

The Genus *Coptocarpus* Chaudoir of
the Australian Region with Notes
on Related African Species
(Coleoptera: Carabidae: Oodini)

TERRY L. ERWIN

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ABSTRACT

Erwin, Terry L. The Genus *Coptocarpus* Chaudoir of the Australian Region with Notes on Related African Species (Coleoptera: Carabidae: Oodini). *Smithsonian Contributions to Zoology*, number 184, 25 pages, 33 figures, 1 table, 1974.—The Australian–New Guinean genus *Coptocarpus* Chaudoir is revised taxonomically. The 13 known species are presented in a key and then arrayed in 5 species groups. Four species, *philipi*, new species, *chimbu*, new species, *yorkensis*, new species, and *grossus*, new species, are newly described and illustrated. The remaining nine species are redescribed and illustrated. Notes are presented on probable phylogenetic relationships with the African genera *Thryptocerus*, *Orthocerodus*, and *Hoplolenus*, and a preliminary zoogeographic scenario is presented, based on these suspected relationships. The Indian genus *Holcocoelus* is thought to be a possible key to the hypothesized relationships and is in need of further study.

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The Genus *Coptocarpus* Chaudoir of the Australian Region with Notes on Related African Species (Coleoptera: Carabidae: Oodini)

Terry L. Erwin

Introduction

The Oodini, as a tribe, have never been systematically analyzed using modern techniques, although certain genera or generic groups were recently treated taxonomically (Basilewsky, 1943, 1946, 1949; Darlington, 1968; Jeannel, 1949; Lindroth, 1956). Older papers (e.g., Blanchard, 1853; Castelnau, 1868; Chaudoir, 1857, 1882; LaFerté, 1851; Macleay, 1873; Sloane, 1910, 1915) were regional compilations of species or "classical" taxonomic studies which did not assemble observed morphological or natural history data into meaningful and predictive classification schemes; distribution, of course, was hardly mentioned, never analyzed.

This study of the oodines, especially *Coptocarpus*, began when P. J. Darlington, Jr., requested that I describe two of his new species of *Coptocarpus* from the Australian Region. Since I am opposed in principle to single species descriptions (Ball and Erwin, 1969; Erwin and Ball, 1972), I undertook a basic revision of the Australian *Coptocarpus*. This led to a preliminary morphological analysis of the oodines in general and to the discovery of the apparent close relationship of certain African species with *Coptocarpus* species.

Terry L. Erwin, Department of Entomology, National Museum of Natural History, Smithsonian Institution, Washington, D.C. 20560.

Thus, the purpose of this presentation is to taxonomically revise the species of *Coptocarpus*, to analyze *Coptocarpus* species morphology in relation to certain other oodine groups, and to provide notes on the African-Australian relationships between *Coptocarpus* and the so-called "Thryptocerini" (Jeannel, 1949).

The only practical revision of *Coptocarpus*, that of Sloane (1910), covers seven of the now known 13 species, provides a key for identification of specimens, and provides terse specimen descriptions with little regard paid to species variation. In this paper by Sloane, species described as *Coptocarpus riverinae* Macleay (1873:329) and *C. planipennis* Macleay (1878:216) were reassigned to genus *Oodes* (Sloane, 1910:446). I have studied the types of these two species (CSIRO) and agree with Sloane's action. However, it must be pointed out that *Oodes*, as presently conceived, is a "catch-all" genus and must be studied from a worldwide viewpoint, especially in regard to the placement of the Australian species. The same may be said for genus *Anatrichis*, which is now composed of at least two monophyletic groups that are not very closely related.

METHODS.—This study is the result of the examination of 117 specimens of *Coptocarpus* and hundreds of specimens of other Oodini.

Methods of dissection and procedure are the same as those used by me in the past (Erwin, 1970);

methods of genitalic illustration are, in part, those I adopted from C. H. Lindroth (Erwin, 1972b, 1973, 1974). Note that the short line accompanying the illustrations equals 1.0 mm unless otherwise noted. My criteria for recognizing taxa at various levels are the same as I outlined before (Erwin, 1970).

The abbreviations given under "Acknowledgments" indicate the museums in which studied specimens are now housed.

I have seen all type-specimens unless otherwise noted and all lectotypes have been so labeled by me.

TERMINOLOGY.—In my 1974 paper on *Pericomp-sus*, I introduced a new term for the longitudinal elytral structures between the elytral intervals. That word is "interneur" and I refer the reader to Erwin (1974).

ACKNOWLEDGMENTS.—I wish to thank P. J. Darlington, Jr., for providing me the incentive and specimens which launched this study. He has also allowed me to place in the country of their origin the holotypes of new species described herein, a philosophy of which we both are strong advocates (see also Darlington, 1971; Erwin, 1972a) when there are suitable museum facilities in those countries. Darlington's specimens, which were not deposited in other countries, are either in the Museum of Comparative Zoology, Cambridge, Massachusetts (MCZ) or in the National Museum of Natural History, Smithsonian Institution, Washington, D.C. and are listed under the catalog numbers of the old United States National Museum (USNM).

I also thank the following people for loan of specimens, especially types, in their charge: Mme. A. Bons, Muséum National d'Histoire Naturelle, Paris (MHNP), and Drs. E. B. Britton and B. P. Moore, Division of Entomology, Commonwealth Scientific and Industrial Research Organization (CSIRO), Canberra City, Australia.

I heartily thank W. Donald Duckworth and Donald R. Whitehead for reading and criticizing the draft manuscript and Walt Brown for the excellent quality scanning electron micrographs of *Coptocarpus* member's tarsal articles.

Coptocarpus Chaudoir

Coptocarpus Chaudoir, 1857:57. [Type-species: *Oodes australis* Dejean, 1831:671, by original designation and monotypy.] *Oodes* of authors.

DIAGNOSIS.—*Coptocarpus* species of Australia and New Guinea may be recognized from other Oodini in the Australian Region (*Anatrichis*, *Oodes*) by the absence of ambulatory setae on the abdominal sterna. Furthermore, *Anatrichis* have only two male probasitarsomeres with squamate setae beneath, while *Oodes* members have three dilated, but the third article of *Oodes* has squamate setae on fully one-half of the article, whereas *Coptocarpus* members have only one-third clothed with these setae.

Among the Oodini, only *Coptocarpus*, *Thryptocerus*, *Orthocerodus*, *Hoplolenus*, and *Holcocolenus* members have the male anterior tarsi asymmetrically arranged (Figures 31, 32). Members of *Holcocolenus* have the least asymmetric tarsal devel-

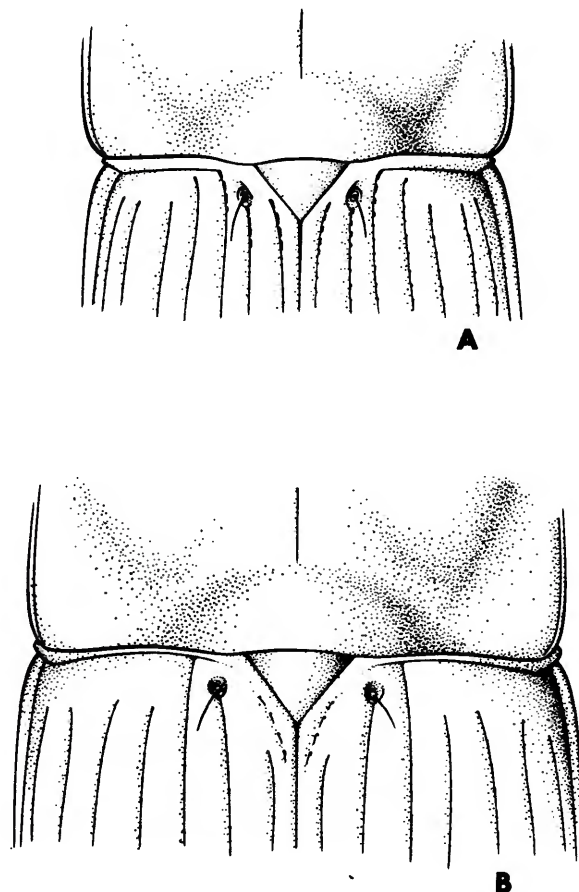


FIGURE 1.—Scutellar region of elytra: A, *Coptocarpus thoracicus*, Margaret River, Australia; B, *C. australis*, Melbourne, Australia.

opment. Of these five genera, only members of *Holcocoleus* possess ambulatory setae on the abdominal sterna, a feature also common to all other Oodini members. Members of all of these genera have an enlarged scutellum in relation to other Oodini.

DESCRIPTION.—Form (Figures 19–30) broad and convex, the prothorax quite large in relation to the elytra as compared to many other ground beetles. Color: Black to rufopiceous, some members quite iridescent beneath, appendages generally paler than color of dorsum. Head: Size various in proportion to pronotal width; labrum with six setigerous pores arrayed across anterior sixth, inner four slightly closer to each other than to lateral ones; clypeus with one setigerous pore at each anterior angle or not; mandibles smooth dorsally; penultimate article of labial palp without setae, other articles of labial palps and maxillary palps also without setae or pubescence; mentum with anterior edge emarginate and unidentate, tooth broad and apically rounded or truncate, margin of mentum with raised bead extended from right to left lobe; submentum bisetose, setigerous pores at posterior lateral angles; antennal pubescence begins at basal sixth of article 4; one supraorbital

seta per eye or none. Prothorax: Broad and convex, nearly as wide or wider than elytra; lateral setae absent; proepisterna and prosternum laterally sparsely punctate or not; male protarsal articles 1–3 (Figure 2) asymmetrically dilated, 2 and 3 fully clothed beneath with squamate setae which are transversely arranged, article 1 with only apical third clothed with these setae, article 4 very small and slightly bilobed, no articles with natatorial setae; protibial spur long and stout, subequal in length to length of probasitarsus or longer. Mesothorax: Scutellum large (Figure 1); scutellar interneur (Figure 1) present or not, when present striate, punctate, or striatopunctate; interneurons 1–7 present externally or not, when present, striate or striatopunctate; apex of elytra moderately to strongly carinatesulcate, sulcus multituberculate; medial groove of mesosternum deeply sulcate; mesepisternum punctate or not; mesotarsus without natatorial setae. Metathorax: Flight wings present or not, when absent, metasterna shortened longitudinally; metepisternum (Figure 3) punctate or not; metatarsus without natatorial setae. Abdomen: Sterna I–III rugosely punctate, sternum IV punctate or not; ambulatory setigerous pores of sterna II–V

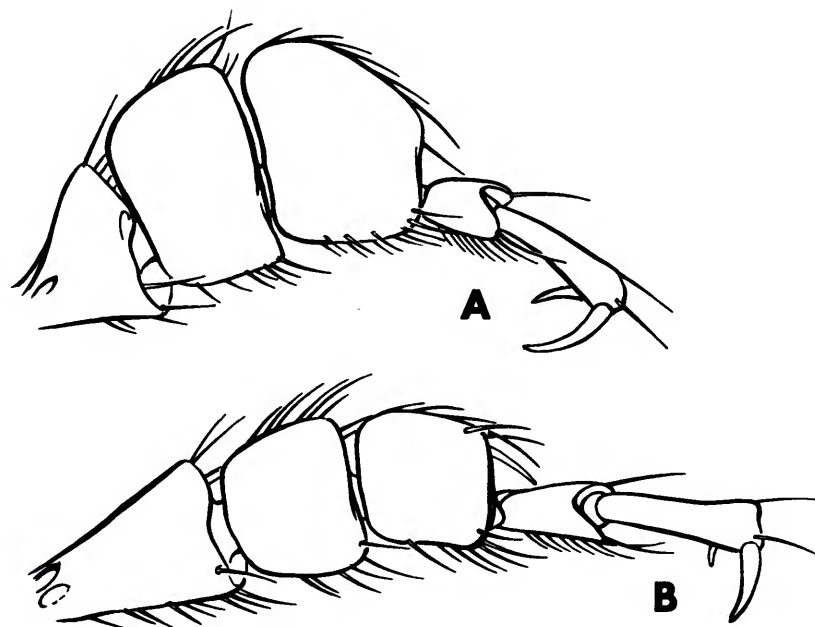


FIGURE 2.—Male anterior tarsomeres: A, *Coptocarpus australis*, Melbourne, Australia; B, *C. grossus*, Margaret River, Australia.

absent; setigerous pores of sternum VI, 4 in female, 2 in male. Genitalia: Male (Figures 4, 6–15) with broadly lobed parameres, the left larger than the right; median lobe with distal orifice symmetrically placed on dorsal surface near apical third; internal sac with numerous spines, plates, and/or microtricheal fields; female stylus a short, arcuate blade with one stout and rather long medial spine and one or two shorter lateral spines located basally, and with a small setigerous pore located lateroventrally at apical third. Microsculpture: Dorsally with very fine isodiametric reticulation interspersed with micropunctulae, ventrally either the same as dorsally or with longitudinally stretched reticulations which produce iridescent coloration. Size: Length, 7.37 to 15.06 mm; width, 2.83 to 6.39 mm. Secondary sexual characteristics: Male with strongly dilated anterior tarsal articles 1–3, each with squamate setae beneath, and sternum VI with two setigerous pores. Female without dilated anterior tarsi or squamate setae and sternum VI with four setigerous pores. Pupae may be sexed by observing the anterior tarsi for dilated articles (Ball and Erwin, 1969).

