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# ZOOTAXA

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**The Dryophthoridae of Costa Rica and Panama:  
Checklist with keys, new synonymy and descriptions of new species of  
*Cactophagus*, *Mesocordylus*, *Metamasius* and *Rhodobaenus*  
(Coleoptera; Curculionoidea)**

ROBERT S. ANDERSON



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# ZOOTAXA

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## Editor

Z.-Q. Zhang (ZhangZ@LandcareResearch.co.nz)

New Zealand Arthropod Collection, Landcare Research, P.B. 92170, Auckland, New Zealand

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## The Dryophthoridae of Costa Rica and Panama: Checklist with keys, new synonymy and descriptions of new species of *Cactophagus*, *Mesocordylus*, *Metamasius* and *Rhodobaenus* (Coleoptera; Curculionoidea)

ROBERT S. ANDERSON

Canadian Museum of Nature, P.O. Box 3443, Station D, Ottawa, ON. K1P 6P4, Canada  
Email: randerson@mus-nature.ca

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## Abstract

The Dryophthoridae of Costa Rica and Panama are reviewed. A checklist is presented of the 127 species in Costa Rica and 103 species in Panama. Keys are presented to genera and species. Twenty-four new species are described as follows: *Mesocordylus redelmeieri* Anderson (type locality; Guanacaste, Costa Rica), *Cactophagus dragoni* Anderson (type locality; Chiriqui, Panama), *C. gasbarrinorum* Anderson (type locality; Chiriqui, Panama), *C. lineatus* Anderson (type locality; San Jose, Costa Rica), *C. lingorum* Anderson (type locality; Puntarenas, Costa Rica), *C. morrissi* Anderson (type locality; Chiriqui, Panama), *C. riesenorum* Anderson (type locality; Puntarenas, Costa Rica), *C. silron* Anderson (type locality; Puntarenas, Costa Rica), *C. sunatoriorum* Anderson (type locality; Chiriqui, Panama), *Metamasius atwoodi* Anderson (type locality; Cocos Island, Costa Rica), *M. bellorum* Anderson (type locality; Chiriqui, Panama), *M. burcheri* Anderson (type locality; Cartago, Costa Rica), *M. gallettae* Anderson (type locality; Darien, Panama), *M. hooveri* Anderson (type locality; Limón, Costa Rica), *M. leopardinus* Anderson (type locality; Guanacaste, Costa Rica), *M. murdiei* Anderson (type locality; Cartago, Costa Rica), *M. richdeboeri* Anderson (type locality; Puntarenas, Costa Rica), *M. shchepaneki* Anderson (type locality; Panama, Panama), *M. vaurieae* Anderson (type locality; Puntarenas, Costa Rica), *M. wolfensohni* Anderson (type locality; Guanacaste, Costa Rica), *Rhodobaenus howelli* Anderson (type locality; Puntarenas, Costa Rica), *R. labrecheae* Anderson (type locality; Puntarenas, Costa Rica), *R. patriciae* Anderson (type locality; Puntarenas, Costa Rica), and *R. tenorio* Anderson (type locality; Limón, Costa Rica). New country records are as follows: *Toxorhinus grillarius* (Lacordaire) (Costa Rica), *Alloscolytopus peruanus* Hustache (Panama), *Cactophagus aurofasciatus* (Breme) (Panama) and *Metamasius scutiger* Champion (Costa Rica). The genera *Toxorhinus* Lacordaire and *Cosmopolites* Chevrolat are transferred from Sphenophorini to Litosomini. Notes about the natural history and plant associations for all new species are given where available.

**Key words:** Coleoptera, Dryophthoridae, checklist, new species, Costa Rica, Panama

## Introduction

In 1994 the Instituto Nacional de Biodiversidad (INBio) in Costa Rica, in cooperation with the international community of taxonomists, embarked on a monumental effort to document the diversity of all living things within the Guanacaste Conservation Area in the northwestern corner of this small tropical country. This ATBI (All Taxon Biodiversity Inventory), as it came to be known, was intended as a means of cataloging all of the wild biodiversity in a limited area such that it is available for sustainable use. Although this massive undertaking did not meet with success, work carried out in its planning phases has proved fruitful. INBio has now established plans to undertake a National Inventory of a much more limited number of taxa, but for a much larger part of the country. A taxon for which extensive planning work has been carried out is the Coleoptera, one of the taxa on which the national inventory will focus. With many thousands of species estimated to occur in Costa Rica, the beetles are expected to be one of the most diverse groups of insects in the inventory.

During planning phases for the ATBI and subsequent National Inventory, one problem recognized was the need for much descriptive taxonomic work. Many of the species of beetles present in Costa Rica require formal description and naming. This will obviously take much time and work and so as a means of delivering results rapidly it was suggested that the initial focus be on groups where there was a substantial amount of descriptive taxonomic work already carried out. For the Curculionoidea, one such group is the Dryophthoridae. Patricia Vaurie worked extensively on this group of weevils from the early 1950's until the late 1970's. She published numerous papers on the taxonomy, distribution and natural history of nearly all genera (Vaurie 1951, 1966, 1967a, 1967b, 1968, 1970a, 1970b, 1970c, 1971, 1973, 1978, 1980, 1981). Her taxonomic works, including keys, serve as an excellent basis for continuing study.

The Dryophthoridae are not a very diverse group as far as weevils are concerned. Numbering only a few hundred species in Central and South America, 127 recorded herein from Costa Rica and 103 from Panama, they prove to be a much more manageable group than most other weevil taxa which can number in the thousands of species. Also, they are large and frequently encountered, which not only makes them readily available in collections for study, but also a much more visible part of the fauna, and thus of more familiarity and interest to the public. Dryophthorids are generally large red and black or orange and black weevils most frequently found associated with palms (Arecaceae) and their relatives. Adults of most species range in size from 10-20 mm in length although some may be as small as 4 mm or as large as 50 mm. Aside from palms, these weevils are associated with various other groups of monocot plants. At more temperate latitudes these plants are primarily grasses (Graminae) and sedges (Cyperaceae) but at tropical latitudes, orchids (Orchidaceae) and bromeliads (Bromeliadaceae), as well as palms, are attacked. Some species are associated with such agriculturally important plants as bananas and corn while others pose a threat to the rapidly developing tropical orchid and bromeliad industries (e.g., Frank and Thomas 2000).

Despite the recent systematic study of the group, a surprising number of new taxa have been discovered. A number of these were recognized by Vaurie but not described due to inadequate material or the limited state of knowledge of patterns in Neotropical insect diversity. Some of the newly discovered species have been found during recent and intensive sampling by INBio parataxonomists, whereas others have been discovered in only recently accessible geographic areas. A few species appear to be exclusively montane species associated with rarely sampled epiphytes such as the Araceae.

Elsewhere, as part of the INBio National Inventory program, a complete illustrated treatment of all of the dryophthorid taxa occurring in Costa Rica will be presented. This will include many photographs, distributions and biological information. The present paper provides a checklist of the Dryophthoridae of Costa Rica and Panama and describes the previously unnamed taxa of this family in the speciose genera *Mesocordylus*, *Cactophagus*, *Metamasius*, and *Rhodobaenus* discovered during the course of the inventory. The

paper also includes some new synonymies and presents the evidence upon which they are based. In preparing this study it was found that a number of species to be described as new also occur in neighbouring Panama and that biogeographically it makes sense to treat the two countries together. In two instances, some of the specimens in the type series of new species being described are from Ecuador.

*Materials and methods.*— Over 6000 specimens have been examined during the course of this study. Most of these specimens are from the extensive collections at INBio, but the collections of the Arthropods of La Selva project (ALAS) made by Henry Hespenseide and colleagues, the Henry and Anne Howden collection (HAHC), the Charles W. O'Brien collection (CWOB), and the Canadian Museum of Nature collection (CMNC) also provided and house important material. For Panama, the collections made over the last 30 years by Henry P. Stockwell were also examined and specimens from these collections were donated to the Canadian Museum of Nature. During her years of study, Patricia Vaurie examined holdings in most large collections and whereas records from her publications are included in the inventory, these collections have not been re-consulted. Complete distributions outside Costa Rica and Panama are available in O'Brien and Wibmer (1982) and Wibmer and O'Brien (1986).

Characters used in species descriptions for the most part follow those used by Vaurie. Features of genitalia were rarely used by her as primary means for species identification but appear to be presented for the sake of completeness and are generally not referred to in any detail. Only the form of the apex of the male aedeagus is presented with consistency by her for all species. One main aspect of the generic classification of these weevils concerns the presence (complete or incomplete) or absence of a lateral line on the male aedeagus. Illustrations of the various states of this character are found in Vaurie (1966, Figs. 2-3; and Vanin (1998, Figs. 10, 27 and 32). Rather than provide modifications to the keys for species identification presented by Vaurie, complete keys are given so as to facilitate identification of this regional fauna without necessarily consulting her works.

*Notes about classification.*—In general, the classification followed is that of Alonso-Zarazaga and Lyal (1999), with some recent changes and additions as well as others proposed herein. Most controversy surrounds the treatment of the genus *Metamasius* and its relatives. In her revisionary work on *Metamasius*, Vaurie (1966, 1967a) divided the genus into three species groups. Species group III of Vaurie (1967a) corresponds to the genus *Cactophagus* LeConte, recently resurrected by Kuschel in Wibmer and O'Brien (1986). Species group I is considered *Metamasius* in the strict sense, whereas species group II is considered *Paramasius* Kuschel, also recently resurrected by Kuschel in Wibmer and O'Brien (1986). An additional genus, *Cyrtomasius*, related to *Paramasius*, was recently described by Vanin (1998).

Herein, the genus *Cactophagus* is retained with *Cactophagoides* Champion and *Paradiaphorus* Chevrolat considered as new junior synonyms. All possess an aedeagus which lacks a lateral line and some of the species newly described herein approach the heavily



sculptured form of species originally placed in *Cactophagoides*. Similarly, *Metamasius* is retained with the genera *Paramasius* and *Cyrtomasius* as new junior synonyms. These taxa have an aedeagus with a partial or complete lateral line. Both the genera *Eucalandra* Faust and *Cosmopolites* Chevrolat are moved to Litosomini from Sphenophorini based upon the form of the scutellum which is rhomboidal, with its greatest width at about the midlength. Kuschel (1995) presents a key to the tribes of Dryophthoridae, some of which are accorded subfamily status by Alonso-Zarazaga and Lyal (1999).

The genera *Dryophthorus* Germar and *Stenommatius* Wollaston currently under study by Charles O'Brien and Guiseppa Osella, are not treated in this study.

New taxa described herein are as follows. All are from either Costa Rica and/or Panama.

<i>Mesocordylus redelmeieri</i> Anderson, new species	C.R.	Panama
<i>Cactophagus dragoni</i> Anderson, new species		Panama
<i>Cactophagus gasbarrinorum</i> Anderson, new species		Panama
<i>Cactophagus lineatus</i> Anderson, new species	C.R.	
<i>Cactophagus lingorum</i> Anderson, new species	C.R.	
<i>Cactophagus morrissi</i> Anderson, new species		Panama
<i>Cactophagus riesenorum</i> Anderson, new species	C.R.	
<i>Cactophagus silron</i> Anderson, new species	C.R.	
<i>Cactophagus sunatoriorum</i> Anderson, new species		Panama
<i>Metamasius atwoodi</i> Anderson, new species	C.R.	
<i>Metamasius bellorum</i> Anderson, new species		Panama
<i>Metamasius burcheri</i> Anderson, new species	C.R.	
<i>Metamasius gallettae</i> Anderson, new species		Panama
<i>Metamasius hooveri</i> Anderson, new species	C.R.	
<i>Metamasius leopardinus</i> Anderson, new species	C.R.	Panama
<i>Metamasius murdiei</i> Anderson, new species	C.R.	
<i>Metamasius richdeboeri</i> Anderson, new species	C.R.	Panama
<i>Metamasius shchepaneki</i> Anderson, new species	C.R.	Panama
<i>Metamasius vaurieae</i> Anderson, new species	C.R.	
<i>Metamasius wolfensohni</i> Anderson, new species	C.R.	Panama
<i>Rhodoaenus howelli</i> Anderson, new species	C.R.	
<i>Rhodoaenus labrecheae</i> Anderson, new species	C.R.	
<i>Rhodoaenus patriciae</i> Anderson, new species	C.R.	
<i>Rhodoaenus tenorio</i> Anderson, new species	C.R.	

Some significant range extensions and new country records are also noted here:

*Toxorhinus grillarius* (Lacordaire). This species is widely distributed but rare in northern South America. This is the first record of the species from Central America:

Costa Rica. Alajuela, Estacion Biologia San Ramon, 900 m, xi-xii.1999, P. Hanson, malaise trap (CWOB).

*Alloscolytoproctus peruanus* Hustache. This rare species was known from scattered localities in South America. Recently, it has been collected frequently in flight intercept traps. This is the first record of the species from Central America: Panama. Darien, Estacion Ambiental Cana, Cerro Pirre, 1450 m, 7-9.vii.1978, J. Ashe and R. Brooks, flight intercept trap (CMNC).

*Cactophagus aurofasciatus* (Breme). This species has been recorded in the literature from South America and Mexico. The Mexico record is questionable but the species has recently been collected in Panama: Panama. Canal Zone, Barro Colorado Island, 15.vii.1978 (CMNC).

*Metamasius scutiger* Champion. Previously known only from the type specimen collected in Panama, one additional specimen of this distinctive species has been collected in Costa Rica: Costa Rica. Limon, Rio Telire, 400 m, 2.viii.1984, A. Solis (INBC).

### Checklist of the Dryophthoridae of Costa Rica and Panama (new taxa are indicated in bold face type)

#### Dryophthorinae<sup>1</sup>

*Dryophthorus* Germar

*Stenommatius* Wollaston

#### Orthognathinae

##### Orthognathini

*Mesocordylus* Lacordaire

*Mesocordylus abditus* Vaurie C.R. Panama

*Mesocordylus bracteolatus* (Boheman) C.R. Panama

*Mesocordylus dispersus* Champion C.R. Panama

*Mesocordylus gracilis* Champion C.R. Panama

*Mesocordylus pustulosus* Champion C.R. Panama

***Mesocordylus redelmeieri* Anderson C.R. Panama**

*Mesocordylus rugicollis* (Boheman) C.R. Panama

*Mesocordylus scutellaris* (Erichson) C.R. Panama

*Mesocordylus secundus* Vaurie C.R. Panama

*Mesocordylus similis* Vaurie C.R. Panama

*Mesocordylus subulatus* (Germar) C.R. Panama

<sup>1</sup> The genera *Dryophthorus* and *Stenommatius* are not treated herein but are under study by Charles W. O'Brien and Giuseppe Osella. Only *Stenommatius sulcifrons* Champion is recorded from Costa Rica and Panama, and *Dryophthorus cocosensis* Champion is recorded from Costa Rica. Numerous other species of both genera occur in Costa Rica and Panama but need further study.

*Orthognathus* Schoenherr  
*Orthognathus subparallelus* (Chevrolat) C.R. Panama

### Rhinostomini

*Rhinostomus* Rafinesque  
*Rhinostomus barbirostris* (Fabricius) C.R. Panama  
*Rhinostomus thompsoni* Vaurie C.R. Panama

### Rhynchophorinae

#### Rhynchophorini

*Dynamis* Chevrolat  
*Dynamis borassi* (Fabricius) Panama  
*Dynamis peropactus* Champion C.R.  
  
*Rhynchophorus* Herbst  
*Rhynchophorus palmarum* (Linnaeus) C.R. Panama

### Litosomini

*Cosmopolites* Chevrolat  
*Cosmopolites sordidus* (Germar) C.R. Panama

New genus Anderson<sup>2</sup>

New genus, new species 1 Anderson C.R. Panama  
New genus, new species 2 Anderson C.R.  
New genus, new species 2 Anderson C.R.

*Eucalandra* Faust  
*Eucalandra setulosa* (Gyllenhal) C.R. Panama

*Melchus* Lacordaire  
*Melchus* new species 1 Anderson<sup>3</sup> C.R.

*Neophrynoides* O'Brien and Wibmer  
*Neophrynoides luteus*(Chevrolat) C.R. Panama

*Sitophilus* Schoenherr  
*Sitophilus granarius* (Linnaeus) C.R. Panama  
*Sitophilus linearis* (Herbst) C.R. Panama

<sup>2</sup> This genus and three species will be described in a forthcoming paper; Anderson (in press).

<sup>3</sup> This species will be described in a forthcoming paper; Anderson (in press).

<i>Sitophilus oryzae</i> (Linnaeus)	C.R.	Panama
<i>Toxorhinus</i> Lacordaire		
<i>Toxorhinus banonii</i> (Guérin)		Panama
<i>Toxorhinus grillarius</i> (Lacordaire)	C.R.	
<b>Polytini</b>		
<i>Polytus</i> Faust		
<i>Polytus mellerborgii</i> (Boheman)	C.R.	Panama
<b>Sphenophorini</b>		
<i>Alloscolytopectus</i> Hustache		
<i>Alloscolytopectus peruanus</i> Hustache		Panama
<i>Cactophagus</i> LeConte		
<i>Cactophagus annulatus</i> (Champion)	C.R.	Panama
<i>Cactophagus aurocinctus</i> (Champion)	C.R.	Panama
<i>Cactophagus aurofasciatus</i> (Breme)		Panama
<i>Cactophagus carinipyga</i> (Champion)	C.R.	
<i>Cactophagus circumdatus</i> (Champion)	C.R.	Panama
<i>Cactophagus circumjectus</i> (Champion)	C.R.	Panama
<i>Cactophagus condylus</i> (Vaurie)	C.R.	Panama
<b><i>Cactophagus dragoni</i> Anderson</b>		<b>Panama</b>
<i>Cactophagus duplocinctus</i> (Champion)	C.R.	Panama
<i>Cactophagus fahraei</i> (Gyllenhal)	C.R.	
<b><i>Cactophagus gasbarrinorum</i> Anderson</b>		<b>Panama</b>
<i>Cactophagus gibberosus</i> (Champion)	C.R.	
<i>Cactophagus graphipterus</i> (Champion)	C.R.	Panama
<b><i>Cactophagus lineatus</i> Anderson</b>	<b>C.R.</b>	
<b><i>Cactophagus lingorum</i> Anderson</b>	<b>C.R.</b>	
<i>Cactophagus mesomelas</i> (Champion)	C.R.	Panama
<i>Cactophagus miniatopunctatus</i> Chevrolat	C.R.	
<b><i>Cactophagus morrissi</i> Anderson</b>		<b>Panama</b>
<i>Cactophagus ornatus</i> (Champion)	C.R.	Panama
<i>Cactophagus personatus</i> (Vaurie)	C.R.	Panama
<i>Cactophagus pruinus</i> (Champion)	C.R.	Panama
<i>Cactophagus pulcherrimus</i> (Chevrolat)	C.R.	Panama
<i>Cactophagus rectistriatus</i> (Champion)	C.R.	Panama
<b><i>Cactophagus riesenorum</i> Anderson</b>	<b>C.R.</b>	
<i>Cactophagus rubrovariegatus</i> Bovie	C.R.	Panama

<i>Cactophagus sanguinolentus</i> (Olivier)	C.R.	Panama
<b><i>Cactophagus siron</i> Anderson</b>	<b>C.R.</b>	
<i>Cactophagus sinuatus</i> (Champion)	C.R.	Panama
<i>Cactophagus strigosus</i> (Erichson)		Panama
<b><i>Cactophagus sunatoriorum</i> Anderson</b>		<b>Panama</b>
<i>Cactophagus transatlanticus</i> (Kirsch)	C.R.	
<i>Cactophagus validirostris</i> (Gyllenhal)	C.R.	Panama
<i>Cactophagus verrucosus</i> (Champion)	C.R.	
<i>Cactophagus viduus</i> (Hustache)	C.R.	Panama
<i>Metamasius</i> Horn		
<i>Metamasius alveolus</i> Vaurie	C.R.	Panama
<b><i>Metamasius atwoodi</i> Anderson</b>	<b>C.R.</b>	
<b><i>Metamasius bellorum</i> Anderson</b>		<b>Panama</b>
<i>Metamasius bromeliadicola</i> Champion	C.R.	
<b><i>Metamasius burcheri</i> Anderson</b>	<b>C.R.</b>	
<i>Metamasius callizona</i> (Chevrolat)		Panama
<i>Metamasius cerasinus</i> Vaurie		Panama
<i>Metamasius cincinnatus</i> Champion	C.R.	Panama
<i>Metamasius crinitus</i> Vaurie	C.R.	Panama
<i>Metamasius dasyurus</i> Champion	C.R.	Panama
<i>Metamasius difficilis</i> Guenther	C.R.	Panama
<i>Metamasius dimiatipennis</i> (Jekel)	C.R.	Panama
<i>Metamasius distortus</i> (Gemminger & Harold)	C.R.	Panama
<i>Metamasius fasciatus</i> (Olivier)	C.R.	Panama
<b><i>Metamasius gallettae</i> Anderson</b>		<b>Panama</b>
<i>Metamasius hebetatus</i> (Gyllenhal)	C.R.	Panama
<i>Metamasius hemipterus</i> (Linnaeus)	C.R.	Panama
<b><i>Metamasius hooveri</i> Anderson</b>	<b>C.R.</b>	
<b><i>Metamasius leopardinus</i> Anderson</b>	<b>C.R.</b>	<b>Panama</b>
<i>Metamasius maculiventris</i> Champion	C.R.	Panama
<b><i>Metamasius murdiei</i> Anderson</b>	<b>C.R.</b>	
<i>Metamasius nudiventris</i> Champion	C.R.	Panama
<i>Metamasius octonotatus</i> Champion	C.R.	Panama
<i>Metamasius pygidialis</i> Guenther	C.R.	Panama
<i>Metamasius quadrilineatus</i> Champion		Panama
<i>Metamasius quadrisignatus</i> (Gyllenhal)		Panama(?)
<b><i>Metamasius richdeboeri</i> Anderson</b>	<b>C.R.</b>	<b>Panama</b>
<i>Metamasius rugipectus</i> (Champion)	C.R.	Panama
<i>Metamasius scutiger</i> Champion	C.R.	Panama

<i>Metamasius sellatus</i> Champion	C.R.	Panama
<i>Metamasius shchepaneki</i> Anderson	C.R.	Panama
<i>Metamasius sierrakowskyi</i> (Gyllenhal)	C.R.	Panama
<i>Metamasius submaculatus</i> Champion	C.R.	Panama
<i>Metamasius sulcirostris</i> Champion	C.R.	Panama
<b><i>Metamasius vaurieae</i> Anderson</b>	<b>C.R.</b>	
<b><i>Metamasius wolfensohni</i> Anderson</b>	<b>C.R.</b>	<b>Panama</b>
<i>Rhodoabaenus</i> LeConte		
<i>Rhodoabaenus auctus</i> Chevrolat	C.R.	Panama
<i>Rhodoabaenus auriculatus</i> (Chevrolat)	C.R.	
<i>Rhodoabaenus bellus</i> Vaurie	C.R.	Panama
<i>Rhodoabaenus bicinctus</i> Chevrolat	C.R.	Panama
<i>Rhodoabaenus bisignatus</i> Champion	C.R.	
<i>Rhodoabaenus cinctus</i> (Gyllenhal)	C.R.	
<i>Rhodoabaenus cuneatus</i> Champion	C.R.	Panama
<i>Rhodoabaenus deltoides</i> Chevrolat	C.R.	
<i>Rhodoabaenus dentirostris</i> (Champion)	C.R.	Panama
<i>Rhodoabaenus fortirostris</i> Champion		Panama
<b><i>Rhodoabaenus howelli</i> Anderson</b>	<b>C.R.</b>	
<i>Rhodoabaenus incertus</i> (Champion)	C.R.	
<i>Rhodoabaenus interruptus</i> Champion	C.R.	Panama
<b><i>Rhodoabaenus labrecheae</i> Anderson</b>	<b>C.R.</b>	
<i>Rhodoabaenus lebasii</i> (Gyllenhal)	C.R.	Panama
<i>Rhodoabaenus lineiger</i> Chevrolat	C.R.	Panama
<i>Rhodoabaenus maculifer</i> (Fahråeus)	C.R.	Panama
<i>Rhodoabaenus melanocardius</i> (Linnaeus)	C.R.	Panama
<i>Rhodoabaenus melas</i> Vaurie	C.R.	
<i>Rhodoabaenus nawradii</i> Kirsch	C.R.	Panama
<i>Rhodoabaenus nebulosus</i> Champion	C.R.	Panama
<i>Rhodoabaenus nigrofasciatus</i> (Champion)	C.R.	Panama
<i>Rhodoabaenus nigropictus</i> Champion	C.R.	Panama
<i>Rhodoabaenus nigrosignatus</i> Champion	C.R.	Panama
<i>Rhodoabaenus olivaceus</i> Champion	C.R.	Panama
<i>Rhodoabaenus pantherinus</i> Champion	C.R.	Panama
<b><i>Rhodoabaenus patriciae</i> Anderson</b>	<b>C.R.</b>	
<i>Rhodoabaenus plicatus</i> Champion	C.R.	Panama
<i>Rhodoabaenus pulchellus</i> (Gyllenhal)	C.R.	Panama
<i>Rhodoabaenus pustulosus</i> (Gyllenhal)	C.R.	
<i>Rhodoabaenus quadripunctatus</i> (Chevrolat)		Panama

<i>Rhodoaenus rhinopilus</i> Vaurie	C.R.	Panama
<i>Rhodoaenus rubicundus</i> Champion	C.R.	Panama
<i>Rhodoaenus saginatus</i> Champion	C.R.	
<i>Rhodoaenus sanguineus</i> (Gyllenhal)	C.R.	Panama
<i>Rhodoaenus stigmaticus</i> (Fahrråeus)	C.R.	Panama
<i>Rhodoaenus subcristatus</i> Champion	C.R.	Panama
<i>Rhodoaenus suturalis</i> (Gyllenhal)	C.R.	
<b><i>Rhodoaenus tenorio</i> Anderson</b>	<b>C.R.</b>	
<i>Rhodoaenus tenuiscapus</i> Champion	C.R.	
<i>Rhodoaenus thoracicus</i> (Gyllenhal)	C.R.	Panama
<i>Rhodoaenus varieguttatus</i> Chevrolat	C.R.	
<i>Rhodoaenus v-nigrum</i> Champion	C.R.	
<i>Rhodoaenus ypsilon</i> Chevrolat	C.R.	Panama
<i>Scyphophorus</i> Schoenherr		
<i>Scyphophorus acupunctatus</i> Gyllenhal	C.R.	
<i>Sphenophorus</i> Schoenherr		
<i>Sphenophorus incurrens</i> Gyllenhal	C.R.	Panama
<i>Sphenophorus sulcifrons</i> Chevrolat	C.R.	
<i>Sphenophorus venatus</i> (Say)	C.R.	

### Key to subfamilies, tribes and genera of Dryophthoridae in Costa Rica and Panama

- 1 Antennal funicle of four articles; tarsus of five distinct articles; size small, total body length less than 4 mm .....  
..... Dryophthorinae.....*Dryophthorus* Germar and *Stenommatius* Wollaston<sup>4</sup>
- Antennal funicle of six articles; tarsus of five articles, but article 4 small and difficult to see at base of article 3; size small to large, total body length greater than 3 mm and generally greater than 10 mm ..... 2
- 2 Front coxae contiguous; anterior margin of pronotum with postocular lobe; pygidium largely covered by elytra; tarsus with article 3 subequal in width to article 2; mandibles triangular, directed anteriorly and with inner edge lacking teeth .....  
.....Orthognathinae, Orthognathini .....3
- Front coxae distinctly (but in some taxa, narrowly) separated; anterior margin of pronotum straight behind eye; pygidium broadly exposed beyond elytra (most) or largely covered by elytra (few); tarsus with article 3 noticeably wider than article 2

<sup>4</sup> The genera *Dryophthorus* and *Stenommatius* are not treated herein but are under study by Charles W. O'Brien and Giuseppe Osella.

- and generally bilobed or occasionally subequal in width to article 2; mandibles variously shaped ..... 4
- 3 Front tibia with outer apical angle produced anterolaterally to a sharp or narrowly rounded angle; middle and hind legs robust, tibiae much wider at apex than at base, fossorial in form ..... *Orthognathus* Schoenherr  
(1 species; *O. subparallelus* (Chevrolat))
- Front tibia with outer apical angle not produced anterolaterally, broadly rounded; middle and hind legs long and narrow, tibiae with apex and base subequal in width or with apex slightly wider than base, not fossorial in form ..... *Mesocordylus* Lacordaire  
(11 species)
- 4 Size small, total body length less than 5 mm; tibia with distinct subapical tooth at inner angle in addition to larger tooth at outer angle..... 5
- Size small to large, total body length greater than 5 mm and generally greater than 10 mm; tibia with either a small rounded subapical swelling (most) or sharp subapical tooth (few) at inner angle in addition to larger tooth at outer angle..... 6
- 5 Rostrum straight, in lateral view with base continuous with head; eyes clearly visible in dorsal view ..... Rhynchophorinae, Litosomini (part) ..... *Sitophilus* Schoenherr  
(3 species)
- Rostrum curved ventrally, in lateral view separated from head by basal constriction; eyes not or barely visible in dorsal view .....  
..... Rhynchophorinae, Polytini ..... *Polytus* Faust  
(1 species; *P. mellerborgii* (Boheman))
- 6 Mandibles large, divaricate, divergent, with distinct teeth on outer edge; outer face concave medially; pygidium largely covered by elytra.....  
..... Orthognathinae, Rhinostomini ..... *Rhinostomus* Rafinesque  
(2 species)
- Mandibles small, convergent and occluding medially, with inner margins distinctly toothed (most); or, elongate subtriangular, with inner margins parallel-sided and lacking teeth, not touching medially (few); pygidium broadly exposed beyond elytra..... 7
- 7 Size very large, total body length greater than 25 mm; metepisternum very broad, length more or less 2 times width..... Rhynchophorinae, Rhynchophorini ..... 8
- Size small to large, total body length greater than 5 mm but usually less than 25 mm; metepisternum narrow, length 3 or more times width..... 9
- 8 Scutellum large, with elongate apical extension; front and middle femora more or less straight ..... *Rhynchophorus* Herbst  
(1 species; *R. palmarum* (Linnaeus))
- Scutellum small, apically acuminate but not extended; front and middle femora curved..... *Dynamis* Chevrolat  
(2 species)
- 9 Rostrum extremely long and slender, as long as pronotum and elytra combined; man-



- dibles elongate subtriangular, with inner margins parallel-sided and lacking teeth, not touching medially; antennal club with slender, stalk-like basal article, width at apex of article 3-4 times width at base; legs long and slender..... Rhynchophorinae, Litosomini (part)....*Toxorhinus* Lacordaire (2 species)
- Rostrum short and robust to long and slender, but shorter than pronotum and elytra combined; mandibles small, convergent and occluding medially, with inner margins distinctly toothed; antennal club with width at apex of glabrous basal article less than 3 times width at base; legs robust..... 10
- 10 Body cylindrical; pronotum very slightly shorter than elytra; middle and hind tibiae short, straight, slightly shorter than combined length of tarsal articles 1-4; tibial apices with three distinct apical projections, two (one long, one short) at inner angle, one (short) at outer angle; elytra with distinct long erect setae; interval 2 densely pilose throughout most of length ..... Rhynchophorinae, Sphenophorini (part)..... *Alloscolytopectus* Hustache (1 species; *A. peruanus* Hustache)
- Body somewhat to markedly dorsoventrally compressed; pronotum distinctly shorter than elytra; middle and hind tibiae long, straight or curved, longer than combined length of tarsal articles 1-4; tibial apices with single tooth at inner angle (in some also with small rounded subapical swelling); elytra without long erect setae; no intervals densely pilose ..... 11
- 11 Scutellum (exposed portion) widest at or near middle, shape rhomboidal or subcircular, more or less as long as wide..... Rhynchophorinae, Litosomini (part).....12
- Scutellum (exposed portion) widest at or near base, shape triangular or subtriangular, generally longer than wide ..... Rhynchophorinae, Sphenophorini (part).....16
- 12 Rostrum markedly laterally compressed in at least apical one-half; body flat, maximum width greater than 1.35 times depth..... *Melchus* Lacordaire (1 species; *Melchus* new species 1 Anderson<sup>5</sup>)
- Rostrum more or less cylindrical, not laterally compressed; body thicker, maximum width less than 1.35 times depth ..... 13
- 13 Elytra with scattered concentrations (nodules) of short erect setae, in some cases surrounded by dense micropilosity ..... 14
- Elytra glabrous or with at most scattered, sparse setae or scales ..... 15
- 14 Rostrum curved ventrally; antennal club with apical pilose part one-third to one-half length of basal glabrous part; pronotum and/or elytra with scattered patches (nodules) of micropilosity; front femur of male with distinct subapical swelling or tooth on inner margin..... New Genus Anderson<sup>6</sup>

<sup>5</sup> This species is described in a forthcoming paper; Anderson (in press).

<sup>6</sup> This new genus and three new species are described in a forthcoming paper; Anderson (in press).

