

Classification, natural history, and evolution of Epiphloeinae (Coleoptera, Cleridae) : Part IX. The genus *Megaphloeus* Opitz, 2010

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Classification, natural history, and evolution of Epiphloeinae (Coleoptera, Cleridae)

Part IX. The genus *Megaphloeus* Opitz, 2010

by Weston Opitz

Abstract. This treatise involves intergeneric relationships among *Opitzius* Barr, *Epiphloeus* Spinola, and *Megaphloeus* Opitz. For the most part, it is a work that brings together a number of epiphloeines that were formerly classified under *Epiphloeus* Kuwert; as listed in the Corporaal catalogue published in 1950. Twenty-six species comprise *Megaphloeus* Opitz, of which 12 were previously described: *M. animosus* (Wolcott) (type locality: Costa Rica, Turrialba), *M. lividipes* (Chevrolat) (type locality: Venezuela), *M. marginipes* (Chevrolat) (type locality: México, Córdoba), *M. mucoreus* (Klug) (type locality: Brazil), *M. nubilus* (Klug) (type locality: Brazil), *M. parvulus* (Schenkling) (type locality: Brazil, Goyas), *M. setulosus* Thomson (type locality: México), *M. sexplagiatus* (Kuwert) (type locality: Peru, Amazonas), *M. terzonatus* (Gorham) (type locality: Brazil, Ega), *M. tricolor* (Kuwert) (type locality: Brazil, Amazonas), *M. velutinus* (Gorham) (type locality: Brazil, Amazonas), *M. variegatus* (Klug) (type locality: Brazil, Pará). The following new species are included in *Megaphloeus* Opitz: *M. absentis* (type locality: México, Puebla, 4.6 km E Teziutlán), *M. bulatus* (type locality: Costa Rica, Puntarenas, Est. Aguhas), *M. cartus* (type locality: Belize, Orange Walk, Rio Bravo construction area, LaMilpa), *M. circinus* (type locality: Colombia, Vaupés, R.N. Mosiro-Itajura, Caparú, Centro Abiental), *M. fucoaquilus* (type locality: Brazil, Rondônia, 62 km SE Ariquemes), *M. longius* (type locality: Honduras, Olancho, P.N. La Muralla), *M. megasensibilis* (type locality: Brazil, Rondônia, 62 km SE Ariquemes), *M. pectilis* (type locality: Guyana, Region 8, Iwokrama Forest, 1 km W Kurupukari, Iwokrama Field Station), *M. platyglenus* (type locality: Ecuador, Orellana, 1km S Onkone Gare Camp.), *M. rictocaliginus* (type locality: Brazil, Rondônia, 62 km SE Ariquemes), *M. tigrinus* (type locality: Colombia, Putumayo, PNN La Paya Fea Charapa), *M. ustafinis* (type locality: Brazil, Mato Grosso, Sinop), *M. ustus* (type locality: Brazil, Nova Teutonia), and *M. vitellinus* (type locality: Brazil, Amazonia). Eleven new synonymies are established in this work: Synonymized under *Megaphloeus mucoreus* (Klug) are *Enoplium fasciatum* Klug, *Epiphloeus balteatus* Chevrolat, *Epiphloeus tomentosus* Spinola, and *Epiphloeus bakeri* Wolcott; under *M. setulosus* (Thomson), *Epiphloeus debilis* Kuwert and *Epiphloeus obscurus*; under *M. tricolor* (Kuwert), *Epiphloeus micaceus* Chapin; under *M. velutinus*, *Epiphloeus tibialis* Kuwert, and under *Enoplium variegatum* Klug, *Epiphloeus ornatus* Spinola, *Epiphloeus buquetii* Spinola, and *Phyllobaenus manni* Wolcott. Nine lectotypes have been designated; they involve *Epiphloeus lividipes* Chevrolat, *Epiphloeus marginipes* Chevrolat, *Enoplium mucoreum* Klug, *Epiphloeus parvulus* Schenkling, *Epiphloeus setulosus* Thomson, *Epiphloeus terzonatus* Gorham, *Epiphloeus tricolor* Kuwert, *Enoplium variegatum* Klug, and *Epiphloeus velutinus* Gorham. Megaphloeines are arbophilic insects involved in tritrophic interactions along with host plants and bark beetles. Evidence suggests that *Megaphloeus* beetles have a kaironomal response to bark beetle aggregate pheromones and host tree terpenes. Specimens have been collected in flight intercept traps laced with ethanol, or mixtures involving sulcatol-ethanol and α -pinine+ethanol in forests laden with *Eucalyptus grandis* W. Hill ex Maid, *Araucaria angustifolia* (Bertol.) Kuntze, *Pinus taeda* Linnaeus, or *Pinus caribaea* Morelet v. *hondurensis*. *Megaphloeus* beetles were collected throughout the year in tropical and subtropical zones at altitudes ranging from 10 to 1850 m. What distinguishes *Megaphloeus* among other epiphloeines is that the phallic apex is large and triangular. Distributional evidence suggests that ancestral *Megaphloeus* originated in South America and perhaps in environs of the Andes or lowland Amazonia. Descendants dispersed northwestward to enter Middle America after closures of the portals of insular Central America. A matrix of 26 character states was analyzed, manually and with Winclada. The two analyses yielded two very similar proposals of intergeneric and megaphloeian interspecies groups phylogenies. It is postulated that *Megaphloeus* Opitz is the sister taxon of a lineage that eventually produced members of genera *Opitzius* Barr and *Epiphloeus* Spinola. In addition to the conventional taxonomic sections, included in this treatise is a Spanish translation of the abstract and of a key to species groups and species. Included are 104 line drawings, two habitus illustrations, eight electron micrographs, 11 distributional maps, two phylogenetic trees, a matrix of 26 character states, and a table showing the distribution of *Megaphloeus* Opitz species groups among montane and lowland refugia of Middle and South America.

Key words. Coleoptera – Cleridae – Epiphloeinae – taxonomy – new species

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Introduction

“On trunks of felled trees, has a curious sidelong motion round the tree; found with small Coleoptera in the mouth, one with a *Copturus*, another with a *Scolytus*, and also a *Trypanaeus*.” These are the thoughts of Bates as he encountered (during 1877) *Megaphloeus mucoreus* (Klug) in the environs of the Brazilian Amazon (GORHAM 1877: 246). Such attributes of epiphloeine behavior were also observed by me along forest edge aside the Amazonian Rio Negro. The genera involved in this sighting were *Plocamocera* Spinola (OPITZ 2004: 13), *Amboakis* Opitz (OPITZ 2006: 107), *Megaphloeus* Opitz (OPITZ 2010a: 16), *Ichnea* Spinola (OPITZ 2010b: 17), and *Madoniella* Pic (Opitz, in preparation). The morphology of mouthparts, thoracic features, and alimentary canal support Bates’s report that these are predatory beetles with likely flight adaptations suitable for quick vertical landing near or on whatever lignicolous insect they can capture. Their strategy most often involves an initial scurrying gait, “pouncing” movement towards the prey, then a catapulting to full flight (OPITZ 2004: 13); often with bark beetle prey lodged in their mandibles.

Material

This treatise is based on 2,154 specimens of adult *Megaphloeus* Opitz. Specimens were obtained via loans, or collected during various expeditions to Middle and South America. The terrain between the southern limit of the United States and the western limit of Colombia has been variously named. In this contribution I refer to the region in question as Middle America, to distinguish the entire region from subdivisions as defined in OPITZ (2005: 97).

Epiphloeus quadristigma (CHEVROLAT 1874: 320) is included in CORPORAAL (1950: 254). Unfortunately, I did not find any specimens in the Paris Museum that correspond to Chevrolat’s nominal species; therefore, I am declaring *E. quadristigma* Chevrolat a species *incertae sedis*.

Repository of specimens

[The following acronyms come from ARNETT *et al.* (1993) and indicate the source of most of the specimens that formed the basis of this study. Names of curators and other keepers of collections, and their e-mail addresses are provided in parentheses.]

- AMNH American Museum of Natural history, Department of Invertebrate Zoology,
Central Park West at 79th Street, New York, New York 10024-5192
(Lee Herman; herman@amnh.org)
- BMNH British Museum of Natural history, Department of Entomology, SW 5BD,
London, England (Maxwell V. L. Barclay; m.barclay@nhm.ac.uk)
- CASC California Academy of Sciences, Department of Entomology, Golden Gate
Park, San Francisco, California 94118 (David H. Kavanaugh;
dkavanaugh@calacademy.org Norman D. Penny; npenny@calacademy.org)
- CDAE California Department of Food and Agriculture, Plant Pest
Diagnostic/Entomology Laboratory, Entomological Collection. 3294 Meadowview Road,
Sacramento, California 95832-1448 (Chuck Bellamy; cbellamy@cdfa.ca.gov
Andrew R. Cline; acline@cdfa.ca.gov)

- CHAH Henry A. Hespenehde Collection, University of California, Los Angeles, Department of Organismic Biology, Ecology and Evolution, 621 Charles E. Young South, Box 951606, Los Angeles, California 90095-1606 (henryh@biology.lifesci.ucla.edu)
- CMNC Canadian Museum of Nature, Insect Collection, Post Office Box 3443, Station D, Ottawa, Ontario, Canada K1P 6P4 (Robert S. Anderson; randerson@mus-natur-ca Francois Genier; fgenier@mus-natur.ca)
- CMNH Carnegie Museum of Natural History, Invertebrate Zoology, 4400 Forbes Avenue, Pittsburgh, Pennsylvania 15213 (Robert L. Davidson: davidson@clpgh.org)
- CNCI Agriculture-Food Canada, K.W. Neatby Building, 960 Carling Avenue, Ottawa, K1A 0C6, Canada (Yves Bousquet: bousquety@agr.gc.ca)
- DEIG Deutsches Entomologisches Institute, Leibniz-Zentrum für Agrarlandschafts- und Landnutzungsforschung e. V. Ebersvalde Str. 84, D-15374 Müncheberg, Germany (Lothar Zerche; zerche@zalf.de)
- DZUP Universidade Federal do Paraná, Departamento de Zoologia, Coleção de Entomologia, Caixa Postal 19020, 81531-990, Curitiba, Paraná, Brazil (Germano H. Rosado-Neto)
- EBCC Estación del Biología Chamela, Universidad Nacional Autónoma de México, Apartado Postal 21, San Patricio, Jalisco, 48980, México (Felipe A. Noguera; fnoguera@servidor.unam.mx)
- EMEC Essig Museum of Entomology, University of California, College of Agriculture, Division of Entomology and Parasitology, California Insect Survey, Berkeley, California 94720 (Cheryl Barr; cbarr@nature.berkeley.edu)
- EMUS Utah State University, Department of Biology, Logan, Utah 84322-5305 (Carol D. VanDohlen; cvand@biology.usu.edu)
- FEIS Faculdade de Engenharia de Ilha Solteira, Universidade Estadual Paulista, Júlio de Mesquita Filho, Campus de Ilha Solteira, Museu de Entomologia da FEIS/UNESP (MEFEIS), Avenida Brasil, Centro, 56 – Caixa Postal 31 – 15.385-000- Ilha Solteira, SP – Brazil (Carlos A. H. Flechtmann; flechtma@bio.feis.unesp.br)
- FMNH Field Museum of Natural history, Division of Insects, Zoology, 1400 South Lake Shore Drive, Chicago, Illinois 60605 (James Boone; jboone@fieldmuseum.org).
- FSCA Florida State Collection of Arthropods, Division of Plant Industry, Florida Department of Agriculture, P. O. Box 147100/1911 SW 34th Street, Gainesville, Florida 32614-7100 (Mike Thomas; ichael.Thomas@ freshfromflorida.com Paul E. Skelley; Paul.Skelley@ freshfromflorida.com)
- IAVH Instituto de Investigación de Recursos Biológicos Alexander von Humbolt, Carrera 7 No. 35-20, Bogotá D. C., Colombia (José Enrique Castillo; jecastillo@humboldt.org.co)
- IMLA Fundacion Miguel Lillo, Dirección de Zoología, Miguel Lillo 251, Entomología. 4000 San Miguel de Tucumán, Argentina (Virginia Colomo de Correa; fmizoo@tucbbs.com.ar)
- INBC Instituto Nacional de Bioversidad. Santo Domingo de Heredia, Apartado Postal 22-3100, Heredia, Costa Rica (Angel Solis; asolis@inbio.ac.cr).
- INHS Illinois Natural history Survey, Center for Biodiversity, 607 East Peabody Drive, Champaign, Illinois 61820-6970 (Kathleen R. Zeider; kmethven@staff.uiuc.edu)
- JEWC Jim E. Wappes Collection, 8734 Paisano Pass, San Antonio, Texas 78255 (Jim Wappes; wappes@earthlink.net)
- JNRC Jacques Rifkind Collection, 5105 Morella Ave., Valley Village, California 91607-3219 (Jacques Rifkind; clerid@aol.com)
- KSUC Kansas State University, Department of Entomology, 123 Waters Hall, Manhattan, Kansas 66506-4004 (Gregory Zolnerowich; gregz@ksu.edu)

- LACM Natural History Museum of Los Angeles County, Entomology Section, 900
Exposition Boulevard, Los Angeles, California 90007
(Brian V. Brown; bbrown@nhm.org)
- MAIC Michael A. Ivie Collection. Department of Entomology, Montana State
University, Bozman, Montana 59717 (Michael A. Ivie; mivie@montana.edu)
- MCNZ Fundação Zoobotânica do Rio Grande do Sur, Museo de Ciências Naturais,
Rua Dr. Salvador Franca, 1427 Caixa Postal 1188, 90001-970, Porto Alegre, RS, Brasil
(M.H. M. Galileo; galileo@fzb.rs.gov.br)
- MCZC Museum of Comparative Zoology, Harvard University, Entomology,
Cambridge, Massachusetts 02138 (Philip D. Perkins; perkins@oeb.harvard.edu)
- MEMU Mississippi State University, Mississippi Entomological Museum. Post Office
Box 9775, Mississippi State, Mississippi 39762
(Terry Schaefer; tschaefer @entomology.msstate.edu)
- MIZT Museo Regionale de Scienze Naturali, Collaboratore Sezione di
Entomologia, Via Giolitti, 36-10123, Torino, Italy (Luca Picciau;
luca.picciau@mail.regione.piemont.it)
- MIZA Museo del Instituto de Zoología Agrícola, Facultad de Agronomía-UCV,
Maracay-Apdo. 4579, Aragua-2101A, Venezuela (José Clavijo; pepeclavijoa@gmail.com)
- MLPA Universidad Nacional de la Plata, Facultad de Ciencias Naturales Y Museo,
Departamento Científico de Entomología, Paseo del Bosque s/n., 1900, La Plata,
Argentina; Juan A. Schnack (postmaster@unplzo.edu.ar)
- MNHN Museum d’Histoire Naturelle, Entomologie, 45 bis, Rue de Buffon, Paris
(Ve), France; Antoine Mantilleri; amantill@mnhn.fr)
- MUCR Museo de Insectos, CIPROC, Escuela de Agronomía, Facultad de Ciencias
Agroalimentarias, Universidad de Costa Rica, San Pedro, San José, Costa Rica
(Humberto J. Lezama; hlezama@cariari.ucr.ac.cr)
- MZSP Museu de Zoologia Universidade de Sao Paulo, Caixa Postal 42.694 01064-
970, Sao Paulo, Brazil (Cleide Costa; cleico@usp.br)
- NHMB Naturhistorisches Museum Basel, Entomology, Augustinergasse 2, CH 4001,
Basel, Switzerland (Michel Brancucci; michel.brancucci@bs.ch)
- NINA Norwegian Institute for Nature Research, Division of Conservation Biology,
Tungasletta 2, NO-7485, Trondheim, Norway
(Frode Ødegaard; frode.odegaard@ninatrd.ninianku.no)
- OXUM Oxford University Museum of Natural History, Hope Entomological
Collections, Parks Road, Oxford, OX 1 3PW, United Kingdom (James Hogan;
james.hogan@oum.ox.ac.uk).
- RDCC Robert D. Cave Collection, 2199 South Rock Road, Fort Pierce, Florida,
34945 (BeetleEditor@gmail.com)
- RGCG Roland Gerstmeier Collection, Technische Universitaet Muenchen, Lehrstuhl
fuer Tieroekologie, Am Hochanger 13, D-85350 Freising, Germany
(Roland Gerstmeier; r.gerstmeier@googleemail.com)
- RHTC Robert H. Turnbow, Jr. Collection, Directorate of Engineering and Logistics,
Fort Rucker, Alabama 36362-5000 (robert.turnbow@us.army.mil)
- SEAN Museo Entomologico. S. E. A., A.P. 527, Leon, Nicaragua
(Jean-Michel Maes; jmmaes@ibw.com.ni).
- SEMC The University of Kansas, Snow Entomological Division, The Natural
history Museum of the University of Kansas, Lawrence, Kansas 66045-2454
(Zachary Falin; ksem@ku.edu)
- SMTD Staatliches Museum für Tierkunde, Abt. Entomologie, Königsbrücker
Landstr. 159, D-01109, Dresden, Germany (Olaf Jaeger; olaf.jaeger@snsd.smwk.sachsen.de)

- STRI Smithsonian Tropical Research Institute, Unit 0948, APO AA 34002-0948,
Panamá (Annette Aiello; AIELLOA@si.edu)
- TAMU Texas A & M University, College of Agriculture and Life Sciences,
Department of Entomology, Minnie Belle Heep Building, College Station,
Texas 77843-7029 (Edward G. Riley; egrchryso@tamu.edu)
- UKIC University of Kentucky, Department of Entomology, S-227 Agricultural
Science North, Lexington, Kentucky 40546-009 (M. Sharkey; msharkey@uky.edu)
- UCDC University of California-Davis, Department of Entomology, R.M. Bohart
Museum of Entomology, 1 Schields Avenue, Davis, California 95616-85849
(Steve L. Heydon: slheydon@ucdavis.edu).
- UMRM University of Missouri-Columbia, College of Agriculture, Food and Natural
Resources, Plant Science Unit, Department of Entomology, I-87 Agriculture Building,
Columbia, Missouri 65211 (Kristin B. Simpson; simpson@missouri.edu).
- UMSP University of Minnesota Insect collection, Department of Entomology, 1980
Folwell Avenue, St. Paul, Minnesota 55108 (Philip J. Clausen; claus004@umn.edu)
- USNM United States Department of Agriculture. Systematic Entomology Laboratory,
c/o National Museum of Natural history MRC 168, Washington, D.C. 20560-0165
(Natalia J. Vandenberg; nvandenb@sel.barc.usda.gov)
- WFBM University of Idaho, Division of Entomology, William F. Barr Museum,
Moscow, Idaho 83844 (Frank Merickel; fmerickel@uidaho.edu)
- WOPC Weston Opitz Collection, Kansas Wesleyan University, Department of
Biology, 100 E. Claflin Ave., Salina, Kansas 67401-6196 (opitz@kwu.edu)
- ZMAN Zoologische Museum der Universiteit van Amsterdam, Institute for
Biodiversity and Ecosystem Dynamics, Department of Entomology,
Plantage Middenlaan 64, 1018 DH Amsterdam, Netherlands
(Ben J. H. Brugge; brugge@science.uva.nl)
- ZMHB Museum für Naturkunde, Institute für Systematische Zoologie,
Invalidenstrasse 43, D – 10115, Berlin, Germany
(Bernd Jaeger; bernd.jaeger@museum.hu-berlin.de)

Methods

Through the generosity of collector naturalists, I was able to obtain a variety of *Megaphloeus* specimens preserved in Pampel's fluid. The formula for this fluid and dissection procedures are described in EKIS (now Opitz) (1977: 6). Illustrations involving the alimentary canal show only two of four cryptonephridial malpighian tubules. Figures of the male and female mesodermal internal reproductive organs show only one of two pairs of accessory glands, and one of two ovaries.

For comparisons involving the metathoracic wings, membranous wings were extracted from dried specimens by first softening a specimen in warm soapy water. Then, wings were removed and immersed in a drop of water set on a glass slide. Excess water was removed from the slide with a paper blotter. Next, the wing was flattened to show its fully expanded form. Finally, the wing was allowed to dry, lifted onto a mount card with glue, and pinned beneath its specimen.

Several representatives of *Megaphloeus setulosus* (Thomson) were completely disarticulated to investigate the morphological attributes of the exoskeleton. Line drawings were made with the aid of a camera lucida mounted on a M5-Wild stereoscopic

microscope. Body length and width measurements were done with a plastic ruler at 120 X. The habitus photograph of *M. vittellinus* sp.nov., was prepared with a Nikon DXM1200 digital camera attached to a Leica MZ. The SEM micrographs were produced with the Scanning Electron Microscope-S-3500 N., in the SEM laboratory of the Department of Entomology, Kansas State University.

I used NICHOLS (1989) and OPITZ (*l. c.*) as sources for morphological terms and BROWN (1956) for selecting specific epithets. Acronyms in ARNETT *et al.* (1993) were used to identify repositories of specimens. In the species descriptions, primary type-label information is provided in the exact form and sequence as is noted on the labels, and the type labels are described from top to bottom. Moreover, in the description of species, the information described on the type label is provided in the exact manner as provided by the collector. This will minimize possible confusion as to the identity of primary types. In the treatment of paratypes, I list locality records as follows: Country: State or Province: specific locality, date of collection, natural history information, identity of collector, and acronym of the specimen repository as well as the number of specimens collected from a specific locality.

Differences in character states of 26 adult morphological characters were polarized evolutionarily and organized into a character matrix (Table 1), then the matrix was analyzed, first manually (Fig. 114), then with Winclada version 1.00.08 (NIXON 2002) in combination with NONA (GOLOBOFF 1993). The computer-based analysis produced one tree of 20 steps, index of consistency of 95, and an index of retention of 92. Heuristic analysis [maximum trees (hold)] = 100, number of replications (mult) = 100, and multiple TBR = TBR (mult max) was used. My decision to select the hand prepared tree for my narrative about *Megaphloeus* phylogeny, over the computer generated model, is based on character weight considerations (WHEELER 1986: 104). In the manually prepared tree only the *micaceus* group remains unresolved, whereas the computer generated phylogeny shows four non-resolutions at intergeneric and interspecies-group levels.

Assessment of species-level discontinuities. A decision about what manner of trait gap warrants a hypothesis of species status, in accordance with the biological concept of the species (MAYR 1969:19), is perhaps one of the most tedious tasks of a systematist. And yet, it is a step that must be made with the utmost of care, as it is the fundamental beginning in the progress of higher taxa systematics (HORN 1887: 7). Moreover, the painstaking efforts sometimes required to separate samples of populations into species are richly rewarding to those of us for whom the discovery of new species represents a personal fulfillment of laboratory adventure.

In my dealings with *Megaphloeus* population samples, I found that morphological differences in the shape of the aedeagal tegmen, size and shape of the phallic apex, shape of the antennal capitulum antennomeres, shape of the funicular antennomeres, and color patterns on the elytral disc particularly useful in predictions about reproductive isolation.

Assessments of supraspecific discontinuities. The extent to which one can effectively decide what manner of species taxa verge possibly has generic significance is directly

proportional to the amount of time one spends investigating one's research animal, and is directly correlated with the extent of one's comprehensiveness of coverage of species taxa. In my research with the Epiphloeinae, I have prepared complete disarticulations of several representatives of most genera, and I have studied the morphology of all the species of a genus known to me. The study of complete specimens disarticulations, which has provided very useful clues as to which organs, and what extent of morphological homogeneity and variations, serve well for predictions of potential generic-level gaps. Variations and homogeneity of given organs of the taxa under study are then "weighed" against the consistency of their morphology among historically stable genera.

For example, I believe the consistent shape of the maxillary terminal palpomere in speciose, stable genera such as *Trichodes* Herbst and *Pelonium* Spinola may be a barometer that suggests that shape of the said organ may be of value to determine generic status among an assemblage of species, especially if there is corollation with other potentially generically useful organ variations; fully recognizing that supraspecific categories are subjectively designated. But, I submit that the aforementioned subjectivity may be decreased by a few increments if we take a comprehensive approach in the coverage of taxa, i.e., include very detailed morphologic analyses among diverse genera and species in supraspecific taxonomic considerations.

Phylogenetic methods. The basic tenets of Hennig's approach to phylogenetics are followed in this treatise (HENNIG 1965). Computer generated parsimony is networked into the Winclada analysis, which yielded one phylogenetic tree (Fig. 115). A second phylogenetic tree (Fig. 114) was prepared manually. These phylogenies include information from representatives of all species taxa of *Megaphloeus* Opitz known to me and from the out-group taxa *Epiphloeus* Spinola, *Opitzius* Barr, *Pteroferus* Opitz, and *Turbophloeus* Opitz. As there is considerable morphologic homogeneity among the megaphloeian species, discussion of infrageneric evolution involves only species-group relationships.

Confidence in the soundness of supraspecific relationships (as expressed in trees and classifications) is highest when discussions of such relationships involve fully resolved phylogenies. This is particularly relevant when one is dealing with generic-level analyses. Moreover, a prevailing attitude in some systematic circles is that all generic taxa must be supported by synapotypy, lest they are eventually drowned in paraphyly and subsequently subjected to cumbersome higher nomenclatural changes. While I am equally adamant about that scenario of estimating phylogenetic relationships, in the real world of morphologic systematics, where intuitive parsimony is still a formidable tool for thoughts about relationships, it is my opinion that an unresolved branch whose resolution is based strictly on morphological criteria has a reasonable chance of being monophyletic on the basis of some criteria that remains undiscovered. This is especially true, when within a genus taxon, all but one or two species taxa fall into phylogenetic place. Moreover, after considerable study, one may be intuitively confident that the taxa of an unresolved lineage are indeed evolutionarily related more to each other than they are to any other taxon under consideration.

