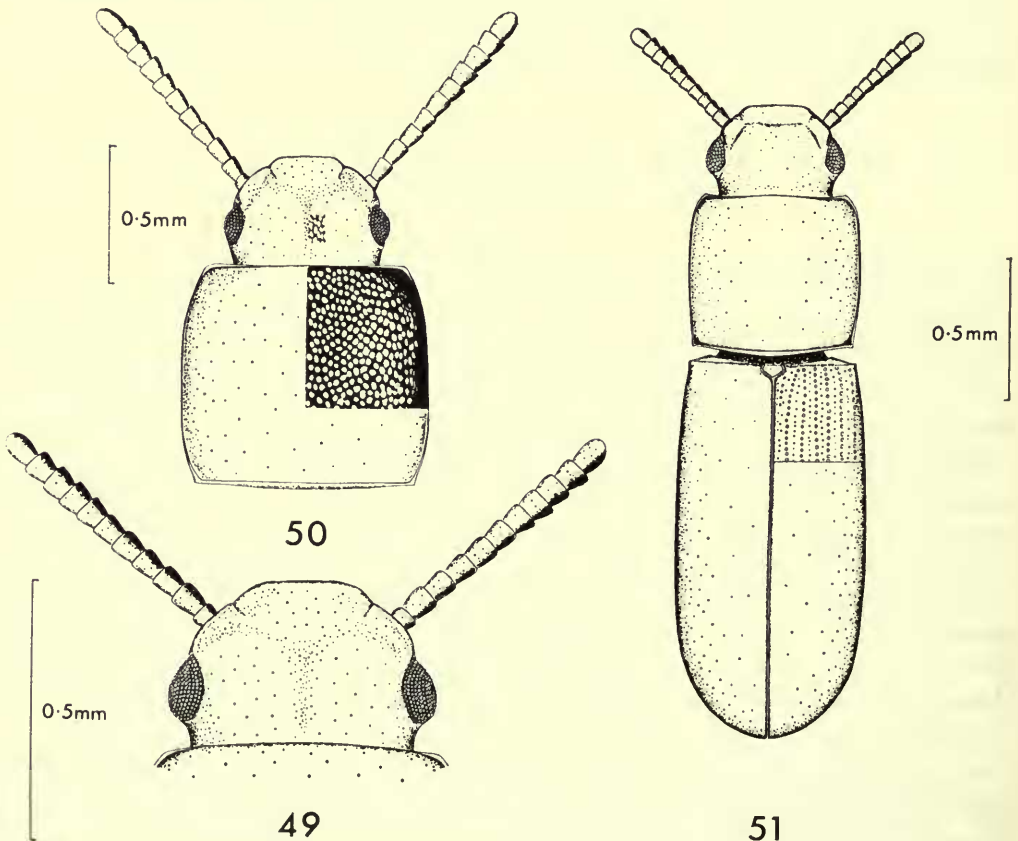
Length 2.3–2.7 mm.; breadth 0.7–0.8 mm.; unicolourous brown; very similar to *bicolor* but more shining.

Head. (Text-fig. 49). Vertex with longitudinal shallow median depression; eyes larger and more prominent than in *bicolor*, ratio of dorsal length to distance from apex of eye to clypeo-genal suture, 11 : 8.

Pronotum. Puncturation slightly denser than in *bicolor*; form similar but sides not distinctly convergent apically.

Elytra. Striae on disc separated laterally by one puncture diameter or slightly more; densely punctured.

LECTOTYPE, present designation (sex indet.). S. INDIA : Nilgiri Hills, bearing



FIGS. 49–51. 49, *Palorinus quadraticollis* (Blair), head. 50, *Palorinus bicolor* (Blair), head and pronotum. 51, *Palorinus opticus* sp. n.

labels as follows: "Type [standard B.M. (Nat. Hist.) type label]/1621/Nilgiri Hills/Andrews Bequest B.M. 1922-22", B.M. (Nat. Hist.).

Paralectotypes: two examples, data as lectotype, B.M. (Nat. Hist.).

Distribution. INDIA—as for types. There are no additional records.

***PROLABRUS* Fairmaire and *ASTALBUS* Fairmaire**

Prolabrus Fairmaire, 1897, *Annls Soc. ent. Belg.* **41**: 111. (Text-fig. 52).

Prolabrus parallelus, Fairmaire, 1897, loc. cit.

Astalbus Fairmaire, 1889, *Annls Soc. ent. Fr.* **68**: 484. (Text-fig. 53).

Astalbus scrobicollis Fairmaire, 1899, loc. cit.; *Astalbus longicollis* Ardoïn, 1959, *Naturaliste malgache* **11**: 90.

A. longicollis may be separated from *A. scrobicollis* by the short lateral pronotal foveae, which reach only to the basal half.