- Rostrum straight; antennal club with apical pilose part obliquely oriented and appearing only as a narrow line; entire body uniformly covered with brownish matte coating; front femur of male without subapical swelling or tooth on inner margin.....  
..... *Neophrynooides* O'Brien and Wibmer  
(1 species; *N. luteus* (Chevrolat))
- 15 Rostrum curved ventrally; elytral striae impressed, intervals with single row of fine punctures; pronotum uniformly punctate ..... *Cosmopolites* Chevrolat  
(1 species; *C. sordidus* (Germar))
- Rostrum more or less straight; elytral striae very shallowly, indistinctly impressed, intervals not punctate; pronotum virtually impunctate. .... *Eucalandra* Faust  
(1 species; *E. setulosa* (Gyllenhal))
- 16 Tarsal article 3 with long ventral pilosity, confined to apical margin as a continuous fringe, ventral surface otherwise glabrous; antennal club obliquely truncate at apex with apical pilose part very short, appearing recessed within glabrous part, visible only as a narrow line in lateral view ..... *Scyphophorus* Schoenherr  
(1 species; *S. acupunctatus* (Gyllenhal))
- Tarsal article 3 with various ventral pilosity; long or short, uniformly covering 1/3 or more of ventral surface, or with pilosity sparse and confined to anterolateral angle or lateral margins, ventral surface otherwise glabrous; antennal club various, with apex evenly (most) or obliquely (few) truncate; apical pilose part of club short or long, generally visible as more than a narrow line in lateral view..... 17
- 17 Tarsal article 3 with ventral pilosity confined to anterolateral angle or lateral margins. .... *Sphenophorus* Schoenherr  
(3 species)
- Tarsal article 3 with ventral pilosity more extensive, covering 1/3 or more of ventral surface ... ..... 18
- 18 Tarsal article 5 (claw-bearing article) with venter at apex excavate or markedly to slightly bilamellate (difficult to see in some specimens); antennal scape enlarged and laterally compressed (few) or more or less cylindrical (most); rostrum humped with abrupt change of orientation from anteriorly directed near base to ventrally directed near apex (many) or anteroventrally oriented, without any dorsal hump or abrupt change in orientation (many); legs of males and females generally similar in shape and vestiture; pygidium narrow especially towards apex which generally is narrowly rounded, tumescent subapically and extended beyond apex of ventrite 5 in ventral view; male aedeagus without lateral line ..... *Rhodoabaenus* LeConte (in part)  
(33 of 44 species)
- Tarsal article 5 (claw-bearing article) with apical venter smooth; antennal scape more or less cylindrical (most) or laterally compressed (few); rostrum generally uniformly anteriorly or anteroventrally oriented, without any dorsal hump or abrupt change in

- orientation (most) or rostrum humped with abrupt change in orientation from anteriorly directed basally to ventrally directed apically (few); legs of males and females either generally similar in structure (many) or with front or hind tibiae of males of a different shape, or bearing different vestiture in the form of rows or tufts of longer hairs (many); pygidium broad especially towards apex which generally is broadly truncate, flat or variously carinate subapically and at most slightly extended beyond apex of ventrite 5 in ventral view; male aedeagus with or without lateral line..... 19
- 19 Male aedeagus with lateral line (complete or incomplete); legs with front or hind tibiae of males bearing vestiture in the form of rows or tufts of longer hairs (which are not present in females) or of a different shape (most), or legs of both sexes generally similar in shape and vestiture (few); ventrally, lacking tubercles between front coxae or with metasternum more or less flat between mesocoxae ..... *Metamasius* Horn  
(36 species)
- Male aedeagus without lateral line; legs of males and females generally similar in shape and vestiture; ventrally, some species with variously developed tubercles between front coxae or with metasternum markedly produced and subconical between mesocoxae.....20
- 20 Small (8.0-13.0 mm; few) to large (13.0-22.0 mm, most) entirely grey or black species, some with dark velvety black markings or a pale colored "V" or "C" shaped marking on the elytra; ventrally, lacking tubercles between front coxae or with metasternum more or less flat between mesocoxae.....*Rhodobaenus* LeConte (in part)  
(11 of 44 species)
- Small (7.0-8.0 mm; few) to large (12.0-25.0 mm, most) black and red, orange or yellow species (most), or entirely black but then metasternum markedly produced and subconical between mesocoxae (few) or pronotum and elytra distinctly, irregularly sculptured (few); ventrally, with variously developed tubercles between front coxae (many) or with metasternum markedly produced and subconical between mesocoxae (many) .....*Cactophagus* LeConte  
(34 species)

## Family Dryophthoridae Schoenherr

### Subfamily Dryophthorinae Schoenherr

Three genera comprise this subfamily, only two of which, *Dryophthorus* and *Stenommatius*, occur in the New World. The genus *Dryophthorus* has an extensive distribution throughout the world with numerous species known. Six of these occur in the Americas but numerous undescribed species exist. *Stenommatius* has three species known from South and Central America, and Mexico. These weevils are recognizable by their small size and antennal funicle of 4 articles. Members of this subfamily are not treated further herein.

**Subfamily Orthognathinae Lacordaire**

Four New World genera are known in this subfamily, three of which occur in Costa Rica and Panama. Among other New World Dryophthoridae, members are recognized by their contiguous front coxae.

**Tribe Rhinostomini Kuschel**

Two genera, *Rhinostomus* and *Yuccaborus* LeConte, are included in this tribe. The status of *Yuccaborus* as a distinct genus is open to question. The tribe is characterized by contiguous front coxae. Only two species of *Rhinostomus* occur in Costa Rica and Panama. *Rhinostomus barbirostris* is exceedingly common in certain situations whereas *R. thompsoni* is much more rarely found.

**Tribe Orthognathini Lacordaire**

Three genera comprise the tribe Orthognathini; *Mesocordylus*, *Orthognathus* and *Sipalinus* Marshall. *Sipalinus* is known from the Old World tropical regions (including Australia) whereas the other two genera are Neotropical with but one species of *Orthognathus* extending as far north as the southwestern United States of America. Members of the tribe are characterized by possession of distinct, rounded postocular lobes and geniculate antennae. Aside from the species of *Mesocordylus*, only *Orthognathus subparallelus* occurs in Costa Rica and Panama.

**Genus *Mesocordylus* Lacordaire**

*Mesocordylus* Lacordaire 1866:314.

Type species: *Calandra subulata* Germar 1824:301. Designation by Vaurie 1970:3.

Twenty-seven species of *Mesocordylus* are known from Mexico through to Argentina. There are eleven species of *Mesocordylus* in Costa Rica and Panama. Of these eleven species, four are restricted to Costa Rica and Panama. One species is described herein as new.

Adults of *Mesocordylus* are most frequently collected at lights and in flight intercept traps. Occasionally, adults are found associated with fallen logs. The immature stages are unknown. Vaurie (1970, 1973) revised the genus.

Key to species of *Mesocordylus* in Costa Rica and Panama

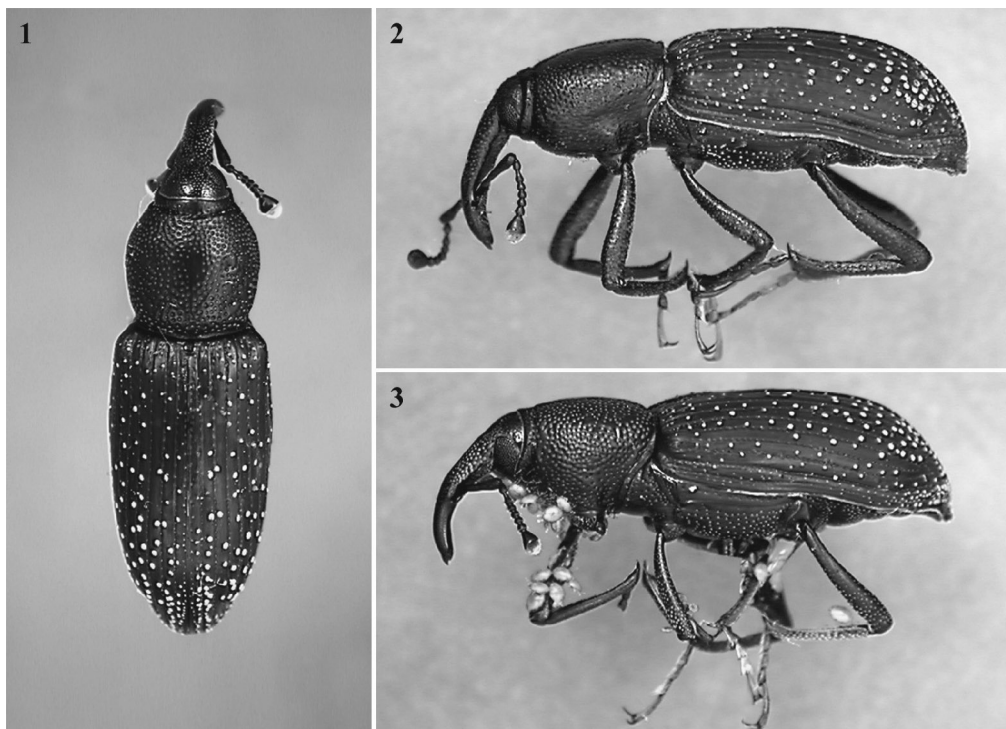
- 1 Hind tibia robust, generally wider than either middle or front tibia, expanded toward apex where it is noticeably wider than at base ..... 2
- Hind tibia slender, generally similar in form to the middle and front tibia, of more or less the same width throughout ..... 4
- 2 Antennal club with pilose part appearing only as narrow apical band; pronotal width subequal to length, disc broadly flattened medially; rostrum virtually straight, width of basal portion more or less twice width of apical portion; elytral striae deeply impressed..... *M. striatus* (Boheman) (in part)
- Antennal club with basal glabrous part subequal in length to, or very slightly longer than, apical pilose part; pronotal width slightly less than length, disc variously convex medially; rostrum at least slightly arcuate, width of basal portion subequal to width of apical portion; elytral striae shallowly, although still distinctly, impressed..... 3
- 3 Hind tibia with inner margin moderately inwardly curved near apex with sparse long hairs along length; pronotal disc with large punctures which are shallow medially, deeper anterolaterally, disc widest at middle, lateral margins arcuate ...*M. similis* Vaurie
- Hind tibia with inner margin more or less straight with dense long hairs along length; pronotal disc with small punctures which are absent to very shallow medially, only slightly deeper anterolaterally, disc widest at apical third, lateral margins virtually straight for most of length.....*M. secundus* Vaurie
- 4 Elytral intervals on disc with micropilose spots or granules minute, smaller than punctures of pronotum, and dense, with usually 20 or more along the discal length of an interval (not including declivity)..... 5
- Elytral intervals on disc with micropilose spots or granules moderate to large, larger than punctures of pronotum, and sparse, with usually 2-15 or more along the discal length of an interval (not including declivity)..... 9
- 5 Antennal club with pilose part very short, appearing only as a narrow apical band; elytral striae deeply impressed.....*M. striatus* (Boheman) (in part)
- Antennal club with pilose part long, composing one-third to one-half length of club; elytral striae shallowly impressed ..... 6
- 6 Pronotum dorsally behind apex narrowly, deeply sulcate from side to side ..... 7
- Pronotum dorsally behind apex not or at most only shallowly, irregularly impressed across middle, moderately to deeply sulcate laterally ..... 8
- 7 Antennal club with pilose part composing about apical one-third length of club; rostrum with lateral margins behind scrobes sinuate in dorsal view; apex of aedeagus deeply "V" shaped.....*M. bracteolatus* (Boheman)
- Antennal club with pilose part composing about apical one-half length of club; rostrum with lateral margins behind scrobes straight in dorsal view; apex of aedeagus shallowly "U" shaped.....*M. abditus* Vaurie
- 8 Rostrum in basal two-thirds, lateral punctures of pronotum, and (in some cases) discal

- intervals of elytra with dense golden micropilosity on and between various granules or mounds; micropilose granules numerous and obvious; antennal club with apical pilose part one-quarter length of club; males with long dense setae along inner margin of each tibia; females with point of antennal insertion on rostrum beyond midlength, the apical portion shorter than basal portion and distinctly, rather deeply punctate.....  
.....*M. dispersus* Champion
- Rostrum in basal two-thirds, lateral punctures of pronotum, and discal intervals of elytra with at most sparse, indistinct micropilose granules; antennal club with apical pilose part one-third length of club; males with short sparse setae along inner margin of each tibia; females with point of antennal insertion on rostrum at midlength, the apical portion as long as basal portion, shining and very sparsely and shallowly punctate ...  
.....*M. scutellaris* (Erichson)
- 9 Pronotum dorsally behind apex deeply, narrowly sulcate from side to side; elytra with micropilose granules moderate, diameter much less than the width of an interval; rostrum with apical portion strongly arcuate, especially so in female.....  
.....*M. redelmeieri* Anderson, new species
- Pronotum dorsally behind apex not sulcate from side to side or at most shallowly and irregularly impressed across middle; elytra with micropilose granules large, diameter about as wide as the width of an interval; rostrum with apical portion slightly to moderately arcuate ..... 10
- 10 Tarsal articles in profile stout, with third article only slightly longer than high; ventrally with fringe of uniformly short, dense hairs, forming hairy pads .....  
.....*M. subulatus* (Germar)
- Tarsal articles in profile elongate, with third article much longer than high; ventrally with long hairs spreading out giving a “fuzzy” appearance, or with at least longer wispy hairs at apex ..... 11
- 11 Hind legs with first and second tarsal articles long and slender, length 4-5 x width; size generally small, total body length 5.0-6.0 mm; rostrum of female dorsally longitudinally sulcate on each side behind apex, sulci widely separate and arcuate.....  
.....*M. gracilis* Champion
- Hind legs with first and second tarsal articles robust, length 2-3 x width; size generally larger, total body length 10.0-19.0 mm; rostrum of female dorsally longitudinally sulcate on each side behind apex (but narrowly separated and straight) or not..... 12
- 12 Pronotum with dorsolateral punctures separate, not forming rugae; elytra with areas between micropilose granules smooth, lacking fine microsculpture; rostrum of female with longitudinal dorsal sulci narrowly separated, straight.... *M. pustulosus* Champion
- Pronotum with some dorsolateral punctures coalescent forming irregular wavy transverse rugae; elytra with areas between micropilose granules with fine isodiametric microsculpture (visible under high magnification); rostrum of female not dorsally longitudinally sulcate on each side behind apex ..... *M. rugicollis* (Boheman)

*Mesocordylus redelmeieri* Anderson, new species

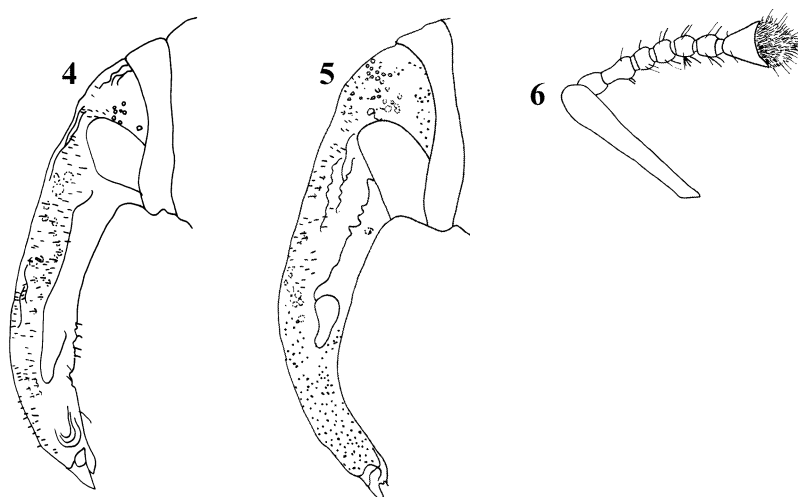
(Figs. 1-6)

Identification.—*Mesocordylus redelmeieri* is recognized by the presence of scattered, moderately large micropilose granules on the elytral intervals (6-12 per interval on disc) (Figs. 1-3), long apical pilose part of the antennal club (only slightly shorter than the basal glabrous part) (Fig. 6), tarsal articles with elongate, but sparse, bristly vestiture, and by the form of the male and female rostrum (Figs. 2-3, 4-5). In females, the rostrum in lateral view is more or less straight in the basal one-half, but strongly arcuate in the apical one-half (Figs. 3, 5); in dorsal view, the lateral margins converge gradually and uniformly from a wide base to a narrow apex. In males, the rostrum in lateral view is more or less straight in the basal three-fifths, and slightly arcuate in the apical two-fifths (Figs. 2, 4); in dorsal view, the lateral margins are subparallel and the width is subequal throughout the length. The punctation on both the male and female rostrum is dense and moderately large basad of the antennal insertion, but finer and smaller apically beyond the antennal insertion, especially so in the female. The pronotum is strongly impressed subapically both laterally and dorsally, although in some specimens the dorsal impression is not deep and continuous, but rather a series of contiguous punctures. The aedeagus of *M. redelmeieri* is very shallowly emarginate at the apex and in lateral view is only slightly arcuate.



**FIGURES 1-3.** *Mesocordylus redelmeieri* Anderson. 1. Dorsal habitus, male. 2. Lateral habitus, male. 3. Lateral habitus, female.

Description.—Male, length 9.3-15.5 mm; width 3.2-5.4 mm. Female, length 10.2-17.5 mm; width 3.4-6.2 mm. Color dark brown to black. Rostrum four-fifths (male) to one-third (female) length pronotum; male in dorsal view with lateral margins subparallel, subequal in width throughout length, in lateral view straight to antennal insertion then slightly arcuate ventrally to apex; female in dorsal view with lateral margins uniformly convergent from base to apical one-fourth or one-fifth, very slightly divergent to narrow apex, width apex one-half to two-thirds width base, in lateral view straight to antennal insertion then strongly arcuate ventrally to apex; punctation in male moderately large, dense in basal one-half, progressively smaller and sparser towards apex, similar in female but with apical portion very finely punctate, subglabrous; all punctures with median seta small, indistinct, micropilosity not evident beyond punctures; surface not otherwise sculptured, carinate or sulcate; dorsally at apex moderately emarginate. Antennal scrobe with lower edge dilated, clearly visible in dorsal view in male, less so in female. Antennae inserted at apical two-fifths in male, slightly beyond middle in female; club large, round, with apical pilose part only slightly shorter than the basal glabrous part. Pronotum cylindrical, somewhat globose in dorsal view, widest at from apical one-third to two-fifths; punctures moderately large, dense laterally, smaller and sparsely medially, median line impunctate in some specimens; subapical impression deep laterally, continuous but shallower dorsally, in some specimens evident as a series of contiguous irregular punctures. Elytra with intervals flat to very slightly convex, each with 6-12 moderately large micropilose granules in single row per interval, granules denser on apical declivity; striae evident, striae punctures obscure. Legs with tibiae slightly incurved subapically; tarsal articles elongate, narrow, with ventral vestiture elongate, sparse, bristly, especially apically on article 3. Genitalia of male with aedeagus very shallowly emarginate at apex; in lateral view, slightly curved ventrally throughout length, elongate, coiled flagellum present.



**FIGURES 4-6.** *Mesocordylus redelmeieri* Anderson. 4. Lateral view of head, male. 5. Lateral view of head, female. 6. Antenna.



Sexual dimorphism.—As in all *Mesocordylus* species, sexual dimorphism is evident in *M. redelmeieri*. Although not as extreme as in some species, there are differences, as noted in the description, mainly in the form of the rostrum.

Material examined.—Male HOLOTYPE labelled “Est. Pitilla 9 Km S. Santa Cecilia, P.N. /Guana, Costa Rica. 700m. Oct 1994, C. / Moraga, L N 330200\_380200 #3262”, INBio barcode 1998040 (INBC). Female ALLOTYPE labelled “Est. Pitilla 9 Km S. Santa Cecilia, P.N. /Guanacaste, Prov. Guana, , Costa Rica. / 700m. Jun 1994, C. Moraga, L N / 330200\_380200 #3002”, INBio barcode 2047538 (INBC). PARATYPES (11 ♂, 21 ♀). COSTA RICA. GUANACASTE PROVINCE. Estacion Pitilla, 9 km S. Santa Cecilia. 700m. 27 Jan-4 Feb 1989 (1 ♂; 32871), Dec. 1989 (1 ♀; 166133), July 1994 (1 ♀; 2048618), Oct 1994 (1 ♀; 1998041). Rio San Lorenzo, Tierras Morenas, R.F. Cord. Guanacaste. 1050m. Jan 1992 (1 ♀; 557184). HEREDIA PROVINCE. La Virgen (16 km S.S.E.), 1050-1150m, 10°16'N, 84°05'W, 15 February 2001, INBio, OET, ALAS Transect (1 ♀; 3215182); 14 March 2001 (1 ♀; 3215342); 17 March 2001 (1 ♂, 1 ♀; 3215387, 3215240); 19 March 2001 (1 ♀; 3214770); 16 April 2001 (1E; 3215000); 20 April 2001 (1E; 3215097). ALAJUELA PROVINCE. Rio Sn. Lorencito, Res. For. San Ramon, 5 km N. Col. Palmarena. 900m. Mar 1990 (3 ♂; 158260, 158043, 158001; 1 ♀; 157965). PANAMA. CHIRIQUI PROVINCE. Fortuna (8°44'N, 82°15'W), 1050m, UV light, May 18, 1976 (1 ♀), October 23, 1976 (1 ♂), November 25, 1976 (1 ♀), April 19, 1977 (1 ♀), September 24, 1977 (1 ♂), October 8, 1977 (1 ♀), November 28, 1977 (1 ♀), March 2, 1978 (1 ♂), April 11, 1978 (1 ♀), April 15, 1978 (1 ♂), April 25, 1978 (1 ♀), April 21, 1978 (1 ♂), May 6, 1978 (1 ♀), June 26, 1978 (1 ♂), July 31, 1978 (1 ♀), May 14, 1979 (1 ♀). Paratypes in CMNC, CWOB, INBC.

Distribution.—Costa Rica (Alajuela, Guanacaste), Panama (Chiriqui).

Natural history.—Specimens, some at light traps, have been collected from 700m to 1050m. No other information is available.

Derivation of specific name.—Through their support of the Nature Discovery Fund at the Canadian Museum of Nature, this species is named after Ernest J. H. Redelmeier of Richmond Hill, Ontario, Canada as a gift from his wife Flavia on the occasion of his 80<sup>th</sup> birthday.

Comments.—In general, *Mesocordylus* species are difficult to identify. This appears to be because of extensive variation in size, sexual dimorphism which is often pronounced, and the fact that many of the specimens are covered in a greasy coating which is difficult to remove and generally obscures distinguishing characters. As with many species of *Mesocordylus*, this species is difficult to distinguish on the basis of any one character state.

### Subfamily Rhynchophorinae Schoenherr

This is the most diverse group of New World Dryophthoridae. Four tribes and 16 genera (including one to be described in a forthcoming publication; Anderson, in press) are repre-

sented in Costa Rica and Panama. These are the New World Dryophthoridae with separated front coxae.

### **Tribe Rhynchophorini Schoenherr**

These are the largest New World Dryophthoridae with some individuals reaching up to 50 mm in length. Three species in the genera *Dynamis* and *Rhynchophorus* occur in Costa Rica and Panama. They are recognized by large size, the form of the articulation between the femur and tibia which consists of a set of flanges and brackets, lack of a second small apical tibial tooth and sternite 9 is absent in males (Kuschel 1995).

### **Tribe Litosomini Lacordaire**

Aside from the genera *Sitophilus* and *Cosmopolites*, these are the most rarely encountered Dryophthoridae. There are seven genera and 12 species present, including one new genus and four new species to be described in a forthcoming paper (Anderson, in press). They are characterized by a normal articulation between the femur and tibia, and a rhomboidal scutellum with its greatest width near the middle. Very little is known of their natural history.

### **Tribe Polytini Zimmerman**

Only *Polytus mellerborgii*, introduced from southwestern Asia, occurs in Costa Rica and Panama. This is a small species, very similar to species of *Sitophilus* in general form. Kuschel (1995) did not recognize this as a distinct tribe.

### **Tribe Sphenophorini Lacordaire**

Six genera but over 100 species of this tribe occur in Costa Rica and Panama. They are characterized by the form of the articulation between the femur and tibia which consists of a set of flanges and brackets, lack of a second small apical tibial tooth, sternite 9 is present in males (Kuschel 1995) and the scutellum is triangular in shape, widest near the base.

### **Genus *Cactophagus* LeConte**

*Cactophagus* LeConte 1876:331.

*Phyllerythrurus* Chevrolat 1885a:92.

*Paradiaphorus* Chevrolat 1885b:287. New synonymy.

*Cactophagoides* Champion 1910:89. New synonymy.  
*Eucactophagus* Champion 1910:96.

Type species: *Sphenophorus validus* LeConte 1858:80. Designation by monotypy.

This is a large tropical genus with about 60 described species. There are 28 species of *Cactophagus* known from Costa Rica and 24 from Panama with 18 species shared between the two countries. The genus occurs from the southern United States to Argentina.

Herein I group all species that lack a lateral line on the aedeagus (with the exception of *Rhodoaenus* species) as *Cactophagus*. This includes the previously recognized genera *Cactophagoides* Champion (with two described Costa Rican species) and *Paradiaphorus* Chevrolat (with a single described Brazilian species). When the extent of variation within species of *Cactophagus* is considered, it is quite clear that both forms are autapomorphic *Cactophagus*. Were they to be considered distinct at the generic level then a further breakdown of remaining *Cactophagus* species into a number of smaller genera would be necessary.

Species of *Cactophagus* are associated generally with monocotyledons such as arums (Araceae), orchids (Orchidaceae), bromeliads (Bromeliadaceae), palms (Arecaceae), and bananas (Musaceae) but at least two species are associated with cacti (Cactaceae). Adults of most species are diurnal. The genus was revised by Vaurie (1966, 1967). Immature stages were described by Anderson (1948).

### Key to species of *Cactophagus* in Costa Rica and Panama (after Vaurie 1966, 1967)

- 1 Pronotum deeply laterally incised subapically immediately behind eye; in dorsal view, lateral margin with distinct, deep subapical emargination, apex distinctly tubulate; pronotum and (especially) elytra with coarse, irregular sculpture ..... 2
- Pronotum at most slightly laterally impressed subapically behind eye, not distinctly incised; in dorsal view, lateral margin more or less continuous to apex, at most slightly constricted subapically or rarely subemarginate; pronotum and elytra generally lacking coarse sculpture ..... 5
- 2 Elytra smooth and even, lacking "wart-like" swellings, striae and intervals uniform, not distorted by swellings; elytra very slightly transversely impressed at anterior and posterior one-thirds but not deeply plicate; color black with elytral intervals 3 and 9 orange throughout most of their lengths ..... *C. lineatus* Anderson, new species
- Elytra with moderate to large, "wart-like" swellings which distort striae and intervals; elytra distinctly, deeply transversely plicate at anterior and posterior one-thirds; color uniformly black or elytra black with few red spots near base ..... 3
- 3 Color black, elytra with distinct red spots at base of interval 3, on humerus and sub-

- apically on interval 9; Panama ..... *C. morrisoni* Anderson, new species
- Color uniformly black; Costa Rica..... 4
- 4 Pronotum with subbasal impression weakly carinate; prosternum between coxae narrow, not tuberculate.....*C. verrucosus* (Champion)
- Pronotum with subbasal impression not carinate; prosternum between coxae wider, slightly tuberculate .....*C. gibberosus* (Champion)
- 5 Outer apex of tibia bidentate; male femora with inner margin with distinct tooth .....  
..... *C. transatlanticus* (Kirsch)
- Outer apex of tibia rounded or obtusely angulate; male femora with inner margin lacking tooth, simple ..... 6
- 6 Metasternum with round or conical protuberance between middle coxae..... 7
- Metasternum feebly rounded or flat between middle coxae ..... 13
- 7 Pronotum with three round, equidistant depressions; antennal club with pilose apical portion one-quarter or less length of entire club; elytra yellowish with black borders and spots..... *C. graphipterus* (Champion)
- Pronotum with one depression at middle of base; antennal club with pilose apical portion one-third or more length of entire club; elytra black, or black with red or orange bands or stripes..... 8
- 8 Metasternal protuberance rounded, not larger than bulge of coxa; mesepimeron with outer front corner turned upward or backward..... *C. pruinosis* (Champion)
- Metasternal protuberance conical, larger than bulge of coxa; mesepimeron with outer front corner flat..... 9
- 9 Rostrum densely, coarsely punctate laterally in basal one-half, sides in front of scrobe with hairy, elongate depression formed by coalescent punctures...*C. viduus* (Hustache)
- Rostrum very finely punctate or impunctate laterally, sides in front of scrobe smooth..  
..... 10
- 10 Rostrum with upper margin of scrobe straight, base not dilated over scrobes.....  
..... *C. aurofasciatus* (Breme)
- Rostrum with upper margin of scrobe with small angulation or sinuation, base dilated (at least slightly) over scrobes ..... 11
- 11 Elytra black, with large black velvety patch on each elytron (feebly defined in some specimens); prosternum with round swelling in front of each coxa .....  
.....*C. carinipyga* (Champion)
- Elytra black, with 1 or 2 transverse orange or red bands; prosternum smooth in front of each coxa ..... 12
- 12 Elytra with 2 red bands, one subbasal, the other at apical one-quarter; pronotum markedly sinuate at middle; scutellum distinctly emarginate anteriorly .....  
.....*C. duplocinctus* (Champion)
- Elytra with a single red basal band; pronotum very slightly sinuate at middle; scutellum slightly concave anteriorly ..... *C. riesenorum* Anderson, new species

- 13 Antenna with pilose apical portion very small, less than one-fourth or one-fifth length of club..... 14
- Antenna with pilose apical portion one-third or more length of club ..... 16
- 14 Hind tibia broad, flat and "paddle-like", width at middle about one-third length.....  
..... *C. silron* Anderson, new species
- Hind tibia typically slender and elongate, width at middle much less than one-third length..... 15
- 15 Pronotum with basal depression and two or more additional depressions; antennal club symmetrical in profile..... *C. aurocinctus* (Champion)
- Pronotum with single shallow basal depression or no depression; antennal club oblique in profile, one side longer than the other..... *C. strigosus* (Erichson)
- 16 Rostrum with ventral surface with long or short hairs ..... 17
- Rostrum with ventral surface glabrous..... 18
- 17 Rostrum with ventral hairs sparse, tiny, basal; pronotum and elytra with velvety black areas; elytral apices truncate ..... *C. miniatopunctatus* Chevrolat (in part)
- Rostrum with ventral hairs dense, long, in two distinct rows; pronotum and elytra without velvety black areas but with tumid orange spots; elytral apices separately rounded..... *C. personatus* (Vaurie)
- 18 Elytra black, with single transverse red band at extreme base (band may be incomplete at middle or divided at sides) ..... 19
- Elytra without transverse red band or if present, not at base, or with other pattern of red markings ..... 21
- 19 Elytral intervals at base flat or only feebly swollen..... *C. mesomelas* (Champion)
- Elytral intervals at base abruptly bulbous ..... 20
- 20 Elytra with one red band; fourth interval bulbous at base and wider than others; pronotum black.... *C. sanguinolentus* (Olivier)
- Elytra with two red bands; fourth and fifth intervals bulbous at base but fourth not wider than others; pronotum with some red in most specimens .....  
..... *C. rubrovariegatus* Bovie
- 21 Mesosternal process at apex distinctly narrower than one-half diameter of coxa ..... 22
- Mesosternal process at apex equal to or greater than one-half diameter of coxa..... 26
- 22 Elytral striae uniform, straight, not distorted by orange maculations (if maculations present); antennal scrobe with posterior edge separated from eye by no more than twice width of base of scape; inner face of front coxa lacking tubercles..... 23
- Elytral striae variously redirected and distorted by swellings at orange maculations (if maculations present); antennal scrobe with posterior edge distant from eye by nearly length of antennal club or more; inner face of front coxa of male with inward-pointed tubercle..... 24
- 23 Rostrum immediately in front of eye with deep, vertical groove (formed by coalescent punctures); pygidium with dense long hairs in apical one-half, along lateral margins

- and along midline; form slender, pronotum longer than wide .....  
 ..... *C. lingorum* Anderson, new species
- Rostrum immediately in front of eye with large, deep punctures; pygidium (except for apical fringe) with sparse, short hairs throughout; form more robust, pronotum about as long as wide ..... *C. circumdatus* (Champion), (in part)
- 24 Pronotum and basal portion of elytra coarsely, irregularly sculptured, rugulose, deeply coarsely punctate; pronotum with single transverse subbasal impression and two paramedian shallow, irregular impressions near midlength .....  
 ..... *C. dragoni* Anderson, new species
- Pronotum and elytra more or less smooth, finely evenly punctate; pronotum with only single transverse subbasal impression ..... 25
- 25 Elytra each with colored subapical spot on third interval elongate and nearly extended to apex; humeral spot longer than adjacent spot ..... *C. sinuatus* (Champion)
- Elytra each with colored subapical spot on third interval (if present), nearly round, situated far from apex; humeral spot short, not larger than others .....  
 ..... *C. ornatus* (Champion)
- 26 Rostrum short, lower margin only three or four times longer than wide ..... 27
- Rostrum longer, lower margin at least five times longer than wide ..... 28
- 27 Middle coxae separated by width of coxa; front coxae separated by width of antennal club; antennal club with apical pilose portion about one-third length of club .....  
 ..... *C. pulcherrimus* (Champion)
- Middle coxae separated by about one-half to two-thirds width of coxa; front coxae separated by less than width of antennal club; antennal club with apical pilose portion about one-half length of club ..... *C. annulatus* (Champion)
- 28 Elytra with punctures of striae large, fovea-like, deeply impressed and "pit-like", intervals and pronotum impunctate ..... *C. fahraei* (Gyllenhal)
- Elytra with punctures of striae small to moderate, shallowly to moderately impressed, intervals finely punctate or impunctate; pronotum with punctures large, coarse and deep to small, shallow and fine ..... 29
- 29 Punctures of elytral striae moderate in size, distinct; intervals finely but distinctly punctate; pronotum with distinct, moderately large deep punctures ..... 30
- Punctures of elytral striae small if present, not distinct; intervals impunctate; pronotum at most finely punctate ..... 31
- 30 Elytra with bases of intervals 3-5 slightly swollen, interval 5 noticeably wider at base than throughout rest of length; pronotum with punctures large, coarse and deep, some coalescent; pygidium subcarinate towards apex .....  
 ..... *C. gasbarrinorum* Anderson, new species
- Elytra with bases of intervals 3-5 flat, more or less of same width throughout lengths; pronotum with punctures moderate, individually distinct, not coalescent; pygidium evenly convex towards apex, not at all carinate ..... *C. validirostris* (Gyllenhal)

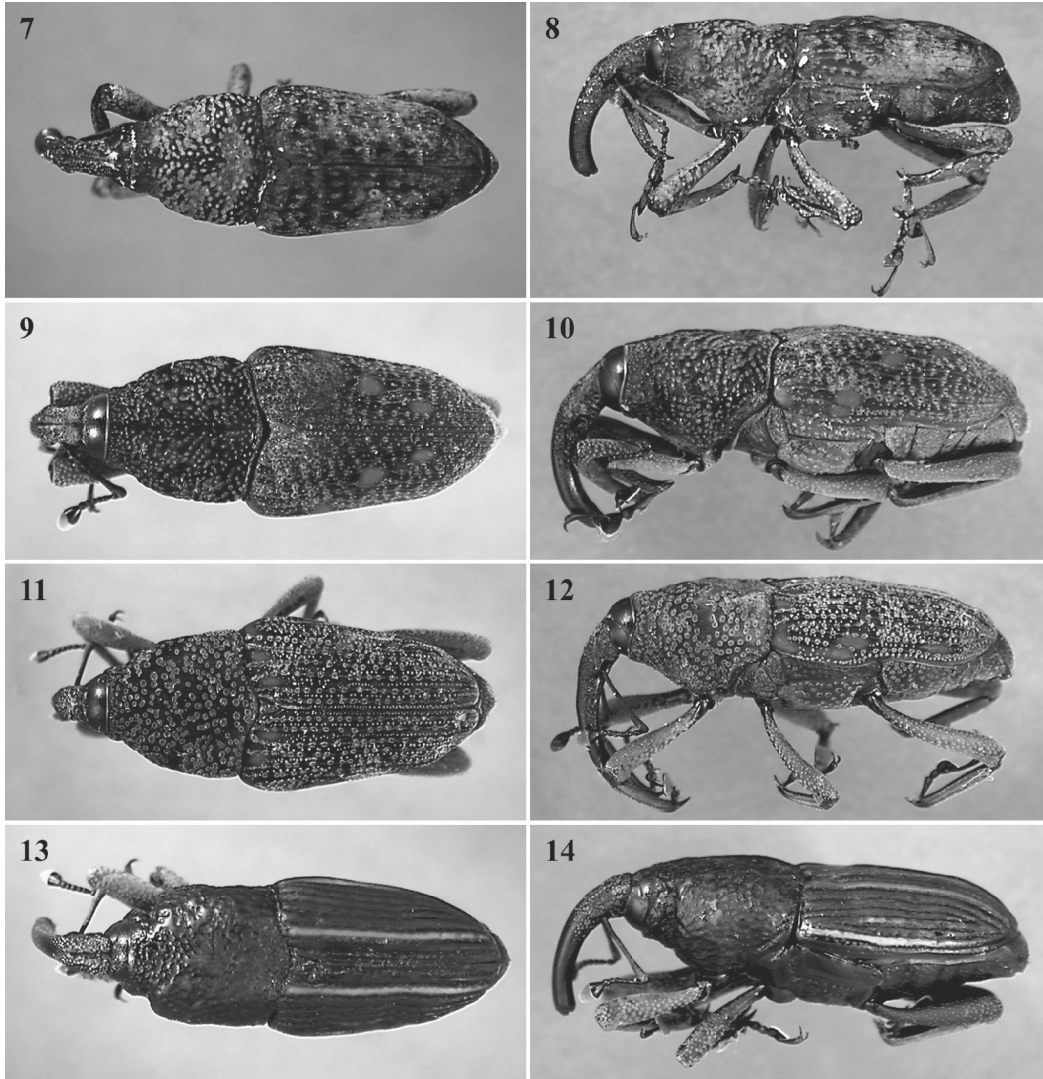
- 31 Pronotum with subbasal impression indistinct or absent; pronotum red or orange with black paramedian stripes; body size less than 8.0 mm.....*C. condylus* (Vaurie)
- Pronotum with subbasal impression distinct and moderately deep; pronotum black with lateral oblique red or orange stripe or maculation, or with no red or orange markings; body size greater than 8.0 mm..... 32
- 32 Pronotum with distinct red or orange lateral stripes that continue posteriorly onto elytra.....33
- Pronotum entirely black or black with pale red marks medially, not continuing posteriorly onto elytra ..... 34
- 33 Prosternum between coxae with distinct tubercle (males) or swelling (females); front tarsus with article 3 almost fully pilose ventrally, with at most a fine median, basal glabrous line; pronotal red or orange stripes narrow, many times longer than wide; pygidium subcarinate .....*C. circumjectus* (Champion)
- Prosternum flat between coxae; front tarsus with article 3 with broad, triangular, basal glabrous area; pronotal red or orange stripes broad, about three times longer than wide; pygidium slightly, evenly convex..... *C. circumdatus* (Champion), (in part)
- 34 Front coxae separated by slightly more than one-half width of coxa; base of elytral interval 4 swollen and directed slightly medially.....  
.....*C. sunatoriorum* Anderson, new species
- Front coxae separated by at most about one-third width of coxa; base of elytral interval 4 flat or slightly convex, directed anteriorly ..... 35
- 35 Male with prosternum between front coxae with distinct tubercle; pygidium with subapical swelling, apex subtruncate in lateral view; elytra with intervals 3-5 lacking series of orange dots at basal one-third .....*C. rectistriatus* (Champion)
- Male with prosternum flat between front coxae; pygidium at most slightly evenly convex, rounded in lateral view; elytra with row of red or orange dots on intervals 3-5 at basal one-third .....*C. miniatopunctatus* Chevrolat, (in part)

### ***Cactophagus dragoni* Anderson**

(Figs. 7-10, 15-18)

Identification.—*Cactophagus dragoni* appears to be closely related to *C. ornatus* and *C. sinuatus* based on similarities in the placement of the antennae on the rostrum far from the eye (Fig. 15), the bilamellate apical portion of the peduncle of the postmentum which is somewhat projected anteriorly and ventrally, and the elytral maculations which (if present) distort the form of the elytral striae (Fig. 9). Most specimens of *C. dragoni* have elytra with orange humeri and a series of disjunct orange maculations extended in an oblique arc from the anterior one-third of the lateral elytral margin to the posterior one-third of the elytral length at interval 3 (Fig. 9). These maculations are tumescent and slightly distort the ely-

tral striae. One immaculate conspecific specimen (near Boquete) is known (Figs. 7-8). Whereas similar, *C. ornatus* and *C. sinuatus* are not as markedly sculptured, have only a transverse subbasal pronotal impression, and the peduncle is not as sharply bilamellate as in *C. dragoni*.