Very few trees are completely resolved in even the most comprehensive systematic studies of the Cleridae. This is particularly true among epiphloeines where morphological adaptations have veered to a common structural basic plan; toward lifestyles involving predation on lignicolous insects. In reality, the genome can only produce a limited number of morphologies that are suitable towards niche-specific predation. Under such circumstances, one may need to use intuitive morphological differences and weigh them against other such gaps that are supported by synapotypy. In other words, no matter how taxon rich the group under study, or how detailed our investigation with specimens, results may not always yield synapotypies, which I do not think warrants speculation of unrelatedness as dictated by methodological definition, or worse, implementation of premature and cumbersome nomenclatural changes.

In my evaluation of character-state phylogeny, I implement the “out group rule,” ably discussed by many authors some of which were cited by me elsewhere (EKIS 1977: 117; OPITZ 2007: 85).

T a x o n o m y

Genus *Megaphloeus* Opitz, 2010

Taxonomic history. Many of the taxa of *Megaphloeus* Opitz were previously placed under *Epiphloeus* Spinola (CORPORAAL 1950: 253). From this assemblage of species I reclassify the majority of *Epiphloeus* Spinola species under *Megaphloeus* Opitz, on the basis of differences of the phallic apex, shape of the terminal maxillary palpomere, length of the antennal funicle, and uniformly sized elytral punctuations that are evenly distributed on the elytral disc. Elsewhere, I discuss (OPITZ 2010c: 48) organs of Cleridae morphology that seem to generate variations that one may interpret worthy of generic status; fully acknowledged is that supraspecific taxonomic levels are subjectively derived. Nevertheless, the shape of the terminal palpomeres of the maxilla is one of the characteristics that have been consistent among taxonomically stable genera among the World fauna of the Cleridae. Perhaps the most significant historical taxonomic aspect of this group of epiphloeines is the abundance of confusion involving species-level synonymies and generic misplacements of species. Recently, OPITZ & HERMAN (2009: 184) addressed questions relevant to the valid spelling of *Epiphloeus* Spinola.

Natural history. Tritrophic interactions among host plants, bark beetles, and checkered beetles have been researched in detail and are well documented in the scientific community. For a general review of the literature on this aspect of checkered beetle biology see ZHOU *et al.* (2001). What the research of these and other authors indicates is that species of the clerines *Thanasimus undatulus* (Say), and *Enoclerus sphaeus* (Fabricius), and probably a variety of other lignicolous clerines, have a kaironomal response to bark beetle aggregate pheromones and host tree terpenes. These chemicals have been commonly used to attract bark beetles, particularly in the coniferous forests of western, southern, and eastern United States.

Personal observations in Amazonia, Brazil, (OPITZ 2004: 13; 2008: 2), and environs of Cerro Campana, Panamá (OPITZ 2005: 16), and research conducted by MECKE *et al*

(2001: 116) and Flechtmann (personal communication) clearly indicate various species and genera of epiphloeines cohabit niches where lignicolous insects are prominent. In Panamá and Brazil I experienced strong afferency with tree volatiles, which were apparently attracting checkered beetle predators. My observation on Cerro Campana was particularly meaningful in that it seemed to corroborate the supposition that tree volatiles attract checkered beetles. There were only two bark beetles among the assemblage of lignicolous insects found on a very odiferous, recently-felled, hardwood. These two bark beetles were observed as they bored into the tissue of a hardwood surrounded by a variety of checkered beetles.

Moreover, a recent shipment of Brazilian checkered beetles from Carlos Flechtmann (FEIS) seems to at least circumstantially suggest that the epiphloeines *Amboakis nova* (Opitz), *Megaphloeus parvulus* (Schenkling), *M. mucoreus* (Klug), and *Parvochaetus sandaracus* Opitz are attracted to ethanol, or mixtures involving sulcatol-ethanol, and α -pinene+ethanol, in forests laden with *Eucalyptus grandis* W. Hill ex Maid, *Araucaria angustifolia* (Bertol.) Kuntze, *Pinus taeda* Linnaeus, or *Pinus caribaea* Morelet v. *hondurensis*.

In addition to the flight intercept traps laced with volatiles, megaphloeans were taken in a Malaise trap, black light, by fogging tree canopy, and with beating sheets. These beetles were collected throughout the year in tropical zones and have been associated with the following vegetation; logs of *Lonchocarpus* sp., *Copturus*, *Inga gagifolia* (L.) Willd., *Pentaclethra macroloba* (Willd.) Kuntze, *Socratea exorrhiza* (Mart.) H. Wendl., *Brosimus utile* F., *Lecyris costaricensis*, *Guarea glabra* Vahl., and *Rheedia madruno* (Kunth) Planch.

***Megaphloeus* Opitz, 2010**

Type species. *Epiphloeus setulosus* Thomson, 1860: 60 [by original designation; OPITZ 2010a: 16].

Diagnosis. Specimens of *Megaphloeus* Opitz are superficially similar to specimens of *Opitzius* Barr and *Epiphloeus* Spinola. However, in all the members of *Megaphloeus* the last maxillary palpomere is conic, not broadened as it is in specimens of the other aforementioned genera (compare Fig. 106 with 107).

Synapotypic characteristics: Elytral disc punctations evenly distributed throughout elytral disc; phallic apex large triangular.

Description. Size: Length 4.0–10.0 mm; width 1.2–3.0 mm.

Form: Oblong subrectangulate (Fig. 1a); elytra about three times longer than wide, epipleural margin slightly arcuate, posterolateral margin gradually curved towards elytral apex.

Vestiture: Cranium vested profusely with stout white setae, with tuft of white setae in ocular notch and posterior border of eye; pronotum loosely matted with stout white setae; elytral disc (Fig. 113) vested with primary (1°) setae and secondary (2°) setae, 1° setae stout, erect, and dark, particularly conspicuous along epipleural and sutural margins, 2° setae short, decumbent, and white or black, latter may be matted into fascia-like aggregates; elytral trichobothria prominent near epipleuron.

Head (Figs 2–4): Cranium rugosely punctate; eyes very bulgy, finely faceted, ocular notch angle acute at innermost point (Fig. 4); antenna (Fig. 1b) inserted at lower angle of eye incision, comprised of 11 antennomeres, capitulum (Fig. 1b) loosely clavate, scape as long as combined length of pedicel and antennomeres 3–7, scape (Fig. 20) curvate, funicular antennomeres (Fig. 108) 3–5 subfiliform (Fig. 101) to subserrate (Fig. 102), 6–8 slightly increasing in width, 9th and 10th antennomeres triangular (Fig. 1), 11th antennomere oval; labrum (Fig. 7) deeply incised; tormal processes horizontal and not welded; mandible (Fig. 17) robust, dentes shallow, mandibular pinicillus very small; maxilla (Fig. 10), terminal palpomere long-digitiform, laterolacinia present; labium (Fig. 13), terminal palpomere short-digitiform; frons not very wide; gular sutures (Fig. 3) strongly converging; post-gular processes (Fig. 110) small and widely separated.

Thorax: Pronotum (Figs 5, 6) transverse, lateral tubercle (Fig. 5) prominent, disc finely punctate, pronotal (Fig. 5) arch roughly punctate, anterior margin curvate, posterior margin transverse, anterior transverse depression well developed, disc of pronotal arch usually transversally wrinkled, rarely not transversally wrinkled; disc of pronotum proper with elevations and depressions, paralateral tumescences usually prominent, depressed obliquely at sides where discal trichobothria (Fig. 109) are prominent; pronotal projection slightly extended to middle (Fig. 6); dorsolateral carina (Fig. 112) not extended to anterior margin of pronotum and posteriorly confluent with pronotal hem; procoxal cavities (Fig. 6) open; prointercoxal process (Fig. 6) linear, not laterally expanded distally; metendosternite (Fig. 8) without furcal lamina; elytra (Figs 103–105, 113) oblong subrectangulate, epipleural margins briefly subparallel then gradually becoming more rounded, then gradually converging towards sutural margin, punctations small, profusely distributed on elytral disc and consistent in size throughout disc, epipleural margin extended throughout elytral length but considerably narrowed in posterior third, elytral trichobothria present near epipleural margin; metathoracic wing as in Figs 9, 72; mesoscutellum (Fig. 74) transverse; profemora particularly robust; tibial spur formula 0-1-1, tarsal pulvilli (Fig. 111) formula 3-3-2, anterior margin of tibia spinous; tarsal unguis (Fig. 111) with large basal denticle.

Abdomen: Narrows to posterior, six visible sterna; male pygidia variously broad spatulate (Figs 11, 12), less so in females (Figs 14, 15), fringed with large setae, sixth visible sternum incised distally in males, not incised in females (Fig. 15). *Male Genitalia* (Figs 16, 19): Aedeagus long and narrow; tegminal lobes (Fig. 16) short; phallobasic rod present (Fig. 16), linear; phallic plates (Fig. 19) very narrow; spicular fork as in Fig. 18; spicular apodeme separated for most of length, conjoined at anterior limit. *Alimentary Canal* (Figs 76, 79): Ventricular papillae feebly developed; four cryptonephridial malpighian tubules.

Male Mesodermal Internal Reproductive Organs (Figs 85–91): Two pairs of accessory glands, length of glands variable; testes comprised of 12 follicles, rarely of less or more.

Female Mesodermal Internal Reproductive Organs (Figs 92–96): Spermatheca slightly sclerotized; spermathecal gland attached at about middle of spermathecal capsule; saccular bursa copulatrix present.

Distribution. The members of this genus are distributed from western México to eastern Argentina.

Key to species groups and species of *Megaphloeus* Opitz

As the labeling in Figs 99–101 suggests, when using the key that follows there may be some difficulty in determining the length proportions between the combined length of the pedicel and funicular antennomeres in relation to the combined length of antennomeres 9 and 10. Therefore, it is recommended that the reader make actual measurements of these antennal regions before proceeding beyond couplet 2 and 10.

- 1 Funicular antennomeres subserrate (Fig. 102) (*platyglenus* group) (Ecuador: Orellana). ***M. platyglenus* sp.nov.**
- 1' Funicular antennomeres subfiliform (Fig. 101). 2.
- 2(1') Combined length of pedicel and funicular antennomeres shorter than combined length of antennomeres 9 & 10 (Fig. 101); antennal capitulum large in size (Fig. 101). 3.
- 2' Combined length of pedicel and funicular antennomeres not shorter than combined length of antennomeres 9 & 10 (Figs 99, 100); antennal capitulum moderate in size (Fig. 99) to small in size (Fig. 100). 10.
- 3(2) Elytra not variegated in color. 4.
- 3' Elytra variegated in color (*variegatus* group). 5.
- 4(3) Elytron mostly yellow, with a row of 4 black spots (Fig. 1a) (Brazil: Bahia) (*vitellinus* group). ***M. vitellinus* sp.nov.**
- 4' Elytron red in basal half, black in distal half (Brazil: Santa Catarina) (*ustus* group). ***M. ustus* sp.nov.**
- 5(3') White line of setae on frontal aspect of ocular suture; few elytral punctations; elytra splayed at sides (Colombia: Amazonas; Nariño, Putumayo. Venezuela: Delta Amacura. Guyana: Demerara. French Guiana: Guyane. Ecuador: Napo. Peru: Lareto: Huanuco: San Martin. Bolivia: Chapare; Beni. Brazil: Amazonas; Mato Grosso; Pará; Rondônia: Maranhão). ***M. variegatus* (Klug)**
- 5' White line on frontal aspect of ocular suture not present; elytral disc copiously covered with elytral punctations; elytra not splayed at sides. 6.
- 6(5') Elytral humeral region without yellow inverted-T (not as in Figs 103–104). 7.
- 6' Elytral humeral region with at least partially developed yellow inverted-T (Figs 103–105). 8.
- 7(6) Cranium and pronotum black; elytral color markings of slightly visible variegations, markings either distinctly light or dark (Brazil: Rondonia). ***M. fucoaqilus* sp.nov.**
- 7' Cranium and pronotum not black; elytral color markings highly variegated with various intensity of color (Colombia: Amazonas. Venezuela: Bolivar. Guyana: Potaro. Brazil: Mato Grosso do Sul;

- Paraná; Santa Catarina; Rio Grande do Sul; Ceará; Bahía; Goiás; Guanabara; São Paulo; Pará; Mato Grosso; Amazonas; Alagôas; Rondônia; Acre. Ecuador: Santiago Morona; Napo. Peru: San Martín; Madre de Dios; Huanuco. Paraguay: San Pedro; Itapua. Argentina: Misiones; Entre Rios). ***M. mucoreus* (Klug)**
- 8(6') Antennomeres 9 & 10 broad triangular (Fig. 30) (Nicaragua: Chontales. Costa Rica: Heredia; Puntarenas; Alajuela; Limón. Panamá: Colón; Canal Zone: Panamá).. ***M. bulatus* sp.nov.**
- 8' Antennomeres 9 & 10 narrow triangular (Figs 31–40). 9.
- 9(8') Elytral apex narrowly rounded (Fig. 103) (Brazil: Rondônia: Mato Grosso). ***M. megasensibilis* sp.nov.**
- 9' Elytral apex broadly rounded (Fig. 104) (Ecuador: Esmeraldas; Pichincha. Peru: Junín; Madre de Dios. Bolivia: Cochabamba. Brazil: Mato Grosso; Chapare; Pará; Rondônia; Amazonas). ***M. terzonatus* sp.nov.**
- 10(2') Combined length of pedicel and funicular antennomeres longer than combined length of antennomeres 9 & 10 (Fig. 100) (*tigrinus* group). 11.
- 10' Combined length of pedicel and funicular antennomeres equal to combined length of antennomeres 9 & 10 (Fig. 99) (*tricolor* group). 21.
- 11(10) Elytra concolorous in ground color, brown (French Guiana: Guyane. Brazil: Paraná; Guanabara; Espírito Santo). ***M. nubilus* (Klug)**
- 11' Elytra not concolorous in ground color, ground color bicolorous. 12.
- 12(11') One antennomere of antennal capitulum pale or yellow. 13.
- 12' One antennomere of antennal capitulum not pale or yellow, antennal capitulum unicolorous, dark. 18.
- 13(10) Third antennomere of antennal capitulum yellow, first antennomere of antennal capitulum brown. 14.
- 13' Third antennomere of antennal capitulum brown; first antennomere of antennal capitulum yellow. 15.
- 14(13) Pronotal disc with a broad dark vertical line (Guyana: Demerara. Brazil: Pará). ***M. pectilus* sp.nov.**
- 14' Pronotal disc without broad dark vertical line, disc concolorous, and brown (Belize: Stann Creek; Panamá: Darien; Colón. Colombia: Magdalena; Vaupés; Antioquia. Venezuela: Bolívar; Tachira. Guyana: Demerara. Ecuador: Napo. Brazil: Rondônia; Tocantins; Pará; Amazonas. Peru: San Martín; Madre de Dios; Huánuco). ***M. sexplagiatus* (Kuwert)**
- 15(13') Elytral humeral region with well-developed yellow inverted-T (Fig. 103). 16.

- 15' Elytral humeral region without yellow inverted-T. 17.
- 16(15) First antennomere of antennal capitulum yellow, infuscated (México: Puebla; Veracruz). ***M. absentis* sp.nov.**
- 16' First antennomere of antennal capitulum yellow, not infuscated (Belize: Orange Walk). ***M. cartus* sp.nov.**
- 17(15') Elytral basal third red; dark regions of elytral disc not round (México: Veracruz. Belize: Cayo; Toledo; Orange Walk. Guatemala: Izabal. Honduras: Olancho; Santa Bárbara; Atlántida. Costa Rica: Heredia; Puntarenas; Guanacaste; Alajuela. Panamá: Chiriquí; Canal Zone; Colón). ***M. marginipes* (Chevrolat)**
- 17' Elytral basal third not red; dark regions of elytra round (México: Nayarit; Tabasco; Chiapas; Puebla; Veracruz; Sinaloa; Jalisco; Yucatán; Quinatan Roo; Guerrero; Oaxaca. Guatemala: Alta Verapaz; Baja Verapaz; Quetzaltenango. Belize: Belize. Honduras: El Paraiso; Yoro; Atlantida; Olancho. El Salvador: Morazán. Nicaragua: Chontales. Costa Rica: Guanacaste; Alajuela; Heredia; Limón; Cartago; San José; Puntarenas. Panamá: Panamá; Darién; Canal Zone; Colón; Chiriquí. Colombia: Putumayo; Magdalena; Cundinamarca; Bolívar. Ecuador: Napo. Venezuela: Tachira; Miranda. Bolivia: Santa Cruz; Cavinás. Peru: Cuzco. Brazil: Rondônia; Mato Grosso). ***M. setulosus* (Thomson)**
- 18(12') Elytral humeral region without yellow inverted-T (Colombia: Putumayo; Caquetá; Magdalena). ***M. tigrinus* sp.nov.**
- 18' Elytral humeral region with yellow inverted-T. 19.
- 19(18') Elytral disc with yellow marking well beyond elytral basal half (Brazil: Santa Catarina; Bahia; Mato Grosso; São Paulo; Mato Grosso do Sul; Paraná; Rondônia; Rio de Janeiro; Guanabara). ***M. parvulus* (Schenkling)**
- 19' Elytral disc without yellow markings beyond elytral basal half. 20.
- 20(19') Pronotal arch red (Brazil: Mato Grosso; Rondônia; Amazonas). ***M. ustafinis* sp.nov.**
- 20' Pronotal arch not red (Honduras: Cortés; Olancho). ***M. longius* sp.nov.**
- 21(10') Pronotal arch bright red. 22.
- 21' Pronotal arch not bright red. 24.
- 22(21) Elytral disc with preapical yellow spot; elytral apex broadly rounded (Colombia: Amazonas). ***M. circinus* sp.nov.**
- 22' Elytral disc without preapical yellow spot; elytral apex sharply rounded (Panamá; Canal Zone; Panamá. Colombia: Amazonas: Putumayo. Surinam: Saramacca. Brazil: Mato Grosso; Amazonas; Rondônia; Pará. Peru: Lareto. Bolivia: La Paz; Chaparé). ***M. velutinus* (Gorham)**
- 23(21') Elytral marking as in Fig. 105b (Venezuela: Aragua; Carabobo).

- *M. lividipes* (Chevrolat)
- 23' Elytral marking not as in Fig. 105b. 24.
- 24(23)' Elytral humeral region devoid of yellow inverted-T; pronotum usually with pair of pale brown spots near the corners of pronotal base (Costa Rica: Cartago; Guanacaste. Panamá: Canal Zone. Venezuela: Bolivar; Barinas. Guyana: Essequibo. French Guiana: Guyane. Bolivia: Cochabamba; Chapare. Brazil: Rodônia; Pará).
..... *M. rictocaliginus* sp.nov.
- 24' Elytral humeral region with at least part of yellow inverted-T present; pronotum without light brown spots at base. 25.
- 25(24') Tegmen with long phallobasic rod (Fig. 60) (México: Los Tuxtlas. Honduras: Atlántida. Nicaragua: Zelaya. Costa Rica: Limón; Heredia; Guanacate; Puntarenas. Panamá: Chiriquí; Canal Zone; Panamá; Colón; Darién. Colombia: Amazonas; Chocó; Caquetá. Venezuela: Tachira. Ecuador: Napo. Peru: Junín. Brazil: Rondônia).
..... *M. animosus* (Wolcott)
- 25' Tegmen with short phallobasic rod (Fig. 65) (Costa Rica: Cartago; Puntarenas; Heredia. Panamá: Panamá; Darién; Colón. Colombia: Amazonas; Caquetá; Putumayo; Vaupés. Venezuela: Aragua. Ecuador: Zemora-Chinchiipe; Napo. Bolivia: La Paz; Beni; Cochabamba; Santa Cruz. Brazil: Rondônia; Mato Grosso; Amazonas).
..... *M. tricolor* (Kuwert)

Description of *Megaphloeus* species

platyglenus group

The members of his monotypic group are distinguishable from congeners by the subserrate condition of the funicular antennomeres (Fig. 102). *M. platyglenus* is known only from Ecuador.

Megaphloeus platyglenus sp. nov. Figs 102 and 122

Type material. Holotype: female. Ecuador: Orellana: Ethnica, Waorani, 1 km S Onkone, Gare Camp, 4-II-1996, 220 m, fogging ground foliage, T.L. Erwin (USNM). (Specimen point mounted, gender symbol and antenna affixed to paper point; support card with affixed metathoracic wing; locality label; collecting technique and natural history label, USNM acronymic label; holotype label; plastic vial with abdomen and aedeagus.)
Paratypes: One specimen. Ecuador: Orellana: Ethnica, Waorani, 1 km S Onkone, Gare Camp, 4-II-1996, 220 m, fogging ground foliage, T.L. Erwin (WOPC, 1).

Description. Size: Length 4.8 mm; width 1.6 mm.

Integument: Cranium mostly yellow, infuscated at upper frons and behind eyes, antenna brown except last antennomere yellow; pronotum yellow brown; mesoscutellum yellow; elytra unicolorous, brown; legs, femora mostly yellow, narrowly infuscated dorsally, tibiae mostly yellow, infuscated, tarsi yellow-brown.

Head: Funicular antennomeres serrate (Fig. 102); combined length of pedicel and funicular antennomeres about as long as combined length of antennomeres 9 & 10; antennal capitulum slender.

Thorax: Pronotal arch not transversally wrinkled; pronotal discal tubercles particularly prominent; elytral apex broadly rounded; anterior margin of protibia with 3 spines.

Abdomen: Aedeagus not available for study.

Variations: Length 4.8–5.0 mm; width 1.6–2.0 mm. The primary type casts a purpurescent hue.

Natural history. Specimens were collected from tree canopy by fogging.

Distribution (Fig. 122). This species is known only from the type locality.

Etymology. The specific epithet *platyglenus* stems from the Greek adjective *platys* (= wide) and the Greek noun *glene* (= eyeball). I refer to the extensive width of the eyes of these beetles.

Differential diagnosis. The members of this species are conveniently distinguished from congeners by the serrate condition of the funicular antennomeres (Fig. 102).

vitellinus group

This group is comprised of one species whose members exhibit four black spots on each elytral disc (Fig. 1a). This beetle is known only from the eastern coast of Brazil.

Megaphloeus vitellinus sp.nov. Figs 1a, 43, 53, 87, and 122

Type material. Holotype: Male. Brazil: Bahia, Encruzilhada, 960 m, XI-1974, M. Alvarenga (MZSP). (Specimen point mounted, gender symbol affixed to paper point; support card; locality label; MZSP acronymic label; holotype label; plastic vial with metathoracic wing and aedeagus.)

Paratypes: None.

Description. Size: Length 8.0 mm; width 2.2 mm.

Integument: Cranium yellow, antenna, scape and 9th antennomere yellow, remainder brown; pronotum mostly yellow, with 6 black maculae, two at lower sides, 2 paralateral ones on disc, one transverse at center of pronotal collar, and one at center of pronotal arch; elytra bicolorous, mostly yellow, humeral yellow inverted T absent, disc with 8 subquadrate brown maculae proximal to sutural margin, infuscations present along epipleural margin and along elytral anterior margin; legs yellow.

Head: Antennal funicle filiform (Fig. 43), combined length of pedicel shorter than combined length of antennomeres 8 & 9; antennomeres 9 & 10 broad triangular, antennal capitulum large.

Thorax: Pronotal arch transversally wrinkled, pronotal discal tubercles not particularly prominent; elytral apex moderately narrowly rounded; anterior margin of protibia with 5 spines.

Abdomen: Aedeagus as in Fig. 53.

Male mesodermal internal reproductive organs (Fig. 87): Medial pair of accessory glands about as long as lateral pair; testes comprised of 12 follicles.

Variations: One specimen examined.

Natural history. The holotype was collected in November.

Distribution (Fig. 122). This species is known only from southeastern Brazil.

Etymology. The specific epithet *vitellinus* (= yellow) is a Latin adjective. I refer to the predominantly yellow color of the available specimens.

Differential diagnosis. This is the only member of the genus in which the elytral color markings involve multispots amidst a yellow ground color as depicted in Fig. 1a.

ustus group

The members of this monotypic group are conveniently identified by exhibiting a black forebody and elytron that is entirely red at its basal half. These beetles are known only from southern Brazil.

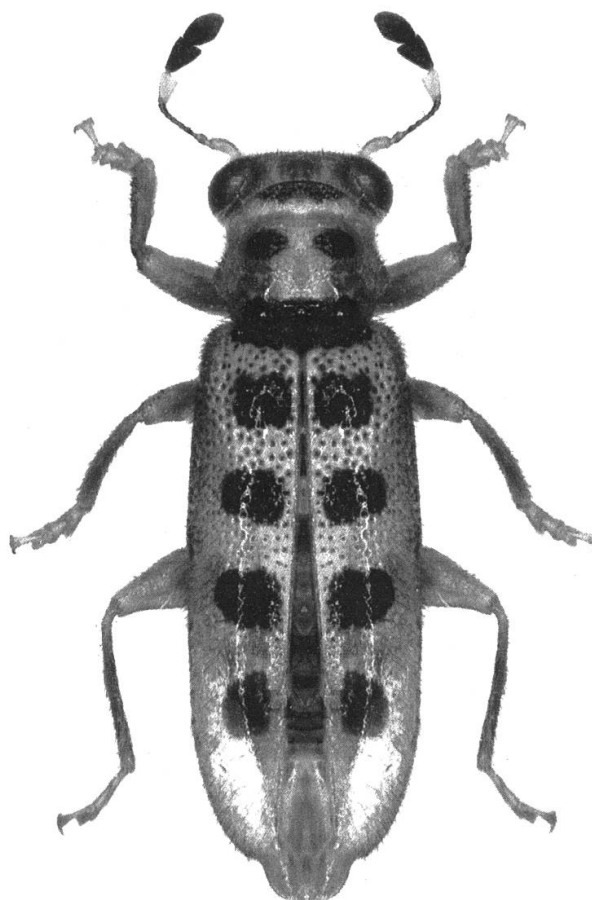


Fig. 1a. Habitus of *Megaphloeus vitellinus* sp.nov.