DISTRIBUTION (Figures 16–18).—The genus as here defined has species with a combined range extending from New Guinea at 5°S latitude to southern Australia at 38°S latitude and which are apparently confined to those two land masses.

Checklist of the Species of *Coptocarpus* Chaudoir

The *philipi* group

1. *C. philipi*, new species

The *chimbu* group

2. *C. chimbu*, new species
3. *C. yorkensis*, new species

The *grossus* group

4. *C. grossus*, new species

The *chaudoiri* group

5. *C. doddi* Sloane, 1910:450
6. *C. nitidus* Macleay, 1873:330
7. *C. chaudoiri* Macleay, 1873:329

The *australis* group

8. *C. gibbus* Chaudoir, 1882:511
9. *C. fuscitarsis* (Blanchard), 1853:39
10. *C. championensis* Chaudoir, 1882:510
11. *C. impar* Sloane, 1910:451
12. *C. thoracicus* (Castelnau), 1868:151
13. *C. australis* (Dejean), 1831:671

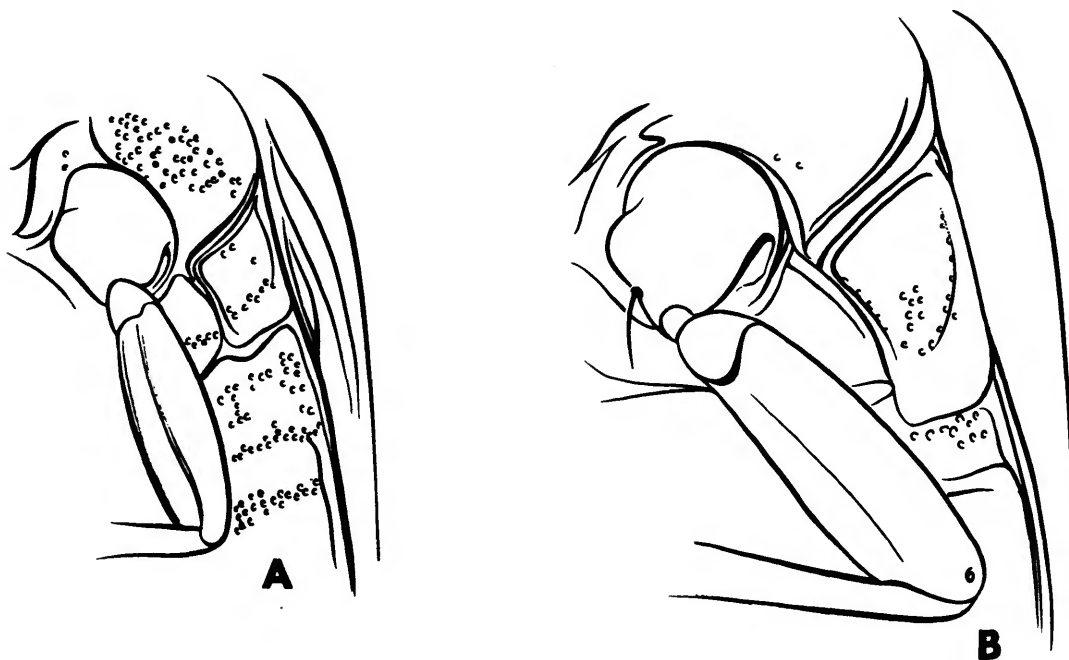


FIGURE 3.—Metasternum, metepisternum, and base of abdominal sterna: A, *Coptocarpus thoracicus*, Margaret River, Australia; B, *C. australis*, Melbourne, Australia.

Key to the Species Groups and Species of *Coptocarpus* Chaudoir

1. Elytron with well-impressed striate interneurs, easily visible to the unaided eye2
Elytron smooth, if striate interneurs present then only discernible at high magnification ..
.....(*chimbu* group) 12
- 2(1). Metepisternum with large coarse punctures (Figure 3) at least in apical half; mesepi-
sternum usually also coarsely punctate (Figure 3)3
Metepisternum and mesepisternum without punctures, surface (at least disc of mesepi-
sternum) smooth and shiny9
- 3(2). Sutural interneur (Figure 1A) continuous from elytral base adjacent to umbilicate setiger-
ous pore to apex; form narrow and elongate(*australis* group, in part) 4
Sutural-scutellar interneur divided, thus not continuous (Figure 1B) adjacent to umbili-
cate setigerous pore; form large and robust5
- 4(3). Size large, length more than 10.0 mm; male genitalia (Figure 13)11. *C. impar* Sloane
Size small (Figure 29), length less than 9.5 mm; male genitalia (Figure 14)
.....12. *C. thoracicus* (Castelnau)
- 5(3). Interneurs striate and finely punctate, punctures easily visible at $\times 50$; male probasitarsus
transverse (Figure 2A), its length subequal to or less than that of article 2 (not seen
in *C. gibbus*)(*australis* group, in part) 6
Interneurs striate, smooth, without fine punctures; male probasitarsus elongate (Figure
2B), longer than article 2(*grossus* group) 4. *C. grossus*, new species
- 6(5). Pronotum with lateral bead narrow throughout, much narrower than apical antennal
articles (viewed from dorsal surfaces)7
Pronotum with lateral bead wide (Figure 26), especially in basal half, fully as wide as
dorsal surfaces of apical antennal articles8. *C. gibbus* Chaudoir
- 7(6). Mesepisternum rugose and coarsely punctate, punctures widespread; pronotum with
lateral bead evenly narrow throughout8
Mesepisternum smooth, without rugosities or punctures; pronotum with lateral bead
wide at middle, narrower toward base and apex9. *C. fuscitarsis* (Blanchard)
- 8(7). Mesepisternum with numerous fine and coarse punctures (Figure 3B), punctures easily
visible among the finely engraved microsculpture; male probasitarsus narrow at apex,
less than 0.75 as wide as article 2 (Figure 2A)13. *C. australis* (Dejean)
Mesepisternum not or very shallowly and sparsely punctate, but finely rugose; male
probasitarsus wide at apex, fully as wide as article 210. *C. championensis* Chaudoir
- 9(2). Prosternum laterally with numerous coarse punctures; head rather large (Figure 23-25)
.....(*chaudoiri* group) 10
Prosternum laterally without punctures, surface smooth; head very small and deeply
sulcate transversely behind eyes (Figure 19)(*philipi* group) 1. *C. philipi*, new species
- 10(9). Pronotum with lateral bead continuous throughout, well developed to base11
Pronotum with lateral bead effaced in basal half7. *C. chaudoiri* Macleay
- 11(10). Elytral intervals slightly convex, interneurs striate and coarsely punctate, deeply im-
pressed; length 9.23 mm5. *C. doddi* Sloane
Elytral intervals flat, interneurs striate and finely punctate, shallowly impressed; length,
10.20 to 11.66 mm6. *C. nitidus* Macleay
- 12(2). Abdominal sterna II coarsely punctate laterad of metacoxa; pronotum (Figure 20) very
broad, wider than elytra across humeri2. *C. chimbu*, new species
Abdominal sternum II rugose but not punctate; pronotum (Figure 21) long and narrow,
subequal to elytral width3. *C. yorhensis*, new species

1. *Coptocarpus philipi*, new species

FIGURES 4, 5A, 18, 19

TYPE-SPECIMENS.—The holotype male is in CSIRO; it was collected by P. J. Darlington, Jr., in 1957. Three paratypes are listed below.

TYPE-LOCALITY.—The Crater, near Atherton Plateau, Queensland, Australia.

DESCRIPTION (Figure 19).—Form broad and depressed, with a very small head about one-third the width of the pronotum. Easily recognized by the small, transversely sulcate head and the pecu-

liar form of the mesobasitarsus (Figure 5A). Color: Black dorsally, black iridescent ventrally; appendages rufopiceous, antennae and palpi testaceous. Head: Narrow and small, with transverse sulcus posterior to eyes, width across eyes subequal to one-third width of pronotum; labrum with two long setae, one at each anterior angle and with four shorter setae closely spaced at middle of anterior edge; mandible with shorter scrobe, dorsal surface broader, otherwise as in *C. australis*. Prothorax: Pronotum broad and depressed, wider than elytra, lateral margin narrowly beaded, with bead extended from hind angle around anterior angle nearly to middle, otherwise as in *C. australis*; venter without punctation, otherwise as in *C. australis*. Mesothorax: As in *C. australis* except elytral interneurs shallowly striate-punctate, scutellar interneur nearly effaced, intervals flat, humeral tooth well developed and prominent; mesepisternum without punctures; mesobasitarsus elongate and bent (Figure 5A) with serrate carina beneath. Meta-

thorax: Flight wings absent; metepisternum without punctures, shape quadrate; metabasitarsus elongate. Abdomen: Sterna not punctate, otherwise as in *C. australis*. Genitalia: Male (Figure 4). Microsculpture: As in *C. australis*. Size: Length, 9.47 to 10.12 mm; width, 4.13 to 4.45 mm.

VARIATION.—The four specimens studied are quite homogeneous.

NATURAL HISTORY.—Darlington (1960) indicates that his specimens were collected in rain forest beneath stones or logs; one was at waterside, the others were not. Specimens were collected in December and February. None were teneral.

ETYMOLOGY.—The genitive patronym, *philipi*, honors my friend and mentor who collected the types of this species, Philip J. Darlington, Jr.

LOCALITY RECORDS (Figure 18).—I have seen four specimens from the following localities: AUS-



FIGURE 4.—Male genitalia with everted endophallus, left lateral profile, and apex, ventral aspect of *Coptocarpus philipi*, holotype from the Crater, Queensland, Australia.

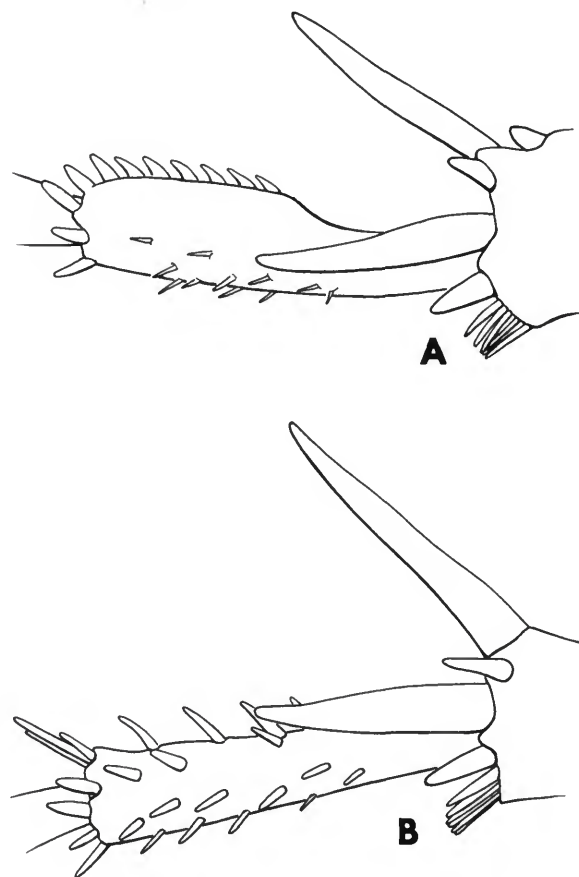


FIGURE 5.—Mesobasitarsus, distal lateral aspect; A, *Coptocarpus philipi*, Lake Eacham, Queensland, Australia; B, *C. australis*, 40 miles ENE of Glen Innes, New South Wales, Australia.

TRALIA: QUEENSLAND: Lake Eacham near Atherton Plateau (MCZ), Longlands Gap near Atherton Plateau (MCZ), "Mts. above Atherton" (USNM), The Crater near Atherton Plateau (CSIRO).

2. *Coptocarpus chimbu*, new species

FIGURES 6, 16, 20

TYPE-SPECIMENS.—The holotype male is in CSIRO; it was collected by F. Parker in 1967.

TYPE-LOCALITY.—Dumun, Northeast New Guinea (ca. 145°W 6°S).