Ardoïn (1959) redescribed these closely related Madagascan genera and suggested that they were related to *Palorus*. A male of *Prolabrus parallelus* (from Dicy—new locality record) and two females of *Astalbus scrobicollis* (from Tsaramandroso, Ampijoroa and the forest of Ankarafantsika—new locality records) were examined and characters pertinent to the relationship of these genera with other members of the *Palorus* genus group were recorded. The specimens have been deposited in the Paris Museum. Most of these characters are common and are as follows:

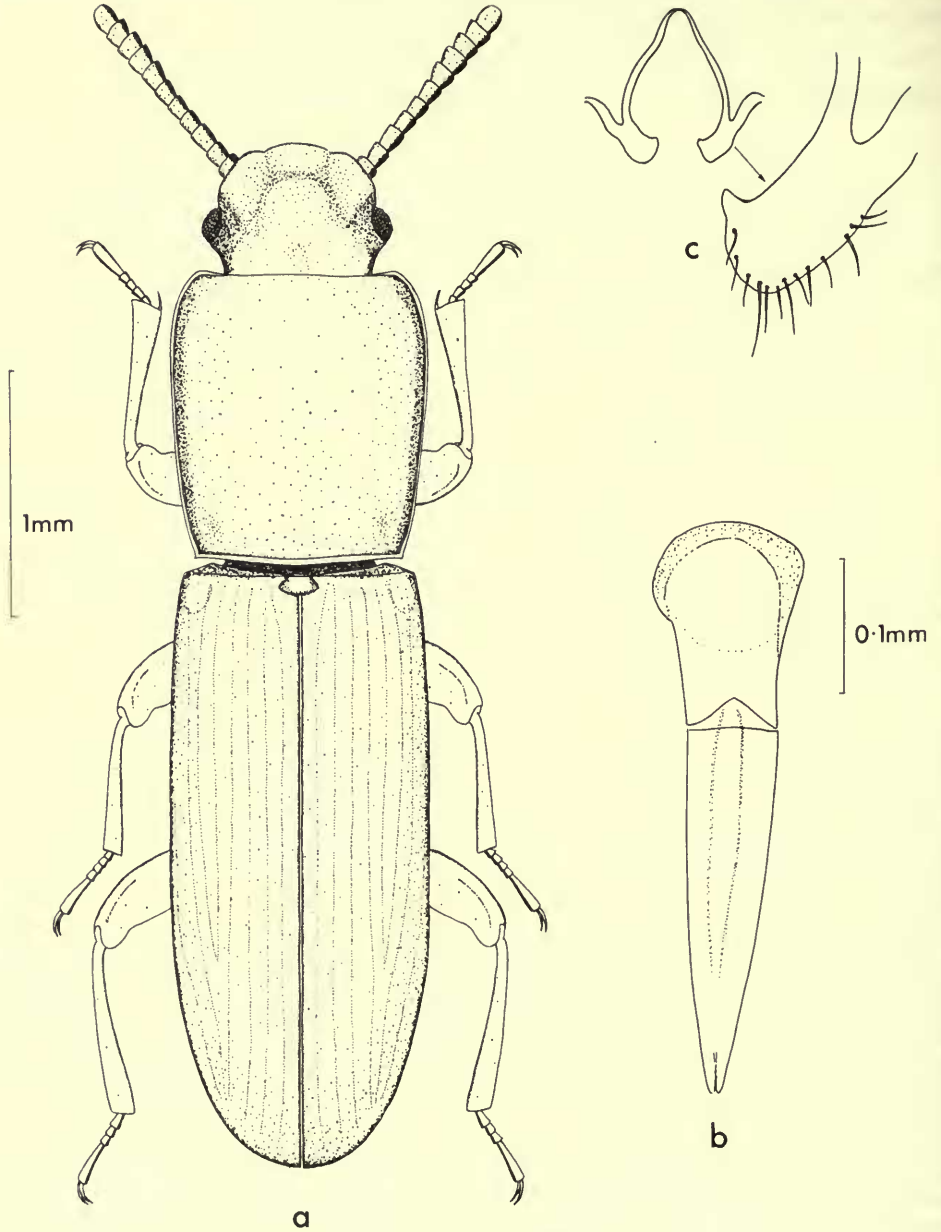
Head. Moderately densely or densely punctured; clypeus raised medially; clypeo-genal sutures indistinct; genae raised above antennal insertions, not distinctly raised or produced anteriorly; eyes not emarginate, lateral, appearing somewhat lenticular, prominent due to development of side of head; supra-orbital carinae absent. Antennae, robust, inserted beneath genae, 11-segmented, apical five segments forming a very indistinct club, apical two thirds of scape exposed, pedicel equal to (*A. scrobicollis*) or slightly shorter than (*P. parallelus*) first flagellar segment; mouth parts not studied in detail but apical segment of maxillary palp elongate.