Megaphloeus ustus sp.nov.

Figs 44, 64, and 122

Type material. Holotype: Male. Brasilien, Nova Teutonia, 27°11'S 52°23'W, 28-XI-1964 (FSCA). (Specimen mounted on cork, gender symbol affixed to cork; locality label; FSCA repository label; holotype label.)

Paratypes: Twenty specimens. Brazil: Santa Catarina: Nova Teutonia, 300–500 m, 27°11'S 52°23'W, 17-XI-1960, Fritz Plaumann (WOPC, 3); *idem*, 21-X-1964, Fritz Plaumann (WOPC, 2); *idem*, 27-X-1964, Fritz Plaumann (WOPC, 3); *idem*, 29-X-1964, Fritz Plaumann (WOPC, 1); *idem*, 1-XI-1964, Fritz Plaumann (WOPC, 2); *idem*, 19-XI-1964, Fritz Plaumann (WOPC, 3); *idem*, 18-X-1965, Fritz Plaumann (WOPC, 1); *idem*, collection day not noted-X-1966, Fritz Plaumann (WOPC, 4); *idem*, collection day not noted-XI-1966, Fritz Plaumann (WOPC, 1).

Description. Size: Length 7.0 mm; width 2.4 mm.

Integument: Cranium dark brown, antenna yellow; pronotum dark brown; elytra bicolorous, humeral yellow inverted T absent, elytral basal half yellow, distal half black, narrow band of white decumbent setae at middle and loose aggregate of white setae in posterior fourth; legs yellow, profemora infuscated.

Head: Antennal funicle filiform (Fig. 44), combined length of pedicel and funicular antennomeres longer than combined length of antennomeres 9 & 10, antennomeres 9 & 10 broad triangular, antennal capitulum intermediate in size.

Thorax: anterior margin of protibia with 7 spines.

Abdomen: Aedeagus as in Fig. 64.

Variations: Length 5.4–8.8 mm; width 1.8–3.0 mm.

Natural history. Specimens were collected during October and November at altitudes ranging from 300 to 500 m.

Distribution (Fig. 122). This species is known from southern Brazil.

Etymology. The trivial name *ustus* is a Latin adjective derived from *usta* (= a kind of red color). I refer to the red coloration in the basal half of the elytra.

Differential diagnosis. Only in the members of this megaphloeine species is the basal half of the elytral disc entirely red.

variegatus group

This group is comprised of six species that may be distinguished from other members of this genus with variegated elytra by the proportionally longer antennal capitulum. Antennomeres 8 and 9 are together longer than the combined length of the funicular antennomeres. The combined distribution of this group extends from Nicaragua to Panamá.

Megaphloeus bulatus sp.nov.

Figs 30, 61, and 118

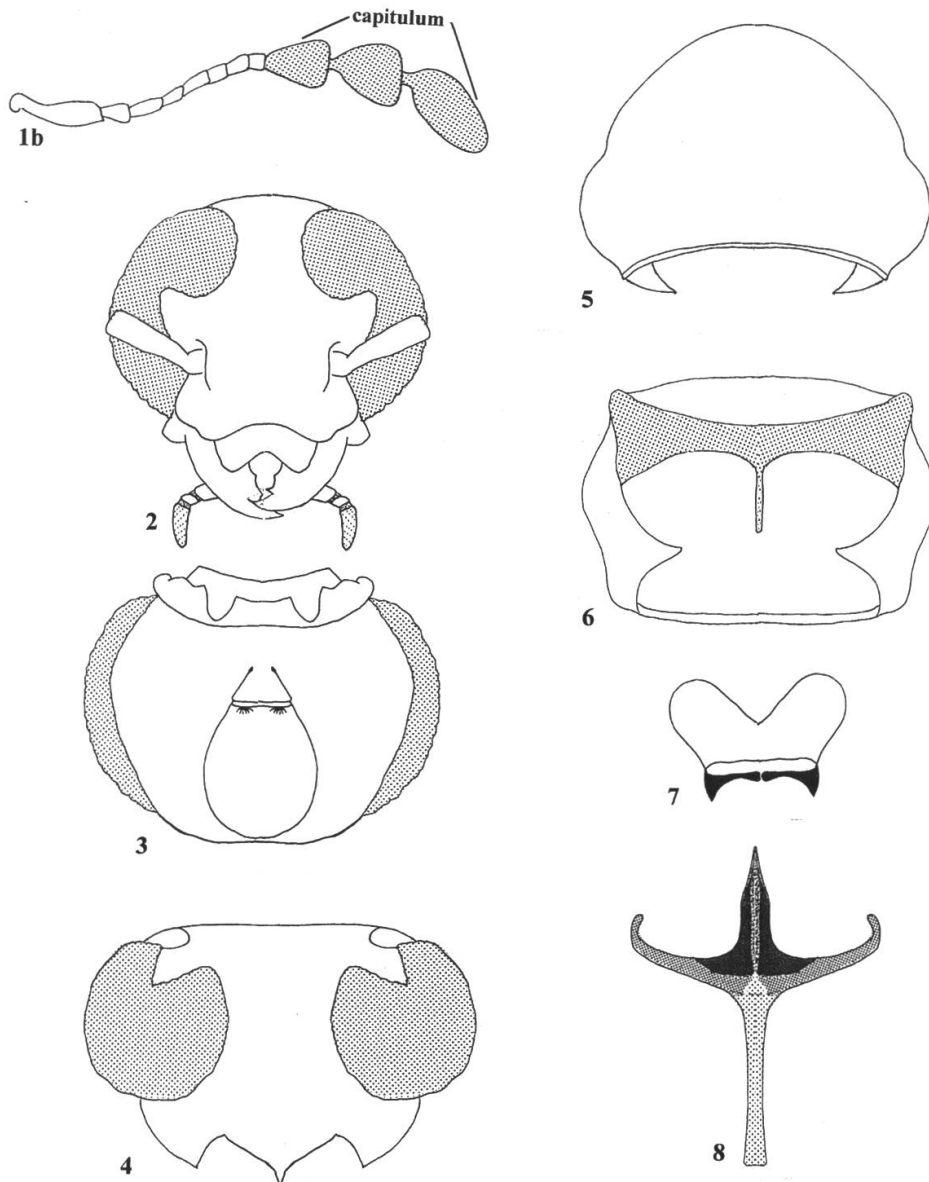
Type material. Holotype: Male. COSTA RICA, Prov. Puntarenas, Est. Agujas, 300 m, 18-24 SET 1996, A. Azofeifa, L_S_ 276750_526550, electronic label INBIO CR 1002 458079 (INBC). (Specimen point mounted, gender symbol affixed to paper point; support card; locality label; electronic label; INBC acronymic label; holotype label; plastic vial with abdomen and aedeagus.)

Paratypes. Twenty-one specimens. Nicaragua: Chontales: Specific location not noted, collection day not noted-collection month not noted-collection year not noted, T. Belt (BMNH, 2); *idem*, collection day not noted-collection month not noted-collection year not noted, Janson (BMNH, 1). Costa Rica: Heredia: La Selva, 3 km S Pto. Viejo, 10°26'N 84°01'W, at fallen branch of *Pentaclethra maculosa*, 5-IV-1984, H. A. Hespenheide (WOPC, 1); La Selva Biol. Sta., 3 km S Pto. Viejo, 10°26'N 84°01'W, on dead *Citrus*, 8-V-1990, H. A. Hespenheide (CHAH, 1); Est. Biol. La Selva, 50–150 m, 10°26'N 84°01'W, collection day not noted-III-1993, collector not noted (INBC, 1); Alajuela: 20 km S Upala, 13-XI-1990, F. D. Parker (WOPC, 1); *idem*, 20-I-12-II-1991, F. D. Parker (EMUS, 1); *idem*, 13-XII-1990-9-I-1991, F. D. Parker (EMUS, 1); Puntarenas: Península Osa, 23 km N of Puerto Jiménez, La Palma. 10 m, Malaise trap, collection day not noted-XI-XII-1992, P. Hanson (JNRC, 1); *idem*, 25-28-V-1974, E. Giesbert (WOPC, 1); Reserva Forestal Golfo Dulce, 3 km SW Rincon, 10 m, Malaise trap, 3-IV-1992, P. Hanson (JNRC, 1); Limón: Reventazon, 3-I-1932, on dry wood (WOPC, 1). Panamá: Colón: Barro Colorado Island, 2-VIII-1924, N. Banks (MCZC, 1); *idem*, 11-VII-1962, J. M. Campbell (WOPC, 1); *idem*, 09°10'N 79°50'W, 23-VI-1971, H. A. Hespenheide (WOPC, 1); *idem*, 17-VIII-1974, H. A. Hespenheide (WOPC, 1); Panamá: 4 km SW Gatun, 11-V-1964, H. P. Stockwell (STRI, 1); Fort Sherman, 09°17'N 79°59'W, 18-X-2001, on *Socratea exorrhiza*, F. Ødegaard (NINA, 1); Cerro Azul, 4 km bey. Goofy Lake, 700 m, 09°12'N 79°23'W, 24-VII-1970, H. A. Hespenheide (FMNH, 1); 8–13 km N El Llano, 20-V-1987, F. T. Hovore (WFBC, 1).

Description. Size: Length 6.0 mm; width 1.9 mm.

Integument: Cranium red-brown, antenna brown; pronotum red-brown; elytra bicolorous, mostly brown, humeral yellow inverted T broad and somewhat angular, humerus and elytral middle with yellow fascia; legs yellow-brown, femora and tibiae infuscated.

Head: Antennal funicle filiform (Fig. 30), combined length of pedicel and funicular antennomeres shorter than combined length of antennomeres 9 & 10, antennomeres 9 & 10 broad triangular, antennal capitulum large.



Figs 1b–8. *Megaphloeus setulosus*. 1b – Antenna. 2–4 – Head (2, frontal view; 3, ventral view; 4 dorsal view). 5, 6 – Pronotum (5, dorsal view; 6, ventral view). 7 – Labrum. 8 – Metendosternite.

Thorax: Pronotal arch and anterior part of pronotal proper transversally wrinkled, pronotal discal tubercles not particularly prominent; elytral apex very narrowly rounded; anterior margin of protibia with 5 spines.

Abdomen: Aedeagus as in Fig. 61.

Variations: Length 5.0–7.0 mm; width 1.5–2.0 mm.

Natural history. Specimens were collected during April and September.

Distribution (Fig. 118). This species is known from Costa Rica and Panamá.

Etymology. The trivial name *bulatus* is a compound name derived from the prefix *bu-* (= large) and the adjective *latus* (= wide). I refer to the large size of the antennal capitulum.

Differential diagnosis. Within the *variegatus* group only in members of *M. bulatus* are the cranium and the pronotum completely reddish-brown.

***Megaphloeus fucoaquilus* sp.nov.**

Figs 63, 98, and 119

Type material. Holotype: Male. Brazil, Rondonia, 62 km SE, Ariquemes, 13-25-1992, W. J. Hanson (FSCA). (Specimen point mounted, gender symbol affixed to paper point; support card; locality label; FSCA acronymic label; holotype label; plastic vial with abdomen and aedeagus.)

Paratypes: None

Description: Size: Length 6.0 mm; width 1.9 mm.

Integument: Cranium black, antenna black, except apex of terminal antennomere yellow; pronotum black; elytra bicolorous, mostly black, humeral inverted T not present, humerus with broad yellow marking that is confluent with yellow macula at elytral middle; legs mostly yellow, anterior fascies of profemora black, metafemora and metatibiae infuscated.

Head: Antennal funicle filiform (Fig. 98), combined length of pedicel and funicular antennomeres shorted than combined length of antennomeres 9 & 10, antennomeres 9 & 10 elongate triangular, antennal capitulum large.

Thorax: Pronotal arch transversally wrinkled, pronotal discal tubercles not particularly prominent; elytral apex moderately narrowly rounded; anterior margin of protibia with 6 spines.

Abdomen: Aedeagus as in Fig. 63.

Variations: One specimen examined.

Natural history. The holotype was collected in April.

Distribution (Fig. 119). Known only from central Brazil.

Derivation nominis. The trivial name *fucoaquilus* is a Latin compound name that stems from *fuco* (= rouge) and *quilis* (= blackish). I refer to the coloration of the elytral disc.

Differential diagnosis. Within the *variegatus* group only in members of *M. fucoaquilus* is the cranium and pronotum completely black.

***Megaphloeus megasensibilis* sp.nov.**

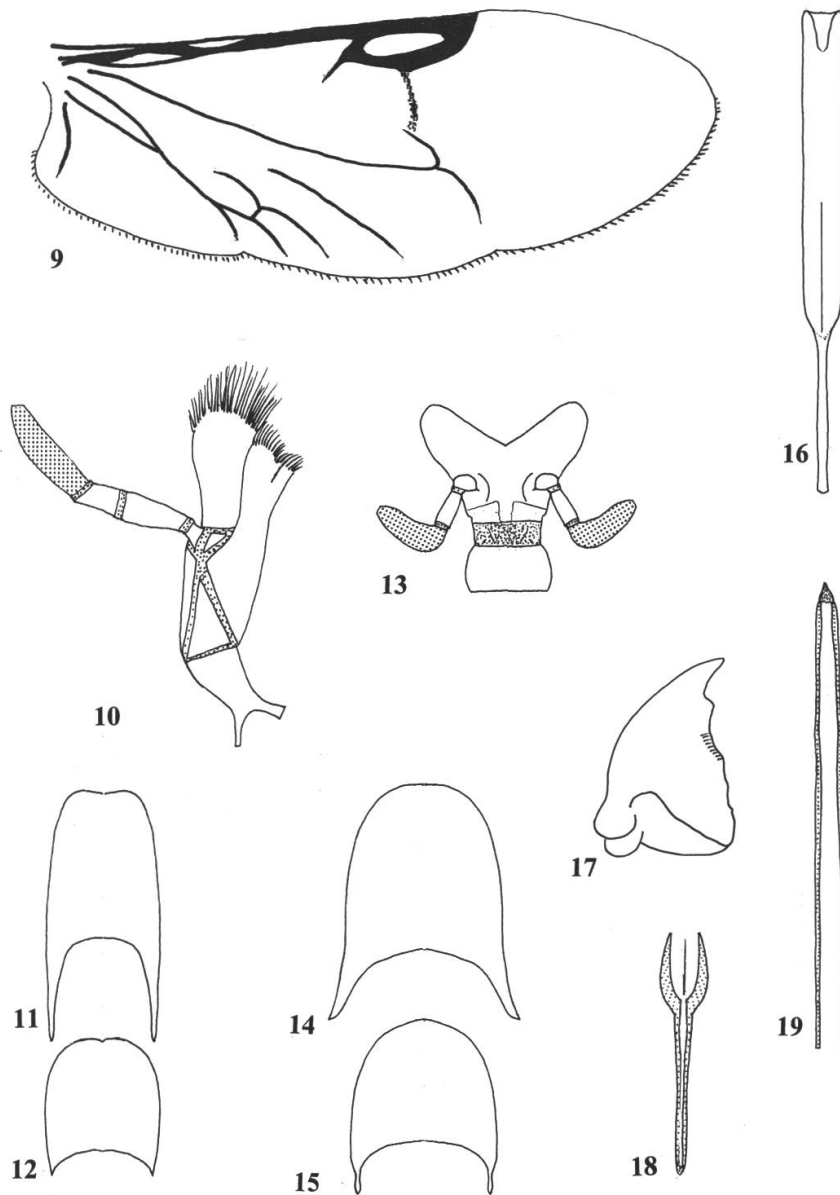
Figs 31 and 119

Type material. Holotype: Male. Brazil, Rondonia, 62 km SE Ariquemes, 1-14-IX-1997, B. Dozier (FSCA). (Specimen point mounted, gender symbol affixed to paper point; support card; locality label; FSCA acronymic label; holotype label; plastic vial with abdomen and aedeagus.)

Paratypes: Six specimens. Brazil: Mato Grosso: DÍAMANTINO, collection day not noted-XI-1981, E. Furtado (WOPC, 1); Rondônia: 62 km SE Ariquemes, 17-24-III-1989, 180 m, W. J. Hanson (EMUS, 1); *idem*, 1-14-XI-1997, B. Dozier (EMUS, 2; WOPC, 2).

Description. Size: Length 6.3 mm; width 2.2 mm.

Integument: Cranium red-brown; antennal scape, pedicel, and funicular antennomeres yellow-brown, capitulum black; pronotum red-brown, center of arch and pronotal proper slightly infuscated; elytra bicolorous, mostly black, humeral yellow inverted T poorly defined, humerus and elytral middle with yellow fascia; legs mostly yellow, anterior fascies of profemora and posterior margin of tibiae infuscated.



Figs 9–19. Various organs. 9–11, 13, 14, 16–19 – *Megaphloeus setulosus* (9, metathoracic wing; 10, maxilla; 11, pygidium, male; 13, Labium; 14, pygidium, female; 16, tegmen; 17, mandible; 18, spicular fork; 19, phallus). 12, 15 – *M. mucoreus* (12, sixth visible sternite, male; 15, sixth visible sternite, female).

Head: Antennal funicle filiform (Fig 31), combined length of pedicel and funicular antennomeres shorter than combined length of antennomeres 9 & 10, antennomeres 9 & 10 narrowly triangular, antennal capitulum large.

Thorax: Anterior margin of protibia with 3 spines.

Abdomen: Aedeagal information not available.

Variations: Length 6.0–6.5 mm; width 2.0–2.3 mm.

Natural history. Specimens were collected during November and March, one at 180 m.

Distribution (Fig. 119). This species is known from central Brazil.

Etymology. The specific epithet is a Latin compound name that stems from *sensibilis* (= capable of perceiving) and the adjective *mega* (= very). I refer to the extraordinarily large antennal capitulum.

Differential diagnosis. The subacute apex of the elytra will distinguish the members of this species within the *variegatus* group. Also, antennomeres 9 and 10 are more narrowly triangular than they are in other specimens of the *variegatus* group.

***Megaphloeus mucoreus* (Klug, 1842)**

Figs 12, 15, 58, 72, 74–78, 90, 93, 97, 123

Enoplium mucoreum Klug, 1842: 371. CORPORAAL 1950: 254. OPITZ 1997: 68.

Enoplium fasciatum Klug, 1842: 371. Brazil, Pará. (MNHN). **syn.nov.** The characteristics that form the basis of the nominal species fall within the range of variation of the species represented by the senior synonym name. CORPORAAL 1950: 254.

Epiphloeus balteatus Chevrolat, 1843: 36. Brasil (MNHN). **syn.nov.** The characteristics that form the basis of the nominal species fall within the range of variation of the species represented by the senior synonym name. CORPORAAL 1950: 253. EKIS 1975: 48.

Epiphloeus tomentosus Spinola 1844: 13. Cayenne, French Guiana (MIZT). **syn.nov.** The characteristics that form the basis of the nominal species fall within the range of variation of the species represented by the senior synonym name. CHEVROLAT 1876: 6. CORPORAAL 1950: 255.

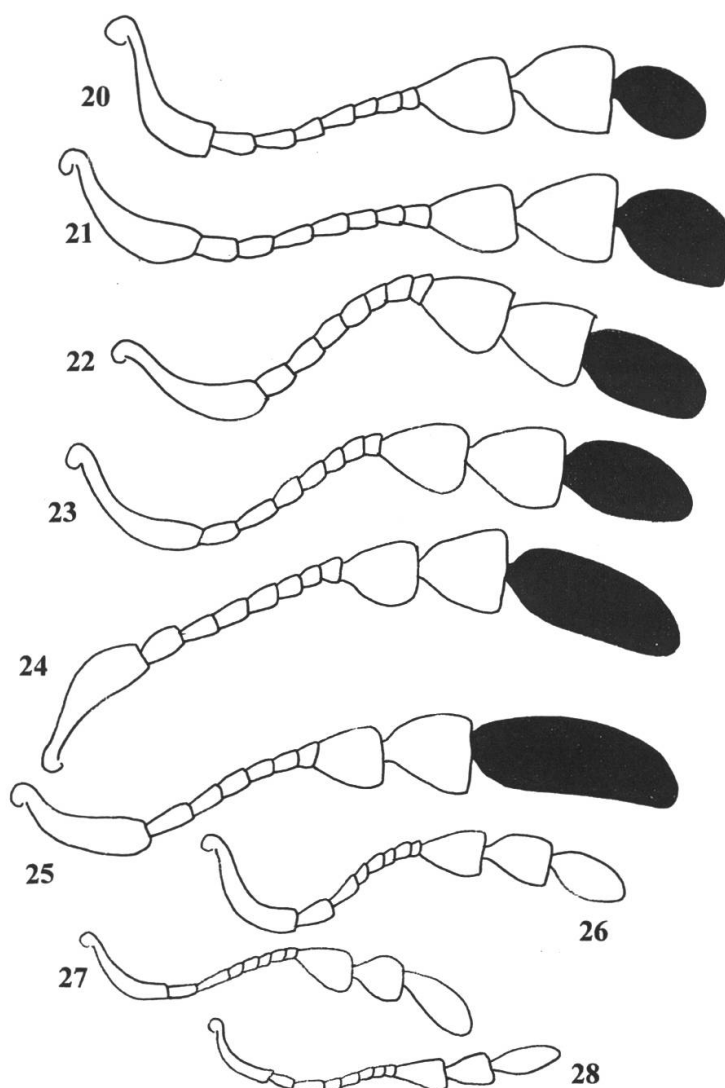
Epiphloeus chevrolati Gorham, 1877: 246. Amazon (BMNH). GAHAN 1910: 72. CORPORAAL 1950: 254.

Epiphloeus bakeri Wolcott, 1912: 74. Rio Madeira, Brazil (FMNH). **syn.nov.** The characteristics that form the basis of the nominal species fall within the range of variation of the species represented by the senior synonym name. CORPORAAL 1950: 253.

Type material. Lectotype: Female (here designated). Brasil (ZMHB). (Specimen pin mounted, gender symbol affixed to support card; identification-locality label; repository label; historical collection label; specimen number label-58853; lectotype label; ZMHB acronymic label; holotype label.)

Paralectotypes: One specimen. No locality data available.

