

Arquivos de Zoologia

THE CAMAROTINE WEEVILS (COLEOPTERA, ATTELABIDAE)

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INTRODUCTION

The present monographic treatment of *Camarotus* (sole genus of the Camarotinae), a strange and rare group of weevils, is the product of years of discontinuous work starting 1963, when several specimens were sent to Dr. Eduard Voss, who had done earlier work on *Camarotus*. The study of that small collection, which included no new taxa but was very interesting, resulted in a revision of the group, with keys for species and discussions of relationships (Voss, 1965). The sexual dimorphism of the front tibiae was noted for the first time in that paper.

Study of materials since then incorporated to the collection of the Museu de Zoologia, Universidade de São Paulo (formerly Departamento de Zoologia, Secretaria da Agricultura) disclosed additional specimens of these weevils which I tried to identify with help of Voss' keys. Several apparently new species were recognized and this led me to borrow material from other collections. Comparison of specimens with original descriptions and with examples identified by Voss revealed some misinterpretations. Mere descriptions of the new species would increase the extant disorder, so a revision of the genus was planned. Fortunately access could be gained to the most important collections and I had the opportunity to examine most of the types, and certainly all of the critical ones. There resulted a broader treatment than originally planned.

The latest general account of the subfamily (Voss, 1965) listed 18 species of *Camarotus* (*singularis* Champion and *rufus* Hustache, two previously described and valid species were not included). Three more species were added by myself (Reichardt, 1969). I am here describing 19 new species and reducing the figure for previously published ones to 21, totalling 40 species of *Camarotus*. This study seems to indicate that a larger number of units may be expected as more becomes known of the bionomics of these weevils.

The localities for some of the new species are not as accurate as desirable, as for example the type of *Camarotus granada*, sp. n., which is labeled "Nouv. Grenade, Ex-Musaeo Steinheil". However, such species are so distinctive that I consider a broad indication of distribution as sufficient. Named as they are now, they are part of the system proposed and can be easily recognized.

This is by no way intended as a definitive monograph, but only as a means of making possible further progress in the study of a difficult and interesting group.

ACKNOWLEDGEMENTS

In the course of this work I became indebted to a large number of persons and institutions, listed below, for loan of specimens and for information. I am especially grateful to those institutions that sent types, thus rendering possible the correct identifications of some species.

AMNH	American Museum of Natural History, New York, United States; Mrs. Patricia Vaurie;
BM	British Museum (Natural History), London, England; Dr. R. T. Thompson;
CB	Carlos Bordon private collection, Caracas, Venezuela;
EIZ	Entomologisches Institut, Eidg. Technische Hochschule, Zürich, Switzerland; Dr. W. Sauter;
EV	Eduard Voss private collection, Harderberg, Germany;
IB	Instituto Biológico, Secretaria da Agricultura, São Paulo, Brazil; Mr. E. Amante;
IOC	Instituto Oswaldo Cruz, Rio de Janeiro, Brazil; Dr. Hugo de Souza Lopes;
JH	Jaroslav Halik private collection, São Paulo, Brazil;
MA	Moacyr Alvarenga private collection, Rio de Janeiro, Brazil;
MD	Staatliches Museum für Tierkunde, Dresden, Germany; Dr. R. Hertel;
MNHN	Muséum National d'Histoire Naturelle, Paris, France; Mme. A. Bons;
MPEG	Museu Paraense "Emílio Goeldi", Belém, Brazil; Mr. Dalcly de Albuquerque;
MZUSP	Museu de Zoologia, Universidade de São Paulo, Brazil;
NHMB	Naturhistorisches Museum Basel, Switzerland; Mr. Walter Wittmer;
RS	Naturhistoriska Riksmuseet, Stockholm, Sweden; Dr. Tord Nyholm;
SRZ	Station de Recherches de Zoologie, Guadeloupe; Dr. P. F. Galichet;
UFPR	Departamento de Zoologia, Universidade Federal do Paraná, Curitiba, Brazil; Dr. J. S. Moure, CMF;
USNM	United States National Museum, Washington, D.C., United States; Mrs. R. E. Warner;
ZI	Zoologisches Institut, Martin Luther Universität, Halle-Wittenberg, Germany; Dr. Johannes Hüsing;
ZMH	Zoologisches Staatsinstitut und Museum, Hamburg, Germany; Dr. H. Weidner;
WB	Werner Bokermann private collection, São Paulo, Brazil.

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Dr. J. F. Lawrence (Museum of Comparative Zoology, Cambridge, United States) was helpful in obtaining important literature; Mrs. M. S. Labouriau studied the "Pollinosity" of *Camarotus*. I am grateful to both.

METHODS

All species were carefully described and after an appraisal of the characters a generic diagnosis was devised, as extensive as seemed necessary. As a consequence specific descriptions were shortened so as

to avoid unnecessary mention of characters common to all species. Although trying to follow consistently this procedure throughout the paper, as I have done in the past, I would like to quote my former professor, P. J. Darlington, Jr. (1968: 3): "...I have tried to be reasonably consistent in preparing descriptions but have not followed a single model exactly. I have treated some tribes and some genera in much more detail than others, the rule being to give the information that has seemed worth giving in each case. My descriptions do follow a basic form but are flexible in detail. I do not like check-list taxonomy, in which descriptions are (in effect) drawn by inserting adjectives in blank spaces in a standard form. This kind of taxonomy is easy, but it is likely to be poor taxonomy. I think it is better to describe each species individually, following of course some sort of basic pattern, and if I state under one species that a character is striking, I see no reason to state (say) twenty times under other species that it is not striking".

A single genus is recognized in the subfamily. The genus has been divided in groups of species, a procedure which shows relationships of the species, and one does not get involved with nomenclature. Such groups can promptly be reformulated or discarded, if necessary. This would not be so simple with a formal subgenus, as is the case of *Camartellus*, a subgenus introduced for one species of the group of *pusillus*, based on characters which proved generic, and as such has to be carried along in synonymy. In naming the species groups I have followed my earlier monograph of Galeritini (Reichardt, 1967), using the oldest specific name in the group.

Variation has been noted and studied where sufficient material was available, but no geographical (nor any other kind of) differentiation could be detected. In most cases the materials available are not sufficient for such studies.

Below genus the only taxonomic category I have recognized is the species. As will be seen, the taxa are so distinct that in no case one could even consider "typological subspecies", a category common in old fashioned (yet still current) Entomology.

For nomenclatorial problems I have followed the 1964 (revised) edition of the Code of Zoological Nomenclature.

The morphological terminology used is current. For the strange structure of the front femora I am using "serrate tooth", applied by Kissinger (1964: 11) to the Prinomerinae. The earlier literature is very inconsistent about this structure. In the original description of the genus (Germar, 1833: 185) we read "... femoribus anticis valde incrassatis, trigonis, intus acute serratis ..."; Lacordaire (1866: 25) says "... cuisses antérieures armées d'une très-grande dent triangulaire..."; in Costa Lima (1956: 37) we read "... fêmures anteriores armados de grande dente triangular com uma série de denticulos na borda anterior ..."; Voss (1965: 221) uses "Schenkel ... gezähnt, die Aussenflanke des Zahns besitzt einen Kamm ...".

Measurements were taken with a micrometric eye-piece; three standard measurements were taken: *total length* (considering that the head

is hypognathous I have measured from middle of eyes, along median line, to apex of elytra), *maximum elytral width* and *elytral length* (the latter measured from base to apex). Measurements are in millimeters (mm); the number is indicated if more than one specimen were measured, and where possible, three measurements are given: minimum, maximum and mean (this in brackets).

All species have been figured, the drawings having been all made by myself with the aid of a camera lucida (OPL), to the same scale, so that sizes can be compared by confrontation of figures. Of each species the dorsal aspect is given, with one (or both) front leg(s), and front view of head (to show shape of beak); in a few cases other details have been added.

I have redrawn and adapted (approximately to my own scale) illustrations of Champion's species (one of which I have not seen) and of one species described by Voss (not seen either). Original descriptions of species not seen (or doubtfully identified) are reproduced. Their inclusion in my system, as well as in the keys, was based on their descriptions, and should be taken with caution, since older descriptions are not always sufficient. However, the possibility of my having described one of them as new is remote, since my new species are all quite distinct.

The geographical information given is as complete as possible. All label data are transcribed, and when necessary (or possible), completed or corrected. In each case I adopted the following general pattern: 1. country, 2. relevant administrative divisions, such as state, department, province, and, on a lower level, "município" (in Brazil, approximately the American county), etc., 3. date of collection, 4. collector, 5. (in brackets, number and sex of specimens; abbreviation of collection). In a few cases, when label data are incomplete, country (or even state) are given in quotation marks.

CAMAROTINAE

Camarotides Schönherr, 1833: 185; Lacordaire, 1866: 25.

Camarotina; Champion, 1903: 289; Hustache, 1930: 111.

Camarotinae; Pascoe, 1870: 437; Hustache, 1929: 169-170 (key); Klima, 1935: 1-2 (catalog); Bondar, 1945: 101; Blackwelder, 1947: 842 (catalog); Guérin, 1953: 202; Crowson, 1954: 162, 165; Costa Lima, 1956: 37, 162; Voss, 1965: 221 (revision).

Small to medium sized weevils (2.0-6.68 mm), frequently with peculiar, cassidid-like shape. Antennae straight. Scape long, usually twice as long as first funicular segment. Labrum absent. Prosternum without rostral depression. Pygidium covered by elytra. Front coxae well separated from each other, more so than median and posterior ones (fig. 87). Front femora with serrate tooth on inner margin (with 7-12 small denticles on distal margin).

TAXONOMIC POSITION OF THE CAMAROTINAE

The main purpose of this paper is to elaborate a taxonomic system for the group, at the species level. Relationships with other groups of weevils, above generic level, are difficult to establish, and I do not feel myself in a position to offer a definite opinion, because of lack of knowledge of other groups of Curculionoidea. Some interesting data have, however, been accumulated throughout this work, and leaving aside more orthodox classifications, two recent views on the problem should be commented.

Crowson (1954: 162, 165) is not very definite about camarotine relationships, but seems to favor the hypothesis of relations with true Curculionidae (especially the subfamily Prionomerinae) rather than with the Attelabidae. According to his views the Prionomerinae are related to *Camarotus* primarily because of "... similar leaf-mining larval habits and some resemblance to *Camarotus* in imaginal structure".

The resemblance between adults of *Camarotus* and Prionomerinae is not very strong; in fact, it is practically limited to a similarity of the front legs, and I am inclined to consider this character as irrelevant, since the two kinds of front legs have very little in common. Figure 1 represents the front leg of *Prionomerus nigrispinnis* Lacordaire, 1863 (Prionomerinae); the typical front leg of *Camarotus* is shown for all species below. In comparison with *Camarotus*, *Prionomerus* shows: 1. femora relatively long, with serrate tooth limited to the apical half; 2. denticles of this tooth very irregular and small; 3. lack of the typically curved hairs between denticles; 4. tibia long, about as long as femur, with completely distinct apical half (no sexual dimorphism has been noted here); 5. when fully closed, part of the tibia is hidden under the femoral tooth.

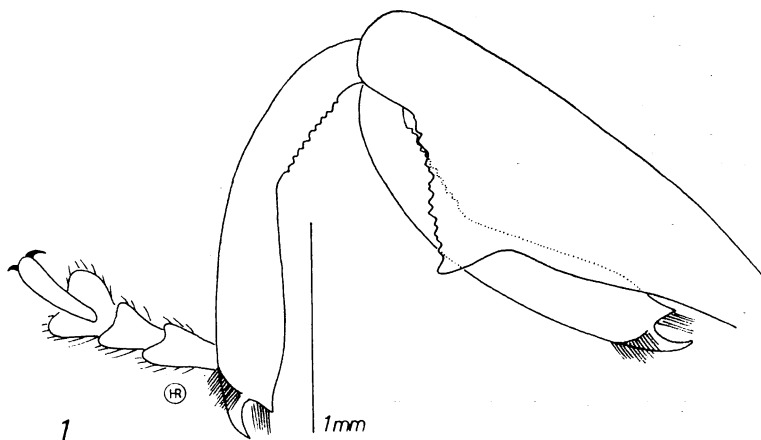


Fig. 1: *Prionomerus nigrispinnis* (from Ipiranga, São Paulo, SP), front leg, with retracted and distended tibia.

There is no doubt that the structures compared are similar. They might, however, have evolved independently from the simply toothed front femur of some other groups of weevils. The hypothesis of independent evolution, as a functional adaptation, is further stressed by the fact that there are similar structures in completely unrelated groups. I have, for example, seen a series of *Ozoctenus*, a genus described by Pascoe in the Hylobiinae, in which the *posterior* femora have a structure similar to that of the *front* femora of Camarotinae and Prionomerinae (see illustration in Costa Lima, 1956: 103, fig. 94, a reproduction of Pascoe's original). In the original description (1871) Pascoe comments on the *posterior* femora of *Ozoctenus* as being "... very remarkable, and can only be paralleled among the Tachygoninae ...". In the same paper Pascoe describes a genus of Tachygoninae from Southeastern Asia, *Icalma*, with similar hind femora.

It seems to me that relationships between Camarotinae and Prionomerinae, based on similarity of front femora, especially the serrate tooth, can be discarded.

As to leaf-mining habits, Bondar is the only author to mention them for the Camarotinae, even though larvae have not yet been described. Commenting the habits of Prionomerinae he (1945: 101) says that the larvae "... criam-se ... dentro das folhas de Dicotiledôneas, comendo o tecido parenquimatoso entre duas epidermes intatas. Nesta subfamília devem entrar os *Camarotinae*, que possuem biologia análoga". Costa Lima (1956: 30, 33) reproduces a paper by Bondar on the biology of Brazilian Curculionidae, where, again, the Camarotinae are said to have "... larvas minadoras de folhas de Melastomataceas e outras Dicotiledoneas". As said above, the larvae of this group of weevils are still undescribed, but Bondar's statements are very possibly based on actual observations. Nevertheless, such statements should be taken very carefully, and need confirmation.

Voss (1965) went much more detailedly into the subject of relationships and concluded that the Camarotinae are more closely related to the Attelabinae, and both should be included, together with other subfamilies, in one family. This position seems to me to be more realistic. Several characters (some of which also mentioned by Crowson), place the group here. One of the important characters is the non-geniculate antenna, a very peculiar character, often considered primitive. The short beak of *Camarotus* is also more suggestive of the Attelabinae.

Voss (*l.c.*: 222) draws attention to a character until then unreported: the sexual dimorphic apex of the front tibiae (see figs. 28, 29). According to him the Attelabinae and the Apoderinae show this dimorphism in all tibiae. As mentioned in the generic description of *Camarotus*, I have checked the apex of the middle and hind tibiae of some species, and apparently (in view of difficulties in examining these legs, due to dense apical pilosity, I could not always be sure) the same dimorphism is displayed in all legs.

For all these reasons I am at present considering the Camarotinae as related to the Attelabinae, and am including both in the Attelabidae.

Camarotus Germar, 1833

Camarotus Germar, 1833: 185 (type-species, by present designation, *Camarotus coccinelloides* Germar, 1833; see notes below); Lacordaire, 1866: 26; Gemminger & Harold, 1871: 2533 (catalog); Karsch, 1881: 50; Heller, 1923: 61-63 (key to species); Voss, 1923: 68-71 (key to some species); Hustache, 1929: 170; 1930: 7; Klima, 1935: 1 (catalog); Blackwelder, 1947: 842 (catalog); Voss, 1965: 221 (revision; key to species).

Camarotellus Voss, 1965: 231 (as subgenus type-species, *Camarotus maculatus* Voss, 1930, by original designation). *Syn. n.*

Small to medium sized weevils (2.0-6.68 mm), frequently with peculiar, cassidid-like shape. Color very variable from species to species, frequently variable within the species; usually one of the best characters for specific distinction.

Head. Beak relatively short (normally about as long as wide at apex), varying from very slender and relatively long to very stout and short. Surface of beak usually punctate, sometimes smooth. *Mouthparts* at apex of beak; dissected in a single species (*fusiger* Heller, figs. 3-5); labrum absent; mandibles very short and stout; maxillae with very short, apparently 4-segmented palpi, galea and lacinia not well visible because of dense vestiture; labium very small, with apparently 2-segmented labial palpi, the basal one bearing a very strong and long apical seta. Antennae (fig. 2) usually inserted at middle of beak, in conspicuous antennal grooves (clearly visible from the front); straight, with relatively long scape, small pedicel, 6-segmented funiculus and 3-segmented, very finely pilose, fusiform club. Antennae completely yellowish to testaceous, except in a few species (from the group of *cassidoides*) with infuscated club (there seems to be some variation in the color of club within the same species).

Pronotum. In all species with more or less the same general shape, usually about twice as wide as long at median line; widest about middle, usually very little narrowed towards base, and much more narrowed to front as far as the anterior strangulation, after which the sides become almost parallel. In some cases the pronotum is almost parallel-sided beyond the middle. Sculpture very regular within the genus: disc punctate, sides granulate; in a few species the whole surface is granulate; in others the discal punctures are widely scattered. Surface sometimes covered with very fine, decumbent, vestiture.

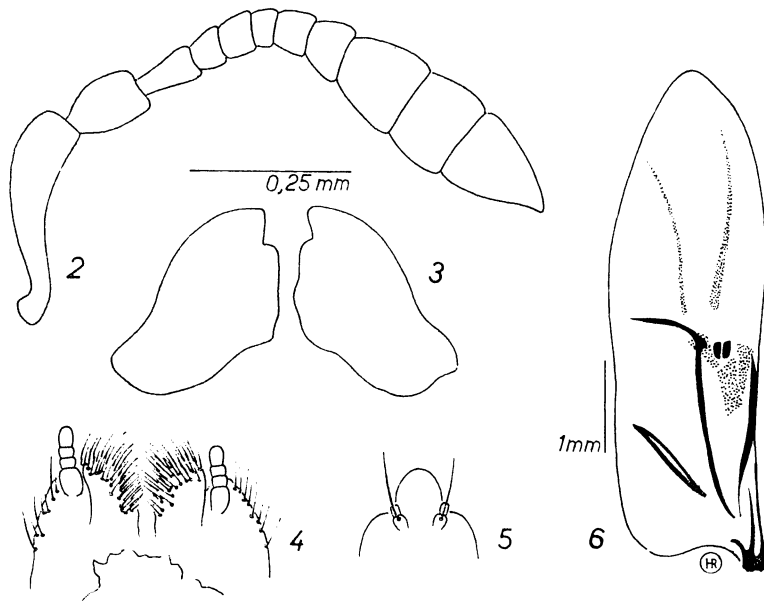
Scutellum. Quite similar in all species; form more or less rhomboid, sometimes giving the impression of being triangular; usually smooth and glabrous. Sometimes differently colored than pronotum and / or elytra.

Elytra. Very variable in shape, always punctate-striate, each elytron with 8 striae. In the *cassidoides* species group the four discal striae

often sulcate, but indication of fusion of punctures always present. Striae parallel, at least discally. Interstices very feebly convex; sometimes convex or even carinate. In some cases unequally wide in whole length or at least in part, then also more or less tuberculate, and frequently bearing tufts of longer setae. Ninth interstice (sutural interstice considered the first) carinate in the *pusillus* species group, slightly expanded laterally in the *attelaboides* species group (here always widest beyond middle), broadly expanded laterally in the *cassidoides* species group (always widest in front of the middle). Margin of lateral expansion usually starting at humeri (often only really developed behind the middle of elytra, though), fused posteriorly with second stria or third interstice; third and eighth, fourth and seventh striae respectively fused apically (usually): fifth and sixth less frequently fused.

Pygidium. Always covered by the elytra.

Prosternum (fig. 87). Usually well developed, with front coxae well separated from each other, more so than median and hind ones (Voss described the subgenus *Camarotellus* based on this character, *i.e.*, front coxae more widely separated from each other than median ones. I have found this character to be generic, the subgenus being therefore synonymized here); anterior coxal cavities closed behind; front coxae spherical, globose, and prominent.



Camarotus fusiger (from Rio Natal, SC): 2, antenna; 3, mandibles; 4, maxillae; 5, labium; 6, wing.

Mesosternum. Relatively well developed, with short process reaching the middle of median coxae; these closer to each other than front ones, also spherical and prominent, but smaller than those.

Metasternum. Large and well developed, with relatively small, flat and not prominent coxae. Hind coxae as distant from each other as the front ones. Metepimeron small, transverse (fig. 87).

Abdomen. Five-segmented, first two segments together slightly longer than three posterior ones; two first ones more or less fused, but suture slightly evident, especially at sides. Elytral epipleurae forming a sharp angle where abdomen meets the metathorax, since the abdomen is wider than the thorax (see fig. 87).

Legs. Front legs stronger than median and hind ones. Front femora (see for example fig. 8) very much enlarged, inflated with serrate tooth (with 7-12 denticles on inner distal margin); the number of denticles, even though mentioned in some of the earlier descriptions as being of taxonomic importance, is variable, sometimes in the same specimen; a single seta in each interval between denticles (seta longer than denticle, and usually curved at apex). Front tibiae always curved, with preapical, external spine, and a single (males) or double (females) apical spine; external margin usually curved (as in fig. 65), in some species angulate basally (as in fig. 62); inner margin usually bicarinate, in some species crenulate (for example fig. 76), in a single case, *sabaniillae* (fig. 91) with preapical tooth on inner margin; inner margin usually with a series of long setae. Tarsi 3-segmented, last segment bilobate. Median and hind legs with normally developed femora and tarsi. Median and hind tibiae also with strong preapical, curved spine, and apparently also single (males) or double (females) spined apically (dense pilosity and mounting of the specimens rendering observation difficult, and usually impossible).

Hind wings (fig. 6). Dissected in a single species, *fusiger* Heller; observed to be present in all species, and always infuscated. Venation very simplified, very similar to that of Apionidae and Platypodinae (figs. 209 and 210, respectively, in Crowson, 1954: 159).

Male genitalia (fig. 27). A single male of *Camarotus crenulatus* was dissected, for confirmation of the sexual dimorphism of the tibiae.

Type-species: *Camarotus coccinelloides* Germar, 1833, by present designation. It is interesting to note that in my search through the entomological literature concerned with weevils, and especially with the Camarotinae, I have found no type designation for *Camarotus*. It seems justified to designate Germar's species as type of the genus described by the same author, especially now that the species is well characterized, on basis of the holotype. Almost needless to say, *Camarotus coccinelloides*, is one of the two species originally included in *Camarotus*.

DISCUSSION

The 40 species presently included in the genus are distributed in 3 species groups. All described species have been included in the mono-

graph, even the three species (*costaricensis* Voss, *angustifrons* Voss and *dilatatus* Champion) I have not seen (the original description of these is reproduced, to facilitate future work).

A single name from the literature has not been assigned to any of the species treated here: *Camarotus rotundipennis* Dejean, 1836. Blackwelder (1947: 842) lists the species as a synonym of *Camarotus cassidoides* Gyllenhal, 1833. It will be seen that *cassidoides* is one of the black species of difficult recognition, and to synonymize *rotundipennis* with *cassidoides* (or with any of the related species for that matter, for example *fusiger* Heller or *similis*, sp. n.), is a task that will have to be accomplished after examination of Dejean's specimen (which I have not seen).

A word should be said about the authorship of *Camarotus*, *Camarotus cassidoides* and *Camarotus coccinelloides*. The three names were described in Schönherr's "*Genera and Species Curculionidum*". Most authors correctly refer *cassidoides* to Gyllenhal (abbreviated "GHL." after the description) and *coccinelloides* to Germar (abbreviated "Germ."), but refer *Camarotus* to Schönherr, even though its description is also followed by the abbreviation "Germ.", leaving no doubt about the authorship.

Some aspects of relationships of the Camarotinae have been discussed after the characterization of the subfamily; the groups of species will be discussed below, separately. One character should, however, be pointed out here: the curious shape and position of the metepimeron (see fig. 87), which to me seems to be unique among weevils.

KEY TO SPECIES GROUPS

1. Ninth elytral interstice only slightly carinate, not forming a well developed lateral expansion (see for example fig. 7); usually small species (under 3.2 mm) *pusillus* species group
- Ninth elytral interstice expanded laterally; species usually larger (over 2.9 mm, in general well over that) 2
- 2(1). Elytral expansion not very widened laterally, especially not on anterior part; elytra widest behind the middle (see for example fig. 24) *attelabooides* species group
- Elytral expansion well developed, usually conspicuously enlarged, especially on anterior part; elytra widest in front of the middle (see for example fig. 67) *cassidooides* species group

pusillus species group

SPECIES INCLUDED

- Camarotus pusillus* Kirsch, 1875 (Peru, Brazil)
Camarotus ochraceus, sp. n. (Brazil)

- Camarotus costaricensis* Voss, 1923 (Costa Rica)
Camarotus submaculatus Heller, 1923 (Brazil)
Camarotus carinatus, sp. n. (Brazil)
Camarotus infuscatus Reichardt, 1969 (Panama)

Small species (2.0-3.2 mm), especially well characterized by an almost complete absence of a true lateral expansion of the elytra. The ninth elytral interstice, which in the other groups forms a lateral expansion, is here only slightly developed into a marginal carina, with crenulate margin in all species. In at least *infuscatus*, however, there is some indication of a very slight expansion, this species forming a connection with the *attelaboides* species group. The shape of the pronotum is identical in all species; the front tibiae are very slender and curved, never angulate externally at base; antennal club never infuscated. Since the species are very similar morphologically, color is usually the best distinguishing character.

The six species included are considered as forming two distinct subgroups, the more primitive one including five species, and *infuscatus*, bridging the gap between those and the *attelaboides* species group (see further discussion on p. 180).

It should be noted that none of the species presents the pollinosity (see p. 176) which occurs on some species of the two other groups.

KEY TO THE SPECIES OF THE *PUSILLUS* GROUP

- | | | |
|-------|---|----------------------|
| 1. | Unicolored species | 2 |
| | Multicolored species; at least with spotted elytra | 4 |
| 2(1). | Black species, antennae and tarsi testaceous; Brazil (Amazonas)
and Peru | <i>pusillus</i> |
| | Testaceous or brownish species | 3 |
| 3(2). | Testaceous species; Central Brazil | <i>ochraceus</i> |
| | Brownish species; Costa Rica | <i>costaricensis</i> |
| 4(1). | Lateral expansion very weakly developed, forming an even curve
which starts more or less behind humeri | 5 |
| | Lateral expansion slightly more developed, beginning close to
the middle of the elytra; Panama | <i>infuscatus</i> |
| 5(4). | Elytral interstices weakly convex, smaller species (2-2,4 mm);
southeastern Brazil | <i>submaculatus</i> |
| | Elytral interstices 2, 4 and 6 carinate; larger species (3 mm);
northern Brazil (Amapá) | <i>carinatus</i> |

Camarotus pusillus Kirsch, 1875

(Figs. 7-9)

Camarotus pusillus Kirsch, 1875: 169 (lectotype ♂, Peru, Junin, Pozuzo; MD, examined and present designation); Heller, 1923: 63 (key); Klima, 1935: 2 (catalog); Blackwelder, 1947: 843 (catalog); Voss, 1965: 227, 230 (key, notes).

Black (elytra sometimes with reddish or brownish undertone); median and hind legs brown; antennae and tarsi testaceous.

Eyes not very convex; beak as long as wide anteriorly; antennae closer to eyes than to apex; surface of beak shiny, very sparsely punctate; frons more closely punctate; vertex finely microreticulated; frons and vertex with sparse white pilosity. Pronotum less than twice as wide as long, widest in the middle, slightly narrowed towards base and much narrowed anteriorly towards strangulation; surface with sparse but coarse punctures, granulate laterally; vestiture white, short and sparse. Elytral expansion very reduced, with crenulate margin, especially near apex; punctate-striate, interstices with single row of short, white hairs. Front tibiae curved, slender, bicarinate dorsally. Measurements (4 specimens): total length, 2.4-2.8; maximum elytral width, 1.44-1.64; elytral length, 1.68-1.8.

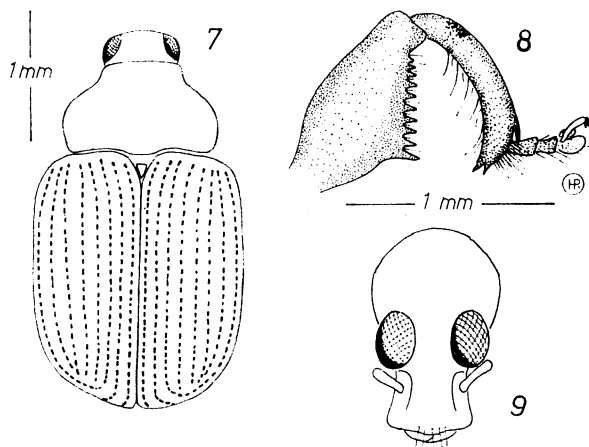
MATERIAL EXAMINED

BRAZIL. *Amazonas*, Rio Negro, Tupuruquara, 20-25.XI.1962, J. Bechyné col. (1 ♂, 1 ♀, MZUSP).

PERU. *Junin*, Pozuzo (lectotype ♂ and 1 paralectotype, MD).