DESCRIPTION (Figure 20).—Form broad and convex with a wide and nearly quadrate pronotum and a moderately large head that is subequal across eyes to half the width of the pronotum. Easily recognized by the absence of striate-punctate interneurs and by the punctate abdominal sternum II. Color: Nigropiceous throughout; appendages rufopiceous. Head: As in *C. australis* except clypeus and vertex without setae. Prothorax: As in *C. australis* except pronotum wider than elytra, venter without punctures. Mesothorax: Elytra smooth, interneurs effaced externally, dorsal

setigerous pores of interval 3 absent, humeral angle dentate, tooth prominent, otherwise as in *C. australis*; mesepisternum without punctures; mesobasitarsi elongate, not serrate-carinate beneath as in *C. philipi*. Metathorax: Flight wings absent; metepisternum not punctate, shape square; otherwise as in *C. australis*. Abdomen: Sternum II coarsely punctate, other sterna smooth or slightly rugose; otherwise as in *C. australis*. Genitalia: Male (Figure 6); female unknown. Microsculpture: As in *C. australis*. Size: Length, 8.58 mm; width, 3.72 mm.

ETYMOLOGY.—The noun, *chimbu*, refers to the name of the river in New Guinea from which area the type was collected.

LOCALITY RECORDS (Figure 16).—I have seen only the holotype from Dumun, New Guinea (CSIRO).

3. *Coptocarpus yorkensis*, new species

FIGURES 7, 18, 21

TYPE-SPECIMENS.—The holotype male is in CSIRO; it was collected by P. J. Darlington, Jr., in 1958. One paratype is listed below.

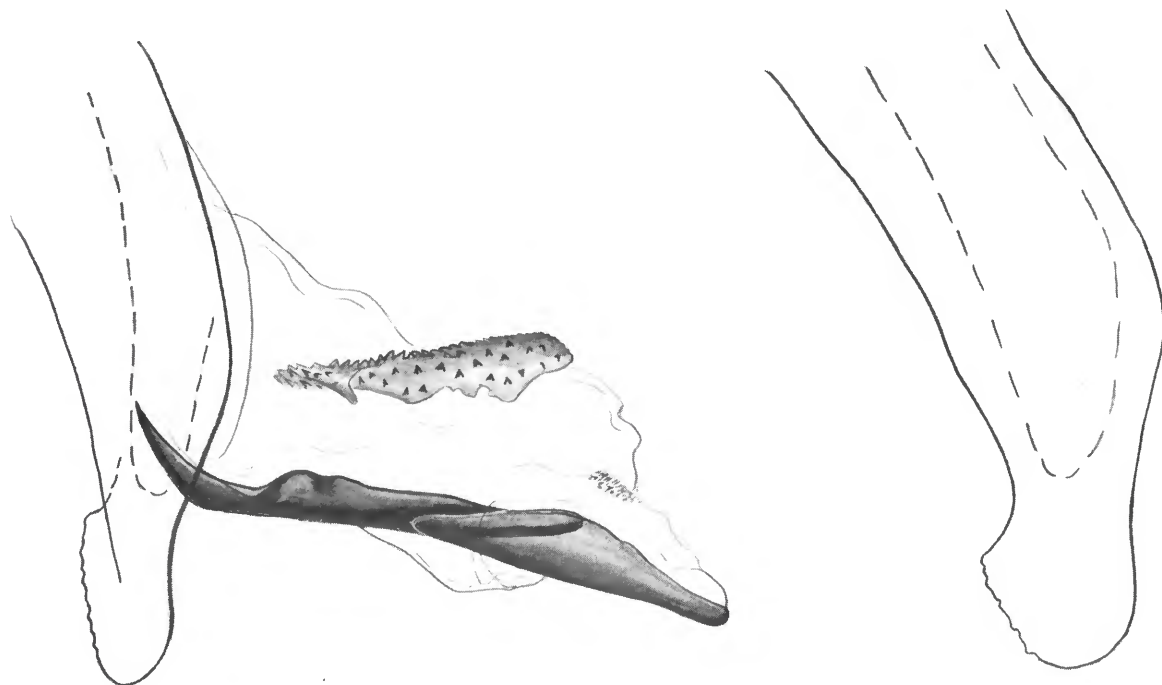


FIGURE 6.—Male genitalia with everted endophallus, left lateral profile, and apex, ventral aspect of *Coptocarpus chimbu*, Dumun, New Guinea.

TYPE-LOCALITY.—Vicinity of Tozers Gap on Cape York, Queensland, Australia.

DESCRIPTION (Figure 21).—Form narrow and subconvex with a moderately small head. Most easily recognized by the nearly smooth elytra and the lack of punctures on abdominal sternum II. Color: Rufopiceous throughout; legs more rufous; male anterior tarsi, antennae, and palpi testaceous. Head: As in *C. australis* except relatively much narrower and with small, nearly flat eyes. Prothorax: Pronotum as in *C. australis* except narrower and less convex; venter as in *C. australis* except punctures absent. Mesothorax: Elytral interneurs very faintly impressed, striate; scutellar interneur almost effaced; intervals flat, interval 3 with two faintly impressed setigerous pores posterior of middle; otherwise elytra as in *C. australis*; mesepisternum without punctures, surface slightly rugose; middle tarsal articles 2 to 4 with moderately long golden setae ventrally, one row each side. Metathorax: Flight wings absent; sterna without punctures; tarsal article 4 only, with 2 rows of moderately long golden setae, otherwise with bilateral rows of spinose setae ventrally. Abdomen: Sterna without

punctures, otherwise as in *C. australis*. Genitalia: Male (Figure 7). Microsculpture: As in *C. australis*. Size: Length, 8.67 to 9.87 mm; width, 3.56 to 4.05 mm.

NATURAL HISTORY.—P. J. Darlington, Jr., and family collected the two known specimens in savannah woodland or rain forest beneath logs or stones (Darlington, 1960). Both specimens were collected in January and neither was teneral.

ETYMOLOGY.—The adjective, *yorkensis*, refers to Cape York, the general area where these beetles live.

LOCALITY RECORDS (Figure 18).—I have seen two specimens, both from Cape York, Queensland; one from near Tozers Gap (CSIRO) and the other from the Iron Range (MCZ).

4. *Coptocarpus grossus*, new species

FIGURES 2B, 8, 17, 22

TYPE-SPECIMENS.—The holotype male and allotype are in CSIRO; both were collected by P. J. Darlington, Jr., in 1931. Ten paratypes are listed below.

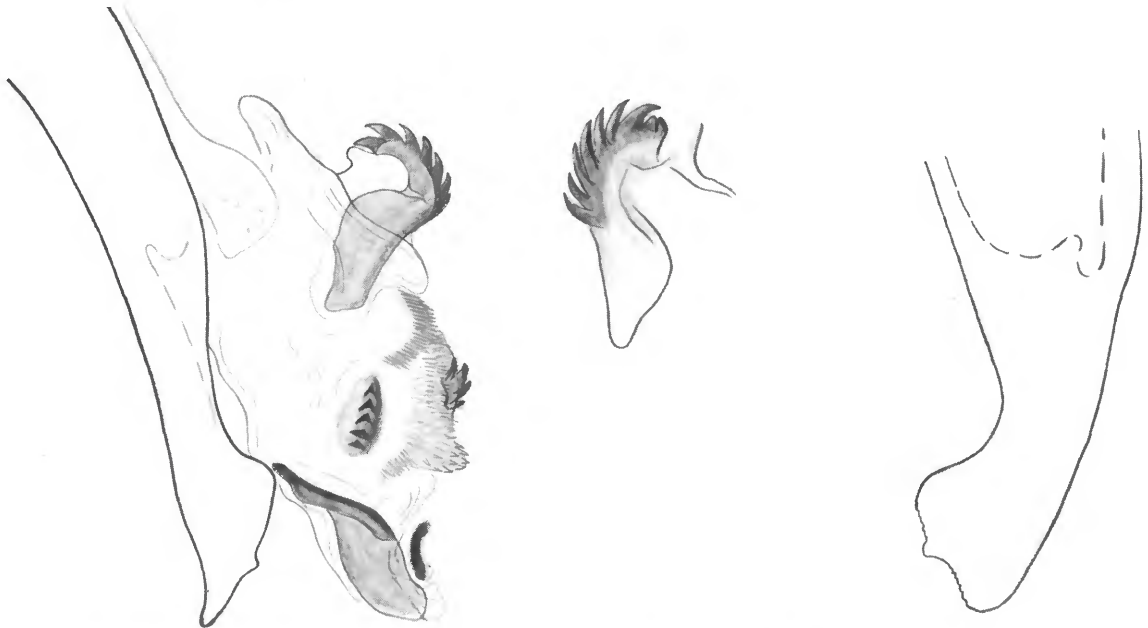


FIGURE 7.—Male genitalia with everted endophallus, left lateral profile; anterior endophallus hook, right lateral aspect; and apex, ventral aspect of *Coptocarpus yorkensis*, vicinity of Tozer Gap, Queensland, Australia.

TYPE-LOCALITY.—Margaret River, Western Australia.

DESCRIPTION (Figure 22).—Form very board and convex with a transverse pronotum, which is somewhat narrower than the inflated elytra, and with a very large head, which is wider across the eyes than half the width of the pronotum. Easily recognized by the smooth striate interneurs and large size. Color: Piceous to nigropiceous throughout; antennae, palpi, and tarsi rufopiceous. Head: Very broad across eyes, wider than half the width of pronotum; mental tooth broadly truncate, otherwise head as in *C. australis*. Prothorax: As in *C. australis* except probasitarsus of male (Figure 2b).

Mesothorax: Elytral interneurs striate, striae well impressed, numbers 1, 4–7 not quite extended to basal margin; scutellar interneur a row of unconnected punctures removed from interneur 1; intervals nearly flat, interval 3 with two small setigerous pores posterior of middle; humeral angle with well-developed, acute tooth that protrudes beyond margin; otherwise as in *C. australis*. Metathorax: Flight wings absent; metepisternum coarsely yet sparsely punctate; otherwise as in *C. australis*. Abdomen: Sterna I to III rugosely punctate laterally; otherwise as in *C. australis*. Genitalia: Male (Figure 8). Microsculpture: Head, pronotum, and elytra with very small isodiametric reticulation throughout;

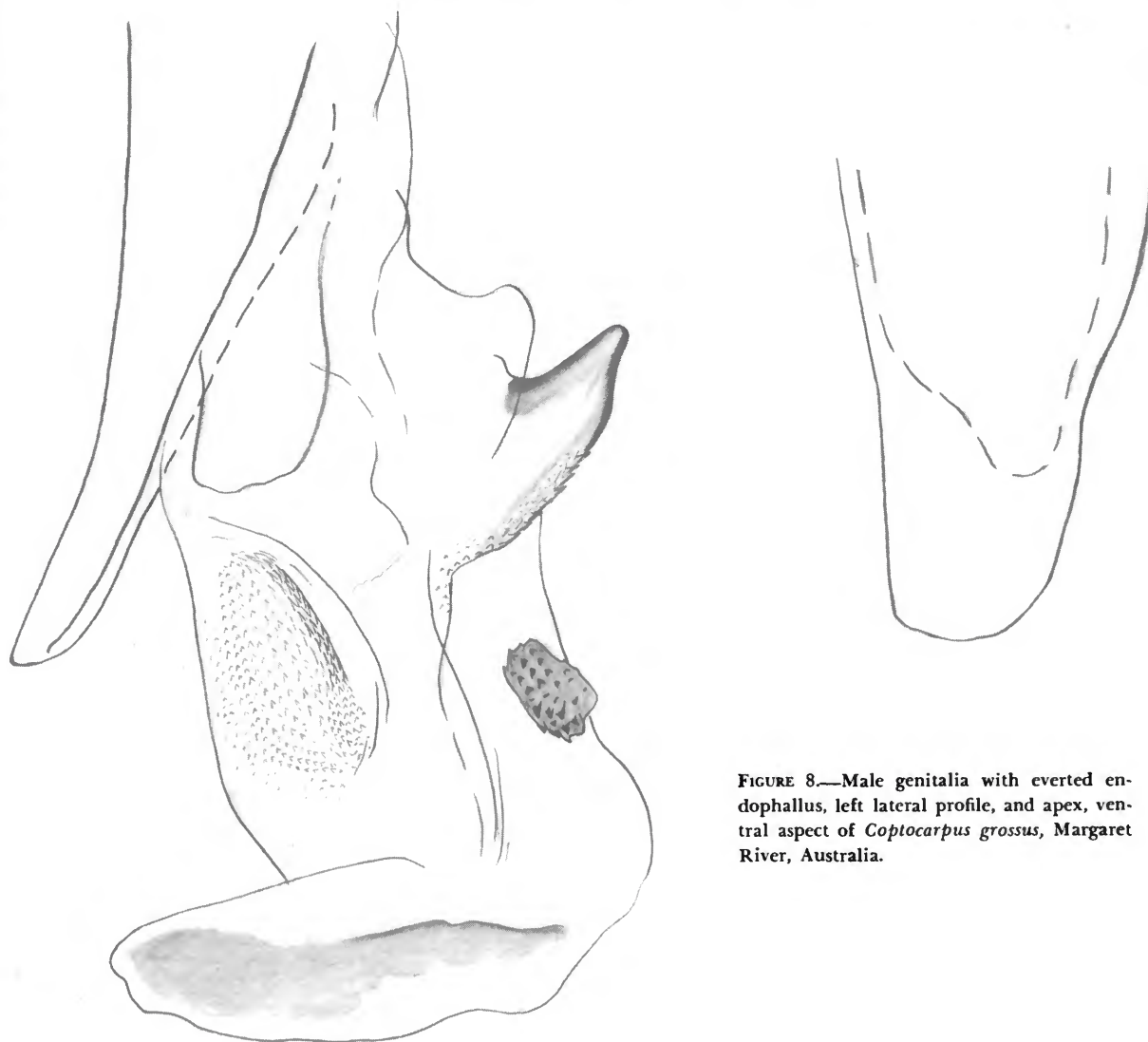


FIGURE 8.—Male genitalia with everted endophallus, left lateral profile, and apex, ventral aspect of *Coptocarpus grossus*, Margaret River, Australia.

venter with more longitudinally stretched reticulation, slightly iridescent. Size: Length, 11.34 to 15.06 mm; width, 4.61 to 6.39 mm.