Other material examined. In addition to the abovementioned types I examined 912 specimens from Colombia: Amazonas: Amacayacu Mocagua, 03°41'S 70°15'W, 150 m, 26-VI-6-VII-2000, Malaise trap, A. Parente; *idem*, 3°46'S 70°18'W, 150 m, 3-17-XII-2001, Malaise trap, D. Chota; *idem*, 03°41'S 70°15'W, 150 m, 26-VI-6-VII-2000, Malaise trap, A. Parente; *idem*, 11°20'N 07°42'W, 10 m, 18-31-X-2001, Malaise trap, R. Henriquez; Magdalena: Tayrona Neguanje, 11°20'N 74°02'W, 10 m, 18-31-X-2001, Malaise trap, R. Henriquez. Venezuela: Bolívar: Nuria, 500 m, 31-V-1975, B. Bechyne; Pedro de Cataniapo, 100 m, 30-VIII-1981, J. L. Garcia. Guyana: Potaro: Kartabo, 11-VII-1925, fallen trees, S. H. Williams; New River, 229 m, 27-II-10-III-1938, C. A. Hudson; *idem*, 229 m, 27-II-10-III-1938, C. A. Hudson; Region 8, Iwokrama Forest, Pakatau Hills, 04°44'54"N 59°01'36"W, 70 m, 27-V-2001, on bark, downed tree, R. Brooks, Z. Falin. Brazil: Mato Grosso do Sul: Três Lagoas International Paper Horto Barra do Moeda, 27-VII-1993, ethanol baited flight intercept trap in stand of *Eucalyptus grandis*, C. A. H. Flechtmann; Selviria UNESP farm, 3-VII-1993, ethanol baited flight intercept trap in riparian forest, A. L. T. Ottati; Três Lagoas International Paper Horto Santa Luzia, 30-VII-1992, black light, C. A. H. Flechtmann; Paraná: Foz Do Iguacu, 7-XII-1966, collector not noted; Telemaco Borba, 20-X-2006, Klabin Papel e celulose, sulcatol+ethanol baited multiple funnel flight intercept trap in stand of *Pinus taeda*, C. A. H. Flechtmann; Telemaco Borba, 24-XI-2006, klabin papel e celulose, sulcatol+ethanol baited multiple funnel flight intercept trap, C. A. H. Flechtmann; Espírito Santo: Conceição da Barra, 5-11-XI-1968, C. & C. T. Elias; *idem*, collection day not noted-X-1972, M. Alvarenga; Santa Catarina: Nova Teutonia, 27°11'S 52°23'W, collection day not noted-collection month not noted-1939, F. Plaumann; *idem*, collection day not noted-X-1971, M. F. Plaumann; *idem*, collection day not noted-IX-1972, F. Plaumann; *idem*, collection day not noted-X-1972, F. Plaumann; *idem*, 300-500 m, collection day not noted-X-1973, F. Plaumann; *idem*, 300-500 m, collection day not noted-XI-1973, F. Plaumann; *idem*, collection day not noted-VIII-1973, F. Plaumann; Nova Teutonia, 4-VI-1902, F. Plaumann; *idem*, 19-XI-1933, F. Plaumann; *idem*, 27°11'S 52°23'W, 1-IV-1935, F. Plaumann; *idem*, 27°11'S 52°23'W, 11-IX-1936, F. Plaumann; *idem*,



Figs 20–28. 20–25 – *Megaphloeus setulosus*, antennal variants (20, México; 21, Guatemala; 22, Nicaragua; 23, Panamá; 24, Bolivia; 25, Brazil). 26 – *M. rictocaliginus*. 27 – *M. ustafinis*. 28 – *M. sexplagiatus*.

collection day not noted-VII-1938, F. Plaumann; *idem*, collection day not noted-XI-1938, F. Plaumann; *idem*, collection day not noted-XII-1938, F. Plaumann; *idem*, 12-VIII-1939, F. Plaumann; *idem*, 14-VIII-1939, F. Plaumann; *idem*, 19-VIII-1939, F. Plaumann; *idem*, 2-XI-1938, F. Plaumann; *idem*, 7-XI-1938, F. Plaumann; *idem*, 12-XI-1938, F. Plaumann; *idem*, 12-VIII-1939, F. Plaumann; *idem*, 17-VII-1939, F. Plaumann; *idem*, 23-VII-1939, F. Plaumann; *idem*, 19-VIII-1939, F. Plaumann; *idem*, 23-VIII-1939, F. Plaumann; *idem*, 2-IX-1939, F. Plaumann; *idem*, 18-IX-1939, F. Plaumann; *idem*, 19-IX-1939, F. Plaumann; *idem*, collection day not noted-collection month not noted-1939; *idem*, 27°11'S, 52°23'W, 11-XI-1940, F. Plaumann; *idem*, collection day not noted-XII-1940, F. Plaumann; *idem*, 12-XI-1953, F. Plaumann; *idem*, collection day not noted-VII-1941; *idem*, collection day not noted-VIII-1944, F. Plaumann; *idem*, collection day not noted-X-1941, F. Plaumann; *idem*, 13-XI-1941, F. Plaumann; *idem*, collection day not noted-X-1944, F. Plaumann; *idem*, collection day not noted-X-1941, F. Plaumann; *idem*, 12-XI-1956, F. Plaumann; *idem*, 14-XI-1951, F. Plaumann; *idem*, 19-X-1952, F. Plaumann; *idem*, 12-XI-1952, F. Plaumann; *idem*, 31-XII-1952, F. Plaumann; *idem*, 16-XII-1953, F. Plaumann; *idem*, 22-X-1956, F. Plaumann; *idem*, 27°11'S 52°23'W, collection day not noted-XI-1959, F. Plaumann; *idem*, 3-X-1960, F. Plaumann; *idem*, 17-XI-1960, 300-500 m, F. Plaumann; *idem*, 22-X-1960, F. Plaumann; *idem*, 10-XI-1960, F. Plaumann; *idem*, collection day not noted-IX-1966, F. Plaumann; *idem*, 27°11'B 52°23'L, 300-500 m, collection day not noted-VIII-1965, F. Plaumann; *idem*, collection day not

noted-XI-1965, F. Plaumann; *idem*, 17-XI-1960, F. Plaumann; *idem*, 300–500 m, 27°11'S 52°23'W; *idem*, 300–500 m, 27°11'S 52°23'W, collection day not noted-X-1973, F. Plaumann; *idem*, collection day not noted-III-1973, F. Plaumann; *idem*, collection day not noted-VIII-1973, F. Plaumann; *idem*, collection day not noted-IX-1973, F. Plaumann; *idem*, collection day not noted-X-1973, F. Plaumann; *idem*, 300–500 m, collection day not noted-XI-1973, F. Plaumann; *idem*, collection day not noted-XI-1973, F. Plaumann; *idem*, collection day not noted-I-1974, F. Plaumann; *idem*, collection day not noted-X-1974; *idem*, 300–500 m, 27°11'B 52°23'L, collection day not noted-XI-1976, F. Plaumann; *idem*, Corupá, 60 m, collection day not noted-XII-1961, A. Maller; *idem*, collection day not noted-XII-1965, F. Plaumann; *idem*, 8-VII-1965, F. Plaumann: Rio Grande do Sul: Pôrto Alegre, 27-XI-1960, collector not noted; *idem*, collection day not noted, collector not noted; Vila Oliva, collection day not noted, collector not noted: Ceará: collection day not noted-month not noted-1905, Fry; Santos, Ilha Santo Amaro, 26-III-1912, G. E. Bryant; *idem*, 28-III-1912, G. E. Bryant; *idem*, 3-IV-1912, G. E. Bryant; *idem*, 5-IV-1912, G. E. Bryant; *idem*, 18-IV-1912, G. E. Bryant; *idem*, 26-IV-1912, G. E. Bryant; *idem*, collection day not noted-IV-1912, G. E. Bryant; Santarém, collection day not noted-VII-1919, S. M. Klages, *idem*, collection day not noted-I-collection year not noted, collector not noted; *idem*, collection day not noted-VII-1919, collector not noted, *idem*; collection day not noted-XII-collection year not noted, collector not noted; Itapiranga, collection day not noted-I-1934, collector not noted; *idem*, collection day not noted-II-1934; Santo Augusto, collection day not noted-XII-1970, O. Roppa: Goiás: Jataí, collection day not noted-VI-1972, F. M. Oliveira; *idem*, collection day not noted-XI-1972, F. M. Oliveira: Guanabara: Represario, collection day not noted-V-1972, M. Alvarenga, collection day not noted-II-1972, M. Alvarenga: São Paulo: Agudos Durafloa S. A., 16-XI-1993, from stand of *Pinus caribaea* v. *hondurensis*, C. A. H. Flechtmann; Lencóis Paulista, Duratex, S. A., 18-VIII-2006, sulcatol+ethanol baited multiple funnel flight intercept trap, C. A. H. Flechtmann; *idem*, 15-IX-2006, C. A. H. Flechtmann; Teodoro Sampaio, collection day not noted-XI-1985, Malaise trap, F. M. Oliveira; Teodoro Sampaio, collection day not noted-VII-1973, Malaise trap, F. M. Oliveira: Pará: Serra Norte, Est. Manganis, 7-VI-1988, Malaise trap, F. F. Ramos; *idem*, collection day not noted-VI-collection year not noted, collector not noted; *idem*, collection day not noted-VII-collection year not noted, collector not noted; Seararia, 24-27-VII-1985, Malaise trap, collector not noted; Jacareacanga, collection day not noted, XII-1968, M. Alvarenga; Concelção do Araguaia, 17-21-XI-1979, P. Mauricio; 70 km W. Monte Dourado, 24-26-XII-1980, Malaise trap, R. Krell: Rondon, 24°38'S 54°07'W, collection day not noted-VI-1952, F. Plaumann; *idem*, 24-VII-1952, F. Plaumann; *idem*, collection day not noted-VII-1952, F. Plaumann; *idem*, 28-VIII-1952, F. Plaumann; *idem*, 29-VIII-1952, F. Plaumann; *idem*, 30-VIII-1952, F. Plaumann; *idem*, 31-VIII-1952, F. Plaumann; *idem*, collection day not noted-VIII-1952, F. Plaumann; *idem*, 3-IX-1952, F. Plaumann; *idem*, 4-IX-1952, F. Plaumann; *idem*, 5-IX-1952, F. Plaumann; *idem*, 7-IX-1952, F. Plaumann; *idem*, 11-IX-1952, F. Plaumann; *idem*, 12-IX-1952, F. Plaumann; *idem*, 13-IX-1952, F. Plaumann; *idem*, 14-IX-1952, F. Plaumann; *idem*, 15-IX-1952, F. Plaumann; *idem*, 16-IX-1952, F. Plaumann; *idem*, 17-IX-1952, F. Plaumann; *idem*, 19-IX-1952, F. Plaumann; *idem*, 19-IX-1952, F. Plaumann; *idem*, 20-IX-1952, F. Plaumann; *idem*, 23-IX-1952, F. Plaumann; *idem*, 26-IX-1952, F. Plaumann; *idem*, 8-IX-1952, F. Plaumann; *idem*, 30-IX-1952, F. Plaumann; *idem*, 20-XI-1952, F. Plaumann *idem*, 25-IX-1952, F. Plaumann; *idem*, 26-IX-1952, F. Plaumann; *idem*, 28-IX-1952, F. Plaumann; *idem*, 2-X-1952, F. Plaumann; *idem*, 3-X-1952, F. Plaumann; *idem*, 4-X-1952, F. Plaumann; *idem*, 5-X-1952, F. Plaumann; *idem*, 6-X-1952, F. Plaumann; *idem*, 7-X-1952, F. Plaumann; *idem*, 8-X-1952, F. Plaumann; *idem*, 9-X-1952, F. Plaumann; *idem*, 10-X-1952, F. Plaumann; *idem*, 11-X-1952, F. Plaumann; *idem*, 12-X-1952, F. Plaumann, *idem*, 13-X-1952, F. Plaumann; *idem*, 14-X-1952, F. Plaumann; *idem*, 18-X-1952, F. Plaumann; *idem*, 20-X-1952, F. Plaumann; *idem*, 21-X-1952, F. Plaumann; *idem*, 22-X-1952, F. Plaumann; *idem*, 23-X-1952, F. Plaumann; *idem*, 24-X-1952, F. Plaumann; *idem*, 25-X-1952, F. Plaumann; *idem*, 29-X-1952, F. Plaumann; *idem*, 25-X-1952, F. Plaumann; *idem*, 26-X-1952, F. Plaumann; *idem*, 27-X-1952, F. Plaumann; *idem*, 28-X-1952, F. Plaumann; *idem*, 29-X-1952, F. Plaumann; *idem*, 20-X-1952, F. Plaumann; Paraná, 24°38'S 54°07'W, 6-I-1953, F. Plaumann; *idem*, 24-X-1952, F. Plaumann; *idem*, 500 m, 3-XI-1952, F. Plaumann; *idem*, 500 m, 5-XI-1952, F. Plaumann; *idem*, 500 m, 7-XI-1952, F. Plaumann; *idem*, 10-XI-1952, F. Plaumann; *idem*, 13-XI-1952, F. Plaumann; *idem*, 14-XI-1952, F. Plaumann; *idem*, 18-XI-1952, F. Plaumann; *idem*, 19-XI-1952, F. Plaumann; *idem*, 6-XII-1952, F. Plaumann; *idem*, 8-XII-1952, F. Plaumann; *idem*, 13-XII-1952, F. Plaumann; *idem*, 19-XII-1952, F. Plaumann; *idem*, 26-XII-1952, F. Plaumann; *idem*, 15-I-1953, F. Plaumann; collection day not noted-VII-collection year not noted, Wolcott; Marabá, 24-X-1974, Malaise trap, J. F. Reinert; Balém, Apeg Forest, 29-VII-6-VIII-1974, flight trap, D. G. Young; *idem*, Balém, Mocambo forest, 2-VII-1981, G. B. Fairchild; Serra Norte, Est. Manganis, 2-5-IX-1983, Malaise trap, F. F. Ramos; *idem*, 16-VI-1983, W. Franca; *idem*, 8-VI-1983, Malaise trap, W. Franca; *idem*, 2-5-IX-1983, Malaise trap, R. B. Neto; *idem*, 7-VI-1983, W. Franca; *idem*, 12-VI-1983, Malaise trap, R. B. Neto; *idem*, 8-VI-1983, W. Franca; *idem*, 16-VI-1983, W. Franca; *idem*, 18-IV-1983,

Márcio Zanuto; *idem*, 10-VI-1983, Malaise trap, F. F. Ramos; *idem*, 28-II-1984, collector not noted; *idem*, 10-IX-1985, Caldera; *idem*, Rio Salobo, 16-V-1984, collector not noted, *idem*, 26-VI-1984, T. Pimentel; *idem*, 28-II-1984, Suspensa; Tucurul, Rio Tocantins, Rio Arapari, 30-III-1984, Suspensa; *idem*, 31-III-4-IV-1984, Suspensa; *idem*, 5-7-VI-1984, Saúde; *idem*, 17-I-1985, Canga; *idem*, 28-31-X-1985, Floresta; *idem*, 9-12-IX-1985, Malaise trap, J. Dias; Ourém, 20-VIII-1992, Patauateua: Mato Grosso: Sinop, Coordenadas, 35 m, collection day not noted-XI-1974, M. Alvarenga; *idem*, collection day not noted-X-1974, M. Alvarenga; *idem*, 350 m, collection day not noted-XI-1974, M. Alvarenga; *idem*, collection day not noted-X-1975, M. Alvarenga; Diamantino, Fazenda Sao Joao, 22-II-1981, E. Furtado; *idem*, collection day not noted-XI-1981, E. Furtado; *idem*, I-V-1981, E. Furtado; *idem*, collection day not noted-XII-1981, E. Furtado; *idem*, Rio Arinos, 7-II-1982, E. Furtado; *idem*, Diamantino, Fazenda, Rio Arinos, collection day not noted-VIII-1983, E. Furtado; Rio Caraguata, 21°48'S 52°27'W, 400 m, 4-IV-1953, F. Plaumann; *idem*, collection day not noted-IV-1953, F. Plaumann; *idem*, collection day not noted-V-1953, F. Plaumann; *idem*, 14-X-1953, F. Plaumann; *idem*, 15-X-1953, F. Plaumann; *idem*, 16-X-1953, F. Plaumann; *idem*, 17-X-1953, F. Plaumann; *idem*, 20-X-1953, F. Plaumann; *idem*, 22-X-1953, F. Plaumann; *idem*, 27-X-1953, F. Plaumann; *idem*, 21°48'S 52°27'W, 3-XI-1953, 400 m, F. Plaumann; *idem*, collection day not noted-XI-1953, 21°48'S 52°27'W, 400 m, F. Plaumann; *idem*, 26-XII-1953, F. Plaumann; *idem*, collection day not noted-XII-1953, 21°48'S 52°27'W, 400 m, F. Plaumann: Bahia: Bahía, collection day not noted-XI-1969, F. M. Oliver; Cachimbo, collection day not noted-collection month not noted-1890, R. Oberthur: Amazonas: Reserva Ducke, 26 km, 22-VIII-1978, Malaise trap, collector not noted; *idem*, Estirao do Equador Rio Javari, collection day not noted-X-1979, M. Alvarenga; Manaus, 1 km W Taruma Falls, 19-I-1981, G. Ekis: Alagôas: Sao Miguel dos Campos, collection day not noted-IV-1984, F. M. Oliveira: Rondônia: 62 km SE Ariquemes, 17-24-III-1989, 180 m, W. J. Hanson; *idem*, 62 km SE Ariquemes, 13-25-IV-1992, W. J. Hanson; *idem*, 20-III-10-IV-1992, J. E. Eger; *idem*, 62 km SE Ariquemes, 8-20-XI-1994, W. J. Hanson; *idem*, 62 km SE Ariquemes, 7-16-XI-1995, W. J. Hanson; *idem*, 62 km SE Ariquemes, 5-16-XI-1996, W. J. Hanson; *idem*, 62 km SE Ariquemes, 1-14-XI-1997, B. Dozier; *idem*, 62 km SW Ariquemes, Rancho Grande, 20-31-X-1997, B. K. Dozier; *idem*, 62 km SE Ariquemes, 22-31-X-1997, W. J. Hanson; *idem*, 62 km SW Ariquemes, 1-17-XI-1997, B. K. Dozier: Acre: Rio Branco, 25-X-8-XI-1991, F. Ramos, A. Henriques; *idem*, 15-VI-2-VII-1992, Humalta. Ecuador: Santiago Morona: Macas, 50 km SE Miazal, 4-7-I-1993, 300 m, M. & J. Wasbauer: Napo: 21 km E Atahualpa, Aliñahui Lodge, 5-6-X-1997, F. Hovore. Peru: San Martín: Tarapoto, Mará Aoút, collection day not noted-collection month not noted-1886, M. de Mathan; *idem*, 22-XI-1936, F. Woytkowski; *idem*, 22-IV-1939, F. Woytkowski: Madre de Dios: Man, Estac. Pakitza, 21-25-VI-1993, Malaise, R. Cambra: Huanuco: vic. Tingo María, 1-5-VI-1999, W. Hanson, S. Keller; *idem*, collection day not noted-collection month not noted-1948; *idem*, collection day not noted-collection month not noted-1909, Marshall Collection. Paraguay: San Pedro: Carumbé, collection day not noted-I-1971, R. Golbach: Itapua: San Pedro Mi, San Rafael Reserve, 26°32'4"S 55°48'18"W, 90 m, 27-XI-2000, Z. H. Falin; San Bernadino, collection date not noted, Fiebrig. Argentina: Misiones: Santa María, collection day not noted-X-1944, M. J. Viana; *idem*, collection day not noted-X-1945, M. J. Viana; *idem*, collection day not noted-X-1947, M. J. Viana; *idem*, Iguazú, collection day not noted-collection month-1987, R. Foerster; Loreto, collection day not noted-I-2001, Malaise trap, subtropical wet forest, P. Fidalgo: Entre Ríos: Collection day not noted-I-1990, Liebig; Pto. Canoas, 200 m, 8-XII-6-I-1991, Hill forest, Malaise trap, S. & J. Peck. Specimens are deposited in AMNH, BMNH, CASC, CDAE, CHAH, CMNC, CMNH, EBCC, EMUS, FEIS, FMNH, FSCA, JNRC, KSUC, MCNZ, MEMU, MNHN, MLPA, MZSP, RDCC, UCDC, UKIC, USNM, WFBC, WFBM, and WOPC.

Description. Size: Length 7.8 mm; width 2.5 mm.

Integument: Cranium reddish-brown, antennal scape yellow, remainder of antenna brown; pronotum reddish-brown; elytra bicolorous, mostly dark brown, humeral yellow inverted T not present, with yellow macula behind humerus and at elytral middle; legs mostly yellow-brown, profemur and metafemur infuscated.

Head: Antennal funicle filiform (Fig. 99), combined length of pedicel and funicular antennomeres shorter than combined length of antennomeres 9 and 10, antennomeres 9 and 10 broad triangular, antennal capitulum intermediate in size.

Thorax: Pronotal arch transversally wrinkled, pronotal discal tubercles not particularly prominent; elytral apex moderately narrowly rounded; anterior margin of protibia with 6 spines.

Abdomen: Aedeagus as in Fig. 58.

Male Mesodermal Internal Reproductive Organs (Fig. 85): Medial accessory gland shorter than lateral gland; testes comprised of 12 follicles.

Female Mesodermal Internal Reproductive Organs (Fig. 93): Spermatheca not capsular; spermathecal gland attached to subapex of spermathecal.

Variation: Length 4.8–8.0 mm; width 1.2–2.5 mm. There is considerable variation in the configuration of light and dark markings on the elytral disc.

Natural history. Bates observed specimens on the trunks of felled trees with small beetles in their mouth (Gorham, 1877: 246). The available specimens were collected throughout the year. They were collected more abundantly in June and July in the northern latitudes and during October and November in the southern latitudes. With regards to altitude, these beetles were captured from 152 to 1300 m.

Carlos A. H. Flechtmann (FEIS) gathered specimens of this and other checkered beetle species with a flight intercept trap laced with sulcatol + ethanol, amidst stands of the loblolly pine (*Pinus taeda* Linnaeus), the rose gum eucalyptus (*Eucalyptus grandis*, W. Hill ex. Maid), and the pine *Pinus caribaea* Morelet *v. hondurensis*.

Distribution (Fig. 123): The composite range for this species extends from Colombia to Argentina.

Differential diagnosis. In *M. mucoreus* specimens there is a triangular patch of white setae at the middle of the elytral disc. This is not the case in other members of the *variegatus* group.

Megaphloeus terzonatus (Gorham, 1877) Figs 40, 68, 101, and 124

Epiphloeus terzonatus Gorham, 1877: 247. CORPORAAL 1950: 254.

Type material. Lectotype. Male (here designated). Amazon, Ega, Bates. (BMNH). (Specimen point mounted, gender symbol affixed to paper point; support card; round blue type label, locality label; orange round label; Gorham type label; Gorham identification label; BMNH acronymic label; lectotype label; plastic vial with abdomen and aedeagus.)

Paralectotypes: Three specimens. Brazil: Amazonas: Ega (= Tefé), Bates (BMNH); *idem*. Amazon, Bates (ZMAN, 1).

Other material examined. I examined 31 specimens from Ecuador: Esmeraldas: Bilsa Biological Station, 500 m, 00°20'24"N 79°42'36"W, 10-V-4-VI-1996, Malaise trap, P. Hibbs: Pichincha: Rio Palenque Science Center, 200 m, 00°36'00"S 79°21'00"W, 25-V-6-VII-1996, Malaise trap, P. Hibbs. Junín: Jauja, 840 m, Sani Beni, 8 km E Santiapo, 19-22-XI-1935, Felix Woytkowski: Madre de Dios: Iberia, 30-IV-1937, 152 m, Frank Johnson; Tambopata, 15 km NE Puerto Maldonado Reserva, Cuzco Amazónico, 12°33'S 69°03'W, 200 m, 17-VII-1989, camp, J. S. Ashe. Bolivia: Cochabamba: Chaparé, 400 m, 8-III-1948, Zischa. Brazil: Mato Grosso: Sinop, Coordenadas, collection day not noted-X-1924, 219 km, M. Alvarenga; *idem*, collection day not noted-X-1974, 219 km, M. Alvarenga; *idem*, collection day not noted-X-1974, M. Alvarenga; *idem*, collection date not noted, collector not noted; Humboldt, El. 200 m, 10°25'S 59°28'W, 20-III-1977, Stockwell: Chapare: Bolivia tropica, 15-X-1949, 250 km, R Zischka: Pará: Santarém, collection day not noted-collection month not noted-1931; Tucuruí, collection day not noted-I-1979, M. Alvarenga; Diamantino, collection day not noted-XI-1981, E. Furtado: Rodônia: 62 km SE Ariquemes, 17-24-III-1989, 180 m, W. J. Hanson; *idem*, 62 km SE Ariquemes, 7-18-XI-1995, W. J. Hanson; *idem*, 62 km SE Ariquemes, 5-16-XI-1996, W. J. Hanson; *idem*, 62 km SE Ariquemes, 1-14-XI-1997, B. Dozier: Amazonas: São Paulo de Olevença, collection date not noted, collector not noted. Specimens are deposited in AMNH, CMNH, EMUS, FSCA, FMNH, MNHN, and WOPC.

Description. Size: Length 6.6 mm; width 2.2 mm.

Integument: Cranium yellow-brown, antennal scape yellow, remainder of antenna brown; pronotum mostly yellow-brown, with central brown macula; elytra bicolorous, humeral yellow inverted T broad and poorly defined, humerus and elytral middle with yellow fascia; legs, anterior fascies of profemora and mesofemora infuscated remainder of legs yellow.

Head: antennal funicle filiform (Fig. 40), combined length of pedicel and funicular antennomeres shorter than combined length of antennomeres 9 and 10, antennomeres 9 and 10 narrow triangular, antennal capitulum large.

Thorax: Anterior margin of protibia with 3 spines.

Abdomen: Aedeagus as in Fig. 68.

Variation: Length 5.8–7.5 mm; width 1.8–2.3 mm. The pronotal discal infuscation varies in expression.

Natural history. Specimens were collected throughout the year, from altitudes ranging from 180–850 m; some in a Malaise trap.

Distribution (Fig. 124). This species is known from Ecuador to central Brazil.

Differential diagnosis. Within the *variegatus* group *M. terzonatus* specimens may be distinguished from the superficially similar *M. fucoaquilus* specimens by the more rounded elytral apex. In both of these species, specimens have an incomplete inverted T near the humeral angle.

Megaphloeus variegatus (Klug, 1842)

Figs 33, 69, 82, 95, and 124

Enoplium variegatum Klug, 1842: 371. Pará, Brasilien, Sieber. DESMAREST 1852: Fig. on table 2, Fig. 2. SCHENKLING 1900: 399. CORPORAAL 1950: 255.

Epiphloeus ornatus Spinola, 1844: 12. Holotype. Male. Cayenne, French Guiana, **syn.nov.** (MIZT). The characteristics used to make available this nominal species falls within the range of variation of the Klug's species. CORPORAAL 1950: 254. EKIS 1975: 49.

Epiphloeus buquetii Spinola, 1844: 10. Holotype. Male. Cayenne, French Guiana (MIZT). **syn.nov.** The characteristics that form the basis of the nominal species fall within the range of variation of the species represented by the senior synonym name. CORPORAAL 1950: 253. EKIS 1975: 48.

Phyllobaenus manni Wolcott, 1912: 73. Rio Madeira, Brazil. (FMNH). **syn.nov.** The characteristics used to make available this nominal species falls within the range of variation of the senior synonym. CHAPIN 1927: 7. CORPORAAL 1950: 252.

Type material. Lectotype. Male (here designated). (ZMHB). (Specimen point mounted, gender symbol affixed to paper point; support card; type label; specimen number label, 58856; ZMHB historical collection label; ZMHB acronymic label; locality-identification label; lectotype label; identification label; plastic vial with abdomen and aedeagus.)