GEOGRAPHIC DISTRIBUTION

Camarotus pusillus is most probably distributed throughout the Amazonian Region. It was only known from the western edges of the



Camarotus pusillus (♀ from Tapuruquara, AM):
7. dorsal view; 8. front leg; 9. front view of head.

Amazonian Basin (types); the present locality, on the Rio Negro, extends the range much into the Amazonian Region.

NOTES ON THE TYPES AND TAXONOMIC DISCUSSION

The two syntypes on which Kirsch based his description have been examined; one male is here designated as the lectotype; the paralectotype, sex undetermined, lacks the front legs.

Camarotus pusillus is very easily distinguished from the other species of this group by its uniform black color; *Camarotus ochraceus*, although morphologically very similar, is entirely testaceous.

***Camarotus ochraceus*, sp. n.**

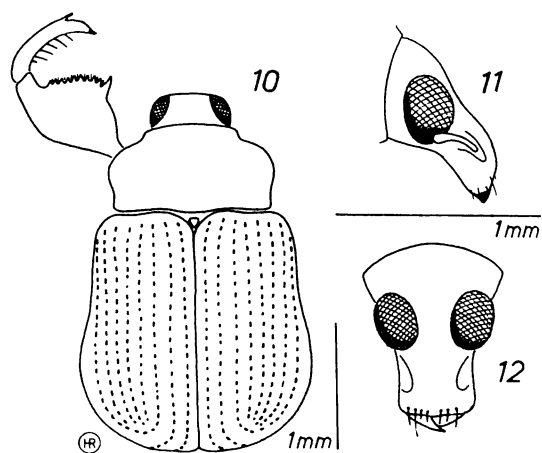
(Figs. 10-12)

TYPE

BRAZIL. Goiás, Ribeirão Vãozinho (about 70 km W of Jataí), 12. II.1962, J. Bechné col. (Holotype ♂, MZUSP).

Brownish-yellow. Beak short and stout as long as wide anteriorly; surface of beak very sparsely punctate, more coarsely on frons; microreticulated on vertex. Pronotum widest at the middle, narrowed towards base and towards anterior constriction; disc punctate, sides granulate. Elytra widest behind the middle, with weakly developed lateral expansion, margin crenulate; punctate-striate. Measurements (holotype): total length 2.6; maximum elytral width, 1.68; elytral length, 1.6.

Female unknown.



Camarotus ochraceus (holotype): 10, dorsal view; 11, side view of head; 12, front view of head.

TAXONOMIC DISCUSSION

Camarotus ochraceus is very closely related to *pusillus* Kirsch, but easily distinguished by the different coloration, as stated above. Also related to *costaricensis* Voss, a brownish species I have not seen.

Camarotus costaricensis Voss, 1923

Camarotus costaricensis Voss, 1923: 69, 70-71 (holotype ♀, Costa Rica, Cartago, Turrialba; "Typus in der Sammlung von Herrn Amtsgerichtsrat Höhne", possibly in the Berlin Museum; not seen); Klima, 1935: 1 (catalog); Blackwelder, 1947: 843 (catalog); Voss, 1965: 227, 230 (key).

ORIGINAL DESCRIPTION

"Diese Art weist grosse Ähnlichkeit mit der vorhergehenden [*notatipennis*] auf, ist etwas kleiner und unterscheidet sich von derselben folgendermassen: Stirn stark eingeeengt, wohl nur halb so breit wie der Rüssel, mit flacher Grube. Wie der ganze Rüssel und die Stirn sind auch die Augen oben flach; seitlich schwach vorgewölbt. Schläfen hinten kurz, schwach gerundet. Nut der Scheitel mit einigen wenigen Punkten, sonst unpunktiert, ebenso der Rüssel. Dieser breiter als lang. Fühler hinter der Mitte eingelenkt. Schaftglied mehr als doppelt so lang wie breit. 1. Geisselglied schwach länglich oval; die nächsten Geisselglieder sehr kurz, davon das 2. Glied am längsten und das 7. Glied am breitesten. 1. Glied der Keule wohl so lang wie breit, dreieckig, das 2. Glied stark quer und das 3. Glied kürzer als das erste. Halsschild wie bei den vorigen gebildet, die Punkte stehen jedoch auch auf der Scheibe ziemlich dicht. — Der Deckensaum der Flügeldecken beginnt erst weit hinter den Schultern, verbreitert sich dann ziemlich schnell in gleichmässiger Rundung, erreicht seine grösste Breite hinter der Mitte, bricht jedoch weit vor der Mitte plötzlich ab; an der Spitze erscheint er dann nochmals äusserst schmal und kaum sichtbar. Das Pygidium wird auch bei dieser Art teilweise freigelassen. Die Punktstreifen in der Nähe der Naht linienförmig eingerissen, seitlich greifen sie die Zwischenräume an. Diese breit und schwach gewölbt, der 2. Zwischenraum ist hinter dem basalen Drittel auf Kosten des dritten erweitert; sie sind unpunktiert. — Vorderschenkel sehr stark, kurz eiförmig, innen mit 13 spitzen, kammartigen Zähnen, von denen der innerste am längsten ist. Vordertibien kräftig, Aussenbewehrung kurz, an der Spitze doppelspitzig. Klauen an der Basis gezähnt. Färbung rotbraun, Halsschild und Vorderschenkel dunkler; Fühler und Tarsen rotgelb. — Die Seiten und der Deckenabsturz, ebenso das Abdomen äusserst kurz mit sparsam verteilten gekrümmten Härchen besetzt. — L.: 2,8mm. Costa Rica: Turrialba. — Typus in der Sammlung von Herrn Amtsgerichtsrat Höhne."

TAXONOMIC DISCUSSION

Camarotus costaricensis is not represented in the collections studied. Even though said to be related to *notatipennis* Voss (= *ohausi* Heller) in the original description, *costaricensis* belongs into the *pusillus* species group, and seems to be most closely related to *ochraceus*, which, however, differs by the different general coloration (testaceous in *ochraceus*, brownish in *costaricensis*).

***Camarotus submaculatus* Heller, 1923**

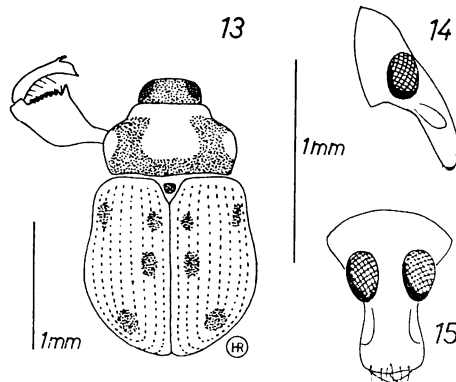
(Figs. 13-15)

Camarotus submaculatus Heller, 1923: 63, 66-67 (holotype ♂, Brazil, "Rio Grande do Sul"; MD, examined); Klima, 1935: 2 (catalog); Blackwelder, 1947: 843 (catalog); Voss, 1965: 227, 230 (key, notes).

Camarotus maculatus Voss, 1930: 65-66 (type-locality, Brazil, São Paulo, São Paulo; Prague Museum, not seen); Klima, 1935: 1 (catalog); Blackwelder, 1947: 843 (catalog). *Syn n.*

Camarotus (Camarotellus) maculatus Voss, 1965: 228, 231 (designation as type-species of *Camarotellus*; key, distribution).

Brownish-red; head and pronotum dark, almost black; beak brown and disc of pronotum reddish (in the type of *submaculatus* the pronotum has only a slight indication of darker color at sides); scutellum dark brown; elytra red with brown spots, variable in number (only the four discal spots present in the type of *submaculatus*); legs (except the much darker front femora), antennae and tarsi light brownish; ventral side dark brown, almost black.



Camarotus submaculatus (♂ from Paranapiacaba, SP):
13, dorsal view; 14, side view of head; 15, front
view of head.

Beak long, about one and a half times as long as wide apically, very much narrowed towards eyes; antennae inserted in the middle; surface of beak and frons longitudinally carinate, especially between the eyes; vertex microreticulated. Pronotum widest at the middle, narrowed towards base and towards anterior stranguation; surface granulate. Elytra widest behind the middle, with weakly developed lateral expansion, margin crenulate; punctate-striate; interstices convex, second with small tuft of hairs in front and behind the middle, and a much smaller tuft on the fourth interstice, slightly behind the middle, and a row of hairs

on the sixth (in the type of *submaculatus* these tufts are not very conspicuous). Measurements (4 specimens) : total length, 2.08-2.4; maximum elytral width, 1.2-1.4; elytral length, 1.28-1.6.

Female unknown.

MATERIAL EXAMINED

BRAZIL. *São Paulo*, Paranapiacaba (Estação Biológica), 19.II.1961, H. Reichardt & W. Bockermann col. (2 ♂, MZUSP, EV); Diadema, 5.III.1961, W. Bockermann col. (1 ♂, WB); *Rio Grande do Sul*, Pipitz col. (1 ♂, holotype, MD).

GEOGRAPHIC DISTRIBUTION

Like many other species of the genus, *Camarotus submaculatus* is found along the coast of southeastern Brazil (see discussion on p. 177).

TAXONOMIC DISCUSSION

The type of *Camarotus submaculatus* agrees morphologically with the original description of *maculatus*. Only color differences are present, but since there is variation of this character in other spotted (or patterned) species, and since the specimens examined, although agreeing with *Camarotus maculatus*, also show some variation in the spotting of the elytra, the two forms are here considered to be synonyms.

In Voss' recent key the two supposed species are located far apart because *maculatus* is distinguished from *submaculatus* by characters used for the subgenus *Camarotellus*, and which have not been checked for *submaculatus* (because the holotype is glued to a cardboard piece, and and its underside cannot be examined); they are, however, generic characters, as seen elsewhere.

Camarotus submaculatus is very similar to the other species of this group. As to morphological characters they are almost identical, however, *submaculatus* has a long beak (fig. 14), while this structure is short and stout in *pusillus*, *carinatus* and *ochraceus*. The characteristically spotted elytra of *submaculatus* easily distinguish the species from the remaining species with patterned elytra (*infuscatius* and *carinatus*).

***Camarotus carinatus*, sp. n.**

(Figs. 16-17)

TYPE

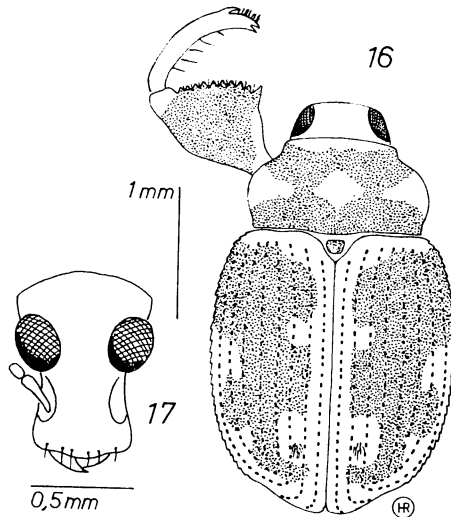
BRAZIL. *Território Federal do Amapá*. Serra Lombard, Limão, 22.VIII.1961, J. & B. Bechyné col. (holotype ♀, MZUSP).

Very dark brown, almost black; beak, sutural and marginal areas of elytra, middle and hind legs, antennae and tarsi brownish.

Head with large, normally convex eyes; beak short and stout, about as long as wide apically; surface very sparsely and irregularly punctate,

more densely so between the eyes. Pronotum widest at the middle, narrowed towards base and towards the anterior strangulation; surface granulate. Elytra widest behind the middle, marginal carina developed, crenalute, punctate-striate; second, fourth and sixth interstices elevated, somewhat carinate; second with weak tuft of hairs at apical fourth. Measurements (holotype): total length, 3.08; maximum elytral width, 1.76; elytral length, 2.12.

Male unknown.



Camarotus carinatus (holotype): 16, dorsal view; 17, front view of head.

TAXONOMIC DISCUSSION

Camarotus carinatus is easily distinguished from the other species of the group chiefly by the size (*carinatus* is the largest) and by the carinate interstices.

Camarotus infuscatus Reichardt, 1969

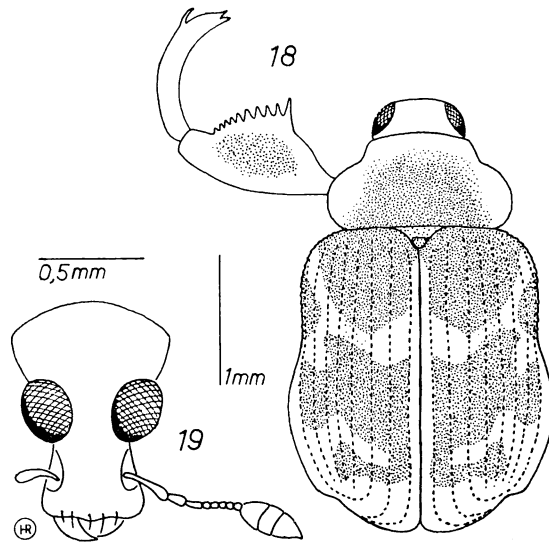
(Figs. 18-19)

Camarotus infuscatus Reichardt, 1969: 313-314, fig. 1 (holotype ♂, Panama, Panama, Cerro Campana; CB).

Dark brown, with indication of almost black markings on pronotum, basal half of elytra and front femora; legs lighter brown; tarsi and antennae testaceous.

Head small, with convex, large eyes; beak short, about as long as wide apically; antennal insertion closer to apex than to eyes; surface of beak and frons deeply and coarsely punctate; beak somewhat narrowed towards eyes. Pronotum about twice as wide as long; widest at the middle, very slightly narrowed towards base and much more so

towards anterior strangulations; surface with very coarse and deep punctures on disc; granulate laterally; surface covered with very fine and decumbent pilosity. Scutellum punctate. Elytra widest behind the middle, with marginal carina more developed behind the middle; interstices very convex, especially in front, the seventh more or less carinate basally; sulci very clearly punctate, with large and deep punctures; marginal carina very slightly crenulate, but crenulation widely spaced and not very apparent on posterior half. Measurements (3 specimens): total length, 2.8-3.2; maximum elytral width, 1.6-1.9; elytral length, 1.9-2.2.



Camarotus infuscatus (holotype; partly adapted from Reichardt, 1969): 18, dorsal view; 19, front view of head.

MATERIAL EXAMINED

Only the type-series (3 specimens, all from the same locality) is presently known.

TAXONOMIC DISCUSSION

Camarotus infuscatus is closely related to *carinatus* from Amapá (Brazil). The two species, even though very similar, are easily distinguished by several characters: in *infuscatus* the pronotum is punctate discally (completely granulate in *carinatus*); the elytral interstices, with the exception of the base of the seventh, are not carinate in *infuscatus* (the second, fourth and sixth are somewhat carinate in *carinatus*); and finally the marginal carina is more expanded slightly before the middle in *infuscatus*, whereas it originates at the humeri in *carinatus*.

attelaboides species group

SPECIES INCLUDED

- Camarotus dispar* Heller, 1923 (Brazil)
Camarotus serrator Voss, 1958 (Brazil)
Camarotus crenulatus, sp. n. (Brazil)
Camarotus laculatus, sp. n. (Brazil)
Camarotus pulcherrimus, sp. n. (Ecuador)
Camarotus nigropunctatus, sp. n. (Brazil)
Camarotus ferrugineus Reichardt, 1969 (Venezuela)
Camarotus impressifrons Voss, 1923 (Brazil)
Camarotus rufus Hustache, 1930 (Guadeloupe)
Camarotus attelaboides Karsch, 1881 (Brazil)
Camarotus rhinion, sp. n. (Brazil)
Camarotus ohausi Heller, 1923 (Brazil)
Camarotus angustifrons Voss, 1922 (Costa Rica)
Camarotus piceus, sp. n. (Brazil)
Camarotus flammeus, sp. n. (Colombia)

Species larger than those of the *pusillus* group (2.96-6.68), characterized by a lateral, variously shaped, expansion of the elytra, but always widest behind the middle. Margin of elytral expansion often crenulate (in *crenulatus*, *laculatus*, *serrator*, *dispar* and *pulcherrimus*); in a single species (*flammeus*) the expansion is punctate (a character quite frequent in the *cassidoides* group). Front tibiae of all species more or less slender, curved and carinate internally; only in *ferrugineus* they are slightly angulate externally at base (a character frequent in the group of *cassidoides*). *Camarotus rufus* and *impressifrons*, two species somewhat closely related, have the epistoma ending in a more or less-sharp tooth (see figs. 39 and 41).

The 15 known species are distributed throughout the Neotropical Region, especially Brazil; a single species is reported from Central America (Costa Rica), and one (*rufus*) seems endemic to Guadeloupe, in fact the only species of the genus so far encountered in the Antilles.

KEY TO THE SPECIES OF THE *ATTELABOIDES* GROUP

1. Elytral expansion beginning just behind the humeri, and shaped into a continuous curve from the humeri to the posterior apex 2
- Elytral expansion only expanded well behind the humeri, always forming an angle where the elytral margin ends and the expansion begins 10
- 2(1). Elytra with tufts of hairs on some of the interstices (sometimes these tufts are rubbed-off, but there are always

- remains of the characteristic swelling in their place of insertion) 3
 Elytra without tufts of hairs on interstices 4
- 3(2). Hair tufts with short, fine hairs; elytral margin finely, but irregularly crenulate; central Brazil *crenulatus*
 Hair tufts with long and stouter hairs; elytral margin not crenulate; southeastern Brazil (and Goiás) *ohausi*
- 4(2). Elytra unicolored 5
 Elytra with darker, usually black markings 8
- 5(4). Outline of elytra more or less circular 6
 Outline of elytra not circular 7
- 6(5). Black species; Brazil (Ceará) *piceus*
 Reddish species; pronotum with black markings on sides; Colombia *flammeus*
- 7(5). Elytral margin crenulate, especially posteriorly; elytral outline more or less rectangular, expansion only very slightly curved laterally; Brazil (Guanabara) *laculatus*
 Elytral margin smooth; expansion beginning just behind the humeri, but very much expanded posteriorly; outline more or less pear-shaped; Venezuela *ferrugineus*
- 8(4). Elytral markings forming an irregular ring, limited externally by the eighth interstice; Costa Rica *angustifrons*
 Elytral markings not forming a ring 9
- 9(8). Elytra marked with two dark, v-shaped, partly erased bands; Brazil (Santa Catarina) *rhinion*
 Elytra unicolored or with dark, lateral spots; southeastern Brazil *attelaboides*
- 10(1). Elytra with tufts of hairs on one or more interstices 11
 Elytra without tufts of hairs on interstices 13
- 11(10). Elytral margin not crenulate; elytra with a single tuft of hairs on anterior part of second interstice, on a black swelling; Brazil (Guanabara) *nigropunctatus*
 Elytral margin crenulate 12
- 12(11). Elytral expansion somewhat angulate at its widest point and posteriorly; striae deeper; smaller species (average length 3.26 mm); southeastern Brazil *dispar*

- Elytral expansion regularly curved; striae shallower; larger species (average length, 3.61 mm); southeastern Brazil *serratora*
- 13(10). Elytra unicolored 14
Elytra red with two black transverse bands, one basal and one apical; Ecuador *pulcherrimus*
- 14(13). Large, reddish-brown species (4.56-6.68 mm); pronotum granulate on posterior area of disc; Guadeloupe .. *rufus*
Smaller, testaceous species (3.88 mm); pronotum very sparsely punctate on disc; Brazil (Pará and Amapá)
..... *impressifrons*

Camarotus dispar Heller, 1923

(Figs. 20-22)

Camarotus dispar Heller, 1923: 63, 66 (lectotype ♂, Brazil, "Espírito Santo"; MD, examined, present designation); Klima, 1935: 1 (catalog); Blackwelder, 1947: 843 (catalog); Voss, 1965: 228, 230 (key, distribution).

Color variable: reddish-brown, with irregular, black markings on elytra and pronotum; scutellum reddish-brown, often black; sometimes very dark, almost completely black, even ventrally; antennae and tarsi testaceous.

Eyes somewhat convex, beak slightly shorter than wide anteriorly; beak and frons very deeply and coarsely punctate; vertex impunctate. Pronotum widest in front of the middle, very slightly narrowed towards base, much more so towards anterior strangulation; surface coarsely foveolate, granulate laterally; covered with short, decumbent pilosity. Scutellum smooth. Elytra with slightly developed elytral expansion beginning at the middle of the elytra and widest at posterior third; margin crenulate; interstices very convex, second with two swellings, one near the middle and one on apical third; swellings with tufts of long hairs; sixth with elongate, humeral swelling; striae very deeply punctate-striate. Measurements (9 specimens): total length, 2.96-3.6 (3.26); maximum elytral width, 1.84-2.08 (1.97); elytral length, 2.16-2.48 (2.37).

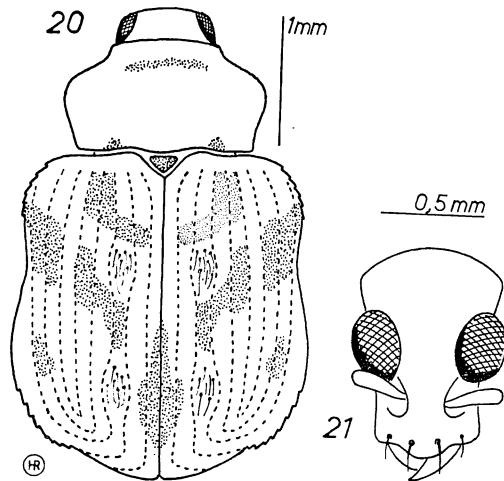
MATERIAL EXAMINED

BRAZIL. *Espírito Santo*, no locality (lectotype ♂ and paralectotype ♂; MD); *Minas Gerais*, Santa Bárbara, Serra do Caraça, 1380 m, XI.1961, Kloss, Lenko, Martins & Silva col. (1 ♀, EV); *idem*, III.1963, F. Werner, U. R. Martins & L. R. Silva col. (♂, MZUSP); *Guanabara*, Rio de Janeiro, Fry col. (2 ♂, BM); *São Paulo*, Diadema, 12.II.1961, H.

Reichardt col. (1 ♀, MZUSP); Barueri, 6.VIII.1955 (1 ♂, WB); *Santa Catarina*, no locality, Staudinger (paralectotype ♂, MD).

GEOGRAPHIC DISTRIBUTION (fig. 22)

The distribution of *Camarotus dispar* is very similar to that of the closely related *serratora*; these species are sympatric to a large extent.



Camarotus dispar (lectotype ♂): 20, dorsal view;
21, front view of head.

NOTES ON TYPES AND TAXONOMIC DISCUSSION

Heller's original description of *Camarotus dispar* was based on 3 specimens with no exact locality: two are from "Espírito Santo" and one from "S. Catharina, Staudgr.", all three also labelled "Coll. J. Faust, Ankauf 1900". One of the specimens from Espírito Santo is herewith designated lectotype.

As seen above, *dispar* is very closely related to *serratora* and to *crenulatus*, being, however, easily distinguished by the characters used in the key.

There is some variation in color, registered in the description, most specimens being, however, reddish-brown, with black elytral markings. An extreme example (♀ from Serra do Caraça) is almost completely black, also ventrally (except as for the testaceous legs).

Camarotus serratora Voss, 1958

(Figs. 22-24)

Camarotus serratora Voss, 1958: 931-932 (holotype ♂ and paratype ♂, Brazil, Rio Grande do Sul, Caxias do Sul; see notes below; EV, examined); 1965: 227, 230, fig. 2 (key).

Reddish-brown; some specimens with the base of pronotum, as well as somewhat oblique band extending from the base of the elytra (between the humeri and the scutellum) to suture, and another parallel band, reaching the suture at about the middle of elytra.

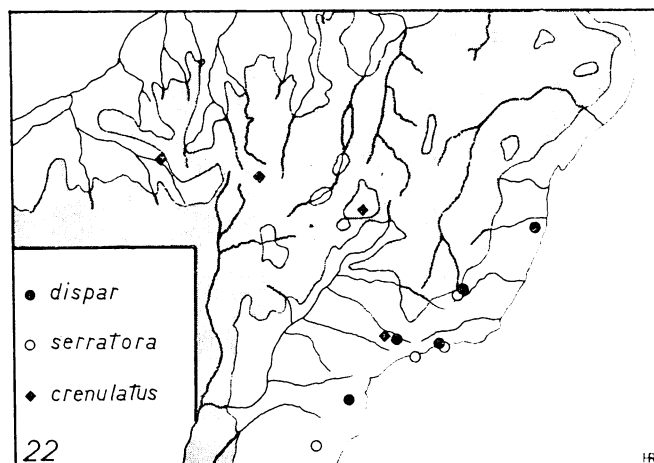


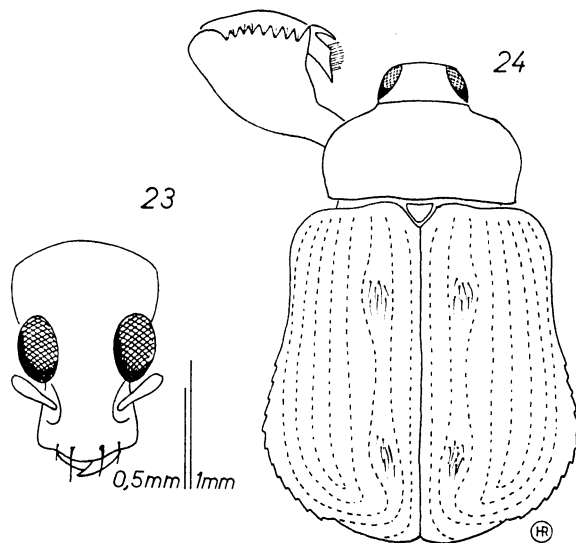
Fig. 22: Geographic distribution of *Camarotus dispar*, *serratora* and *crenulatus* (map redrawn from Hueck, 1966; open formations stippled).

Eyes weakly convex; beak relatively short, about as long as wide anteriorly; surface of beak and head more or less densely and deeply punctate; antennae inserted at about the middle of beak. Pronotum widest in front of the middle, very slightly narrowed towards base, and much more narrowed towards the anterior strangulation; surface deeply and coarsely punctate on disc, granulate laterally; covered with very short and decumbent pubescence. Elytral expansion slightly developed, beginning a little before the middle of elytra, and expanded very gently to reach its maximum width at posterior half; then regularly curved to meet second interstice; margin of elytra, beginning at humeri, clearly crenulate; striae punctate, not very deep; interstices normally convex, second with two swellings, one near the middle and one near the apical third; swellings with tufts of long hairs; sixth interstice with glabrous, elongate, almost cariniform, humeral swelling. Measurements (10 specimens): total length, 3.2-4.08 (3.61); maximum elytral width, 2.12-2.8 (2.37); elytral length, 2.32-2.96 (2.56).

MATERIAL EXAMINED

BRAZIL. *Minas Gerais*, Santa Bárbara, Serra do Caraça, I-II.1885, E. Gounelle col. (1 ♀, MNHN); *Guanabara*, Rio de Janeiro, Fry col., n.º 6123 (1 ♀, BM); *idem* (Corcovado), 19.V.1958, 16.X.1958, 10.XI.1958, X.1967, Alvarenga & Seabra col. (1 ♂, UFPR; 2 ♂, MA; 1 ♀, EV); *São*

Paulo, Ilha de Santo Amaro, 22.IV.1916, G. E. Bryant col. (1 ♂, BM); *Rio Grande do Sul*, Caxias do Sul (Vila Oliva), 12.II.1949, Pe. P. Buck col. (holotype ♂ and paratype ♂, Bondar's n.º 4978, EV; 4 ♂, 1 ♀, Buck's n.º 2050, AMNH, MZUSP).



Camarotus serrator (♂ from Caxias do Sul, RS):
23, front view of head; 24, dorsal view.

GEOGRAPHIC DISTRIBUTION (fig. 22)

The material of *serrator* Voss available at present enlarges substantially the known distribution of the species along the southeastern coast of Brazil. Unfortunately a great blank is still present between the northern (Minas Gerais, Guanabara and São Paulo) and the southern (Rio Grande do Sul) part of the distribution.

NOTES ON THE TYPES AND TAXONOMIC DISCUSSION

There is some confusion concerning the type-material of *Camarotus serrator*, which fortunately enough I was able to untangle. Voss described *serrator* based on two specimens he received from Bondar's collection (n.º 4978, without locality). They were presumed to have been collected in Bahia, where Bondar did most of his collecting [in the original description we read: "Brasilien (Bahia?) ..."]].

Five specimens of *Camarotus serrator* received from the American Museum of Natural History, were labelled "Gregorio Bondar collection, David Rockefeller Donor" and "Villa Oliva, P. Buck, n.º 2050". These specimens agree very closely with the types of *serrator* (especially in color), and it occurred to me that they might all belong to the same series.

Mrs. Patricia Vaurie from the American Museum of Natural History, who has always been very helpful, was kind enough to check Gregório Bondar's notebook, which was bought by the American Museum together with Bondar's collection. In this notebook the following assessment was made under n.º 4978: "Camarotinae ruivo em *Miconia hyemalis* St. Hill. Melastomaceae. Pe Pio Buck N 2050, 7 ex. 2 a Voss 10-8-50". Later on he added "*Camarotus serrator* Voss, n. sp. carta 29-9-50". Thus, the specimens from Vila Oliva (a suburb of Caxias do Sul) belong with the type-specimens of *serrator*, and Bahia as type-locality or part of the range of the species, should be eliminated from the literature.