VARIATION.—As in *C. australis* the size variation is remarkable even within a single population sample. However, all character states studied are constant and the male genitalia with all of its intricate internal details are constant.

NATURAL HISTORY.—P. J. Darlington, Jr., collected one example near the Margaret River in October and several others at the same place in November. Other specimens seen were collected in October and February. None were teneral.

ETYMOLOGY.—The Latin adjective, *grossus*, meaning "big," in reference to the broadness of these beetles.

LOCALITY RECORDS (Figure 17).—I have seen 12 specimens from the following localities: AUSTRALIA: WESTERN AUSTRALIA: Margaret River (CSIRO, MCZ, MHNP, USNM), Manjimup (MCZ), 30 miles SW Nannup (CSIRO).

5. *Coptocarpus doddi* Sloane

FIGURES 9, 18, 23

Coptocarpus doddi Sloane, 1910:450. [Holotype, a male, in CSIRO. Type-locality: Port Darwin, Northern Territory, Australia.]

DESCRIPTION (Figure 23).—Form broad and convex with a transverse pronotum subequal in width to width of elytra, and with a moderate-sized head which, across the eyes, is slightly smaller than half the width of the pronotum. Easily recognized by the slightly convex elytral intervals, continuous lateral pronotal bead, punctate prosternum laterally, and smooth met- and mesepisterna. Color: Piceous to rufopiceous throughout; appendages slightly paler. Head: As in *C. australis* except vertex transversely shallowly sulcate. Prothorax: As in *C. australis* except probasitarsus of male shorter than apical tibial spur. Mesothorax: As in *C. australis* except punctures of interneurs more coarse, scutellar interneur absent, and mesepisternum



FIGURE 9.—Male genitalia with everted endophallus, left lateral profile; anterior endophallus hook; left oblique aspect; and apex, ventral aspect of *Coptocarpus doddi*, holotype from Port Darwin, Australia.

without punctures. Metathorax: Flight wings absent, metepisternum without punctures, otherwise as in *C. australis*. Abdomen: Sterna I to III only punctate laterally, not rugose, otherwise as in *C. australis*. Genitalia: Male (Figure 9); female unknown. Microsculpture: As in *C. australis*, venter with more longitudinally stretched reticulation. Size: Length, 9.23 mm; width 4.05 mm.

LOCALITY RECORDS (Figure 18).—I have seen only the holotype from Port Darwin, N.T., Australia (CSIRO).

6. *Coptocarpus nitidus* Macleay

FIGURES 10, 18, 24

Coptocarpus nitidus Macleay, 1873:330. [Type lost according to B. P. Moore, in litt. Type-locality: Cape York, Queensland, Australia.]

Coptocarpus oviformis Chaudoir, 1882:511.—Sloane, 1910:451. [Lectotype, a female, herein selected in MHNP. Type-locality: Cape York, Queensland, Australia.]

DESCRIPTION (Figure 24).—Form broad and moderately convex with a transverse pronotum nearly as wide as the elytra, and with a moderately large head, which is slightly narrower than half the width of the pronotum. Recognized best by the nonpunctate venter, complete pronotal lateral bead, well-impressed striate-punctate interneurs, and flat intervals. Color: As in *C. australis*. Head: As in *C. australis* except smaller relative to rest of body and with four medial labral setae located closer to center of labrum. Prothorax: As in *C. australis* except male probasitarsus more elongate. Mesothorax: As in *C. australis* except interneurs less impressed, intervals flatter, venter not punctate. Metathorax: Flight wings absent, venter not punctate, otherwise as in *C. australis*. Abdomen: As in *C. australis* except sterna I and II less punctate and less rugose. Genitalia: Male (Figure 10). Microsculpture: As in *C. australis*. Size: Length, 10.20 to 11.66 mm; width, 4.05 to 4.94 mm.

VARIATION.—The small sample is quite homogeneous.

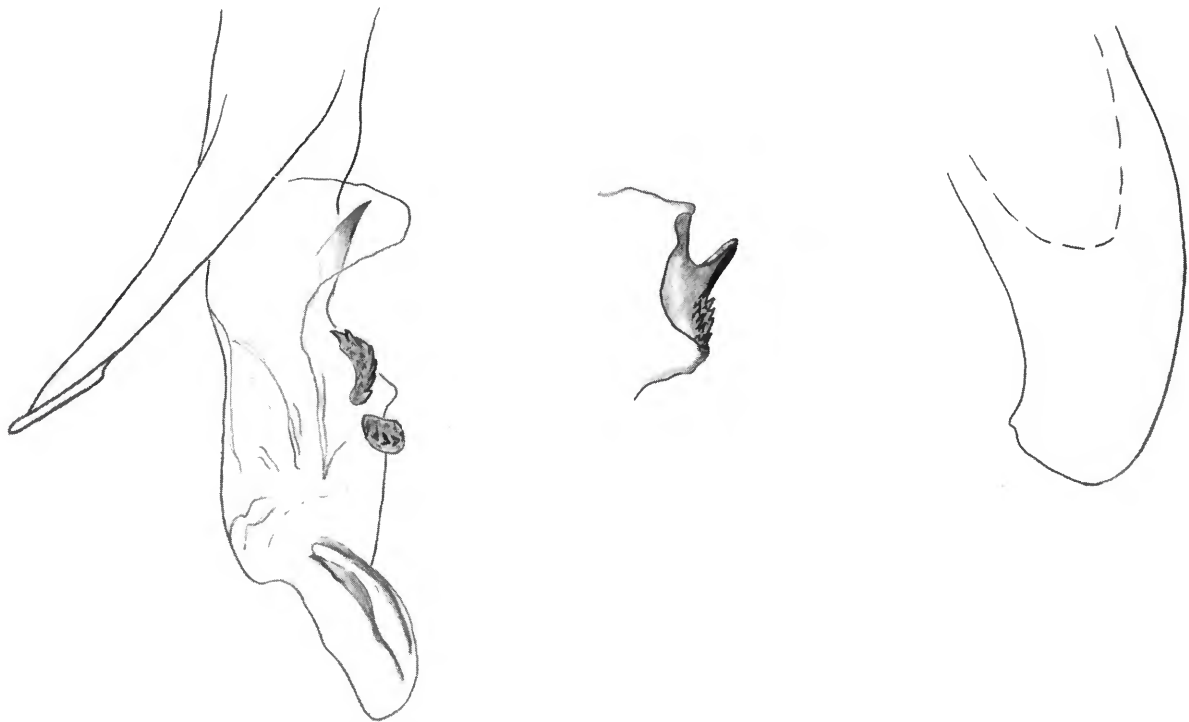


FIGURE 10.—Male genitalia with everted endophallus, left lateral profile; anterior endophallus hook, left oblique aspect; and apex, ventral aspect of *Coptocarpus nitidus*, Bamaga, Queensland, Australia.

NATURAL HISTORY.—P. J. Darlington, Jr., and family collected these beetles in light rain forest or savannah woodland in two localities. I have seen specimens collected only in January; none were teneral.

LOCALITY RECORDS (Figure 18).—I have seen 10 specimens from the following localities: AUSTRALIA: QUEENSLAND: "Cape York" (MHNP), Bama (CSIRO, MCZ, USNM), Lockerbie (MCZ).

NOTES.—Although the type is apparently lost we have Sloane's (1910) statement that he examined the "one type-specimen (female)" in the Macleay Museum. He considers *C. nitidus* synonymous with *C. oviformis* (of which the type is in MHNP) and provides additional character states to add to Macleay's terse description (1873). Based on these observations of both Macleay and Sloane, I am confident that Darlington's specimens are of this species.

7. *Coptocarpus chaudiroi* Macleay

FIGURES 18, 25

Coptocarpus chaudiroi Macleay, 1873:329. [Lectotype, a female, here selected in CSIRO. Type-locality: Clarence River, New South Wales, Australia.]

DESCRIPTION (Figure 25).—Form very broad and moderately convex with a transverse pronotum nearly as wide as the elytra, and with a large head which, across the eyes, is slightly narrower than half the width of the pronotum. Easily recognized by the nonpunctate postventer (except abdominal sternum I) and the effaced lateral bead along the basal half of the pronotum. Color: As in *C. australis*. Head: As in *C. australis*. Prothorax: As in *C. australis* except punctuation of posternum coarser; lateral bead of pronotum effaced in basal third; male tarsi unknown. Mesothorax: As in *C. australis* except intervals less convex medially and flat laterally, interneurs less impressed and venter not punctate. Metathorax: Flight wings absent, venter not punctate. Abdomen: Sternum I rugosely punctate, otherwise as in *C. australis*. Genitalia: Male unknown; female not dissected. Microsculpture: As in *C. australis*. Size: Length, 12.60 mm; width, 5.58 mm.

LOCALITY RECORDS (Figure 18).—I have seen only the lectotype from the Clarence River, New South Wales, Australia (CSIRO).

8. *Coptocarpus gibbus* Chaudoir

FIGURES 17, 26

Coptocarpus gibbus Chaudoir, 1882:511. [Lectotype, a female, here selected in MHNP. Type-locality: "Australie" as originally given by Chaudoir.]

DESCRIPTION (Figure 26).—Form broad and convex with a very large head which is wider than half the width of the pronotum. Easily recognized by the very wide pronotal bead, which is wide throughout its length. Color: Nigropiceous throughout; appendages rufopiceous. Head: As in *C. australis* except head much broader in relation to width of pronotum. Prothorax: As in *C. australis* except lateral bead wider throughout its length. Male anterior tarsi not seen. Mesothorax and Metathorax: As in *C. australis* except flight wings absent; metepisternum shorter, almost quadrate. Abdomen: As in *C. australis* except sternum III with fewer punctures and more longitudinal rugosities. Genitalia: Male unknown; female as in *C. australis*. Microsculpture: As in *C. australis*. Size: Length, 11.74 to 11.90 mm; width, 4.69 to 4.86 mm.

LOCALITY RECORDS (Figure 17).—I have seen two specimens, one not labeled (MHNP) and one from Queensland, Australia (MHNP).

NOTES.—Sloane (1910) recorded specimens from western Australia at Albany, Bunbury, and Mount Barker, but I have not seen these specimens. One specimen in MHNP is labeled "Queensland" and it matches the unlabeled type. Sloane's records must be regarded as based on some other species with which he confused *C. gibbus*. It is doubtful that *C. gibbus* occurs both in Queensland and southernmost Western Australia.

9. *Coptocarpus fuscitarsis* (Blanchard)

FIGURES 11, 18, 27

Oodes fuscitarsis Blanchard, 1853:39. [Lectotype, a male, here selected in MHNP. Type-locality: Raffles Bay, Northern Territory, Australia.]