Thorax. Pronotum elongate, margined at base, sides and apical angles, with or without lateral foveae; scutellum transverse. Prosternal process moderately elongate, weakly margined at sides and apex, in *Astalbus* apex obtuse, in *Prolabrus* apex as in *Palorus*. Metendosternite similar to *Palorus* but stem comparatively longer. Protibiae (studied in detail only in *Astalbus*) with small scaliform spines (similar to those in *Palorinus*), widely separated, inserted beneath external margin; external apical angle produced into tooth, internal apical angle bearing a small and a large articulated tooth (as in *Palorus*) and internal margin with long setae; tarsal formula 5-5-4.

Elytra. Free, covering abdomen completely; humeral angle ill-defined; ten rows of striae present, striae 9 and 10 close together at margin and with scutellary striae of four or five rather small punctures; interstices slightly raised, most distinctly so towards apex; apex of elytra appearing slightly sulcate; puncturation—single rows of fine punctures; epipleura as in *Coelopalorus*. Wings (*Astalbus*) similar to *Palorinus* but anal veins 1-4 represented (anal veins 1 and 2 very lightly sclerotized and rather indistinct).

Abdomen. Five visible sternites; in ♀ *Astalbus* no internal pits on disc; in ♂ *Prolabrus* disc of sternites 1, 2 and 3 with deep internal pits.

Genitalia. ♂ (*Prolabrus*) as in Text-figs. 52b, c, aedeagus with parameres longer than basal piece, fused dorsally and joined ventrally by membrane forming a tube, sclerotized struts of

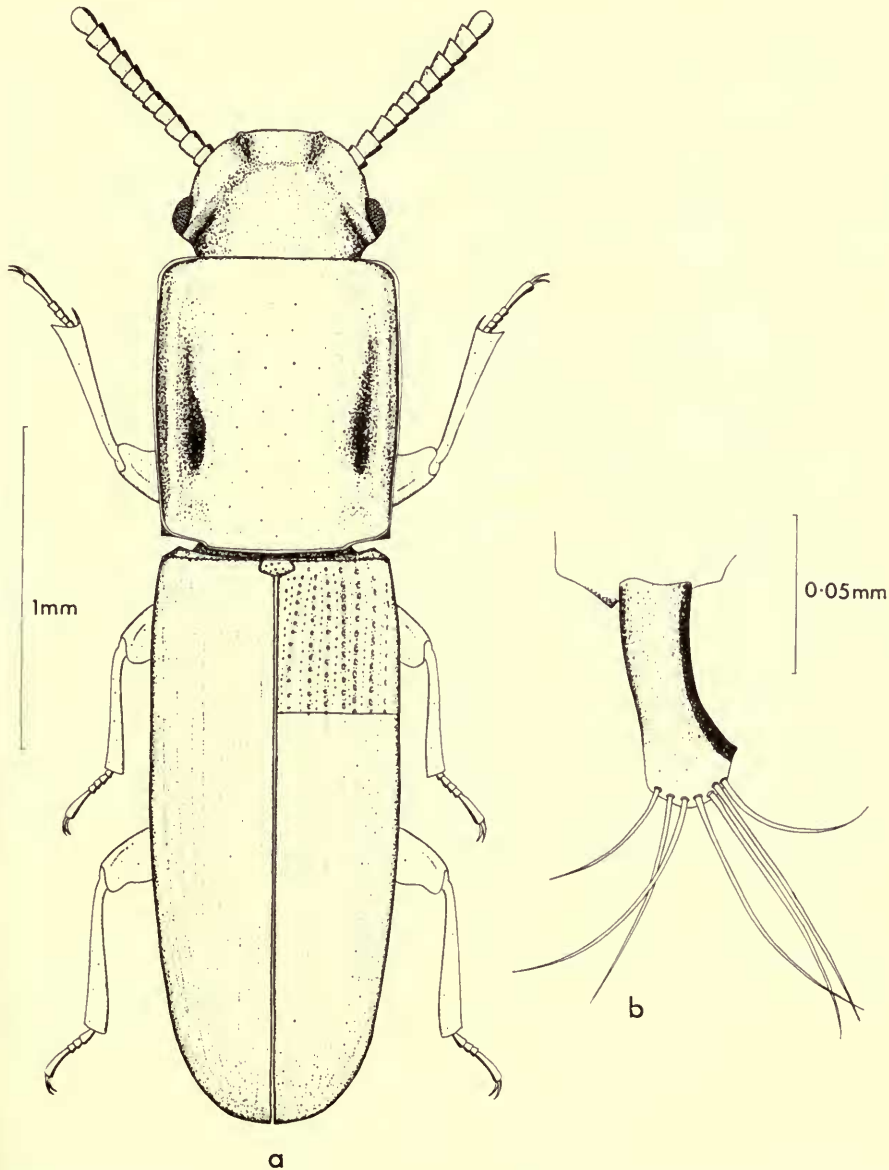


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FIG. 52. *Prolabrus parallelus* Fairmaire, (a) ♂; (b) aedeagus; (c) pleurites of 9th abdominal segment of ♂ (apex shown enlarged).

median lobe visible in paramere tube; pleurites of 9th abdominal segment joined apically and of a distinctive form. ♀ (*Astalbus*) styli (Text-fig. 53b) sclerotized, with heavily sclerotized distal margin and long apical setae, elongate.