Camarotus serrator is very closely related to *dispar* Heller and *crenulatus*. The three species have crenulate elytral margin, but differ in other characters. In its original description *serrator* was stated to differ from *dispar* by the absence of the anterior tuft of hairs on the elytra, and by being uniformly red. As seen in other cases, the hairs of these elytral tufts can be easily rubbed off, and the presence of a swelling strongly suggests this to have happened, a hypothesis strengthened by the fact that of the 5 specimens from Vila Oliva (see above), some have the anterior tufts partly rubbed off, as well as by the fact that one of the types of *serrator* has remains of hairs where the anterior tuft should have been located:

From *cranulatus*, *serrator* is distinguished by having tufts of hairs only on the third interstice, while *crenulatus* has tufts on the third, fifth and seventh interstices. In *crenulatus* the elytral expansion starts just behind the humeri, while it starts closer to the middle in *serrator*.

From *dispar* Heller, *serrator* differs especially by the different coloration (*dispar* is usually black-spotted, while *serrator* is either uniformly reddish or presents two parallel, transverse black bands); *dispar* has deeper striae, and consequently more convex interstices; in *dispar* the elytral expansion ends before reaching the second interstice, and this species is smaller, in average.

By the lateral expansion of the elytra, which only begins at about the middle of the elytra, *dispar* and *serrator* are very characteristic species; *impressifrons* from northern South America, as well as *rufus* from Guadeloupe, have similarly built elytral expansion, but differ in other characters.

POLLINOSITY

A single specimen of *serrator* (Serra do Caraça) has the dorsal surface covered with yellow pollinosity.

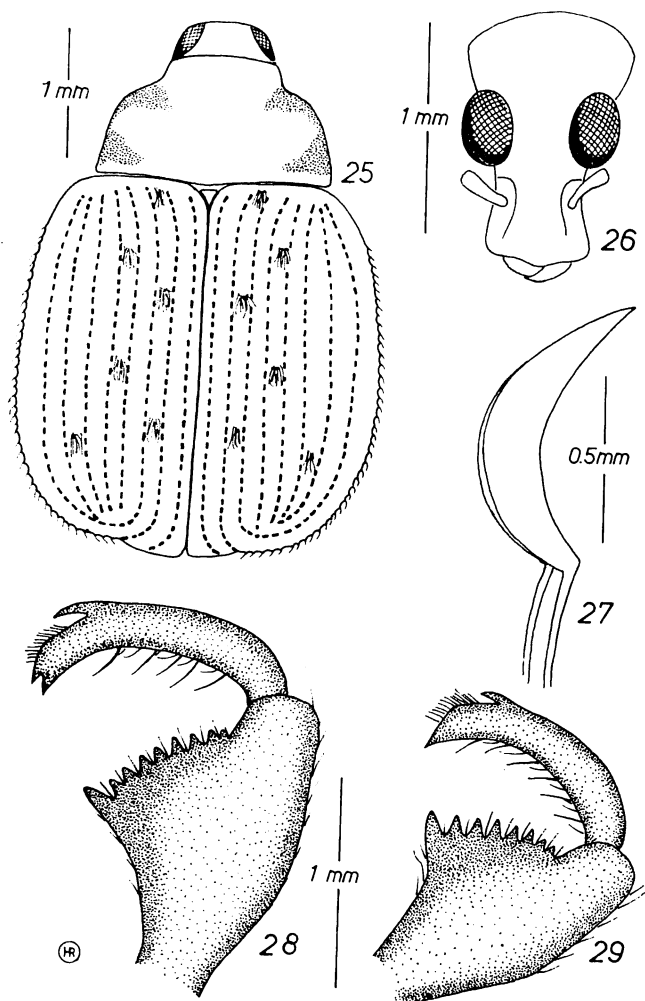
Camarotus crenulatus, sp. n.

(Figs. 22, 25-29)

TYPES

BRAZIL. *Território Federal de Rondônia*, Vilhena, 24.II.1961, J. & B. Bechyné col. (holotype ♂ and paratype ♀, MZUSP); Goiás, Corum-

bá de Goiás, 4-8.II.1961, J. & B. Bechyné col. (1 paratype ♂ and 1 paratype ♀, MZUSP); *Mato Grosso*, Chapada dos Guimarães, 29.XI.1963, F. M. Oliveira, M. Alvarenga & W. Bokermann col. (1 paratype ♂, WB); *São Paulo*, Itu, Fazenda Pau d'Alho, 1-5.XI.1961, U. R. Martins col. (1 paratype ♂, MZUSP). "Brésil" (1 paratype ♂, MNHN).



Camarotus crenulatus (paratype ♂ from Corumbá de Goiás, GO): 25, dorsal view; 26, front view of head; 27, aedeagus; 28, front leg of female; 29, front leg of male.

Reddish-brown, with black spot on front femora, blackish sides of pronotum and irregular black markings on sides of elytra.

Eyes convex; beak almost as long as wide at apex, strangulated in front of eyes; antennae inserted at basal third of beak, antennal grooves

visible from above; surface of beak and head irregularly and sparsely punctate. Pronotum transverse, strangulated anteriorly, very densely and coarsely punctate, granulate laterally, covered with short, yellow hairs. Elytra widest behind the middle; lateral expansion weakly developed, vanishing just before reaching the humeri; lateral margin of expansion, especially at posterior third, crenulated underneath (also somewhat visible from above); surface of elytra with tufts of hairs (tufts with few and short hairs) placed as follows: second interstice, one near anterior margin, one near swollen end, and one each approximately near the middle of anterior and posterior half; fourth interstice: one at middle of the elytra and one at anterior third; sixth interstice: two tufts alined with the median ones of the second interstice. Elytra otherwise with sparse, short and yellow pubescence. Measurements (6 specimens): total length, 3.77-4.55 (4.21); maximum elytral width, 2.53-2.99 (2.73); elytral length, 2.6-3.05 (2.83). Male genitalia as in figure 27.

GEOGRAPHIC DISTRIBUTION (fig. 22)

Judging by the localities recorded, *crenulatus* is a widespread species, most possibly distributed over central Brazil.

TAXONOMIC DISCUSSION

Camarotus crenulatus is very closely related to *dispar* Heller, and runs into couplet 27 of Voss' key (1965: 227). This new species, however, is easily distinguished from *dispar* by having tufts of short hairs on the second, fourth and sixth interstices (*dispar* has two tufts on the second interstice, one near the middle and one subapically), by the differently shaped lateral expansion, and the less conspicuous crenulation of the margin of the expansion.

POLLINOSITY

Some of the specimens are covered with sparse, yellow pollinosity.

Camarotus laculatus, sp. n.

(Figs. 30-31)

TYPE

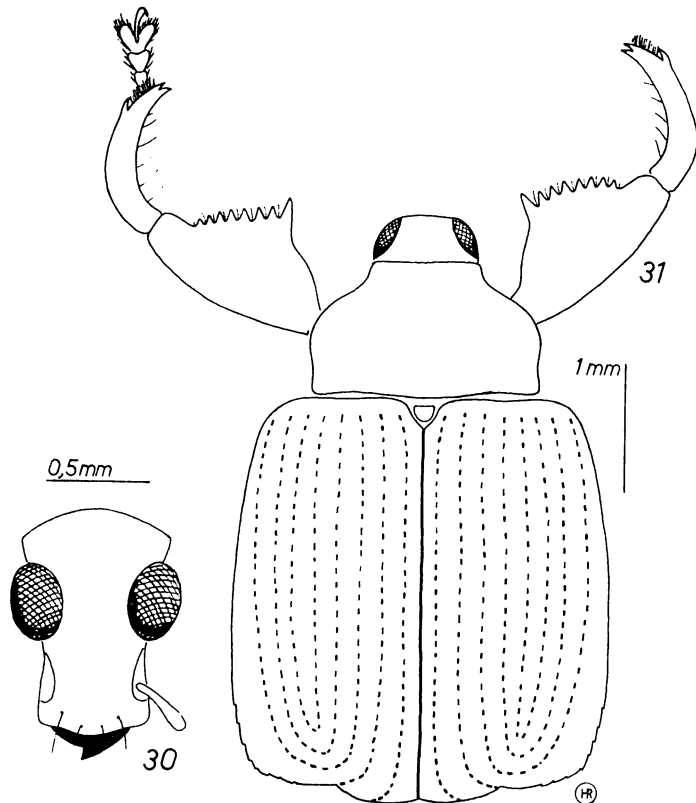
BRAZIL. *Guanabara*, Rio de Janeiro, Fry col., n.º 4414 (holotype ♀, BM).

Testaceous.

Head relatively small; beak as long as wide anteriorly, narrowed towards eyes; surface of beak and frons irregularly, but clearly punctate; antennae inserted at the middle of the beak. Pronotum widest at middle, narrowed towards base, and much more so towards anterior strangulation; disc very deeply punctate, sides granulate. Elytra widest slightly behind the middle, with well developed lateral expansion; this starting at the humeral angle, only very slightly curved, almost parallel-sided, shaped into a sharp curve at posterior angle, ending well before

the sutural angle, fusing with the second interstice; margin crenulate, crenulation especially well visible at the posterior part; striae deeply punctured, interstices slightly convex. Measurements (holotype): total length, 4.52; maximum elytral width, 2.8; elytral length, 3.12.

Male unknown.



Camarotus laculatus (holotype): 30, front view of head;
31, dorsal view.

TAXONOMIC DISCUSSION

Camarotus laculatus * is well characterized by the peculiarly shaped elytral expansion, giving the elytra a more or less rectangular outline, with almost parallel sides. It is somewhat difficult to relate *laculatus* with the other species of the group, but it most probably is related to *crenulatus*.

Camarotus pulcherrimus, sp. n.

(Figs. 32-33)

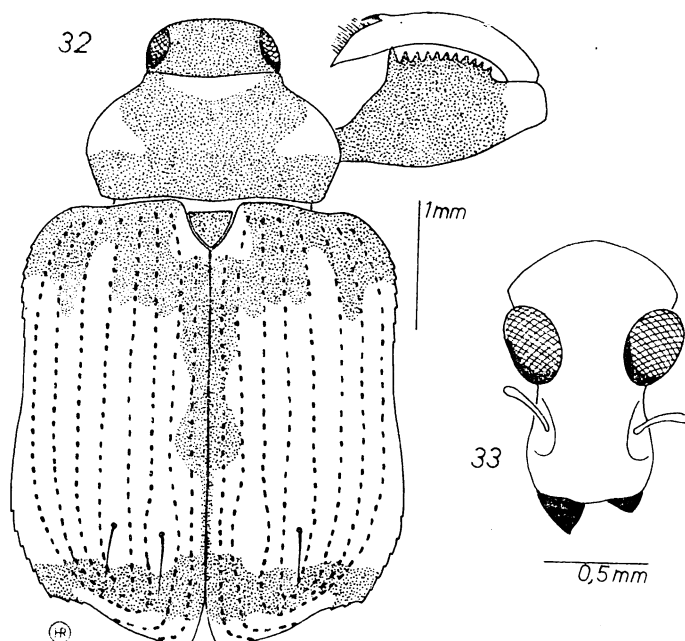
TYPE

ECUADOR. Buckley col., n.º 52.314 (holotype ♀, BM).

(*) See Post Scriptum on page 184, for the description of *Camarotus trunculus*, sp. n., a new species which is closely related.

Very dark brown, nearly black; elytra with large, discal mark from margin to margin, some irregular, inconspicuous markings on pronotum, apex of front femora, front tibiae, middle and hind legs; scutellum black; antennae and tarsi testaceous.

Eyes relatively small; beak strong and stout, about as long as wide at apex, somewhat narrowed towards eyes; surface of beak and frons



Camarotus pulcherrimus (holotype): 32, dorsal view;
33, front view of head.

very deeply and irregularly punctate; antennae inserted at middle of beak. Pronotum widest at middle, somewhat narrowed towards base and much more so towards anterior strangulation; surface very irregular, disc with 3 elevations, two in front of the middle and one behind the middle, between the two anterior elevations with a deeper depression; disc punctate, sides granulate. Elytra widest at posterior third, with weakly developed expansion, which starts at about the middle and ends before the sutural angle; margin irregularly serrate; striae punctate-striate; second, third, fourth and sixth interstices more or less tuberculate at the base; second and fourth interstices widened at the middle of apical half and each bearing a strong, single seta. Measurements

(holotype): total length, 4.68; maximum elytral width, 2.8; elytral length, 3.28.

Male unknown.

TAXONOMIC DISCUSSION

Camarotus pulcherrimus, unfortunately only one single specimen available, with no precise locality in Ecuador, is related to *dispar* Heller, from southeastern Brazil. The two species have the very peculiar elytral expansion ending well before the sutural angle (even though also joining the second interstice); margins serrate (as other species), and other characters in common. They are, however, easily told apart by the completely different elytral color pattern, and by the peculiar pronotal sculpture of *pulcherrimus*. The latter is also much larger. The elytral setae on interstices 2 and 4 of *pulcherrimus* are a very characteristic feature, unequaled in the group, and which perhaps is a primitive type of the elytral tufts of setae present in other species (including *dispar*). The possibility of tufts having been rubbed off, and a single seta having remained, should also be considered.

Camarotus nigropunctatus, sp. n.

(Figs. 34-35)

TYPE

BRAZIL. *Guanabara*, Rio de Janeiro, Pascoe Coll. (holotype ♂, BM).

Testaceous; pronotum somewhat darker on disc; each elytron with a small black swelling at anterior part of the second interstice.

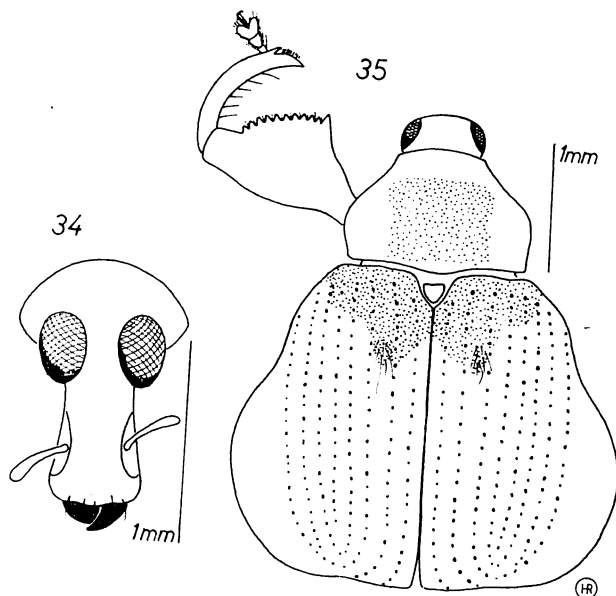
Head relatively small, with convex eyes; beak thin, relatively long, about one and half times as long as wide at apex; antennae inserted in the middle of beak; surface of beak and frons irregularly punctate. Pronotum widest just in front of the middle, only very slightly narrowed towards base, much more narrowed towards anterior strangulation; surface granulate laterally, punctate on disc; covered with very short, fine and decumbent pilosity. Elytral expansion beginning slightly in front of the middle, expanding gradually to reach its widest point at posterior third, then joining the second interstice and ending in a curve which reaches the sutural angle; striae clearly punctate, interstices normally convex; second interstice with a small, black swelling at the middle of anterior half which bears inconspicuous tuft of short and fine hairs. Measurements (holotype): total length, 3.52; maximum elytral width, 3.20; elytral length, 2.32.

Female unknown.

TAXONOMIC DISCUSSION

Camarotus nigropunctatus is a unique species in the *attelaboides* group. Its elytral expansion is well developed, its widest point behind the middle of the elytra. It is furthermore characterized by the rela-

tively thin and long beak, as well as by the two black hair-tuft bearing swellings on the second interstice. Possibly related to *pulcherrimus*, and as this, possibly representing an extreme offshoot of *dispar*.



Camarotus nigropunctatus (holotype): 34, front view of head; 35, dorsal view.

Camarotus ferrugineus Reichardt, 1969

(Figs. 36, 37)

Camarotus ferrugineus Reichardt, 1969: 314-315, fig. 2 (holotype ♀, Venezuela, Miranda, Alpes del Puy; CB).

Brown with darker pronotum, head and front legs; scutellum darker than pronotum and elytra; elytra with indication of darker, humeral spot; antennae and tarsi testaceous.

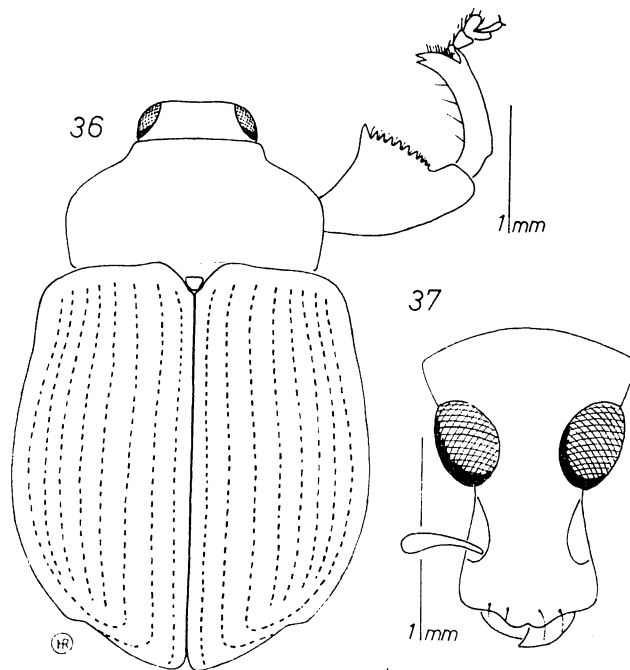
Beak relatively long, slightly longer than wide at apex; much narrowed towards eyes; antennae inserted at middle of beak; surface of beak completely smooth, impunctate; head very sparsely punctate between the eyes; antennae normal; head covered with sparse and short, decumbent pilosity. Pronotum widest at middle, very slightly narrowed towards base and very much towards anterior strangulation; surface punctate on disc, granulate laterally, with short, sparse and decumbent pilosity. Elytra widest closely behind the middle, with weak lateral expansion starting just behind the humeri; striae punctate,

lightly impressed. Front tibiae slender, curved, very slightly angulate externally at base, carinate on inner margin. Measurements (holotype): total length, 4.4; maximum elytral width, 2.6; elytral length, 3.0.

Male unknown.

MATERIAL EXAMINED

VENEZUELA. *Miranda*, Alpes del Puy, Parque Nacional Guatopo, 400 m, 16.VI.1967, C. Bordon col. (1 ♀, CB).



Camarotus ferrugineus (holotype; partly adapted from Reichardt, 1969): 36, dorsal view; 37, front view of head.

TAXONOMIC DISCUSSION

Camarotus ferrugineus, the only species at present known from Venezuela, is very closely related to *impressifrons* Voss (known from Brazil, Pará and Amapá), both represented only by females. *C. ferrugineus*, however, is more slender at humeri, its lateral expansion beginning more anteriorly, and expanding very gradually to the widest point, whereas it expands more abruptly in *impressifrons*. The pronotal disc of *impressifrons* is almost smooth, while in *ferrugineus* there are conspicuous, sparse punctures. The anterior tibiae of *ferrugineus* are very slightly angulate externally at base (fig. 37), while they are normally curved in *impressifrons*.

***Camarotus impressifrons* Voss, 1923**

(Figs. 38-39)

Camarotus impressifrons Voss, 1923: 69, 71 (holotype ♀, Brazil, Pará, Belém; originally in the Hamburg Museum, destroyed in World War II); Klima, 1935: 1 (catalog); Blackwelder, 1947: 843 (catalog); Voss, 1965: 237, 230 (key).

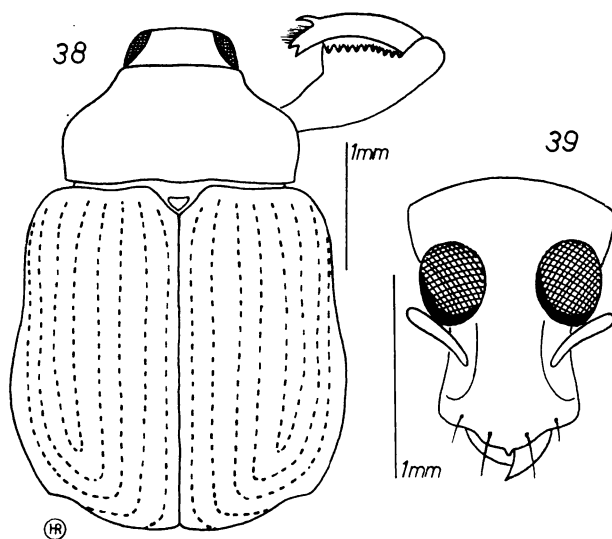
Testaceous.

Eyes very convex; beak normal, about as long as wide anteriorly, much narrowed basally; antennae inserted at middle; surface smooth; frons punctate, with slight impression between the eyes. Pronotum about twice as wide as long, widest about middle, narrowed posteriorly and anteriorly; surface sparsely punctate, almost smooth posteriorly, granulate laterally. Scutellum small, smooth, quadrangular. Elytra widest at posterior third; expansion starting just in front of the middle; striae punctate, only slightly impressed; interstices flat. Measurements (1 specimen): total length, 3.88; maximum elytral width, 2.48; elytral length, 2.68.

Male unknown.

MATERIAL EXAMINED

BRAZIL. *Território Federal do Amapá*, Pôrto Platon, 24.VII.1961, J. Bechné col. (2 ♀, MZUSP).



Camarotus impressifrons (♀ from Pôrto Platon, AP):
38, dorsal view; 39, front view of head.

GEOGRAPHIC DISTRIBUTION

This species was only known by the holotype, collected at Belém, Pará. The present specimens from Amapá, extend the range northwards, suggesting distribution similar to that of *Camarotus cassidoides* (fig. 81).

TAXONOMIC DISCUSSION

The 2 specimens examined fully agree with Voss' original description, except that one of them is smaller and has an indication of two dark spots on each elytron, one on the sixth and seventh interstices, just behind the humeri, and one on the third, fourth and fifth interstices, close to the middle of the elytra. Unfortunately, due to an accident, the head and pronotum of the smaller specimen were lost after it having been studied. I have, however, no doubt about the conspecificity of the two specimens.

Camarotus impressifrons is a well characterized species by its uniformly, testaceous color. There is some relation to the Venezuelan *ferrugineus*, even though they are quite distinct species, as described above. The type of elytral expansion, beginning at about the middle of the elytra, relates *impressifrons* with *ferrugineus*, *flammeus* and *rufus*. *Camarotus impressifrons* and *rufus* are the two only species with the epistomal tooth.

Camarotus rufus Hustache, 1930

(Figs. 40-42)

Camarotus rufus Hustache, 1930: 8 (holotype ♀, Guadeloupe, Trois Rivières; MNHN, examined); Klima, 1935: 2 (catalog); Blackwelder, 1947: 843 (catalog).

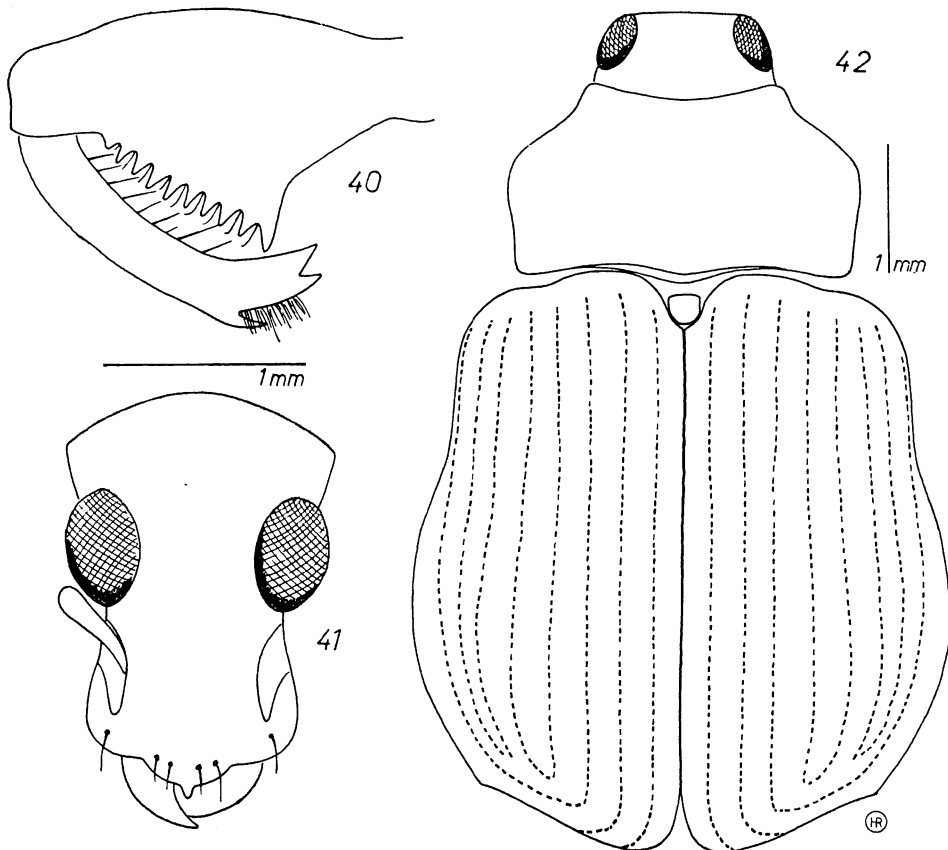
Brownish to reddish-brown, with testaceous antennae and tarsi.

Eyes very slightly convex; beak slightly longer than wide at apex, very slightly narrowed towards eyes; epistoma with median tooth; surface sparsely punctate; antennae inserted about middle of the beak; frons and vertex only very sparsely punctate. Pronotum less than twice as wide as long, widest at middle, slightly narrowed basally; very much narrowed towards anterior strangulation; surface of pronotum granulate laterally, and at posterior area of disc (here granulations look like imbricated scales), punctate at anterior half of disc. Surface of pronotum and head covered with very short, decumbent pilosity. Elytra widest behind the middle, with weakly developed lateral expansion, which only begins right before the middle; posteriorly the expansion is more or less angulate, joining the second interstice; punctate-striate, striae with fine but very deep punctures; lateral margin of expansion slightly crenulate. Measurements (holotype ♀, ♀ and ♂ res-

pectively) : total length, 6.68, 5.68, 4.56; maximum elytral width, 3.93, 3.25, 2.75; elytral length, 4.18, 3.43, 2.87.

MATERIAL EXAMINED

GUADELOUPE. Trois Rivières, Dufau col. (holotype, ♀, MNHN); *idem*, Forêt de Moscou, 800 m, 30.I.1964, J. Bonfils col. (1 ♀, SRZ); Pointe Noire, route des Manèttes (?), 18.VIII. 1965, J. Bonfils col. (1 ♂, SRZ).



Camarotus rufus (holotype): 40, front leg; 41, front view of head; 42, dorsal view.

NOTES ON THE TYPES AND TAXONOMIC DISCUSSION

The type-specimen (Hustache collection, preserved in the Paris Museum), bears two identification labels (in different handwritings) : "Prionomerus rubidus n. sp." and "Camarotus rufus m.". The species, as seen above, is obviously a *Camarotus* and not a *Prionomerus*.

Camarotus rufus is apparently very variable, especially in size (measurements above) and color (the type is of a rich reddish-brown,

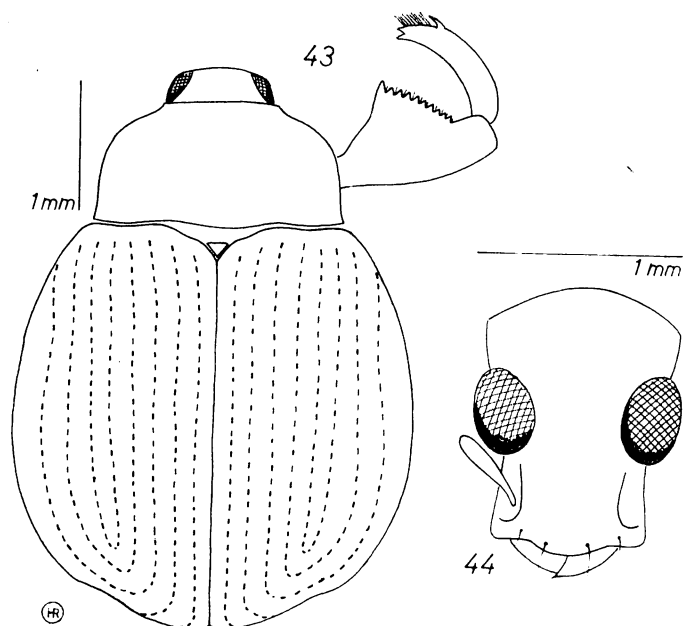
whereas the two other specimens are more testaceous, almost brownish). It is the only species recorded for the Antilles, and one of the largest of the genus. *Camarotus rufus* is apparently related to *ferrugineus*, *impressifrons* and *flammeus*, but has some unique characters, such as the pronotal sculpture (very characteristic and unique: in no other described species does the pronotum show an imbricate, scaly posterior half of the disc), the weak angle formed by the elytral expansion at posterior half, and especially the epistomal tooth (which is only present in *impressifrons* and *rufus*).