Paralectotypes: Description based on one specimen

Other material examined. I examined 118 specimens from Colombia: Amazonas: Leticia, 28-V-1974, insect flight trap, R. C. Wilkerson; Amacayacu Mocagua, 03°41'S 70°15'W, 150 m, 3-9-IV-2000, Malaise, A. Parente; *idem*, 6-12-VI-2000, Malaise trap, A. Parente; *idem*, 12-19-VI-2000, Malaise trap, A. Parente: Nariño: La Planda Parcela Olga, 01°15'N 78°15'W, 1850 m, 16-VI-2-VII-2001, Malaise trap, G. Oliva: Putumayo: La Paya, Rio Caucaya, 00°07'S 74°55'W, 320 m, 19-IX-1-X-2001, Malaise trap, R. Cobete; *idem*, Cabaña, 330 m, 00°02'S 75°12'W, 20-XI-5-XII-2001, Malaise trap, E. Lozano; *idem*, 5-25-XII-2001, Malaise trap, E. Lozano; La Paya Chagra, 00°07'S 74°55'W, 320 m, 26-II-1-III-2002, Malaise trap, R. Cobete: Meta: Sierra de La Macarena, Cabaña Cerrillo, 03°21'N 73°56'W, 460 m, 10-XI-21-XII-2002, Malaise trap, A. Herrera & W. Villalba; *idem*; 4-17-I-2003, Malaise trap, A. Herrera & W. Villalba; Sierra de La Macarena, Caño Curía Parcela, 03°21'N 73°56'W, 460 m, 9-24-II-2003, Malaise trap, W. Villalba; *idem*, 24-II-10-III-2003, Malaise trap, W. Villalba. Venezuela: Bolivar: Jabillal Rio Caura, 140 m, 25-XI-1978, collector not noted: Delta

Amacura: 11 km W Piacoa, 14-31-VII-1987, seasonal humid forest on sand, Malaise trap, S. & J. Peck. Guyana: Demerara: Ituribisi, collection day not noted-X-1948-collection day not noted-III-1949, D. J. Atkinson; Region 8, Iwokrama Forest, Pakatau hills, 04°44'54"N 59°01'36"W, 70 m, 27-V-2001, on bark, downed tree, R. Brooks & Z. Falin. Ecuador: Orellana: Reserva Étnica Waorami, 1 km S Onkone Gare Camp, 3910S 76 26W, 8-II-1995, 220m, fogging leaves of plants in terre firme, T.L. Erwin; *idem*, 3-VII-1995, 220m, fogging leaves of plants in terre firme, T.L. Erwin (USNM, 1). Napo: Yasuni Res. Sta., 00°40'566"S 76°23'851"W, 30-IX-11-X-2002, 250 m, C. Brammer; 18 km S Tena, 28-IV-1978, L. & C. W. O'Brien & Marshall; *idem*, 19-30-X-1998, 250 m, W. J. Hanson; *idem*, 30-IX-11-X-2002, 250 m, C. Brammer; Sucumbios, Sacha Lodge, 0.5°S 76.5°W, 270 m, 20-30-IX-1994, Malaise trap, Hibbs; *idem*, 12-2-II-1994, Malaise, Hibbs; vic. Misahualli, 01°02'S 77°40'W, 27-31-X-2002, E. M. Fisher. Peru: Lareto: Iquitos, Rio Nanay, 4-6-II-1984, L. Huggert; Huambo, collection day not noted-collection month not noted-1889, collector not noted; Huanuco: Tingo María, 11-20-X-1937, F. Woytkowski; *idem*, 25-VI-5-VII-1937, F. Woytkowski; Leonpampa, collection day not noted-XII-1938, F. Woytkowski; San Martin: Hera, 15 km SE Moyabamba, 860 m, 23-VI-1947, collector not noted; *idem*, 4-VI-1947, 860 m, F. Woytkowski; Satipo: 15-IX-1941, P. Papraycki. Bolivia: Chapare: 400 m, 1-X-1950, R. Zischka; Beni: Rio Itenez opposite Costa Marques, 1-3-IX-1964, Bouseman & Lussenhop; Tumupasa, collection day not noted-XII-collection year not noted, W. M. Mann. Brazil: Amazonas: Obydos, collection date not noted-collection month not noted-1878, collector not noted; Tefé (= Ega), collection day not noted-collection month not noted-1878, collector not noted; *idem*, 7-XI-1964, F. M. Oliveira; Manaus, 1 km W Taruma Falls, 19-I-1981, G. Ekis; Mato Grosso: collection day not noted-X-1974, M. Alvarenga; Sinop, collection day not noted-X-1975, M. Alvarenga; *idem*, collection day not noted-X-1976, M. Alvarenga; Pará: Altamira, collection day not noted-XI-1974, John F. Reinert; Serra Norte, collection day not noted-IX-1985, Manganés; *idem*, collection day not noted-X-1985, Caldeirão; Benevidas, 4-6-VII-1988, Morelan; *idem*, collection date not noted, collector not noted; Santarem, collection date not noted, collector not noted; Rondônia: Pôrto Velho, 27-IX-1979, Torge Arias; Ouro Preto do Oeste, 25-28-VIII-1986, collector not noted; 7 km NW Costa Marquez; 16-XI-1986, Malaise trap, R. Wilkerson; 62 km SE Ariquemes, 17-24-III-1989, W. J. Hanson; *idem*, 13-25-IV-1992, W. J. Hanson; *idem*, 8-20-XI-1994, W. J. Hanson; *idem*, 7-18-1995, W. J. Hanson; *idem*, 5-16-XI-1996, W. J. Hanson; *idem*, 1-14-XI-1997, B. Dozier; *idem*, 1-17-XI-1997, B. K. Dozier; Maranhão: Açailândia, 23-IX-1986, P. Maranas; vic. Caucalandia, 160-350 m, 10°32'S 62°48'W, 28-X-1991, John R. MacDonald. Specimens are deposited in AMNH, BMNH, CASC, CMNC, CMNH, EMUS, FMNH, FSCA, IAVH, IMLA, JNRC, LACM, MCZC, MEMU, NHMB, MIZA, MNHN, OXUM, TAMU, USNM, WFBC, WOPC, and ZMAN.

Description. Size: Length 6.8 mm; width 2.3 mm.

Integument: Cranium reddish-brown, antennal scape yellow, remainder of antenna brown; pronotum reddish-brown; elytra bicolorous, humeral yellow inverted T not present, disc with admixture of yellow and dark markings; legs mostly yellow, profemur and tibiae infuscated, tarsi yellow.

Head: Antennal funicle filiform (Fig 33), combined length of pedicel and funicular antennomeres shorter than combined length of antennomeres 9 and 10, antennomeres 9 and 10 broad triangular, antennal capitulum large; anterior margin of protibia with 4 spines; elytral apex broadly rounded. **Abdomen:** Aedeagus as in Fig. 69.

Male Mesodermal Internal Reproductive Organs (Fig. 82): Medial accessory gland about as long as lateral gland; testes comprised of 12 follicles.

Female Mesodermal Internal Reproductive Organs (Fig. 95): Spermatheca not capsular; spermathecal gland attached to base of spermathecal capsule.

Variation: Length 5.3–8.0 mm; width 2.0–3.0 mm.

Natural history. Specimens were collected from South America throughout the year, at 70 to 1850 m, and with an insect flight trap, Malaise trap, and on bark of a felled tree.

Distribution (Fig. 124): This species is known from Colombia to central Brazil.

Differential diagnosis. Only in the members of this species, within the *variegatus* group, is the elytron explanate at the middle.

***tigrinus* group**

Eleven species form this group. The members may be identified by comparing the greater length of the combined length of the pedicel and funicular antennomere and the shorter combined length of antennomeres 8 and 9. This group extends from México to Brazil.

***Megaphloeus absentis* sp.nov.**

Figs 62, 81, 103, and 116

Type material. Holotype. Female. 15 mi. East Teziutlan, Pueb. MEX. VIII 5–6, 60, H.F. Howden (CMNC). (Specimen point mounted, gender symbol affixed to paper point; support card; locality label; CMNC acronymic label; holotype label; plastic vial with ovipositor and abdomen.)

Paratypes: Three specimens. México: Veracruz: Est. Biol. Los Tuxtlas, 1-9-VII-1988, J. A. Chemsak (EMEC, 1); Los Tuxtlas, vicinity Balzapote, 27-IV-6-V-1989, E. Giesbert (FSCA, 1); 14-16 km. S'ntcompn, 4-6-V-1994, J. E. Wappes (JEW, 1).

Description. Size: Length 5.0 mm; width 1.4 mm.

Integument: Cranium red-brown; antenna, scape yellow, remainder brown except basal antennomere of capitulum mostly yellow; pronotum black; mesoscutellum brown; elytra bicolorous, mostly brown, humeral region with distinct well defined yellow inverted T, humerus and elytral middle with yellow macula; legs mostly yellow, femora and tibiae infuscated.

Head: Antennal funicle filiform (Fig. 81); combined length of pedicel and funicular antennomeres longer than combined length of antennomeres 9 and 10; antennomeres 9 and 10 short triangular, antennal capitulum small.

Thorax: Pronotal arch transversally wrinkled; pronotal discal tubercles not prominent; elytral apex moderately narrowly rounded; anterior margin of protibia with 5 spines.

Abdomen: Aedeagus as in Fig. 62.

Variation: Length 5.0–5.8 mm; width 1.4–1.8 mm. There is considerable variation in the extent of infuscation of the legs.

Natural history. Specimens were collected during April, July, and August.

Distribution (Fig. 116): This species is known from Southeastern México.

Etymology. The specific epithet *absentis* (= away from) is a Latin adjectival. I refer to the absence of pale maculae from the distal regions of the elytra.

Differential diagnosis. There are four species in the *tigrinus* group whose specimens show antennomere 9 yellow: *M. absentis*, *M. cartus*, *M. marginipes*, and *M. setulosus*. *Megaphloeus absentis* specimens may be distinguished from those of the other aforementioned species by the slight infuscation of antennomere 9.

***Megaphloeus cartus* sp.nov.**

Figs 37, 49, and 118

Type material. Holotype: male. BELIZE, Orange Walk, Rio Bravo Cons. Area, La Milpa, VII-18-1996, C.W. & L.B. O'Brien (FSCA). (Specimen point mounted, gender symbol affixed to paper point; support card; locality label; FSCA acronymic label; holotype label; plastic vial with abdomen and aedeagus.)

Paratypes: None.

Description. Size: Length 4.3 mm; width 1.5 mm.

Integument: Cranium reddish-brown, antenna scape, pedicel, and basal antennomere of antennal capitulum yellow, remainder of antenna brown; pronotum brown; elytra bicolorous, mostly dark brown, humeral yellow T distinct, humeral and elytral middle with yellow fascia; legs, femora mostly yellow, anterior femoral fascies progressively less infuscated from profemur to metafemur, tibiae and tarsus yellow.

Head: Antennal funicle filiform (Fig. 37), combined length of pedicel and funicular antennomeres longer than combined length of antennomeres 9 and 10, antennomeres 9 and 10 short triangular, antennal capitulum intermediate in size.

Thorax: Pronotal arch transversally wrinkled, pronotal discal tubercles not particularly prominent; elytral apex moderately narrowly rounded; anterior margin of protibia with 3 spines.

Abdomen: Aedeagus as in Fig. 49.

Variation: One specimen examined.

Natural history. The holotype was collected during July.

Distribution (Fig. 118). This species is known only from Belize.

Etymology. The specific epithet *cartus* stems from the Greek *Kartos* (= shortened). I refer to the shortened phallobasic apodeme.

Differential diagnosis. The members of this species may be distinguished from other members of the *tigrinus* group by its small size (4.3 mm). The 8th antennomere in specimens of this species is entirely yellow, which is not the case in the other small members of the *tigrinus* group.

Megaphloeus longius sp.nov.

Figs 36, 56, 100, and 118

Type material. Holotype: Male. Honduras: Olancho. P. N., La Muralla, 31-V-1995, R. Turnbow (FSCA). (Specimen point mounted, gender symbol affixed to paper point; support card; locality label; FSCA acronymic label; holotype label; plastic vial with abdomen and aedeagus.)

Paratypes: Five specimens. Honduras: Cortés: Peña Blanca, Lago Yojoa, 21-VI-1979, at light, J. A. Chemsak (EMEC, 1); Olancho: La Muralla, Parque Nacional, 24-27-V-1995, J. E. Wappes (JEWEC, 1; JNRC, 1); *idem*, 31-V-1995, R. Turnbow (RHTC, 1; WOPC, 1).

Description. Size: Length 5.2 mm; width 1.8 mm.

Integument: Cranium red-brown, antennal scape yellow, remainder of antenna brown; pronotum brown; elytra bicolorous, humeral yellow inverted T well defined, humerus and elytral middle with yellow fascia; legs mostly yellow, anterior fascies of profemora and metafemora infuscated, metatibiae infuscated.

Head: Antennal funicle filiform (Fig. 36), combined length of pedicel and funicular antennomeres about equal in length than combined length of antennomeres 9 and 10, antennomeres 9 and 10 short triangular, antennal capitulum small.

Thorax: Pronotal arch transversally wrinkled, pronotal discal tubercles not particularly prominent; elytral apex sharply narrowly rounded anterior margin of protibia with 2 spines.

Abdomen: Aedeagus as in Fig. 56.

Variation: Length 4.2–5.2 mm; width 1.0–1.8 mm.

Natural history. Specimens were collected during May and June; one with a black light.

Distribution (Fig. 118): This species is known only from Honduras.

Etymology. The specific epithet *longius* (= longer) is a Latin adjective. I refer to the elongate body form of this species.

Differential diagnosis. There are four species in the *tigrinus* group whose specimens show a fully developed inverted T near the humeral angle. This involves *M. absentis*, *M. cartus*, *M. parvulus*, and *M. longius*. *Megaphloeus longius* specimens may be distinguished from the members of the other aforementioned species by their conspicuously more slender body form.

***Megaphloeus marginipes* (Chevrolat, 1874)** Figs 41, 67, 83, 91, 92, 117, 118

Epiphloeus marginipes Chevrolat, 1874: 320. CORPORAAL 1950: 254.

Type material. Lectotype: Male (here designated). Mexico, Codova (= Córdoba), Salle (MNHN). Here designated. (Specimen point mounted, gender symbol affixed to paper point; support card; locality label; identification label, MNHN acronymic label; lectotype label.)

Paralectotypes: Two specimens. México: Veracruz: Córdoba, Salle (MNHN).

Other material examined. I examined 103 specimens from México: Veracruz: Tierra Blanca, 28-VII-1941, H. S. Dybas; Fortín de las Flores, 10-VII-1973, Howard V. Weems Jr.; 10 km N Fortín, 21-29-VII-1976, E. Giesbert; *idem*, collection date not noted, collector not noted. Belize: Cayo: 6.9 km S Georgeville, 20-VIII-1977, C. W. O'Brien; Chiquibul, F. R., 12 km S Las Cuevas Res. Stn., collection day not noted-IV-1995, Howe & King; *idem*, Chiquibul Forest Res., Las Cuevas field station, 88°59'W 16°44'N, 500-700 m, collection day not noted-VI-1997, D. Inward; Toledo: Maya Mts., Bladen Branch. For. Res., 150 m, 1-5-VIII-1989, M. Williamson; Orange Walk: Bravo Cons. Area Rd. to Well Trail, 16-VII-1996, P. W. Kovanik; Rio Bravo Cons. Area, 7-15-1996, Shower House light, C. W. & L. B. O'Brien. Guatemala: Izabal: 25 km SE Morales, 900 m, 31-V-2-VI-1997, E. Giesbert. Honduras: Liberia, 6-IX-1984, rain forest, C. W. O'Brien (locality not found): Olancho: La Muralla Pq. Nac., 24-27-V-1995, J. E. Wappes; *idem*, 26-V-1995, R. Turnbow; *idem*, 1-VI-1995, R. Turnbow; Santa Bárbara: 13 km SE Mochita, Montana de Pozo, Azul, collection date not noted, O'Brien & Marshall; Atlántida: Lancetilla Tela, 15°43'N 87°27'W, 30-IV-1995, Malaise trap in lowland rain forest, R. Cave; *idem*, 15-IV-1995, Malaise trap in lowland rain forest, R. Cave; *idem*, 31-VIII-1995, Malaise trap in lowland rain forest, 31-VIII-1995, R. Cave; 15 km W La Ceiba, 20-VI-20-VII-1996, 175 m, Malaise trap, tropical rain forest, R. Lehman; Yoro: Parq. Nac. Pico Pijol, 13-14-VI-1988, R. D. Cave. Costa Rica: Heredia: F. La Selva, 3 km S Pto. Viejo, 10°26'N 84°01'W, 6-IV-1980, H. A. Hespeneide; *idem*, 7-V-1990, H. A. Hespeneide; *idem*, 29-IV-1990, H. A. Hespeneide; *idem*, Est. Biol. La Selva, 50-150 m, 10°26'N 84°01'W, 15-III-1993, collector not noted; *idem*, 16-IV-1993, collector not noted; *idem*, 100 m, collection day not noted-II-III-1993, Hanson & Godoy; *idem*, Est. Biol. La Selva, 50-150 m, 10°26'N 84°01'W, 30-VI-1995, collector not noted; *idem*, 16-VIII-1995, collector not noted; *idem*, 1-XI-1995, collector not noted; *idem*, 2-V-1996, collector not noted; *idem*, 30-VIII-7-IX-1996, L. LaPierre; 30-VIII-7-IX-1996, Louis M LaPierre; *idem*, 150 m, 10°26'N 84°01'W, 6-IX-1999, collector not noted; *idem*, 12-VI-2000, collector not noted; *idem*, 10-VII-2000, collector not noted; 11 km ESE La Virgen, 250-350 m, 10°21'N 84°03'W, 22-II-2004, collector not noted; *idem*, 9-III-2004, collector not noted; *idem*, 18-IV-2004, Malaise trap, collector not noted: Puntarenas: Parque Nacional Corcovado, Est. Sirena, 08°28'-31'N 83°36'W, 22-III-1981, H. A. Hespeneide; Golfo Dulce, 24 km W Piedras Blancas, 200 m, collection day not noted-XII-1990, Hanson; Río Claro, collection day not noted-collection month not noted-1991, collector not noted; *idem*, 19-V-1993, collector not noted; Rancho Quemado, 200 m, Peninsula de Osa, collection day not noted-IV-1992, D. Brenes; Guanacaste: Estac. Maritza, 600 m, W side Volcán Orosi, Malaise trap, collection day not noted-collection month not noted-1988, J. Rifkind; *idem*, collection day not noted-collection month not noted-1989, collector not noted; *idem*, Estación Maritza, lado oeste Volcán Orosi, 600 m, 1-VIII-1-X-1992, Malaise trap, collector not noted; Est. Pitilla, 9 km S Sta. Cecilia, 700 m, 22-VIII-1993, C. Moraga; *idem*, Est. Pitilla, 9 km S Santa Cecilia, 700 m, 15-III-collection day not noted-IV-1994, Malaise trap, E. Araya; *idem*, Est. Las Pailas, Rincón de la Vieja, 800 m, 16-

30-VI-1994, Malaise trap, D. G. García: Alajuela: 20 km S Upala, 22-31-V-1990, F. D. Parker; *idem*, 26-V-1991, F. D. Parker; *idem*, 24-VI-22-VII-1991, F. D. Parker; *idem*, 7-VI-1991, F. D. Parker; Cacao Biological Station, 1050 m, 10°55'38"N 85°27'7"W, 10-VII-2000, on fermenting tree, J. Ashe, R. Brooks, Z. Falin. Panamá: Chiriquí: Bugaba, collection date not noted, Champion; *idem*, 61-915 m, collection date not noted, Champion: Panamá: Cerro Campana, 830 m, 29-VI-1974, Erwin & Whitehead; *idem*, 29-VI-1974, C. O'Brien; *idem*, 5-VII-1974, O'Brien & Marshall: Colón: Barro Colorado Is. 09°10'N 79°50'W, 17-VIII-1974, H. A. Hespenheide; *idem*, 15-VI-1977, H. A. Hespenheide; *idem*, 20-VI-1977, H. A. Hespenheide; *idem*, 850 m, 08°40'N 79°56'W, 24-VII-1978, H. A. Hespenheide; 1.25 km SW Gstun, 11-V-1964, H. P. Stockwell; Fort Sherman 09°17'N 79°59'W, 4-XII-2001, on *Brosimum utile*, F. Ødegaard. Specimens are deposited in BMNH, CHAH, CMNC, EMUS, FSCA, INBC, JEW, JNRC, MUCR, NHMB, NINA, RDCC, and WOPC.

Description. Size: Length 7.2 mm; width 2.2 mm.

Integument: Cranium reddish-brown, apex of terminal maxillary and labial palpomeres brown, rest yellow, antenna scape and basal antennomere of antennal capitulum yellow, remainder of antenna brown; pronotum brown; elytral bicolorous, humeral yellow inverted T not present, ground color brown, with three pale markings, one at base near humerus, one at middle, and one near elytral apex; legs with femora decreasingly brown on anterior fascies, tibiae and tarsi yellow.

Head: Antennal funicle filiform (Fig. 41), combined length of pedicel and funicular antennomeres about equal in length than combined length of antennomeres 9 and 10, antennomeres 9 and 10 short triangular, antennal capitulum small.

Thorax: Pronotal arch transversally wrinkled, pronotal discal tubercles not particularly prominent, elytral apex sharply narrowly rounded; anterior margin of protibia with 4 spines.

Abdomen: Aedeagus as in Fig. 67.

Male Mesodermal Internal Reproductive Organs (Fig. 91): Medial accessory gland shorter than lateral gland; testis comprised of 12 follicles.

Female Mesodermal Internal Reproductive Organs (Fig. 92): Spermatheca not capsular; spermathecal gland attached to subapex of spermatheca.

Variation: Length 5.0–9.0 mm; width 1.5–2.8 mm. This widely distributed species varies extensively in the shape of the light and dark elytral markings.

Natural history. Specimens were collected during April through September.

Distribution (Figs 117, 118): This species is known from Southeastern México to central Panamá.

Differential diagnosis: *Megaphloeus marginipes* specimens have the basal third of the elytral disc entirely red. This will distinguish the members of this species from congeners.

Megaphloeus nubilus (Klug, 1842)

Figs 42, 48, and 119

Enoplium nubilum Klug, 1842: 370. CORPORAAL 1950: 254.

Type material. Holotype: Male. Brasilien (ZMHB). (Specimen pin mounted, gender symbol affixed to support card; identification-locality label; ZMHB acronymic label; holotype label; historical collection label; specimen number label-58852; holotype label; identification label; plastic vial with abdomen and aedeagus.) Paratypes: Species description based on one specimen.

Other material examined. I examined 8 specimens from: French Guiana: Cayenne. Brazil: Paraná: Vila Velha: Guanabara: Rio de Janeiro: Espíritu Santo. Specimens are deposited in BMNH, WOPC, and ZMHB.

Description. Size: Length 9.0 mm; width 2.8 mm.

Integument: Cranium brown, antennal scape yellow, remainder of antenna brown; pronotum brown, densely vested with matted white setae; elytra concolorous, brown; legs bicolored, profemora black in anterior fascies, mesofemora yellow, metafemora mostly brown, tibiae dark brown along posterior margin.

Head: Antennal funicle filiform (Fig. 42), combined length of pedicel and funicular antennomeres about equal to combined length of antennomeres 9 and 10, antennomeres 9 and 10 short triangular, antennal capitulum intermediate in size.

Thorax: Pronotal arch transversally wrinkled, pronotal discal tubercles particularly prominent; elytral apex moderately narrowly rounded; anterior margin of protibia with 11 spines.

Abdomen: Aedeagus as in Fig. 58.

Variation: Length 7.0–9.0 mm; width 2.1–3.0 mm.

Natural history. No information available.

Distribution (Fig. 119). This species is known only from French Guiana and southeastern Brazil.

Differential diagnosis. Only the members of this species have the integument entirely light brown; a color pattern that will distinguish *M. nubilus* specimens from congeners.

Megaphloeus parvulus (Schenkling, 1900)

Figs 47, 51, and 119

Epiphloeus parvulus Schenkling, 1900: 398. CORPORAAL 1950: 254.

Type material. Lectotype: Male (here designated). Goyaz (Bras.), Donithier (DEIG). (Specimen mounted on a paper point, gender symbol affixed to paper point; support card; locality label; collection label; holotype label; institutional repository label; DEIG acronymic label, holotype label.)

Paralectotypes: None.

Other material examined. One hundred-seventy seven specimens were examined from Brazil: Santa Catarina: Nova Teutonia, 27°11'S 52°23'W, 300–500 m, collection day not noted-XII-1940, F. Plaumann; *idem*, collection day not noted-XI-1973, F. Plaumann; *idem*, collection day not noted-VIII-1973, F. Plaumann; *idem*, collection day not noted-IX-1973, F. Plaumann; *idem*, collection day not noted-X-1973, F. Plaumann; *idem*, collection day not noted-XI-1973, F. Plaumann; *idem*, collection day not noted-XII-1973, F. Plaumann; *idem*, collection day not noted-I-1974, F. Plaumann; *idem*, collection day not noted-II-1978, F. Plaumann; *idem*, collection day not noted-XI-collection year not noted, B. Pohl; Rio Caraguata, 21°48'S 52°27'W, 14-IX-1963, 400 m, F. Plaumann; Bahia: Santa Amaro, 2-III-1912, G. E. Bryant; Itepetinga, collection day not noted-XI-1969, F.M. Oliveira; Encruzilhada, collection day not noted-XI-1974, 960 m, M. Alvarenga; Mato Grosso: Diamantino, collection day not noted-XII-1981, E. Furtado; São Paulo: Lencóis Paulista, Duratex, S. A., 8-XII-2006, á-pinene+ethanol+sulcatol baited flight intercept trap in stand of *Eucalyptus grandis*, C. A. H. Flechtmann; Mato Grosso do Sul: Três Lagoas International Paper Horto Santa Luzia, 27-VIII-1992, black light, flight intercept trap, in stand of *Eucalyptus grandis*, C. A. H. Flechtmann; Paraná: Telemaco Borba, 20-X-2006, Klabin Papel e Celulose, 15-XII-2006, sulcatol+ethanol baited multiple funnel flight intercept trap in stand of mixed ombrofilous forest fragments, with prominence of *Araucaria angustifolia*, C. A. H. Flechtmann; Rondônia: 62 km SW Ariquemes, Fzda. Rancho Grande, 18-XI-1994, C. W. & L. B. O'Brien; Rio de Janeiro: Floresta Tijuca, 1-XII-1961, F.M. Oliveira; Représa Rio Grande, collection day not noted-IV-1961, F.M. Oliveira; Specimens are deposited in AMNH, BMNH, CASC, CDAE, CMNC, CMNH, CNCI, DZUP, EAPZ, EMEC, EMUS, FEIS, FMNH, FSQA, INBC, ISNB, JNRC, LACM, MCZC, MNHN, NHMB, OXUM, RGCG, RHTC, TAMU, USNM, WFBC, WFBM, WOPC, ZMAN, and ZMHB.