These two genera appear to be most closely related to the oriental genera *Coelopalorus* and *Palorinus*.



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FIG. 53. *Astalbus scrobicollis* Fairmaire, (a) ♀; (b) stylus.

COELOPALORUS Blair **stat. n.**

Palorus (*Coelopalorus*) Blair, 1930, *Indian Forest Rec. Ent. Ser.* **14** (5) : 135.

Palorus (*Palorinus*) partim. Blair, *Ibid.*

Type-species : *Palorus* (*Coelopalorus*) *foveicollis* Blair.

Length 1.9–4.3 mm. ; body depressed ; dark brown to yellowish brown, shining or dull ; micro-reticulation indistinct or distinct.

Head. Moderately densely punctured, anterior margin rounded or slightly emarginate ; clypeus raised medially ; genae tangential to eye, not raised above level of clypeus, not produced anteriorly, slightly raised above antennal insertions ; with a sulcus at inner basal margin of eye (Text-fig. 55b) ; eyes not emarginate, latero-ventral, lateral base resting on a shelf-like prominence of side of head, dorsal surface level with surface of head ; supra-orbital carinae absent. Antennae inserted beneath genae, 11-segmented, pedicel slightly longer than first flagellar segment or approximately equal to it, 5 apical segments forming indistinct club ; mouth parts similar to those of *Palorus* but left mandible with distinct medial tooth on cutting edge.

Thorax. Pronotum transverse, margined basally, laterally and apically at apical angles, with or without deep lateral foveae, with a slight depression at each side near basal margin (see Text-figs. 54a, 56a) laterally without a distinctly flattened region ; scutellum transverse. Prosternal process comparatively broad, broadly expanded behind coxal cavities, not distinctly margined (unlike *Palorus*). Metendosternite as in *Palorus*. Protibiae (Text-fig. 54b) with row of scaliform spinules beneath external and apical margins and (in *foveicollis*) distinct row of spines beneath internal margin (not apparent in *carinatus*) ; proximal margin laterally with row of setae ; tarsal formula 5–5–4.

Elytra. Free, completely covering abdomen, 10 single rows of striae punctures, 6 dorsal and 4 lateral (in *foveicollis* lateral striae becoming obsolete on basal three-quarters), scutellary striae of two to five punctures (usually absent in *foveicollis*) ; interstice 7 carinate from humeral angle to approximately apical sixth, interstices with single rows of fine punctures ; epipleura only slightly inclined, near apical eighth tapering rather abruptly then narrow to apex. Wings well developed, anal veins all represented in *foveicollis* (Text-fig. 55a) but venation greatly reduced in *carinatus* (Text-fig. 56f).

Abdomen. With five visible sternites, ♂ *foveicollis* with deep internal pits on discs of sternites 2, 3 and 4, ♀ *foveicollis* and both sexes of *carinatus* without deep internal pits on sternites.

Genitalia. ♂, aedeagus—parameres fused dorsally but not ventrally, closed only by membrane, articulated with the basal piece, sclerotized struts of the median lobe are visible in paramere tube ; pleurites of 9th abdominal segment forming moderately sclerotized, incomplete ring surrounding the aedeagus when at rest and bearing long setae at apices. ♀, styli—cylindrical, lightly sclerotized, with apical surface bearing long setae.

KEY TO SPECIES OF *COELOPALORUS*

- 1 Larger species, 3.6–4.3 mm. ; pronotum with deep lateral foveae (Text-fig. 54a)
foveicollis (Blair) (p. 140)
 – Smaller species, 1.9–2.6 mm. ; pronotum without lateral foveae (Text-fig. 56a)
carinatus (Blair) (p. 143)