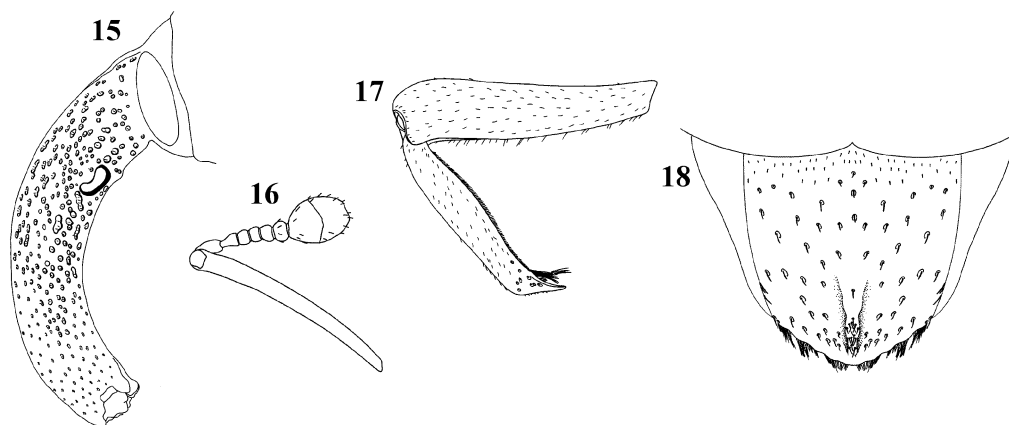


**FIGURES 7-14.** *Cactophagus* species. 7-10. *Cactophagus dragoni* Anderson. 7. Dorsal habitus, immaculate form. 8. Lateral habitus, immaculate form. 9. Dorsal habitus, maculate form. 10. Lateral habitus, maculate form. 11-12. *Cactophagus gasbarrinorum* Anderson. 11. Dorsal habitus. 12. Lateral habitus. 13-14. *Cactophagus lineatus* Anderson. 13. Dorsal habitus. 14. Lateral habitus.

Description.— Male, length, 13.8-15.3 mm; width, 5.8-6.5 mm. Female, length, 13.4-14.4 mm; width, 6.0-6.3 mm. Color black with elytral orange maculations at humeri, on



intervals 10 and 11 at basal one-third, and in an oblique arc through intervals 5-7 at midlength, to intervals 3 and 4 at apical one-third; maculations slightly swollen and distorting elytral striae.



**FIGURES 15-18.** *Cactophagus dragoni* Anderson. 15. Lateral view of head, female. 16. Antenna. 17. Hind leg, male. 18. Pygidium, male.

Rostrum subequal to length pronotum; elongate, cylindrical, robust, evenly rather strongly curved, very coarsely, irregularly punctate basally, punctures somewhat finer, sparser apically; base of rostrum expanded slightly in dorsal view at point of antennal insertion only; in lateral view slightly wider at base but not obviously expanded, basal area long, about two-fifths total rostral length. Rostrum glabrous ventrally; peduncle markedly bilamellate apically, projected anteriorly and ventrally. Scrobe with posterior margin about 6 or 7 times width of base of scape from anterior margin of eyes. Antenna with scape more or less one-half length rostrum; club slightly laterally compressed, elongate-oval; apical pilose part subequal to length basal glabrous part. Pronotum with lateral margins irregular, subparallel in basal one-half, convergent subapically, tubulate to apex; disc and flanks moderately deeply irregularly punctate throughout, some punctures coalescent forming irregular shallow rugae; surface irregular, with shallow impressions laterally at midlength and deep transverse impression subbasally at middle; anterolateral margin immediately behind eyes with surface somewhat crenulate. Pronotum slightly longer than wide. Elytra with length one and one-half times length pronotum; intervals finely punctate, irregularly creased; intervals 3-5 swollen and irregularly sculptured at base; striae with moderately deep, widely spaced, small punctures. Scutellum large, "V" shaped, length slightly longer than width at base, flat. Pygidium tumescent medially; shallowly regularly punctate throughout; apex broadly rounded, with transverse row of longer setae. Ventrally with front coxae very narrowly separated by no more than width of base of scape; prosternum markedly sloping between and anterior to front coxae, with low tubercle between coxae. Meso-, metasternum and ventrite 1 irregularly sparsely punctate; ven-

trites 2 to 5 sparsely, finely punctate; last ventrite flat, glabrous. Legs moderately long, moderately densely regularly punctate, especially on outer face of femora; front coxae of male with inwardly projected low rounded swelling, lacking in female; femora clavate, moderately long, hind femur reaching apex of pygidium; inner margins of middle and hind tibiae very slightly inwardly expanded subbasally; all tibiae with very fine, uniformly short, stout, peglike setae throughout length arranged in pectinate manner. Tarsi with article 1 of front leg pilose on both lobes; third article very widely dilated, pilose ventrally except for narrow median line in basal one-half; all tarsi with third articles symmetrical; apical margin of third articles very shallowly emarginate.

Variation.—Some variation exists in the extent of the elytral orange maculations which are lacking on interval 4 and intervals 6 and 7 in some specimens, and one immaculate specimen (near Boquete) is known.

Sexual dimorphism.—Sexes are difficult to separate in this species. Males have a slightly more concave metasternum and ventrite 1, and possess small tubercles on the front coxae.

Material Examined.—Male HOLOTYPE labelled "Pan. Chiriqui Prov. / Cont'l Divide Trl. / 11-15.V.1995 / Morris & Wappes" (CMNC). Female ALLOTYPE labelled "Panama. Chiriqui / Fortuna, 82°15'W / 8°44'N, May 20, 1978 / O'Briens & Marshall" (CWOB). PARATYPES (5 ♂, 3 ♀). PANAMA. CHIRIQUI PROVINCE. Boquete (5.6 km. W.), La Culebra Trail, 1450m, 19.vi.1996, J.Ashe & R. Brooks, *Arum* leaf axils, #178 (1 ♂). Continental Divide Trail, 11-15.V.1995, Morris and Wappes (1 ♂). Fortuna, 82°15'W 8°44'N, May 20, 1978, O'Briens & Marshall (1 ♂). May 16, 1978 (2 ♂; 1 ♀). Reserva Forestal La Fortuna, Quebrada Aleman, 21.VII.1995, C.W. and L.B. O'Brien (1 ♀). Cuenca Fortuna, Aoki Camp, 23.V.1985, R. Flowers (1 ♀). Paratypes in CMNC, CWOB.

Distribution.—Panama (Chiriqui).

Natural history.—Adults have been collected in montane cloud forest in the La Fortuna area of Chiriqui province, Panama. The specimen from 5.6 km. W. Boquete was collected in the axil of a large arum plant (Araceae).

Derivation of specific name.—Through support for the Nature Discovery Fund at the Canadian Museum of Nature, this species is named after Jane Dragon of Fort Smith, Northwest Territories, Canada.

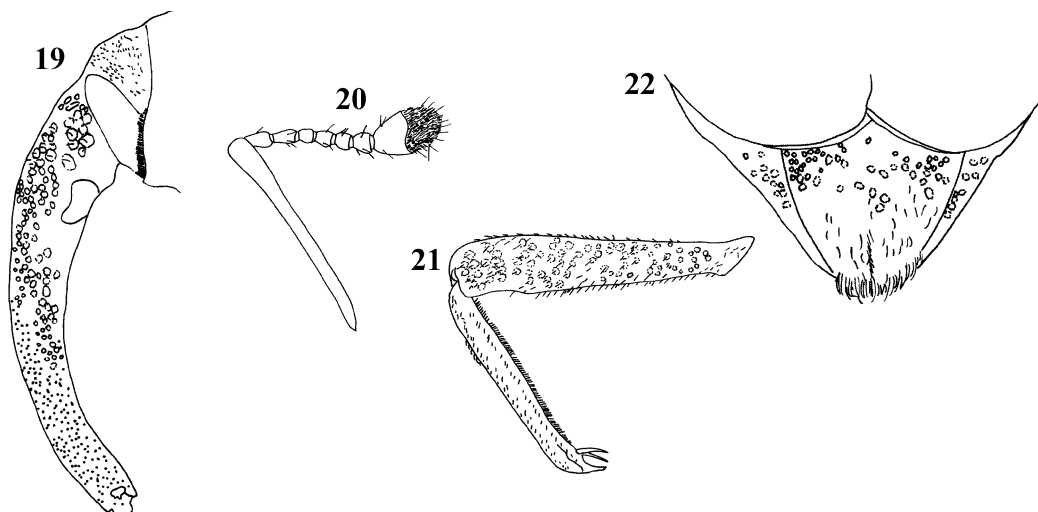
Comments.—This species approaches species previously placed in *Cactophagoides* in the extent of pronotal and elytral sculpture. Such intermediate forms have led to the consideration of *Cactophagoides* as a junior synonym of *Cactophagus*.

### ***Cactophagus gasbarrinorum* Anderson, new species**

(Figs. 11-12, 19-22)

Identification.—This species is easily recognized by its large size (16-17 mm in length),

pattern of elytral coloration (Figs. 11-12), and large deep irregular punctures on the basal one-half of the rostrum (especially laterally) (Fig. 19), the pronotal disc and the elytra (Fig. 11). It bears some similarity to *C. validirostris* which has more obvious dorsal punctation than most species of *Cactophagus*, although the punctures are not as deep and large as in *C. gasbarrinorum*. In some aspects it approaches the form of the species of *Cactophagoides*.



**FIGURES 19-22.** *Cactophagus gasbarrinorum* Anderson. 19. Lateral view of head, female. 20. Antenna. 21. Hind leg, female. 22. Pygidium, female.

Description.— Male, not known. Female, length, 16.0-16.8 mm; width 6.7-7.6 mm. Color black except for narrow, transverse red band at base of elytra, band extended posteriorly from humerus along lateral margin to anterior one-third of elytral length whereupon directed inwardly to interval 8 (faintly also onto intervals 7 and 6), also with irregular broken band of elongate, dark red markings at apical one-quarter on intervals 2, 6 and 8, that on interval 2 long and narrow, extended almost to elytral apex.

Rostrum slightly longer than pronotum; elongate, robust, subcylindrical, evenly curved; coarsely, densely punctate in basal one-half (especially laterally in front of and behind point of antennal insertion), punctures finer, sparser towards apex, apical one-quarter virtually impunctate, glabrous; base of rostrum expanded, basal expanded area about one-third total rostral length. Rostrum glabrous ventrally; peduncle flat, bilamellate. Scrobe with posterior margin about three times width of base of scape from anterior margin of eyes. Antenna with scape moderately long, about one-half length rostrum; club slightly laterally compressed, elongate-oval; apical pilose part subequal in length to basal glabrous part. Pronotum with lateral margins slightly convergent in basal one-half, moderately convergent to subapex, apex tubulate; sparsely but deeply and irregularly punctate throughout; moderately but irregularly transversely impressed subbasally; disc with three

irregular, low swellings at middle. Elytra with length one and one-half times length pronotum; with striae with large, deep punctures encroaching well into elytral intervals, intervals distinctly punctate, punctures smaller, shallower but denser than on striae; intervals somewhat rugose at about midlength elytra; base of intervals 2–4 slightly swollen. Scutellum “V” shaped, length one and one-third times width at base, flat. Pygidium with apical one-half vaguely carinate and setose, not tumescent; lateral margins at apex also setose; apex subtruncate. Ventrally with front coxae separated by slightly more than one-third width of coxa; prosternum coarsely, deeply punctate, slightly swollen between front coxae; flat anterior to coxae. Meso- and metasterna and ventrites with large deep but sparse punctures, punctures smaller and shallower medially; last ventrite of female with small, flat, subapical area, not setose. Legs elongate, matte, with moderately large shallow punctures throughout; femora clavate, long and moderately narrow, hind femur almost reaching midlength of pygidium; inner margins of all tibiae and femora with only very short, sparse setae; all tibiae straight. Tarsi each with third article widely dilated, almost completely pilose ventrally except for very narrow, subbasal midline; all tarsi with third articles symmetrical and apical margins truncate.

Material Examined.—Female HOLOTYPE labelled “Panama. Chiriqui Pr. / Reserva La Fortuna / Cont. Div. Trail / 18 Jan 92; El 1300m / H.P. Stockwell (CMNC). PARATYPE (1 ♀). PANAMA. CHIRIQUI PROVINCE. Cuenca Fortuna, Aoki Camp, 7.V.1985, R.W. Flowers (1 ♀). Paratype in CWOB.

Distribution.— Panama (Chiriqui).

Natural history.—The only known specimens were collected at or near 1300m in the vicinity of the La Fortuna Dam in Chiriqui in Panama. The habitat along The Continental Divide Trail and surrounding areas is a wet cloud forest.

Derivation of specific name.—Through his support of the Nature Discovery Fund at the Canadian Museum of Nature, this species is named after Ausilio “Silvio” Gasbarrino originally of Montreal, Canada.

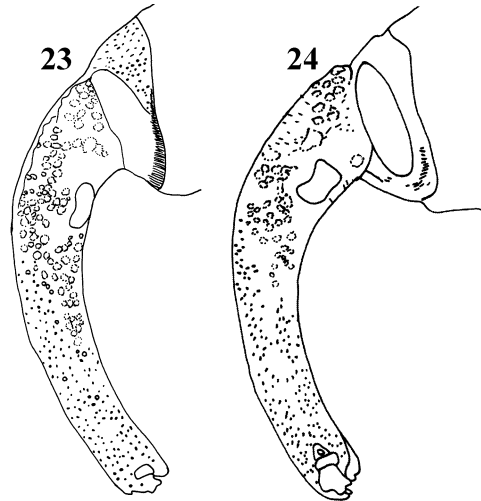
### ***Cactophagus lineatus* Anderson, new species**

(Figs. 13-14, 23)

Identification.—The single known specimen of this species can be easily recognized by the laterally incised pronotal margins, pattern of elytral coloration and the lack of any pronounced elytral sculpture (Figs. 13-14). The pygidium is at most convex with the median line not distinctly raised or carinate. In addition, the prosternum in front of the coxae is flat, but sloping anteriorly.

Description.— Male not known. Female, length, 14.5 mm; width 5.8 mm. Color black, pronotal disc and flanks with irregular dark orange maculations among punctures, elytra with four yellow-orange stripes, one throughout length of interval 4, two along

intervals 4 and 6, but infused with black near midlength, the last throughout length of interval 8; lateral portions of metasternum with irregular dark yellow-orange maculations as on pronotum.



**FIGURES 23-24.** *Cactophagus* species. 23. *Cactophagus lineatus* Anderson, lateral view of head, female. 24. *Cactophagus morrisi* Anderson, lateral view of head, female.

Rostrum about two-thirds length pronotum; elongate, cylindrical, evenly curved, densely, coarsely, deeply punctate dorsally at base and laterally at point of antennal insertion; apical one-half glabrous and very finely punctate, shining; base of rostrum expanded in dorsal view, basal expanded area long, about one-third total rostral length; in dorsal view with deep median sulcus in basal expanded area; in lateral view with deep irregular sulci (formed by coalescent punctures) behind point of antennal insertion. Peduncle convex, deeply bilamellate. Scrobe with posterior margin about four times width of base of scape from anterior margin of eyes. Antenna with scape about one-half length rostrum; club elongate-oval; apical pilose part very slightly longer than basal glabrous part. Pronotum with lateral margins subparallel to slightly divergent, abruptly constricted subapically, tubulate to apex; pronotum at constriction behind eyes somewhat excavate; moderately densely, deeply, irregularly punctate on disc and flanks; disc moderately deeply impressed subbasally at middle. Elytra with length one and one-third times length pronotum; intervals impunctate, convex; striae deeply impressed, impunctate. Disc laterally transversely creased or plicate at basal one-third and again at apical one-third; bases of intervals 2 and 3 slightly swollen and expanded; scutellar area depressed. Scutellum small, "V" shaped, length slightly greater than width at base. Pygidium slightly convex; coarsely deeply punctate throughout; apex subtruncate; with median row of short sparse setae in apical one-half and across apical margin. Ventrally with front coxae separated by only width of scape; prosternum moderately densely, irregularly punctate, flat but sloping anteriorly. Lateral portions of metasternum with large irregular punctures, otherwise venter moder-

ately densely, irregularly shallowly punctate; punctures smaller medially on metasternum and ventrites 1-5; last ventrite flat, punctate. Legs moderate in length, moderately densely, shallowly punctate; femora clavate, hind femur reaching apical one-third of ventrite 5; front coxae with inner faces subtuberculate; inner margins of all tibiae slightly sinuate sub-basally; inner margin of all tibiae with only short, sparse, peglike setae. Tarsi each with third article widely dilated, pilose ventrally except in broad fusiform median area in basal one-half; all tarsi with third articles symmetrical and apical margins truncate.

Material examined.—Female HOLOTYPE labelled “Costa Rica, Prov. San Jose, / Estacion Santa Elena. 1300-1400m. / 15 FEB 1996 M. Segura. / L\_S\_371500\_508500 #7678”, INBio barcode 2466110 (INBC).

Distribution.—Costa Rica (San Jose).

Natural history.—No information is available on natural history of this species.

Derivation of specific name.—This species is named after the linear pattern of elytral markings.

### ***Cactophagus lingorum* Anderson, new species**

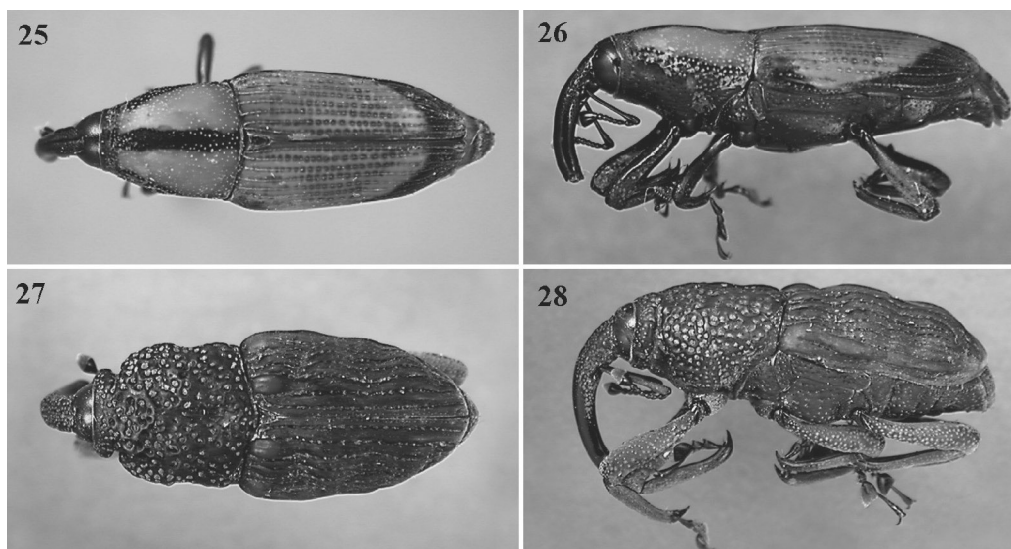
(Figs. 25-26, 29-32)

Identification.—This species is recognized by its dorsal color pattern (Figs. 25-26), slender form, densely pilose broadly carinate pygidium (Fig. 32), and virtually completely pilose and widely dilated third tarsal articles. This species has the superficial appearance of *C. laetus* (Erichson) but the latter has the intervals in the region of the subapical callus of the elytra distinctively modified, tumescent and merged, less extensive pilosity on the venter of the third tarsal articles, and an evenly convex pygidium.

Description.— Male, not known. Female, length, 9.5-11.1 mm; width 3.3-3.7 mm. Color black except for pronotum with very broad orange maculation on each side of mid-line throughout length of pronotum, and small round lateromedian orange spot on flanks; elytra with pair of large orange maculations covering nearly entire disc with the exception of humerus, interval 10 and various lengths of the apical portions of intervals 1-9 which are black in an obliquely defined posterolateral area.

Rostrum about three-quarters length pronotum; elongate, moderately robust, cylindrical and shining in apical one-half, evenly curved, moderately coarsely punctate laterally and dorsally at base, otherwise shallowly, finely punctate throughout; apical one-third glabrous and virtually impunctate; base of rostrum very slightly and gradually expanded, basal expanded area about one-fourth total rostral length. Rostrum glabrous ventrally; peduncle with slight to moderately developed anteriorly directed anterior tooth; bilamelate. Scrobe with posterior margin about twice width of base of scape from anterior margin of eyes. Antenna with scape about one-half length rostrum; club very slightly laterally compressed, elongate-oval; apical pilose part about two-fifths length of entire club.

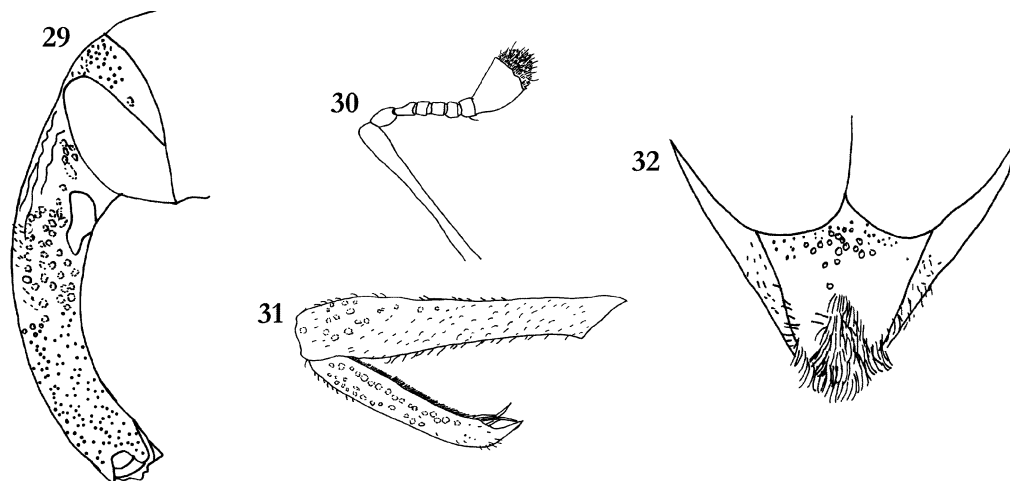
Pronotum with lateral margins subparallel in basal one-half, moderately convergent from midlength to apex; sparsely and shallowly punctate throughout; moderately deeply transversely impressed postmedially. Form of pronotum elongate-narrow, length slightly less than one and one-third times width. Elytra one and two-thirds times length pronotum; with striae vaguely punctate (more so laterally) and intervals impunctate, flat. Scutellum elongate, narrow; length about one and one-half times width at base, flat. Pygidium broadly carinate in apical two-thirds, not tumescent; densely setose along low median carina and in apical one-third generally; punctate throughout; apex subacuminate. Ventrally with front coxae separated by about one-fifth to one-sixth width of coxa; prosternum flat between and anterior to front coxae. Mesosternum and lateral portions of metasternum and ventrites shallowly punctate; middle of metasternum and ventrites 1 and 2 virtually impunctate, shining; last ventrite of female flat at middle, apex deflexed ventrally. Legs moderately coarsely punctate and finely setose throughout; femora slightly clavate, moderately long and narrow, hind femur barely reaching apex of ventrite 4; inner margins of all tibiae with only very short, peglike setae arranged in pectinate manner; all tibiae straight. Tarsi each with third article very widely dilated, completely pilose ventrally except for very narrow midline at base; middle and hind tarsal third articles asymmetrical, inner lobe smaller than outer; apical margin of third articles truncate.



**FIGURES 25-28.** *Cactophagus* species. 25-26. *Cactophagus lingorum* Anderson. 25. Dorsal habitus. 26. Lateral habitus. 27-28. *Cactophagus morrissi* Anderson. 27. Dorsal habitus. 28. Lateral habitus.

Variation.—The bright and distinctive pronotal and elytral patterns are consistently similar among specimens from the northern portion of Costa Rica. One tentatively conspecific specimen from Parque Internacional La Amistad Pacifico near the Panama border

has a different color pattern but is otherwise identical in all other structural respects. In this specimen, the orange pronotal lines are much narrower and the elytra has less extensive orange maculations. The elytral maculations in this specimen are broadly "c-shaped" and resemble those of *M. shchepaneki* and *M. circumdatus*.



**FIGURES 29-32.** *Cactophagus lingorum* Anderson. 29. Lateral view of head, female. 30. Antenna. 31. Hind leg, female. 32. Pygidium, female.

**Material Examined.**—Female HOLOTYPE labelled “Est. La Casona, 1520m, / Res. Biol. Monteverde, / Prov. Punt. Costa Rica / N. Obando, Oct. 1991, / L-N-253250,449700”, INBio barcode 502152 (INBC). PARATYPES (4 ♀). COSTA RICA. ALAJUELA PROVINCE. Reserva Biología San Ramon. Estacion Biología San Ramon, San Ramon (27km.N., 8km.W.), 10°13'30"N, 84°35'30"W, 850-950m, 29.vi.-6vii.1999, R. Anderson, wet premontane forest, 99-108 (1 ♀). GUANACASTE PROVINCE. Estacion Pitilla, Santa Cecilia (9 km S.), 700m, Jun 1989 (1 ♀; 7694). PUNTARENAS PROVINCE. Monteverde, Estacion Biología Monteverde, 10°18'53" N, 84°47'49" W, 1800m, 13.VI.2001, R. Anderson, cloud forest, on stems/roots of epiphytic Araceae (1 ♀). Santa Elena, Santa Elena Cloud Forest Reserve, 10°20'42" N, 84°47'53" W, 1650m, 11.VI.2001, R. Anderson, cloud forest (1 ♀). Paratypes in CMNC, INBC.

An additional tentatively conspecific specimen, not a paratype, has been examined from Costa Rica, Limon, Parque Internacional La Amistad Pacifico, Refugio Valle de Silencios, 2400m, 341400N, 577250E, 18.IV.2001, Roger Gonzalez Tenorio (INBC).

**Distribution.**—Costa Rica (Alajuela, Guanacaste, Puntarenas).

**Natural history.**— Adult specimens were collected at 700-950 m in wet premontane evergreen forest, and at 1520 m, likely in upper montane evergreen forest or perhaps cloud forest. A single specimen was beaten from the roots and stems of epiphytic Araceae. The tentatively conspecific specimen from La Amistad Pacifico was collected at 2400 m.



Derivation of specific name.— Through their support of the Nature Discovery Fund at the Canadian Museum of Nature, this species is named after the Ling family of Ottawa, Ontario, Canada. Frank Ling is presently Chairman of the Board of Trustees of the Canadian Museum of Nature.

***Cactophagus morrisi* Anderson, new species**

(Figs. 24, 27-28)

Identification.—The three known specimens of this species can be easily recognized by the laterally incised pronotal margins, pattern of elytral coloration and the pattern of elytral sculpture (Figs. 27-28). The pygidium is at most convex with the median line not distinctly raised or carinate, although it is setose, and, the prosternum in front of the coxae is flat, but sloping anteriorly. It is also larger and more robust than the related species of *Cactophagus*, which were formerly placed in the genus *Cactophagoides*.

Description.— Male not known. Female, length, 5.5-17.7 mm; width 6.7-8.2 mm. Color black, metasternum reddish, infused with black, elytra with red spots as follows: at base, just before midlength and subapically on interval 2; just before midlength on interval 3 (small and vague); basally and from midlength to apical one-third on interval 8; and, humeral region.

Rostrum subequal in length to pronotum; elongate, cylindrical, evenly curved, densely, coarsely, deeply punctate dorsally at base and laterally at point of antennal insertion; apical one-half glabrous and very finely punctate, shining; base of rostrum expanded in dorsal view, basal expanded area long, about one-third total rostral length; in dorsal view with deep median sulcus in basal expanded area becoming subfoveate above eyes; in lateral view with large deep coalescent punctures behind point of antennal insertion. Peduncle slightly convex, deeply bilamellate. Scrobe with posterior margin about four times width of base of scape from anterior margin of eyes. Antenna with scape long, about two-thirds length rostrum; club elongate-oval; apical pilose part subequal in length to basal glabrous part. Pronotum with lateral margins subparallel to slightly divergent, abruptly constricted subapically, tubulate to apex; pronotum at constriction behind eyes slightly to deeply excavate; moderately densely, deeply, irregularly punctate on disc and flanks; disc moderately deeply impressed subbasally at middle, impression with midline with very slight low carina. Elytra one and one-third times length of pronotum; intervals impunctate to very slightly punctate apically, convex; striae deeply impressed, impunctate. Disc laterally transversely creased or plicate at basal one-third and twice again just behind midlength; bases of intervals 2-4 swollen (especially of 2) and base of 2 expanded; intervals 1-5 swollen in transverse band variously at midlength and again at elytral declivity; intervals 1-2 convex subapically; intervals 5 and 7 slightly to markedly constricted basally; scutellar area not distinctly depressed. Scutellum small, "V" shaped, length

slightly greater than width at base, concave. Pygidium slightly convex; coarsely deeply punctate throughout; apex subtruncate; with median row of short sparse setae in apical one-half and across apical margin. Ventrally with front coxae separated by only width of scape; prosternum moderately densely, irregularly punctate, flat but slightly sloping anteriorly. Lateral portions of metasternum with large irregular punctures, otherwise venter moderately densely, irregularly shallowly punctate; punctures smaller medially on ventrites 2-4; last ventrite flat, punctate. Legs moderate in length, moderately densely, shallowly punctate; femora clavate, hind femur longer, almost reaching apex of pygidium; front coxae with inner faces subtuberculate; inner margins of front and middle tibiae slightly sinuate subbasally, hind straight; inner margin of all tibiae with only short, sparse, peglike setae. Tarsi each with third article widely dilated, pilose ventrally except in broad fusiform median area in basal one-half; all tarsi with third articles symmetrical and apical margins truncate.

Variation.—One paratype has a reduced pattern of red spots and is lacking spots on intervals 2-3 just before the midlength. In addition, the elongate red marking on interval 8 is reduced to two spots, one at the midlength, the other at the apical one-quarter. There is also variation in the depth of the excavation on the pronotum behind the eyes and in the extent to which elytral striae 5 and 7 and constricted basally.