DESCRIPTION (Figure 27).—Form broad and convex with pronotum wider than widest part of elytra. Easily recognized by the smooth mesepisternum and the wide pronotal bead medially, which narrows anteriorly and posteriorly. Color: Nigropiceous, appendages rufopiceous except male anterior tarsi rufous, and antennae and palpi testa-

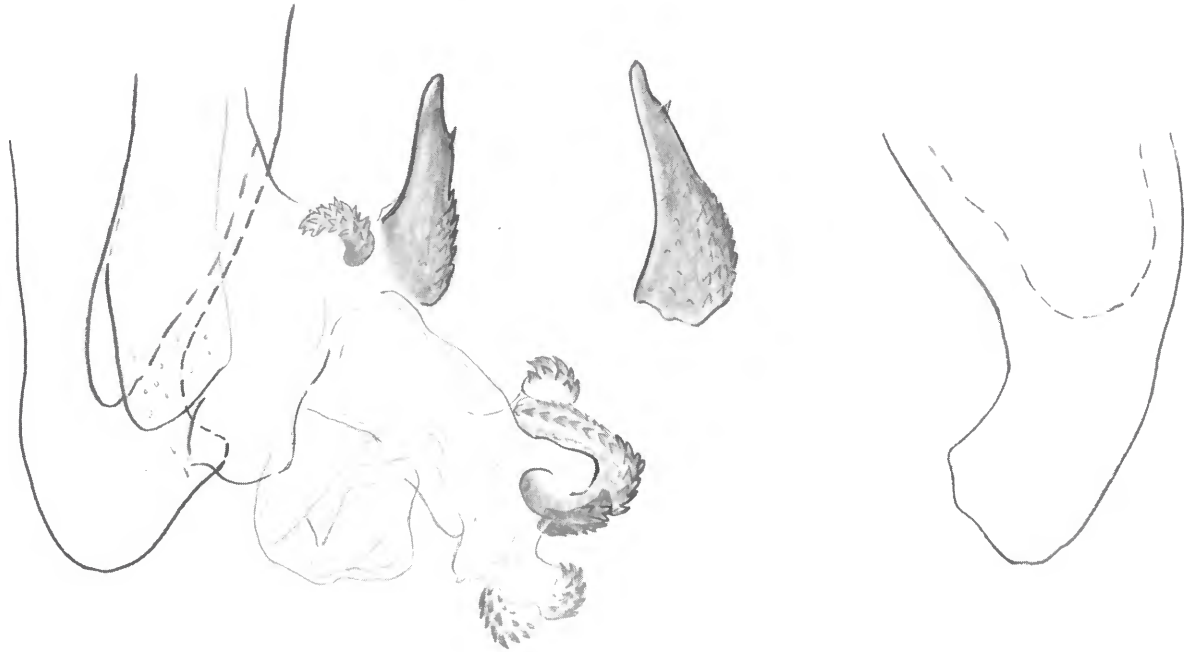


FIGURE 11.—Male genitalia with everted endophallus, left lateral profile; anterior endophallus hook, left oblique aspect; and apex, ventral aspect of *Coptocarpus fuscitarsis*, lectotype from Raffles Bay, Australia.

ceous. Head: As in *C. australis* except narrower than half the width of the pronotum and eyes more depressed posterodorsally. Prothorax: Pronotum broad and convex, slightly wider than elytra at widest point, lateral margin with bead wide at middle, tapering posteriorly and anteriorly; posterolateral depression very shallow; otherwise as in *C. australis*. Mesothorax: As in *C. australis* except mesepisternum smooth, without punctures. Metathorax: As in *C. australis* except flight wings absent. Abdomen: As in *C. australis* except only sternum I and II with fine punctures, sternum III finely rugose. Genitalia: Male (Figure 11); female as in *C. australis*. Microsculpture: As in *C. australis*. Size: Length, 10.04 to 11.34 mm; width, 4.61 to 4.69 mm.

LOCALITY RECORDS (Figure 18).—I have seen 2 specimens from Raffles Bay, Northern Territory, Australia (MHNP).

10. *Coptocarpus championensis* Chaudoir

FIGURES 12, 17, 28

Coptocarpus championensis Chaudoir, 1882:510. [Lectotype, a male, here selected in MHNP. Type-locality: "Australie"

as originally given by Chaudoir, herewith restricted to Eradu, near Champion Bay, Western Australia on the basis of Sloan's (1910) records, and on specimens listed below.]

DESCRIPTION (Figure 28).—Form short, broad, and convex with strongly depressed posterolateral sides of the pronotum. Easily distinguished from the similar *C. australis* members by the rugose, rather than punctate, mesepisterna and by the nearly smooth striate interneurs. Color: Rufopiceous to nigropiceous; head and pronotum in some specimens rufous and elytra nigropiceous, in others concolorous; appendages rufous or piceous except tarsi, antennae, and palpi testaceous or rufotestaceous. Head and Prothorax: As in *C. australis* except posterolateral sides of pronotum more depressed, anterolateral sides of prosternum less punctate, and probasitarsus of male subequal in width to article 2. Mesothorax: As in *C. australis* except interneurs 3 to 7 with extremely small punctures hardly visible at $\times 50$, scutellar interneur striate-punctate, intervals barely convex, and mesepisternum finely rugose but not punctate. Metathorax: As in *C. australis* except metepisternum with smaller and more rugose punctuation. Abdomen: As in

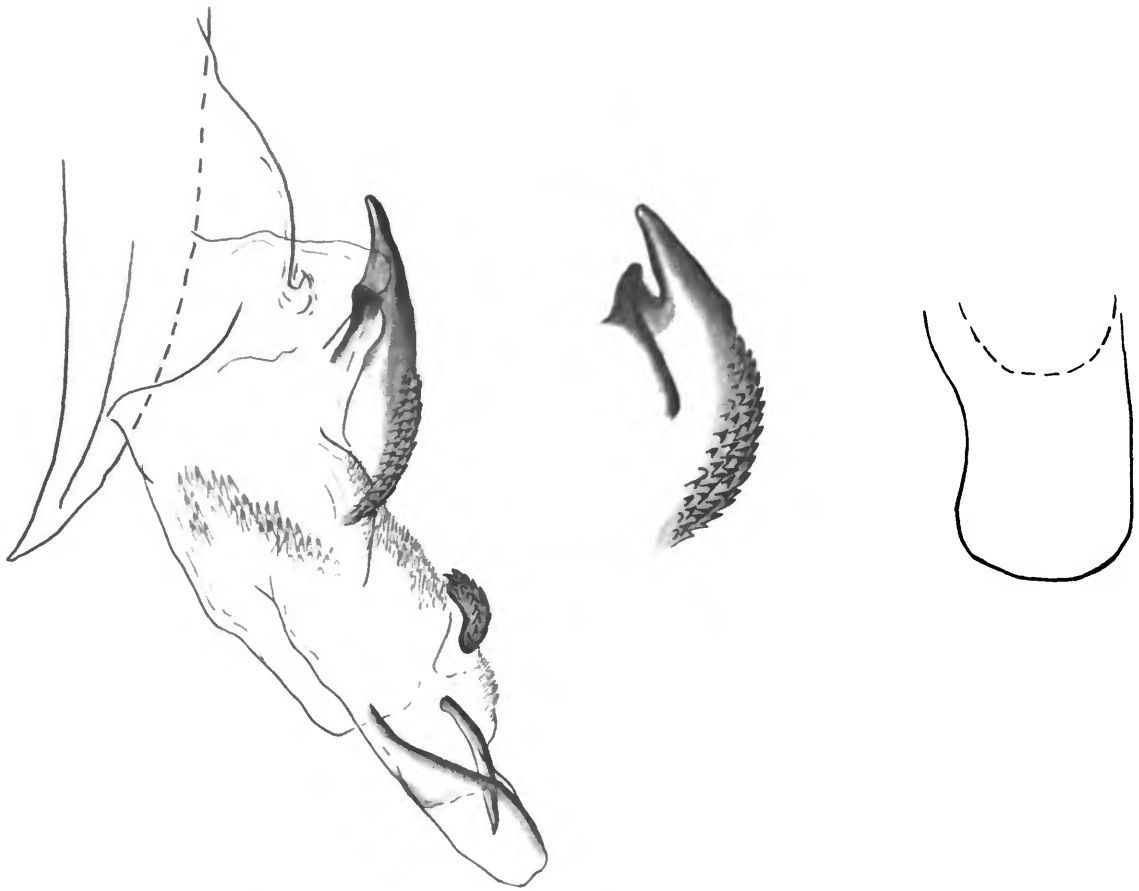


FIGURE 12.—Male genitalia with everted endophallus, left lateral profile; anterior endophallus hook, left oblique aspect; and apex, ventral aspect of *Coptocarpus championensis*, Geraldton, Australia.

C. australis. Genitalia: Male (Figure 12); female as in *C. australis*. Microsculpture: As in *C. australis*. Size: Length, 9.39 to 11.74 mm; width, 3.96 to 4.86 mm.

VARIATION.—See description of color above; otherwise the samples available are quite homogeneous.

NATURAL HISTORY.—I have seen specimens collected in April, October, and December. Some specimens collected in October were quite teneral, the rest subteneral when collected. The April and December specimens, one collected each month, are fully pigmented and hard. It is likely that immatures could be found in September.

LOCALITY RECORDS (Figure 17).—I have seen 24 specimens from the following localities: AUSTRAL-

IA: (MHNP); WESTERN AUSTRALIA: Cranbrook (MCZ), Geraldton (CSIRO, MCZ, USNM), "Mt. Casino ? v. Perth" (MCZ), Rockingham (MCZ), Swan River (MHNP).

NOTE.—Sloane (1910) records specimens from Eradu, near Champion Bay.

11. *Coptocarpus impar* Sloane

FIGURES 13, 17

Coptocarpus impar Sloane, 1910:451. [Holotype, a headless male, in CSIRO. Type-locality: Roebuck Bay, Western Australia.]

DESCRIPTION.—Form similar to *C. thoracicus* but more elongate and proportionately larger. Easily



FIGURE 13.—Male genitalia with everted endophallus, left lateral profile; anterior endophallus hook, left oblique aspect; and apex, ventral aspect of *Coptocarpus impar*, holotype, Roebuck Bay, Australia.

distinguished from other members of the genus by the absence of a scutellar interneur and the elongate, narrow form. Color: Piceous; appendages paler with rufotestaceous anterior tarsi (male). Head: Missing from type, the only specimen I have seen. Prothorax: As in *C. australis* except prosternum anterolaterally with fewer but coarser punctures. Mesothorax: As in *C. australis* except elytra without scutellar interneur and mesepisternum coarsely punctate. Metathorax: As in *C. australis* except flight wings absent. Abdomen: Sterna I to III with scattered coarse punctures, otherwise as in *C. australis* (male only, female not seen). Genitalia: Male (Figure 13). Microsculpture: Pronotum with very small isodiametric reticulations, surface rather dull; elytral reticulation larger, surface shiny. Size: Length (without head), 8.58 mm; width, 3.88 mm. Sloane (1910) gives the length of the type with the head as 10.0 mm and the width as 3.80 mm. The small discrepancy in width size is probably due to refinement of measuring devices since 1910.

LOCALITY RECORD (Figure 17).—I have seen only

the type-specimen from Roebuck Bay, Western Australia.

NOTE.—Sloane (1910) recorded a female specimen from Shark Bay, Western Australia.

12. *Coptocarpus thoracicus* (Castelnau)

FIGURES 1A, 3A, 14, 18, 29, 33

Oodes thoracicus Castelnau, 1868:151. [Lectotype, a male, here selected in MHNP. Type-locality: Swan River, Western Australia.]

Coptocarpus parvus Sloane, 1915:461, [Holotype, a male, in CSIRO. Type-locality: Karri Forest near Manjimup, Western Australia. New synonymy.]