***Coelopalorus foveicollis* (Blair) comb. n.**

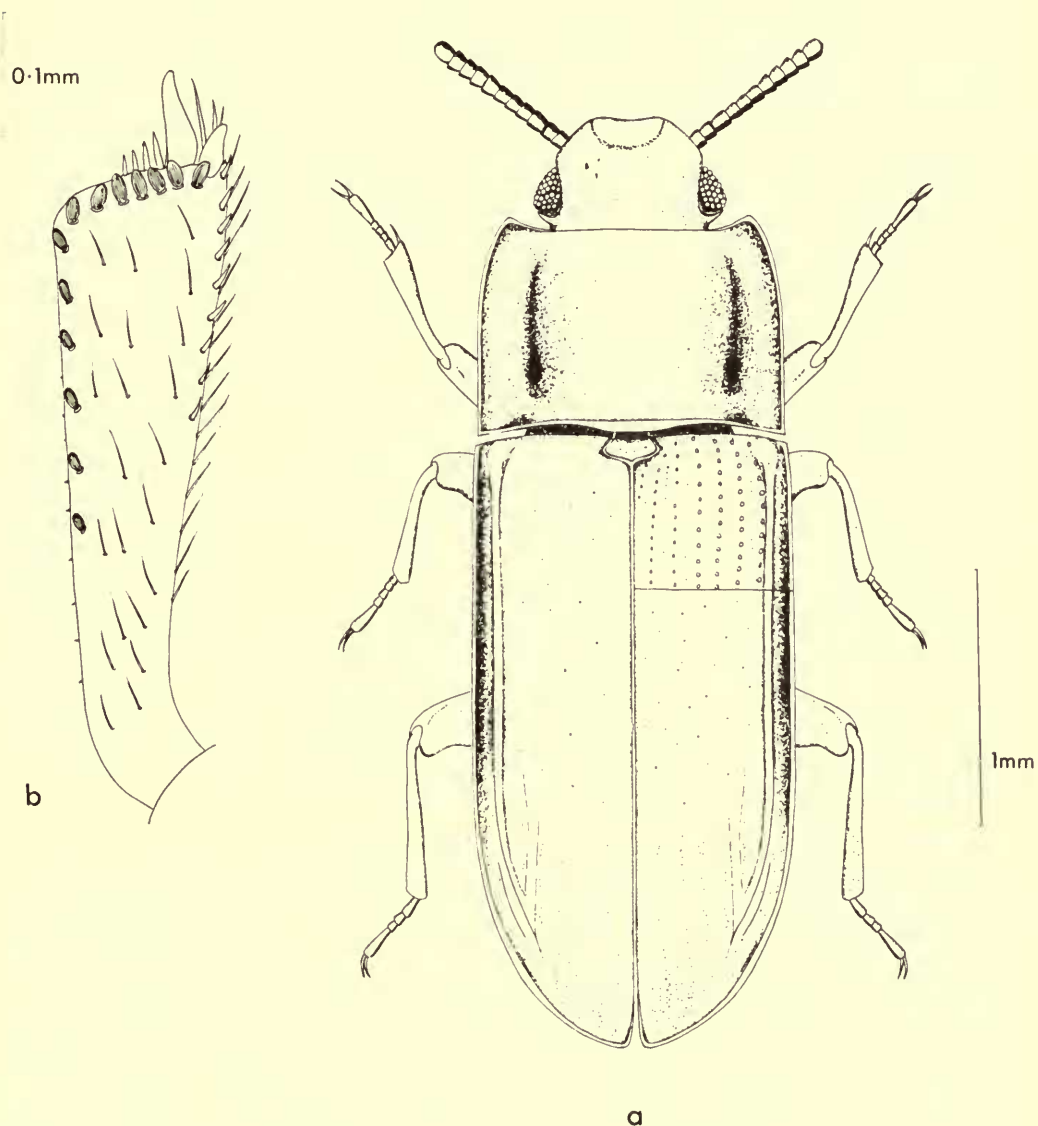
(Text-figs. 54a, 55a–f), Map 1

Palorus (*Coelopalorus*) *foveicollis* Blair, 1930, *Indian Forest Rec. Ent. Ser.* **14** (5) : 136.

Length 3.6–4.3 mm. ; breadth 1.2–1.6 mm. ; depressed ; dark red-brown, shining ; micro-reticulation variable, shallow but usually distinct on head and pronotum.

Head. Moderately densely punctured, punctures separated by 1–2 diameters; anterior margin shallowly emarginate; clypeus broad, slightly raised medially; genae flat, anterior margin almost straight; eyes as in Text-fig. 55b, vertex with a small shallow median depression.

Pronotum. Puncturation variable on disc, usually fine and sparse, lateral puncturation



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FIG. 54. *Coelopalorus foveicollis* (Blair), (a) ♂; (b) right tibia, ventral.

moderately coarse and dense; laterally with deep longitudinal foveae extending from approximately apical eighth to basal quarter, deepest towards base; side margin almost parallel for basal four fifths; basal margin shallowly biarcuate; a small depressed area on each side at base (see Text-fig. 54a).

Elytra. Depressed, sides (lateral to carina) almost vertical; striae lateral to carina becoming obsolete basally; striae separated by four to seven strial puncture diameters; scutellary striae, if differentiated, represented by two to three small punctures; interstices with single rows of fine punctures, interstice 7 carinate from base (humeral angle) to apical sixth, other interstices becoming slightly raised from apical third to apex (as indicated in Text-fig. 54a); lateral margin narrowly explanate with distinct expansion at about apical sixth.