Camarotus attelaboides Karsch, 1881

(Figs. 43-45)

Camarotus attelaboides Karsch, 1881: 51, pl. 2, fig. 1 [holotype ♂ (?), "Brasilia", Berlin Museum, not seen]; Heller, 1923: 63 (key); Klima, 1935: 1 (catalog); Blackwelder, 1947: 842 (catalog); Voss, 1965: 226, 230 (key, distribution).

Camarotus bruchoides Karsch, 1881: 51 [holotype ♂ (?), Brazil, Minas Gerais, São João del Rei; Berlin Museum, not seen]; Heller, 1923: 63 (key); Voss, 1923: 68, 69 (key, distribution); Klima, 1935: 1 (catalog); Blackwelder, 1947: 842 (catalog); Voss, 1965: 228, 231 (key, distribution). *Syn. n.*



Camarotus attelaboides (♀ from Corcovado, Rio de Janeiro, GB): 43, dorsal view; 44, front view of head.

Sexual-dimorphic in color: male black, with red elytra and red spots on pronotum, tarsi and antennae yellow; female testaceous dorsally, with longitudinal, black line on pronotum and head (here sometimes expanding into a spot) where it ends more or less between the eyes; ventrally black, legs dark, tarsi and antennae yellow. Scutellum black in both sexes.

Beak relatively short (not as short and stout as in *rhinion*), about as long as wide anteriorly; antennae inserted at middle of beak; beak and frons deeply and coarsely punctate, vertex with sparse and shallow punctures. Pronotum about twice as wide as long; posterior half parallel-side, strangulate anteriorly; disc impunctate, sides granulate; surface covered with short and fine hairs. Elytra widest at middle, with expansion extending from the humeri to near the apical angle; sulci punctate; surface with very short and fine hairs. Measurements (10 specimens from Serra do Caraça): total length, 4.25-5.37 (4.60); maximum elytral width, 2.68-3.78 (3.08); elytral length, 2.93-3.83 (3.30).

MATERIAL EXAMINED

BRAZIL. *Minas Gerais*, no locality (1 ex., BM); Serra do Caraça, 1,380 m, XI.1961, Kloss, Lenko, Martins & Araujo col. (1 ♂, MZUSP; 1 ♀, EV); *idem*, 23-25.XI.1960, Araujo & Martins col. (1 ♂, EV); *idem*, III.1963, F. Werner, U. Martins & L. R. Silva col. (2 ♂, 3 ♀, MZUSP; 1 ♂, 1 ♀, EV); *idem*, I-II.1885, E. Gounelle col. (1 ♂, 2 ♀, MNHN); *Guanabara*, Rio de Janeiro (Corcovado), 28.XI.1958, Alvarenga & Seabra col. (1 ♀, MA); *Rio de Janeiro*, Itatiaia, 850 m, II.1899, E. Gounelle col. (1 ♂, BM); *São Paulo*, Salesópolis, Estação Biológica de Boracéia, 11.XI.1960, K. Lenko col. (1 ♀, MZUSP); Cerqueira Cesar, I.1889, E. Gounelle col. (1 ♀, MNHN). "Brasil", no locality (1 ♂, MD; 1 ♂, MNHN). "South America" (1 ♂, BM). No locality, ex Coll. Chevrolet (1 ♂, RS; determined as *marginalis* Imhoff).

GEOGRAPHIC DISTRIBUTION (fig. 45).

Besides the listed records (some of which already in Voss, 1965: 230, 231) the species has been found in Santa Catarina, Rio Capivari (Voss, 1923: 69). *Camarotus attelaboides* seems restricted to southeastern Brazil.

SYNONYMIC NOTES AND TAXONOMIC DISCUSSION

Camarotus attelaboides and *bruchoides* have been distinguished in the past by a character which placed them far apart in keys: elytral width widest at middle of the elytra, in *attelaboides*, and elytral width widest behind the middle in *bruchoides* (Heller, 1923; Voss, 1965).

This character is very subtle and not at all constant. Of the specimens from Serra do Caraça, collected in March 1963, 1 ♂ and 3 ♀ were identified by Voss as *attelaboides*; a second male, however, as *bruchoi-*

des. The species is very variable, especially in the width of elytra. I am convinced that all specimens listed above are conspecific.

In the original descriptions Karsch already noted the closeness of what he considered two distinct species.

Camarotus attelaboides exhibits an interesting sexual dimorphic variation in color. *Camarotus attelaboides* is very closely related to *rhinion*, which is differently colored.

POLLINOSITY

Specimens of *Camarotus attelaboides* are usually covered with yellow pollinosity on the dorsal side; on the elytra there is usually, a triangular spot of pink pollinosity, with its base towards the base of the elytra.

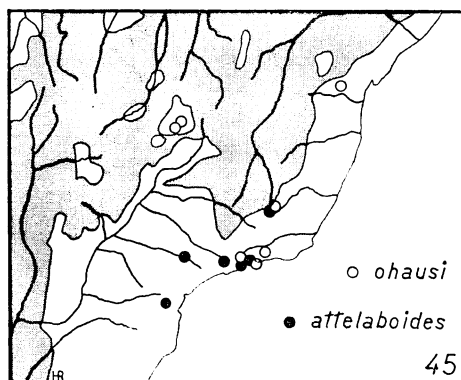


Fig. 45: Geographic distribution of *Camarotus attelaboides* and *ohausi* (map redrawn from Hueck, 1966; open formations stippled).

Camarotus rhinion, sp. n.

(Figs. 46-48)

TYPES

BRAZIL. *Santa Catarina*, Cotejipe, 750 m, VII.1960, F. Plaumann col. (holotype ♂, MZUSP); Corupá, X.1944, A. Maller col. (paratype ♀, AMNH).

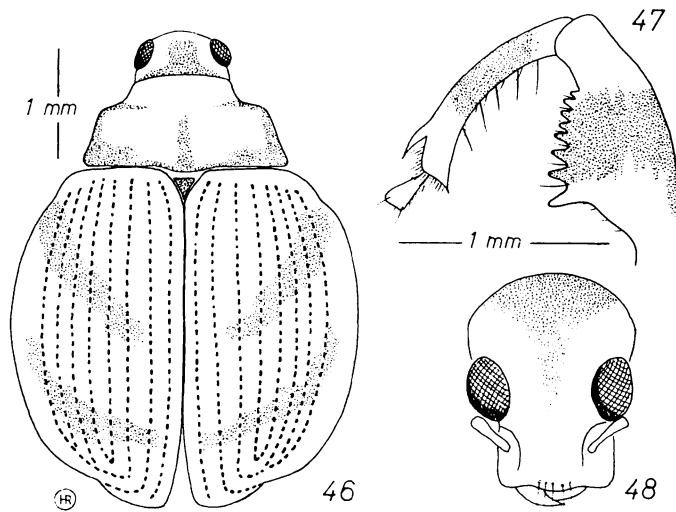
Yellowish-brown, with brown spots on occiput (extending into frons), sides of pronotum, median line of pronotum and two interrupted bands on elytra; a spot of the same color on anterior femora and tibiae. Scutellum brown.

Eyes moderately convex; beak very short and stout (slightly shorter than wide distally); antennae inserted anteriorly; antennal grooves distinctly visible from above; head sparsely punctate, with frontal depression. Pronotum slightly wider than twice its length at median line,

widest at basal angles, narrowed anteriorly; surface deeply punctate, granulate laterally. Head and pronotum covered with short, decumbent pubescence. Elytra widest at middle, expansion moderate, extending from humeri to near apical angle; sulci very clearly punctate; surface uneven, with very sparse pilosity. Measurements holotype ♂ and paratype ♀ respectively): total length, 3.25, 5.75; maximum elytral width, 2.5, 3.87; elytral length, 2.3, 4.0.

TAXONOMIC DISCUSSION

Camarotus rhinion is closely related to *attelaboides* Karsch (running to its vicinity in Voss' key); however, *rhinion* has a much shorter and stouter beak, and has completely different elytral design. The size difference between the holotype and the paratype, is noteworthy.



Camarotus rhinion (holotype): 46, dorsal view; 47, front leg; 48, front view of head.

Camarotus ohausi Heller, 1923

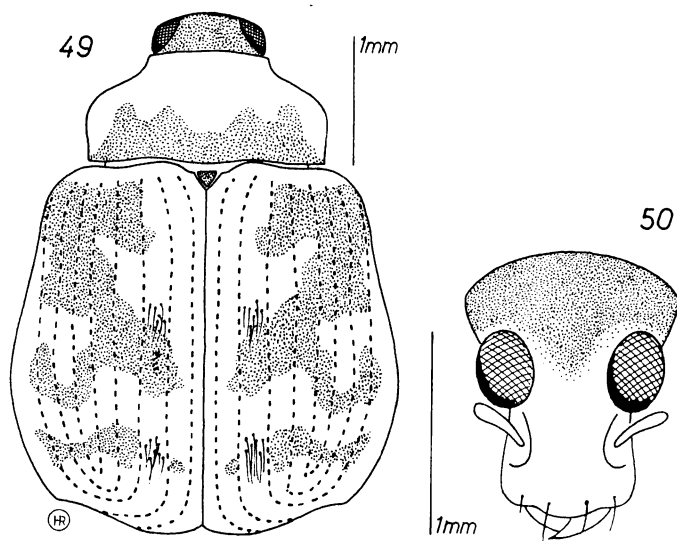
(Figs. 45, 49-50)

Camarotus ohausi Heller, 1923: 63, 67 (holotype ♀, Brazil, Rio de Janeiro, Petrópolis; MD, examined); Klima, 1935: 1 (catalog); Blackwelder, 1947: 843 (catalog); Voss, 1965: 228, 231 (key, distribution, synonymy).

Camarotus notatipennis Voss, 1923: 68, 69-70 (holotype ♀, Brazil, Rio de Janeiro, Nova Friburgo; Berlin Museum, not seen); Klima, 1935: 1 (catalog); Blackwelder, 1947: 843 (catalog); Voss, 1965: 231 (proposed synonymy with *ohausi* Heller).

Reddish-brown, usually with irregular, black markings on elytra and pronotum; scutellum dark brown; head darker, vertex usually black; antennae and legs testaceous.

Eyes feebly convex, beak relatively short and stout (shorter than wide apically); antennae inserted slightly behind the middle of the beak; surface punctate, punctures longitudinally arranged, especially between the eyes. Pronotum almost twice as wide as long, widest at middle, slightly narrowed posteriorly, very much narrowed anteriorly; disc almost impunctate, sides granulate. Elytra widest behind the middle, expansion relatively well developed; second interstice swollen and with tufts of hairs at middle of anterior half and at middle of posterior half; fourth interstice less swollen and with smaller tufts of hairs at anterior third and slightly behind the middle; sixth interstice with row of humeral hairs; striae punctate. Measurements (10 specimens): total length, 3.25-5.0 (3.87); maximum elytral width, 2.25-3.62 (2.71); elytral length, 2.25-3.31 (2.68).



Camarotus ohausi (holotype): 49, dorsal view; 50, front view of head.

MATERIAL EXAMINED

BRAZIL. *Rio de Janeiro*, Petrópolis, 6.XI.1904, F. Ohaus col. (holotype ♀, MD); Itatiaia (?), 14.I.1924, J. F. Zikán col. (1 ♀, WB); *Guanabara*, Rio de Janeiro (Corcovado), XI.1962, XI.1963, XI.1966, M. Alvarenga & C. A. C. Seabra col. (1 ♂, UFPR; 1 ♂, EV; 1 ♀, MA); *idem* (Tijuca), XII.1884, E. Gounelle col. (1 ♂, MNHN); *idem* (3 ♂, 1 ♀, BM); *Minas Gerais*, Santa Bárbara, Serra do Caraça, I-II.1885, E. Gounelle col. (1 ♀, MNHN); *idem*, 23-25.XI.1960, Araujo & Martins col. (1 ♂, EV); *idem*, III.1963, F. Werner, U. R. Martins & L. R. Silva col.

(2 ♂, MZUSP; 1 ♀ EV); Camanducaia, Vila Monte Verde, 16.XI.1966, J. Halik col. (1 ♀, JH); Goiás, Anápolis (Chácara do Tangará), 21-24. II.1966, F. Lane col. (1 ♀, MZUSP); Corumbá de Goiás (Fazenda Monjolinho), 4.VI.1942, F. Lane col. (1 ♀, EV); Bahia, Santo Antonio da Barra, XI-XII.1888, E. Gounelle col. (1 ♀, MNHN). "Brasilia, Sahlberg" (1 ♀, MD; labelled *marginalis* Labr. by Heller). No locality (1 ♂, MNHN; Coll. E. Gounelle).

GEOGRAPHIC DISTRIBUTION (fig. 45)

Described from two close localities in the State of Rio de Janeiro (Petrópolis and Nova Friburgo), the present records expand the known distribution of this species from Guanabara and Rio de Janeiro inwards to Minas Gerais, southern Bahia and Goiás.

SYNONYMIC NOTES AND TAXONOMIC DISCUSSION

The synonymy of *ohausi* Heller and *notatipennis* Voss was suggested by Voss (1965: 231), even though preceded by a question mark. I have not seen the type of *notatipennis*, but have no doubt that this specimen is a rubbed-off specimen of *ohausi*.

There is very much random variation of the elytral markings in this species. The ♀ from Itatiaia, as well as the ♀ with no locality label (MD, identified by Heller as *marginalis*), are completely dark red specimens; the ♀ from Anápolis has only a small black spot near the margin, behind the humeri; in the 2 males from Serra do Caraça this spot is prolonged obliquely towards the suture, but ends at the first stria; there is also a black, colon-shaped spot going from the elytral base, along the third interstice to the second interstice; there are also irregular spots on the apical half.

Camarotus ohausi is morphologically very similar and close to *attelaboides*, differing especially by the elytral hair tufts, absent in *attelaboides*. In *ohausi* the pronotum is much less strangulated anteriorly than in *attelaboides*; the stout and relatively short beak of *ohausi* is a very characteristic feature.

POLLINOSITY

Some specimens of *Camarotus ohausi* are partially covered with yellow pollinosity, especially on the elytra, for example the specimens from Serra do Caraça, as well as the male from Tijuca (MNHN) and the 3 ♂ and 1 ♀ from Rio de Janeiro (BM).

Camarotus angustifrons Voss, 1922

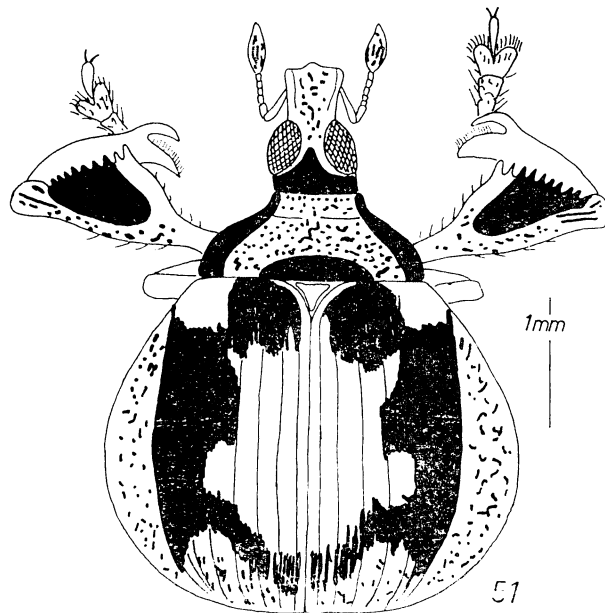
(Fig. 51)

Camarotus angustifrons Voss, 1922: 167, fig. (holotype ♂, Costa Rica, Cartago, Turrialba; originally stated to be in Voss' collection, present location unknown); Heller, 1923: 63 (key); Klima, 1935: 1

(catalog); Blackwelder, 1947: 842 (catalog); Voss, 1965: 228, 231 (key).

ORIGINAL DESCRIPTION

“Kopf- und Rüsselbildung erinnert sehr an *Euops*-Arten. Kopf breiter als lang; auf dem Scheitel etwas eingedrückt und hier kräftig und dicht punktiert. Schläfen kleiner als der halbe Augenzweidrittel Durchmesser, zur Basis etwas verbreitert. Augen gross, mässig gewölbt; Stirn schmal, gut $\frac{1}{3}$ so breit wie der Rüssel vor der Basis dick. Dieser wenig länger als an der Spitze breit, glänzend, seitlich kräftiger punktiert. Fühlerfurche von oben etwas sichtbar; Fühlerschaft erreicht nicht ganz die Mitte der Augen; Geissel gedrungen; Keule kräftig und so lang wie die Geissel, 1. Glied derselben fast so lang wie breit, mittleres quer, ein 4. Glied ist deutlich erkennbar. — Halsschild mehr als doppelt so breit wie lang; vor dem Vorderrand etwas eingeschnürt und hier kaum halb so breit wie an der Basis; seitlich kräftig gerundet. Punktierung auf der Scheibe fein und mehr verteilt, hinten kräftiger und dichter, seitlich runzlig gekörnelt. — Schildchen klein in einem grossen dreieckigen Ausschnitt der Decken eingebettet, etwas länger als breit, hinter der Basis eingeschnürt. — Flügeldecken breiter als lang, an der Basis so breit wie die des Halsschildes; von hier zunächst fast geradlinig verbreitert, in grossem Bogen dann beide Decken gemeinsam gerundet. Punktstreifen schmal linienförmig, furchig vertieft; Zwischenräume an der Basis schmaler und gewölbt, in der Mitte der Decken breiter und fast eben, äusserst schwach querrunzlig. — Vorderschenkel sehr kräftig zur Spitze verbreitert und mit 10-zähligen, tief eingeschnittenen Kamm versehen. Vordertibien aussen kräftig gebogen und vor der Spitze mit gekrümmten Haken besetzt. Zwischen Haken und Schienenspitze befindet sich auf letzterer eine Haarreihe. Klauen frei und innen schwach gezähnt. 3. Tarsenglied breit und tief gelappt. Färbung rotbräunlich; die seitlich wie bei den *Cassida* flach ausgezogenen Deckenränder sind rotgelb gefärbt. Die Flügeldecken sind gegen den Rand



Camarotus angustifrons (redrawn from Voss, 1922):
51, dorsal view.

schwarz abgesetzt, ebenso ist die Basis der Decken des Halsschildes und des Kopfes, die Seiten des Halsschildes und die vordere Kernpartie der Vorderschenkel schwarz gefärbt. — Auf dem Rücken der Decken ist die Behaarung nur äusserst kurz, staubförmig und sparsam verteilt, an den Rändern dichter, länger und halb aufgerichtet. — L.: 4 mm (s.r.): lat. 3.5 mm Costa Rica: Turrialba. — Typus in meiner Sammlung."

TAXONOMIC DISCUSSION

Unfortunately no material of *Camarotus angustifrons* was available for the present study. According to the description and illustration (fig. 51, redrawn from Voss), *Camarotus angustifrons* is closely related to *Camarotus ohausi* from Brazil. The two species have about the same size and the elytral expansion is widest at the posterior third. The elytral and pronotal markings of *angustifrons* easily distinguish it from *ohausi*: *ohausi* has tufts of hairs on the second and fourth interstices, while *angustifrons* has no hair tufts.

***Camarotus piceus*, sp. n.**

(Figs. 52-53)

TYPE

BRAZIL. Ceará, Serra de Baturité, I. 1895, E. Gounelle col. (holotype ♂, MNHN).

Piceous, with lighter, brownish elytral margins; antennae brown, with lighter club.

Head short and stout, with large, not to convex eyes; beak stout slightly shorter than wide at apex, parallel-sided; antennal insertions closer to the apex than to the eyes; surface of beak with strong punctures, more or less longitudinally arranged and which extend to the vertex. Pronotum less than twice as wide as long, widest basally, more or less parallel-sided at the middle, then narrowed abruptly towards anterior strangulation; surface more or less densely punctate on disc, granulate laterally; covered with short and decumbent pubescence. Elytra widest at the middle, with moderately developed expansion, extending from the humeri to near the apical angle; interstices only slightly convex, normal; sulci punctate, the 4 discal ones with more or less fused punctures; elytral pilosity apparently restricted to a single row of fine and decumbent hairs in the middle of each interstice. Measurements (holotype): total length, 4.4; maximum elytral width, 3.08; elytral length, 3.36.

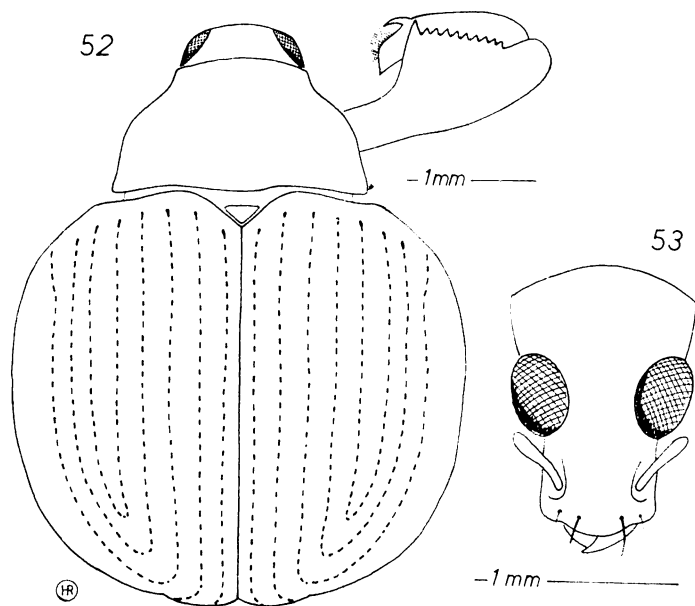
Female unknown.

TAXONOMIC DISCUSSION

Camarotus piceus, the only species of the genus at present known from Northeastern Brazil, is easily distinguished from the other species of *Camarotus* placed in the group of *attelaboides*, by its piceous color. The single specimen was covered with a dense layer of pollinosity,

of two different colors: red on the elytra and yellow on the pronotum, head and front legs (the better part of it had to be removed for the description).

Camarotus piceus, even though placed in the group of *attelaboides*, has the lateral expansion more developed than other species of the group, more or less bridging the gap between the groups of *attelaboides* and *cassidoides*.



Camarotus piceus (holotype): 52, dorsal view; 53, front view of head.

As discussed elsewhere (p. 179) the type-locality of *Camarotus piceus*, even though in the domain of the xerophytic "caatinga" formation, is a refuge covered with forests (orographic forests, locally known as "brejos").

POLLINOSITY

See under taxonomic discussion.

Camarotus flammeus, sp. n.

(Figs. 54-55)

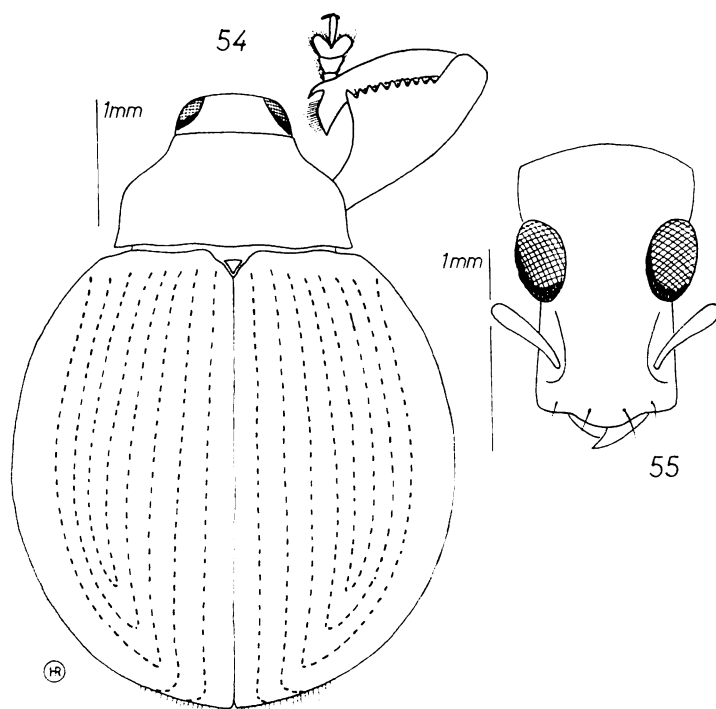
TYPE

COLOMBIA. Boy(acá) (?) (holotype ♂, BM).

Reddish, sides of pronotum and occiput with black markings.

Eyes convex; beak strong and stout, about as long as wide apically; antennae inserted closer to the apex than to the base; surface of beak and frons sparsely punctate, frons with small, deep depression at the middle, between the eyes. Pronotum twice as wide as long; widest at the middle, slightly narrowed towards the base, very much narrowed towards anterior strangulation; surface granulate laterally, sparsely punctate discally; with median depression just in front of the middle of the disc; surface covered with fine, decumbent pilosity. Elytral expansion weakly developed, starting at the humeri and regularly curved, reaching and merging into the second interstice, and continued to the sutural angle; expansion punctate; striae punctate, interstices normally convex; surface covered with fine, decumbent hairs; posterior margin of elytra pilose. Measurements (holotype): total length, 4.88; maximum elytral width, 3.68; elytral length, 3.48.

Female unknown.



Camarotus flammeus (holotype): 54, dorsal view; 55, front view of head.

TAXONOMIC DISCUSSION

Camarotus flammeus, the only species of the group known at present from Colombia, seems to be related to *Camarotus piceus* from Northeastern Brazil. The two species have very similar elytral expan-

sions, almost circular in outline; they are distinguished by several characters, especially color; furthermore, in *flammeus* the expansion is punctate, and the frons and pronotum have small depressions, not present in *piceus*.

As noted elsewhere, the punctate elytral expansion of *Camarotus flammeus* is a unique character in the *attelaboides* species group, even though common in the *cassidoides* group.

NOTES ON THE TYPE

The holotype bears a small, manuscript label with the following words: "Camarotus Spinola Columbia Boy", and a second, printed label, reading "Pascoe Coll. B. M. 1893-60". It is very possible (and I am accepting this interpretation) that "Boy" refers to the Colombian Department of Boiacá.

Cassidoides species group

SPECIES INCLUDED

- Camarotus ustulatus*, sp. n. (Brazil)
- Camarotus granada*, sp. n. (Colombia)
- Camarotus oresbius*, sp. n. (Brazil)
- Camarotus annularis*, sp. n. (Brazil)
- Camarotus punctatus* Reichardt, 1969 (Brazil)
- Camarotus colombicus* Heller, 1923 (Colombia)
- Camarotus corcovadensis*, sp. n. (Brazil)
- Camarotus eucnemius*, sp. n. (Brazil)
- Camarotus coccinelloides* Germar, 1833 (Brazil)
- Camarotus cassidoides* Gyllenhal, 1833 (Brazil, French Guiana and Surinam)
- Camarotus fusiger* Heller, 1923 (Brazil)
- Camarotus similis*, sp. n. (Brazil)
- Camarotus carrapatus*, sp. n. (Brazil)
- Camarotus sabanillae* Heller, 1923 (Ecuador)
- Camarotus singularis* Champion, 1903 (British Honduras, Panama)
- Camarotus dilatatus* Champion, 1903 (Guatemala)
- Camarotus lazarus*, sp. n. (Brazil)
- Camarotus peltatus*, sp. n. (Brazil)
- Camarotus marginalis* Imhoff, 1836

Very variable in size, from small to very large (2.9-6.08 mm), well characterized by the variable shape of the lateral expansion, but always well developed, and always widest in front of the middle (usually widest at the anterior angles of the expansion). The lateral expansion is often punctate, but its margin is never crenulate (as it is in the other two groups of species). The front tibiae are always very

strong, stout, curved, frequently angulate externally at base; also frequently with crenulate inner margin (in a single species, *sabanillae*, there is a subapical tooth on the inner margin of the tibiae, a tooth absent in all other known species of the genus).

Nineteen species are included, and all are distributed throughout the Neotropical Region. The larger part of the species has been recorded from Brazil; two species are known from Central America. A few are restricted to Western and Northern South America.