Description. Size: Length 4.0 mm; width 1.1 mm.

Integument: Cranium red-brown, antenna brown; pronotum red-brown; elytra bicolorous, humeral yellow inverted T well developed, various shades of dark brown, light brown and yellow, humerus and anterolateral half of elytra yellow; legs yellow, tibiae and tarsi infuscated.

Head: Funicular antennomeres filiform (Fig. 47), combined length of pedicel and funicular antennomeres about equal to combined length of antennomeres 9 and 10, antennomeres 9 and 10 short triangular; antennal capitulum small.

Thorax: Pronotal arch transversally wrinkled, pronotal discal tubercles not particularly prominent; elytral apex moderately narrowly rounded; anterior margin of protibia with 3 spines.

Abdomen: Aedeagus exceptionally long and narrow (Fig. 51).

Male mesodermal internal reproductive organs: Medial accessory gland about half as long as lateral gland; testis comprised of 12 follicles.

Female mesodermal internal reproductive organs: Spermatheca not capsular; spermathecal gland attached to subapex of spermathecal capsule.

Variation: Length 4.0–6.0 mm; width 1.2–2.0 mm. There is considerable variation in the definition and shape of the yellow regions of the elytral disc.

Natural history. The largest series of these beetles were captured by Fritz Plaumann; from November through December in southeastern Brazil. Other Brazilian specimens were collected during September, October, and from March through May.

Carlos A. H. Flechtmann gathered these beetles with a flight intercept trap laced with sulcatol-ethanol or α -pinene+ethanol, in forests laden with *Eucalyptus grandis* W. Hill ex Maid or *Araucaria angustifolia* (Bertol.) Kuntze.

Distribution (Fig. 119). The species is known only from Brazil.

Differential diagnosis. The members of this species have a narrow inverted T near the humeral angle and a narrow angular fascia at the elytral middle that does not reach the sutural or epipleural margins. Also, there is a triangular yellow marking near the elytral apex, near the sutural margin. This combination of characteristics will distinguish the members of this species from congeners.

Notes. The historical name Goyas, used as a type locality herein, is now referred to as Goiás.

Megaphloeus pectilus sp.nov.

Figs 46, 57, 104, and 119

Type material. **Holotype:** Male. GUYANA: Region 8, Iwokrama Forest, 1 km W Kurupukari, Iwokrama Field Station, 60 m, 4°40'N 58°41'W, 2 JUNE 2001, R. Brooks, Z. Falin, GUY1BF01 122, ex. on bark downed trees; electronic label ♂ SM 0569740 (SEMC). (Specimen point mounted, gender symbol affixed to paper point; support card; locality label; electronic label; SEMC acronymic label; holotype label.)

Paratypes: Nine specimens. Guyana: Demerara: Region 8, Iwokrama Forest, 1 km W Kurupukari, Iwokrama Field Station, 60 m, 4°40'N 58°41'W, 60 m, 2-VI-2001, R. Brooks & Z. Falin (EMEC, 3; WOPC, 2); Region 8, Iwokrama Forest, Turtle Mountain base camp, 50 m, 4°43'N 58°43'W, 1-VI-2001, R. Brooks & Z. Falin (EMEC, 2; WOPC, 1). Brazil: Pará: Specific collection location not noted, collection day not noted-VI-collection year not noted, collector not noted (CMNH, 1).

Description. Size: Length 4.8 mm; width 1.2 mm.

Integument: Cranium yellow-brown, antenna mostly yellow, only antennomeres 9 and 10 brown; pronotum, lower sides brown, disc yellow at sides and brown at middle; elytra bicolorous, humeral yellow inverted T broad, humerus and elytral middle with yellow fascia; legs yellow, femora and tibiae faintly infuscated.

Head: Antennal funicle filiform, combined length of pedicel and funicular antennomeres about equal in length to combined length of antennomeres 9 and 10, antennomeres 9 and 10 rectangulate, antennal capitulum small, narrow.

Thorax: Anterior margin of protibia with 6 spines.

Abdomen: Aedeagus as in Fig. 57.

Variation: Length 4.0–4.8 mm; width 1.0–1.2 mm.

Natural history. Specimens were collected during June, at 60 m from bark of felled trees.

Distribution (Fig. 119). This species is known from Guyana and northern Brazil.

Etymology. The specific epithet *pectilus* is a Latin adjective derived from *pectilis* (= colored). I refer to the striking coloration of the pronotum.

Differential diagnosis. There are three species in the *tigrinus* group in whose members the last antennomere is yellow. This involves *M. sexplagiatus*, *M. setulosus*, and *M. pectilus*. From the members of the other two aforementioned species *M. pectilus* specimens may be distinguished by the vertical dark line on the disc of the pronotum.

***Megaphloeus setulosus* (Thomson, 1860)**

Figs 1b–11, 13, 14, 16–19, 20–25, 29, 79, 106, 108–113, 116, 120, and 126

Epiphloeus setulosus Thomson, 1860: 60. GORHAM 1882: 166. CORPORAAL 1950: 254. OPITZ 1997: 66.

Epiphloeus debilis Kuwert, 1893: 293. Holotype. Gender unknown. Peru:

Amazon (MNHN). **syn.nov.** The characteristics on which this nominal species is based fall in the range of variation for the senior synonym. CHAPIN, 1927: 6. CORPORAAL 1950: 253.

Epiphloeus obscurus Kuwert, 1893: 494. Lectotype. Gender unknown. México (MNHN). **syn.nov.** The characteristics on which this nominal species is based fall in the range of variation for the senior synonym. CORPORAAL 1950: 254.

Type material. Lectotype: Female (here designated). México (MNHN). (Specimen point mounted, gender symbol affixed to paper point; support card; identification-locality label; MNHN acronymic label; lectotype label; plastic vial with abdomen and aedeagus.)

Paralectotypes: Three specimens. México (MNHN).

Other material examined. I examined 255 specimens from México: Nayarit: San Blas, 21-VII-1954, E. I. Schlinger; *idem*, La Bajada, 11-14-III-1987, J. Kirkley; Tabasco: Teapa: collection day not noted-II-collection year not noted, H. H. S.: Chiapas: Suchiapa, 18-VII-1957, J. A. Chemsak & B. J. Rannels; Simojovel, 1-16-VIII-1958, J. A. Chemsak; Portugal, 12 km SE Simojovel, 17-VII-1958, J. A. Chemsak; Finca Albion, 25 km S Tapachula, 31-VI-1998, 650 m, from logs of *Lonchocarpus* sp., J. E. Macias; Puebla: 24 km E Teziutlán, 5-6-VIII-1960, H.F. Howden; Veracruz: Cotaxtla, Exp. Sta., Cotaxtla, 23-VI-1962, D. H. Janzen; *idem*, 14-VII-1962, D. H. Janzen; Cordoba, 4-VIII-1962, A. E. Michelbacher; *idem*, 27-VI-1972, G. H. Nelson; Lago Catemaco, 25-VIII-1965, A. R. Gillogly; Los Tuxtlas, vicinity Balzapote, 29-IV-6-V-1989, E. Giesbert; Sinaloa: 24 km N Mazatlán, 7-VIII-1973, E. Giesbert; Jalisco: Estación de Biología Chamela, 24-VII-1986, M. Sáucheg; 15 km N Melaque, 15-17-VII-1992, J. Chemsak; *idem*. 6-12-X-1988, F. T. Hovore; Yucatán: 18-24 km N San Felipe Carr. Pte., 24-V-VI-1984, J. E. Wappes; Quintana Roo: 11 km N Carillo Puerto on 295, 26-X-1991, F. W. Skillman, Jr.; *idem*, 27-X-1991, R. Turnbow; Guerrero: R. Papagaio, collection day not noted-X-collection year not noted, 366 m, H. H. Smith; Oaxaca: Hwy 147, 8.8 km NW Palomares, 27-V-1983,

L. O'Brien & G. B. Marshall. Guatemala: Alta Verapaz: La Vega del Yucal Baleu, Mpio San Cristóbal, 8-VI-1989, 600-800 m, collector not noted; Baja Verapaz: San Gerónimo, collection date not noted, Champion: Quetzaltenango: Las Mercedes, collection date not noted, 915 m, Champion, *idem*, Las Mercedes, collection date not noted, 915 m, Champion. Belize: Belize: 11-VIII-1974, C. W. O'Brien. Honduras: El Paraiso: Yuscarán, Cerro Monserrat, 1-7-I-1993, R. Ortega: *idem*, 23-V-1993, R. Ortega: Yoro: Parq. Nac. Pico Bonito, El Portillo, 640 m, 15°26'27"N 87°08'09"W, 27-IX-2000, R. Cordero & J. Torres: Atlántida: Lancetilla, Tela, 15°43'N 87°27'W, collection day not noted-X, -XI-1995, Malaise trap in lowland rain forest, R. Cave: Olancho: 31 km NE Catacamas, 15-VI-1974, C. W. O'Brien: El Salvador: Morazán: Torola, collection date not noted, 305 m, Champion. Nicaragua: Chontales: Collection date not noted, T. Belt. Costa Rica: Guanacaste: La Pacífica, 7 km N Cañas, 8-19-VII-1986, R. D. Cave; Cañas, 3.5 km NW Cañas, 9-12-VI-1978, E. Giesbert; *idem*, 14 km S Cañas, 5-10-IX-1990, F. D. Parker; Brasilito, *idem*, 10 km N Brasilito, 9-11-XI-1991, F. D. Parker; Murciélagos, 8 km S de Cuajiniquíl, 11-I-19-II-1994, Malaise Trap, E. Araya; Cacao, 1000-1400 m, SW side Volcán Cacao, collection date not noted-1988-1989, Malaise Trap, GNP Biodiv. Survey; Cerro El Hacha, 300 m, 12 km SE La Cruz, collection date not noted-1988, Malaise Trap, GNP Biod. Surv.; Maritza, 600 m, W side Volcán Orosi, collection date not noted-1988, Malaise Trap, GNP Biod. Surv.; *idem*, 600 m, lado O Vol. Orosi, collection date not noted-1989, Malaise Trap, collector not noted; *idem*, collection date not noted-1991, collector not noted; *idem*, collection date not noted-1988, collector not noted: Alajuela: Naranjo, 3 km SE R. Naranjo, 1-15-IV-1992, F. D. Parker; *idem*, 21-28-III-1993, F. D. Parker, *idem*, 1-9-VI-1993, F. D. Parker; *idem*, 12-VI-1993; *idem*, 14-16-VI-1993; *idem*, 11-13-VI-1993, Malaise Trap, M. E. Irwin; *idem*, 13-31-VII-1990, F.D. Parker; *idem*, 21-31-VII-1992, F. D. Parker; *idem*, 29-VII-1990, F. D. Parker; Upala, 20 km S Upala, 12-30-IV-1991, F. D. Parker; *idem*, 29-VII-1990, F. D. Parker; *idem*, 1-15-IX-1990, F. D. Parker; *idem*, 22-31-X-1991, F. D. Parker; *idem*, 25-31-X-1990, F. D. Parker; *idem*, 20 km S Upala, 22-31-X-1991, F. D. Parker; *idem*, 25-31-X-1990, F. D. Parker; *idem*, 8-28-II-1970, Malaise Trap, O. Peck: Heredia: Puerto Viejo, 4-VIII-1965, A. Raske; *idem*, La Selva Biol. Sta., 3 km S Puerto Viejo, 10°26'N 84°01'W, 16-V-1990, on dead *Citrus*, H. A. Hespeneheide, *idem*, 11 km SE La Virgen, 450-550 m, 10°20'N 84°04'W, 23-III-2003, INBio-OET-ALAS transect, *idem*, 8-IV-2003, INBio-OET-ALAS transect: Limón: 23 km W. Limón, 25-VII-1975, E. M. Fisher; Canuita, 3 km S Canuita, 23-26-XII-1988, F. D. Parker; Reventazón River, Hamburg Farm, 20-IV-1925, F. Nevermann; *idem*, 15-VIII-1925 m, F. Nevermann; *idem*, 13-I-1930, Nevermann, *idem*, 13-II-1930, F. Nevermann; *idem*, 28-I-1932, F. Nevermann: Cartago: Turrialba, Int. Amer. Inst. Agr. Sci., 17-20-VIII-1964, blacklight trap, R. E. Woodruff; *idem*, 600 m, 25-VII-1973, V. O. Becker; San José: Colón, 800 m, collection day not noted-III-IV-1990, Luis Fourmier (locality not found); Puntarenas: Rancho Quemado, 200 m, Peninsula de Osa, 21-III-7-IV-1992, F. Quesada; *idem*, 1 km N Rincón de Osa, 23-VI-2001, big tree fall, M. A. Ivie; *idem*, 0-100 m, P.N. Corcovado, collection date not noted-1991, Malaise Trap, collector not noted. Panamá: Panamá: 1.25 km SW Gatun, 11-V-1984, H. P. Stockwell, *idem*, Madden Forest, 1.88 km, 09°06'N 79°38'W, 3-VIII-1971, H. A. Hespeneheide; *idem*, 3-VIII-1971, H. P. Stockwell; *idem*, 3.5 km WNW Paraiso, 09°02'N 79°40'W, 13-VIII-1971, H. A. Hespeneheide; *idem*, Madden Dam, 09°13'N 79°38'W, 2-VIII-1971, H. A. Hespeneheide; *idem*, Barro Colorado Is. 09°10'N 79°50'W, 29-VIII-1974, H. A. Hespeneheide; *idem*, 2-VII-1977, H. A. Hespeneheide; *idem*, Ft. San Lorenzo, 2-I-1983, E. Giesbert: Bayano District, 20 km E Caniba, 29-VII-1990, collector not noted; *idem*, Cerro Azul, 30-IV-1981, E. Giesbert; Parq. Nac. Soberanía, Madden For. Rd., el 40 m, 09°04'50"N 79°37'27"W, 20-28-VII-1999, Malaise Trap, Gillogly & Woolley; *idem*, Pan American Hwy, 30 km E of Cañita, 15-29-XI-1992, Jean and Keve Ribardo: Darién: Pirre, P. N. Darién, Est. R. Frio, 30-VII-VIII-2002, Malaise, A. Santos, R. Miranda; *idem*, 450 m, 1-21-IV-2004, Malaise Trap, R. Cambra; *idem*, Est. Rancho Frio, 80 m, 21-III-4-IV-2000, Malaise Trap, Cambra, Santos, Bermúdez; *idem*, Est. Cruce Mono, 5-28-II-1993, Malaise Trap, R. Cambra & J. Coronado: Colón: N Shore Gatun Lake, 10-11-V-1984, E. Giesbert, *idem*, N Shore Gatun Lake, 2-VI-1984, E. Giesbert: Chiriquí: Fortuna Dam Area, Elev 1100 m, 22-28-V-1984, S. McKamey. Colombia: Putumayo: Santiago, N de S 700 m, 11-V-1974, H. & A. Howden; La Paya, Cabaña, La Paya, 330 m, 00°02'S 75°12'W, 20-XI-5-XII-2001, Malaise Trap, E. Lozaro: Magdalena: Tayrona Neguanje, 11°20'N 74°02'W, 10 m, 14-28-VII-2001, Malaise Trap, R. Henríquez, *idem*, Tayrona Pueblito, 11°20'N 74°2'W 225 m, 4-20-XII-2000, Malaise Trap, R. Henríquez, *idem*, Tayrona Gairaca, 11°20'N 74°2'W, 5 m, 5-20-IV-2001, Malaise Trap, R. Henríquez, *idem*, 3-22-I-2001, Heuraques: Cundinamarca: Rio Magdalena a Bogotá, 9-VIII-1877, D. O. Thieme. Ecuador: Napo: Yasuni Res. Sta., 19-30-X-1998, 250 m, W. J. Hanson. Venezuela: Miranda: Rio Negro cr. Capaya, 100 m, 10-12-XI-1977, C. Andara & J. Clavijo: Tachira: 42 km SE San Cristóbal, 19-V-1974, 700 m, H. & A. Howden; Las Cuevas, 7°47'N 71°47'W, 600 m, 10-12-XI-1988, L. Ruiz Pineda; Canton Barinas, 40 km E Canton Barinas, 8-III-1970, 70 m, S. L. Wood; Los Colorados, Alto el Mirador, 09°54'N 75°07'W, 22-IV-7-V-2001, 400 m, Malaise, E. Deulufeut. Bolivia: Santa Cruz: Los Volcanes, Amboró National Park, 18°06'S 63°36'W, 20-XI-12-XII-2004, 1000 m, Malaise trap on tree fall, M. V. I. Barclay & H. Mendel; *idem*, 4-6 k SSE Buena Vista, F & F

Hotel, 2-12-II-2000, J. E. Wappes; *idem*, El Cairo, 5 km W Buena Vista, 16-18-X-2004, UV Light, J. E. Eger; R. Japacani, collection date not noted, J. Steinbach: Cavinás: Rio Beni, collection date not noted, collector not noted. Peru: Cuzco: Urubama River, 11°17'S 73°47'W, collection day not noted-collection date not noted-1974. Brazil: Rondônia: Ariquemes, 62 km SE Ariquemes, 13-25-IV-1992, W. J. Hanson, *idem*, 7-18-XI-1995, W. J. Hanson, *idem*, 5-16-XI-1996, W. J. Hanson, *idem*, 22-31-X-1997, W. J. Hanson, *idem*, 1-14-XI-1997, B. Dozier: Mato Grosso: Sinop, Coordenadas, collection day not noted-X-1974, 350 m, M. Alvarenga. Specimens are deposited in AMNH, BMNH, CASC, CDAE, CHAH, CMNC, CMNH, CNCI, EAPZ, EMEC, EMUS, FMNH, FSCA, INHS, JEWG, JNRC, LACM, MAIC, MCZC, NHMB, MNHN, MSUC, MZLU, RGCG, RHTC, SMTD, STRI, TAMU, UMRM, UMSP, USNM, WFBC, WFBM, WOPC, ZMAN, and ZMHB.

Description. Size: Length 7.0 mm; width 2.0 mm.

Integument: Cranium red-brown, profusely vested with white decumbent setae, setae particularly dense in ocular notch, antenna with scape, pedicel, funicular antennomeres, and basal antennomere of capitulum yellow, last and penultimate antennomeres dark brown; pronotum red-brown; elytra bicolorous, mostly brown, humeral yellow inverted T not present, disc patterns of red-brown and dark brown, base, middle, and, posterior third profusely vested with silvery setae (Fig. 29); legs progressively more yellow from dark profemur to mostly yellow metafemur, tibiae and tarsi yellow.

Head: Antennal funicle filiform (Fig. 1b), combined length of pedicel and funicular antennomeres about equal in length as combined length of antennomeres 9 and 10, antennomeres 9 and 10 broad triangular, antennal capitulum large.

Thorax: Pronotal arch transversally wrinkled, pronotal discal tubercles not particularly prominent; elytral apex moderately narrowly rounded; anterior margin of protibia with 8 spines.

Abdomen: Aedeagus as in Figs 16, 19.

Variation: Length 4.8–7.5 mm; width 1.2–3.0 mm. In some specimens, particularly those from México, there are a few elytral setae that are more yellow than silver. These are found just behind the humeral margin. The length of the last antennomere varies with geography, with antennomere 11 becoming increasingly longer from north to south as Figs 20–25 indicate.

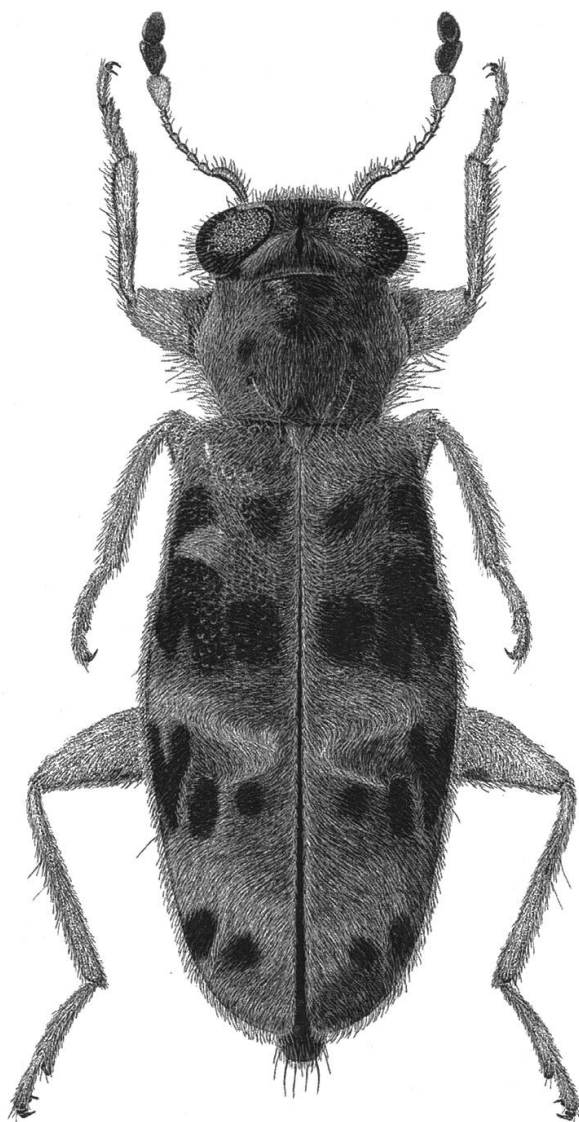


Fig. 29. *Megaphloeus setulosus* habitus.

Natural history. Specimens were collected in Middle America from February through December with most specimens taken from May through July. In South America most of the collection dates involve the later months of the year, but the collection dates range from February through December. These beetles were captured at altitudes of 0 to 1100 m; in Malaise traps, from logs of *Lonchocarpus* sp., by beating “slash”, via a black light, or captured on dry wood. Henry Hespenehde collected specimens on *Cecropia* and *Inga fagifolia* (L.) Willd.

Distribution (Figs 115, 120, 126). This species ranges from México to central Brasil.

Differential diagnosis. The members of this widely distributed species have the elytral markings as depicted in Fig. 29.

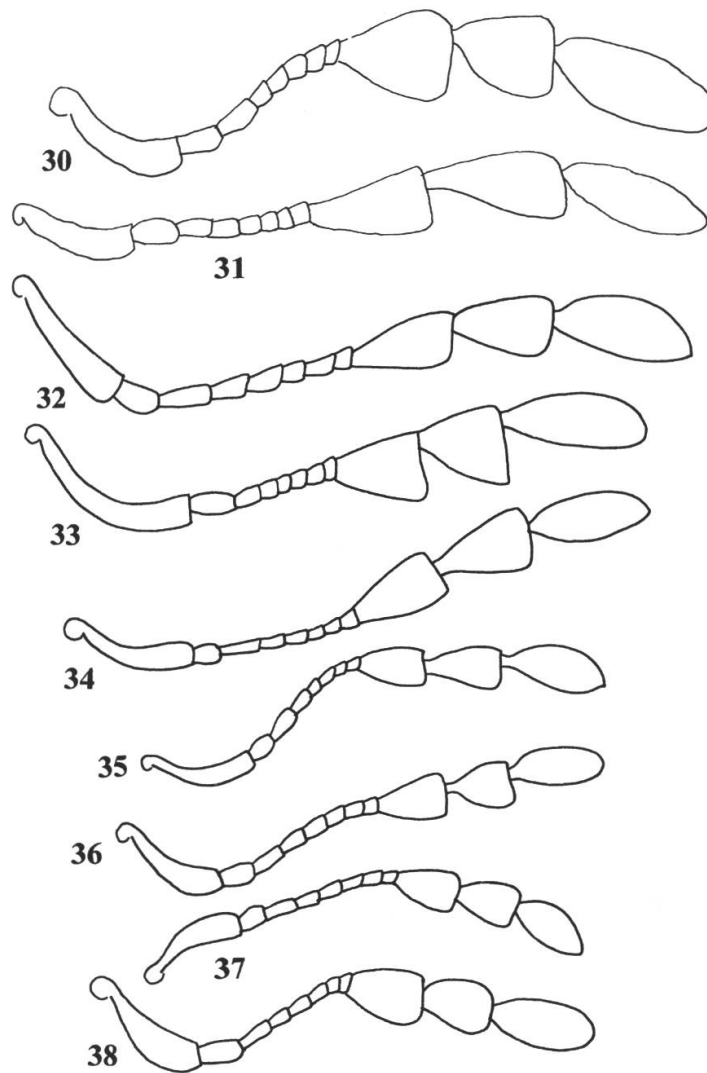
***Megaphloeus sexplagiatus* (Kuwert, 1893)** Figs 28, 73, 88, 96, 120, and 126

Epiphloeus sexplagiatus Kuwert, 1893: 494. SCHENKLING 1900: 399. CHAPIN 1927: 6. CORPORAL 1950: 254. *Epiphloeus iracundus* Wolcott, 1912: 74. Holotype: Female. Rio Madeira, Brazil. (FMNH). **syn.nov.** The specimens upon which this species is based falls within the range of variation of *M. sexplagiatus* Kuwert. CHAPIN 1927: 71. CORPORAL 1950: 254. **Paratypes:** One specimen. Brazil: Rio Madeira (FMNH)

Type material. **Holotype:** Gender not known. Peruvian Amazon (MNHN). The holotype of this species was examined by me in Paris in 1974. I could not find the specimen in the MNHN collection during a subsequent visit in 2006. The original species description is based on one specimen. A homotype is used to redescribe the species herein.

Paratypes: None known.