Genitalia. Aedeagus (Text-figs. 55c, d) a short broad structure, basal piece longer than parameres; styli (Text-fig. 55f) short cylindrical with apical surface bearing long setae.

Holotype and paratypes. Blair (1930) in his description of *foveicollis*, habitat data "describes" the specimen from Tenasserim as the type ("Tenasserim (type)"). I am accepting this specimen as Holotype—it bears the following data: "Type [British Museum circular, red-bordered label]/Tenasserim/Heteromeri/foveicollis [Blair's MS]/Atkinson Coll 92-3". Specimens accepted as paratypes bear the following data: 1 "Capt. Wimberley/Andaman Islands/heteromera/Fry Coll. 1900.100", 1 "Ceylon" (circular blue label, 2 "H. L. Andrewes Nilgiri Hills/Andrewes Bequest. B.M. 1922-221", 1 "Toungoo/Gen? near Palorus/Andrewes Bequest B.M. 1922-221", 1 "Penang/Bowring 63.47", 1 "Cocos-Keeling Is. Direction Id. June-July 1923 W. R. Penniford. B.M. 1924-5", 3 "Casteln/Malacca/Sharp Coll. 1905-313", 1 "Casteln/Malacca/Fry Coll. 1905-100", 1 "Malacca/G. Lewis Coll. 1915-38". I have labelled these 12 specimens "Paratype" (British Museum circular, yellow-bordered labels).

Distribution. Oriental (imported into Trinidad and E. Africa) (see Map 1). Blair (1930) records this species from BURMA (type locality), CEYLON, S. INDIA, MALACCA, the PHILIPPINES and COCOS KEELING Is. In addition to these localities I have seen specimens from FORMOSA, N. VIETNAM (Hoah Binh), SARAWAK and KENYA (imported). Spilman (1959) records *foveicollis* from the HAWAIIAN ISLAND—Oahu, TRINIDAD (associated with stored produce) and U.S.A., Mobile (in grain products) and Kulzer (1957) recorded it from GUAM Is.

Habitat. Spilman (1959), referring to *foveicollis* collected on Oahu by Mr. E. J. Ford, Jr., said that it was collected in light traps (Feb., July, Aug., Sept., Nov.) and in the tunnels and powdery frass of the Lyctid *Lyctus curtulus* Casey and the Bostrychid *Sinoxylon conigerum* Gerst. in monkeypod, *Samanea saman* Merrill. Corbett, Yusope and Hassan (1937) record this species occasionally associated with copra. They illustrate and briefly describe the immature stages and note that adults and larvae feed on copra mould but not copra. This species is occasionally imported into Britain in stored products and has been recorded from stored products in E. Africa and certain oriental countries (where it is indigenous). It has arrived in Britain in illipe nuts and Malayan sago flour (from Singapore), Burmese groundnut cake, and E. African cattle food, 1954 (loaded at Mombasa). In Msambweni, Kenya, 1952, it was found on Cowpeas. Mr. F. N. Wright, a colleague, collected it in spillage (4 yrs. old) in a rice store in Sarawak.

Coelopalorus carinatus (Blair) comb n.

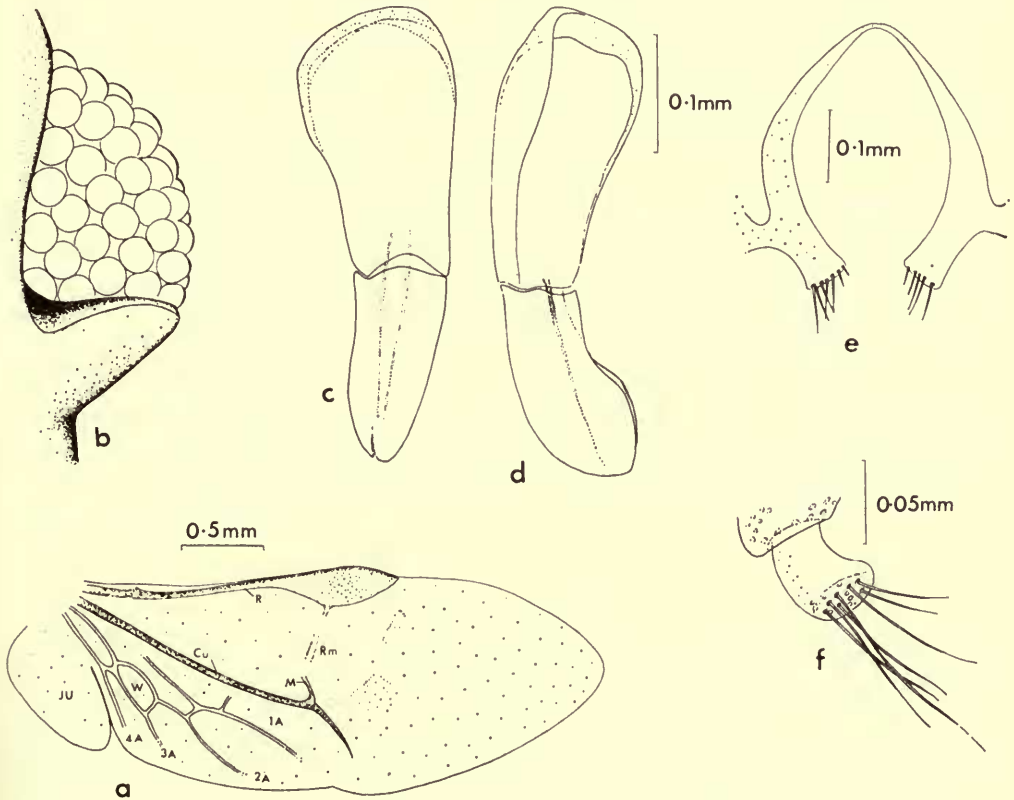
(Text-fig. 56, Map 1)