KEY TO THE SPECIES OF THE *CASSIDOIDES* GROUP

- | | | |
|-------|--|----|
| 1. | Head, pronotum and elytra uniformly colored | 2 |
| | Head, pronotum or elytra with different color patterns, or head and pronotum not colored as elytra | 12 |
| 2(1). | Testaceous | 3 |
| | Black | 6 |
| 3(2). | Testaceous ventrally; front angles of elytral expansion rounded; disc of pronotum granulate; British Honduras and Panama <i>singularis</i> | |
| | Black ventrally, at least in part | 4 |
| 4(3). | Completely black ventrally; Guatemala <i>dilatatus</i> | |
| | Only thorax black ventrally | 5 |
| 5(4). | Thorax completely black ventrally; front tibiae angulate externally at base; larger species (4.5 mm); Brazil (Santa Catarina) <i>peltatus</i> | |
| | Only meso- and metathorax black ventrally; front tibiae not angulate at base; smaller species (3.8-4.0 mm); Brazil (Minas Gerais and Guanabara) <i>lazarus</i> | |
| 6(2). | Front tibiae with subapical tooth on inner margin; Ecuador <i>sabanillae</i> | |
| | Front tibiae without subapical tooth on inner margin | 7 |
| 7(6). | Lateral expansion of elytra deeply punctate; Brazil (Santa Catarina) <i>carrapatus</i> | |
| | Lateral expansion of elytra not punctate | 8 |
| 8(7). | Front angles of lateral expansion very rounded; general outline of beetle almost circular | 9 |
| | Front angles of elytral expansion angulate (although not sharp) | 10 |

- 9(8) . Smaller species (2.9 mm), with more slender beak and more prominent eyes; Brazil (Rio de Janeiro) *oresbius*
 Larger species (3.9 mm), with stouter beak and less prominent eyes; club infuscated; Colombia *granada*
- 10(8) . Antennal club usually darkened; front margin of elytral expansion, between humeri and front angle, usually concave; some elytral interstices with thin and short clusters of hairs; Brazil (Goiás, Guanabara, Rio de Janeiro, São Paulo and Paraná) *similis*
 Antennal club yellow; front margin of expansion, between humeri and front angle, convex, elytral interstices without clusters of hairs 11
- 11(10) . Pronotum granulate; northern South America . . *cassidoides*
 Pronotum punctate discally; southeastern Brazil . . . *fusiger*
- 12(1) . Elytral expansion punctate 13
 Elytral expansion impunctate 16
- 13(12) . Head, pronotum and disc of elytra black 14
 Differently colored 15
- 14(13) . Elytral expansion completely testaceous; larger species (4.6 mm); Colombia *colombicus*
 Elytral expansion testaceous, but darkened at the middle (see fig. 73); smaller species (3.4-3.9 mm); Brazil (Guanabara) *corcovadensis*
- 15(13) . Elytra with testaceous lateral expansion and brownish black disc of elytra; Brazil (Goiás and Paraná) *punctatus*
 Elytra reddish-brown, with black, almost circular ring; Brazil (Guanabara) *annularis*
- 16(12) . Front angles of lateral expansion very rounded; general outline of beetle almost circular; Brazil (Goiás) . . . *ustulatus*
 Front angles of lateral expansion sharp 17
- 17(16) . Elytra reddish, with black margin; Brazil (Guanabara).
 *marginatus*
 Elytra without black margin 18
- 18(17) . Head, pronotum and front legs dark brown; elytra light brown, with slightly darker suture; Brazil (Paraná)
 *eucnemius*
 Reddish-brown, elytra frequently spotted; southeastern Brazil
 *coccinelloides*

Camarotus ustulatus, sp. n.

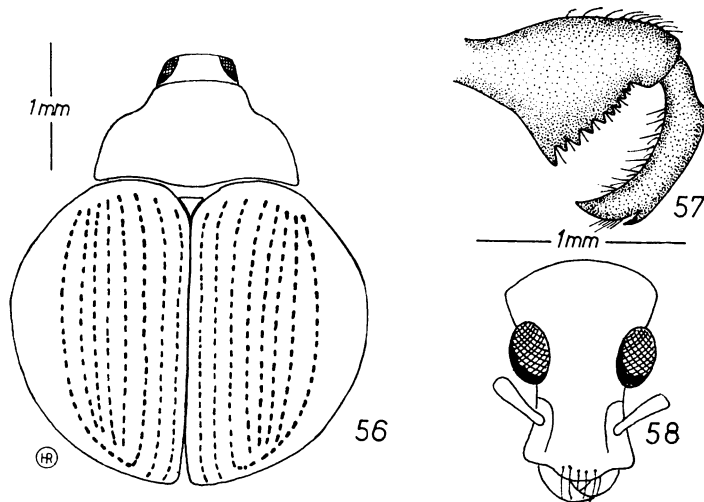
(Figs. 56-58, 81)

TYPES

BRAZIL. Goiás, Ribeirão Vãozinho, about 70 km W of Jataí, 12.II. 1962, J. Bechyné col. (holotype ♂, MZUSP); Jataí, Pujol col. (paratype ♂, BM).

Reddish-brown, with darker pronotum and head; front femora and tibiae also darker; antennae testaceous.

Eyes very convex; beak about as long as wide apically, with well developed antennal grooves; antennae inserted at the middle of beak; head and beak very deeply and more or less irregularly punctate. Pro-



Camarotus ustulatus (holotype): 56, dorsal view; 57, front leg; 58, front view of head.

notum transverse, less than twice as wide as long along median line; more or less parallel-sided posteriorly, then regularly curved as far as anterior strangulation; surface sparsely but deeply punctate, granulate laterally. Head and pronotum with very short, almost imperceptible pubescence. Elytra widest in front of the middle, with well developed lateral expansion; elytra almost circular in outline, expansion not punctate; sulci punctate-striate; interstices with very short, decumbent pubescence. Front femora slightly granulate externally at apex; front tibiae curved, angulate externally. Measurements (holotype and paratype): total length, 3.12, 3.18; maximum elytral width, 2.43, 2.56; elytral length, 2.06, 2.12.

Female unknown.

TAXONOMIC DISCUSSION

Camarotus ustulatus is well characterized by the almost circular outline of the elytra; related to the species with angulate front tibiae, but, easily distinguished by the different color pattern, and by the relatively small size.

The almost circular outline of the elytra links this species to *piceus* (group of *attelaboides*) and *oresbius* and *granada* (of the *cassidoides* group). As stated in the introductory remarks on the groups of species, there is no sharp limit between the two. Of the four species discussed here, only *piceus* was placed in the *attelaboides* group, especially on account of the elytra, although almost circular in outline, being widest behind the middle; in *piceus* the front tibiae (slender and not angulate externally) also point to the species of the group of *attelaboides*. *Camarotus piceus* is possibly an intermediate species between the two groups. From *oresbius* and *granada*, *ustulatus* is distinguished by the color: the former species are black.

Camarotus ustulatus is variable in color: the holotype is a much darker specimen, whereas the paratype is lighter colored, with slightly more contrasts between the light colored elytra and the dark colored front part of the body.

POLLINOSITY

While the holotype of *Camarotus ustulatus* shows no trace of pollinosity, the paratype has some, of a bright yellow color, left on the sides of the pronotum, as well as on areas of the front legs.

***Camarotus granada*, sp. n.**

(Figs. 59-60)

TYPE

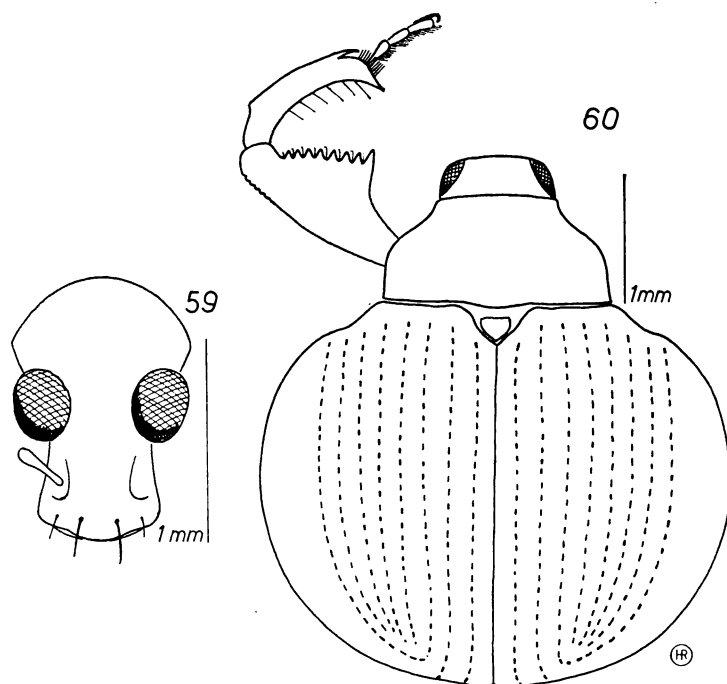
"Nouv. Grenade, Ex-Musaeo Steinheil" (holotype ♂, MNHN).

Black, with somewhat lighter tarsi; antennae testaceous, with infuscated club.

Beak short, about as long as wide apically, very much narrowed towards the eyes; antennae inserted at the middle; apical half of beak impunctate, basal half of beak and frons sparsely but coarsely punctate; vertex impunctate. Pronotum transverse, much less than twice as wide as long; widest posteriorly, parallel-sided at basal half, then strangulated anteriorly; disc punctate, sides granulate; covered with fine, decumbent and light colored pilosity. Lateral expansion of elytra well developed, widest in front of the middle; elytra almost circular in outline, not angulate anteriorly; expansion impunctate; sulci striate, deep; surface with short, decumbent and whitish pilosity. Front tibiae angulate externally,

not denticulate along the inner margin. Measurements (holotype): total length, 3.93; maximum elytral width, 3.31; elytral length, 2.93.

Female unknown.



Camarotus granada (holotype): 59, front view of head; 60, dorsal view.

TAXONOMIC DISCUSSION

Camarotus granada is related to the species with almost circular elytral outline, especially *ustulatus* and *oresbius* (see discussion under *ustulatus*). It is easily distinguished by color, as well as by the infuscated antennal club, a character *granada* shares with another, though unrelated, black species of this species group, *sabanillae*. The elytral outline easily distinguishes *granada* from the other black species of *Camarotus*.

POLLINOSITY

There are remains of pink pollinosity on the elytra, pronotum and head of the holotype.

Camarotus oresbius, sp. n.

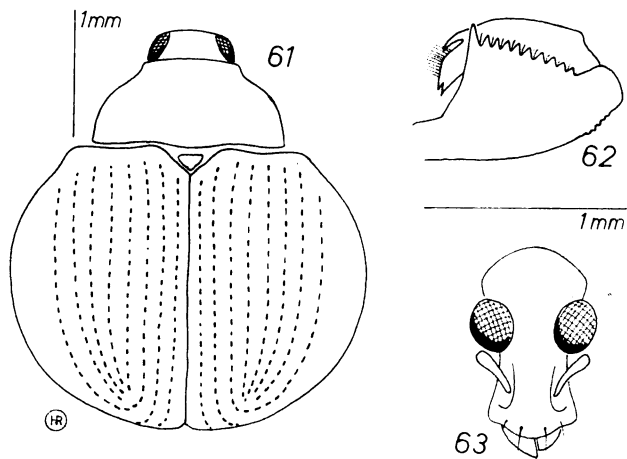
(Figs. 61-63)

TYPE

BRAZIL. *Rio de Janeiro*, Itatiaia, 850 m, II.1899, E. Gounelle col. (holotype ♀, BM).

Brownish-black, with yellow antennae.

Eyes prominent; beak about as long as wide anteriorly, somewhat narrowed towards the eyes; antennae inserted at the middle of beak; surface of beak and frons sparsely but clearly punctate. Pronotum widest at the middle, very slightly narrowed towards base, very much narrowed towards anterior strangulation; disc deeply punctate, sides granulate; surface with very short and sparse pilosity. Elytra almost circular in outline, widest in front of the middle, with well developed expansion; expansion impunctate; striae and interstices normal. Front



Camarotus oresbius (holotype): 61, dorsal view; 62, front leg; 63, front view of head.

femora slightly granulate externally at apex; front tibiae angulate externally at base. Measurements (holotype): total length, 2.91; maximum elytral width, 2.5; elytral length, 1.93.

Male unknown.

TAXONOMIC DISCUSSION

Camarotus oresbius is a small, well characterized species, related especially to *granada* and *ustulatus*, but, as seen above, easily distinguished from those by several characters.

Camarotus annularis, sp. n.

(Figs. 64-66)

TYPE

BRAZIL. Guanabara, Rio de Janeiro (Corcovado), VIII.1966, M. Alvarenga col. (holotype ♀, MZUSP).

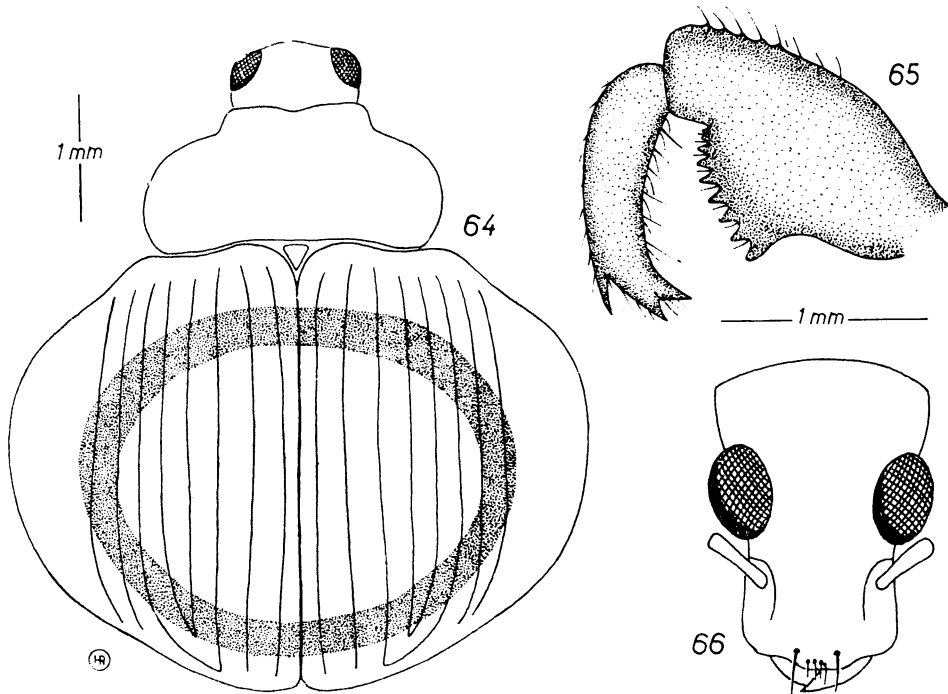
Reddish-brown, with black base of pronotum, front femora and elytral ring (laterally reaching the eighth interstice, slightly erased anteriorly near suture; slightly wider than one interstice); antennae yellowish-brown.

Eyes moderately convex; beak about as long as wide at apex, somewhat strangulated in front of the eyes; antennae inserted more or less at the middle of the beak; antennal grooves shallow, visible from above; beak and head irregularly and sparsely punctate. Pronotum very transverse, more than twice as wide as long, strangulated anteriorly; surface densely and coarsely punctate, granulate laterally; glabrous. Elytra widest in front of the middle; lateral expansion well developed, almost circular in outline, moderately punctate; interstices normal; elytra of slightly lighter color outside the black ring, covered with very fine and short pubescence restricted to this area (corresponding laterally to the expansion). Front tibiae curved, not angulate externally. Measurements (holotype): total length, 4.9; maximum elytral width, 4.0; elytral length, 3.3.

Male unknown.

TAXONOMIC DISCUSSION

Camarotus annularis differs from all other species by the color; it is also one of the largest species of the genus.



Camarotus annularis (holotype): 64, dorsal view; 65, front leg; 66, front view of head.

POLLINOSITY

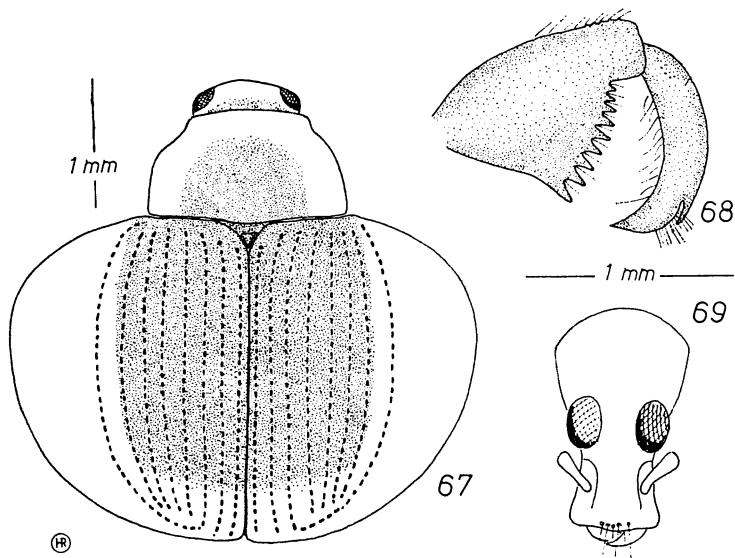
The pollinosity and elytral structure of this species are as follows: the area outside the black ring is densely and very finely pubescent, covered with yellow pollinosity in the single specimen at hand. At naked eye examination the elytra appear to have a yellow border, a black ring and brownish disc.

***Camarotus punctatus* Reichardt, 1969**

(Figs. 67-69, 81)

Camarotus punctatus Reichardt, 1969: 315-316, figs. 3-5 (holotype ♂, Brazil, Goiás, Ribeirão Vãozinho, MZUSP).

Testaceous; antennae also testaceous; occiput, disc of pronotum and elytra darker, almost black.



Camarotus punctatus (holotype; from Reichardt, 1969): 67, dorsal view; 68, front leg; 69, front view of head.

Eyes convex; beak slightly longer than wide at apex; antennae inserted at the middle; frons and beak deeply and coarsely punctate, occiput transversely microrugose. Pronotum transverse, less than twice as wide as long, more or less parallel-sided at posterior half, then regularly arched as far as anterior strangulation; surface very deeply rugose-punctate, granulate laterally. Elytra widest in front of the middle, with well developed elytral margin; elytral outline almost circular, not angulate anteriorly; clearly and deeply, but sparsely punctate;

sulci striate-punctate, deep; surface with very short, decumbent, sparse pilosity. Front tibiae not angulate externally at base. Measurements (4 specimens): total length, 3.28-3.6; maximum elytral width, 3.2-3.8; elytral length, 2.2-2.52.

Female unknown.

MATERIAL EXAMINED

BRAZIL. *Goiás*, Ribeirão Vãozinho (about 70 km W of Jataí), 12.II.1962, J. Bechyné col. (holotype ♂, MZUSP); *Paraná*, Ponta Grossa, XI.1943, X.1951 (2 ♂ paratypes, WB); "Brésil" (1 ♂ paratype, MNHN).

TAXONOMIC DISCUSSION

Camarotus punctatus is closely related to *annularis* and other species with elytra of circular outline (see *ustulatus* and related species). They are all, as seen above, easily distinguished by coloration.

Camarotus colombicus Heller, 1923

(Figs. 70-72)

Camarotus colombicus Heller, 1923: 62, 63-64 (holotype ♀, Colombia, Norte de Santander, Alto de las Cruces, 2,200 m; MD, examined); Klima, 1935: 1 (catalog); Blackwelder, 1947: 842 (catalog); Voss, 1965: 225, 229 (key).

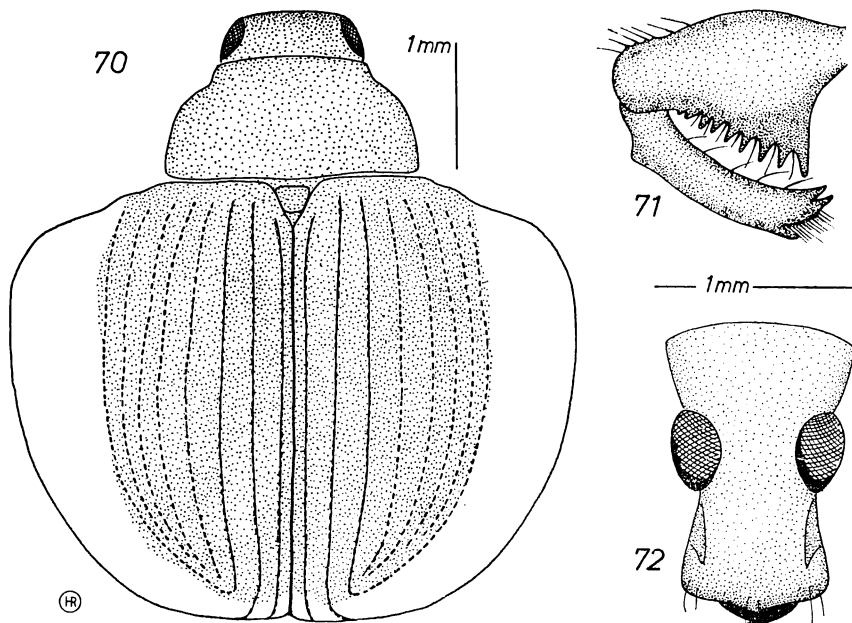
Black, elytral expansion and antennae testaceous, tarsi brown.

Eyes weakly developed, only slightly convex; beak about as long as wide anteriorly, stout, somewhat narrowed towards eyes; surface of beak with sparse, but deep punctures; frontal punctures more or less fused in longitudinal lines; vertex almost impunctate; antennae closer to eyes than to apex of beak. Pronotum widest in the middle, only slightly narrowed posteriorly; very much narrowed towards anterior strangulation; disc sparsely and more or less finely punctate, sides more or less granulate. Elytra widest anteriorly, with well developed expansion; expansion evenly rounded anteriorly, its surface distinctly and coarsely punctate; punctate-striate, 4 discal striae more or less sulcate (individual punctures clearly marked), others clearly punctate. Front tibiae strong, angulate externally. Measurements (holotype): total length, 4.6; maximum elytral width, 4.0; elytral length, 3.28.

Male unknown.

MATERIAL EXAMINED

COLOMBIA. *Norte de Santander*, Alto de las Cruces, 2,200 m, Fassl col. (holotype ♀, MD).



Camarotus colombicus (holotype): 70, dorsal view; 71, front leg; 72, front view of head

TAXONOMIC DISCUSSION

Camarotus colombicus resembles *cassidoides* in shape, sharing with the latter several characters, as the elytral outline, the angulate front tibiae and the head form. The lateral expansion, however, is neatly and closely punctate (impunctate in *cassidoides*). By its coloration *colombicus* is easily distinguished from the other species.

Camarotus corcovadensis, sp. n.

(Figs. 73-74)

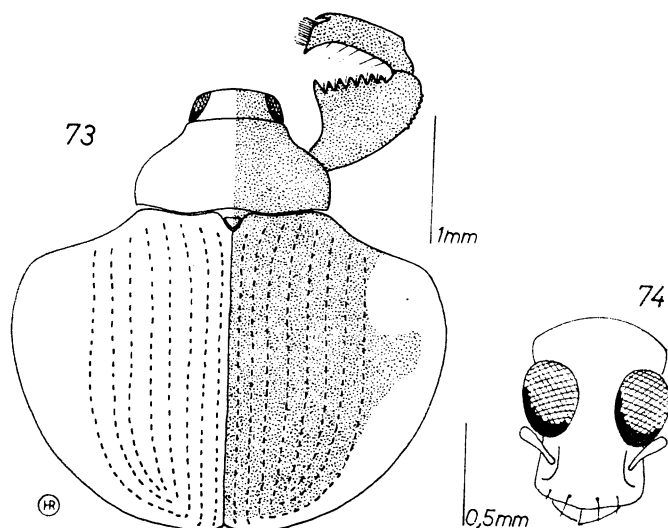
TYPES

BRAZIL. *Guanabara*, Rio de Janeiro (Corcovado), 19.V.1958, Alvarenga & Seabra col. (holotype ♂, MZUSP); *idem*, 12.VI.1958, VI.1963, *idem* col. (1 ♂, 2 ♀ paratypes, MA, EV).

Black, with testaceous elytral expansion and antennae.

Eyes relatively large, but not too convex; beak short, slightly shorter than wide apically, more or less parallel-sided; surface of beak and frons deeply punctate, puncture more elongate longitudinally on beak; antennae inserted in about the middle of the beak. Pronotum widest basally, parallel-sided at the posterior half, then curved towards anterior stran-

gulation; disc sparsely punctate, sides granulate. Surface of head and pronotum with short, sparse, decumbent, white pubescence. Elytra widest anteriorly, with well developed lateral expansion; expansion rounded anteriorly, its surface more or less sparsely, but neatly punctured; punctate-striate, four discal striae more or less sulcate, remainder punctate; interstices normally convex. Front femora granulate externally; front tibiae strong, angulate externally. Measurements (4 specimens): total length, 3.4-3.92; maximum elytral width, 3.16-3.36; elytral length, 2.48-2.60.



Camarotus corcovadensis (holotype): 73, dorsal view; 74, front view of head.

TAXONOMIC DISCUSSION

Camarotus corcovadensis is evidently closely related to *colombicus* Heller. The two species are very similarly colored (in *colombicus* the expansion is completely testaceous, while in *corcovadensis* it is testaceous at the inchoateness, passing to brownish, and then returning to testaceous); the lateral expansion is punctate in both and both have angulate anterior tibiae. However, *colombicus* is much larger, and has a differently shaped head.

There are some close relations to *punctatus* too, but the latter has testaceous front legs and the expansion is more rounded anteriorly.

***Camarotus eucnemius*, sp. n.**

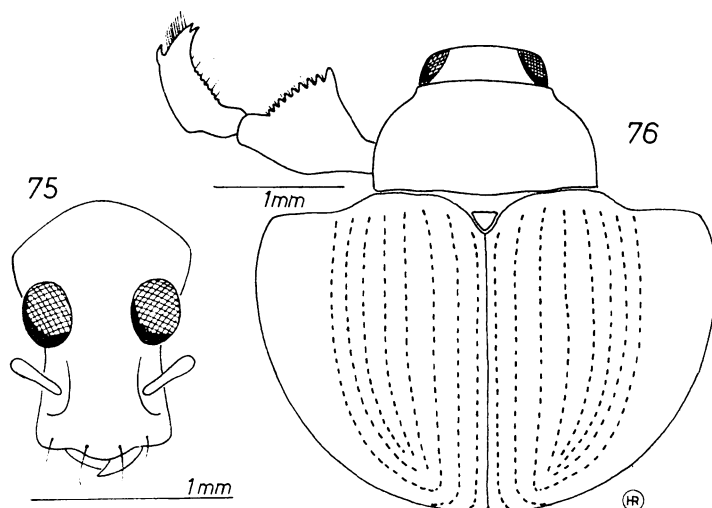
(Figs. 75-76)

TYPE

BRAZIL. Paraná, Pascoe Coll. (holotype ♀, BM).

Brown, with reddish-brown elytra and testaceous antennae; scutellum darker than elytra.

Beak about as long as wide at apex, very much narrowed towards eyes; antennae inserted at the middle; surface of beak and frons punctate. Pronotum widest at the middle, very slightly narrowed posteriorly; very much narrowed towards anterior strangulation; disc very sparsely punctate, sides granulate. Elytra widest in front of the middle, with well developed lateral expansion; front angles sharp but rounded; surface of expansion impunctate; sutural interstice darker than elytra.



Camarotus eucnemius (holotype): 75, front view of head; 76, dorsal view.

Front tibiae strong, curved, angulate externally at base; crenulate internally. Measurements (holotype): total length, 3.75; maximum elytral width, 3.12; elytral length, 2.31.

Male unknown.

TAXONOMIC DISCUSSION

Camarotus eucnemius is closest to *coccinelloides*, but it is easily distinguished by the different coloration and by having very regular interstices (somewhat tuberculate in *coccinelloides*).

POLLINOSITY

The single specimen at hand is partially covered with bright yellow pollinosity.

***Camarotus coccinelloides* Germar, 1833**

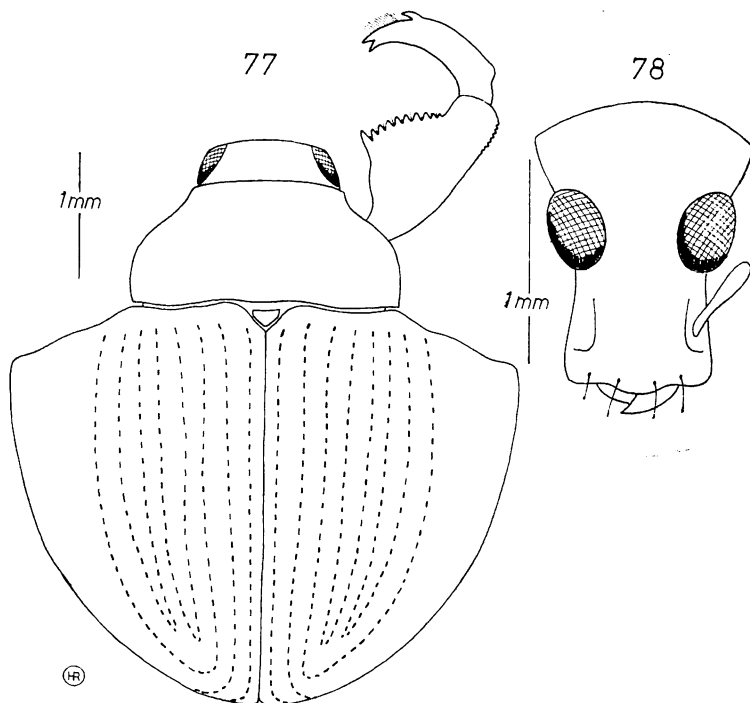
(Figs. 77-78, 81)

Camarotus coccinelloides Germar, 1833: 186 (holotype ♀, "America meridionale"; MH, examined).

Camarotus dilatatus (nec Champion, 1903) Heller, 1923: 62 (key); Voss, 1965: 226, 230 (key, notes).

Dark brownish-red, with lighter and irregularly spotted elytra (one immature specimen, from "Brasilien, Tabac", more or less orange-red in color), often also unicolor; scutellum black; antennae and tarsi testaceous.