DESCRIPTION (Figure 29).—Form much narrower and flatter than *C. australis* members, but with proportions similar. Recognized immediately on small size and absence of scutellar interneur. Color: Rufopiceous to piceous; head, pronotum, and sutural interval of elytron paler than elytral disc; antennae and palpi testaceous, legs bright rufous, tarsi rufotestaceous. Head and Prothorax: As in

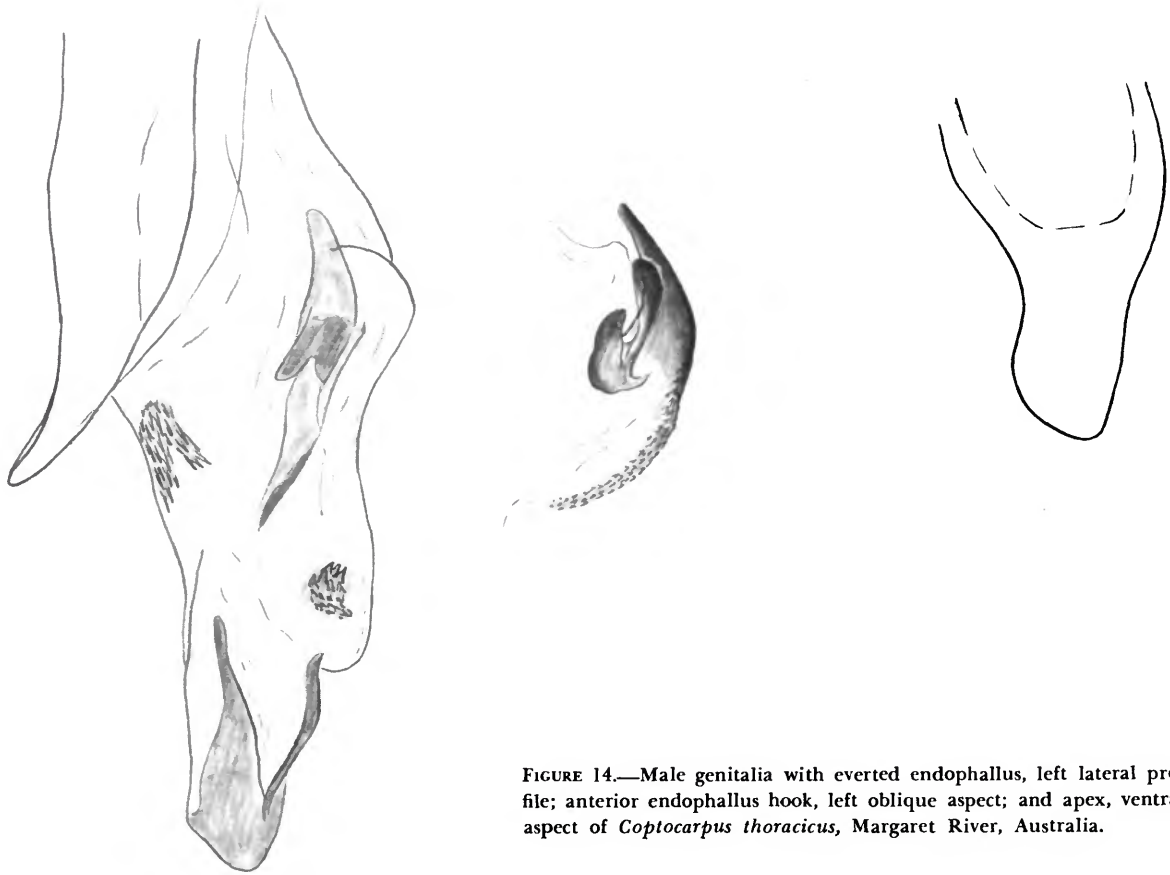


FIGURE 14.—Male genitalia with everted endophallus, left lateral profile; anterior endophallus hook, left oblique aspect; and apex, ventral aspect of *Coptocarpus thoracicus*, Margaret River, Australia.

C. australis. Mesothorax: As in *C. australis* except scutellar interneur absent (Figure 1A), punctures of interneurs 1 to 8 smaller, punctures of mesepisternum coarser. Metathorax: As in *C. australis* except flight wings absent, metepisternum smaller and more quadrate with fewer punctures (Figure 3A). Abdomen: As in *C. australis* except sterna I to III coarsely and more sparsely punctate. Genitalia: Male (Figure 14); female as in *C. australis*. Microsculpture: As in *C. australis* except reticulation of elytra much larger and coarser. Size: Length, 7.37 to 9.15 mm; width, 2.83 to 3.64 mm.

VARIATION.—This is a remarkably variable species. The width and general shape of the pronotum vary in relation to the elytra, the pronotum being narrower, subequal, or wider than the elytra and the microsculpture of the elytra may be exceedingly coarse or quite smooth. There is apparently

no correlation with sex and microsculpture coarseness, as in some other ground beetles.

NATURAL HISTORY.—I have seen specimens collected in October, November, and January. The January specimen appears to have been subterminal when collected.

LOCALITY RECORDS (Figure 18).—I have seen 19 specimens from the following localities: AUSTRALIA: WESTERN AUSTRALIA: King George Sound (MHNP); Manjimup in Karri Forest (CSIRO); Margaret River (CSIRO, MCZ, MHNP, USNM); Swan River (MHNP).

13. *Coptocarpus australis* (Dejean)

FIGURES 1B, 2A, 3B, 5B, 15, 18, 30, 31

Oodes australis Dejean, 1831:671. [Lectotype, a female, here selected in MHNP. Type-locality: "Nouvelle-Holande" as

given originally by Dejean, herewith restricted to Melbourne, Victoria, Australia, based on hand-labeled specimens in the Chaudoir collection in MHNP.]

Oodes reichei LaFerté, 1851:271 [type(s) lost].—Chaudoir, 1857:58.

Oodes convexus Castelnau, 1868:151. [Lectotype, a male, here selected in MHNP. Type-locality: King George Sound, Victoria, Australia. New synonymy.]

DESCRIPTION (Figure 30).—Form broad and convex with a transverse pronotum nearly as wide as the elytra, and with a large head which, across the eyes, is subequal to half the width of the pronotum. Recognized easily by the character states mentioned in the key. Color: Piceous to nigropiceous throughout; appendages, especially palpi, slightly paler. Head: Broad across eyes, subequal to half the width of pronotum; clypeus with setigerous pore at each anterior angle; labrum with six setigerous pores evenly spaced across anterior margin; mandibles smooth dorsally; palpi glabrous; ligula bisetose,

medial carina broad and flat; mentum bisetose, setigerous pores at base of marginal tooth; mentum with anterior edge emarginate and unidentate, tooth broad and apically rounded, margin with raised bead extended from right to left lobe; submentum bisetose, setigerous pores at posterior lateral angles. Prothorax: Pronotum broad and convex, slightly narrower than elytra at widest point, lateral margin narrowly beaded with bead extended from hind angle around anterior angle halfway to midpoint of anterior margin, disc with shallow stria directed longitudinally at middle and disc slightly depressed posterolaterally; proepisterna finely and sparsely punctate; prosternum more densely punctate anterolaterally; prosternal process well developed, sulcate at middle and with raised bead around apex, apex acute or rounded and received into deep mesosternal groove; male tarsal (Figure 2A) articles 1 to 3 broadly dilated and asymmetric medially, ventrally (Figure 31) apical

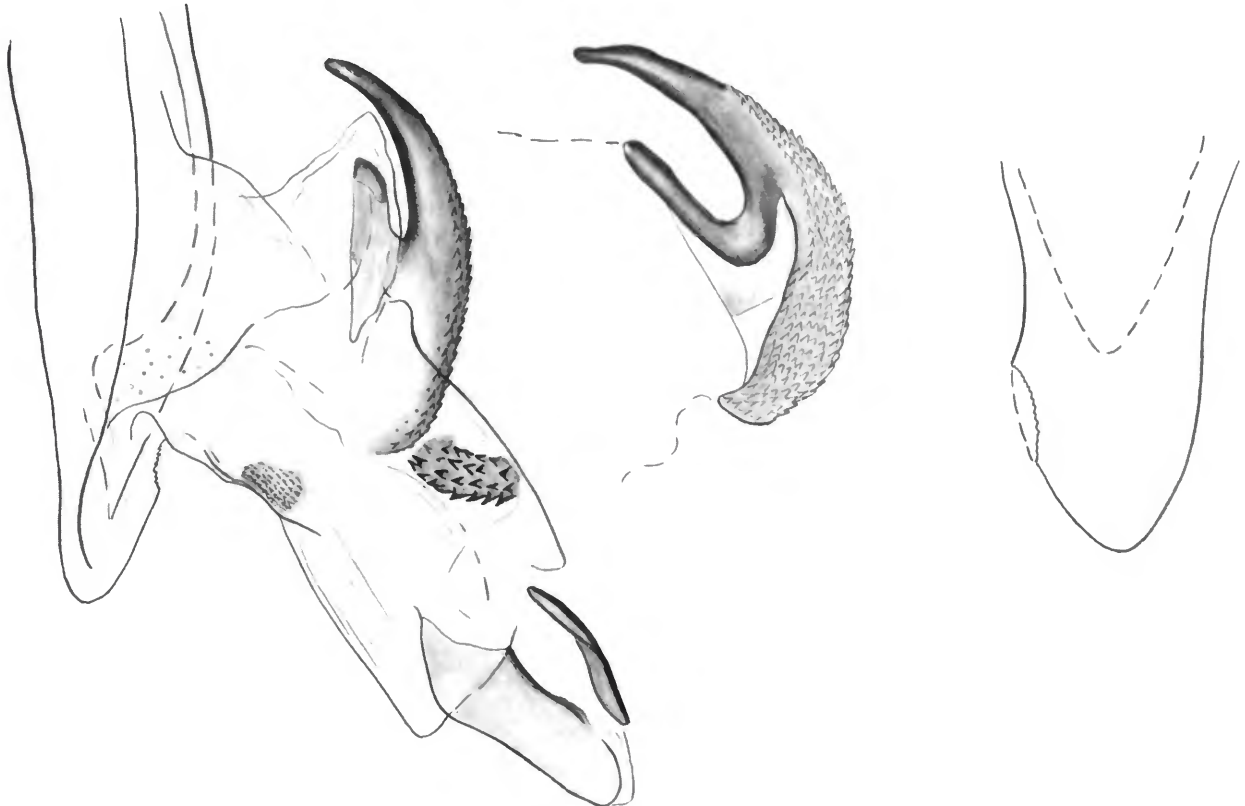


FIGURE 15.—Male genitalia with everted endophallus, left lateral profile; anterior endophallus hook, left oblique aspect; and apex, ventral aspect of *Coptocarpus australis*, north of Coonabarabran, Australia.

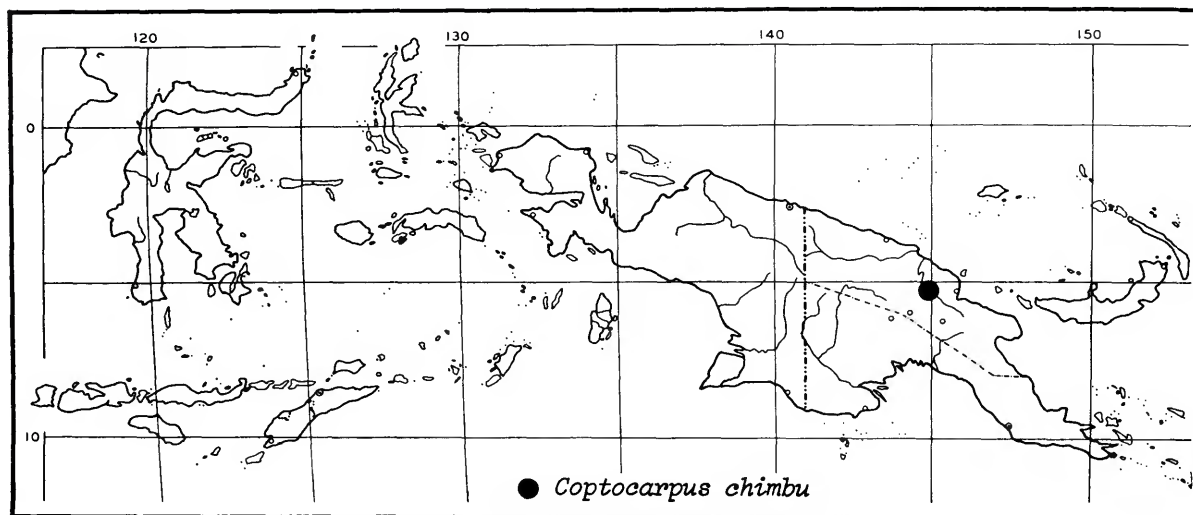


FIGURE 16.—Distribution map.

third of basitarsus and all of articles 2 and 3 with numerous squamate setae (Figure 33) arranged in transversely arcuate rows of 4 to 12 setae per row, articles laterally with long and slightly flattened setae, the lateral ones longer than the medial ones, article 4 small and emarginate apically; apical tibial spur long and stout, slightly arcuate, as long as basitarsus. Mesothorax: Elytral interneurs striate-punctate, punctures small and widespread, striae well impressed and not quite extended to basal margin; scutellar interneur (Figure 1b) a row of unconnected punctures extended apically to base of interneur 1; intervals moderately convex, interval 3 with two small setigerous pores posterior of middle; humeral angle with a very small tooth which barely protrudes beyond margin; lateral channel with numerous setigerous pores and small tubercles anteriorly and posteriorly, less so medially; mesepisternum with numerous fine punctures; middle tarsal articles 1 to 4 (Figure 5b) with bilateral rows of spinose setae ventrally. Metathorax: Flight wings fully developed with reflexed apex; metepisternum coarsely punctate in apical half (Figure 3b); metasternum smooth; hind tarsal articles as middle ones. Abdomen: Sterna I to IV rugosely punctate laterally; sterna III to V without ambulatory setae; sternum VI bisetose in males, quadrisetose in females. Genitalia: Male (Figure

15). Microsculpture: Head, pronotum, and elytra with very small isodiametric reticulation throughout. Size: Length, 9.23 to 13.12 mm; width, 4.05 to 5.34 mm.