Palorus (Palorinus) carinatus Blair, 1930, *Indian Forest Rec. Ent. Ser.* **14** (5) : 143.

Length 1.9–2.6 mm.; breadth 0.7–0.9 mm.; depressed; yellowish brown, dull; microreticulation strong.

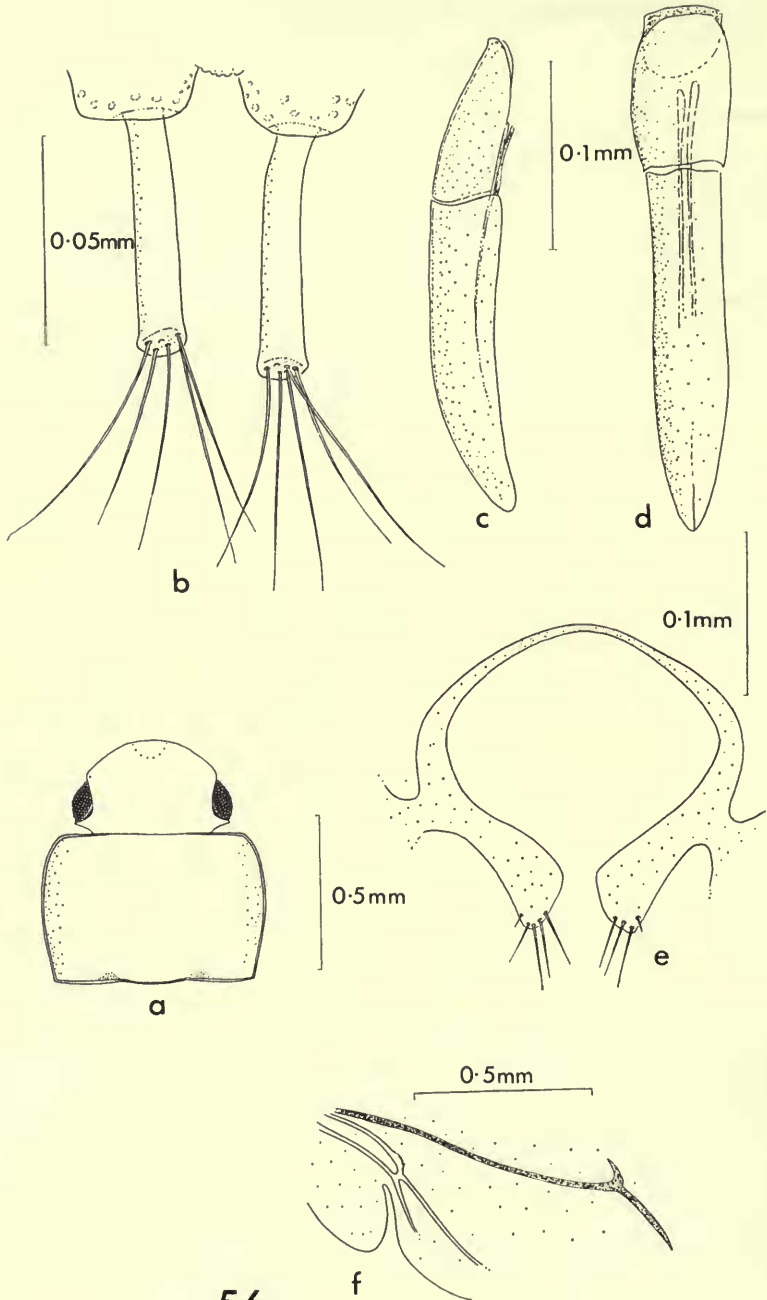
Head (see Text-fig. 56a). Moderately densely punctured, punctures separated by 1–3 diameters; anterior margin rounded; genae flat; clypeo-genal suture not distinct, clypeus thus ill-defined; clypeal region with small anterior median area impunctate (indicated in Text-fig. 56a) and slightly raised medially; vertex with very shallow median depression; eyes, see Text-fig. 56a and Text-fig. 55b; antennae longer than pronotum (antennae: pronotum 13:12).