Eyes convex; beak slightly longer than wide at apex, very much narrowed towards eyes; antennae inserted closer to eyes than to apex; surface of apical half impunctate, basal half of beak, frons and vertex punctate, between eyes with two longitudinal, punctate striae. Pronotum about twice as wide as long, parallel-sided at basal half, narrowed anteriorly towards stragulation; surface, including disc, granulate. Elytra widest in front of the middle, with well developed lateral expansion,



Camarotus coccinelloides (♀ from Corcovado, Rio de Janeiro, GB): 77, dorsal view; 78, front view of head.

which is somewhat angulate anteriorly, impunctate; four discal striae sulcate, with clear indication of fused punctures; remainder punctate; punctures of the eighth striae large and well impressed; interstices very convex and somewhat tuberculate. Front tibiae normally curved, strong, angulate externally at basal third, carinate internally. Measurements (10 specimens): total length, 3.32-4.36 (3.08); maximum elytral width, 2.98-3.72 (3.31); elytral length, 2.32-2.96 (2.61).

MATERIAL EXAMINED

BRAZIL. *Guanabara*, Rio de Janeiro (Corcovado), 10.X.1959, Alvarenga & Seabra col. (1 ♀, WB); *idem*, X.1962, Alvarenga & Seabra col. (1 ♀, EV); Rio de Janeiro, Eversman col. (1 ♂, MD); *idem*, Fry col. (1 ♂, 1 ♀, BM); *Santa Catarina*, Corupá, XI.1948, A. Maller col. (1 ♂, AMNH); *Rio Grande do Sul*, Pareci Novo (1 ♂, WB). "Brasilien, Tabac" (1 ♂, MD); "Brésil" (1 ♀, MNHN); "Brasil" (1 ♀, BM). "America meridionale" (holotype ♀, MD).

GEOGRAPHIC DISTRIBUTION (fig. 81)

Camarotus coccinelloides is found in southern Brazil, as many other species, extending from Guanabara to Rio Grande do Sul, along the coast.

SYNONYMIC AND TAXONOMIC NOTES

Germar's *coccinelloides* has been misidentified from the beginning. It has usually been considered as black, and my attention was drawn to Germar's original description of *coccinelloides* as being "ferrugineus". Fortunately I was able to study the type and straighten the identification of the true *coccinelloides*.

Heller (1923) and Voss (1965) identified two specimens of *coccinelloides* as *dilatatus* Champion, a Guatemalan species. One of these specimens, labelled "Brasilien, Tabac", seems to be an immature specimen, but I have no doubt that they are all conspecific.

Camarotus coccinelloides is related to the species near *cassidoides*, with more or less angulate lateral expansion: *fusiger*, *marginalis* and *lazarus*. It is, readily distinguished, however, by the completely different color pattern.

This species is very variable. Most specimens (especially those from Corupá and Rio de Janeiro), including the holotype, are very dark brownish-red; other specimens (from Corcovado) are more intensely brown, with a semblance of spotting on the elytra; the elytra are more irregular, with vestiges of swellings in some interstices, especially at basal half. However, there seems to be no doubt about the conspecificity of these examples, as assured by other, morphological, characters.

***Camarotus cassidoides* Gyllenhal, 1833**

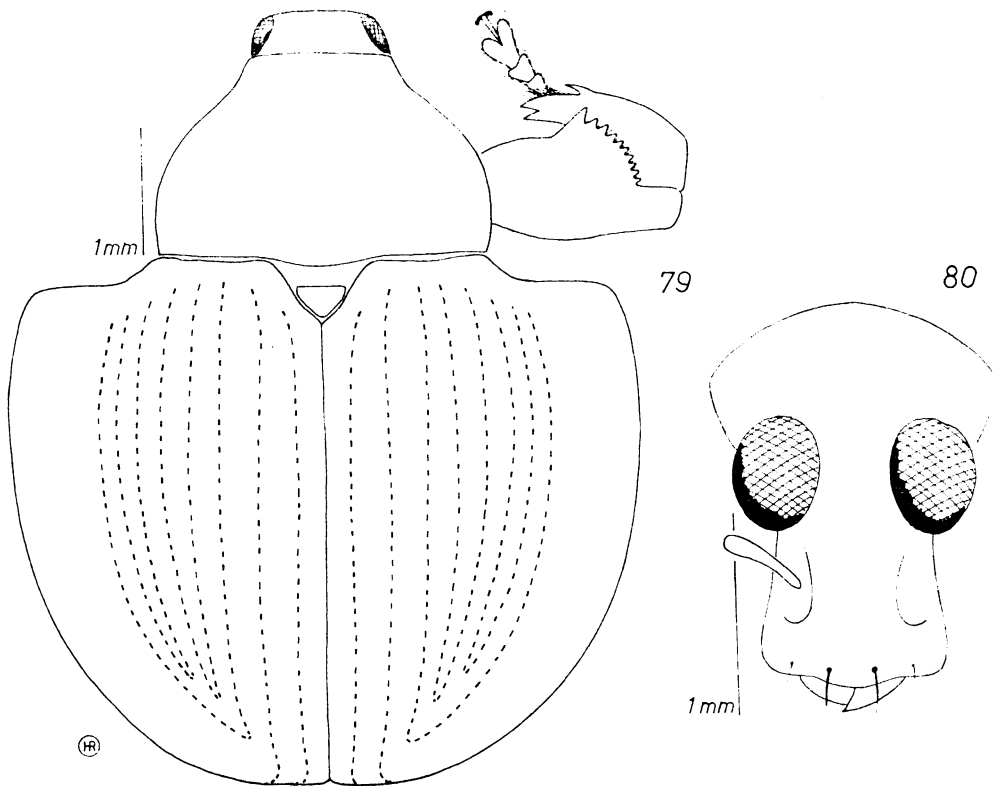
(Figs. 79-81)

Camarotus cassidoides Gyllenhal, 1833: 186 (type-locality, Brazil, "Minas Gerais"; holotype ♀, RS, examined); Gemminger & Harold, 1871: 2533 (catalog); Klima, 1935: 1 (catalog); Blackwelder, 1947: 842 (catalog).

Camarotus coccinelloides (*nec* Germar, 1833) Voss, 1965:225,229 (key; notes on the type; see discussion below).

Black with testaceous antennae; tarsi very dark, almost black.

Head large, with relatively small, but convex eyes; beak long, about as long as wide at apex, very much narrowed towards eyes; antennae inserted at the middle of the beak; surface of beak very finely punctate; surface of head between eyes with deep and coarse punctures; vertex smooth; antennae testaceous (in the original description Gyllenhal says "... antennae breves, testaceae, pilosae, clava nigricante ..."; only the left club is preserved in the holotype, and it is completely yellow, as



Camarotus cassidoides (holotype): 79, dorsal view; 80, front view of head.

the remaining segments of the antenna). Pronotum widest at base, more or less parallel-sided at basal half, then evenly curved towards the anterior strangulation; surface completely granulate; discal granules not as strongly developed as the lateral ones; surface covered with short and decumbent hairs. Elytra widest in front of the middle, with very well developed lateral expansion; expansion well rounded anteriorly, clearly impunctate; first four striae sulcate, but evidently formed by the fusion of punctures; outer striae more clearly punctate, especially the last one (eighth), with large and neatly individualized punctures; interspaces normally convex; surface of elytra covered with short and decumbent pilosity. Front tibiae strong, angulate externally near base. Tarsi very dark, almost black. Measurements (6 specimens): total length, 4.52-6.08 (5.28); maximum elytral width, 4.0-5.92 (4.71); elytral length, 3.0-4.08 (3.6).

MATERIAL EXAMINED

BRAZIL. "Minas Geraes", Ménétriés col. (holotype ♀, RS). *Território Federal do Amapá*, Pôrto Platon, 20.VII.1961, J. Bechyné col. (1 ♀, MZUSP).

FRENCH GUIANA. Cayenne (1 ♀, MNHN; 1 ♂, BM).

SURINAM. *Marowijne District*, Langaman Kondre, VIII.1965, B. Malkin col. (1 ♀, MZUSP).

"South America" (1 ♀, BM).

TAXONOMIC DISCUSSION AND NOTES

Camarotus cassidoides is a very distinct species, even though easily confused with the other species in its vicinity. *Camarotus cassidoides* is the only species with completely granulate pronotum (in the other species it is punctate discally). The head, especially the beak, of *cassidoides* is also very characteristic: the beak is very stout, and strongly narrowed towards the eyes.

Inner margin of front tibiae very finely denticulate (holotype, fig. 79, not examined in this respect), while it is either smooth or more coarsely denticulate in the other species.

The holotype of *cassidoides* agrees exactly with the other examined specimens, especially with the one from Surinam. The material at hand seems to indicate this species to be distributed in Northern South America (fig. 81), a distribution which is, however, in conflict with the type-locality "Minas Geraes". I have seen relatively rich material from this part of Brazil, but no specimen agrees with the type of *cassidoides*. It seems, therefore, reasonable to believe the specimen to have been mislabelled, and consequently the type-locality should be accepted with caution.

Camarotus cassidoides and *coccinelloides* seem to have always been confused. Voss (1965: 229) examined the holotype of *cassidoides*, but

included the specimen in his key as *coccinelloides*, a mistake explained perhaps by the fact that the holotype of *cassidoides* is not labelled with the specific name (I suppose there is only a drawer-label with the specific name) but is not well justified, because the specimen bears the locality label, which is very clearly written, and is completely different from the locality of *coccinelloides*. One strange claim of Voss (*l.c.*: 225) is "... Vorderschienen ... ohne subbasalen Zahn an der Aussenflanke...", whereas the holotype, examined by Voss, as seen above, has a very clear subbasal angle (fig. 79), as do other specimens I have studied.

Because of the possible confusion between *cassidoides* and *coccinelloides*, I am not giving all other references to the species found in the literature. Elsewhere (p. 15) I have discussed *Camarotus rotundipennis* Dejean, 1836, which might, but might as well not be a synonym of *cassidoides*. One, possibly correct reference to the species, is that of Prud'homme (1906: 26), for French Guiana.

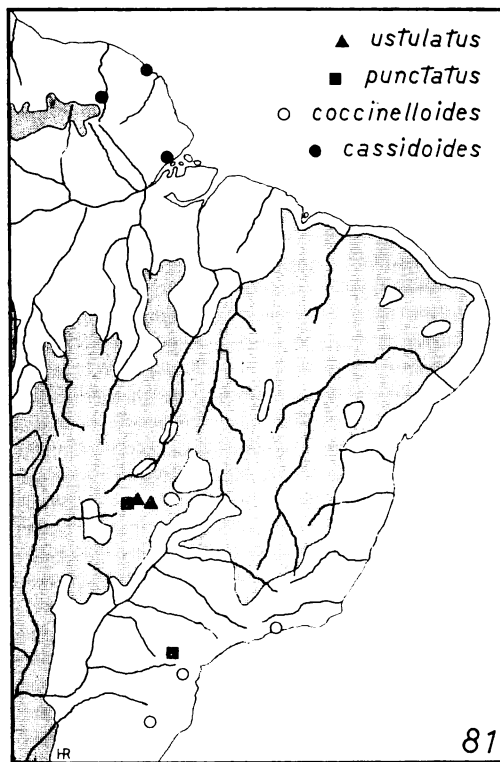


Fig. 81: Geographic distribution of *Camarotus ustulatus*, *punctatus*, *coccinelloides* and *cassidoides* (map redrawn from Hueck, 1966; open formations stippled).

POLLINOSITY

Some of the specimens of *Camarotus cassidoides* (the ones from Langaman Kondre, Pôrto Platon and "South America") are dorsally covered with reddish pollinosity.

Camarotus fusiger Heller, 1923

(Figs. 82-84)

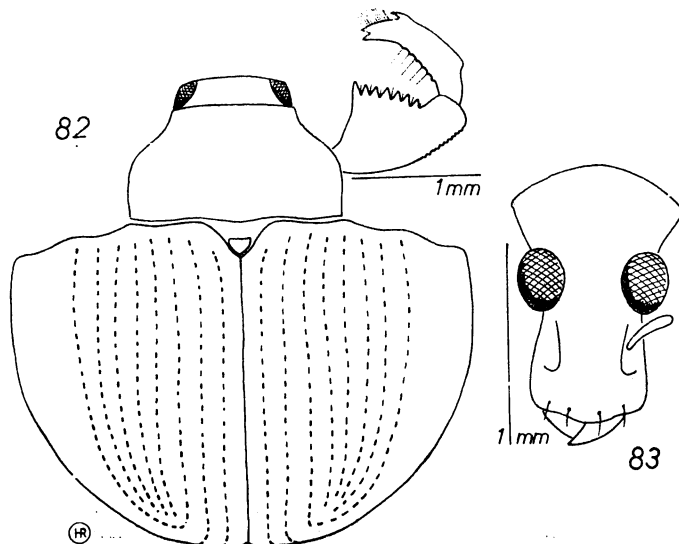
Camarotus cassidoides (*nec* Gyllenhal, 1833) Heller, 1923: 62 (key); Klima, 1935: 1 (*pars*, catalog); Blackwelder, 1947: 842 (*pars*, catalog); Voss, 1965: 225, 229 (*cassidoides*, *sic*, notes and distribution). *Syn. n.*

Camarotus fusiger Heller, 1923: 62, 64 (holotype ♀, Brazil, Rio de Janeiro, Petrópolis; MD, examined); Klima, 1935: 1 (catalog); Blackwelder, 1947: 843 (catalog); Voss, 1965: 226, 229 (key; distribution and synonymy).

Camarotus petropolitanus Heller, 1923: 62, 64-65 (holotype ♀, Brazil, Rio de Janeiro, Petrópolis; MD, examined); Klima, 1935: 2 (catalog); Blackwelder, 1947: 843 (catalog); Guérin, 1953: 202, fig. 303; Voss, 1965: 229 (proposed synonymy with *fusiger* Heller).

Black (immature specimens brownish); antennae and tarsi testaceous; antennal club testaceous (sometimes somewhat darkened).

Beak short and stout, about as long as wide apically, strongly narrowed towards eyes; antennae inserted at the middle; surface of beak



Camarotus fusiger (holotype): 82, dorsal view; 83, frontal view of head.

finely punctate towards apex, more coarsely punctate basally and between the eyes. Pronotum less than twice as wide as long, widest basally, more or less parallel-sided at basal half, then regularly curved to meet anterior strangulation; disc coarsely but somewhat irregularly punctate, sides granulate; covered with very fine, decumbent, white pilosity. Elytra widest anteriorly, lateral expansion well developed, sometimes more or less angulate anteriorly; impunctate; four discal striae sulcate, but with clear indication of fused punctures; other striae punctate; punctures of the eighth stria well impressed, very large, especially at the anterior half. Front femora somewhat granulate externally, near apex; front tibiae very strong, curved, angulate externally near base; finely denticulate internally. Measurements (10 specimens): total length, 3.5-4.43 (4.03); maximum elytral width, 3.06-4.37 (3.62); elytral length, 2.43-3.12 (2.78).

MATERIAL EXAMINED

BRAZIL. *Bahia*, Santo Antonio da Barra, XI-XII.1888, E. Gounelle col. (1 ♀, MNHN); *Espírito Santo*, no locality, Coll. Fry (1 ♀, BM); *Minas Gerais*, Serra do Caraça, III.1963, F. Werner, U. Martins & L. R. Silva col. (1 ♂, 1 ♀, MZUSP; 1 ♂, 1 ♀, EV); *Guanabara*, Rio de Janeiro (Corcovado), XI.1965, Alvarenga & Seabra col. (1 ♂, MZUSP); *idem*, 9.VII.1958, XI.1961, *idem* col. (1 ♂, 1 ♀, EV); *idem*, 9.X.1958, 18.X.1958, 15.V.1956, X.1963, *idem* col. (3 ♂, 1 ♀, MA); *idem*, X.1959, XII.1961, W. Bokermann col. (1 ♂, 1 ♀, WB); Rio de Janeiro, Coll. Fry (1 ♀, BM); *Rio de Janeiro*, Itatiaia, 700 m, 7.X.1923, 24.XII.1924, J. F. Zikán col. (2 ♂, 1 ♀, IOC); *São Paulo*, São Paulo ("Mata do Governo" = Água Funda), 8.XII.1926, J. Melzer col. 1 ♂, MZUSP); *idem* (1 ♂, 1 ♀, AMNH); Campos do Jordão, 28.XII.1944, F. Lane col. (1 ♀, MZUSP; 1 ♂, 1 ♀, EV); Santos, 17-23.II.1899 (1 ♀, MD); Guarujá, 3.XII.1939, F. Lane col. (1 ♂, EV); Ilha de Santo Amaro, 19.IV.1912, G. E. Bryant col. (1 ♂, BM); Itanhaém, 3.IV.1939, O. Guilherme col. (1 ♂, 1 ♀, MNHN), Batea, XI.1940, F. Lane col. (1 ♂, MZUSP); *Paraná*, Curitiba, XI.1938, F. S. Pereira col. (1 ♂, MZUSP); *idem*, II.1938 (1 ♀, IB); *idem* (1 ♂, 1 ♀, WB); Bocaiuva, 1,000 m, XII.1963, F. Plaumann col. (1 ♂, MZUSP); Guarapuava, XII.1949 (1 ♂, WB); no locality, Coll. Pascoe (2 ♂, BM); *Santa Catarina*, Corupá, X., XII.1948, A. Maller col. (1 ♂, 1 ♀, AMNH); Nova Teutônia, IX.1954, F. Plaumann col. (1 ♀, MZUSP); Rio Natal, XII.1945, A. Maller col. (1 ♀, AMNH); Rio Vermelho, XI.1946 (1 ♀, AMNH); São Bento, 800 m, XI.1924, A. Maller col. (1 ♂, BM); *Rio Grande do Sul*, São Francisco de Paula, 24.I.1942 (1 ♂, WB). "Brésil, Gounelle" (1 ♂, MNHN).

GEOGRAPHIC DISTRIBUTION (fig. 84)

Camartotus fusiger is the only species of the genus of which a fair amount of specimens has been seen, allowing a better idea of its distribution, ranging from Bahia to Rio Grande do Sul, along the Atlantic coast. This type of distribution is typical of some species (see further discussion on p. 177).

SYNONYMIC AND TAXONOMIC DISCUSSION

As mentioned elsewhere there has been a large deal of confusion in the identification of the black species of *Camarotus*. *Camarotus coccinelloides* is not a black species, as supposed by several authors posterior to Germar. The true *Camarotus cassidoides*, judging from the scant material I have seen, is restricted to Northern South America. *Camarotus fusiger* is widespread along the eastern coast of Brazil, having quite often been referred to *cassidoides* (see synonymy). This confusion is in great part due to the extreme variability of *Camarotus fusiger* (which also led Heller to describe a specimen from the same locality as *Camarotus petropolitanus*, correctly synonymized with *fusiger* by Voss), especially as to shape of elytral expansion and color. Immature specimens seem to be quite common in collections, and are brownish. A true, though immature, *fusiger* might have been identified as *coccinelloides* (said in the description to be ferrugineous), and such specimen might have led to consider the black, mature specimen of *fusiger* as Germar's species.

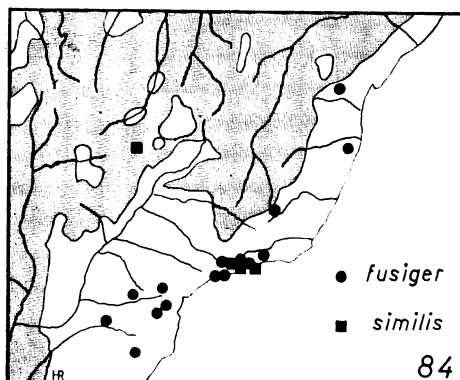


Fig. 84: Geographic distribution of *Camarotus fusiger* and *similis* (map redrawn from Hueck, 1966; open formations stippled).

Camarotus fusiger is distinguished from *cassidoides* by the pronotum, which is completely granulate in the latter, while only granulate laterally in *fusiger*. *Camarotus sabanillae* is promptly separable by the subapical tooth at the inner margin of the front tibiae. This species also has a darkened antennal club. *Camarotus carrapatus* is the only one of the black species with punctate lateral expansion. The remaining of the black species, *similis*, is difficult to characterize, but shows some peculiar characters, already mentioned in the key, of which the most conspicuous seems to be the anterior margin of the elytral expansion.

POLLINOSITY

Pollinosity is quite common in this species, and in all cases observed, the whole surface of the beetle is covered with bright yellow pollinosity.

***Camarotus similis*, sp. n.**

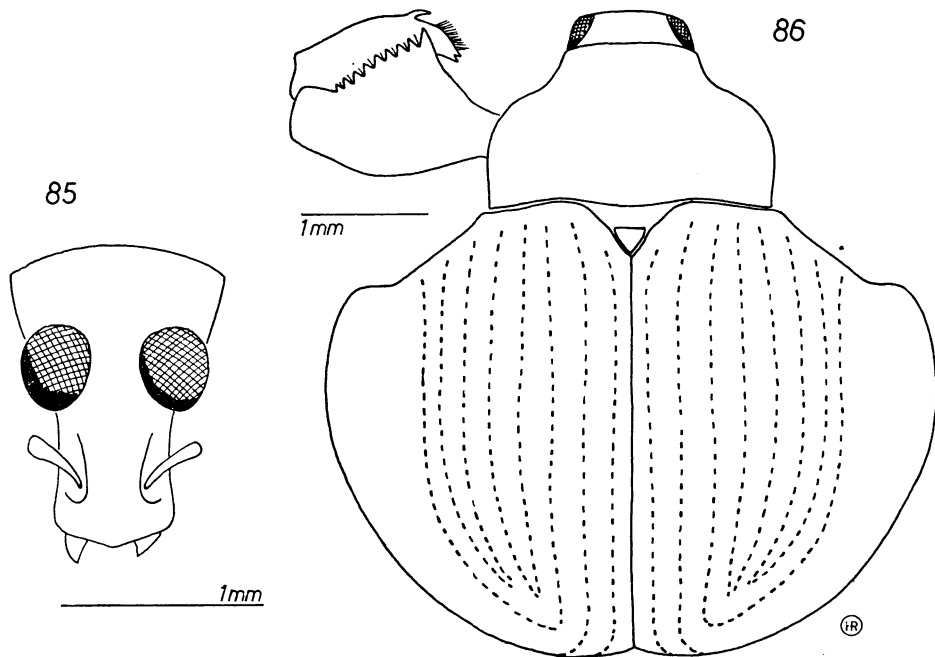
(Figs. 84-87)

TYPES

BRASIL. *Goiás*, Jataí, XII.1897-I.1898, Pujol col. (paratype ♀, BM); *Guanabara*, Rio de Janeiro, Coll. Fry (holotype ♂, BM; paratype ♂, MZUSP); *Rio de Janeiro*, Itatiaia, 1,600 m, XI.1952, J. Spaner col. (paratype ♂, IOC); *Paraná*, no locality (n.º 4979; 2 ♂ paratypes, EV, AMNH; see notes below). *São Paulo*, Salesópolis, Estação Biológica de Boracéia, 16-18.IV.1962, H. M. Canter col. (1 ♂, MZUSP; not included in the type series).

Black; antennae yellow, with infuscated club.

Eyes relatively prominent; beak short and stout, about as long as wide at apex; antennae inserted closer to apex; surface of beak and frons sparsely but deeply punctate. Pronotum widest at the middle, very slightly narrowed towards base, very much narrowed towards anterior

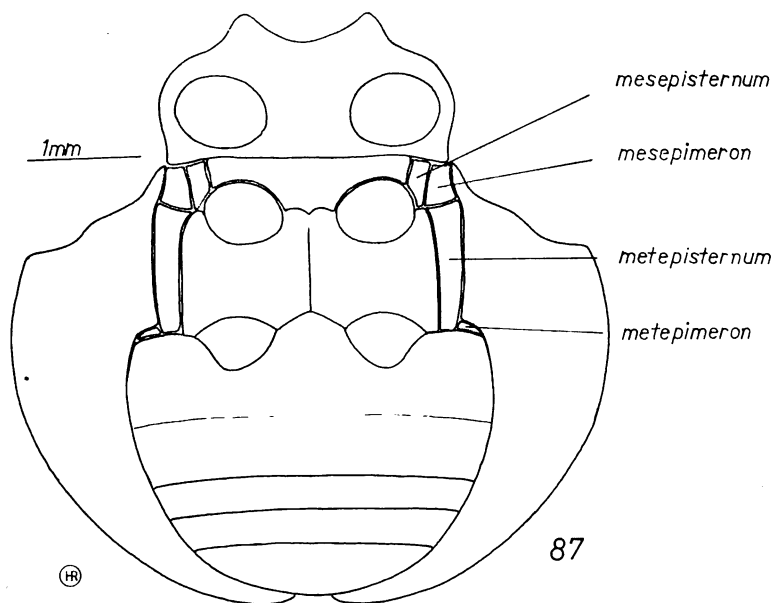


Camarotus similis (paratype ♀ from Jatai, GO): 85, front view of head; 86, dorsal view.

strangulation; sides granulate, disc very sparsely punctate. Elytra with well developed lateral expansion; anterior margin of expansion concave; expansion impunctate; four discal striae sulcate, other striae punctate. Elytral pilosity forming clusters of short and fine hairs on base, middle and posterior part of the third interstice, slightly behind the middle of the fifth, and near the base of the sixth. Front tibiae very strong, angulate externally at apex, crenulate internally. Measurements (5 specimens): total length, 4.18-5.06; maximum elytral width, 3.87-5.0; elytral length, 2.81-3.43.

TAXONOMIC DISCUSSION AND NOTES ON THE TYPES

Camarotus similis is very similar to *fusiger*, differing especially by the infuscated antennal club and the concave front margin of the elytral expansion. The elytral pilosity, forming thin and short clusters of hairs (very different from the type of hair tufts observed in some species of the *attelaboides* species group), is also a very distinctive character, even though not clearly visible in all specimens.



Camarotus similis (same specimen as in fig. 86): 87, ventral view.

The two paratypes from Paraná, no locality, were originally from Bondar's collection, and according to Gregório Bondar's notebook, we have the following data for these specimens: "4979 Camarotinae, preto, 2 ex. do Museu do Paraná, 1 a Voss 10-8-50." I assume they are from Paraná (and not Bahia, as the specimen in Voss collection was labeled).

The specimen from Estação Biológica de Boracéia (the specimen cited in Voss, 1965: 229, under *C. coccinelloides* Chevr., and which was labelled by Voss as *Camarotus* prope *coccinelloides*), is a severely damaged specimen, and is placed under *similis* with doubts, especially because of the completely yellow antennae, and the absence of the hair-clusters on the elytra (most possibly rubbed off).

POLLINOSITY

The paratype from Rio de Janeiro is covered with bright yellow pollinosity; the paratype from Itatiaia is covered with orange pollinosity on the elytra, pronotum and head, and yellow pollinosity on the front legs.

Camarotus carrapatus, sp. n.

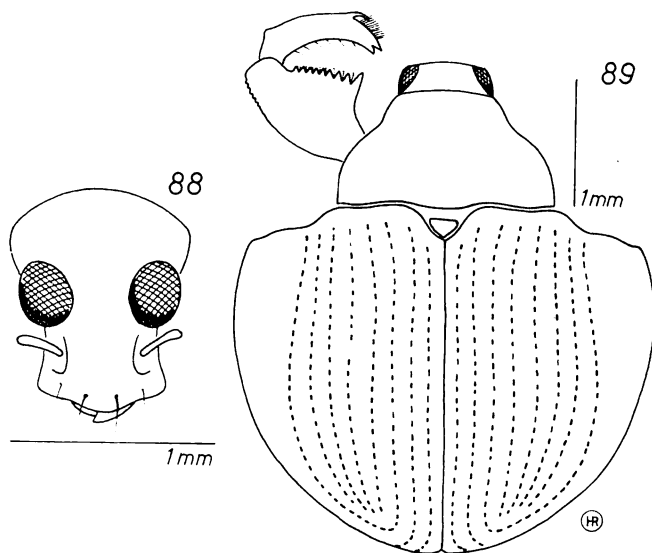
(Figs. 88-89)

TYPE

BRAZIL. *Santa Catarina*, Corupá, XI.1948, A. Muller col. (holotype ♀, AMNH).

Black with testaceous antennae and brownish tarsi.

Beak relatively short, slightly shorter than wide anteriorly; antennae inserted at the middle of beak; antennal grooves normal; surface of head and beak with some sparse punctures, except for the completely rugose apex of the beak. Pronotum normal, transverse, about twice as wide as long along median line; more or less parallel-sided in basal



Camarotus carrapatus (holotype): 88, front view of head; 89, dorsal view.

half, very much narrowed anteriorly, towards the anterior strangulation; punctate discally and granulate laterally. Elytra widest slightly in front of the middle, with large and well developed, punctate, lateral expansion; anterior angles more or less sharp; punctate striate, convex. Front tibiae strong, curved, angulate externally, carinate internally. Measurements (holotype): total length, 3.75; maximum elytral width, 3.06; elytral length, 2.50.

Male unknown.