Material Examined.—Female HOLOTYPE labelled “Panama: Chiriqui Prov. / Cont’l Divide Trail / 3-4.VII.1997 / Morris and Wappes” (CMNC). PARATYPES (2 ♀). PANAMA. CHIRIQUI PROVINCE. Continental Divide Trail, 11-15.V.1999, Morris and Wappes (1 ♀). Fortuna Dam, 28 May 1984, H.W. Churchill (1 ♀). Paratypes in CMNC.

Distribution.— Panama (Chiriqui).

Natural history.—No information is available on natural history of this species.

Derivation of specific name.—This species is named after Roy Morris of Lakeland, Florida, one of the collectors of the holotype.

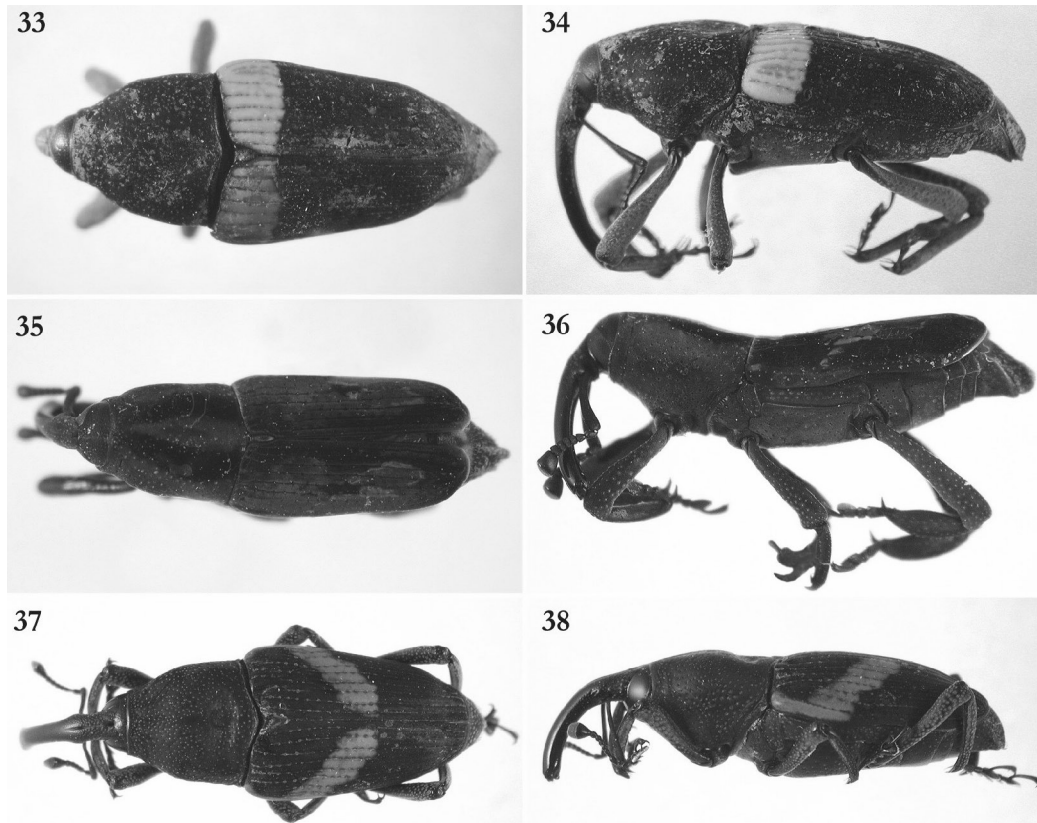
### ***Cactophagus riesenorum* Anderson, new species**

(Figs. 33-34, 39-41)

Identification.—The only known specimen of *C. riesenorum* can be easily recognized by the pattern of elytral coloration (single transverse basal red band) (Figs. 33-34), tumescent front of metasternum, slightly sinuate basal margin of pronotum (Fig. 33) and apically carinate pygidium. This species is most similar in color pattern to *C. aurofasciatus* but that species is much broader in dorsal aspect, has a distinctly sinuate basal pronotal margin, has a virtually impunctate, short rostrum, has a straight upper edge of the antennal scrobe, and has a wider basal red band on the elytra. In rostral form, the species resembles *C. duplocinctus* but that species has a distinctly sinuate basal pronotal margin and an anteriorly medially excised scutellum. Other characters distinguish *C. riesenorum* from all

members of *Cactophagus* with an anteriorly tumescent metasternum (*C. aurofasciatus* group of Vaurie [1967]).

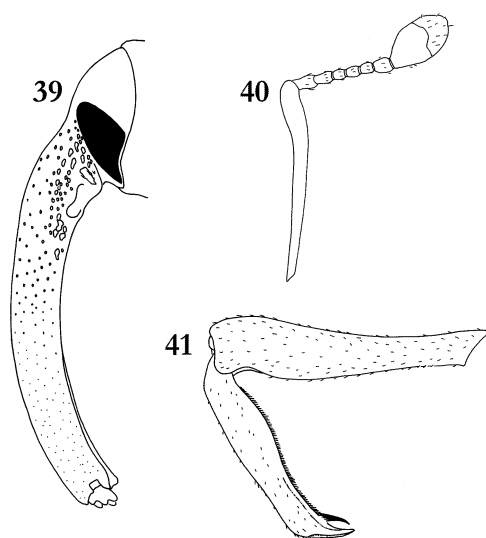
Description.— Male, length, 14.6 mm; width 5.1 mm. Female not known. Color black, with elytra with distinct transverse basal red band in apical one-quarter.



**FIGURES 33-38.** *Cactophagus* species. 33-34. *Cactophagus riesenorum* Anderson. 33. Dorsal habitus. 34. Lateral habitus. 35-36. *Cactophagus silron* Anderson. 35. Dorsal habitus. 36. Lateral habitus. 37-38. *Cactophagus sunatoriorum* Anderson. 37. Dorsal habitus. 38. Lateral habitus.

Rostrum slightly longer than pronotum; elongate, cylindrical, evenly curved, densely, shallowly punctate dorsally and laterally in basal one-third; apical two-thirds glabrous and virtually impunctate, shining; base of rostrum slightly expanded in dorsal view, basal expanded area short, about one-fifth total rostral length; in dorsal view with shallow median sulcus in basal expanded; in lateral view with deep impressed semi-circular area behind point of antennal insertion. Peduncle slightly convex, bilamellate. Scrobe with posterior margin about two times width of base of scape from anterior margin of eyes. Antenna with scape moderately long, about one-half length rostrum; club elongate-oval; apical pilose part subequal in length to basal glabrous part. Pronotum with lateral margins

subparallel to slightly convergent in basal one-half, more markedly convergent at apical one-third, subapically constricted, tubulate to apex; moderately densely, moderately deeply, regularly punctate on disc and flanks; disc moderately deeply impressed subbasally at middle; hind margin of pronotum very slightly sinuate at middle. Elytra one and one-third times length of pronotum; intervals very finely, shallowly punctate, convex; striae deeply impressed, sparsely punctate; bases on intervals 2-5 not produced anteriorly. Scutellum small, "V" shaped, length slightly greater than width at base, concave. Pygidium deeply regularly punctate throughout; apex broadly acuminate; with distinct, apical median finely setose carina. Ventrally with front coxae separated by width of scape; prosternum moderately densely, irregularly punctate, flat but sloping anteriorly. Metasternum impunctate medially, with large irregular punctures laterally; anterior process of metasternum markedly prominent and tumescent at middle; venter otherwise with moderately deep, sparse punctures laterally on ventrites 1-5, on mesepisternum, mesepimeron, less so on metepisternum; last ventrite flat, deflexed ventrally at apex, apex narrowly impressed at middle. Legs moderate in length, moderately densely, shallowly punctate; femora clavate, hind femur longer, almost reaching middle of ventrite 5; front coxae with inner faces rounded; inner margins of tibiae straight, with row of short, peglike setae. Tarsi each with third article widely dilated, pilose ventrally except in narrow median line at base; all tarsi with third articles symmetrical and apical margins truncate.



**FIGURES 39-41.** *Cactophagus riesenorum* Anderson. 39. Lateral view of head, male. 40. Antenna. 41. Hind leg, male.

Material examined.—Male HOLOTYPE labelled "S. Irazuzta 2/16 / CR, Puntarenas Prov. / Monteverde 14-1800m / 10°18'N, 84°48'W / 1986" (CMNC).

Distribution.—Costa Rica (Puntarenas).

Natural history.—There is no information available on natural history.

Derivation of specific name.— Through their support of the Nature Discovery Fund at the Canadian Museum of Nature, this species is named after the Riesen family of Calgary, Alberta, Canada.

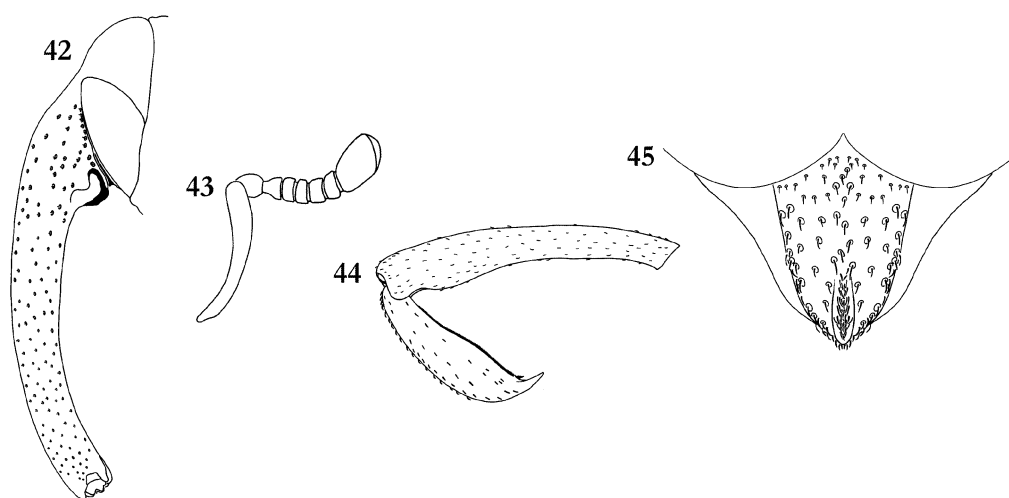
Comments.—The holotype was discovered in the student collections of the Estacion Biologica Monteverde in June 2001.

***Cactophagus silron* Anderson, new species**

(Figs. 35-36, 42-45)

Identification.—This very distinctive species is easily recognized by its small size (< 7 mm in length), uniform grey-black color (Figs. 35-36), somewhat oblique form of the antennal club with only a narrow apical pilose part (Fig. 43), and most significantly, the broadly expanded and keeled hind tibiae (Fig. 44). Among *Cactophagus* it is most closely related to *Cactophagus strigosus* (Erichson), *C. rubricatus* Hustache and *C. limulus* (Vaurie), based on the asymmetrical form of the antennal club.

Description.— Male, length 6.7 mm; width 2.6 mm. Female, not known. Color grey-black with only humeri pale orange. Pronotum with pair of darker velvety black slightly curved paramedial lines.



**FIGURES 42-45.** *Cactophagus silron* Anderson. 42. Lateral view of head, male. 43. Antenna. 44. Hind leg, male. 45. Pygidium, male.

Rostrum slightly longer than length pronotum; elongate, narrow, cylindrical, slightly evenly curved, virtually impunctate except for scattered minute punctures in basal one-half; base of rostrum slightly expanded, basal expanded area very short, about one-fifth total rostral length. Rostrum glabrous ventrally; peduncle flat, bilamellate anteriorly. Scrobe with posterior margin about one-half width of base of scape from anterior margin

of eyes. Antenna with scape about one-half length rostrum; club slightly laterally compressed, asymmetrical, with form oblique with inner margin slightly shorter than outer margin; apical pilose part visible as a narrow oblique line. Pronotum with lateral margins slightly convergent in basal one-half, moderately convergent to apex; very sparsely and very shallowly punctate on disc, flanks with punctures slightly deeper; flat subbasally.

Pronotum with length greater than width. Elytra about one and one-half times length of pronotum; intervals impunctate, flat; intervals 2 and 3 curved inwardly at base, intervals 4 and 5 wider at base, interval 6 constricted subbasally; striae punctate, shallowly impressed. Scutellum elongate "V" shaped, length two and one-half times width at base, slightly swollen towards apex. Pygidium sparsely but deeply punctate throughout, with apical one-half tumescent, acutely carinate and setose along midline; lateral and apical margins finely, sparsely setose; apex narrowly rounded. Ventrally with front coxae separated by about one-quarter width of coxa; prosternum flat between and anterior to front coxae. Meso- and metasterna and ventrites sparsely shallowly punctate (less so medially); last ventrite of male deeply sparsely punctate apically at middle. Legs finely and shallowly punctate; femora slightly clavate, hind femur almost reaching apex of ventrite 5; inner margins of femora glabrous, of all tibiae with only very short, dense setae arranged in pectinate manner; hind tibiae markedly expanded and keeled along outer margin, middle and front tibiae slightly inwardly arcuate. Tarsi each with third article slightly dilated, pilose ventrally except for extreme base at middle; third articles of all tarsi symmetrical; apical margin of third articles slightly produced, rounded.

Material Examined.—Male HOLOTYPE labelled "July 6, 1957 / Golfito, Costa Rica / Truxal & Menke (CMNC; in exchange from LACM).

Distribution.—Costa Rica (Puntarenas).

Natural history.—No information is available about the natural history of this species.

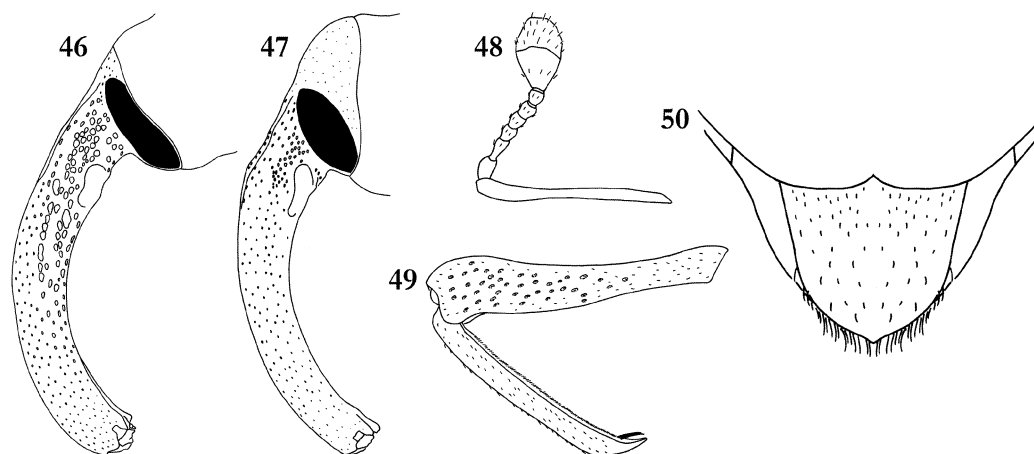
Derivation of specific name.—Through their support of the Nature Discovery Fund at the Canadian Museum of Nature, this species is named after Silvana and Ron Macdonald of Toronto, Ontario, Canada.

### ***Cactophagus sunatoriorum* Anderson, new species**

(Figs. 37-38, 46-50)

Identification.—*Cactophagus sunatoriorum* bears a great resemblance to *C. personatus* or *C. rectistriatus* but is clearly distinct based upon the lack of ventral pilosity on the rostrum (as in *C. personatus*) by the more widely separated front coxae, and by the flat prosternum in males (tuberculate in males of *C. rectistriatus*). Additionally, the humeri are orange in *C. sunatoriorum* whereas they are black in *C. personatus* and infuscate subbasally in *C. rectistriatus*. The elytral maculations do not distort the striae as in *C. dragoni* and *C. ornatus* and form a broader, more continuous arc (Figs. 37-38).

Description.— Male, length, 12.2 mm; width, 5.6 mm. Female, length, 11.2-12.0 mm; width, 5.2-5.5 mm. Color black with humeri and basal portion of interval 10 yellow-orange, with broad orange band extending from interval 10 at basal one-third in a slightly oblique manner to sutural interval at about midlength.



**FIGURES 46-50.** *Cactophagus sunatoriorum* Anderson. 46. Lateral view of head, male. 47. Lateral view of head, female. 48. Antenna. 49. Hind leg, male. 50. Pygidium, male.

Rostrum subequal to length pronotum; elongate, cylindrical, moderately robust, evenly rather strongly curved, somewhat coarsely, irregularly punctate laterally at base, punctures much finer, sparser apically in male and throughout length in female; base of rostrum expanded in dorsal view at point of antennal insertion only; in lateral view more or less subequal in width throughout length, basal expanded area about one-third total rostral length. Rostrum glabrous ventrally; peduncle bilamellate, projected anteriorly and ventrally. Scrobe with posterior margin about 4 or 5 times width of base of scape from anterior margin of eyes. Antenna with scape slightly longer than length rostrum; club laterally compressed, elongate-oval; apical pilose part very slightly shorter than length basal glabrous part. Pronotum with lateral margins slightly convergent in basal two-thirds, convergent subapically, tubulate to apex; disc and flanks uniformly shallowly punctate throughout; with broad transverse subbasal impression at middle. Pronotum with length subequal to width. Elytra one and one-half times length of pronotum; intervals impunctate, flat; striae with moderately deep, widely spaced, small punctures. Scutellum large, "V" shaped, length slightly longer than width at base, concave at base. Pygidium rounded medially, not tumescent; coarsely deeply regularly punctate throughout; apex broadly subtruncate, with transverse row of longer setae. Ventrally with front coxae widely separated by slightly more than one-half width of coxa; prosternum flat between and anterior to front coxae. Meso-, metasternum and ventrite 1 irregularly sparsely punctate; ventrites 2 to 5 sparsely, finely punctate; last ventrite flat, glabrous, with shallow apical depression. Legs

moderately long, moderately densely regularly punctate, especially on outer face of femora; femora slightly clavate, moderately long, hind femur reaching apex of pygidium; inner margins of middle and hind tibiae straight; all tibiae with very fine, uniformly short, stout, peglike setae throughout length arranged in pectinate manner. Tarsi with third article very widely dilated, pilose ventrally in apical two-thirds except for "v-shaped" basal area; all tarsi with third articles symmetrical; apical margin of third articles truncate, straight.

Material Examined.—Male HOLOTYPE labelled "Pan: Chiriqui Prov. / Cont'l Divide Trl. / 11-15.V.1999 / Morris & Wappes" (CMNC). Female ALLOTYPE labelled "Panama: Chir. Res. / For. La Fortuna, Cont. / Divide Tr., 7.20.1995 / C.W. & L.B. O'Brien" (CWOB). PARATYPE (1 ♀). PANAMA. CHIRIQUI PROVINCE. Continental Divide Trail, 12-14.V.1999 (1 ♀). Paratype in CMNC. There is also an additional specimen from Panama Province, Cerro Campana, 15.IV.1970, H. Hesperheide, from which the rostrum has been broken off.

Distribution.—Panama (Chiriqui, Panama).

Natural history.—Three of the four known specimens were collected in cloud forest in the La Fortuna area of Chiriqui province in Panama.

Derivation of specific name.—Through their support of the Nature Discovery Fund at the Canadian Museum of Nature, this species is named after the Sunatori family as a gift from Michèle Provencher.

### Genus *Metamasius* Horn

*Metamasius* Horn 1873:410.

*Odontorhynchus* Chevrolat 1880:316.

*Metamasiopsis* Champion 1910:100.

*Subphyllerythrurus* Voss 1954:333.

*Paramasius* Kuschel 1958:750. Resurrected synonymy.

*Cyrtomasius* Vanin 1998:117. New synonymy.

Type species: *Calandra sericea* Olivier 1807:84. Designation by monotypy.

This is a large tropical genus with about 60 described species. There are 30 species of *Metamasius* in Costa Rica and 29 (plus 1 questionable) in Panama with 24 shared between the two countries. The genus occurs from the southern United States to Argentina.

Herein I group all species that possess the plesiomorphic character state of some indication of a lateral line on the aedeagus. This includes the genera *Paramasius* and *Cyrtomasius* as recently treated by Vanin (1998). The two described species of *Paramasius* are the only Dryophthoridae known to have a partial lateral line (incomplete at base; see Vanin 1998, Figs. 10 and 27) whereas the lateral line of the one known *Cyrtomasius* species is complete (Vanin 1998, Fig. 32) as in all *Metamasius*. Similarity in body characters other



than form of the aedeagus suggests that both 'taxa' are derived from within *Metamasius* and do not warrant distinct generic status.

Species of *Metamasius* are associated generally with monocotyledons such as orchids (Orchidaceae), bromeliads (Bromeliadaceae), palms (Arecaceae), sugarcane (Graminae), and bananas (Musaceae) (Vaurie 1966). Adults of most species are diurnal. Immature stages were described by Anderson (1948).

**Key to species of *Metamasius* in Costa Rica and Panama (largely after Vaurie 1966, 1967a)**

- 1 Outer apex of middle and hind tibia with distinct, minute tooth..... 2
- Outer apex of middle and hind tibia rounded or obtusely angulate, not dentate..... 3
- 2 Venter, except for abdominal ventrites, virtually impunctate; male rostrum with inner margin crenulate; inner margin of hind tibia of male with subapical tuft of long curled hairs..... *M. cincinnatus* Champion (in part)
- Venter distinctly punctate; male rostrum with inner margin smooth; hind tibia of male lacking hairs ..... *M. rugipectus* (Champion)
- 3 Elytral sutural interval and intervals 3, 5 and 7 elevated and wider than other intervals (fourth interval may be elevated at midlength); pronotum foveate on each side in front of base, also with lateral margins (viewed dorsally) somewhat emarginate from base to just beyond midlength ..... *M. distortus* (Gemminger and Harold)
- Elytral intervals all of equal elevation and width; pronotum not foveate on each side in front of base, lateral margins (viewed dorsally) not emarginate ..... 4
- 4 Pygidium from base to apex with high, bluntly keeled, tomentose swelling, in lateral view with apex distinctly truncate and angulate; inner margin of middle tibia of male sinuate and slightly expanded ..... *M. pygydialis* Guenther
- Pygidium flat to slightly convex, midline may be setose and slightly elevated but not markedly so; in lateral view with apex rounded; inner margin of middle tibia of male straight to slightly sinuate, not expanded sinuate..... 5
- 5 Antennal club with apical pilose portion very short, visible in lateral view only at extreme apex of club as a narrow line; rostrum more or less straight, male with ventral margin irregularly crenulate ..... *M. wolfensohni* Anderson, new species
- Antennal club with apical pilose portion one-quarter or more length of entire club; rostrum straight or curved ventrally to various extent, male with ventral margin irregularly crenulate or smooth..... 6
- 6 Hind tarsal article 3 only slightly expanded, width at apex less than twice width of article 2 at apex..... 7
- Hind tarsal article 3 markedly expanded, width at apex more than twice width of article 2 at apex..... 8
- 7 Antenna with apical pilose portion one-third length of entire club; rostrum with fine,

- yellow pilosity throughout most of length, divided dorsally by median glabrous line; tarsi densely tomentose dorsally ..... *M. cerasinus* Vaurie
- Antenna with apical pilose portion about one-half length of entire club; rostrum with fine, yellow pilosity in basal one-third only; tarsi sparsely tomentose dorsally .....  
..... *M. hebetatus* (Gyllenhal)
- 8 Prosternum in front of coxae with ring of distinct yellow hairs (usually as long as apical article of antennal funicle); antenna with apical pilose portion of club distinctly truncate and quadrate at apex ..... *M. hemipterus* (Linnaeus)
- Prosternum in front of coxae glabrous or very finely pilose; antenna with apical pilose portion of club broadly rounded ..... 9
- 9 Prosternum in front of coxa with abrupt, tumid and punctate transverse swelling (swelling less pronounced on females and small males); male with large (huge in some specimens) ventrally produced, apically rounded tooth on the peduncle of postmentum; base of elytral interval 6 excavate and bidentate ..... *M. maculiventris* Champion
- Prosternum flat to slightly convex in front of coxa; male with at most a small ventrally produced, rounded tooth on peduncle of postmentum; base of elytral interval 6 not modified ..... 10
- 10 Elytra with basal one-half of all intervals filled with large, irregular, deep punctures; pronotum with similar, large deep punctures; male rostrum with ventral margin crenulate ....  
..... *M. submaculatus* Champion
- Elytra with all intervals impunctate or at most very finely punctate; pronotum with punctures various; male rostrum with ventral margin crenulate or smooth ..... 11
- 11 Elytral striae each with numerous paired, large, micropilose pits .....  
..... *M. leopardinus* Anderson, new species
- Elytral striae impunctate or with at most small linearly arranged fine punctures ..... 12
- 12 Pronotal disc virtually impunctate (except for apical collar and extreme basal margin)  
..... 13
- Pronotal disc distinctly finely to coarsely punctate, punctures may be limited to sub-basal median impressed area or may be fine and shallow throughout ..... 19
- 13 Rostrum short and almost straight, length approximately 3-4 times width at apex; antennal club with apical pilose portion short, about one-quarter length of entire club ....  
..... *M. burcheri* Anderson, new species
- Rostrum slightly to moderately curved, length greater than 5 times width at apex; antennal club with apical pilose portion at least one-third or more length of entire club  
..... 14
- 14 Pronotum with flanks and prosternum virtually impunctate; inner margin of hind tibia of male with tuft of dense, long golden hairs at middle .....  
..... *M. cincinnatus* Champion, (in part)
- Pronotum with flanks and prosternum distinctly punctate; inner margin of hind tibia of male with or without tuft of long golden hairs ..... 15

- 15 Rostrum with large, distinct punctures immediately in front of point of antennal insertion; pronotal disc orange or red, with elongate black stripe along midline and shorter subbasal black spots on either side of midline .....*M. quadrilineatus* Champion
- Rostrum with at most fine, shallow, indistinct punctures immediately in front of point of antennal insertion; pronotal disc black, red with small black paramedian spots just anterior to midlength, or red with very broad black median area extended across basal margin.....16
- 16 Pronotum red with small black paramedian spots just anterior to midlength, or red with very broad black median area extended across basal margin; male rostrum with ventral margin crenulate; male hind tibia with ventral margin with row or long, golden hairs in apical three-quarters .....*M. dimidiatipennis* (Jekel)
- Pronotum entirely black; male rostrum with ventral margin smooth; male hind tibia with ventral margin with row of uniformly short golden or brown peg-like hairs ..... 17
- 17 Body robust, length less than twice maximum width; metasternum tumid in lateral view; pronotum with basal margin virtually impunctate; elytra with series of small yellow dots near middle or a broad yellow band at middle with small black spot on interval 3 .....*M. sellatus* Champion
- Body more slender, length more than twice maximum width; metasternum flat medially; pronotum with basal margin with row of punctures; elytra with transverse yellow or orange band just anterior to, or posterior to, midlength..... 18
- 18 Elytra with transverse yellow or orange band just posterior to midlength; male abdomen with last ventrite impressed; male hind tibia with inner margin with tuft of long golden brown hairs .....*M. fasciatus* (Olivier)
- Elytra with transverse yellow or orange band just anterior to midlength; male abdomen with last ventrite flat; male hind tibia with inner margin with row of uniformly short brown hairs .....*M. callizona* (Chevrolat)
- 19 Pronotum with disc with distinct transverse subbasal impression or crease; Pronotum orange-red with single median black stripe of more or less same width throughout length; elytra with black "V-shaped" sutural maculation at middle (other various black markings also present); body size small, 6.0-6.9 mm .....  
..... *M. vaurieae* Anderson, new species
- Pronotal disc flat with slight to deep longitudinal or round subbasal impression; pronotum with color pattern various; elytra with color pattern various; body size small to large, 6.5-23.5 mm, most 8.0-12.0 mm ..... 20
- 20 Pronotal disc with punctures confined to subbasal median area (and subapically along apical collar) ..... 21
- Pronotum with disc with punctures (although fine and shallow in some specimens) more or less evenly scattered throughout ..... 25
- 21 Pronotum with distinct subbasal median impression with large, deep punctures ..... 22
- Pronotum with subbasal median area flat or very slightly impressed, punctures moder-

- ate to small and fine ..... 23
- 22 Abdomen with last ventrite with large patch of long, dense, golden brown hairs in apical one-half; all tibiae of male with inner margins with dense, long, golden brown hairs; body size large, 21.0-23.5 mm ..... *M. sierrakowskyi* (Gyllenhal)
- Abdomen with last ventrite glabrous (female) or with two small paramedian patches of long golden hairs at about midlength (male); front and middle tibiae of male with inner margins with sparse, elongate golden hairs, hind tibia with inner margin with tuft of long golden hairs at about midlength; body size moderate, 9.5-13.0 mm .....  
..... *M. difficilis* Guenther
- 23 Rostrum in lateral view more or less of same width throughout length; antennal club about as wide as long; male rostrum with distinct, paired, ventral swellings under apical margin of scrobe ..... *M. shchepaneki* Anderson, new species
- Rostrum in lateral view more distinctly tapered in apical one-half; antennal club much longer than wide; male rostrum with ventral margin smooth ..... 24
- 24 Front coxae separated by about one-half the width of a coxa; male (female not known) hind tibia with inner margin with distinct tuft of dense, long, golden hairs at midlength....  
..... *M. bellorum* Anderson, new species
- Front coxae separated by no more than about one-third the width of a coxa; male hind tibia with inner margin with row of sparse, long, golden hairs in apical two-thirds.....  
..... *M. bromeliadicola* Champion
- 25 Rostrum of male (female not known) ventrally near base with tuft of dense, coarse, yellow hairs; antennal club with apical pilose portion about one-quarter length of entire club ..... *M. crinitus* Vaurie
- Rostrum glabrous ventrally; antennal club with apical pilose portion about one-third or more length of entire club ..... 26
- 26 Pronotal disc with punctures large, dense and deep, many contiguous or nearly so; rostrum of male with ventral margin crenulate; pygidium with pair of paramedian apical tufts of long golden hairs..... *M. octonotatus* Champion
- Pronotal disc with punctures fine, sparse and shallow to moderately dense and moderately deep, punctures widely separated, not contiguous or nearly so; rostrum of male with ventral margin smooth or with slight ventral swelling at about midlength; pygidium various ..... 27
- 27 Pronotum widest at base, tapered uniformly throughout length to apex, elongate-narrow in general form; male hind tibia with inner margin with row of dense, long, dark hairs in apical two-thirds..... *M. alveolus* Vaurie
- Pronotum widest anterior to base or of more or less equal width from base to near apex, abruptly constricted and tapered subapically, subquadrate in general form; male hind tibia with inner margin with row of uniformly short hairs or with row of sparse, long, fine yellow hairs in apical two-thirds..... 28
- 28 Rostrum in lateral view robust in form, length about 4 to 5 times width at apex, about

- as wide at apex as at base, or at most only very slightly narrower at apex ..... 29
- Rostrum in lateral view elongate and slender in form, length much more than 5 times width at apex, distinctly narrower at apex than at base..... 31
- 29 Inner margin of front tibia with rows of dense, long golden hairs; rostrum with ventral margin crenulate..... *M. dasyurus* Champion, male (in part)
- Inner margin of front tibia with row of uniformly short hairs; rostrum with ventral margin smooth..... 30
- 30 Elytral interval 5 with pair of tumid elongate orange/red spots or a longer continuous tumid line, spots or lines slightly distorting adjacent elytral striae; male abdomen with last ventrite (5) with large patch of golden hairs in apical two-thirds; female abdominal ventrites 3-5 with elongate, fine, appressed, golden hairs along midline .....  
.....*M. hooveri* Anderson, new species
- Elytral interval 5 various in color, not tumid, adjacent elytral striae not distorted, straight; male abdomen with last ventrite (5) with large patch of golden hairs in apical two-thirds; female abdominal ventrites 3-5 glabrous.....*M. sulcirostris* Champion
- 31 Rostrum more or less straight, anteriorly directed; body size small, 6.0 mm .....  
.....*M. scutigera* Champion
- Rostrum at least somewhat curved ventrally; body size, small to moderate, 7.5-14.3 mm ..... 32
- 32 Elytra with only transverse orange or red band at basal one-third; body size small, 7.5-9.3 mm.....*M. murdiei* Anderson, new species
- Elytra with pattern various, if band present, it is at midlength and other parts of elytra with at least some red or orange as well; body size small to moderate, 8.2-14.3 mm ...  
..... 33
- 33 Pronotum and elytra flat in lateral view; pronotum uniformly distinctly punctate over entire surface of disc; elytral intervals with distinct fine punctures; pygidium of female with midline with patch of dense, elongate hairs in apical one-half, no apical tufts present  
.....*M. atwoodi* Anderson, new species
- Pronotum and elytra at least slightly convex in lateral view; pronotum with punctures various in depth and density over disc; elytral intervals with fine punctures or impunctate; pygidium of female with pair of small paramedian apical tufts of hair or with large subapical tuft as well as pair of paramedian apical tufts..... 34
- 34 Elytra with slightly oblique red band at midlength and with intervals 3-6 red in area of subapical callus; ventral margin of rostrum of male with slight ventral swelling at about midlength; pygidium with pair of paramedian apical tufts; male hind tibia with inner margin with row of minute, peg-like brown spines .....  
..... *M. richdeboeri* Anderson, new species
- Elytra with pattern various; ventral margin of rostrum of male either smooth or crenulate; pygidium various; hind tibia with inner margin various ..... 35
- 35 Tarsi with venter of article 3 with midline glabrous in a broad, triangular patch towards

- base; pronotum with subbasal area with larger and deeper punctures than elsewhere on disc; areas lateral to punctate area virtually impunctate; male abdomen with last ventrite and inner margin of hind tibia with elongate, fine hairs .....  
 ..... *M. nudiventris* Champion
- Tarsi with venter of article 3 completely pilose, no glabrous spots evident; pronotum with subbasal area with punctures of more or less the same size and depth as elsewhere on disc, if punctures deeper and denser in impressed subbasal area, areas lateral to punctate area with at least some punctures; male abdomen with last ventrite glabrous and with inner margin of hind tibia with uniformly minute, peg-like brown spines... 36
- 36 Pygidium with single, broad apical patch of short hairs; male front tibia with inner margin with row of uniformly short, peg-like brown spines; male rostrum with ventral margin smooth.....*M. gallettae* Anderson, new species
- Pygidium with large, preapical tuft of long hairs and small paramedian apical tufts (tufts may be contiguous medially); male front tibia with inner margin with rows of dense, long, fine golden hairs; male rostrum with ventral margin crenulate .....  
 .....*M. dasyurus* Champion, (in part)

***Metamasius atwoodi* Anderson, new species**

(Figs. 51-52, 57-62)

Identification.—*Metamasius atwoodi* is endemic to Cocos Island off the southwestern coast of Costa Rica. This distinctive species is easily distinguished by its strongly dorsoventrally compressed form and almost planar dorsal and ventral surfaces (Fig. 52); pronotum with punctures uniformly dense and small, extended from disc onto flanks and prosternum; rostrum very narrow, subcylindrical, evenly curved (Figs. 51, 57-58); pygidium with a distinct tuft of elongate golden setae arising from the apical one-half of the midline (Figs. 61-62); legs short, the hind femora only reaching the apex of ventrite 3; and femora with outer faces uniformly densely punctate. The only other species of *Metamasius* recorded from Cocos Island is *M. hebetatus*.