VARIATION.—The remarkable size difference between individuals has led to confusion among the early students of the genus. All external character states studied and the male genitalia indicate, however, that there is probably but one species involved.

NATURAL HISTORY.—P. J. Darlington, Jr., and family collected members of this species in five different localities, all of which are in savannah woodland. According to Darlington (1960) specimens were collected from beneath logs or stones in all these localities. I have seen specimens collected in May, June, October, and November; none were teneral.

LOCALITY RECORDS (Figure 18).—I have seen 35 specimens from the following localities: AUSTRALIA: AUSTRALIAN CAPITAL TERRITORY: Gudgenby River (MCZ, USNM). NEW SOUTH WALES: about 20 miles E of Armidale (CSIRO, MCZ), about 40 miles ENE of Glen Innes (MCZ), Ebor on Dorrigo Plateau (MCZ), Manar Creek on Canberra Coast Road (CSIRO), north of Coonabarabran (MCZ, USNM), Paterson (MCZ, CSIRO). VICTORIA: Mel-

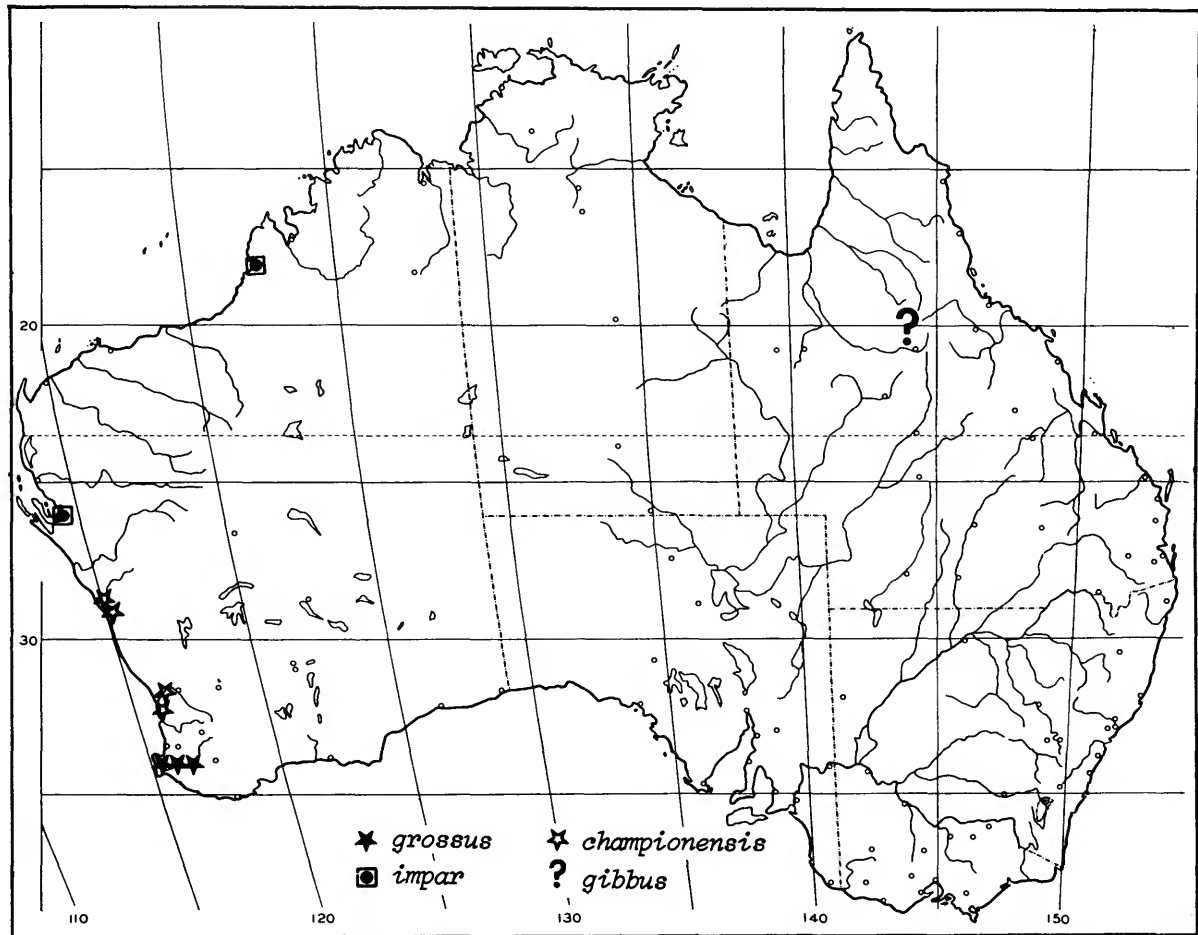


FIGURE 17.—Distribution map.

bourne (MHNP), Ringwood (MCZ). WESTERN AUSTRALIA: Cape DuBoulay (MHNP), Fremantle (MHNP).

DISTRIBUTIONAL NOTE.—Sloane (1910) recorded specimens from Western Australia, Mount Barker, Beverley, Roebuck Bay.

NOMENCLATORIAL NOTES.—LaFerté (1851:271) described *Oodes reichei* in a footnote to his table of *Oodes* where he listed "Reichei (nobis). (1) id. Swan river." Chaudoir (1857:58) stated that *O. reichei* was a variation of *Coptocarpus australis* and not "une espèce distincte." Later, Chaudoir (1882:510) stated that *O. reichei* was not discretely described (more or less a nomen nudum) but equals

C. convexus. LaFerté's description, although short and inconcise, is a valid piece of work under the present nomenclatorial code. Sloane (1910:446) apparently read Chaudoir's (1882) statement and reported *O. reichei* as a nomen nudum, but equal to *C. convexus* Castelnau. Since the type appears to be lost, I am regarding *O. reichei* as synonymous with *C. convexus*, in view of Chaudoir's (1882) opinion, and therefore with *C. australis*.

Coptocarpus convexus Castelnau is based on a very small specimen of *C. australis*; in all ways, including male genitalia, it matches *C. australis* Dejean; therefore I am regarding the two as conspecific.

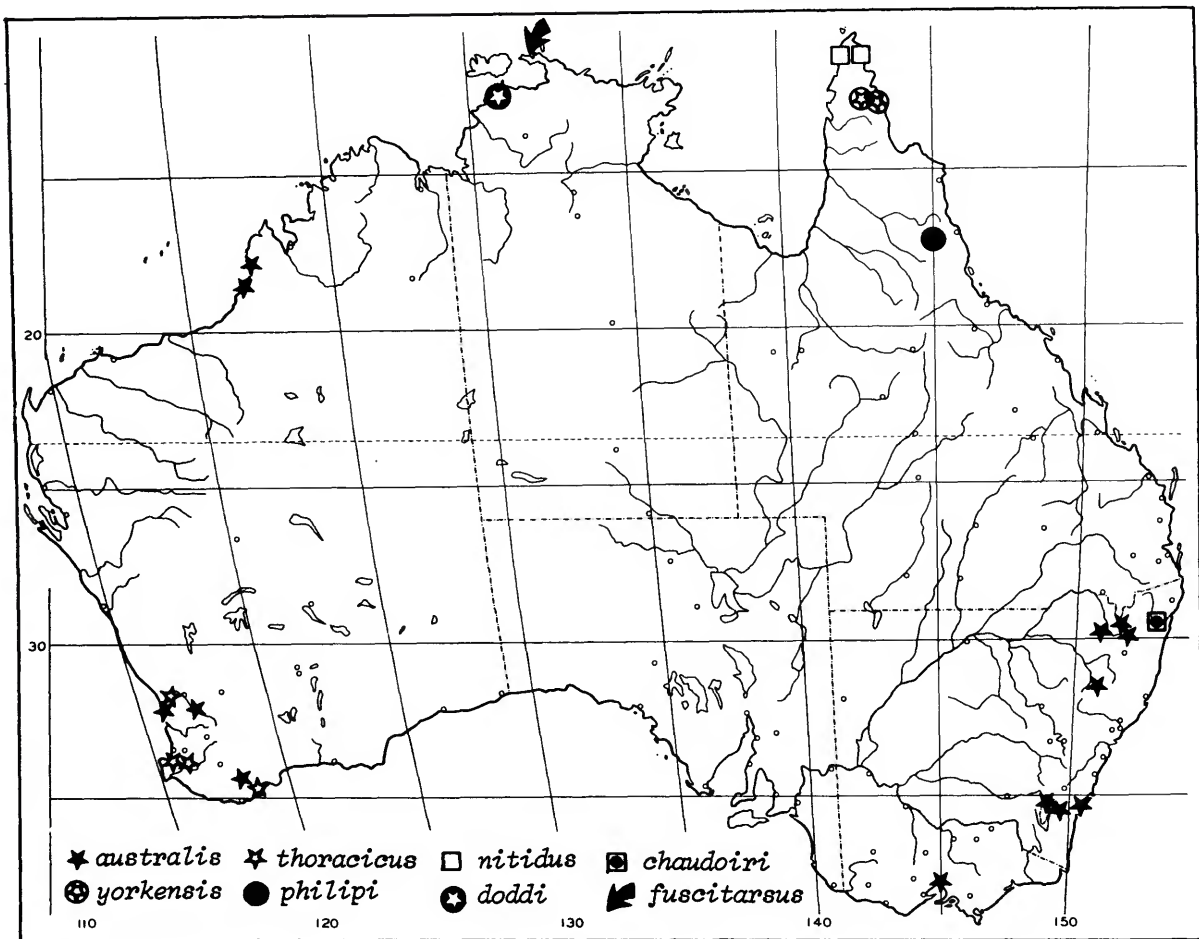


FIGURE 18.—Distribution map.

Phylogenetic and Zoogeographic Notes

The striking similarities between the Australasian *Coptocarpus* and the African "Thryptocerini" are more than convergences. After analyzing many character states of members of 23 genera or subgenera of Oodini, I believe that the apomorphic trends set out in Table 1 amply indicate relationship among *Coptocarpus*, *Thryptocerus*, *Orthocerodus*, and *Hoplolenus*. An overall oodine study now underway will clarify this situation. In the interim, the following notes express my current opinions with regard to *Coptocarpus*.

The 13 known species of *Coptocarpus* are arrayed in five species groups. The members of the *australis* group are the most generalized of *Copto-*

carpus, the most widespread, and two species have winged members. These members, while having objective synapomorphies 10, 15, 23 (see Table 1), retain an *Oodes* form. Members of the other four groups are variously apomorphic in form, they are wingless, and they have some or all of the objective synapomorphies 1, 2, and 4 (see Table 1).

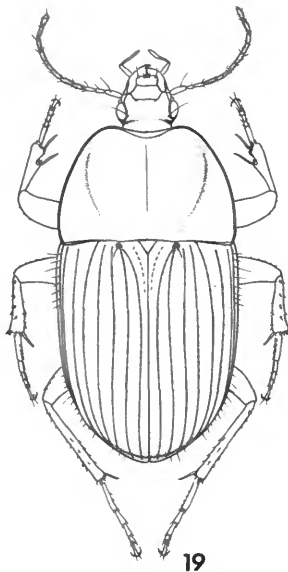
The members of the *philipi* and *chimbu* groups are most similar to *Orthocerodus* and *Hoplolenus* members, respectively. The members of *Thryptocerus* are similar to members of *Orthocerodus* (thus also, *philipi* group) except for the unique (among oodines) elongate antennal scape and the oblique insertion of article 2 into the scape. *Hoplolenus obesus* members have peculiar mandibles (among oodines), but in all other aspects are similar to

TABLE 1.—*Distribution of character states in the four Oodine genera, Coptocarpus, Thryptocerus, Orthocerodus, Hoplolenus (asterisk = objective apomorphic condition, i.e., highly derived when distribution of state is examined throughout the oodines; plus = character present; minus = character absent or character state is different)*