TAXONOMIC DISCUSSION

Camarotus carrapatus is the only black species of *Camarotus* with punctate elytral expansion. Morphologically it is very similar to *Camarotus fusiger* and *similis*, though smaller.

The name *carrapatus* is derived from the Portuguese "carrapato", a tick (Ixodidae), to which some of the *Camarotus* have a superficial similarity.

Camarotus sabanillae Heller, 1923

(Figs. 90-92)

Camarotus sabanillae Heller, 1923: 62, 65 (holotype ♂, Ecuador, Santiago-Zamora, Sabanilla; MD, examined); Klima, 1935: 2 (catalog); Blackwelder, 1947: 843 (catalog); Voss, 1965: 226, 229 (key, notes).

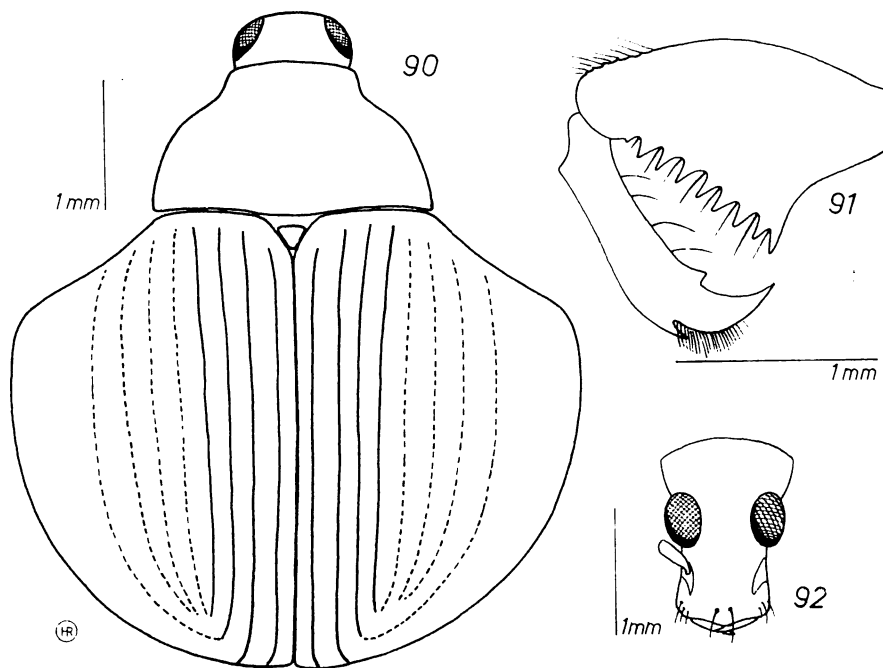
Black, including antennal club (only scape, pedicel and funiculus of antennae yellow) and tarsi.

Beak only very slightly longer than wide apically, somewhat narrowed towards eyes; surface deeply punctate; frons also punctate, vertex impunctate. Pronotum widest basally, only very slightly narrowed towards middle, then narrowed to meet anterior strangulation; surface punctate on disc, granulate laterally; with very short and inconspicuous pilosity. Elytra widest in front of the middle, with well developed lateral expansion; expansion well rounded anteriorly, impunctate; four discal striae sulcate, with evidence of fused punctures; remainder punctate-striate; punctures of the eighth (last) stria well developed, larger than those of the other striae; interstices smooth, convex. Front tibiae strong, long, angulate externally near base, with straight external margin; inner margin not denticulate, with subapical tooth. Tarsi black. Measurements (holotype): total length, 4.37; maximum elytral width, 4.0; elytral length, 3.12.

Female unknown.

MATERIAL EXAMINED

ECUADOR. *Santiago-Zamora*, Sabanilla, 1,900 m, 5.X.1905, F. Ohaus col. (holotype ♂, MD).



Camarotus sabanillae (holotype): 90, dorsal view; 91, front leg; 92, front view of head.

TAXONOMIC DISCUSSION

Camarotus sabanillae is one of the black species of the group of *cussidoides*, all of which are very similar, and difficult to separate. *Camarotus subanillae* has some very striking characters: the antennal club is black (the only other species with infuscated antennal club is *similis*); the tarsi of *sabanillae* are black (*similis* also has very dark tarsi); the most notable character, unique in the genus, is the subapical tooth on the inner margin of the front tibiae (fig. 91). The inner margin of the tibiae is not denticulate. In *Camarotus sabanillae* the pronotum is widest basally, and only very slightly narrowed towards the middle.

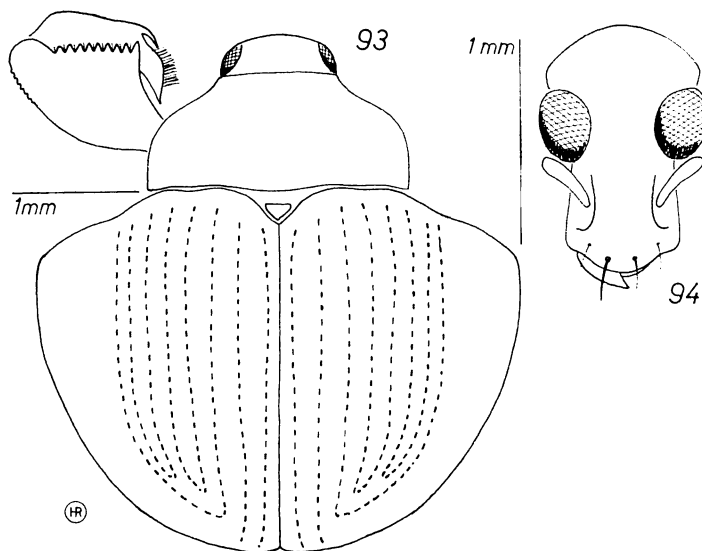
Camarotus singularis Champion, 1903

(Figs. 93-97)

Camarotus singularis Champion, 1903: 289, pl. 15, figs. 2, 2a, 2b (holotype ♀, British Honduras, Rio Sarstoon; BM; not seen); Heller, 1923: 62 (key); Klima, 1935: 2 (catalog); Blackwelder, 1947: 843 (catalog).

Testaceous dorsally and ventrally.

Beak relatively short and stout, about as long as wide apically; surface of beak and frons deeply punctate; antennae inserted at the middle of the beak; antennal grooves normal. Pronotum transverse, more than twice as wide as long, widest at the middle, only very slightly narrowed towards base; much narrowed anteriorly; surface granulate, except in front, where it is deeply punctate; with a smooth line along the middle; very finely shortly pilose. Elytra widest anteriorly, with well developed, impunctate, lateral expansion; anterior angles rounded; striae punctate-striate, interstices not very convex. Front tibiae strong and stout, curved and angulate externally at base, carinate internally. Measurements (1 specimen): total length, 4.31; maximum elytral width, 3.37; elytral length, 2.62.



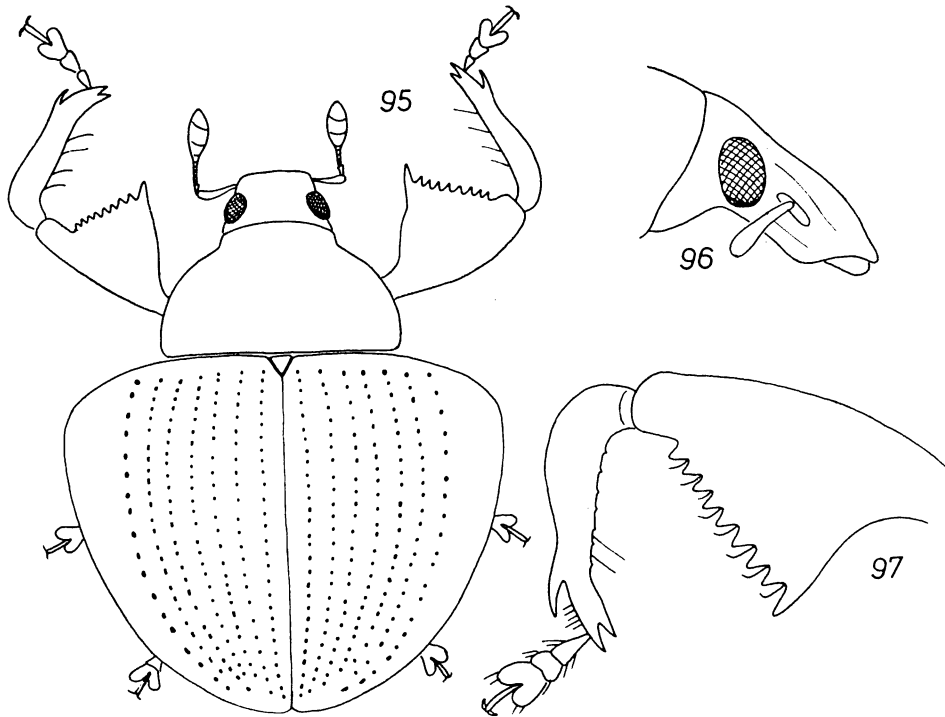
Camarotus singularis (♂ from Paraiso, Panama): 93, dorsal view; 94, front view of head.

MATERIAL EXAMINED

PANAMA. Canal Zone, Paraiso, 5.III.1911, E. A. Schwarz col. (1 ♂, USNM).

TAXONOMIC DISCUSSION

The Panamanian specimen described above agrees fairly well with Champion's description and illustrations of *Camarotus singularis*. Champion's illustrations (redrawn and adapted as figs. 95-97 in this paper), are not too accurate (for example in the number of elytral striae), and only reproduced here for the sake of completeness. The front tibiae are clearly angulate externally in the Panamanian specimen; Champion's description and illustrations are not too clear in this respect.



Camarotus singularis (redrawn from Champion, 1903): 95, dorsal view; 96, side view of head; 97, front leg.

Since the Panamanian specimen agrees fairly well with *singularis*, and does not match any of the other species I have seen, it seems advisable to keep it identified as such.

Camarotus singularis, *dilatatus* and *lazarus* are the only dorsally testaceous species in this group. *Camarotus dilatatus*, however, is black ventrally; *lazarus* is easily distinguished from *singularis* by the differently shaped anterior angles of the elytral expansion.

Because of the possibility of a wrong identification of this species with Champion's, I quote below the original description:

"1. *Camarotus singularis*, sp. n. (Tab. XV, figg. 2, 2a, b). Broad, robust, shining, rufo-ferrugineous, the antennae and tarsi testaceous. Head and rostrum coarsely, sparsely, irregularly punctate, the punctures here and there longitudinally confluent, the rostrum broadly subquadrate, the eyes not prominent; antennae short. Prothorax at the base twice as broad as long rapidly narrowing from about the middle forwards and feebly constricted in front; surface coarsely, somewhat closely punctate, the flanks granulate. Scutellum transverse, almost smooth. Elytra broadly explanate at the sides, the expanded margin obliquely truncate in front and rapidly narrowing posteriorly, the humeri rounded; the disc coarsely and deeply punctate-striate, the interstices smooth and convex. Anterior femoral teeth short. Anterior tibiae very stout, sparsely ciliate within,

truncate and sharply bimucronate at the apex, the external hook long. Length 4, breadth $3 \frac{2}{5}$ millim.

Hab. British Honduras, Rio Sarstoon (Blancaneaux).

One specimen. This insect approaches the South American *C. cassidoides*, Gyll., and *C. marginalis*, Imhoff, but is rufo-ferruginous in colour and the elytral margin is less expanded anteriorly, the humeri being more rounded."

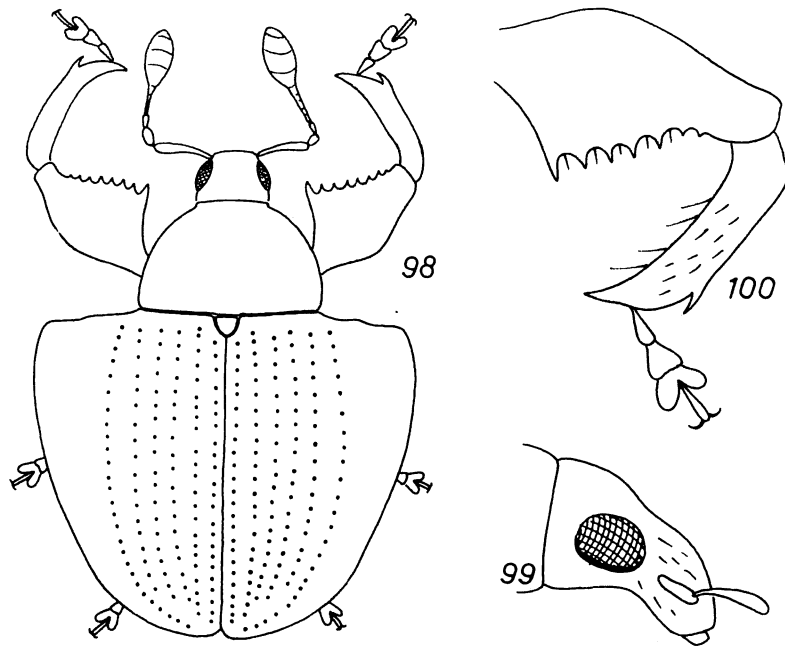
Camarotus dilatatus Champion, 1903

(Figs. 98-100)

Camarotus dilatatus Champion, 1903: 290, pl. 15, figs. 3, 3a, 3b (holotype ♂, Guatemala, Cerro Zunil, 4,000 ft.; BM); Klima, 1935: 1 (catalog); Blackwelder, 1947: 843 (catalog).

ORIGINAL DESCRIPTION

"2. *Camarotus dilatatus*, sp. n. (Tab. XV, figg. 3, 3a, b). Broad, depressed, shining, testaceous, the eyes, scutellum, and under surface (the head excepted) black, very finely pubescent. Head finely punctate, the punctures becoming coarser and longitudinally confluent on each side of the carina between the eyes, rostrum almost smooth at the tip, the eyes large and not prominent; antennae a little longer than the anterior tibiae. Prothorax short, nearly two and one-half times as broad as long, abruptly narrowed and feebly constricted in front; the surface closely and rather coarsely punctate, the flanks granulate. Elytra broadly explanate at the sides, the expanded margin abruptly and obliquely sinuato-truncate in front and rapidly narrowing posteriorly, the humeri obtu-



Camarotus dilatatus (redrawn from Champion, 1903): 98, dorsal view; 99, side view of head; 100, front leg.

sely angulate; the tarsi coarsely punctate-striate, the interstices convex and almost smooth. Anterior femoral teeth long. Anterior tibiae strongly curved, broad, sparsely ciliate within, very obliquely truncate and sharply mucronate at the apex, the external hook moderately long. Length 3 1/2, breath 3 1/3 millim.

Hab. Guatemala, Cerro Zunil, Pacific slope, 4000 feet (Champion).

One example. More depressed than *C. singularis*, testaceous above and black beneath, the explanate margin of the elytra more hollowed in front (the intermediate legs thus being visible from above); the anterior femoral teeth longer, the anterior tibiae very obliquely truncate at the apex, and armed with a single long tooth only at the inner angle."

TAXONOMIC DISCUSSION

I have not seen this species, neither have Heller (1923: 62) or Voss (1965: 226, 230). As I have shown elsewhere, the species these authors referred to *dilatatus* are true *coccinelloides*. *Camarotus dilatatus* is only known from the type, collected in Guatemala.

Camarotus dilatatus appears to be very characteristic, and seems to be related to *singularis*. The different coloration of the ventral parts of *dilatatus* (black), as well as the black scutellum, easily distinguish the species from *singularis*. These color characteristics of *dilatatus* are not frequent: I have not seen any other species with testaceous dorsal surface and black scutellum and ventral parts. *Camarotus lazarus* and *peltatus* are both testaceous dorsally, and partly black underneath, however, they have testaceous scutellum. By these characters *dilatatus* should be easily identified.

Camarotus lazarus, sp. n.

(Figs. 101-102)

Comarotus marginalis (nec Imhoff, 1836) Heller, 1923: 62 (key); Klima, 1935: 1 (*pars*; catalog); Blackwelder, 1947: 843 (*pars*; catalog); Voss, 1965: 225, 229 (key, distribution).

TYPES

BRAZIL. *Minas Gerais*, Serra do Caraça, Santa Barbara, III.1963, F. Werner, U. Martins & L. R. Silva col. (holotype ♀, MZUSP); *idem*, 23-25. XI. 1960, Araujo & Martins col. (paratype ♂, EV); *ibidem*, I. 1970, F. M. Oliveira col. (paratype ♀, MA); *Guanabara*, Rio de Janeiro, Fry Coll. (2 paratypes ♂, BM, MZUSP). Not included in type-series: *Guanabara*, Rio de Janeiro, Sahlberg (1 ♂, RM).

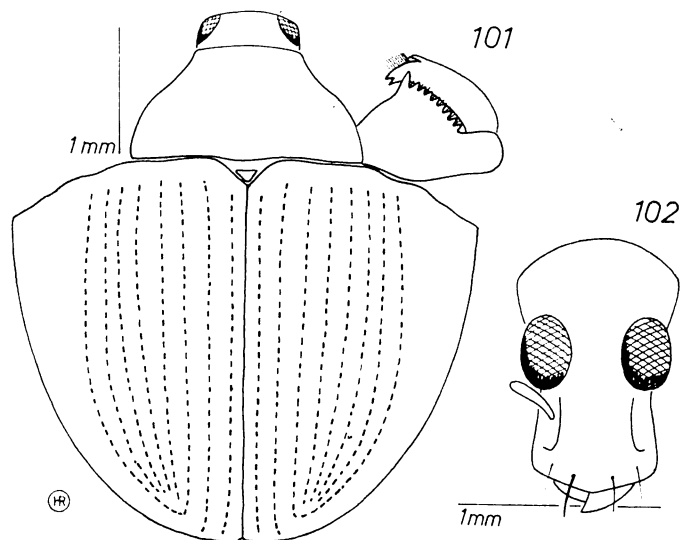
Testaceous, with black eyes, meso- and metathorax.

Beak about as long as wide anteriorly; antennae inserted at the middle of the beak antennal grooves normal; surface of beak and frons very sparsely punctate. Pronotum transverse, about twice as wide as long along median line; widest at base and gradually narrowed towards anterior strangulations; surface only sparsely punctate discally, granulate laterally. Elytra widest anteriorly, with well developed, punc-

tate, anteriorly angulate lateral expansion; striae punctate-striate. Front tibiae strong, stout, curved, not angulate externally. Measurements (4 specimens): total length, 3.8-4.08; maximum elytral width, 3.08-3.52; elytral length, 2.68-2.96.

TAXONOMIC DISCUSSION

Camarotus marginalis Imhoff has until now been misidentified, as will be shown under the species. The specimens identified by Voss as *marginalis* do not agree with Imhoff's original description in most characters, and really represent the new species described here. These specimens (*marginalis* Voss, nec Imhoff, 1965: 229) are from Rio de Janeiro (the male from the Stockholm Museum not included in the type-series because of poor preservation) and "Brasilien". The latter, in the Dresden Museum, is actually a specimen of *ohausi* Heller.



Camarotus lazarus (holotype): 101, dorsal view; 102, front view of head.

Camarotus lazarus is very characteristic by the clearly angulate elytral expansion. In Voss' key (1965: 225) his *marginalis* comes to the vicinity of *colombicus*, but examination of the type of the latter proved the two species not to be closely related, *colombicus* being closer to *cassidoides*. A notable characteristic of this species are the black meso- and metathorax. Another species, perhaps related, is *dilatatus*, also testaceous dorsally and black ventrally. Unfortunately Champion's description does not state clearly which areas are black.

Camarotus lazarus is closest to *peltatus*, described below. Characters are mentioned in the key and under that species.

Camarotus lazarus is named after Lázaro R. Silva, one of its collectors.

POLLINOSITY

The two paratypes from Rio de Janeiro are covered dorsally with yellow pollinosity.

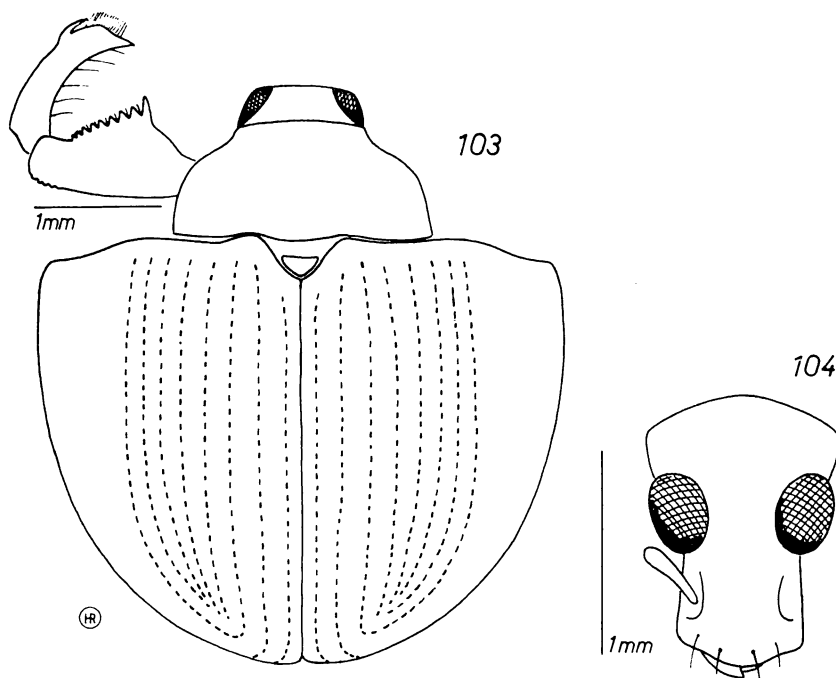
***Camarotus peltatus*, sp. n.**

(Figs. 103-104)

TYPE

BRAZIL. *Santa Catarina*, A. Maller col. (holotype ♂, MZUSP).

Testaceous, with dark brown, longitudinal line on pronotum and vertex; thorax and first abdominal segment dark brown.



Camarotus peltatus (holotype): 103, dorsal view; 104, front view of head.

Beak about as long as wide anteriorly, as remainder of head, densely punctate. Pronotum short, more than twice as wide as long along median line; surface very sparsely punctate on disc, granulate laterally. Elytra widest anteriorly, with well developed, punctate, anteriorly angulate, lateral expansion. Front tibiae strong, angulate externally at base; apex of femora granulate externally. Measurements (holotype): total length, 4.5; maximum elytral width, 4.12; elytral length, 3.25.

Female unknown.

TAXONOMIC NOTES

Camarotus peltatus is very closely allied to *lazarus* (and to a lesser degree, to *marginalis*), but readily distinguished by the following characters: larger size; pronotum relatively shorter; elytral expansion more densely punctate; front tibiae angulate externally. Ventrally the two species are also easily distinguished: *lazarus* has only the meso- and the metathorax darkened, while in *peltatus* the whole thorax and the first abdominal segment are darker colored. From *marginalis*, *peltatus* differs mostly by color.

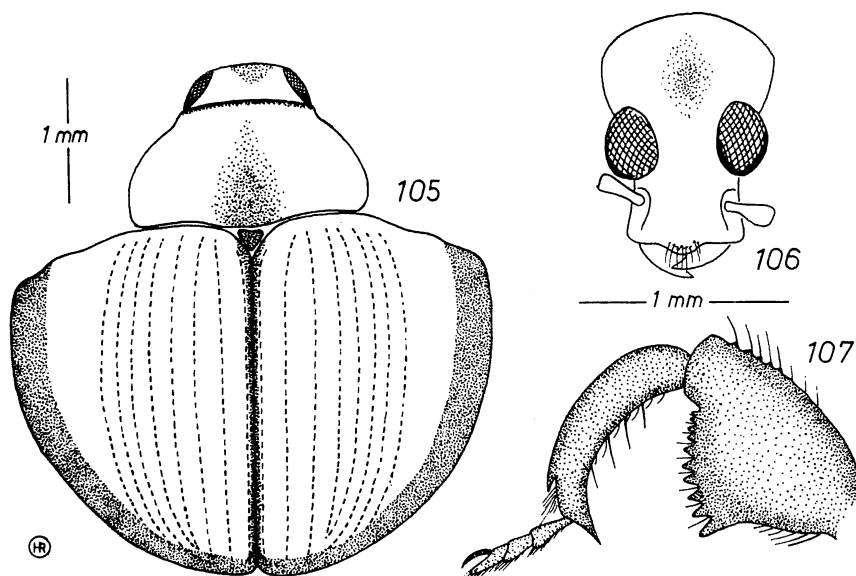
***Camarotus marginalis* Imhoff, 1836**

(Figs. 105-107)

Camarotus marginalis Imhoff, 1836, n.º 68, fig. (holotype ♀, "Americae meridionalis", originally in "Mus. Escher-Zollikofer, Turicensis"; not located); Gemminger & Harold, 1871: 2533 (catalog); Klima, 1935: 1 (*pars*; catalog); Blackwelder, 1947: 843 (*pars*; catalog).

Red, with black, frontal spot, elongate (longitudinal) spot along the median line of pronotum, scutellum, elytral suture and margin; front legs darker, infuscated.

Eyes convex; beak about as long as wide in front, strangulated in front of the eyes; beak and frons very deeply and irregularly punctate; antennae inserted at the middle of the beak, antennal grooves deep, visi-



Camarotus marginalis (♂ from Corcovado, Rio de Janeiro, GB): 105, dorsal view; 106, front view of head; 107, front leg.

ble from above. Pronotum about twice as wide as long, strangled anteriorly; surface very strongly punctate, rugose laterally; covered with very short pubescence. Elytra widest in front of the middle, lateral expansion well developed, somewhat angulate anteriorly; impunctate; interstices normally developed, convex; sulci clearly punctate; sutural interstice slightly more convex than others; covered with very fine, decumbent pilosity. Front tibiae not angulate externally. Measurements (3 specimens): total length, 3.31-3.56; maximum elytral width, 2.81-3.18; elytral length, 2.37-2.56.

MATERIAL EXAMINED

BRAZIL. *Guanabara*. Rio de Janeiro (Corcovado), 10.V.1958, X.1962, XII.1966, M. Alvarenga & C. A. Seabra col. (2 ♂, 1 ♀, MZUSP, MA).

NOTES ON THE TYPE AND TAXONOMIC DISCUSSION

The holotype of *Camarotus marginalis* Imhoff has not been located. According to Horn & Kahle (1935: 69, 121) the "Escher-Zollikofer" collection went to the Entomological Institute of the Eidgenössische Technische Hochschule, Zürich, and Imhoff's collection to the Naturhistorisches Museum, Basel. Mr. W. Wittmer, Basel, sent me two specimens from Cayenne, named *Camarotus marginalis*, from Imhoff's collection. These specimens are not the types, since they are two specimens of an undetermined species of Prionomerinae. Dr. W. Sauter, Zürich, examined the "Escher-Zollikofer" collection, and found no specimen of *Camarotus*, even though there is an empty space for *marginalis*, but no pin-hole indicating that there has ever been a specimen in this place. From Imhoff's original description it is evident that the species described is a true *Camarotus*, not a Prionomerinae. The type of this species must, therefore, be considered as lost.

The present redescription is based on the above mentioned specimens, which agree very closely with Imhoff's original description. Heller's (1923: 62) and Voss' (1965: 225, 229) short descriptions in their keys do not agree with my specimens or the original description. Imhoff clearly states that *marginalis* is red with darkened elytral margins and curcum-scutellar region (see original description below). The species called *marginalis* by Voss is completely testaceous ("gelbbraunlich"), and Voss most probably based his identification on a specimen identified as *marginalis* by Heller.

Even though my specimens of *marginalis* do not agree completely with the original description (Imhoff only describes the lateral elytral margin as being infuscated, whereas the specimens studied have a fine sutural margin of that color too; the expansion is said to be punctate, whereas it is smooth in the present specimens), it agrees more closely with it than do Voss' specimens; since, as seen above, the type has not been located, it seems best to provisionally accept this identification.

Voss' *marginalis* is described above as *lazarus*.

Camarotus marginalis is closest to *lazarus*, but is easily distinguished from it, as well as from all the other species of the genus by its very characteristic elytral design.

ORIGINAL DESCRIPTION

"*Camarotus marginalis*. (*Patria*: America meridionalis. *Mus.* Escher-Zollikofer, Turicensis.) Antennis tarsis-que flavotestaceis, rufus, elytris circa scutellum & ad marginem lateralem infuscatis, sulcatis, sulcis punctatis, suturalibus ultra medium simplicibus, margine ipso punctis majusculis crebrius impresso."

BIOLOGICAL NOTES

Practically nothing is known of the biology of the Camarotinae. Lacordaire (1866: 27) states that "les espèces que j'ai observées, tant à Cayenne qu'au Brésil, se tiennent immobiles sur les feuilles dont celles qui sont très convexes paraissent n'être que des excroissances". Unfortunately Lacordaire does not mention the species observed in the field, possibly because most were undescribed at the time (as mentioned in footnote 2 of the same page). Bondar (1945: 101) states the larvae have leafmining habits (as discussed elsewhere, p. 102, larvae of this group have not yet been described); Costa Lima (1956: 163) mentions two undetermined species "... roendo o parenquima das folhas de sapucaia (*Lecythis* sp.)."