Description.— Male, length, 9.5 mm; width, 3.4 mm. Female, length, 9.0-11.4 mm; width, 3.3-4.3 mm. Color red with black; head black, rostrum red to slightly infuscate; pronotal disc red, with infuscate anterior margin and variously developed narrow median line; elytra red with black laterally, in variously black to infuscate anteromedian band or spot, subapically at more or less posterior one-quarter in some specimens, and in a variously infuscate sutural margin; legs red, apices of femora infuscate. Venter red, sutures variously infuscate.

Rostrum subequal to length pronotum; elongate, subcylindrical, very narrow, evenly curved, very finely shallowly punctate only at extreme base; base of rostrum abruptly expanded in dorsal view; in lateral view slightly wider at base, expansion gradual, basal

expanded area short, about one-sixth total rostral length. Rostrum glabrous ventrally; peduncle flat. Scrobe with posterior margin about width of base of scape from anterior margin of eyes. Antenna with scape more or less one-half length rostrum; club slightly laterally compressed, oval; apical pilose part subequal to length basal glabrous part. Pronotum with lateral margins subparallel in basal one-half, convergent subapically, tubulate to apex; disc and flanks uniformly moderately deeply punctate throughout; uniformly flat, with imperceptible subbasal impression. Pronotum with length slightly greater than width. Elytra with length one and two-thirds times length pronotum; intervals finely punctate in two or three irregular rows, flat; striae with distinct, moderately deep, small punctures, punctures of striae 7-9 larger and merged with punctures of adjacent striae. Scutellum elongate, "U" shaped, length about twice width at base, flat. Pygidium flat to slightly convex, not tumescent; coarsely deeply irregularly punctate throughout; apex subtruncate; apical one-half of midline with dense elongate golden setae forming prominent tuft. Ventrally with front coxae separated by from one-fourth to one-third width of coxa; prosternum densely, regularly punctate, flat between and anterior to front coxae. Lateral portions of meso-, metasternum and ventrites 3 to 5 moderately deeply, densely punctate; punctures larger, deeper laterally on ventrites 1 and 2; last ventrite flat. Legs short, densely regularly punctate, especially on outer face of femora; femora slightly clavate, short, hind femur only reaching apex of ventrite 3; inner margins of middle and hind tibiae of male very slightly inwardly expanded subbasally, straight in female; with setae in apical three-quarters, setae of more or less uniform length, short, stout. Tarsi each with third article very widely dilated, completely pilose ventrally; front tarsus with third article symmetrical, third article of middle and hind tarsi asymmetrical, outer lobe noticeably wider than inner lobe, especially on hind tarsus; apical margin of third articles very slightly emarginate.

Variation.—There is very slight variation in the color pattern of this species, mainly in the extent of black on the elytra.

Sexual dimorphism.—The single male specimen examined has less dense and shorter setae on the pygidium and has the scape proportionally longer than in the female. Also, in males, the hind tibiae have the inner margins very slightly inwardly expanded near the base.

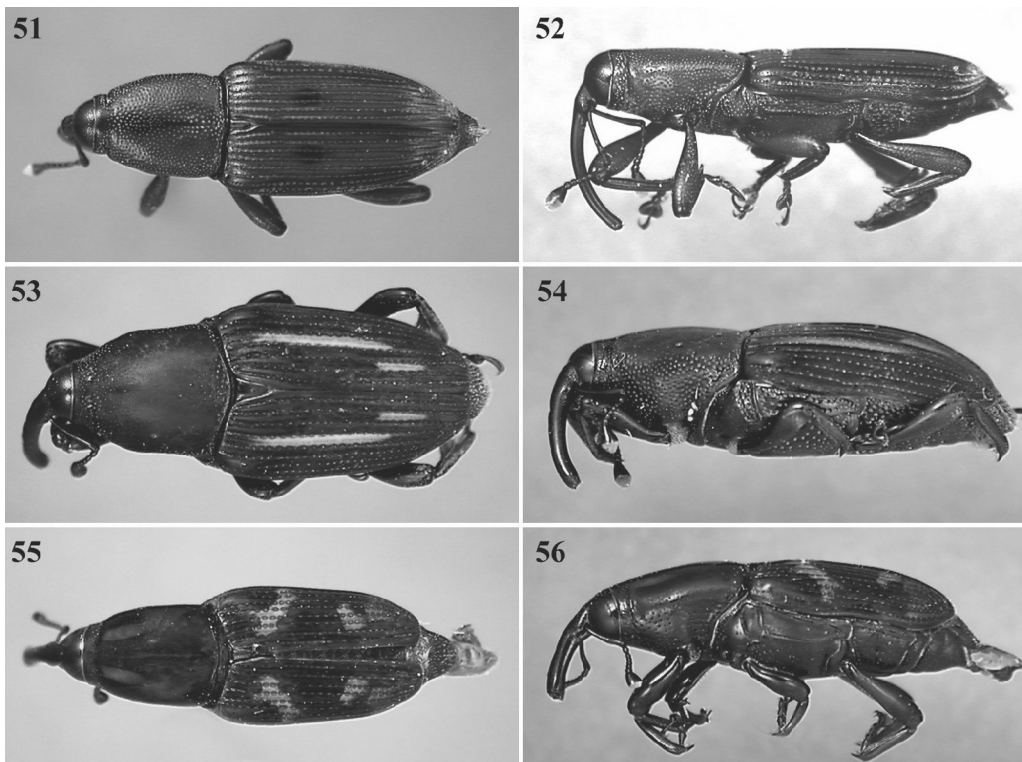
Material examined.—Male HOLOTYPE labelled "Costa Rica. Prov. Puntarenas. / P.N. Isla del Coco. Bahia Wafer. / 1 m. Oct 1994. J.F. Quesada / Long:-87:03:30\_Lat:5:32:45 #3314", INBio barcode 2544733 (INBC). Female ALLOTYPE labelled as holotype, INBio barcode 2544728 (INBC). PARATYPES (9 ♀). Labelled as holotype (7 ♀; 2544723, 2544726, 2544727, 2544731, 2544732, 2544734, 2544735). COSTA RICA. PUNTARENAS PROVINCE. Isla del Coco, Bahia Chatan, 5-9 Feb 1993. (1 ♀; 1851696). Mirador, 11.II.1984, 1530', T.W. Sherry, T.K. Warner, *Rooseveltia* palm tree fall (1 ♀). Paratypes in CMNC, CWOB, INBC.

Distribution.—Costa Rica (Puntarenas [Isla del Coco]).

Natural history.—Adults were collected near sea level, likely on or near the coast. A

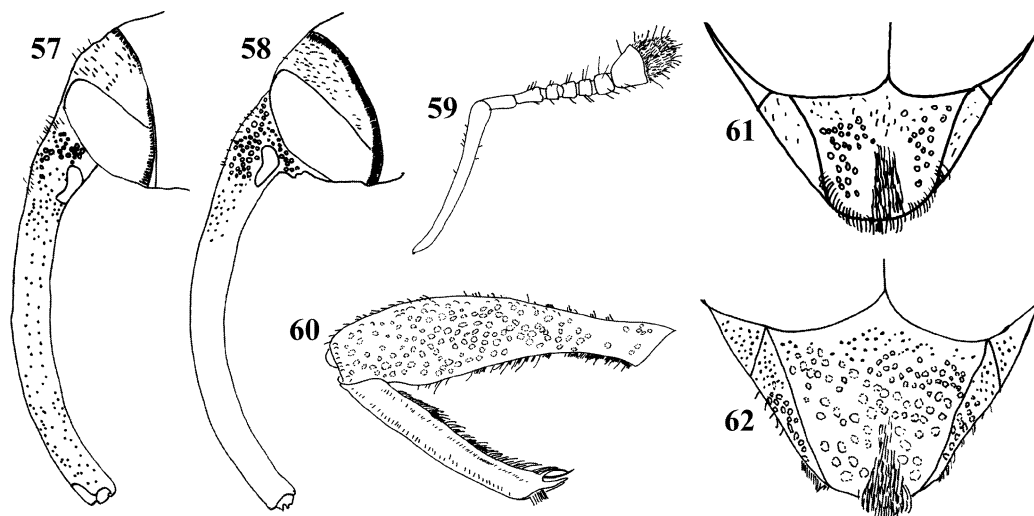
single specimen has a fibrous pupal cell mounted along with the adult. This suggests this specimen was collected in the pupal cell or had recently emerged from it. The source plant of this fibrous material is unknown to me but one additional specimen was collected from a *Rooseveltia* (= *Euterpe* Mart.) palm tree fall and this might be the plant in question. No other information is available on natural history.

Derivation of specific name.— In recognition of the support of noted Canadian author Margaret Atwood for systematics research, at her request, this species is named after her late father, Dr. Carl Atwood (1906-1993), a forest entomologist, most recently at the University of Toronto, where he was a professor from 1946-1972. Dr. Atwood was an active conservationist and one of the first to caution about the widespread use of insecticides to combat forestry pests because of detrimental effects, not only on the target pest, but on populations of the pest insects' natural predators. Ms. Atwood was invited as the honorary recipient of the first name to be offered in support of the Nature Discovery Program and Fund, coordinated by the Canadian Museum of Nature in Ottawa.



**FIGURES 51-56.** *Metamasius* species. 51-52. *Metamasius atwoodi* Anderson. 51. Dorsal habitus. 52. Lateral habitus. 53-54. *Metamasius bellorum* Anderson. 53. Dorsal habitus. 54. Lateral habitus. 55-56. *Metamasius burcheri* Anderson. 55. Dorsal habitus. 56. Lateral habitus.





**FIGURES 57-62.** *Metamasius atwoodi* Anderson. 57. Lateral view of head, male. 58. Lateral view of head, female. 59. Antenna. 60. Hind leg, male. 61. Pygidium, male. 62. Pygidium, female.

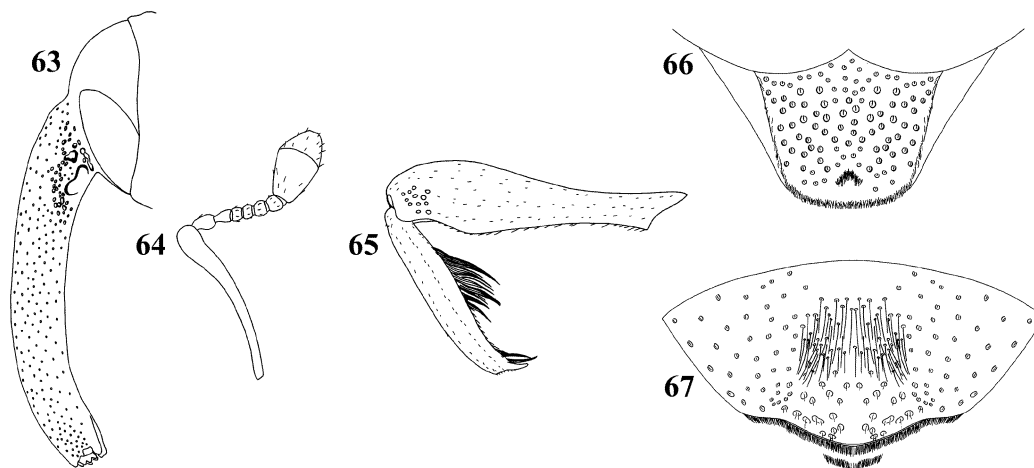
***Metamasius bellorum* Anderson, new species**

(Figs. 53-54, 63-67)

**Identification.**—The single known specimen of this species, although closely related to *M. bromeliadicola*, *M. nudiventris*, and *M. quadrilineatus*, is quite distinctive based mainly on the male secondary sexual characters of the vestiture of the hind tibiae (Fig. 65) and the extensive and dense vestiture of ventrite 5 (Fig. 67). In *M. bellorum* the inner margin of the hind tibia has a tuft of dense elongate hairs at about the midlength, the hairs progressively shorter towards the tibial apex (Fig. 65). In *M. bromeliadicola* and *M. nudiventris* the hairs along the inner margin of the hind tibia are similarly long but arranged in a row along the tibial length, not as a distinct tuft. On the other hand, in *M. quadrilineatus* the hairs are long and arranged as a distinct tuft; however, there are no progressively shorter hairs extended to the tibial apex. As in *M. bromeliadicola*, the apex of the pygidium is subtruncate in *M. bellorum* (Fig. 66) and much broader than in *M. quadrilineatus* or *M. nudiventris*. Also, the front coxae in *M. bellorum* are widely separated by about one-half the width of a coxa whereas the front coxae in *M. bromeliadicola*, *M. nudiventris* and *M. quadrilineatus* are more narrowly separated by no more than about one-third the width of a coxa. In addition, the apical pilose part of the antennal club is one-third the length of the entire club (Fig. 64).

**Description.**— Male, length, 11.7 mm; width, 4.9 mm. Female not known. Color mostly black, pronotal disc, dorsal portion of pronotal flanks, and elytra, piceous (elytra

variously infuscate); elytra with elongate yellow stripe in interval 4 from near base to apical one-third, and shorter yellow stripe on interval 2 slightly beyond apical one-third.



**FIGURES 63-67.** *Metamasius bellorum* Anderson. 63. Lateral view of head, male. 64. Antenna. 65. Hind leg, male. 66. Pygidium, male. 67. Apex of abdomen, male.

Rostrum about two-thirds length pronotum; elongate, cylindrical, evenly curved, densely, very finely, shallowly punctate; dorsally at base and laterally at point of antennal insertion with punctures slightly larger, deeper; apical one-half glabrous and virtually impunctate, shining; base of rostrum slightly expanded in dorsal view, basal expanded area short, about one-fifth total rostral length. Rostrum glabrous ventrally; peduncle flat, bilamellate anteriorly. Scrobe with posterior margin separated from anterior margin of eyes by about width of base of scape. Antennal scape about one-half length rostrum; club elongate-oval; apical pilose part one-third length of entire club. Pronotum with lateral margins subparallel to slightly sinuate in basal one-half, convergent subapically, tubulate to apex; moderately densely, deeply punctate on flanks, across apical margin and at middle of base, otherwise disc impunctate; flat at base. Pronotum with length slightly greater than width. Elytra one and one-half times length pronotum; intervals impunctate, flat; striae with distinct, moderately deep, small punctures. Scutellum broadly "V" shaped, length one and one-half times width at base, concave anteriorly, slightly emarginate. Pygidium very slightly convex, not tumescent; coarsely deeply punctate and setose throughout; apex subtruncate; apical margin with row of short setae, also with small patch of denser, erect setae medially near base. Ventrally with front coxae separated by slightly more than one-half width of coxa; prosternum moderately densely, regularly punctate, flat. Lateral portions of meso-, metasternum and ventrites 1 to 5 moderately densely, deeply punctate; punctures larger laterally on metasternum and ventrites 1 and 2; middle of metasternum and ventrites 1-4 virtually impunctate, shining; last ventrite flat, with large round patch of dense long erect hairs covering middle of apical three-quarters. Legs short, sparsely, very shallowly

punctate; femora slightly clavate, short, hind femur reaching apex of ventrite 4; inner margins of all tibiae slightly sinuate subapically; hind tibiae with distinct tuft of dense elongate hairs at about the midlength, the hairs getting progressively shorter towards the tibial apex. Tarsi each with third article widely dilated, pilose ventrally except in broad "V" shaped median area; all tarsi with third articles symmetrical; apical margins of third articles moderately deeply emarginate.

Sexual dimorphism.—Although females are not yet known in this species, it can be inferred (based on the related species *M. bromeliadicola*, *M. nudiventris* and *M. quadrilineatus*) that they will lack the pilosity on ventrite 5 and along the inner margin of the hind tibiae.

Material Examined.—Male HOLOTYPE labelled "Panama. Chiriqui Prov. / Cont'l Divide Trail / 3-4-VII.1997 / Morris & Wappes" (CMNC).

Distribution.—Panama (Chiriqui).

Natural history.—No information is available on natural history of this species. The habitat along the Continental Divide Trail near the La Fortuna Dam is a wet ridgetop cloud forest. Given the plant associations of its close relatives *M. bromeliadicola* and *M. quadrilineatus*, it is suspected that this species also is associated with bromeliads.

Derivation of specific name.—Through their support of the Nature Discovery Fund at the Canadian Museum of Nature, this species is named after the Bell family of Grimsby, Ontario, Canada.

### ***Metamasius burcheri* Anderson, new species**

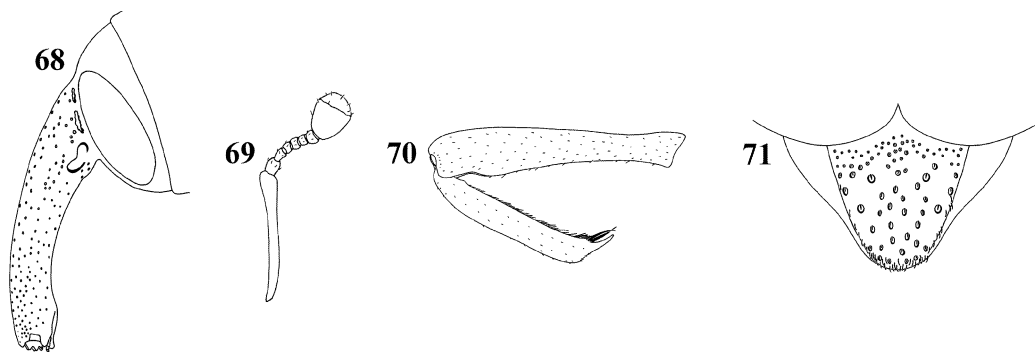
(Figs. 55-56, 68-71)

Identification.—This species is easily recognized by the elongate-narrow form of the pronotum (Fig. 55); short rostrum and legs (Fig. 56); short pilose apex of the antennal club (Fig. 69); and long, narrow scutellum. There is no tooth at the apex of the tibia as in the superficially similar Mexican species *M. flavopictus* (Champion). This species appears to be most closely related to, and similar to, *M. bromeliadicola* and *M. dimidiatipennis*.

Description.—Male, not known. Female, length, 9.8-11.9 mm; width 4.0-4.9 mm. Color black and red. Head and rostrum black. Pronotum black, with two elongate red spots (slightly convergent anteriorly) at apical one-third. Elytra black, with red humeri, short oblique red band at basal one-third extended from interval 2 to 8, red spot at apical one-third on intervals 2-5, and apical one-quarter piceous. Ventrally black, with only lateral portions of ventrites 2-5 reddish; legs entirely black, or black, with femora red basally, tibia red throughout middle portion of length.

Rostrum short, about one-half length pronotum; somewhat robust, cylindrical, evenly but slightly curved, very finely, densely and shallowly punctate especially towards base; base of rostrum slightly expanded, basal expanded area short, about one-quarter total ros-

tral length. Rostrum glabrous ventrally, bisulcate with sulci separated by sharp median carina; peduncle concave medially, with small rounded, ventrally directed, subapical tooth. Scrobe with posterior margin separated from anterior margin of eyes by about one-half width of base of scape. Antennal scape about one-half length rostrum; club slightly laterally compressed, oval; apical pilose part one-quarter of total club length. Pronotum with lateral margins subparallel to slightly convergent in basal two-thirds, slightly more convergent to apex; virtually impunctate on disc, flanks with punctures sparse but moderately deep; flat subbasally. Pronotum very elongate-narrow, length one and one-third times width. Elytra one and one-half times length pronotum; with intervals impunctate, flat; striae with punctures moderately deep, moderately large. Scutellum elongate-narrow, "U" shaped, length three times width at base, flat. Pygidium sparsely but deeply punctate throughout, not to slightly carinate, not tumescent; lateral margins at apex finely setose; apex subtruncate. Ventrally with front coxae separated by slightly less than one-third width of coxa; prosternum flat between front coxae; slightly transversely swollen anterior to coxae. Meso- and metasterna at most finely, sparsely and shallowly punctate, ventrites 1-4 with punctures larger, deeper, denser laterally, sparse and shallow medially; last ventrite of female deeply punctate throughout, apex finely setose and very slightly impressed at middle. Legs short, virtually impunctate; femora clavate, short and robust, hind femur only reaching apex of ventrite 4; inner margins of all tibiae and femora with short, moderately dense setae; front and hind tibiae straight, middle tibia very slightly inwardly arcuate. Tarsi each with third article widely dilated, pilose ventrally except for large triangular glabrous spot and middle in basal one-half; all tarsi with third articles symmetrical; apical margin of third articles truncate.



**FIGURES 68-71.** *Metamasius burcheri* Anderson. 68. Lateral view of head, female. 69. Antenna. 70. Hind leg, female. 71. Pygidium, female.

Material examined.—Female HOLOTYPE labelled “Quebrada Segunda, P.N. / Tapanti, 1250m, Prov. / Cartago, Costa Rica. Ago / 1992, G. Mora / L-N 194000, 560000”, INBio barcode 803527 (INBC). PARATYPE (1♀). GUANACASTE PROVINCE.

Tilarán, Tierras Morenas, Rio San Lorenzo, 800m, 1 November 1993, G. Rodríguez, L\_N 283950\_424500 (1 ♀; 3355430) (CMNC).

Distribution.—Costa Rica (Cartago).

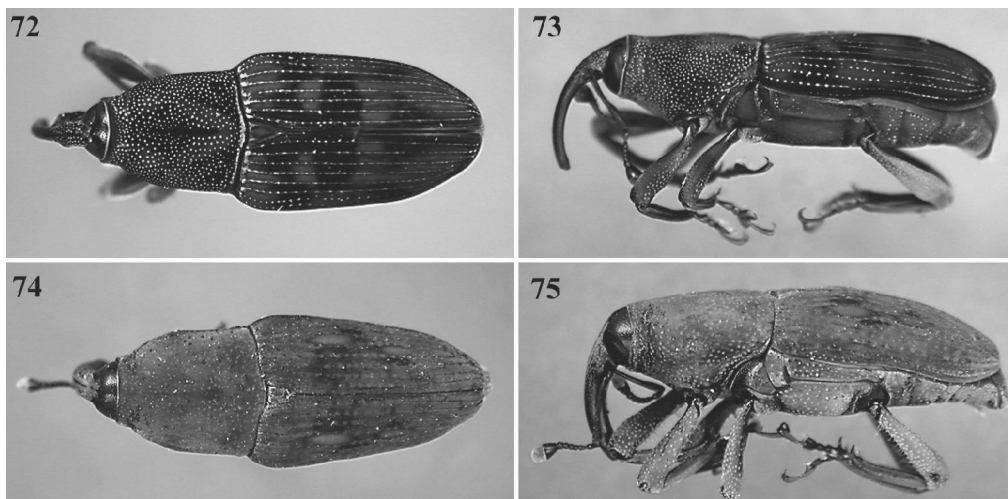
Natural history.—Nothing is known about the natural history of this species. It is closely related to species associated with bromeliads and likely is similarly associated. The two known specimens were collected in forest at 1250m in Cartago Province and 800m in Guanacaste Province.

Derivation of specific name.— Through their support of the Nature Discovery Fund at the Canadian Museum of Nature, this species is named after Robert Percy Burcher of Calgary, Alberta, Canada as a gift from his children.

***Metamasius gallettae* Anderson, new species**

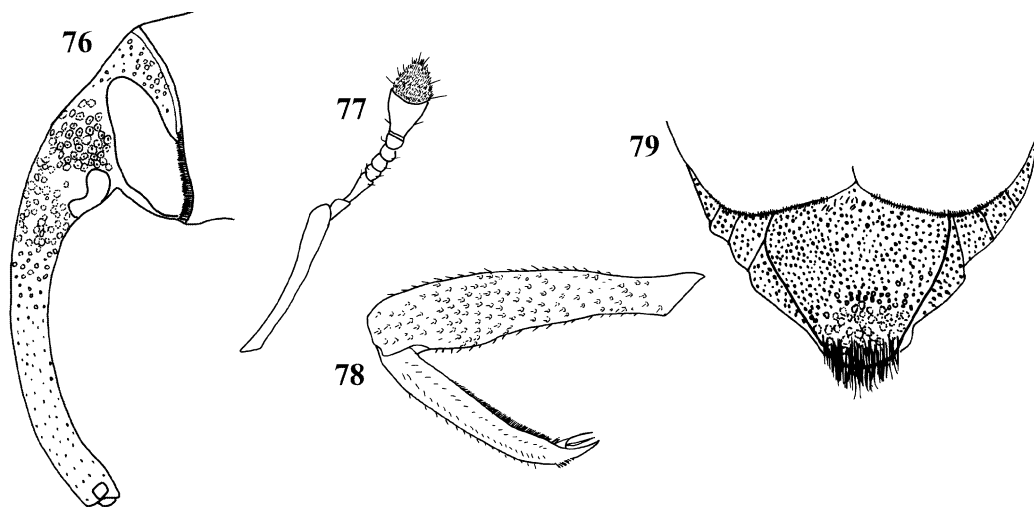
(Figs. 72-73, 76-79)

Identification.—*Metamasius gallettae* is best defined by a combination of character states. It is very similar to *M. octonotatus*, *M. dasyurus*, and related species, but can be recognized by the relatively short, strongly curved rostrum in both sexes (Fig. 76); pygidium in both sexes not carinate and with only a transverse patch of uniformly fine short hairs across the apical margin (Fig. 79); widely separated front coxae; inner margins of tibiae of both sexes with dense, fine short setae arranged in a pectinate manner (Fig. 78), except for the front tibia of males where the setae are slightly longer and wispy; and, the very widely dilated and deeply emarginate third tarsal articles.



**FIGURES 72-75.** *Metamasius* species. 72-73. *Metamasius gallettae* Anderson. 72. Dorsal habitus. 73. Lateral habitus. 74-75. *Metamasius hooveri* Anderson. 74. Dorsal habitus. 75. Lateral habitus.

Description.— Male, length, 8.3-8.7 mm; width, 3.4-3.8 mm . Female, length, 8.2-9.3 mm; width, 3.3-3.9 mm. Color variable, red with black; head black, rostrum red, infused dorsally with black; pronotal disc black, or dark red with black median fusiform maculation, posterolateral angles, and oblique line extended from lateral margin at anterior one-third onto flank to dorsal margin of coxa; elytra black with various extent of red across basal margin, in complete or laterally incomplete “C” shaped macula at midlength, and subapically on intervals 1-6; scutellum black or black with red; legs red, apices of femora infusate. Venter black, or black with red laterally on metasternum and ventrites.



**FIGURES 76-79.** *Metamasius gallettae* Anderson. 76. Lateral view of head, male. 77. Antenna. 78. Hind leg, male. 79. Pygidium, male.

Rostrum slightly shorter than pronotum; elongate, cylindrical, narrow, evenly rather strongly curved, very finely, densely, shallowly punctate basally, punctures finer and sparser apically, apical one-quarter glabrous and impunctate; base of rostrum abruptly expanded in dorsal view at point of antennal insertion, but narrowed again before eyes; in lateral view slightly wider at base, expansion gradual, basal expanded area short, about one-fifth total rostral length. Rostrum glabrous ventrally; peduncle flat, vaguely bituberculate at extreme apex. Scrobe with posterior margin separated from anterior margin of eyes by about width of base of scape. Antenna with scape more or less one-half length rostrum; club slightly laterally compressed, elongate-oval; apical pilose part subequal to length basal glabrous part. Pronotum with lateral margins subparallel in basal two-thirds, convergent subapically, tubulate to apex; disc and flanks uniformly moderately deeply punctate throughout, some specimens with median area or line with shallower, sparser punctures or impunctate; flat, but with slight subapical and subbasal impressions; anterolateral margin immediately behind eyes with some punctures coalescent, surface somewhat crenulate. Pronotal length slightly greater than width. Elytra one and two-thirds

times length pronotum; intervals impunctate, very slightly convex in two or three irregular rows, flat; striae with distinct, moderately deep, small punctures. Scutellum elongate, "V" shaped, length about one and two-thirds times width at base, flat. Pygidium flat to slightly convex, not tumescent; coarsely deeply irregularly punctate throughout; apex narrowly subtruncate; apical margin with multiple rows of dense, fine hairs arranged in a transverse patch, not carinate or otherwise setose. Ventrally with front coxae separated by almost width of coxa; prosternum densely, regularly punctate, flat between and anterior to front coxae, at most very slightly swollen anterior to coxae. Lateral portions of meso- and metasternum finely sparsely punctate; middle of metasternum and ventrites 1 to 5 moderately deeply, densely punctate; punctures finer and shallower medially on metasternum and ventrites 1 to 3; last ventrite flat with subapical median round patch of very dense, short, fine hairs, hairs slightly longer and more obvious in male. Legs moderately long, densely regularly punctate, especially on outer face of femora; femora slightly clavate, moderately long, hind femur almost reaching apex of pygidium; inner margins of middle and hind tibiae of male very slightly, imperceptibly, inwardly expanded subbasally, straight in female; all tibiae with very fine, uniformly short, stout, peglike setae throughout length arranged in pectinate manner, except for front tibia of male where setae longer, finer, wispy. Tarsi each with third article very widely dilated, completely pilose ventrally; all tarsi with third articles symmetrical and with apical margins deeply emarginate.

Variation.—There is some variation in the color pattern of this species, mainly in the extent of black on the pronotum and elytra.

Sexual dimorphism.—Males and females are difficult to separate in this species. Males have a slightly longer, slightly more densely punctate rostrum, a front tibia with the inner margin with longer and wispy hairs, the last ventrite with a slightly more obvious patch of fine, short hairs, and an impressed middle of ventrite 1.

Material examined.—Male HOLOTYPE labelled "Panama: Darien / Estacion Ambiental Cana / Cerro Pirre, 1200m / 4-7.VI.1996 / J.Ashe & R. Brooks / F.I.T. #105 (CMNC). Female ALLOTYPE labelled as holotype, except "1380m, F.I.T. 107" (CMNC). PARATYPES (3 ♂, 10 ♀). Labelled as holotype, except 1450m, F.I.T. 108 (1 ♂, 6 ♀). ECUADOR. PICHINCHA PROVINCE. Santo Domingo, Tinalandia Resort, 0°13'S, 79°09'W, 760m, 18-24.V.1997, C. & K. Messenger (2 ♂, 4 ♀). Paratypes in CMNC, CWOB, INBC.

Distribution.—Panama (Darien), Ecuador (Pichincha).

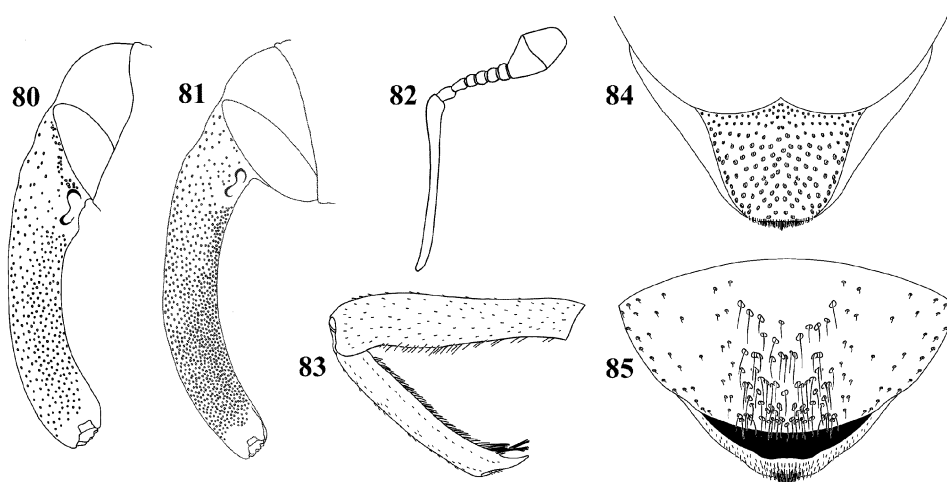
Natural history.—Adults were collected in montane cloud forest and montane evergreen forest transition between 1200-1450m in Panama as well as in montane evergreen forest at 760m in Ecuador. No other information is available on natural history.

Derivation of specific name.—Through the support of the Nature Discovery Fund at the Canadian Museum of Nature, by Mark Dallas, this species is named after Galletta Nurseries of Arnprior, Ontario, Canada.

*Metamasius hooveri* Anderson, new species

(Figs. 74-75, 80-85)

Identification.—This species is similar to the somewhat difficult to characterize *M. sulcirostris* but is very easily recognized by the distinct elytral pattern of two or four somewhat swollen short orange lines on interval 4 (which slightly distort the elytral striae) (Figs. 74-75), the distinct double row of setae on the ventral surface of the rostrum (abraded in some specimens but indicated by an irregular short row of micropilose subcontiguous punctures), and the form of the pilosity on the ventrites of both sexes (Fig. 85). In dorsal view, the basal expanded portion of the rostrum has a very fine, shallow median sulcus which extends just beyond the end of the expanded portion onto the narrower part of the rostrum.



**FIGURES 80-85.** *Metamasius hooveri* Anderson. 80. Lateral view of head, male. 81. Lateral view of head, female. 82. Antenna. 83. Hind leg, male. 84. Pygidium, male. 85. Apex of abdomen, female.

Description.— Male, length, 11.5-12.4 mm; width, 4.6-5.2 mm. Female, length, 12.2-12.9 mm; width, 5.0-5.3 mm. Color black to dark brown except for four slightly swollen short orange lines on the elytral disc, one pair at anterior one-third of elytral length, the other pair just behind the middle, both on interval 4 (adjacent areas of intervals 3 and 5 may be piceous as well); these short lines may be merged into two longer lines in some specimens. Dorsal surface with fine velvety coating obscuring underlying cuticle.