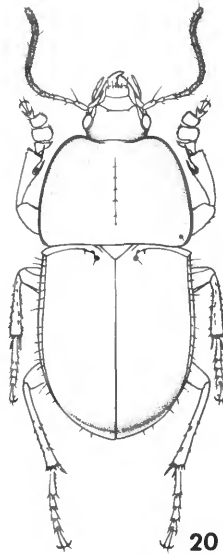
Character state	<i>Coptocarpus</i>	<i>Thryptocerus</i>	<i>Orthocerodus</i>	<i>Hoplolenus</i>
Head:				
1. Labrum, number and pattern of setae	6, or 1-4-1*	1-4-1*	1-4-1*	1-4-1*
2. Clypeus, number of setae	0*, or 2	0*	0*, or 2	0*
3. Labial palp, number of setae	0	0	0	0
4. Front, number of supraorbital setae per eye	0*, or 1	1	1	1
5. Antennal scape, elongate	-	+*	+/-	-
6. Antennal article 2, obliquely inserted into scape	-	+*	-	-
Prothorax:				
7. Pronotum, number of setae	0	0	0	0
8. Proepisternum, punctate	-, +	-	-	+
9. Prosternum, punctate	-, +	-	-	+
10. Male, 3 basitarsomers asymmetrically dilated	+*	+*	+*	+*
11. Male, tarsomere vestiture transversely arranged	+*	+*	+*	+* (Fig. 32)
12. Tarsomere, laterally with natatorial setae	-	-	-	-
13. Tibial spurs, elongate	+	+	+	+
14. Prosternal process, triangulate and produced	+*	+*	+*	+*
Mesothorax:				
15. Scutellum, very large	+*	+*	+*	+*
16. Umbilicate setal pore adjacent to scutellum, foveate	+*	+*	+*	+*
17. Male, basitarsomere elongate	+*	+*	+*	+*
18. Mesosternal groove, deep	+*	+*	+*	+*
Metathorax:				
19. Metepisternum, punctate	+, -	-	-	+
20. Metasternum, punctate	+, -	-	-	+
Male Genitalia:				
21. Apex of median lobe, toothed laterally	+, -	+, -	-	+
22. Right paramere, reduced to nubbin	-	+	+	?
Abdomen:				
23. Ambulatory seta absent	+*	+*	+*	+*

Coptocarpus philipi and also *C. nitidus* of the *chaudoiri* group. This indicates to me that if *Coptocarpus*, *Orthocerodus*, *Thryptocerus*, and *Hoplolenus* are each monophyletic groups, they

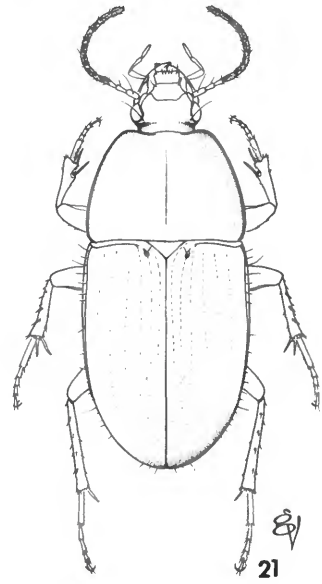
would have attained similar forms through convergent processes. Alternatively, if they had a common ancestral stock similar in form to *australis* group members, and this ancestral stock was wide-



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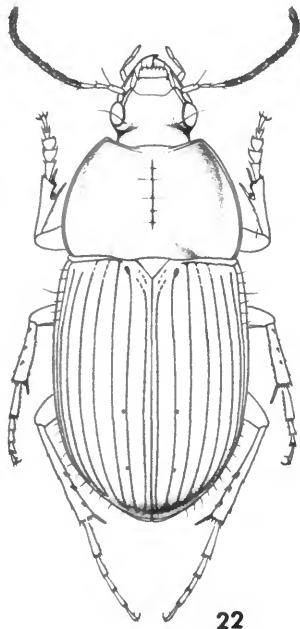


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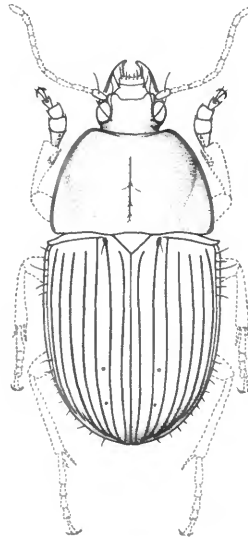


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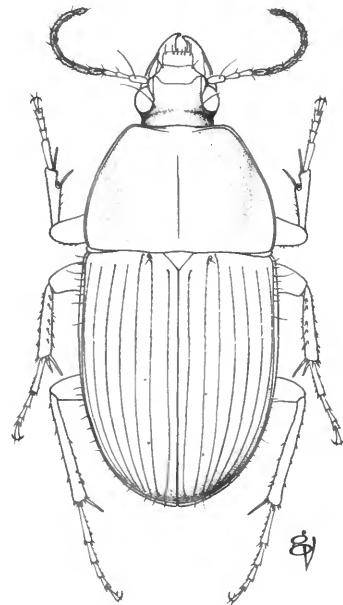
FIGURES 19-21.—Habitus, dorsal aspect: 19, *Coptocarpus philipi*, female, Mountains above Atherton, Queensland, Australia; 20, *C. chimbu*, male, Dumun, New Guinea; 21, *C. yorkensis* female, Iron Range, Queensland, Australia.



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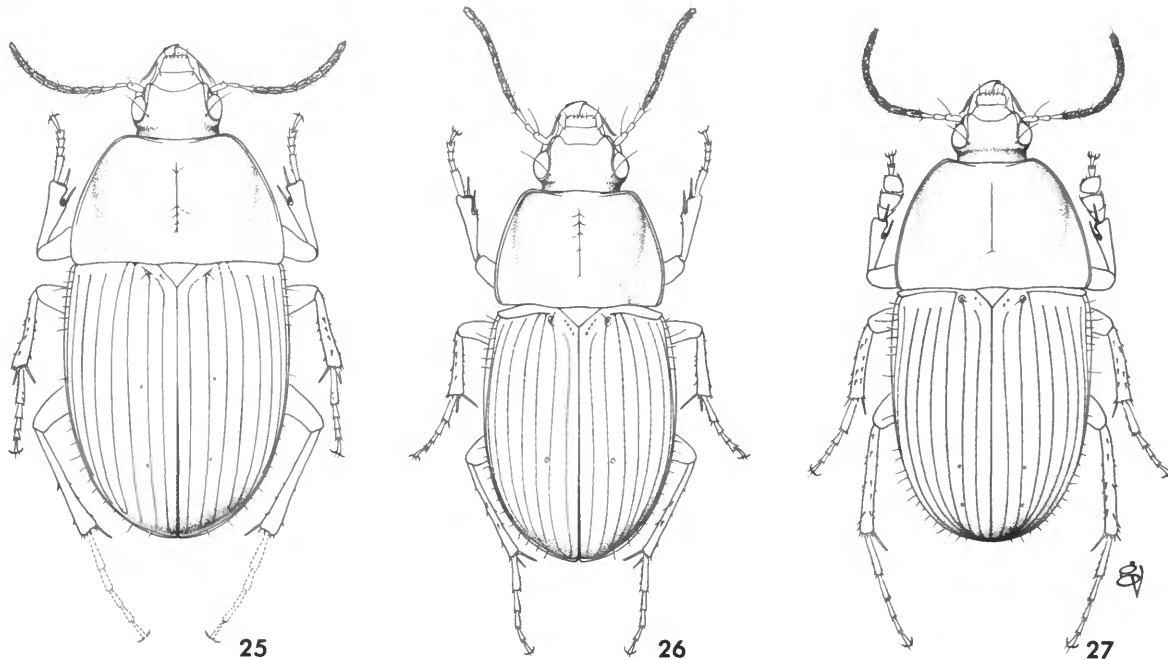


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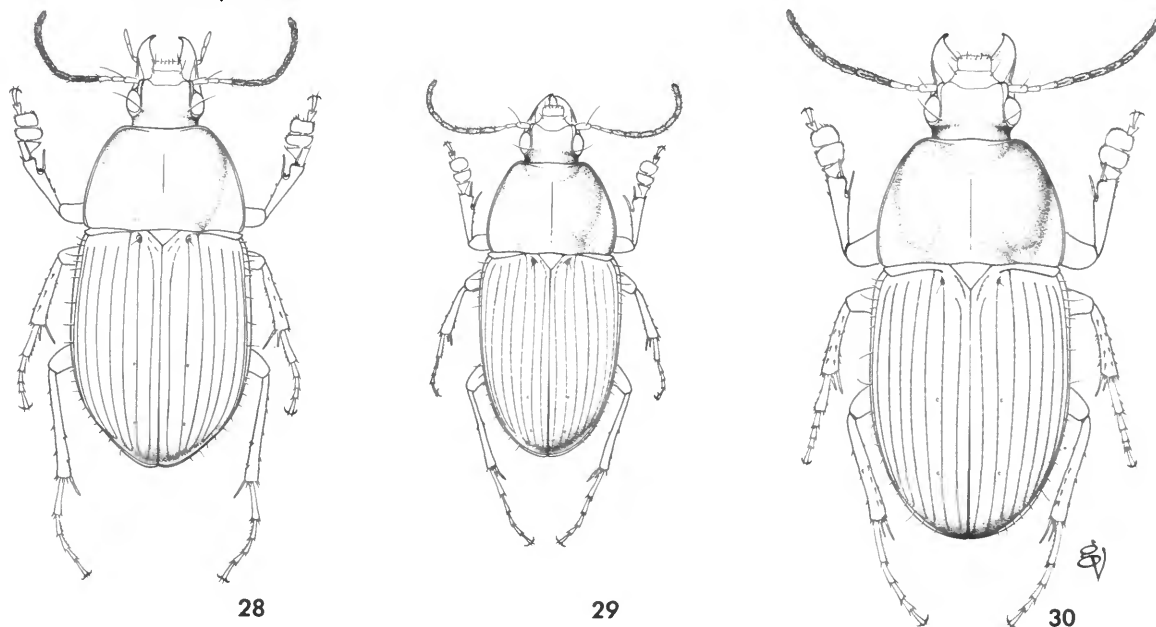


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FIGURES 22-24.—Habitus, dorsal aspect: 22, *Coptocarpus grossus*, male, Margaret River, Australia; 23, *C. doddi*, holotype, male, Port Darwin, Australia; 24, *C. nitidus*, female, Bamaga, Australia.



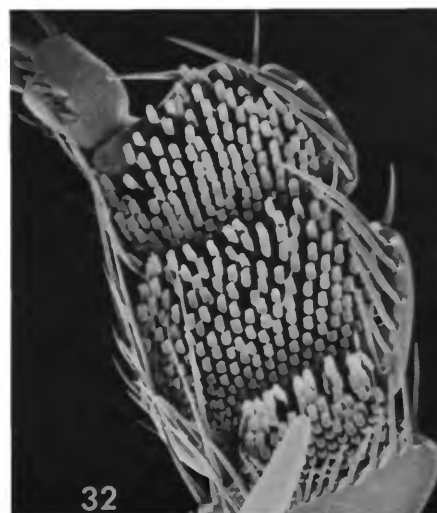
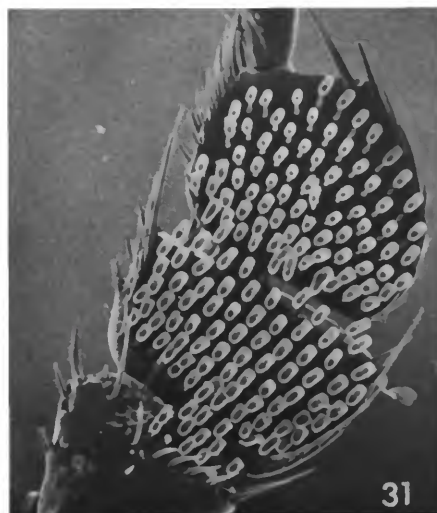
FIGURES 25-27.—Habitus, dorsal aspect: 25, *Coptocarpus chaudiroi*, lectotype, female, Clarence River, Australia; 26, *C. gibbus*, lectotype, female, Australia; 27, *C. fuscitarsus*, lectotype, male, Raffles Bay, Australia.



FIGURES 28-30.—Habitus, dorsal aspect: 28, *Coptocarpus championensis* male, Geraldton, Australia; 29, *C. thoracicus*, male, Margaret River, Australia; 30, *C. australis*, male, Melbourne, Australia.

spread throughout the Oriental, Ethiopian, and Australian Regions, then similar forms and synapomorphies 3, 7, 10, 11, 12, 13, 14, 15, 16, 17, 18, and 23 (see Table 1) would be easily explained through relationship. Perhaps with the evolution and spread of the more successful *Oodes* members this primitive stock of *Coptocarpus*-like animals was replaced in the northern Ethiopian and Oriental Regions, leaving the relict groups in the southern Ethiopian and Australian Regions.

Because of the overall oodine study already mentioned, I do not want to rerank the "thryptocerine" genera here. Also, I wish to point out that if the alternate scenario above is correct we might expect to find a relict or two of the *Coptocarpus* lineage in the Oriental tropics. It is very possible that further study of the Indian *Holcocaleus latus* LaFerté will prove to be the key to this problem. This species has members strongly resembling the *australis* group members of *Coptocarpus*; the most significant difference is the presence of ambulatory setae on the abdominal sterna in *Holcocaleus* members.



FIGURES 31-33.—Right anterior tarsus, ventral aspect: 31, *Coptocarpus australis*, male ($\times 74$); 32 *Hoptolenus obesus*, male ($\times 68$); 33, suction cup setae of tarsus, *Coptocarpus thoracicus* ($\times 295$).

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