Other material examined. One hundred-and-forteen specimens were examined from Belize: Stann Creek: 16 km W Stann Creek Town, 18-XIII-1977, C. W. O'Brien & L. Marshall. Panamá: Darien: Pirre Est. Rancho Frío, 80–560 m, Malaise trap, 21-III-4-IV-2000, Cambra, Santos, & Bermúdez; *idem.* 7-16-XI-2000, R. Cambra & A. Santos; *idem.* 8-VIII-2-X-2002, R. Cambra & A. Santos; *idem.* 9-17-IV-2002, R. Cambra, A Santos, & R. M; *idem.* 3-17-X-2002, R. Cambra & A. Santos; *idem.* 1-21-IV-2004, R. Cambra; Cruce Mono, Malaise trap, 6-II-4-III-1993, R. Cambra & J. Coronado; *idem.* 5-28-II-1993, R. Cambra & J. Coronado: Colón: Barro Colorado Island, 9-IV-1980, Henk Wolda; *idem.* 1-VI-collection day not noted-VII-1981, R. B. Kimsey; *idem.* 30-V-2-4-VI-1986, Henk Wolda; *idem.* 6, 9-11-VI-1986, Henk Wolda; *idem.* 13, 15-17-X-1986, Henk Wolda; *idem.* 3-V-2006, collector not noted: San Lorenzo Sherman, 16-XI-2002, D. Bernal. Colombia: Magdalena: Tayrona Pueblito, 11°20'N 74°02'W, 225 m, Malaise trap, 29-VII-14-VIII-2000, R. Henriquez; *idem.* 30-IX-26-X-2000, R. Henriquez: Vaupés: Mosiro-Itajura (Caparú) Terrazas, 01°4'S 69°31'W, 22-IX-7-X-2002, 60 m, Malaise trap, L. Benavides; *idem.* 10-17-XI-2003, J. Pinzón: Antioquia: Puerto Berrío, 12-VIII-1933, collector not noted. Venezuela: Bolívar: El Hormiguero Moseta de Nuria, 3-VI-1975, 500 m, B. Bechyne; Río Cauca, 25-IV-1984, B. Bechyne: Tachira: Río Frío, 20-24-IV-1982, 600 m, collector not noted. French Guiana: Guyane: Régina, Kourou, Montagne des Singes, collection date not noted-II-2008, Malaise trap, D. Faure; Montage de Kaw, Pk 37.5, 19-XI-2000, J.A. Cerda. Guyana: Demerara: Region 8, Iwokrama Forest, Turtle Mt. base camp, on bark of downed tree, 04°43'N 58°43'W, 1-VI-2001, 50 m, R. Brooks & Z. Falin. Ecuador: Orellana: Reserva Ehnica Waorani, 1 km S Onkone Gare Camp, 00°39'S 76°26'W, 29-VII-1995, 220m, fogging leaves of plants in terre firme, T.L. Erwin; Tiputini Biodiversity Station, 00°37'S 76°08'W, 23-X-1998, 220-250m, fogging leaves of plants in terre firme, T.L. Erwin; Napo: 24 km E. Atahualpa, 16-23-X-1995, 480 m, E. & V. Giesbert: Yasuni Res. Sta., 00°41'S 76°24', 30-IX-11-X-2002, 250 m, W. C. Brammer. Brazil: Rondônia: 62 km S.E. Ariquemes, 13-IV-1992, W. J. Hanson; *idem.* 18-VII-1995, W. J. Hanson; *idem.* 1-14-XI-1997, B. Dozier; *idem.* near Fzda. Rancho Grande, 1-17-XI-1997, B. K. Dozier; *idem.* near Fzda. Rancho Grande, Black Light Trap, 3-15-XII-1996, J. E. Eger: Tocantins: Chapada, collection day not noted-X-collection year not noted, collector not noted; *idem.* collection day not noted-XI-collection year not noted, collector not noted: Pará: Jacareacanga, collection day not noted-XI-1969, F. R. Barbosa; *idem.* collection day not noted-XII-1968, M. Alvarenga; Tucuruí Río, Tecantins Saúde, 3-5-VI-1984, 2m, Armadilha & Suspensa: Amazonas: Manaus, 1 km W. Taruma Falls, 16-II-1981, 100 m, C. Young; Fonte Boa, collection day not noted-collection month not noted-collection year not noted, Hahnel. Peru: San Martín: Río Seco,



Figs 30–38. Antennae. 30 – *Megaphloeus bulatus*. 31 – *M. megasensibilis*. 32 – *M. tricolor*. 33 – *M. variegatus*. 34 – *M. animosus*. 35 – *M. circinus*. 36 – *M. longius*. 37 – *M. cartus*. 38 – *M. lividipes*.

27 km W of Rioja, 21-IX-1936, F. Woytkowski: Madre de Dios: Manu, Estec. Pakitza, Malaise trap, 15-18-II-1992, R. Cambra; *idem*. 21-25-VI-1993, R. Cambra: Huánuco: Pachitea, collection day not noted-collection month not noted-collection year not noted, collector not noted. Specimens are deposited in: AMNH, BMNH, CASC, CDAE, CHAH, CMNC, CMNH, CNCI, DEIG, EMEC, EMUS, FMNH, FSCA, JEWG, JNRC, LACM, MAIC, MCZC, NHMB, MNHN, RGCG, RHTC, USNM, WFBC, WFBM, WOPC, ZMAN, and ZMHB.

Description. Size: Length 4.0 mm; width 1.3 mm.

Integument: Cranium brown, antenna brown except scape and last antennomere yellow; pronotum brown; elytra bicolorous, mostly brown, humeral yellow inverted T broad and poorly defined, with humeral, middiscal, and preapical yellow maculae; legs yellow.

Head: Antennal funicle filiform (Fig. 28), combined length of pedicel and funicular antennomeres about equal in length as combined length of antennomeres 9 and 10, antennomeres 9 and 10 short triangular, antennal capitulum small.

Thorax: Pronotal arch transversally wrinkled, pronotal discal tubercles not particularly prominent; elytral apex moderately narrowly rounded; anterior margin of protibia with 5 spines.

Abdomen: Aedeagus as in Fig. 73.

Male mesodermal internal reproductive organs (Fig. 88): Medial accessory gland very small, much smaller than lateral gland.

Female mesodermal internal reproductive organs (Fig. 96): Spermatheca not capsular; spermathecal gland attached to subapex of spermathecal capsule.

Variation: Length 3.5–5.0 mm; width 1.1–1.7 mm. Except for variations in body size, the members of this species are quite homogeneous.

Natural history. Specimens captured north of the Equator were taken from April through August, whereas those captured below the equator were taken from October through January. H. A. Hespenheide collected several specimens in the Panamá Canal region on fallen *Guarea glabra* Vahl. The known altitudinal range of this species extends from 2 to 600 m. Many specimens were captured in a Malaise trap.

Distribution (Figs 120, 126). This species ranges from eastern Belize to central Brazil.

Differential diagnosis. There are three species in the *tigrinus* group whose specimens have the last antennomere completely yellow. This involves *M. pectilus*, *M. setulosus*, and *M. sexplagiatus*. Specimens of *M. sexplagiatus* may be distinguished from specimens of the other aforementioned species by three yellow maculae that characterizes the elytral disc.

Megaphloeus tigrinus sp.nov.

Figs 45, 50, 89, 94, and 122

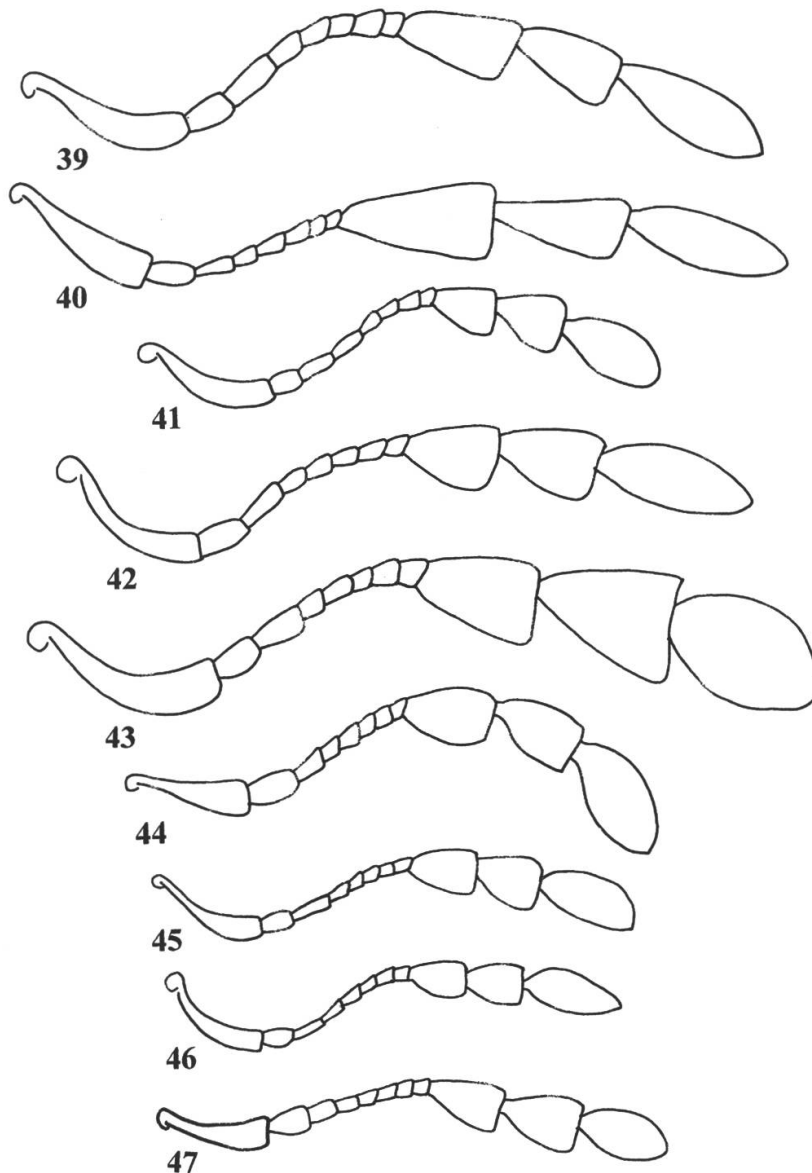
Type material. Holotype: Male. COLOMBIA, Putumayo, PNN La Paya Fca Charapa, 08S 7457W, 330m, Malaise, 12–27.iv.2002, R. Cobete Leg. M. 3147 (IAVH). (Specimen point mounted, gender symbol affixed to paper point; support card; locality label; IAVH acronymic label; holotype label; plastic vial with abdomen and aedeagus.)

Paratypes: Five specimens. Colombia: Putumayo: La Paya Mamansoya, Tierra Alta, 00°06'S 74°58'W, 22-26-IX-2001, 360m, Malaise trap, D. Campos (WOPC, 1); La Playa Fca. Charapa, 00°8'S 74°67'W, 28-IV-14-V-2002, 330 m, Malaise trap, R. Cobete (IAVH, 1); Caquetá: PNN Serranía de Chiribiquete, Río Cuñaré, 00°31'N 72°38'W, 29-X-12-XI-2000, 300 m, Malaise trap, bos. terra firme, M. Ospina & E. González (IAVH, 1); Magdalena: PNN Tayrona Neguanje, 11°20'N 74°02'W, 14-28-VII-2001, 10 m, R. Henriquez (WOPC, 1). Ecuador: Orellana: Reserva Étnica Waorami, 1 km S Onkone Gare Camp, 3910S 76 26W, 7-II-1996, 220m, fogging leaves of plants in terre firme, T.L. Erwin (USNM, 1).

Description. Size. Length 7.0 mm; width 2.0 mm.

Integument: Cranial frons red, epicranium black, antennal scape, pedicel, and funicular antennomeres light brown, capitulum brown; pronotum black; elytra bicolorous, mostly yellow-brown, humeral yellow inverted T not present, with black fascia anterior to middle and two black contiguous markings in posterior half; legs, procoxae, anterior fascies of profemora, and posterior margin of tibiae infuscated, remainder yellow.

Head: Antennal funicle filiform (Fig. 45), combined length of pedicel and funicular antennomeres longer than combined length of antennomeres 9 and 10, antennomeres 9 and 10 short triangular, antennal capitulum small.



Figs 39–47. Antennae. 39 – *Megaphloeus velutinus*. 40 – *M. terzonatus*. 41 – *M. marginipes*. 42 – *M. nubilus*. 43 – *M. vittellinus*. 44 – *M. ustus*. 45 – *M. tigrinus*. 46 – *M. pectilus*. 47 – *M. parvulus*.

Thorax: Pronotal arch transversally wrinkled, pronotal discal tubercles not prominent; elytral apex moderately narrowly rounded; anterior margin of protibia with 7 spines.

Abdomen: Aedeagus as in Fig. 50.

Male mesodermal internal reproductive organs (Fig. 89): Medial accessory gland shorter than lateral gland; testes comprised of 10 follicles.

Female internal reproductive organs (Fig. 94): Spermatheca not capsular; spermathecal gland attached to subapex of spermathecal capsule; bursa copulatrix very reduced in size.

Variation: Length 5.0–7.0 mm; width 1.5–2.0 mm. Other than size, the available specimens are quite homogeneous.

Natural history. Specimens were collected during April, May, July, and November; all with a Malaise trap.

Distribution (Fig. 122). This species is known from northwestern to southeastern Colombia.

Etymology. The trivial name *tigrinus* (= of tigers) is a Latin noun. I refer to the coloration of the elytral disc.

Differential diagnosis. In *M. tigrinus* the pronotum is entirely dark brown, which is a characteristic that will distinguish its members from others in the *tigrinus* group.

***Megaphloeus ustafinis* sp.nov.**

Figs 27, 54, and 126

Type material. Holotype: Male. Brazil: Mato Grosso: Sinop, X-1974, M. Alvarenga (FSCA). (Specimen point mounted, gender symbol affixed to paper point; support card; locality label; Weston Opitz Collection label; FSCA acronymic label; holotype label.)

Paratypes: Nineteen specimens. Brazil: Mato Grosso: Sinop, collection day not noted-X-1974, M. Alvarenga (WOPC, 8); *idem*, collection day not noted-X-1975, M. Alvarenga (WOPC, 1); Vila Vera, collection day not noted-X-1973, M. Alvarenga (WOPC, 1); Rondônia: Vilhena, collection day not noted-XI-1973, M. Alvarenga (WOPC, 2); *idem*, 22-X-1986, C. Ellas (DZUP, 1); 62 km SW Ariquemes, nr. Fza. Rancho Grande, 8-20-XI-1994, black light, J. E. Eger (SEMC, 1); Amazonas: Fonteboa, Hahnel (MNHN, 1); Tefé, M. de Mathan, collection day and month not noted-1879 (MHNP, 1); Amazon, Bates (BMNH, 3).

Description. Size: Length 5.2 mm; width 1.5 mm.

Integument: Cranium red-brown, antenna yellow; pronotum mostly black, pronotal arch red; elytra bicolorous, mostly brown, humeral yellow inverted T poorly developed, humerus and elytral middle with yellow fascia; legs mostly yellow, anterior fascies of profemora and posterior of tibial fascies dark brown.

Head: Antennal funicle filiform (fig 54), combined length of pedicel and funicular antennomeres longer than combined length of antennomeres 9 and 10, antennomeres 9 and 10 narrow triangular, antennal capitulum small.

Thorax: Anterior margin of protibia with 6 spines.

Abdomen: Aedeagus as in Fig. 54.

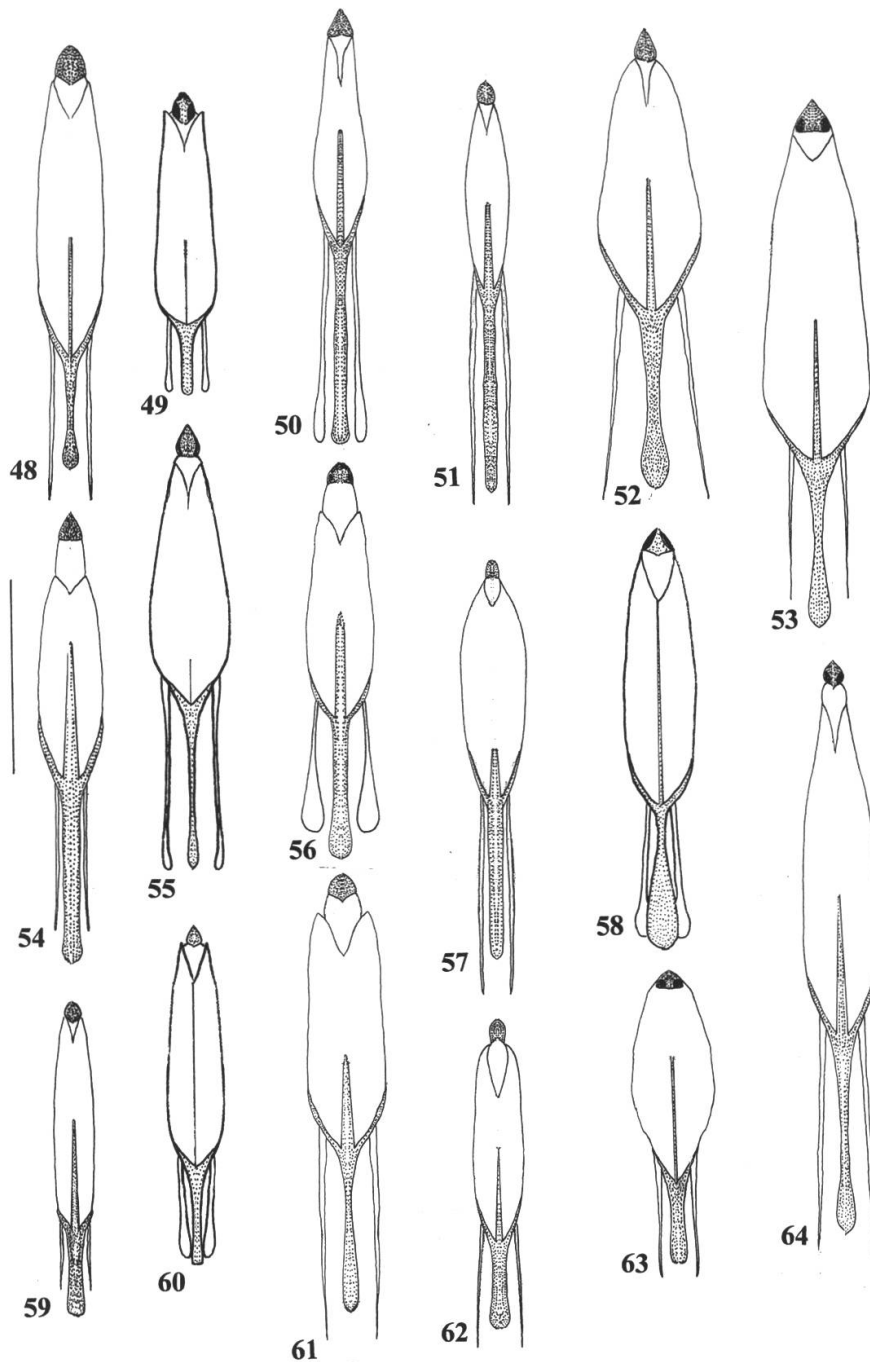
Variation: Length 4.9–7.1 mm; width 1.4–2.8 mm. In some specimens the mesofemora and metafemora are also infuscated.

Natural history: The available specimens were collected during October and November, some with a Malaise trap.

Distribution (Fig. 126). This species is known from central Brazil.

Etymology. The specific epithet *ustafinis* is a Latin compound name that stems from *usta* (= a kind of red color) and *finis* (= boundary). I refer to the reddish color of the pronotal arch.

Differential diagnosis. In the members of this species the pronotal arch is red, which distinguishes these beetles from others in the *tigrinus* group.



Figs 48–64. Aedeagi. 48 – *Megaphloeus nubilus*. 49 – *M. cartus*. 50 – *M. tigrinus*. 51 – *M. parvulus*. 52 – *M. circinus*. 53 – *M. vittellinus*. 54 – *M. ustafinis*. 55 – *M. lividipes*. 56 – *M. longius*. 57 – *M. pectilus*. 58 – *M. mucoreus*. 59 – *M. rictocaliginus*. 60 – *M. animosus*. 61 – *M. bulatus*. 62 – *M. absentis*. 63 – *M. fucoaquilus*. 64 – *M. ustus*.

tricolor group

This group is comprised of six species whose members may be distinguished by the equality of the combined length of the scape and funicular antennomeres and the combined length of antennomeres 8 and 9. Geographically, this group extends from Costa Rica to central Brazil.

***Megaphloeus animosus* (Wolcott, 1927)**

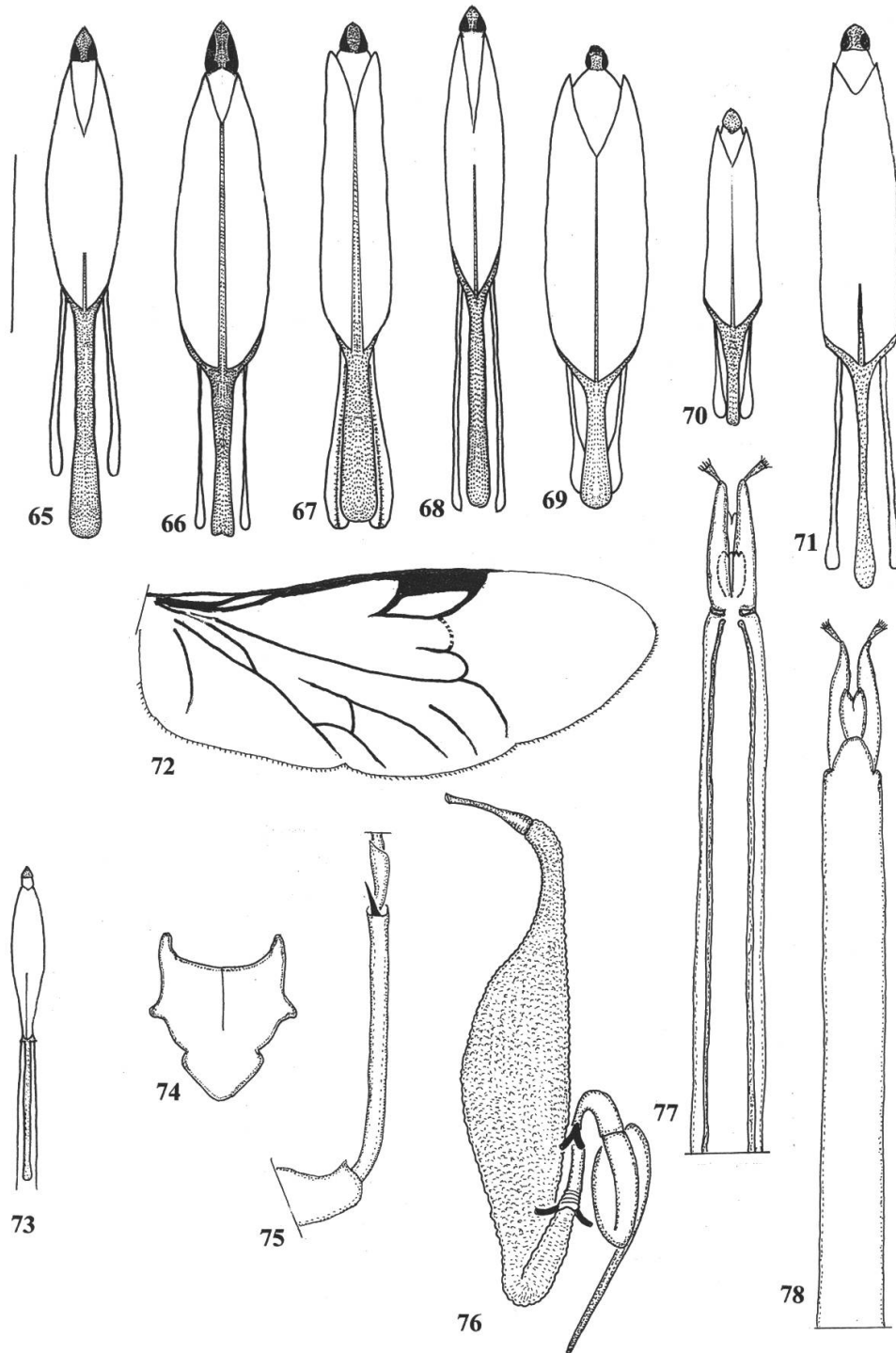
Figs 34, 60, 70, and 119

Epiphloeus animosus Wolcott, 1927: 92. CORPORAL 1950: 253.

Type material. Holotype: Female. Turrialba, Costa Rica (FMNH). (Specimen point mounted, gender symbol affixed to paper point; support card; locality label; collection label; holotype label; FMNH acronymic label; identification label, plastic vial with abdomen and ovipositor.)