Rostrum slightly shorter than pronotum; elongate, moderately robust, cylindrical, evenly curved, moderately coarsely punctate dorsally at base otherwise very finely, shallowly punctate; apical one-third glabrous and virtually impunctate; base of rostrum slightly, gradually expanded in dorsal view only, basal expanded area about one-third total rostral length, in dorsal view with very fine, shallow median sulcus which extends just beyond end of expanded portion onto narrower part of rostrum. Rostrum ventrally with distinct double row of setae (abraded in some specimens but indicated by an irregular short



row of micropilose subcontiguous punctures); peduncle flat; bilamellate anteriorly. Scrobe with posterior margin separated from anterior margin of eyes by about width of base of scape. Antennal scape long, slightly more than one-half length rostrum; club slightly laterally compressed, elongate-oval; apical pilose part subequal to length basal glabrous part. Pronotum with lateral margins subparallel in basal one-half to three-fifths, moderately convergent to subapex, apex tubulate; moderately densely, shallowly punctate, moreso on flanks than on disc; shallowly transversely impressed medially anterior to base. Pronotal length slightly greater than width. Elytral length one and two-thirds times length pronotum; striae and intervals impunctate, flat, except interval 4 slightly swollen at each orange maculation, swelling slightly distorting striae. Scutellum broadly "V" shaped, slightly longer than width at base, slightly concave. Pygidium flat or very slightly convex, with sparsely setose median line in apical one-half, not tumescent; coarsely deeply punctate and setose in apical one-half; apex broadly rounded; apical margin with continuous row of dense, long setae. Ventrally with front coxae separated by about one-quarter to one-third width of coxa; prosternum densely regularly punctate, slightly concave at middle, flat between and anterior to front coxae. Lateral portions of meso-, metasternum and ventrites sparsely, shallowly, regularly punctate; middle of metasternum and ventrites 1 to 3 similarly punctate, not shining; male with midline of ventrites 2 to 4 sparsely, finely setose, except for segment 1 with large median patch of longer, appressed golden hairs, and also with segment 5 with round patch of long hairs and two tufts of longer, dense, erect golden hairs on each side at midlength; female with segments 3-5 with moderately dense, very long, appressed fine hairs in broad patch along midline. Legs moderate in length, shallowly punctate, finely setose; femora clavate, hind femur reaching midlength of ventrite 5; inner margins of tibiae with setae short, sparse on front tibiae, finer and longer on middle and hind tibiae; all tibiae straight. Tarsi each with third article widely dilated, pilose ventrally except in "U" shaped area in basal two-thirds; all tarsi with third articles symmetrical and with apical margins very slightly emarginate.

Sexual dimorphism.—The ventral surface of the ventrites is quite different in males and females of this species. In males, the midline of all segments is finely sparsely setose with segment 5 bearing two tufts of longer, dense, erect hairs on each side of midline at midlength; in females, segments 3-5 have moderately dense, very long, appressed fine hairs in a broad patch along the midline.

Variation.—Specimens from Limon Province have 2 short tumid lines on interval 4 on each elytron, whereas specimens from Heredia Province have the 2 short lines on each elytron joined into a single longer, tumid line.

Material Examined.— Male HOLOTYPE labelled "Sector Cerro Cocori, Fca. De E. / Rojas, 150m, Prov. Limón, / Costa Rica. Mar 1993. E. Rojas / L-N-286000,567500", INBio barcode 1406710 (INBC). Female ALLOTYPE labelled "Sector Cerro Cocori, Finca de E. Rojas. / Prov. Limón, Costa Rica, 150m Ago. / 1993. E. Rojas / L-N-286000-567500 #2291", INBio barcode 1136510 (INBC). PARATYPES (9 ♂, 1 ♀). COSTA

RICA. HEREDIA PROVINCE. Estacion Biologia La Selva, 50-150 m, 10°26'N, 84°01'W, Proj. ALAS, 16 Oct 1995 (1 ♂; 2731810); 1 Dic 1995 (1 ♂; 2731870); 28 May 1998 (1 ♂; 2227367); XII.1996-II.1997 (1 ♂). LIMON PROVINCE. R.N.F.S. Barra del Colorado, Rio Sardinias, 10m, 25 Aug 1992, F. Araya, L-N 291500, 564700 (1 ♂; 807106). Sector Cerro Cocori, Finca de E. Rojas, 150m, Mar 1991, E. Rojas, L-N-286000-567500 (1 ♂; 624727); Oct 1991 (1 ♂; 618194); Jun 1993, #2179 (1 ♂; 1935288). Sector Cedrales de la Rita, 3 km N. del Puente Rio Suerte, Ruta Puerto Lindo, 10m, Apr 1996, E. Rojas, L-N-278600, 566500, #7236 (1 ♀; 2463363). Hacienda Tapezco, Tortuguero (29 km. W.), 10°30'N, 83°47'W, 40m, 13 March 1978, J.P. Donahue et al. (1 ♂). Paratypes in CMNC, CWOB, INBC, LACM.

Distribution.—Costa Rica (Heredia, Limon).

Natural history.—All specimens have been collected in lowland rainforest. No other information is available.

Derivation of specific name.— Through their support of the Nature Discovery Fund at the Canadian Museum of Nature, this species is named after Ruth Hoover of Cardinal, Ontario, Canada as a gift from her sister Judith Umbach.

#### ***Metamasius leopardinus* Anderson, new species**

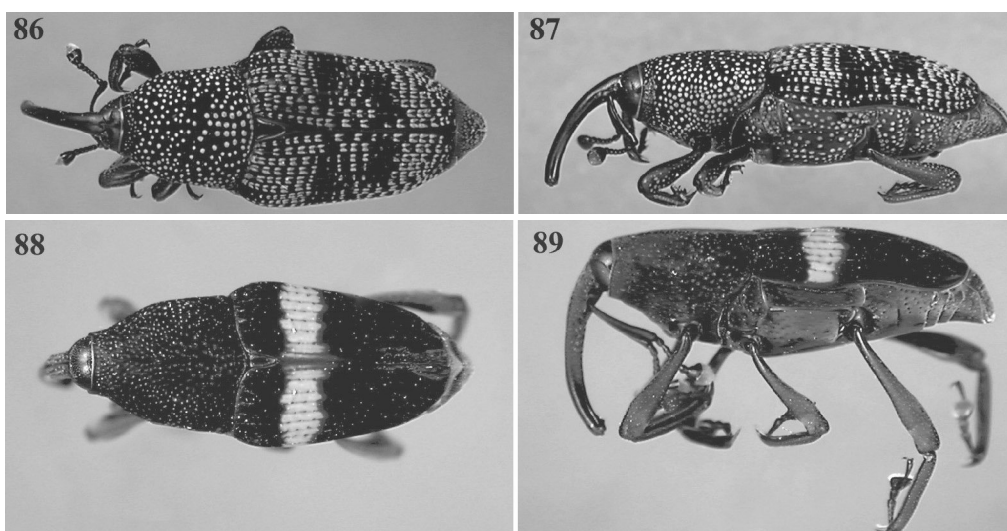
(Figs. 86-87, 90-95)

Identification.—This species is very easily recognized by the distinct and unique form of the elytral stria punctures which are paired, filled with dense fine pale yellow pilosity, and extended about one-third of the way into the elytral intervals (Figs. 86-87). In the form of the punctures, this species approaches *Sphenophorus cicatristriatus* Fähræus, although the punctures are not as large or as markedly developed as in that species. These punctures may be lacking or less dense in a variously developed median band giving the general appearance of a vague black transverse vitta (Fig. 86). The entire body, with the exception of the head and rostrum, median portion of the metasternum and ventrites 1 to 4, is deeply, regularly punctate, each puncture filled with the same dense fine pale yellow pilosity. Most of the specimens seen are totally black whereas a few possess various amounts of red on the pronotum and the elytra. In other characters this species resembles *M. nudiventris* Champion although in that species the pronotal disc is much less densely punctate and the punctures are not filled with pilosity as they are in *M. leopardinus*.

Description.— Male, length, 9.7-13.4 mm; width, 4.0-5.6 mm. Female, length, 10.2-13.7 mm; width, 4.2-5.8 mm. Color entirely black or black with small amounts of red laterally in longitudinal stripe on pronotal disc and in one or two irregular transverse series of spots on elytra, one at basal one-third, the other postmedian.

Rostrum slightly shorter than pronotum; elongate, cylindrical, shining, evenly curved, very finely, shallowly punctate; base slightly, gradually expanded in dorsal view only, basal expanded area short, about one-sixth total rostral length; rostrum glabrous ventrally;

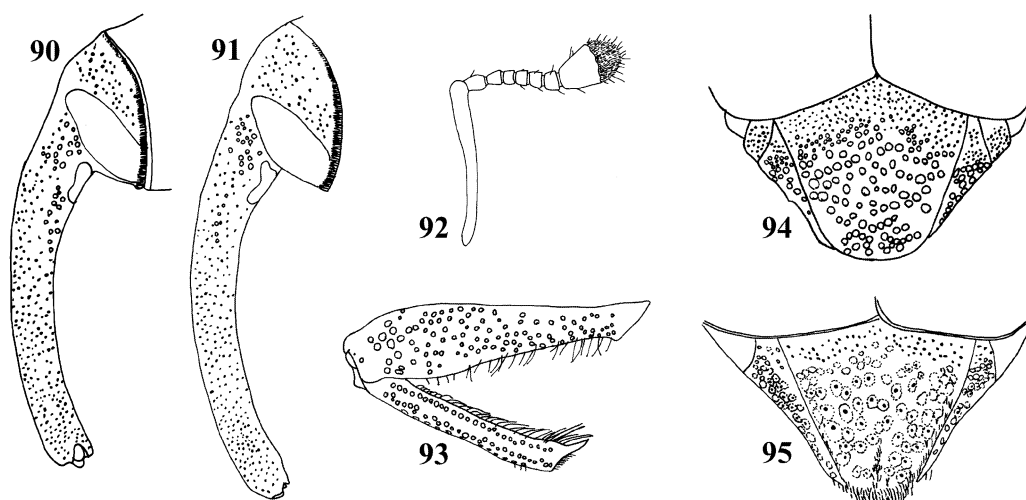
peduncle with anterior angle directed very slightly anteriorly; bilamellate anteriorly. Scrobe with posterior margin separated from anterior margin of eyes by less than width of base of scape. Antennal scape about one-half length rostrum; club slightly laterally compressed, oval; apical pilose part two-fifths to one-third length of entire club. Pronotum with lateral margins slightly convergent in basal two-thirds, moderately convergent to apex; moderately densely, deeply punctate, except slightly sparser medially on disc; flat or at most shallowly impressed medially at base. Pronotum with length slightly greater than width. Elytral length one and two-thirds times length pronotum; intervals impunctate, flat; striae with large, deep, paired densely pilose, obliquely oval punctures, extended up to one-third way into intervals. Scutellum broadly "V" shaped, slightly longer than width at base, flat. Pygidium flat, with slightly raised, but not carinate, sparsely setose, median line in apical one-half, not tumescent; coarsely deeply punctate throughout; apex broadly rounded; apical margin with continuous row of uniformly short setae. Ventrally with front coxae separated by slightly less than one-half width of coxa; prosternum densely regularly punctate, flat between and anterior to front coxae. Lateral portions of meso-, metasternum and ventrites deeply, regularly punctate; middle of metasternum and ventrites 1 to 3 virtually impunctate, shining; last ventrite deeply regularly punctate, slightly impressed, finely setose, moreso in male than in female. Legs moderate in length, shallowly punctate, finely setose except subapically on femora where punctures large and dense; femora clavate, hind femur almost reaching apex of ventrite 4; inner margins of tibiae with setae in apical two-thirds, setae short, sparse on front tibiae, progressively longer on middle and hind tibiae; all tibiae straight. Tarsi each with third article widely dilated, pilose ventrally except in "V" shaped area in basal two-thirds and midline in apical one-third; all tarsi with third articles symmetrical and with apical margins very slightly emarginate.



**FIGURES 86-89.** *Metamasius* species. 86-87. *Metamasius leopardinus* Anderson. 86. Dorsal habitus. 87. Lateral habitus. 88-89. *Metamasius murdiei* Anderson. 88. Dorsal habitus. 89. Lateral habitus.

Sexual dimorphism.—Sexual dimorphism in *M. leopardinus* is evident in the form of the middle of ventrite 1 which is distinctly concave and subtuberculate laterally immediately adjacent to this concavity in males. In females, ventrite 1 is flat. Also, the apex of ventrite 5 is slightly more deeply impressed in males than in females.

Variation.—There is extensive variation in the pattern of the characteristic large elytral punctures. In some specimens, the punctures are more or less uniformly distributed over the elytra; however, in some specimens they are lacking, or sparser, in a broad median band, giving the impression of a median black vitta to the naked eye. Most of the specimens examined are completely black in color but four individuals have the lateral portions of the pronotal disc reddish and eight specimens have various amounts of red in one or two irregular transverse series of spots on the elytra.



**FIGURES 90-95.** *Metamasius leopardinus* Anderson. 90. Lateral view of head, male. 91. Lateral view of head, female. 92. Antenna. 93. Hind leg, male. 94. Pygidium, male. 95. Pygidium, female.

Material examined.—Male HOLOTYPE labelled “Rio San Lorenzo, 1050m, / Tierras Morenas, Z.P. / Tenorio, Prov. Guanacaste / Costa Rica, Abr 1992 / F. Quesada / L-N 287800, 427600”, INBio barcode 867699 (INBC). Female ALLOTYPE labelled as holotype, INBio barcode 867647 (INBC). PARATYPES (13 ♂, 24 ♀). COSTA RICA. No further locality, F. Nevermann, 7.VI.1936 (1 ♂). GUANACASTE PROVINCE. Rio San Lorenzo, Tierras Morenas, Z.P. Tenorio, Apr 1992 (6 ♂, 16 ♀; 415418, 752431, 867659, 791859, 415227, 791861, 867652, 791854, 413029, 411620, 867650, 791845, 791853, 791858, 867700, 867677, 411619, 791856, 422412, 791857, 867651, 413032, 867655). CARTAGO PROVINCE. P.N. Tapanti, 1150m, Oct 1994 (1 ♂, 2 ♀; 2025118, 2025114, 2025113). Quebrada Segunda, 1250m, Mar 1992 (1 ♀; 741260); Apr 1992 (1 ♂; 699196); May 1992 (1 ♀; 950253); Jul 1992 (1 ♀; 712116); Mar 1993 (1 ♀; 1206517); May 1993 (1 ♂; 1206262). R. Grande de Orosi, desde Sendero La Pava Hasta la Catarata, 1700m, Mar

1995 (1 ♂, 1 ♀; 2423813, 2423814). SAN JOSE PROVINCE. Zurqui de Moravia, 1600m, malaise trap, XII, 1996, Hanson & Godoy (1 ♀). PANAMA. CHIRIQUI PROVINCE. 7 km S. Fortuna Dam. 15-17 May 1996, Wappes, Huether and Morris (1 ♂). Paratypes in AMNH, BMNH, CMNC, CWOB, INBC, USNM.

Distribution.—Costa Rica (Cartago, Guanacaste, San Jose), Panama (Chiriqui).

Natural history.—Specimens have been collected from 1050-1700 m elevation. One specimen was collected from a bromeliad.

Derivation of specific name.—This species is named after the form of the pale yellow pilose punctures which give specimens a finely spotted appearance.

Comments.—This species is quite common in the collections at INBio, but is represented by only one other specimen in the other collections examined.

### ***Metamasius murdiei* Anderson, new species**

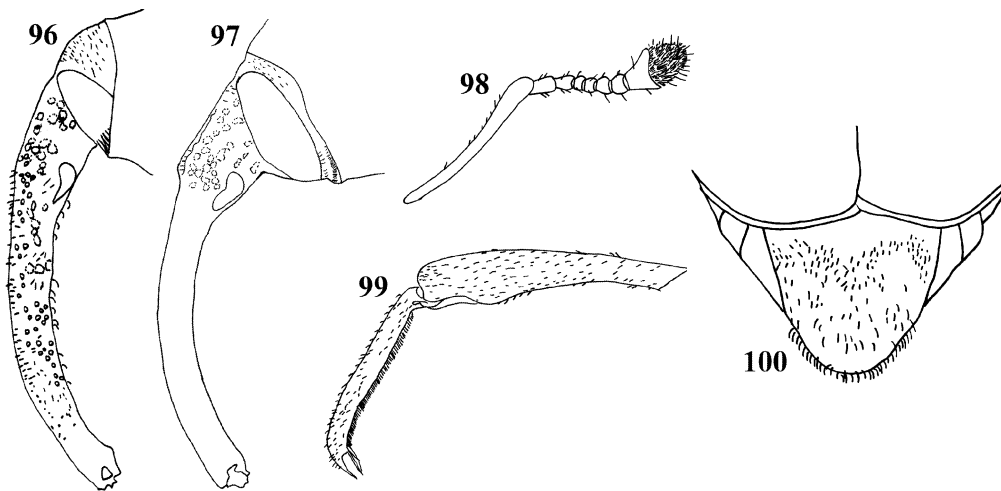
(Figs. 88-89, 96-100)

Identification.—This species is recognized by its smaller size (< 10 mm in length), single orange-yellow transverse band at the basal one-third of the elytra (Figs. 88-89), and the postmedially deeply and broadly impressed pronotum (Fig. 88). It has a color pattern similar to *M. callzona* (Chevrolat), *Cactophagus aurocinctus* (Champion) and *C. orizabensis* (Chevrolat) but none of these species has the pronotum similarly impressed. Males have a long narrow evenly curved rostrum with the basal portion slightly and only gradually swollen immediately anterior to the eyes, the antennae inserted by about three times the width of the base of the scape from the anterior margin of the eyes (Fig. 96). The rostrum of the female is evenly curved, glabrous and shining, virtually impunctate, with the apical portion contrasting markedly with the swollen and coarsely punctate basal portion (Fig. 97). The legs in both sexes are long, the hind femur almost reaching the apex of the pygidium (Fig. 89).

Description.— Male, length 7.5-9.3 mm; width 3.5-3.9 mm. Female, length, 8.7 mm; width 3.8 mm. Color black except for broad transverse continuous yellow band at basal one-third of elytra; postocular region reddish.

Rostrum subequal to pronotum in length, elongate; in male subcylindrical and shining in apical one-third, evenly curved, moderately coarsely punctate laterally at base, otherwise shallowly punctate throughout; base of rostrum only slightly and gradually expanded in dorsal and lateral views; in female cylindrical and shining throughout length, evenly curved, virtually impunctate, base of rostrum distinctly and suddenly expanded; basal expanded area about one-fourth to one-third total rostral length. Rostrum glabrous ventrally; peduncle in male of slight “see-saw” form with posterior tooth prominent, directed ventrally and anterior angle directed very slightly anteriorly; bilamellate anteriorly; in female, flat. Scrobe with posterior margin separated from anterior margin of eyes by about

three times width of base of scape. Antennal scape about one-half length rostrum; club slightly laterally compressed, oval; apical pilose part subequal in length to, or very slightly longer than, basal glabrous part. Pronotum with length slightly greater than width; lateral margins subparallel to slightly convergent in basal one-half, moderately convergent from midlength to apex; sparsely and shallowly but distinctly punctate throughout; moderately and very broadly impressed postmedially, distinctly concave. Elytra one and one-half times length pronotum; with striae and intervals impunctate, flat. Scutellum elongate, narrow; length about three times width at base, flat. Pygidium slightly swollen subapically, not tumescent; sparsely setose and punctate throughout; apex subtruncate. Ventrally with front coxae separated by slightly less than width of coxa; prosternum with slight rounded swelling between front coxae; flat anterior to coxae. Mesosternum and lateral portions of metasternum and ventrites shallowly punctate; middle of metasternum and ventrites 1 and 2 virtually impunctate, shining; last ventrite of female flat at middle. Legs elongate, very shallowly punctate and finely setose throughout; femora clavate, moderately long and narrow, hind femur almost reaching apex of pygidium; inner margins of all tibiae with only very short setae arranged in pectinate manner; all tibiae straight. Tarsi each with third article widely dilated, completely pilose ventrally; all tarsal third articles symmetrical with apical margins truncate.



**FIGURES 96-100.** *Metamasius murdiei* Anderson. 96. Lateral view of head, male. 97. Lateral view of head, female. 98. Antenna. 99. Hind leg, male. 100. Pygidium, male.

Material examined.—Male HOLOTYPE labelled “Costa Rica: Cartago / 5 km E. Turrialba / CATIE vii-21/22-75 / E.M. & J.L. Fisher” (CMNC). Female ALLOTYPE labelled “Costa Rica Her[edia] / Chilamate / 24-30 Jul 1993 / W.J. Hanson” (CWOB). PARATYPES (2 ♂). PANAMA. CHIRIQUI PROVINCE. Fortuna (8°44’N, 82°15’W), 1050m, UV light, 27 January, 1979 (1 ♂). Bocas del Toro, Chiriqui Grande (16 km W.), 22 February, 1999, J.E. Wappes (1 ♂). Paratypes in CWOB.

Distribution.—Costa Rica (Cartago, Heredia), Panama (Chiriqui).

Natural history.—No information is available.

Derivation of specific name.—Through their support of the Nature Discovery Fund at the Canadian Museum of Nature, this species is named after Michael Terrence Murdie of Breckenridge, Quebec, Canada as a gift from his wife Risë Paquette on the occasion of his 60<sup>th</sup> birthday.

Comments.—This species was first recognized as new by Patricia Vaurie in 1978. She had placed a determination label on the holotype identifying it as “*Metamasius* n. sp.?”.

***Metamasius richdeboeri* Anderson, new species**

(Figs. 101-102, 109-114)

Identification.—This species is difficult to characterize although the elytral color pattern, with a single red broad transverse median band, and in some specimens, a red subapical irregular spot and reddish humeri, is distinctive (Figs. 101-102). The pronotum is marked with red medially at the base and in two variously developed oblique lateral lines. In its color pattern, this species resembles some specimens of *M. dasyurus* but the pattern of setae on the pygidium is different and males do not have the long hairs on the inner margins of the front tibiae found in the latter species. In contrast to *M. dasyurus*, the tibiae have only small, stout, spine-like setae along the inner margins, giving an overall “comb-like” or pectinate appearance (Fig. 112), and the pygidium has two apical tufts of setae (Fig. 113). The hind and middle tibiae are also slightly inwardly expanded subbasally in the males, but not as distinctly as they are in *M. hebetatus*. The pronotum is distinctly impressed subbasally with the punctures deeper and denser in this impressed area. In males, there is a very slight ventral swelling on the rostrum at the midlength (Fig. 109), a feature otherwise seen only in *M. sanguinipes* and *M. tibialis*, but in these latter species the swelling is much more angulate and acute.

Description.—Male, length, 11.9-14.3 mm; width, 5.1-5.5 mm. Female, length, 10.4-12.8 mm; width, 5.0-5.4 mm. Color black with red; pronotal disc red, or black with red laterally in variously developed oblique longitudinal stripe and at middle of base; elytra black with red variously in a broad complete median band (on some specimens band abbreviated laterally to a large oblique spot extended from intervals 2 to 8), on humeral angle and subapically on intervals 3 to 5. Venter black, some specimens with lateral portions of metasternum, middle of ventrite 1, and metepisternum variously infused with red.

Rostrum shorter than pronotum; elongate, subcylindrical, evenly curved, densely, finely, shallowly punctate; base of rostrum slightly, abruptly expanded in dorsal view; in lateral view, only slightly wider at base, expansion gradual, basal expanded area about one-fourth total rostral length; also with slight ventral swelling at more or less midlength in male. Rostrum glabrous ventrally; peduncle uniformly produced ventrally, bilamellate.

Scrobe with posterior margin separated from anterior margin of eyes by about width of base of scape. Antennal scape slightly more than one-half length rostrum; club slightly laterally compressed, oval; apical pilose part subequal to length basal glabrous part. Pronotum slightly longer than wide; lateral margins subparallel to slightly divergent in basal two-thirds, convergent subapically, tubulate to apex; moderately densely, shallowly punctate, except slightly larger and deeper subbasally at middle, medially just behind anterior margin, and on flanks; with moderately deep, round impression medially at base. Elytra one and two-thirds times length pronotum; intervals impunctate, flat; striae with distinct, moderately deep, small punctures. Scutellum broadly "V" shaped, slightly longer than width at base, concave and sloping anteriorly. Pygidium flat, with slightly raised, sparsely setose, median region, not tumescent; coarsely deeply punctate throughout; apex narrowly rounded; apical margin with pair of tufts of setae. Ventrally with front coxae separated by from one-fourth to one-half width of coxa; prosternum moderately densely, regularly punctate, variously impressed, concave between and anterior to front coxae. Lateral portions of meso-, metasternum and ventrites 3 to 5 shallowly, sparsely punctate; punctures larger, deeper laterally on ventrites 1 and 2; last ventrite flat. Legs moderate in length, shallowly punctate, finely setose; femora slightly clavate, hind femur almost reaching apex of ventrite 5; inner margins of middle and hind tibiae of male slightly inwardly expanded subbasally, straight in female; with setae in apical two-thirds, setae of more or less uniform length, short, stout, overall appearance pectinate. Tarsi each with third article widely dilated, pilose ventrally except in narrow, median fusiform line in basal two-thirds; all tarsi with third articles symmetrical and with apical margins very slightly emarginate.

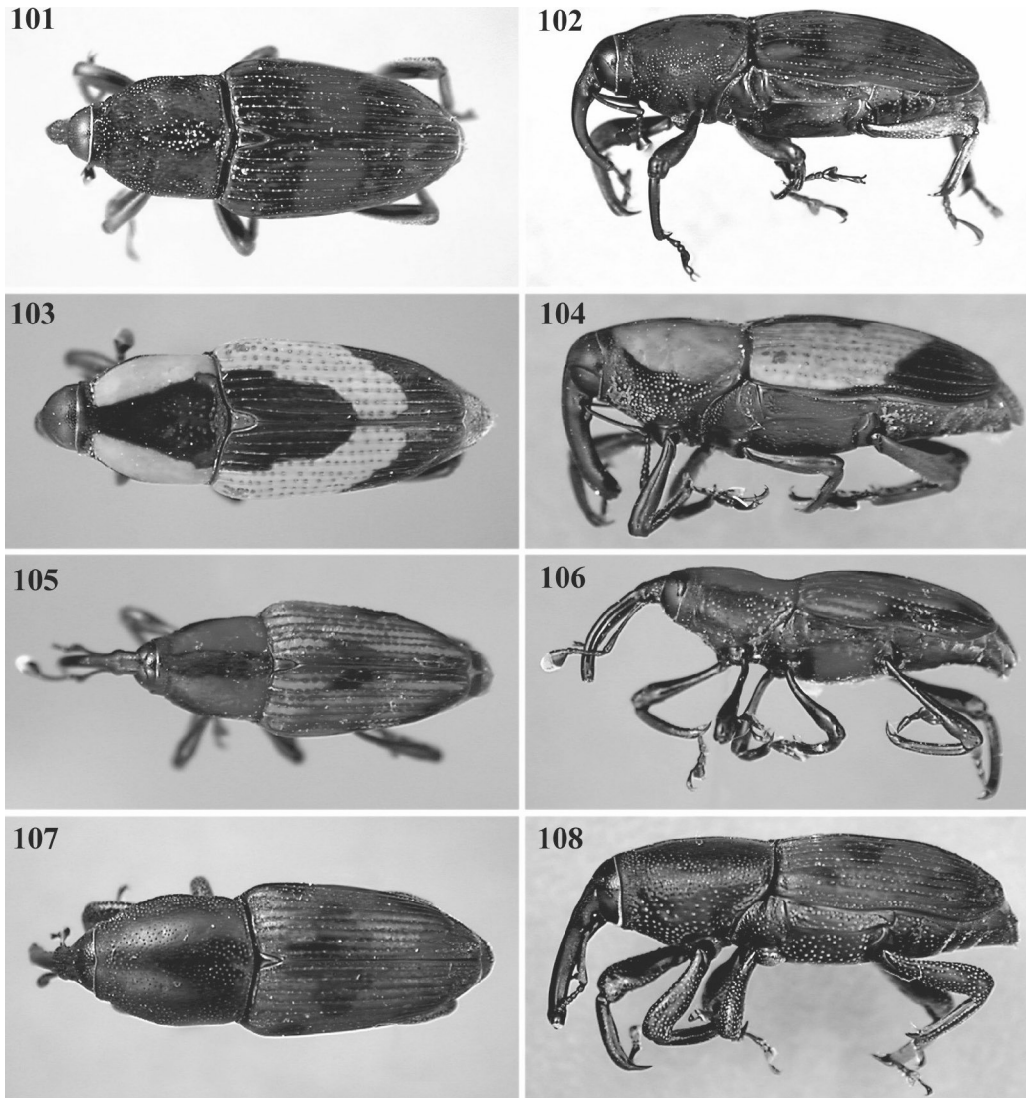
Variation.—There is some variation in the color pattern of this species. In all specimens there is a single red broad transverse median band, but in some specimens, there is also a red subapical irregular spot evident from intervals 3-5, and in these same specimens, the humeri also are reddish. In all specimens but one, the pronotum is black with red markings medially at the base and in two variously developed oblique, anteriorly convergent, lateral lines. In this exceptional specimen the pronotum is entirely red.

Sexual dimorphism.—In males, the rostrum is more slightly robust in lateral view and possesses a slight ventral swelling at about the midlength. Also, the inner margins of the middle and hind tibiae are slightly inwardly expanded in males, not so expanded in females.

Material examined.—Male HOLOTYPE labelled "Rancho Quemado, 200m, / Peninsula de Osa, Prov. / Puntarenas. Costa Rica / F. Quesada, Mar 1992 / L-S 292500, 511000", INBio barcode 864097 (INBC), with pupal cell attached. Female ALLOTYPE labelled as holotype, INBio barcode 864131 (INBC). PARATYPES (8 ♂, 10 ♀). COSTA RICA. HEREDIA PROVINCE. La Selva Biological Station, 3 km S. Puerto Viejo. Apr 1990, J. Wetterer (1 ♂). 25 Jun 1985, H. A. Hespenheide (1 ♀). LIMON PROVINCE. Res. Biol. Hitoy Cerere, Est. Hitoy Cerere, R. Cerere. 4-20 Dec 1991 (1 ♀; 490101). Amubri, 70 m, 4-30 Apr 1995 (1 ♂; 2144776). PUNTARENAS PROVINCE. Peninsula de Osa. Cerro



Rincon. 23 Jan 1997 (emerged 19 Feb 1997), 775 m. 274700 521700 (4 ♂, 3 ♀). Rancho Quemado. 21 Mar-7 Apr 1992 (3 ♀; 412638, 412634, 412639); Mar 1992 (1 ♂; 864130); Apr 1992 (1 ♂; 495142). PANAMA. CHIRIQUI PROVINCE. Bocas del Toro, Corriente Grande, Rio Changuinola, 9°17'30" N, 82°32'41" W, 18.IV.1980, H. Wolda (1 ♀). PANAMA PROVINCE. Cerro Campana, 850m, 8°40'N, 79°56'W, 14 Jul 1974, H.P. Stockwell (1 ♀). Paratypes in CMNC, INBC.

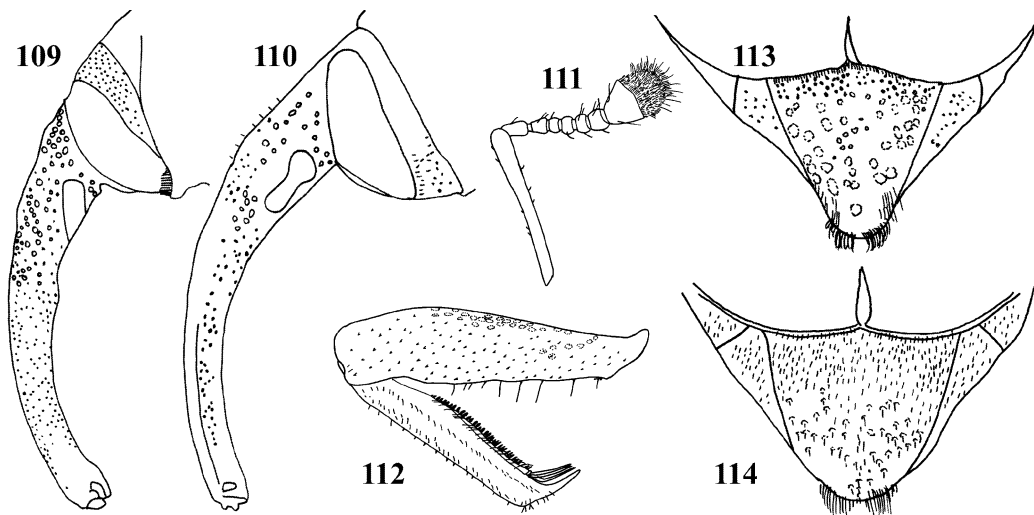


**FIGURES 101-108.** *Metamasius* species. 101-102. *Metamasius richdeboeri* Anderson. 101. Dorsal habitus. 102. Lateral habitus. 103-104. *Metamasius shchepaneki* Anderson. 103. Dorsal habitus. 104. Lateral habitus. 105-106. *Metamasius vaurieae* Anderson. 105. Dorsal habitus. 106. Lateral habitus. 107-108. *Metamasius wolfensohni* Anderson. 107. Dorsal habitus. 108. Lateral habitus.

Distribution.—Costa Rica (Heredia, Limon, Puntarenas), Panama (Chiriqui, Panama).

Natural history.—All specimens have been collected in lowland rainforest. Little information is available on natural history although a number of the specimens collected in the Osa Peninsula have fibrous pupal cells mounted along with the adult beetles. This suggests these specimens were collected in the pupal cells or had recently emerged from them. One series of such specimens from Cerro Rincon (775 m) was collected in the roots of “chonta” (*Socratea exorrhiza*; Arecaceae) along with larvae. It is possible that the other Osa specimens were from the same species of palm.

Derivation of specific name.—Through their support of the Nature Discovery Fund at the Canadian Museum of Nature, this species is named after Richard deBoer of Manotick, Ontario, Canada as a gift from his wife Coralie Lalonde.



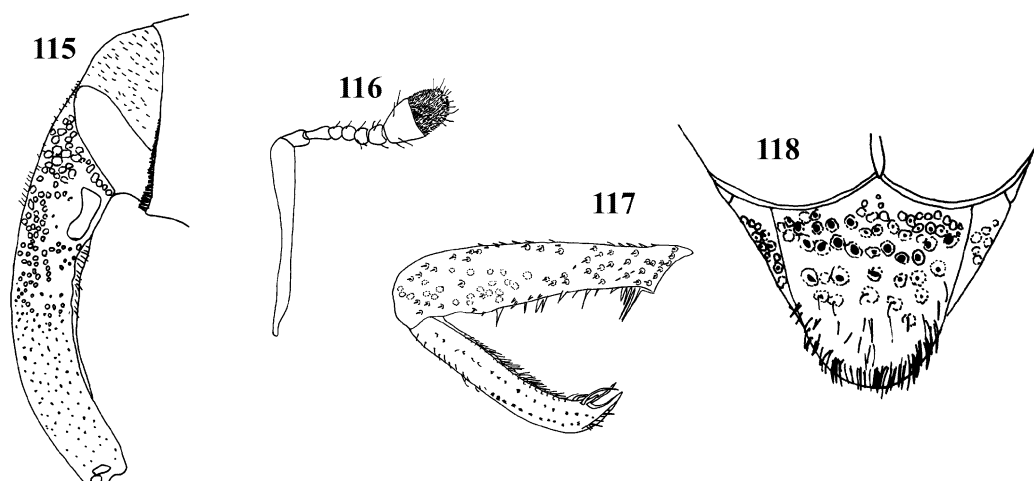
**FIGURES 109-114.** *Metamasius richdeboeri* Anderson. 109. Lateral view of head, male. 110. Lateral view of head, female. 111. Antenna. 112. Hind leg, male. 113. Pygidium, male. 114. Pygidium, female.