Camarotus serrator Voss, according to Bondar's notes (see notes on the types under that species), was collected on *Miconia hyemalis* St. Hilaire (Melastomataceae) by P. Buck in the type-locality. The species collected in Serra do Caraça by the several expeditions of the (former) Departamento de Zoologia, were all obtained by bush beathing. The same is true for the few specimens (*Camarotus submaculatus* and *dispar*) I have collected in Diadema and Paranapiacaba. Jan Bechyné, who collected several species in the "cerrado", told me that all were found in the flowers of a small "cerrado" palm, among cover-leaves, before the flower opens. The species taken at Corcovado Mt., Rio de Janeiro (State of Guanabara), have been encountered by M. Alvarenga and C. A. Campos Seabra at the top of the mountain, where specimens of insects are generally blown to by air currents, or perhaps attracted by the powerful lights (the latter probably not the case with *Camarotus*).

A very noteworthy fact observed in many species of *Camarotus* is the *pollinosity* which partly or completely covers these weevils dorsally. Lacordaire (*l.c.*) was the first author to mention it: "... et recouverts d'une efflorescence abondante, diversement colorée, qui manque souvent chez les exemplaires conservés dans les collections". Other authors have noted this pollinosity (*e.g.* Voss, 1965: 229, who mentions *Camarotus fusiger* as being "... oft dicht gelb bestäubt"), but nothing certain about it is known. My first guess was that the insects were covered with pollen. The assumption was not confirmed by Dr. M. L. Salgado Labouriau, a specialist of "cerrado" plants pollen, to whom the material was submitted. The pollinosity of *Camarotus* is definitely not pollen. According to Mrs. Labouriau the pollinosity could perhaps be conidia of fungi, I have not pursued the matter.

It should be noted that the pollinosity was observed on a large number of species, and usually on all specimens (see notes on "pollinosity" under each species). In some cases, unfortunately in species known from a single specimen (therefore I cannot say if this is a rule) the pollinosity is distributed according to a certain pattern. In *Camarotus annularis*, for example, the pollinosity is restricted to the elytral area outside the black ring (the area on which this pollinosity is observed is covered with dense pilosity); in *Camarotus piceus* the pollinosity is pink on the elytra and yellow on the pronotum, head and front legs. *Camarotus attelaboides* (of which several specimens were studied) is usually covered with dense yellow pollinosity intermixed with some spots of pink pollinosity on the elytra (as noted under that species, the pattern seems to be somewhat constant).

No pollinosity was observed in any of the species of the group of *pusillus*.

The study of the elytral structure, as well as that of other parts of the insect, renders removal of the pollinosity necessary. In most cases, however, I have removed it only from one side of the insect. Removal is very easily accomplished with a small brush wet in alcohol.

GEOGRAPHIC DISTRIBUTION AND SPECIATION

The Camarotinae are endemic to the Neotropical Region, having been described from Central America (as far north as Guatemala and British Honduras) and South America (as far south as southern Brazil). Unfortunately they are rare (at least in collections), most probably because nothing is known on their habits. The Central American species are very poorly known, and except for *Camarotus singularis* (described from British Honduras and presently recorded from Panama), only known from a single locality. No species have thus far been found in Mexico, El Salvador, Honduras and Nicaragua. In South America no species have been recorded from Bolivia, Paraguay, Uruguay, Argentina and Chile. It is evident that in South America the Camarotinae are restricted to the Brazilian subregion (see Kuschel, 1969: 710, fig. 1), and are most probably present in the corresponding part of these countries, except possibly Chile.

In spite of a fairly complete distribution of the genus in South America (fig. 108), very little is known about the range of individual species. A large number is still known from single localities (and frequently from single specimens). Of other species, however, I have seen relatively abundant material, and a careful analysis of their distribution shows that the genus is in general related to tropical forests. This is clearly evidenced in the maps presented: the distribution of species of which material was available from a reasonable number of localities (or from localities otherwise interesting), was plotted on maps with the distribution of forests in South America [adapted from fig. 2 of Hueck 1966; in my maps, figs. 22, 45, 81, 84 and 108, the shaded areas represent the "caatinga — cerrado — Chaco" belt of open (or semi-open)

formations which runs diagonally from Northeastern Brazil to Northwestern Argentina, as well as other open formations in South America]. Figures 22, 45, 81 and 84 represent the distribution of some species, whereas fig. 108 gives a general idea of the distribution of the genus in South America. It becomes evident that most species are in the coastal rain forests of southeastern Brazil (one of the best collected areas in the Neotropics). Some species (*ohausi*, fig. 45, for example), are in coastal forests and in forest refuges within other vegetal formations as well. From these forest refuges, for example the "Mato Grosso de Goiás" (forest enclaves in the Central Brazilian "cerrado", see Waibel, 1948) the species seem to be in the process of invading other vegetal formations. Jataí, a locality in and near which (including the Ribeirão Vãozinho) several species have been taken, is located in this general area. *Camarotus fusiger* (fig. 84) and *ohausi* (fig. 45), two species with typical distribution in the coastal rain forest, have both been recorded from Condeúba (in Southern Bahia), a transition zone, with forests and cerrados. *Camarotus crenulatus* (fig. 45) is also a

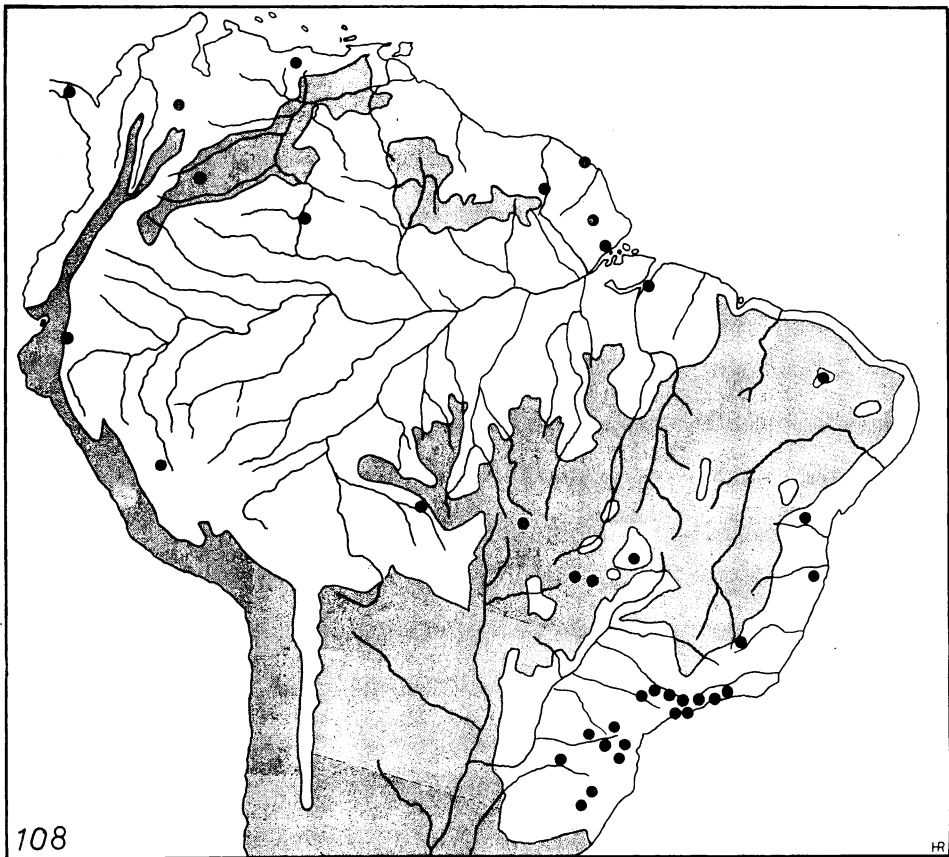


Fig. 108: Distribution of the genus *Camarotus* in South America (map redrawn from Hueck, 1966; open formations stippled).

good example, having been collected in the southern edges of the Amazonian forest (Rondônia), in the Chapada dos Guimarães (forested slopes and "cerrado" on top), in the "Mato Grosso de Goiás", and finally in a small "cerrado" near Itu (State of São Paulo).

The single species known from Northeastern Brazil, *Camarotus piceus*, is from the Serra do Baturité, a typical locality of forest enclaves within the xerophytic "caatinga" (orographic forests, locally called "brejos"; see Lima, 1966). The relict character of the forests in this area has been known for a long time, and in some groups of animals interesting observations were made (see, for example, Pinto & Camargo, 1961: 195). Unfortunately very little is known about its fauna of insects. Pierre-Émile Gounelle is the only entomologist who spent some time there collecting, during the month of January of 1895.

As seen under biology, some of the species collected near Jataí by Jan Bechyné have been found in the flowers of a typical "cerrado" palm. These species are possibly already adapted to the "cerrado", even though some are still forest species with scattered occurrences in the "cerrado".

The geographic distribution of *Camarotus* is a very clear example of what can be interpreted as a mechanism of speciation without territorial discontinuity, as discussed by Ford (1965). First comes the direct invasion of a certain vegetal formation by elements of another formation (for example the case of *ohausi*, fig. 45 or *similis*, fig. 84); as an intermediary stage, areas of transition established when a vegetal formation is violently changed, are colonized first (for example the records of forest species in the "Mato Grosso de Goiás" or Condeúba). This kind of mechanism is most probably very common in animals, but unfortunately the available examples are few. Martins (in press) arrived at similar conclusions with the study of the distribution of a group of cerambycids (Ibidionini).

PHYLOGENY

The species of *Camarotus* are in general very easily distinguished from each other, but the characters are usually very subtle and few, some apparently showing parallel evolution. In spite of the diversity of forms, as seen in the taxonomic part, it is impossible (and unnecessary) to split the genus.

Lacordaire (1866) was the first entomologist who studied the group carefully, and stated that: "on peut établir deux sections dans le genre, d'après la forme des élytres. Chez quelques espèces (1), ces organes sont très-convexes, demi-circulaires et coupés presque carrément à leur base, qui déborde très-fortement les élytres; leur ressemblance avec celles de certaines *Cassida* exotiques est complète. Chez les autres (2), ils sont médiocrement convexes, parfois même presque plans, brièvement ovales, arrondis aux épaules, et leur base est peu ou même pas plus large que celle du prothorax." The first group of species of Lacordaire corresponds to my *cassidoïdes* group, whereas his second group is that of

attelaboides. The limits of the groups, however, are not very sharp, and Lacordaire (*l. c.*) says that "je ne crois pas qu'elles [the second group] puissent former un genre distinct, car, abstraction faite de leur forme générale, elles présentent tous les caractères des espèces de la première section. Il est probable qu'il existe des passages qui les rattachent intimement à celles-ci".

Voss' study of *Camarotus* (1965), based on the knowledge of a larger number of species than that known by Lacordaire, presents a phylogeny very similar to the one proposed by myself, but the genus is not divided in the groups of species already visualized by Lacordaire. Voss only segregated a single species (*maculatus* Voss), which he considers as very primitive, in a subgenus of its own, *Camarotellus*. My studies of *Camarotus* agree with those of Voss only as to the primitiveness of *maculatus* (a member of the *pusillus* species group), but as I have shown elsewhere, the subgenus *Camarotellus* cannot be maintained.

A single character has been used for the grouping of the species of *Camarotus*, the *elytral expansion*. The elytra of *Camarotus* are always (punctate-) striate, each elytron with eight striae. The elytral expansion is formed by the ninth interstice, more or less broadly expanded laterally. Based on the degree of development of this expansion, I am proposing to cluster the species in three groups, which are very clearly delimited as seen in their characterization (see fig. 109). There are, however, clearly transitional forms, confirming Lacordaire's (*l. c.*) supposition that "il est probable qu'il existe des passages qui les rattachent intimement...".

As shall be seen below, the structure of the system is based on the degree of development of the elytral expansion, but other characters support this division, though frequently only in part.

PUSILLUS SPECIES GROUP

In the group of *pusillus* the ninth interstice does not form a true elytral expansion, but only forms a marginal carina, more or less well developed along the whole margin. In a single species, *infuscatus*, the marginal carina is slightly more expanded at the posterior half of the elytra, forming a kind of a link between the groups of *pusillus* and *attelaboides*. Only six species are presently known in this group, which is relatively very homogeneous in morphology.

ATTELABOIDES SPECIES GROUP

A slightly greater development of the lateral expansion, always widest beyond the middle of the elytra, characterizes the second, group of species. The species included in this group form four clusters of species. In the more primitive species the elytral expansion is only developed at the posterior part of the elytra, starting at about the middle of the elytra (somewhat like *infuscatus* of the *pusillus* group, with the difference that here a true expansion is seen, whereas in *infuscatus* there is only a slightly more developed marginal carina). The two typical species of this subgroup are *dispar* and *serratora*, two

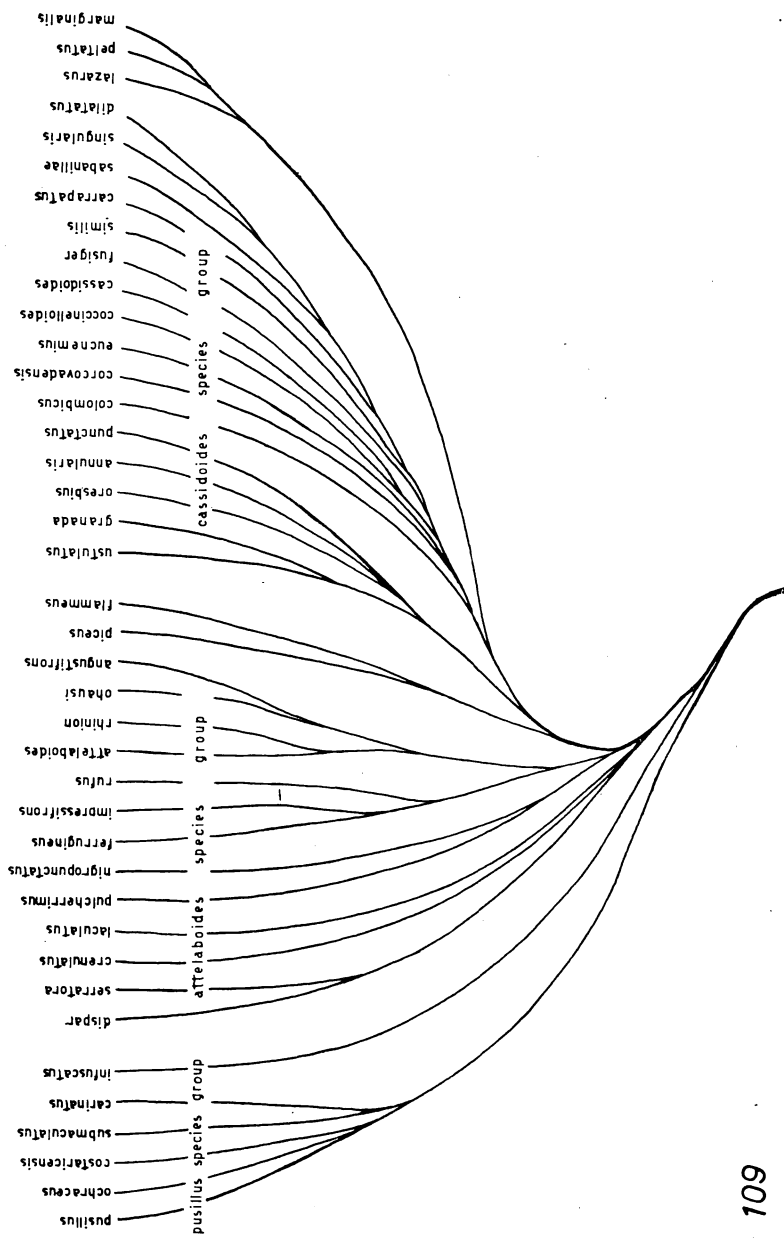


Fig. 109: Evolutionary tendencies in *Camarotus*.

closely allied species. *Camarotus pulcherrimus* (fig. 32) and *nigropunctatus* (fig. 35) are also more or less typical, but have an exaggerated expansion; *crenulatus* (fig. 25) is also related to *dispar* and *serratora*, but seems to be an offshoot. *Camarotus laculatus* (fig. 31) could possibly also be included here, also as an offshoot.

A next cluster of species within the *attelabooides* species group is easily derived from the preceding subgroup, but the expansions starts at the humeri, and only expands behind the middle of the elytra. The elytra have a general pear-shaped form. Included are: *ferrugineus* (fig. 36), *impressifrons* (fig. 38) and *rufus* (fig. 42).

The third subgroup within the group in discussion, assembles species with the elytral expansion starting at the humeri, and also expanded from behind the middle of the elytra, but the elytra are relatively shorter, not elongate as in the preceding subgroup. Included are *attelabooides* (fig. 43), *rhinion* (fig. 46), *ohausi* (fig. 49) and *angustifrons* (fig. 51).

The last subgroup could almost be considered as intermediate between the groups of *attelabooides* and *cassidooides*: the two species included, *piceus* (fig. 52) and *flammeus* (fig. 54), have a somewhat circular outline of elytra, very similar to that of the first subgroup of the next group (see taxonomic part for the reasons of not fusing these two subgroups).

CASSIDOIDES SPECIES GROUP

The last group of species in *Camarotus*, here considered the apex of the evolution of the subfamily, is that of *cassidooides*, with species with extreme development of the lateral expansion. Three clusters of species can also be visualized.

The more primitive subgroup includes species very similar to *piceus* and *flammeus*, also with more or less circular outline of the elytra, but clearly widest in front of the middle. Five species are included: *ustulatus* (fig. 56), *granada* (fig. 60), *oresbius* (fig. 61), *annularis* (fig. 64) and *punctatus* (fig. 67).

The species of the second subgroup have the elytral expansion almost at the maximum registered expansion, but the front margin, between the anterior angle and the humeri, is more or less oblique, directed backwards. This subgroup is the richest in number of species, including the following ones: *colombicus* (fig. 70), *corcovadensis* (fig. 73), *eucnemius* (fig. 76), *coccinelloides* (fig. 77), *cassidooides* (fig. 79), *fusiger* (fig. 82), *similis* (fig. 86), *carrapatus* (fig. 89), *sabanillae* (fig. 90), *singularis* (fig. 93, 95) and *dilatatus* (fig. 98).

The third subgroup, and the terminus of this evolutionary line is represented by three species, *lazarus* (fig. 101), *peltatus* (fig. 103) and *marginalis* (fig. 105). Here the front margin of the elytral expansion is almost perpendicular to the lateral margin, the angle being always very sharp.

This proposed phylogenetic arrangement (fig. 109) shows some very nice and clear lines of evolution, but unfortunately it is based on a single character. Of course, other characters are present, but no com-

plete correlation has been found. Some of these characters should be commented on.

FRONT TIBIAE

In the groups of *pusillus* and *attelaboides* the front tibiae are always very slender, curved, carinate internally, and except for *ferrugineus* (with front tibiae slightly angulate externally at the base, fig. 36), they are never angulate externally at the base. In the *cassidoidea* species group the front tibiae are always relatively shorter, stouter, and are frequently angulate externally at base. Only *lazarus*, *marginalis*, *annularis* and *punctatus* have non-angulate front tibiae. In other species of this group (not examined in all species, because of difficult position for examination) the inner margin of the front tibiae is crenulate.

Camarotus sabanillae is the only species of the genus with subapical tooth on the inner margin of the front tibiae.

FRONT FEMORA

Structurally the front femora are very similar in all groups, but in the group of *cassidoidea* the comb of teeth is much stronger and more globose. Frequently the external margin is granulate apically in this same group of species.

ELYTRAL MARGIN

The elytral margin is never crenulate in the species of the *cassidoidea* group. In all species of the *pusillus* group I have seen (all, except *costaricensis*) the margin of the elytra is crenulate. In the *attelaboides* group the more primitive species, *dispar*, *serrator*, *crenulatus*, *laculatus* and *pulcherrimus* (all in the first subgroup) have crenulate elytral margin. *Camarotus nigropunctatus*, an aberrant species, possibly related to this subgroup, does not have crenulate elytral margins.

ELYTRAL EXPANSION

The elytral expansion can be punctate or impunctate. In the *attelaboides* group a single species (*flammeus*) has punctate expansion. In the *cassidoidea* group the number is higher: the following species have punctate expansion: *lazarus*, *peltatus*, *colombicus*, *corcovadensis*, *carripatus*, *annularis* and *punctatus*.

DISCUSSION

Of the characters listed above, some have evolved independently in different groups (*e.g.*, the punctate elytral expansion, the externally angulate front tibiae), others seem to be correlated (*e.g.*, the form of the front tibiae and femora, but especially the crenulation of the elytral margin in the primitive *pusillus* species group and the primitive subgroup within that of *attelaboides*).

The character I have most heavily depended on, the development of the elytral expansion, is of course correlated in the different groups, and there is no doubt that the species can be grouped according to this character.

POST SCRIPTUM

A specimen of *Camarotus* received for identification through the courtesy of Moacyr Alvarenga, who already had contributed with very interesting species for this division, after the manuscript was in press, turns out to be an interesting new species, which deserves to be described here, even though it is not possible any more to mention it in the text.

Camarotus trunculus, sp. n.

TYPE

BRAZIL. *São Paulo*, São José do Barreiro, Serra da Bocaina, 1,650 m, I. 1969, M. Alvarenga col. (holotype ♂, MZUSP).

Reddish; front tibiae and part of front femora black; elytra with black base (black markings continued towards apex of elytra, along fourth interstice, fading out near apical tubercle); antennae, anterior tarsi, median and posterior legs, testaceous.

Head normal, beak slightly longer than wide apically, narrowed towards eyes; antennae inserted closer to apex of beak; surface of beak and frons deeply and irregularly punctate.

Pronotum widest in the middle, slightly narrowed posteriorly; completely granulate.

Elytra widest behind the middle, with well developed lateral expansion; the expansion starts well behind humeri, and is almost parallel-sided, forming a sharp curve at posterior angles, and ending well before the sutural angle, fusing with second interstice; whole elytral margin clearly crenulate; striae well impressed; interstices normal, except for the fifth, which forms a large tubercle just before the apex of the elytra. Measurements (holotype): total length, 4.18; maximum elytral width, 2.18; elytral length, 2.81.

Female unknown.

TAXONOMIC DISCUSSION

Camarotus trunculus is most closely related to *Camarotus laculatus*. Both have the very characteristic quadrangular elytral outline, but are readily distinguished by the presence of two well pronounced tubercles at the end of the fifth elytral interstices in *trunculus*. This species is also well characterized by the completely granulate pronotum, which is punctate discally in *laculatus*.

REFERENCES

- BLAKWELDER, R. E.
1947. Checklist of the coleopterous insects of Mexico, Central America, the West Indies, and South America. *Bull. U. S. Nat. Mus.* 185 (5): 765-925.
- BONDAR, G.
1945. Notas Entomológicas da Bahia. XV. *Rev. Ent.* 16: 89-112.
- CHAMPION, G. C.
1903. *Biologia Centrali-Americana*, Insecta, Coleoptera 4 (4): 1-144, figs.
- COSTA LIMA, A. M. DA
1956. *Insetos do Brasil* (Coleópteros 4), pp. 1-373, 260 figs., Escola Nacional de Agronomia, Rio de Janeiro.
- CROWSON, R. A.
1954. *The Natural Classification of the Families of Coleoptera*. 214 pp., 212 figs. (Reprint edition, 1967, Classey, England).
- DARLINGTON, JR., P. J.
1968. The Carabid beetles of New Guinea Part III. Harpalinae (Continued): Perigonini to Pseudomorphini. *Bull. Mus. Comp. Zool.* 137 (1): 1-253, 186 figs., 3 col. pls.
- DEJEAN, P. F. M. A.
1836. *Catalogue des Coléoptères de la collection de M. le comte Dejean. Troisième édition, revue, corrigée et augmentée.* Livr. 1-4, pp. 1-468, Paris.
- FORD, E. B.
1965. *Ecological Genetics*. 335 pp., 16 pls., Methuen & Co. Ltd., London.
- GEMMINGER, M. & E. VON HAROLD
1871. *Catalogus coleopterorum ... 8*: 2181-2668, Monachii.
- GERMAR, E. F.
1833. in Schönherr, C. J., *Genera et Species curculionidum 1*, pt. 1, pp. 1-381, Paris.
- GUÉRIN, J.
1953. *Coleópteros do Brasil*. 356 pp., 500 figs.. Faculdade de Filosofia, Ciências e Letras da Universidade de São Paulo.
- GYLLENHAL, L.
1833. in Schönherr, C. J., *Genera et Species curculionidum 1*, pt. 1, pp. 1-381, Paris.
- HELLER, K. E.
1923. Über bekannte und neue *Camarotus*-Arten (Coleopt. Curcul.). *Deut. Ent. Zeit.*: 61-67.

HORN, W. & I. KAHLE

1935. Über entomologische Sammlungen, Entomologen & Entomo-Museologie. *Ent. Beihefte* 2: 1-160.

HUECK, K.

1966. *Die Wälder Südmarikas. Ökologie, Zusammensetzung und wirtschaftliche Bedeutung.* pp., figs.. G. Fischer, Stuttgart.

HUSTACHE, A.

1929. Curculionides de la Guadeloupe. *Faune Col. Franc.* 3: 165-267.
1930. *Idem. Ibidem* 4: 1-148, figs.

IMHOFF, L.

- 1837-1842. in Labram, J. D. & L. Imhoff, *Singulorum generum curculionidum ... Pars I.* Basel.

KARSCH, F.

1881. Die *Camarotus* des Berliner Museums (Colept. Curculion.). *Berl. Ent. Zeit.* 25: 50-51, pl. II, fig. 1.

KIRSCH, T. F. W.

1875. Beiträge zur Kenntnis der Peruanischen Käferfauna auf Dr. Abendroth's Sammlungen basiert. (Viertes Stück). *Deut. Ent. Zeit.* 19: 161-208.

KLIMA, A.

1935. *Coleopterorum Catalogus*, pars 145, Camarotinae, 2 pp.

KUSCHEL, G.

1969. Biogeography and ecology of South American Coleoptera. in Fittkau, E. J., J. Illies, H. Klinge, G. H. Schwabe & H. Sioli, *Biogeography and ecology in South America* 2: 709-722, 1 fig.. *Monographiae Biologicae* 19. W. Junk, The Hague.

LACORDAIRE, J. T.

1866. *Genera des Coléoptères* 7, 620 pp., figs., Paris.

LIMA, D. DE A.

1966. Esbôço fitoecológico de alguns "brejos" de Pernambuco. *Bol. Técn. Inst. Pesq. Agron. Pernambuco* 8: 3-10.

MARTINS, U. R.

- in press. Monografia da Tribo Ibdionini (Coleoptera, Cerambycinae). Parte VI. *Arq. Zool., S. Paulo* 16 (6).

PASCOE, F. P.

1870. Contributions towards a knowledge of the Curculionidae. Part I. *Journ. Linn. Soc. Zool.* 10: 434-493, figs.
1871. *Idem.* Part II. *Ibidem* 11: 154-218, figs.

PINTO, O. M. DE O. & E. A. DE CAMARGO

1961. Resultados ornitológicos de quatro recentes expedições do Departamento de Zoologia ao nordeste do Brasil, com a descrição de seis novas subespécies. *Arq. Zool. Est. S. Paulo* 11: 193-284.

PRUD'HOMME

1906. *Catalogue des Coléoptères de la Guyane Française recueillis par M. Prudhomme de 1870 a 1906.* 46 pp., Imprimerie du Gouvernement, Cayenne.

REICHARDT, H.

1967. A monographic revision of the American Galeritini (Coleoptera, Carabidae). *Arq. Zool., S. Paulo*, 15 (1-2): 1-176, 158 figs.
1969. Três novos "Camarotus" (Coleoptera, Attelabinae). *Rev. Brasil. Biol.* 29 (3): 313-316, 5 figs.

SCHÖNHERR, C. J.

1833. *Genera et species curculionidum 1.* pp. 1-381, Paris.

VOSS, E.

1922. Neue Rüsselkäfer aus verschiedenen Erdteilen (9. Beitrag zur Kenntnis der Curculioniden). *Deut. Ent. Zeit.*: 166-174.
1923. Einige weitere *Camarotus*-Arten, zugleich eine Ergänzung der Hellerschen Studie über diese Gattung (Col. Curc.). (12. Beitrag zur Kenntnis der Curculioniden). *Ibidem*: 68-71.
1930. Einige weitere Attelabiden und eine neue *Camarotus*-Art. Rhynchitinae. *Sborn. Ent. Odd. Nár. Mus. Praze* 8: 60-66.
1958. Einige unbeschriebene Curculioniden, vorwiegend aus dem Museum G. Frey (Col. Curc.). *Ent. Arb. Mus. Frey* 9 (3): 918-933.
1965. Die Unterfamilie Camarotinae, ihre Beziehungen zur Familie Attelabidae sowie ein Versuch, die phylogenetischen Zusammenhänge innerhalb der letzteren zur Darstellung zu bringen (Coleoptera, Curculionidae). *Ent. Abh. Staatl. Mus. Tierk. Dresden* 32 (11): 221-244, 4 figs., 6 pls.

WAIBEL, L.

1948. Vegetation and land use in the Planalto Central of Brazil. *Geogr. Rev.* 38 (4): 529-554, 28 figs.