Pronotum (Text-fig. 56a). Transverse, depressed, densely and coarsely punctured, disc usually with finer, sparser puncturation; apex straight; base weakly indented on each side of medial third at a small shallow depression.



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FIG. 55. *Coelopalorus foveicollis* (Blair), (a) wing—W, anal cell, other lettering as in Text-fig. 4.; (b) eye; (c, d) aedeagus (c) dorsal and (d) side view; (e) pleurites of 9th abdominal segment of ♂; (f) stylus.



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FIG. 56. *Coelopalorus carinatus* (Blair), (a) pronotum and head; (b) styli; (c, d) aedeagus (c) side and (d) dorsal view; (e) pleurites of 9th abdominal segment of ♂; (f) wing, anal region.

Elytra. Similar in shape to *foveicollis* (Text-fig. 54a), depressed, sides lateral to carina almost vertical; strial punctures large, striae separated by 2-3 strial puncture diameters, scutellary striae ill-defined, 2-5 punctures, often becoming obsolete apically; interstices with single rows of fine punctures, interstice 7 carinate from humeral angle to apical sixth (as in *foveicollis*), other interstices slightly raised for whole length, more distinctly so apically.

Genitalia. Aedeagus (Text-figs. 56c, d) elongate, parameres longer than basal piece; styli (Text-fig. 56b) elongate, cylindrical, bearing long setae on apical surface.

Holotype and paratypes. Blair (1930), in his description of this species, said "Habitat: S. India (type), Nilgiri Hills, 3,500', January and December, under bark of dead *Ficus* and *Grevillea* (H. L. Andrewes); Kanara (H. E. Andrewes); Ceylon, Dikoya, 4,000', XII. 1881 (G. Lewis)". In the British Museum (Nat. Hist.) there are three specimens (on the same card) labelled "Type [British Museum circular, red bordered label]/1509 [red ink MS]/Nilgiri Hills/Andrewes Bequest. B.M. 1922-221/*Palorus carinatus* Blr. T. det. K. G. Blair", one of the specimens is differentiated by the letter T on the card below the specimen; I am accepting this as the *holotype*. In addition there are 13 specimens bearing the label "Andrews Bequest B.M. 1922-221" including: 4 labelled "H. L. Andrews Nilgiri Hills", 4⁷ labelled "Nilgiri Hills/1509 [red ink MS]", as the series including the holotype, 6 (5 on the same card) labelled "Nilgiri Hills H. L. Andrewes XII.07 3,500 ft.". Also the specimens from Ceylon (Lewis) and Kanara (H. E. Andrewes) are present. I am accepting these 17 specimens as paratypes and have labelled them with British Museum circular, yellow-bordered paratype labels.

Distribution. Oriental (see Map 1). In addition to material from the type localities, S. INDIA and CEYLON, I have seen specimens with the following data: "Lenggong Malay Peninsula Lea & Party/S.A. Museum specimen", "Bantam Java, de Vos" (in Frey Mus.), "Phil Islands Honolulu H.T. 11.15.1933 on rice grain 5542" (in Smithsonian Institute, Washington), "Hainan Tuchan 14. vi. 1959" (in Hung. Nat. Hist. Mus.).

Habitat. Blair (1930) records this species under bark of dead *Ficus* and *Grevillea*. It is sometimes associated with stored products. I have seen specimens collected from *Areca catechu* L. in a store in Malaya. It appears to have been carried into, Honolulu in rice (see above) and has been collected in the United Kingdom on illipe nuts from Malaya.

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⁷ 1 in the Hungarian Natural History Museum, Budapest.

Museum G. Frey, Tutzing, Dr. L. R. Natvig, Universitetet i Oslo, Mr. A. Neboiss, National Museum of Victoria, Melbourne, The President, Forest Research Institute, Dehra Dun, India, Prof. Dr. H. Sachtleben, Deutsches Entomologisches Institut, Berlin, Mr. T. J. Spilman, Smithsonian Institute, U.S. National Museum, Washington, Dr. S. Stockmann, Helsinki, Prof. G. C. Varley, Hope Department of Entomology, Oxford University, Miss C. M. F. von Hayek, British Museum (Natural History), London, Dr. R. L. Wenzel, Chicago Natural History Museum, Illinois, Mr. J. T. Woods, Queensland Museum, Brisbane.

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