***Metamasius shchepaneki* Anderson, new species**

(Figs. 103-104, 115-118)

Identification.—This species is easily confused with *Cactophagus circumdatus*, with which it shares an almost identical pattern of pronotal and elytral coloration. In both species the pronotum has a pair of broad orange stripes which follow the lateral margins and which are continued onto the elytra again following the lateral margins until about the midlength whereupon they each arc medially, and almost meet at the elytral suture at about the posterior one-third of the elytral length (Figs. 103-104). *Metamasius shchepaneki*, is however, separable from *C. circumdatus* by the much finer and denser punctation of the

rostrum (especially laterally around the point of antennal insertion) in the former, and by the form of the subbasal area of the pronotal disc which in *M. shchepaneki* is flat and not transversely impressed as it is in *C. circumdatus*. Despite the similarities in color pattern and general appearance, *M. shchepaneki* males also possess a lateral unsclerotized line on the aedeagus and is thus not closely related to *C. circumdatus*, the males of which lack this lateral line.



**FIGURES 115-118.** *Metamasius shchepaneki* Anderson. 115. Lateral view of head, male. 116. Antenna. 117. Hind leg, male. 118. Pygidium, male.

Description.— Male, length, 9.8-11.5 mm; width 3.9-5.0 mm. Female, length, 13.8 mm; width 5.4 mm. Color black except for pair of broad lateral continuous orange stripes on pronotum continued onto the elytra at humerus, following lateral margins of elytra until more or less midlength whereupon each arcs medially towards elytral suture, stripes almost meeting at the elytral suture at about posterior one-third of elytral length.

Rostrum about two-thirds length pronotum; elongate, subcylindrical and shining, evenly slightly curved; finely, densely punctate throughout except impunctate at extreme apex; base of rostrum slightly expanded only at point of antennal insertion, basal area about one-fourth total rostral length; ventrally, just anterior to point of antennal insertion, with pair of small rounded prominences in male, lacking in female. Rostrum in lateral view subequal in width throughout length, not noticeably tapered towards apex; rostrum glabrous ventrally; peduncle flat, bilamellate anteriorly. Scrobe with posterior margin separated from anterior margin of eyes by about width of base of scape. Antennal scape long, about two-thirds length rostrum; club slightly laterally compressed, oval; apical pilose part subequal in length to, or very slightly shorter than, basal glabrous part. Pronotum slightly longer than wide; lateral margins slightly convergent in basal one-half, moderately convergent from midlength to apex; very sparsely, finely punctate except deeper, larger on flanks

and irregularly on basal region of disc at middle; disc flat postmedially to at most very slightly concave, not transversely impressed. Elytra one and one-third times length pronotum; with striae vaguely punctate basally, intervals impunctate, flat. Scutellum elongate, broad; length very slightly greater than width at base, flat. Pygidium uniformly slightly convex, not tumescent; sparsely setose and punctate throughout; apex subtruncate with pair of small apical tufts of short setae. Ventrally with front coxae separated by about one-half width of coxa; prosternum flat, with very slight rounded swelling anterior to each coxa. Mesosternum and lateral portions of metasternum and ventrites shallowly punctate; middle of metasternum and ventrites 1 and 2 finely punctate, shining. Last ventrite of male flat at middle, with large densely setose patch; of female, glabrous, punctate, extreme apex slightly deflexed ventrally. Legs short, shallowly punctate and very finely setose throughout; femora slightly clavate, short, hind femur almost reaching apex ventrite 4; inner margins of all tibiae with sparse short setae arranged in pectinate manner; all tibiae straight. Tarsi each with third article widely dilated, pilose ventrally except glabrous in broad basal fusiform area; front and hind tarsal third articles symmetrical, middle tarsal third articles slightly asymmetrical and with apical margins very slightly emarginate.

Variation.—There is slight variation in the pattern of elytral coloration with the black markings extended further posteriorly and broader in some specimens.

Sexual dimorphism.—In males, the apex of ventrite 5 has a large densely setose patch, whereas in the female this area lacks any distinct hairs, although the extreme apex is deflexed ventrally. Also, the rostrum of males has a slight ventral swelling immediately anterior to the point of antennal insertion; such a swelling is lacking in females.

Material Examined.— Male HOLOTYPE labelled “PANAMA. Panama Pr. / Cerro Campana, 850m / 8°40'N, 79°56'W. / 8 Apr. 72, Stockwell (CMNC). Female ALLOTYPE labelled as holotype except “820m, 12 May 74” and “on vine / *Carludovica* sp.” (CMNC). PARATYPES (3 ♂, 1 ♀). COSTA RICA. CARTAGO PROVINCE. Turrialba, Parque Nacional Barbilla, Senero a Rio Danta, 800m, 24 April 2001, W. Arana, LN596387, 218279 (1 ♀; 3173305). Guanacaste PROVINCE. Faldas, S.W. Volcan Cacao, 1150-1250m, Jun 1996, C. Moraga, I. Villegas, L\_N\_322300\_376000 #7646 (1 ♂; 2422728). PANAMA. PANAMA PROVINCE. Cerro Campana, 900-950m, 5 Jun 1995-04, R.S. Anderson (1 ♂). 850 m, 29.v.1970 (1 ♂). Paratypes in CMNC, INBC.

Distribution.—Costa Rica (Cartago, Guanacaste), Panama (Panama).

Natural history.— All specimens have been collected in montane evergreen forest or cloud forest at elevations from 820-1250m. The allotype is labelled as collected on a vine, *Carludovica* sp., but this most likely refers to a species of *Asplundia* (both genera Cyclanthaceae) as no species of the former climb. Interestingly, *M. sierrakowskyi* has also been collected on flowers of Cyclanthaceae.

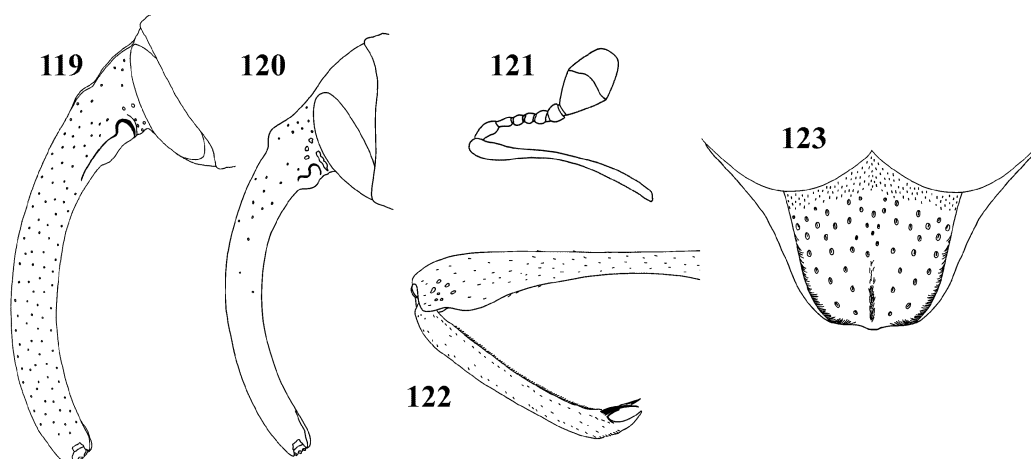
Derivation of specific name.—This species is named after Mike Shchepanek of Ottawa, Ontario, Canada, and Collection Manager for Botany at the Canadian Museum of Nature.

Comments.—In 1980 Patricia Vaurie labelled what is here designated as the holotype of this species as *Metamasius* sp.? and added a second label noting that it was “not *amoenus*, not *circumdatus*, and not *circumjectus*”.

***Metamasius vaurieae* Anderson, new species**

(Figs. 105-106, 119-123)

Identification.—This species is easily recognized by its small size (< 7 mm in length) and appearance of a *Rhodoabaenus* rather than a typical *Metamasius*. Among *Metamasius* it has a characteristic color pattern (Figs. 105-106); a long narrow cylindrical evenly curved rostrum with the basal portion abruptly swollen immediately anterior to the eyes, the antennae inserted by about the width of the base of the scape from the anterior margin of the eyes (Figs. 119-120); femora clavate, long and narrow, the hind femur almost reaching the apex of the pygidium (Fig. 122); pygidium with the apical one-half sharply carinate and setose but not tumescent (Fig. 123). In its small size and color pattern this species most closely resembles *M. scutiger* and *Cactophagus condylus* (Vaurie).



**FIGURES 119-123.** *Metamasius vaurieae* Anderson. 119. Lateral view of head, male. 120. Lateral view of head, female. 121. Antenna. 122. Hind leg, male. 123. Pygidium, male.

Description.— Male, length 6.0-6.9 mm; width 2.4-2.5 mm. Female, length, 6.1-6.3 mm; width 2.3-2.5 mm. Color black and red. Head and rostrum black except for small reddish spot laterally on swollen basal portion of rostrum. Pronotum with median broad black line and lateral broad black line at lateral declivity; flanks with narrower black line immediately dorsad of front coxae. Elytra red with black “V” shaped vitta at middle extended from sutural interval to interval 2; also with elytral intervals 6 to 10 variously black or infuscate in posterior one-half. Ventrally with prosternum, lateral portions of metasternum and lateral portions of ventrites 2-5 red; otherwise black.

Rostrum subequal to length pronotum; elongate, narrow, cylindrical, evenly curved, virtually impunctate except for scattered shallow punctures near base; base of rostrum abruptly expanded in dorsal and lateral views, basal expanded area very short, about one-sixth total rostral length; rostrum glabrous ventrally; peduncle flat. Scrobe with posterior margin separated from anterior margin of eyes by about width of base of scape. Antennal scape long, about two-thirds length rostrum; club slightly laterally compressed, oval; apical pilose part subequal in length to basal glabrous part. Pronotum slightly longer than wide; lateral margins subparallel in basal one-half, moderately convergent to apex; sparsely and shallowly punctate in basal median area and laterally; moderately deeply transversely impressed subbasally. Elytra twice as long as pronotum; with striae and intervals impunctate, flat. Scutellum "V" shaped, length twice width at base, flat. Pygidium with apical one-half sharply carinate and setose, not tumescent; lateral margins at apex also setose; apex subtruncate. Ventrally with front coxae separated by slightly less than one-half width of coxa; prosternum somewhat convex between front coxae; flat anterior to coxae. Meso- and metasterna and ventrites virtually impunctate; last ventrite of male with sparse, short setae, very slightly impressed at middle. Legs elongate, shiny, virtually impunctate except shallowly punctate towards apex femora; femora clavate, long and narrow, hind femur almost reaching apex of pygidium; inner margins of all tibiae and femora with only very short, sparse setae; all tibiae slightly inwardly arcuate. Tarsi each with third article widely dilated, completely pilose ventrally; front tarsus with third article symmetrical, third article of middle and hind tarsi asymmetrical, outer lobe noticeably wider than inner lobe; apical margin of third articles truncate.

Sexual dimorphism.—No significant sexual dimorphism was noted except for the slight, finely setose impression at the apex of the last ventrite in the male.

Material examined.—Male HOLOTYPE labelled "Costa Rica: Prov./ Puntarenas, 1 km / SE Monte Verde, / 1500-1600m / 10°18'N, 84°48'", "16.viii.1976 / H.A. Hespeneheide", "palm leaf" (INBC). Female ALLOTYPE labelled "Est. La Casona, 1520m / Res. Biol. Monteverde, / Prov. Punt. Costa Rica / J.C. Saborio, Oct. 1991 / L-N-253250, 449700". INBio barcode 578208 (INBC). PARATYPES (2 ♂, 3 ♀). COSTA RICA. PUNTARENAS PROVINCE. Santa Elena Cloud Forest Reserve, 10°20'42" N, 84°47'53" W, 8.IX.1998, 1700m, C.W. & L.B. O'Brien (1 ♂); 14.VI.2001, 1650m, R. Anderson, on stems/roots of epiphytic Araceae (2 ♀). Estacion Biologia Monteverde, 10°19'10" N, 84°48'57" W, 10.VI.2001, 1800m, N. Franz (1 ♀); 12.VI.2001, 1730m, R. Anderson, on stems/roots of epiphytic Araceae (1 ♂). Paratypes in CMNC, CWOB.

Distribution.—Costa Rica (Puntarenas).

Natural history.—Specimens were collected from 1500-1800m elevation in the vicinity of Monteverde and Santa Elena in Puntarenas province. Three specimens were collected by beating the roots and stems of epiphytic Araceae. The holotype was collected on a 'palm leaf' but this is likely incidental.

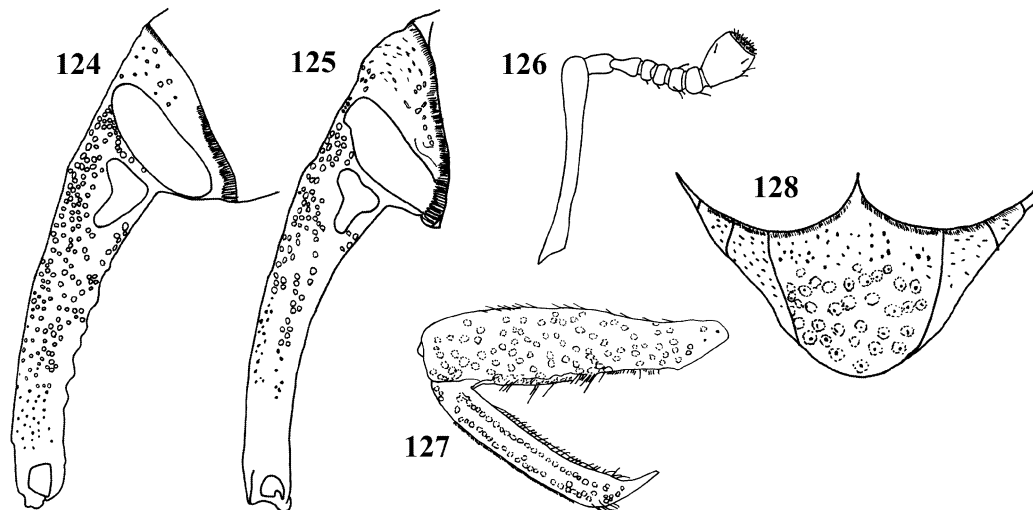
Derivation of specific name.—This species is named after Patricia Vaurie (1909-1982). Her extensive works on the genus *Metamasius* (Vaurie 1966, 1967a) and other related genera still serve as the primary reference works for the study of these weevils. An obituary and bibliography was published in in 1982 in the journal, *The Coleopterists Bulletin* 36: 453-457.

Comments.—This species was first recognized as new by Patricia Vaurie in 1978. She placed a determination label on the holotype questioning whether it was perhaps *Metamasius scutiger* Champion, another small, but distinct species described from neighbouring Panama.

***Metamasius wolfensohni* Anderson, new species**

(Figs. 107-108, 124-128)

Identification.—This species is easily recognized by its tubular body form, large barrel-shaped pronotum which is rather evenly convex dorsally (Fig. 107), the short almost straight rostrum (Figs. 124-125), antennal club with the apical pilose part present only as a narrow line (Fig. 126), and prosternum with front coxae very narrowly separated by about the width of the antennal scape. In addition, males of this species have a series of rounded swellings or crenulations ventrally along the lateral margins of the rostrum (Fig. 124).



**FIGURES 124-128.** *Metamasius wolfensohni* Anderson. 124. Lateral view of head, male. 125. Lateral view of head, female. 126. Antenna. 127. Hind leg, male. 128. Pygidium, male.

Description.— Male, length 12.2-13.5 mm; width 4.7-5.0 mm. Female, length, 7.1-12.5 mm; width 2.8-4.8 mm. Color black, elytra red in basal two-thirds except for black

interval 10, subhumeral spot, and oblique spot at anterior one-third extended variously from interval 1 to 5. Some specimens with the pronotum with four broad red stripes, one on either side of the midline and one along each lateral margin.

Rostrum about one-half to two-thirds length of pronotum in male, slightly longer in female; elongate, narrow, cylindrical, virtually straight to very slightly curved; very finely shallowly punctate throughout; extreme apex glabrous and virtually impunctate, shining; base of rostrum abruptly expanded, basal expanded area short, about one-fourth total rostral length; ventral lateral margins with series of small crenulation or low irregular tubercles in male, area smooth in female; male also with venter of rostrum bisulcate adjacent to series of crenulations, sulci separated by low but acute median carina. Peduncle flat, bilamellate. Scrobe with posterior margin almost touching anterior margin of eyes. Antenna with scape short, about one-half length rostrum; club very slightly laterally compressed, oval; apical pilose part visible only as a narrow line at extreme apex. Pronotum slightly longer than wide; lateral margins evenly rounded to subapex, apex tubulate; widest at middle; sparsely, finely and shallowly punctate on disc, virtually impunctate medially in some specimens; more densely, deeply punctate along lateral, and anterior margins, and at middle of base; with slight crenulations on anterolateral margin behind eye; disc uniformly convex, "barrel-shaped". Elytra one and one-third times length pronotum; with striae punctate, intervals very finely, irregularly punctate, slightly convex. Scutellum "V" shaped, length one and one-third times width at base, slightly convex, apical margin slightly emarginate at middle. Pygidium flat, deeply, densely regularly punctate, finely pilose subapically; apex subtruncate. Ventrally with front coxae separated by about width of antennal scape; prosternum somewhat convex anterior to coxae, otherwise flat. Meso- and metasterna and ventrites with large shallow punctures, punctures sparser medially; last ventrite punctate, lacking pilosity. Legs short, matte, with large, moderately dense, shallow punctures; femora slightly clavate, short, hind femur almost reaching apex of ventrite 5; inner margins of all tibiae and femora with only very short, sparse, "peglike" setae arranged in pectinate manner; all tibiae slightly inwardly arcuate at apex. Tarsi each with third article widely dilated, pilose ventrally, except for glabrous narrow "V" shaped median area; all tarsi with third articles symmetrical and with apical margins very slightly emarginate.

Sexual dimorphism.—Males and females of this species can be distinguished by the shorter rostrum of males bearing a series of ventral crenulations or low swellings along the lateral margins.

Variation.—There is extensive size variation within this species with one small female examined which is almost one-half the size of the largest female. As noted in the description, there is variation in the color pattern on the pronotum of this species with two specimens from Costa Rica and one from Ecuador having the disc striped with red. Also, in the specimen from Ecuador, the elytra are more infuscate than on specimens from other localities.



Material Examined.—Male HOLOTYPE labelled “Est. Pitilla, 700m, 9km S / Sta. Cecilia, P.N. Guana- / caste, Prov. Guan. Costa/ Rica, C. Moraga, 3-18 / Oct 1991, / L-N-330200, 380200”, INBio barcode 549111 (INBC). Female ALLOTYPE labelled “R. Sn Lorenzo, 1050m, / Tierras Morenas, R.F. / Cord. Guanacaste, Prov / Guan. Costa Rica. / C. Alvarado, Nov 1991, / L-N-287800, 427600”, INBio barcode 491890 (INBC). PARATYPES (4 ♂, 5 ♀). COSTA RICA. ALAJUELA PROVINCE. Res. For. San Ramon, 5 km N. Col. Palmarena, Rio Sn. Lorencito, 900m, Mar 1990 (1 ♀; 158510). CARTAGO PROVINCE. Monumento Nacional Guayabo, 1100 m, Nov 1994 (1 ♀; 2092983). GUANACASTE PROVINCE. Estacion Pitilla, 9 km. S. Santa Cecilia, 700m, 11-30 Jan 1993 (1 ♀; 1675931). Z.P. Tenorio, R. Sn. Lorenzo, Tierras Morenas, 1050m, Apr 1992 (1 ♀; 867691). PUNTARENAS PROVINCE. San Luis, Finca Buen Amigo, Monteverde, 4 km. S. de la Reserva, 1000-1350m, Jun 1996 (1 ♂; 2468659). May 1994 (1 ♂; 1870818). PANAMA. CANAL ZONE. Pipeline Road, 5 km N.W. Gamboa, 27 Jun 1985, H.P. Stockwell (1 ♂). CHIRIQUI PROVINCE. Fortuna (8°44'N, 82°15'W), May 17, 1978, O'Briens and Marshall (1 ♀). ECUADOR. NAPO PROVINCE. Yasuni N.P., Yasuni Research Station, 76°36'W, 00°38'S, 215m, 27.VII-1.VIII.1998, lowland rainforest, Ratcliffe et al. (1 ♂). Paratypes in CMNC, CWOB, INBC.

Distribution.—Costa Rica (Alajuela, Guanacaste, Puntarenas), Panama (Canal Zone, Chiriqui), Ecuador (Napo).

Natural history.—Specimens have been collected from 700-1350m elevation in montane evergreen forest in Costa Rica, and near 200m in lowland rainforest in Panama and Ecuador.

Derivation of specific name.—This species is named after James D. Wolfensohn, President of the World Bank, in recognition for the continuing support of INBio activities by the Global Environmental Fund of the World Bank.

### Genus *Rhodoaenus* LeConte

*Rhodoaenus* LeConte 1876:332.

*Homalostylus* Chevrolat 1885:287.

Type species: *Curculio tredecimpunctatus* Illiger 1794:613. By subsequent designation (Vaurie 1967:13).

This is a large tropical genus with approximately 100 species described. There are 41 species of *Rhodoaenus* known from Costa Rica and 28 from Panama with 26 shared between the two countries. The genus occurs from southern Canada to Argentina.

*Rhodoaenus* species lack a lateral line on the aedeagus. This is a synapomorphy shared with *Cactophagus*. Most *Rhodoaenus* species can be easily distinguished because tarsal article 5 (the claw-bearing article) is ventrally excavate at the middle of the apex

and/or is bilamellate to a various extent; however, there are a few species in which the ventral surface of the article is unmodified. These latter species of *Rhodobaenus* are generally larger in size than most other *Rhodobaenus* and are usually entirely grey or black, some with dark velvety black markings or a pale colored "V" or "C" shaped marking on the elytra. Most *Rhodobaenus* species also tend to have a rostrum that is somewhat humped near the base.

Where known, species of *Rhodobaenus* are associated generally with Asteraceae (Vaurie 1981). Larvae are stem miners. Immature stages were described by Anderson (1948).

### Key to species of *Rhodobaenus* in Costa Rica and Panama (largely after Vaurie 1982)

- 1 Rostrum short, wide, three to four times longer than width at base..... 2
- Rostrum long, more than five times longer than width at base..... 3
- 2 Pronotum (excluding apical and basal constrictions) with sides subparallel; elytra black, with velvety black angular and oblique patches; pygidium in lateral view with apex abrupt, tumid, extended well beyond apex of abdomen .....  
..... *R. nigrosignatus* Champion
- Pronotum (excluding apical and basal constrictions) with sides convergent to apex; elytra yellowish, without any velvety black angular or oblique patches; pygidium in lateral view with apex rounded, not tumid, not extended much beyond apex of abdomen .....  
..... *R. lineiger* Chevrolat
- 3 Antennal scape somewhat to markedly expanded, maximum width about as wide as or wider than width of the rostrum at apex; in cross-section, distinctly laterally compressed and flattened ..... 4
- Antennal scape not expanded, maximum width less than width of the rostrum at apex; in cross-section, more or less circular, not laterally compressed or flattened..... 7
- 4 Pronotum uniformly convex or flattened, not transversely impressed near base.....  
..... *R. incertus* (Champion)
- Pronotum transversely impressed near base..... 5
- 5 Antennal scape broadly expanded, with maximum width as wide as width of antennal club; elytra gray with oblique median black band .....*R. nigrofasciatus* (Champion)
- Antennal scape with maximum width about one-half width of antennal club; elytra with at least some dark red or bright orange ..... 6
- 6 Elytra scarcely, if at all, longer than pronotum; dark red, with faint black areas basally and apically.....  
..... *R. dentirostris* (Champion)
- Elytra distinctly longer than pronotum; bright orange with humeral region, sutural area to interval 3, and apical one-third black..... *R. patriciae* Anderson, new species
- 7 Rostrum with dorsal surface anterior to point of antennal insertion with dense, long bristly or wispy setae..... 8
- Rostrum with dorsal surface anterior to point of antennal insertion with at most scat-

- tered short, stout setae, each no longer than the width of a puncture..... 10
- 8 Elytra only very slightly longer than pronotum; humeri rounded, elytra with broad impressed area extended posteriorly and obliquely from humeri to interval 3 at apical one-third; pronotum with deeply impressed "U" shaped area medially on disc; rostrum with setose area on dorsal surface divided by sharp median carina.....  
..... *R. tenorio* Anderson, new species
- Elytra much longer than pronotum; humeri quadrate, elytra and pronotum lacking impressed areas; rostrum with setose area on dorsal surface not divided median carina or carina broad and low ..... 9
- 9 Body black; body size larger (10.5-13.0 mm); pronotum transversely impressed sub-basally at middle; rostrum with setose area confined to basal one-half, divided by low, rounded, median carina ..... *R. subcristatus* Champion (in part; females)
- Body orange and black; body size smaller (6.4-7.5 mm); pronotum slightly swollen and tumescent at very middle of disc, not impressed; rostrum with setose area extended almost to apex, not divided, median carina lacking.....  
..... *R. howelli* Anderson, new species (in part; females)
- 10 Pronotum with middle of disc swollen and somewhat tumescent, orange in color with narrow median black line; peduncle sharply carinate ventrally, apex extended beyond apex of the rostrum and acutely angulate.....  
..... *R. howelli* Anderson, new species (in part; males)
- Pronotum with middle of disc either flat or slightly evenly convex, not tumescent, color various; peduncle various but not extended beyond apex of the rostrum and acutely angulate..... 11
- 11 Body size small, 4.5-6.0 mm; pronotum elongate and narrow, red with white dots, three black stripes and two short yellowish streaks extended forward from base; sub-basal median impression, feeble if present; head transversely deeply incised between eyes; hind femora with upper margin slightly sinuate ..... *R. ypsilon* Chevrolat
- Not agreeing with all statements above..... 12
- 12 Hind femora arcuate, long, extended beyond apex of pygidium; eyes short, narrow, not wider than width of antennal club ..... *R. rubicundus* Champion
- Not agreeing with all statements above..... 13
- 13 Tarsus with area between claws ventrally excavated medially and bilamellate at sides; body size 4.0-15.0 mm ..... 14
- Tarsus with area between claws flat and smooth; body size 10.0-20.0 mm..... 41
- 14 Antennal club with pilose apical portion only one-fourth or one-fifth length of club; pronotum red with single black median line ..... *R. suturalis* (Gyllenhal)
- Antennal club with pilose apical portion one-third or more length of club; pronotum various, not red with single black median line..... 15
- 15 Pronotum with transverse subbasal impression ..... 16
- Pronotum flat or slightly convex subbasally, not impressed ..... 25

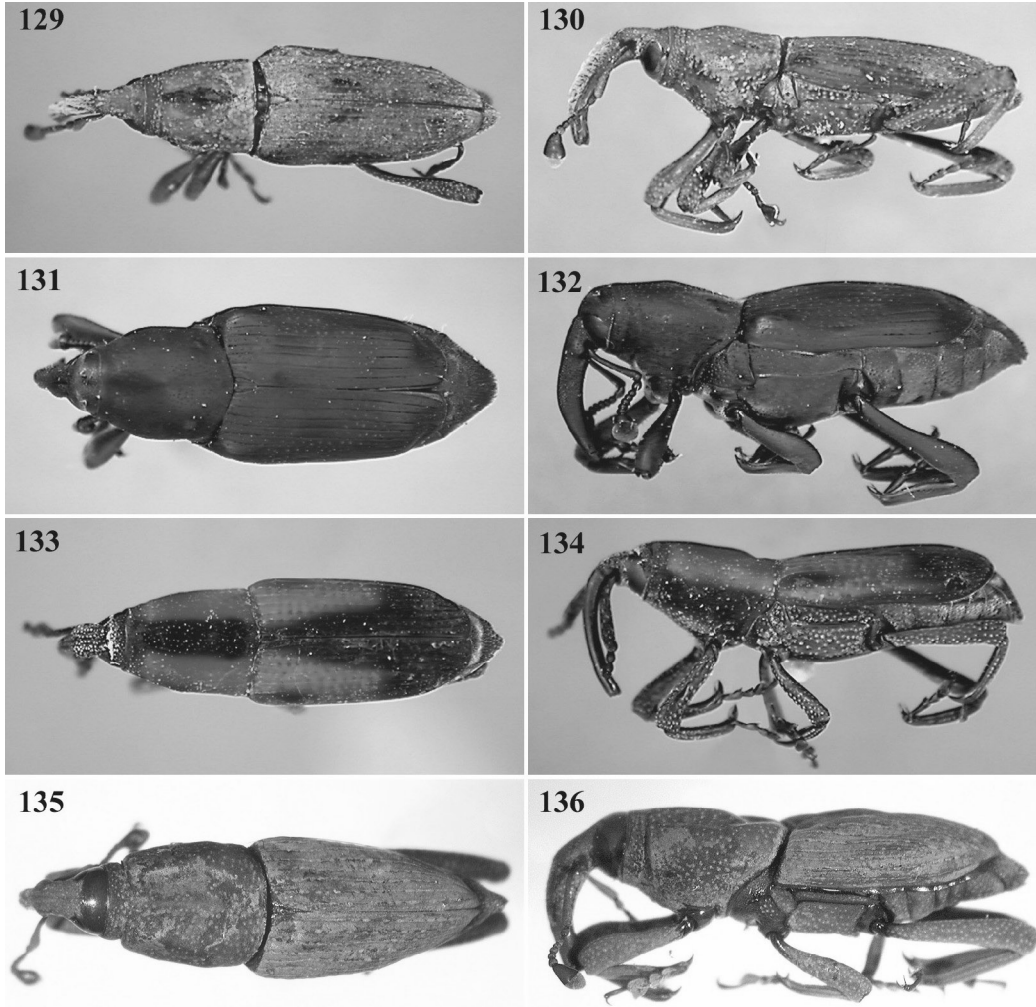
- 16 Dorsum without definite white dots around punctures ..... 17  
 - Dorsum with punctures encircled by whitish dots or with dots merged into streaks .. 23
- 17 Color gray or black..... 18  
 - Color red or red and black..... 19
- 18 Size small, 6.5-8.5 mm; femora each about same width throughout length; black .....  
 ..... *R. melas* Vaurie  
 - Size moderate, 8.0-13.0 mm; femora each twice as wide at apex as at base; gray with  
 six indistinct darker spots.....  
 ..... *R. olivaceus* (Olivier), or *R. subcristatus* Champion (in part; males)
- 19 Elytra, except for scutellum, red.... ..... *R. sanguineus* (Gyllenhal)  
 - Elytra various, but with at least some black..... 20
- 20 Pronotum red, with at least some black spots.... ..... *R. pantherinus* Champion  
 - Pronotum black, or red with black stripes..... 21
- 21 Elytra either red with six black spots and subapical black band (four central spots can  
 be merged into a band, or subapical band can be divided into spots), or elytra black  
 with humeri red; male with aedeagus in lateral view narrowed to subacuminate apex,  
 male with ventral tubercle and rostrum ventrally smooth..... *R. bicinctus* Chevrolat  
 - Elytra red with outer intervals lined or spotted with black, apex black, or, elytra red  
 with two black spots across middle, or black with irregular red suffusions; male with  
 aedeagus in lateral view widened feebly to blunt, rounded apex, male lacking ventral  
 tubercle and with rostrum ventrally sparsely setose..... 22
- 22 Rostrum long, narrower than apex of front femur, generally bright red; elytra red with  
 outer intervals lined or spotted with black, apex black; pronotum with three black stripes  
 ..... *R. deltoides* Chevrolat  
 - Rostrum shorter, at least as wide as apex of front femur, black; elytra red with two  
 black spots across middle, or black with irregular red suffusions; pronotum with single  
 black stripe.... ..... *R. bisignatus* Champion
- 23 Dorsum with white or yellowish dots merged into solid, generally symmetrical  
 streaks; body size small, 6.5-7.5 mm.... ..... *R. bellus* Vaurie  
 - Dorsum with white dots separate, individually distinct; body size moderate, 7.0-9.5 mm  
 ..... 24
- 24 White dots small, inconspicuous; each elytron with three large, clearly defined, vel-  
 vety dark spots; color gray or purplish..... *R. maculifer* (Fahråeus)  
 - White dots larger, nearly filling elytral intervals; each elytron with three or four  
 poorly-defined dark spots under filmy covering; color gray or reddish .....  
 ..... *R. nebulosus* Champion
- 25 Pronotum with disc red; rostrum markedly arcuate, ventrally with long, curled hairs  
 (abraded in some specimens); elytra dark red or red with dark areas medially and laterally....  
 ..... *R. rhinopilus* Vaurie  
 - Pronotum, rostrum and elytra various, not as described above..... 26

- 26 Body entirely black ..... 27
- Body with at least some red or orange ..... 28
- 27 Pronotum subconical, lateral margins uniformly convergent to apex; dorsum with definite white spots around punctures; rostrum with punctures shallow and small; antenna with basal shiny article of club attached more or less symmetrically to funicle.....  
..... *R. tenuiscapus* Champion
- Pronotum with lateral margins subparallel in basal one-half, then convergent to apex; dorsum without definite white spots around punctures; rostrum with punctures deep and large; antenna with basal shiny article of club attached distinctly asymmetrically to funicle..... *R. labrecheae* Anderson, new species
- 28 Dorsum without definite white spots around punctures..... 29
- Dorsum with punctures encircled by whitish dots or with dots merged into streaks.. 38
- 29 Elytra entirely black (or very dark red)..... 30
- Elytra with at least some red ..... 33
- 30 Prosternum red with lateral black spot; antennal scape about as long as, or very slightly longer than funicle; antennal club with apical pilose portion one-third total length of club..... *R. thoracicus* (Gyllenhal), (in part)
- Prosternum entirely red, without lateral black spot; antennal scape distinctly longer than funicle; antennal club with apical pilose portion one-half or more total length of club ..... 31
- 31 Hind tarsus with article 3 widely dilated, apex three times wider than width of article 2 at apex, article 2 shorter than 3 ..... *R. cinctus* (Gyllenhal) (in part)
- Hind tarsus with article 3 only slightly wider than width of article 2 at apex, article 2 subequal in length to 3 ..... 32
- 32 Pronotum convex, lateral margins arcuate; rostrum widened and humped at base, basal dilation punctate, not sulcate; male aedeagus carinate ventrally .....  
..... *R. lebasii* (Gyllenhal) (in part)
- Pronotum flat, especially at base, lateral margins subparallel to near apex; rostrum not widened or humped at base, basal dilation sulcate; male aedeagus smooth ventrally ....  
..... *R. pulchellus* (Gyllenhal) (in part)
- 33 Elytra with short interval 10 and part or all of interval 9 red, or with short interval 10 and intervals 3-7 in basal one-third red..... 34
- Elytra with more red than noted above ..... 35
- 34 Elytra with short interval 10 and part or all of interval 9 red; antennal scape long, much longer than funicle; pronotum longer than wide ..... *R. auctus* Chevrolat (in part)
- Elytra with short interval 10 and intervals 3-7 in basal one-third red; antennal scape short, about as long as funicle; pronotum as long as wide.....  
..... *R. thoracicus* (Gyllenhal) (in part)
- 35 Elytra with apical one-third black from side to side; pronotum generally with narrow median black stripe and four small black spots..... *R. lebasii* (Gyllenahl) (in part)

- Elytra with apical one-third not entirely black; pronotum various ..... 36
- 36 Femora red with black spot; if spot not evident, elytra with eight rounded or elongate black markings in addition to lateral or apical black spots .....  
..... *R. cinctus* (Gyllenhal) (in part)
- Femora black; elytra various in color..... 37
- 37 Pronotum uniformly convex, very slightly longer than wide, lateral margins arcuate from base to near apex; rostrum humped and wider at base; basal dilation generally not sulcate; elytra with sides tapered to apex ..... *R. auctus* Chevrolat (in part)
- Pronotum flattened slightly towards base, longer than wide, lateral margins subparallel; rostrum evenly convex, not humped, of same width throughout length; basal dilation sulcate; elytra with sides subparallel..... *R. pulchellus* (Gyllenhal) (in part)
- 38 Dorsum with white dots merged into solid streaks..... *R. cinctus* (Gyllenhal) (in part)
- Dorsum with white dots distinct, separate ..... 39
- 39 Antennal scape shorter than funicle, apex barely reaching middle of rostrum; antennal club with pilose apical portion one-third or less length of entire club; body size small, 6.0-6.5 mm ..... *R. nigropictus* Champion
- Antennal scape as long as or longer than funicle, apex reaching beyond the middle of rostrum; antennal club with pilose apical portion more than one-third length of entire club; body size larger, greater than 6.5 mm ..... 40
- 40 Pronotum slightly longer than wide, basal margin at middle slightly depressed; gular peduncle with angles moderately sharp; pygidium with setose median white line; rostrum finely punctate, not setose ..... *R. pustulosus* (Gyllenhal)
- Pronotum distinctly longer than wide, basal margin at middle not depressed; gular peduncle with angles very sharp; pygidium with setae, if present, not concentrated along median line; rostrum coarsely punctate and setose ..... *R. varieguttatus* Chevrolat
- 41 Pronotum of male with two angular, anterolateral, cup-like prominences; male rostrum in front of scrobe in dorsal view semi-circularly dilated; female rostrum one-third longer than pronotum, not dilated above scrobe, and gular peduncle with sharp ventrally directed tooth perpendicular to axis of rostrum..... *R. auriculatus* Chevrolat
- Male and female not as described above..... 42
- 42 Pronotum with transverse or round subbasal depression; antenna with apical pilose portion nearly one-half or more length of entire club; antennal funicle with apical four articles round or elongate, shining ..... 43
- Pronotum with no subbasal depression, but may be flattened; antenna with apical pilose portion one-third or less length of entire club; antennal funicle with apical four articles transverse, micropilose ..... 47
- 43 Pronotum with apical constriction abrupt, incised and markedly creased on each side; elytra transversely creased or plicate in front of and behind middle; pronotal disc generally bifoveate ..... *R. plicatus* Champion
- Pronotum with apical constriction slight, its sides oblique not creased on each side;

- elytra very slightly, if at all plicate; pronotal disc not foveate ..... 44
- 44 Elytra with eight small dark spots, of which two on disc at middle may be merged; rostrum nearly straight at base, arcuate only towards apex, densely punctate.....  
..... *R. stigmaticus* Fahråeus
- Elytra either with four very large spots, two at middle and two at apex (may be merged into bands), and two tiny humeral spots, or elytra virtually immaculate; rostrum markedly arcuate from base, almost semi-circular in profile, sparsely punctate except near base ..... 45
- 45 Elytra with definite dark spots or bands, median marks covering about one-third of length of elytra.... ..... *R. nawradii* Kirsch (in part)
- Elytra immaculate ..... 46
- 46 Elytra with humerus in dorsal view gently rounded, slightly extended beyond base of pronotum; pygidium in lateral view rather acuminate and produced.....  
..... *R. cuneatus* Champion
- Elytra with humerus in dorsal view obtusely angulate, distinctly wider than base of pronotum; pygidium in lateral view convex at apex (under tuft of hairs).....  
..... *R. nawradii* Kirsch (in part)
- 47 Elytra with disc with "V-shaped" or heart-shaped dark mark not reaching sides ..... 48
- Elytra with disc with no dark mark; or, mark not shaped as above; or, mark reaching sides ..... 49
- 48 Elytra with distinct, depressed "C-shaped" area surrounding dark mark, this area grayish, whitish or reddish ..... *R. v-nigrum* Champion
- Elytra lacking distinct, depressed "C-shaped" area surrounding dark mark, this area flat, entire elytron dusty or buffy..... *R. melanocardius* Linnaeus (in part)
- 49 Elytra with disc with two small, separated dark spots ..... *R. quadripunctatus* Chevrolat
- Elytra with disc immaculate; or, regularly mottled with micropilose punctures; or, with indistinct median band narrowed laterally ..... 50
- 50 Rostrum in lateral view much wider at middle than at apex and at least twice as wide at base as at apex, markedly arcuate and punctate ..... *R. fortirostris* Champion
- Rostrum in lateral view at most slightly wider at middle than at apex, slightly arcuate or nearly straight, markedly punctate only at base ..... 51
- 51 Elytra with large median dark band, band narrowed laterally in some specimens .....  
..... *R. interruptus* Champion (in part)
- Elytra immaculate; or, regularly mottled, or, pattern indeterminate ..... 52
- 52 Elytra greased or worn such that no pattern or micropilose punctures are visible.....  
..... *R. quadripunctatus* Chevrolat; or, *R. melanocardius* Linnaeus
- Elytra tessellate or mottled with large or small, micropilose punctures ..... 53
- 53 Body size large, 15.0-22.0 mm; leg with tarsal article 3 pilose ventrally except for median line at base; middle coxae separated by one-third diameter of a coxa; pronotum not foveate or indistinctly bifoveate..... *R. interruptus* Champion (in part)

- Body size moderate, 10.0-14.0 mm; leg with tarsal article 3 pilose ventrally in only apical one-half to two-thirds; middle coxae separated by one-half diameter of a coxa; pronotum usually with four foveae .....*R. saginatus* Champion



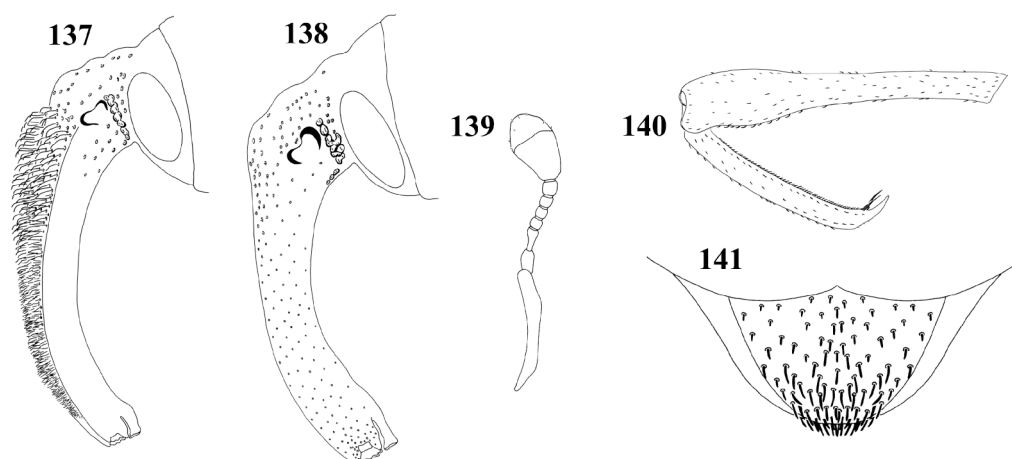
**FIGURES 129-136.** *Rhodobaenus* species. 129-130. *Rhodobaenus howelli* Anderson. 129. Dorsal habitus. 130. Lateral habitus. 131-132. *Rhodobaenus labrecheae* Anderson. 131. Dorsal habitus. 132. Lateral habitus. 133-134. *Rhodobaenus patriciae* Anderson. 133. Dorsal habitus. 134. Lateral habitus. 135-136. *Rhodobaenus tenorio* Anderson. 135. Dorsal habitus. 136. Lateral habitus.



***Rhodoaenus howelli* Anderson, new species**

(Figs. 129-130, 137-141)

Identification.—This species was first recognized from a single very distinctive female specimen from Monteverde. In this female, almost the entire dorsal surface of the rostrum is covered with very long, dense golden, wispy hairs (Figs. 130, 137). Two conspecific males have since been found but each lacks the pilosity on the rostrum (Fig. 138). The species is virtually identical in color pattern and, on cursory examination, appears to be similar in structure to *R. rubicundus*. Aside from the obvious pilosity of the rostrum on the female, *R. howelli* also differs in the shorter length of the apical pilose part of the antennal club (which is subequal in length to the basal glabrous part in *R. rubicundus*), in the shorter length of the hind femur (which extends beyond the apex of the pygidium in *R. rubicundus*), and in the more basal placement of the point of antennal insertion (which is more distant from the eye in *R. rubicundus*). In addition, the rostrum is narrower and less deeply punctate in *R. howelli* than in *R. rubicundus*. The peduncle in both sexes is quite distinctive being convex and carinate and with a sharp apical angle (Figs. 137-138).



**FIGURES 137-141.** *Rhodoaenus howelli* Anderson. 137. Lateral view of head, female. 138. Lateral view of head, male. 139. Antenna. 140. Hind leg, male. 141. Pygidium, male.

Description.— Male, length, 6.7-6.8 mm; width 2.3-2.4 mm. Female, length, 6.4-7.5 mm; width 2.3-2.5 mm. Color orange-red with black markings. Head and rostrum red, except for small black spot immediately behind eyes; antennae somewhat infusate. Pronotum red with median narrow black line as well as narrow irregular black line along midheight of flanks; lateral margins also spotted with black at midlength and more medially at basal one-quarter. Elytra red, with humeral region black, this black marking extended obliquely, posteriorly in irregular band towards sutural interval at midlength of elytra; apical callus also with elongate black markings on intervals 2, 6 and 8. Ventrally with prosternum red, posterolateral angles of metasternum infusate with black.

Rostrum subequal to length pronotum, strongly humped at base; elongate, narrow, cylindrical, slightly evenly arcuate; female with deep, dense punctures dorsally in basal five-sixths, also with long, dense, fine, wispy golden hairs in basal five-sixths; male, lacking such pilosity, at most finely punctate; lateroventrally impunctate, glabrous, shining; base of rostrum slightly expanded, basal expanded area very short, about one-sixth total rostral length. Rostrum glabrous ventrally; peduncle convex, carinate, with sharply acute and produced apical angle, not toothed. Scrobe with posterior margin slightly more than width of base of scape from anterior margin of eyes. Antenna with scape about one-half length rostrum; scape expanded apically, not flattened, inner face with shallow irregular sulcus at apex; club slightly laterally compressed, elongate-oval; apical pilose part about one-half length of basal glabrous part. Pronotum with lateral margins subparallel to slightly convergent in basal one-half, gradually convergent to apex; very sparsely and shallowly, indistinctly punctate throughout; flat subbasally; middle of disc slightly tumescent. Elytra with length twice length pronotum; with striae and intervals impunctate, flat; interval 2 slightly wider near apex than intervals 1 or 3. Scutellum elongate, lateral margins subparallel in basal one-half; length twice width at base, flat. Pygidium with subapex at middle slightly tumescent, regularly punctate and setose in apical one-half; apex broadly acuminate. Ventrally with front coxae separated by width of base of scape; prosternum slightly concave between, and flat anterior to, coxae. Meso- and metasterna and ventrite 1 sparsely, shallowly punctate throughout; ventrites 2 to 4 impunctate; last ventrite flat, impunctate in basal one-half, punctate in apical one-half, narrowly, deeply impressed at middle at apex. Legs elongate, matte, coarsely, shallowly punctate throughout; femora clavate, long, hind femur almost reaching apex of pygidium; inner margins of all tibiae with only very short, sparse setae; all tibiae slightly inwardly arcuate. Tarsi each with third article moderately widely dilated, pilose ventrally except in narrow band along basolateral margins; tarsi with third articles symmetrical; apical margin of third articles truncate; claw-bearing segment flat ventrally at apex; tarsi long and slender, first article about three times as long as wide.

Material Examined.—Female HOLOTYPE labelled “Costa Rica, Punta. / MonteVerde Biol.Res. / IX-7-1998, 1500m / C.W.&L.B. O’Brien” (CWOB). Male ALLOTYPE labelled “Costa Rica Puntarenas / Monteverde / 20-24 Jun 1986 / W. Hanson, G. Bohart (CWOB). PARATYPE (1 ♂, 1 ♀). HEREDIA PROVINCE. La Virgen (16 km S.S.E.), 1050-1150m, 10°16'N, 84°05'W, 21 February 2001, INBio, OET, ALAS Transect (1 ♀; 3203343). PUNTARENAS PROVINCE. Monte Verde, 1570m, 16 May 1989, J. Ashe, R. Brooks, R. Leschen, ex. berlese (1 ♂). Paratypes in CMNC, INBC.

Distribution.—Costa Rica (Heredia, Puntarenas).

Natural history.—Specimens were collected in montane forest from 1050m to near 1600m. One specimen was collected from leaf litter in a berlese funnel. No other information is available.

Derivation of specific name.— Through her support of the Nature Discovery Fund at the Canadian Museum of Nature, this species is named after Susan Howell of Ottawa, Ontario, Canada.

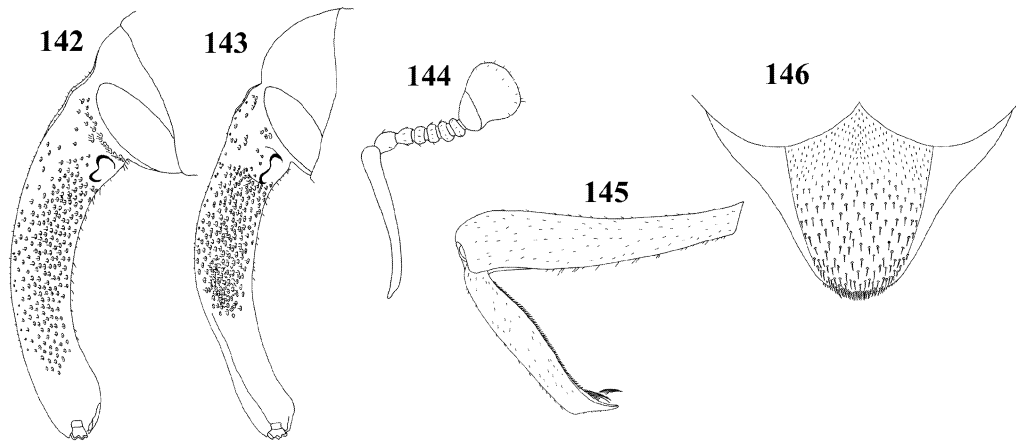
Comments.—As noted, this species is very closely related to *R. rubicundus*. In her original treatment of *R. rubicundus*, Vaurie (1967) considered that the venter of the claw-bearing articles of the tarsi of that species were flat and not bilamellate or excavated. Accordingly, but somewhat enigmatically, she placed the species with the *R. nawradii* group. In a later treatment (Vaurie 1980) she noted that the tarsi were in fact very indistinctly bilamellate in *R. rubicundus* and removed that species from inclusion in the *R. nawradii* group. In the known specimens of *R. howelli*, the ventral surface of the claw-bearing articles of the tarsi appear flat thus confusing the issue once again.

***Rhodoaenus labrecheae* Anderson, new species**

(Figs. 131-132, 142-146)

Identification.—This species is known only from a male and female from Puntarenas Province in Costa Rica. *Rhodoaenus labrecheae* is a moderately large but generally nondescript black species similar in general form, size and color to *R. cuneatus* and *R. subcrisatus*. It is clearly different however, and can easily be differentiated upon close examination by a variety of characters. Most notable among these characters is the form of the rostrum which in *R. labrecheae* is laterally compressed (especially throughout the middle portion of its length), more or less evenly moderately arcuate (although in the female there is a slightly stronger arcuation starting at the apical three-fifths) (Fig. 147); in lateral view, has the lateral portion immediately in front of the point of antennal insertion to the midlength or slightly beyond, deeply, densely regularly punctate and distinctly setose, the apical one-half to one-third less densely and more finely punctate (Fig. 147); and, in dorsal view with the apex distinctly wider than subapically. In addition, the point of antennal insertion is basal, separated from the front margin of the eye by less than the width of the base of the scape. This contrasts with the antennal placement in most other larger black species, which is more distal from the eye, separated from it by four or more times the width of the base of the scape. Also, the point of attachment of the funicle to the base of the antennal club is distinctly asymmetrical (Fig. 144) in the two available specimens. The pronotum is flat basally although it is very slightly reflexed and may appear to be very shallowly creased. The elytra, while not short compared to the length of the pronotum, appear somewhat truncated such that the pygidium is clearly, distinctly extended well beyond their apices (Fig. 131). Although the members of this species have the appearance of small, non-maculate members of the *R. nawradii* group, the claw-bearing segments of the tarsi are slightly bilamellate ventrally, although this is easy to overlook.

Description.— Male, length, 9.4 mm; width 3.9 mm. Female, length, 10.2 mm; width 4.4 mm. Color black, matte; with indistinct whitish, very fine pilosity, most visible around punctures and in vaguely contrasting pattern on elytra.



**FIGURES 142-146.** *Rhodobaenus labrecheae* Anderson. 142. Lateral view of head, male. 143. Lateral view of head, female. 144. Antenna. 145. Hind leg, male. 146. Pygidium, male.

Rostrum slightly shorter than pronotum, not humped at base; laterally compressed (especially throughout middle portion of length), more or less evenly moderately arcuate (female with slightly stronger, somewhat abrupt, arcuation starting at apical three-fifths); in lateral view, with lateral portion immediately in front of point of antennal insertion to midlength or slightly beyond, deeply, densely punctate, distinctly setose, the apical one-half to one-third less densely and more finely punctate; base of rostrum abruptly expanded, basal expanded area about one-fourth total rostral length; in dorsal view with the apex distinctly wider than subapically. Peduncle flat, smooth; in female slightly pendant (but not toothed) at base. Scrobe with posterior margin less than width of base of scape from anterior margin of eyes. Antenna with scape about three-fifths length rostrum; scape slightly clavate apically; club laterally compressed, oval; apical pilose part one and one-half to two times length of basal glabrous part; point of attachment of funicle with club distinctly asymmetrical. Pronotum with lateral margins subparallel to slightly divergent in basal one-half, gradually convergent to apex; very sparsely and shallowly, indistinctly punctate throughout; flat subbasally. Elytra with length one and two-thirds times length pronotum; with striae impressed, intervals finely, sparsely punctate, flat; some punctures of intervals with very fine white surrounding pilosity; humeral region, subapical callus to apex, and midlength from sutural interval to interval 5 in transverse “V” shape very slightly more shining, apparently lacking fine whitish pilosity; apex somewhat truncate. Scutellum elongate-narrow, lateral margins subparallel in basal one-third; length two and one-half times width at base, flat. Pygidium exposed well beyond elytral apices, with subapex at middle tumescent in male, less so in female; regularly punctate and setose throughout; apex

broadly acuminate. Ventrally with front coxae separated by width of base of scape; prosternum flat between and anterior to coxae. Meso- and metasterna and ventrites sparsely, shallowly punctate throughout, last ventrite flat, apex shallowly medially impressed, slightly deflexed in male, flat, not deflexed in female. Front and middle legs short, hind longer; matte, finely irregularly punctate throughout; femora clavate, widest at extreme apex; front and middle femora short, hind femur longer, almost reaching apex of ventrite 5 in male, shorter in female, barely reaching apex of ventrite 4; inner margins of all tibiae with only short, sparse setae; all tibiae straight. Tarsi each with third article moderately widely dilated, completely pilose ventrally; tarsi with third articles symmetrical; apical margin of third articles truncate; claw-bearing segment faintly bilamellate ventrally at apex.

Sexual dimorphism.—Sexual dimorphism is quite evident in the two specimens examined. The male has a rostrum that is more evenly arcuate, whereas the female rostrum is somewhat more abruptly arcuate at about the apical three-fifths. In addition, the pygidium is slightly more tumescent in the male and the apex of ventrite 5 is slightly impressed and deflexed. The hind femur is slightly longer in the male, almost reaching the apex of ventrite 5, whereas in the female it barely reaches the apex of ventrite 4.

Material Examined.—Male HOLOTYPE labelled “C.R., Punt., Monte- / verde Cloud Forest / Res. V-27, 31-1984 / Riley, Rider&LeDoux” (CWOB). Female ALLOTYPE labelled “Costa Rica. Prov. Puntarenas. Fila / Cruces, Laguna Gamboa. 1400m. 30 / ABR 1996. I.A. Chacón. / L\_S\_304200\_574850 #8233”, INBio barcode 2447812 (INBC).

Distribution.—Costa Rica (Puntarenas).

Natural history.—Both specimens were collected at or near 1400m. No other information on natural history is available.

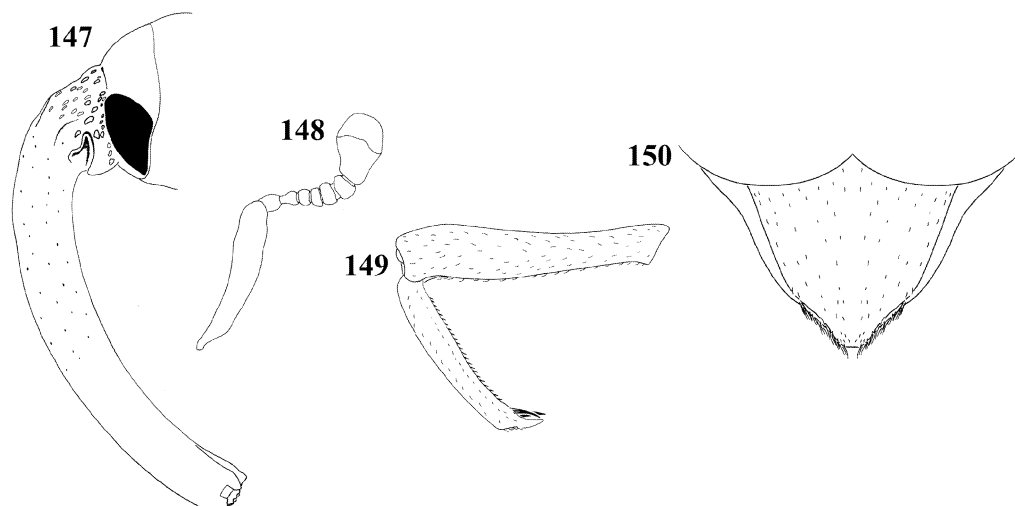
Derivation of specific name.—Through her support of the Nature Discovery Fund at the Canadian Museum of Nature, this species is named after Adèle Labrèche as a gift from Mario Lalanne.

### ***Rhodoaenus patriciae* Anderson, new species**

(Figs. 133-134, 147-150)

Identification.—This species is known only from three female specimens from the Osa Peninsula. *Rhodoaenus patriciae* is similar to the southern South American *R. tornowii* (Bréthes) in elytral color pattern (Fig. 133) and in that the antennal scape is widened throughout most of its length (Fig. 148); however, in *R. patriciae*, the pronotal color pattern is different, the punctures of the femora are large, deep and dense, and the vestiture of the third tarsal articles has less extensive pilosity. The species may also be confused with *R. bicinctus* but that species has a different elytral pattern, the rostrum is usually red, and the antennal scape is not expanded throughout its length, but only clavate at the apex.

Description.— Male, not known. Female, length, 6.7-6.8 mm; width 2.3-2.4 mm. Color black and red. Head and rostrum black. Pronotum red with median broad black line as well as lateral broad black line along midheight of flanks, apical margin also infusate. Elytra red with apical one-third black, this black marking extended forward along sutural region to base of elytra in an inverted “V” shape; humeral region at interval 7 also black. Ventrally with prosternum red, otherwise black or deep piceous.



FIGURES 147-150. *Rhodobaenus patriciae* Anderson. 147. Lateral view of head, female. 148. Antenna. 149. Hind leg, female. 150. Pygidium, female.

Rostrum slightly shorter than pronotum, strongly humped at base; elongate, narrow, cylindrical, almost straight, virtually impunctate except for moderately dense punctures dorsally on basal; base of rostrum abruptly expanded, basal expanded area very short, about one-sixth total rostral length; base of rostrum immediately in front of eyes subdentate ventrally. Peduncle flat basally, markedly and sharply keeled towards apex. Scrobe with posterior margin about width of base of scape from anterior margin of eyes. Antenna with scape long, about two-thirds length rostrum; scape expanded throughout length, subequal in width from basal one-third to apex, flattened, inner face with shallow irregular sulcus; club slightly laterally compressed, oval; apical pilose part subequal in length to basal glabrous part. Pronotum with lateral margins subparallel to slightly convergent in basal one-half, gradually convergent to apex; very sparsely and shallowly, indistinctly punctate except across base; moderately deeply transversely creased subbasally. Elytra with length one and four-fifths times length pronotum; with striae and intervals impunctate, flat. Scutellum elongate-narrow, lateral margins subparallel in basal one-half; length twice width at base, flat. Pygidium with subapex at middle slightly tumescent, punctate throughout; apical margin with row of elongate, fine setae; apex broadly acuminate. Ventrally with front coxae separated by width of base of scape; prosternum flat between and

anterior to coxae. Meso- and metasterna and ventrites sparsely, shallowly punctate laterally, punctures finer and sparsely medially; last ventrite flat, slightly deflexed at apex. Legs elongate, matte, coarsely, deeply punctate throughout; femora clavate, widest at extreme apex; long, hind femur almost reaching apex of ventrite 5; inner margins of all tibiae with only very short, sparse setae; all tibiae slightly inwardly arcuate. Tarsi each with third article moderately widely dilated, pilose ventrally except in narrow band along basolateral margins; tarsi with third articles symmetrical; apical margin of third articles truncate; claw-bearing segment bilamellate ventrally at apex.

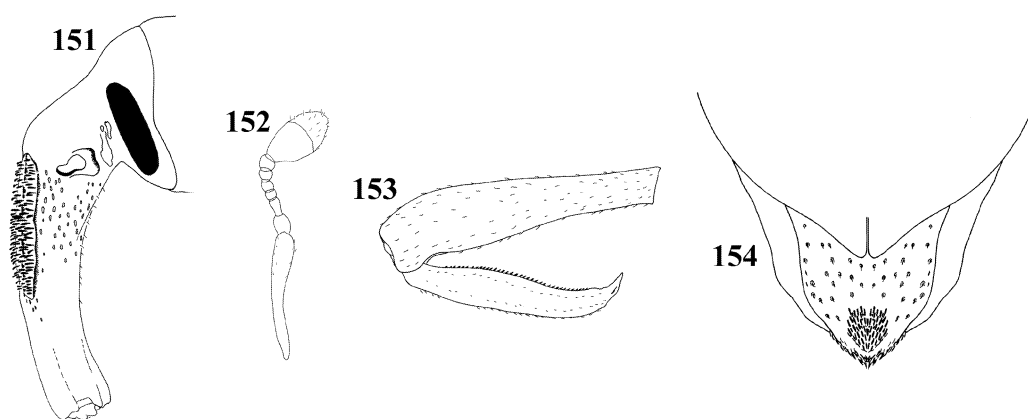
**Material Examined.**—Female HOLOTYPE labelled “Sirena, Corcovado N.P. / Puntarenas Province / Costa Rica, 0-100m / G. Fonseca. Nov 1989 / 270500, 508300”, INBio barcode 113978 (INBC). PARATYPES (2 ♀). COSTA RICA. PUNTARENAS PROVINCE. Osa Penninsula. Rincon (2.5 mi. SW.). 08°42’N, 83°29’W”, 6.iii.1968, H. Hespeneheide (1 ♀). Cerro Nora, 10 Feb 1972, S. Medica (1 ♀). Paratypes in CMNC, CWOB.

**Distribution.**—Costa Rica (Puntarenas).

**Natural history.**—Specimens were collected near sea level in the Osa Penninsula.

**Derivation of specific name.**—This species is named after Patricia Vaurie.

**Comments.**—This species was first recognized as new by Patricia Vaurie. She placed a determination label on one of the paratypes stating that it was near but not *R. tornowii*.



**FIGURES 151-154.** *Rhodobaenus tenorio* Anderson. 151. Lateral view of head, female. 152. Antenna. 153. Hind leg, female. 154. Pygidium, female.

***Rhodobaenus tenorio* Anderson, new species**

(Figs. 135-136, 151-154)

**Identification.**—The paired setose patches on the dorsal surface of the female rostrum divided medially by a distinct fine carina (Fig. 151), and the unique sculpturing of the pronotum and elytra (Figs. 135-136) immediately characterize this odd, perhaps flightless

species. Whereas *R. howelli* also has the dorsal surface of the female rostrum setose, in *R. tenorio*, the setosity is shorter, with each hair broader and scale-like, and the extent of the pilosity is limited to a smaller patch extended from immediately above the point of antennal insertion to the midlength of the rostrum (Fig. 151). The patch is also divided medially by a distinct, fine, sharp carina. The pronotum and elytra are sculptured unlike any other *Rhodobaenus*. The pronotum has a subbasal transverse impression (as do many *Rhodobaenus*) but this impression is extended anteriorly for a short distance on either side of the broadly elevated midline. The elytra has the scutellar region broadly impressed and also has a distinct oblique impression extended from the humerus to interval 2 at about the apical one-third. The pygidium is markedly, acutely tumescent apically (Fig. 154) and the tarsi have the venter of the claw bearing articles flat (as in *R. howelli*). The short elytra with somewhat rounded humeri (Fig. 135) indicates species is likely flightless.

Description.—Female, length, 9.5 mm; width 3.2 mm. Male not known. Color black with dark red-brown head, rostrum, mesosternum and coxae.

Rostrum shorter than pronotum, slightly humped at base; elongate, tapered apically, laterally compressed basally in front of point of antennal insertion, slightly evenly arcuate; with deep, large punctures laterally in front of point of antennal insertion, dorsally with short, dense, broad, dark golden scale-like hairs arranged in paramedian patches extended from above point of antennal insertion to about midlength of rostrum; base of rostrum slightly expanded, basal expanded area short, about one-fourth total rostral length. Rostrum glabrous ventrally; peduncle flat, not produced or toothed. Scrobe with posterior margin about twice width of base of scape from anterior margin of eyes. Antenna with scape slightly longer than one-half length rostrum; scape slightly expanded apically, not flattened; club cylindrical, elongate-oval; apical pilose part slightly less than one-half length of basal glabrous part. Pronotum with lateral margins evenly slightly arcuate from base to subapical constriction, apex distinctly constricted, tubulate; sparsely and shallowly, indistinctly punctate throughout; with subbasal transverse impression and longitudinal paramedian impressions extended anteriorly of subbasal impression for short distance on either side of broadly elevated midline. Elytra with length subequal to length pronotum; with striae with indistinct, shallow, elongate punctures, intervals impunctate, flat; elytra with scutellar region broadly impressed, also each elytron with distinct oblique impression extended from the humerus to interval 2 at about the apical one-third. Scutellum elongate, lateral margins subparallel in basal one-half; length twice width at base, flat. Pygidium with subapex at middle markedly, acutely tumescent, regularly punctate with dense long, scale-like setae on tumosity; apex narrowly rounded. Ventrally with front coxae separated by less than width of base of scape; prosternum flat between and anterior to coxae. Meso- and metasterna and ventrite 1-5 sparsely, shallowly punctate throughout; last ventrite flat at middle at apex. Legs (especially hind) elongate, matte, coarsely, shallowly punctate throughout; femora clavate, long, hind femur reaching apex of pygidium; inner margins of all tibiae with only very short, peg-like setae; all tibiae straight. Tarsi each with third arti-



cle slightly dilated, pilose ventrally except in narrow median line; tarsi with third articles asymmetrical; apical margin of third articles very slightly emarginate; claw-bearing segment flat ventrally at apex; tarsi moderately long, first article less than twice as long as wide.

Material examined.—Female HOLOTYPE labelled "COSTA RICA, Prov. Limón. PILA / Bratsi, Refugio Valle del Silencio / 2400m. 17 ABR 2001. R. González. / Manual. L\_S\_341400\_577250 #62561" INBio barcode 3307215 (INBC).

Distribution.—Costa Rica (Limón)

Natural history.—No information is available on natural history.

Derivation of specific name.—This species is named after INBio parataxonomist Roger Gonzalez Tenorio for his diligence (and success) in finding new species of weevils.

Comments.—This is the only known species of *Rhodobaenus* with such pronotal and elytral sculpturing.

### Acknowledgements

Many thanks are due the many individuals and institutions who loaned or donated material for this study, most notably Charles O'Brien and Henry Hespenheide, both of whom went out of their way to find additional specimens for me to examine. Special acknowledgement is given to the Instituto Nacional de Biodiversidad (INBio) and in particular to Alvaro Herrera, Angel Solis, Carlos Viquez, and the Coleoptera technicians and parataxonomists at this institution. Without the assistance of INBio staff and the rationale provided by the mission of this institution, this work could not have taken place. Line illustrations were prepared by Nadine Duperre and Patricia Bishop. Photographic plates were prepared by Roger Langlois and Katey Wasmund. Special mention is also made to the seventeen patrons of the Canadian Museum of Nature's Nature Discovery Fund and Program and whose participation is acknowledged herein. In recognition of support for systematics research, this program offers the opportunity for fund patrons to have species of organisms named in their honour or in the honour of someone they designate.

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