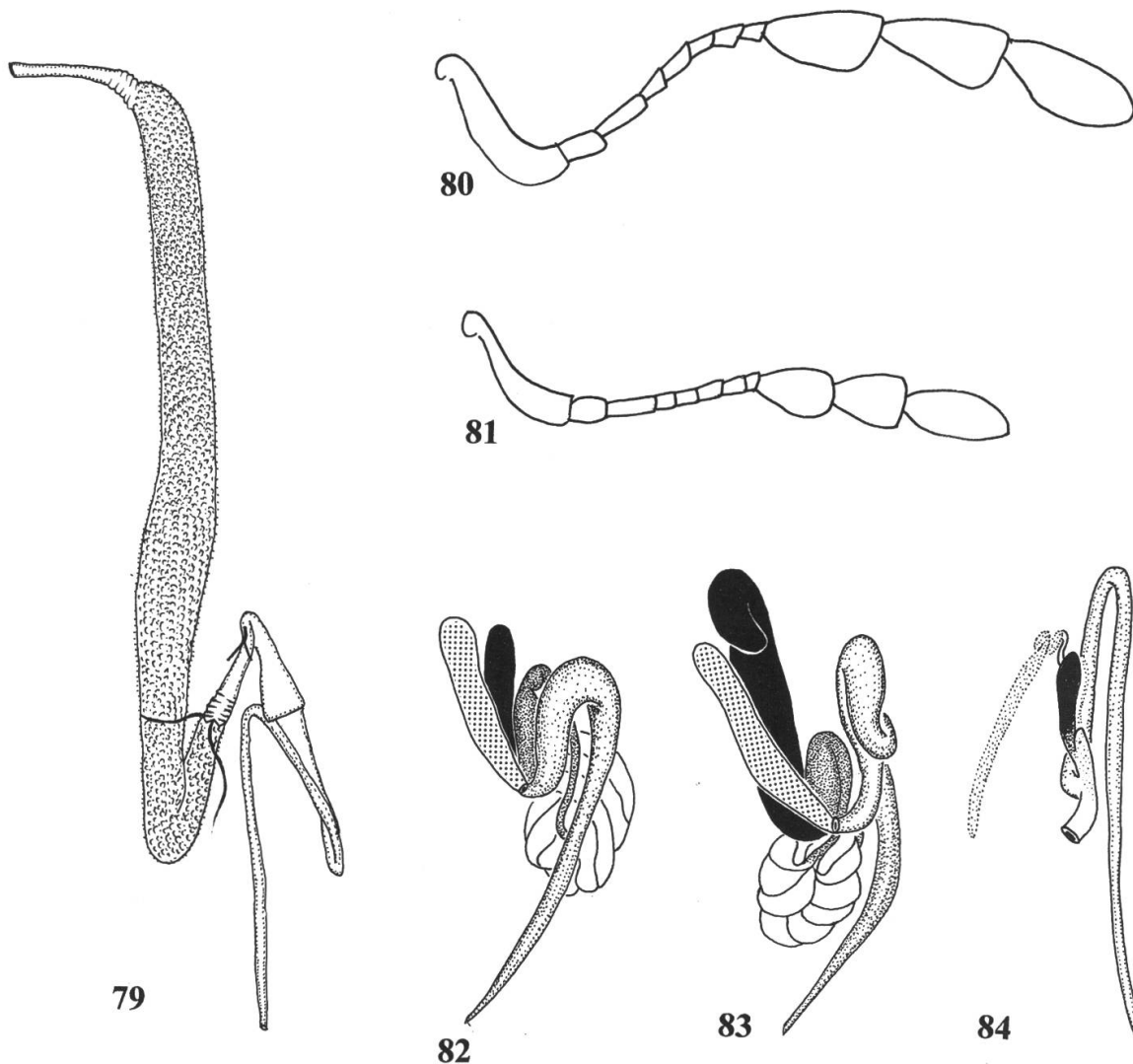
Paratypes: Ten specimens. Costa Rica: Cartago: Turrialba, collection date not noted (FMNH, 3); *idem*, collection day and year not noted, March, 900 m, collector not noted (FMNH, 3); *idem*, collection day and year not noted, June, 900 m, collector not noted (FMNH, 1); *idem*, collection day, month, year not noted, Heyne, Berlin-Wilm (FMNH, 1); *idem*, collection day, month-1924 (ZMAN, 2).

Other material examined. I examined 168 specimens from México: Veracruz: Los Tuxtlas (= San Andrés Tuxtla), Biol. Sta. UNAM, 20-V-1983, 76 m, C. & L. O'Brien & G. Marshal. Honduras: Atlántida: Parq. Nac. Pico Bonito El Manchon, 350 m, 15°29'18"N 87°07'39"W, 20-III-2000. Nicaragua: Zelaya: Cerro Saslaya, 700 m, 13°44'N 85°01'W, collection day not noted-IV-1996, Maes/Heruandez, *idem*, Rio Las Latas, 220 m, 14°34'N 88°33'W, 2-VI-1997, J. M. Maes & B. Hernandez. Costa Rica: Limón: Hamburg Farm, Reventazon, Ebene Limón, 9-IV-1925, F. Nevermann; 35 km N Guápiles, 7-9-II-1978, E. Giesbert; Estrella Valley, Pandora, 1-28-III-1984, Malaise trap, H. Howden & G. Manley. Cartago: Turrialba, 610 m, 9-III-1964, S. L. W: Heredia: Near Puerto Viejo de la Sarapiquí, 15-VIII-1989, Malaise Trap in tree fall gap, B. Brown & D. Feener; La Selva, 3 km, S Pto. Viejo, 10°26'N 84°01'W, 5-IV-1984, H. A. Hespeneheide; *idem*, 50-150 m, 10°26'N 84°01'W, collection day not noted-III-1993, INBio-OET; *idem*, collection day not noted-IV-1993, INBio-OET; *idem*, collection day not noted-V-1993, INBio-OET; *idem*, collection day not noted-VI-1993, INBio-OET; *idem*, collection day not noted-VII-1993, INBio-OET; *idem*, collection day not noted-I-1994, INBio-OET; *idem*, collection day not noted-IV, 1994, INBio-OET; *idem*, collection day not noted-X-1994, INBio-OEM; *idem*, collection day not noted-VIII-1995, INBio-OEM; *idem*, collection day not noted-X-1995, INBio-OET; *idem*, collection day not noted-XI-1995, INBio-OET; *idem*, collection day not noted-II-1996, INBio-OET; *idem*, collection day not noted-VIII-1999, INBio-OET; *idem*, collection day not noted-IX-1999, INBio-OET; 11 km ESE La Virgen, 450-550 m, 10°20'N 84°04'W, 23-II-2003, InBio-OET; *idem*, 10°21'N 84°03'W, 11-III-2003, InBio-OET; *idem*, 23-III-2003, INBio-OET; *idem*, 8-IV-2003; *idem*, 20-IV-2003, INBio-OET; *idem*, 22-II-2004, INBio-OET; *idem*, 9-III-2004, INBio-OET; *idem*, 21-III-2004, INBio-OET; *idem*, 6-IV-2004, INBio-OET; *idem*, 18-IV-2004, INBio-OET; Cahuita, 16-VI-1989, F. Hovore; Rara Avis, 15 km SW Las Horquetas, 700 m, Rainforest, 24-27-1994, beating slash, J. Rifkind & P. Gum; Sector Cerro Cocori, Fca. De E Rojas, 150 m, 5-VII-1992, Malaise Trap, collector not noted; *idem*, 75 m, 10°26'N 84°01'W, Casa Rafael #2, collection day not noted-IX-1992, Malaise Trap, P. Hanson; *idem*, 14-X-1992, collector not noted; *idem*, collection day not noted-collection date not noted-1992, E. Rojas; Guanacaste: 9 km S Santa Cecilia, Estac. Pitilla, 70 m, collection date not noted-collection month not noted-1988, Malaise Trap, GNP Biod. Survey: Puntarenas: 24 km W Piedras Blancas, 200 m, Resva. Forestal Golfo Dulce, 08°46'N 83°24'W, collection day not noted-XI-1990, P. Hanson; *idem*, collection day not noted-X-1991, P. Hanson; *idem*, collection day not noted-XI-1991, P. Hanson; *idem*, collection day not noted-XII-1991, P. Hanson; *idem*, collection day not noted-III-1992; *idem*, 5 km W Piedras Blancas, 100 m, collection day not noted-XI-1992, Malaise trap, P. Hanson; *idem*, collection day not noted-XII-1992, Hanson & Godoy; 27 km S Puerto Jiménez, 710 m, Peninsula Osa, 08°32'N 83°19'W, collection day not noted-II-1992, Malaise trap, P. Hanson; *idem*, 5 m, Peninsula Osa, collection date not noted-II-1991, Malaise trap, P. Hanson; *idem*, 24 km W Peidras Blancas, collection day not noted-VI-1991, Malaise trap, P. Hanson; *idem*, 3 km SW Rincon, 10 m, collection day not noted-X-1991, Malaise trap, P. Hanson; *idem*, collection day not noted-III-IV-1992, P. Hanson; San Vito, 1500 m, Est. Biológica, Las Alturas, 08°57'N 82°50'W, collection day not noted-III-1992, Malaise trap, P. Hanson; *idem*, 1-II-1998, F. Hovore; Rancho Quemado, 200 m, Peninsula de Osa, collection day not noted-VI-1992, F. Quesada; Punta Leona, 29-VI-3-VII-2001, beating slash, J. & A. Rifkind, P. Gum; Parque Nacional Corcovado, Est. Sirena, 08°28'31"N 83°36'W, 20-III-1981, H. A. Hespeneheide. Panamá: Bocas del Toro: 40 km W Chiriquí Grande, 10-V-1999, Morris & Wappes; Chiriquí: Tolé: collection date not noted, Champion; Boquete, 2-IX-1977, Henk Wolda; Fortuna Dam area, 1100 m, 22-28-V-1984, S. McKamey; Bugaba, 244-457 m, collection date not noted, Champion; San Lorenzo, collection date not noted, Champion; Volcán de Chiriquí, 0.6-915 m, collection date not noted, Champion: Panamá: Cerro Azul, 4 km bay, Goofy Lake, 700 m, 09°12'N 79°23'W, 24-VII-1970, H. A. Hespeneheide; *idem*; Cerro Campana, 850 m, 08°40'N 79°56'W, 7-I-1972, H. P. Stockwell, *idem*, 09°09'N 79°51'W, collection date not noted, Pickering, Windsor; *idem*, 640 m, 26-V-3-VI-1981, E. Giesbert; Cerro Jefe, 700 m, 09°12'N 79°21'W, 21-IV-1973, Stockwell; *idem*, 08°40'N 79°56'W, 27-VII-1974, H. A. Hespeneheide;



Figs 65–78. Aedeagi. 65 – *Megaphloeus tricolor*. 66 – *M. velutinus*. 67 – *M. marginipes*. 68 – *M. terzonatus*. 69 – *M. variegatus*. 70 – *M. animosus*. 71 – *M. tricolor*. 72 – *M. mucoreus*, metathoracic wing. 73 – *M. sexplagiatus*, aedeagus. 74–78 – *M. mucoreus* (74, mesoscutellum; 75, hind leg; 76, alimentary canal; 77, ovipositor, ventral view; 78, ovipositor, dorsal view).

idem, 29-VI-1974, O'Brien & Marshall; 10 km N El Llano, 28-V-3-VI-1984, 427 m, E. Giesbert; Madden Forest, 3-VIII-1971, H. P. Stockwell; Barro Colorado Island, 8-VII-1961, J. M. Campbell; *idem*, 2-VIII-1971, H. A. Hespenehde; *idem*, 09°10'N 79°50'W, 9-VIII-1974, H. A. Hespenehde; *idem*, 5-IV-1993, Inga tree fall, collector not noted; *idem*, 23-VII-1977, H. A. Hespenehde; *idem*, 26-VII-1978, H. A. Hespenehde; *idem*, 27-



Figs 79–84. Various organs. 79 – *Megaphloeus setulosus* alimentary canal. 80–81 – Antenna (80, *M. tricolor*; 81, *M. absentis*). 82–84 – Mesodermal internal reproductive systems (82, male of *M. variegatus*; 83, male of *M. marginipes*; 84, female of *M. velutinus*).

VII-1978, H. A. Hesperheide; *idem*, 12-V-1980, Henk Wolda; *idem*, 23-25-VI-1980, Henk Wolda; *idem*, 13,16,18-VI-1980, Henk Wolda; *idem*, 14,17,19-III-1986, Henk Wolda; *idem*, 7,10,12-III-1986, Henk Wolda; *idem*, 20,23,25-VI-1986, Henk Wolda; *idem*, 6,9,11-VI-1986, Henk Wolda; *idem*, 6,9,11-VI-1986, Henk Wolda; *idem*, 7,9,11-III-1986, Henk Wolda; *idem*, 14,16,18-VII-1986, Henk Wolda; *idem*, 29-IX-1-3-X-1986, Henk Wolda; *idem*, 14-VII-1980; Henk Wolda; *idem*, 19-25-IX-1984, H. Wolda; *idem*, Pipeline Road, 14-VI-1975, D. Engleman; *idem*, 3-IV-1981, R. B. & L. S. Kimsey; Madden Forest, 2 km, 09°06'N 79°38'W, 2-V-III-1971, H. A. Hesperheide; *idem*, 2-VIII-1971, H. A. Hesperheide; *idem*, 3-VIII-1971, H. P. Stockwell; Barro Colorado Island, 09°10'N 79°50'W, 18-IV-1973, H. Hesperheide; *idem*, 11-IX-1978, lights, Henk Wolda; *idem*, 20-VI-1981, R. B. & L. S. Kimsey; *idem*, 1-VI-1981, R. B. Kimsey; *idem*, 3-V-2006, collector not noted: Colón: Santa Rita Ridge, 15-IV-1976, Stockwell; Ft. Sherman, 31-V-VI-1981, E. Giesbert: Darien: Pirre, Est. Rancho Frio, 21-III-4-IV-2000, 230 m, Malaise Trap, Cambra, Santos Bermúdez; *idem*, 21-III-4-IV-2000, 80 m, Malaise trap, Cambra, Santos, Bermúdez; *idem*, 21-III-4-IV-2000, 560 m, Malaise trap, Cambra, Santos, Bermúdez; *idem*, 21-III-4-IV-2000, 230 m, Malaise trap, Cambra, Santos, Bermúdez; *idem*, 7-16-XI-2000, 80 m, Malaise trap, R. Cambra, A. Santos; *idem*, 18-24-I-2001, 80 m, Malaise trap, R. Cambra, A.

Santos; *idem*, 16-XI-17-I-2001, Malaise trap, R. Cambra, A. Santos; *idem*, 9-17-IV-2002, 80 m, Malaise trap, R. C., A. S., R. M.; *idem*, 30-VII-8-VIII-2002, Malaise trap, A. Santos, R. Miranda; *idem*, 8-VIII-2-X-2002, R. Cambra, A. Santos; *idem*, 3-17-X-2002, Malaise trap, R. Cambra, A. Santos, 1-21-IV-2004, 450 m, Malaise trap, R. Cambra: Veraguas: Bahia Honda, Rio Limón, 7-17-X-2001, Malaise trap, R. Cambra, A. Santos; *idem*, Est. Biol. Eden., 28-V-2-VI-2002, R. Cambra, A. Santos. Colombia: Amazonas: Amacayacu, Matamata, 03°41'S 70°16'W, 27-III-3-IV-2000, 150 m, Malaise trap, A. Parente; *idem*, Amacayacu Camino a San Martín 03°41'N 70°15'W, 1-10-III-2004, 150 m, Malaise trap, T. Pape & D. Arias: Chocó: Utría Cocalito Dosel, 06°1'N 77°20'W, 16-VIII-IX-2000, 20 m, Malaise trap, J. Pérez: Caquetá: Serranía de Chirbliquete Rio Cuñaré, bos. tierra firme, 00°31'N 72°38'W, 29-IX-12-X-2000, 300 m, Malaise trap, M. Ospina & E. González. Venezuela: Tachira: Rio Frio, 20-24-IV-1982, 600 m, U. C. V. Ecuador: Napo: Yasuni Res. Sta., 19-30-X-1998, 250 m, W. J. Hanson. Peru: Junín: Satipo, 19-I-1984, L. Huggert. Brazil: Rondônia: 62 km SE Ariquemes, 7-18-XI-1995, W. J. Hanson. Specimens are deposited in BMNH, CHAH, FMNH, FSCA, INBC, JEW, JNRC, MIUP, MNHN, MUCR, SEAN, STRI, USNM, WFBC, and WOPC.

Description. Size: Length 5.0 mm; width 5.5 mm.

Integument: Cranium red-brown, antennal scape yellow, rest of antenna brown; pronotum brown except anterior margin red; elytra bicolorous, mostly brown, humeral yellow inverted T broad and poorly defined, humerus and elytral middle with yellow fascia; legs brownish-yellow.

Head: Antennal funicle filiform (Fig. 34), combined length of pedicel and funicular antennomeres about equal in length than combined length of antennomeres 9 and 10, antennomeres 9 and 10 elongate triangular, antennal capitulum intermediate in size.

Thorax: Pronotal arch transversally wrinkled, pronotal discal tubercles not particularly prominent; elytral apex moderately narrowed; anterior margin of protibia with 4 spines.

Abdomen: Aedeagus as in Fig. 60.

Variation: Length 3.5–5.2 mm; width 1.3–1.8 mm.

Natural history. Specimens were captured in Middle America throughout the year, and from October through April in South America. These beetles were taken at elevations that range from 10 to 1500 m. H. A Hesperheide captured several specimens on dead *Rhedia*, others on dead branches of *Pentaclethra maculosa*. F. Nevermann captured these beetles at night, on dry wood among wilted leaves of *Lecyris costaricensis*.

Distribution (Figs 118, 119). This species is known from México to Brazil.

Differential diagnosis: In the *tricolor* group only the members of this species show an elytral disc that is traversed by only two yellow fasciae.

Megaphloeus circinus sp.nov.

Figs 35, 52, and 119

Type material. Holotype: Male. COLOMBIA, Vaupés, R. N. Mosiro-Itajura (Caparú), Centro Abiental, 1°4'S 69°31'W, 60 m, Malaise, 20-I-1-II-2003, M. Sharkey & D. Arias, M. 3386 (IAVH). (Specimen point mounted, gender symbol affixed to paper point; support card; locality label; IAVH acronymic label; holotype label.)

Paratypes: One specimen. Colombia: Amazonas: Mun. Leticia, km 11 Via Tarapaca, 04°7'S 69°57'W, 6-21-II-2003, 200 m, Malaise trap, W. Morales (WOPC, 1).

Description. Size: Length 5.0 mm; width 1.5 mm.

Integument: Cranium red-brown, antenna scape and pedicel yellow, remainder light brown; pronotum proper brown, arch red; elytra bicolorous, humeral yellow inverted T poorly defined, humerus elytral middle, and preapical region of elytral disc with yellow

macula; legs mostly yellow, anterior facies of profemora infuscated, posterior margin of tibiae infuscated.

Head: antennal funicle filiform (Fig. 35), combined length of pedicel and funicular antennomeres about equal in length than combined length of antennomere 9 and 10; antennomeres 9 and 10 short triangular, antennal capitulum intermediate in size.

Thorax: Pronotal arch transversally wrinkled, pronotal discal tubercles not prominent; elytral apex moderately narrowly rounded; anterior margin of protibia with 5 spines.

Abdomen: Aedeagus as in Fig. 52.

Variation: The two specimens examined do not vary appreciably.

Natural history. Specimens were collected during February, one at 60 m within a Malaise trap, the other at 200 m, also within a Malaise trap.

Distribution (Fig. 119). This species is known from southern Colombia.

Etymology. The specific epithet *circinus* is a Greek adjective that stems from *kirkinos* (= encircle). I refer to the subspheroid macula on the preapical region of the elytral disc.

Differential diagnosis. There are two species in the *tricolor* group whose members have the pronotal arch that is at least part red. This involves *M. velutinus* and *M. circinus*. *M. circinus* specimens may be distinguished from *M. velutinus* specimens by the more rounded apexes of the elytra. The apex of the elytra of *M. velutinus* specimens is subacute.

***Megaphloeus lividipes* (Chevrolat, 1874)** Figs 38, 55, 99, 105b, and 119

Epiphloeus lividipes Chevrolat, 1874: 320. CORPORAAL 1950: 254.

Type material. Lectotype: Female (here designated). Venezuela. (MNHN). (Specimen point mounted; identification-locality label; support card; lectotype label; MNHN acronymic label.)

Paratypes: None.

Other material examined. I examined 5 specimens from: Venezuela: Aragua: Rancho Grande, 18-V-1973, J. Salcedo & J. José Clavijo; *idem*, 24–25-II-1971, H. & A. Howden: Carabobo: Chirqua, 31-VII-1968, 1700 m, J. & B. Bechyne. Specimens are deposited in CMNC, MIZA, and WOPC.

Description. Size: Length 5.0 mm; width 1.5 mm.

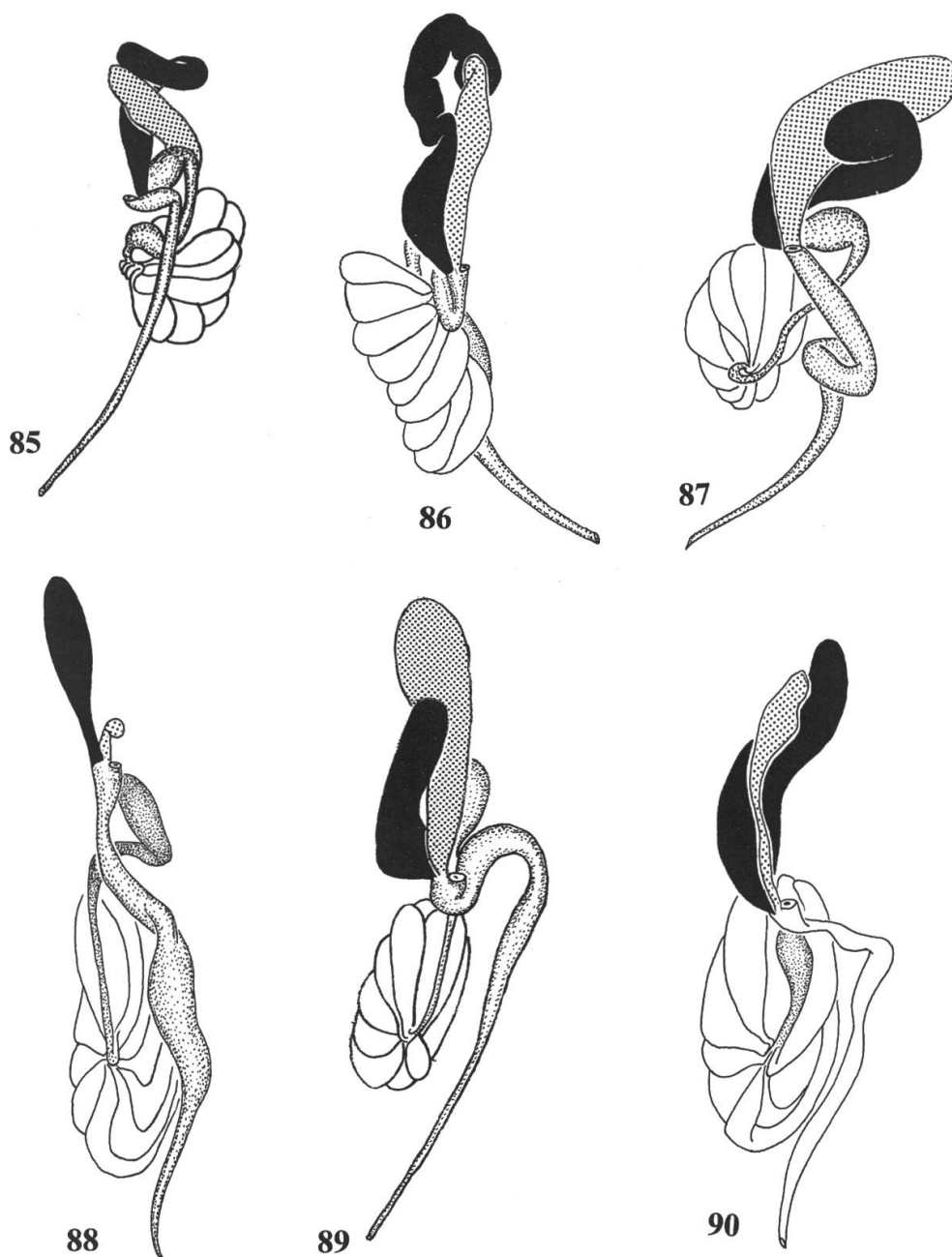
Integument: Cranium reddish-brown, antennal scape yellow, remainder of antenna brown; pronotum mostly dark brown, anterior margin light brown; elytra bicolorous, humeral yellow inverted T not present, admixture of dark brown pattern, one macula extends from humerus, medially located yellow macula connects to short yellow streak near elytral apex; legs mostly yellow, femora, tibiae, and tarsi infuscated.

Head: Antenna funicle filiform (Fig. 38), combined length of pedicel and funicular antennomeres about equal in length as combined length of antennomeres 9 and 10, antennomeres 9 and 10 short triangular, antennal capitulum intermediate in size.

Thorax: pronotal arch transversally wrinkled, pronotal discal tubercles not particularly prominent; elytral apex sharply rounded; anterior margin of protibia with 4 spines.

Abdomen: Aedeagus as in Fig. 55.

Variation: The available specimens are quite homogeneous.



Figs 85–90. Male mesodermal internal reproductive organs. 85 – *Megaphloeus mucoreus*. 86 – *M. tricolor*. 87 – *M. vitellinus*. 88 – *M. sexplagiatus*. 89 – *M. tigrinus*. 90 – *M. mucoreus*.

Natural history. Specimens were collected from May through July, at altitudes that range from 1100 to 1800 m, by sweeping montane trail vegetation.

Distribution (Fig. 119). This species is known from the northern Andes of Colombia and Venezuela.

Differential diagnosis. *Megaphloeus lividipes* specimens have three angular fascia covered with silvery setae. These fasciae are broadly interconnected along the sutural margin. This elytral characteristic is unique in *Megaphloeus*.

***Megaphloeus rictocaliginus* sp.nov.**

Figs 26, 59, and 120

Type material. Holotype: Female. Brazil, Rondonia, 62 km SE Ariquemes, 5–16 Nov 1996, W. J. Hanson (FSCA). (Specimen point mounted, gender symbol affixed to paper point; support card; locality label; FSCA acronymic label; holotype label.)

Paratypes: Thirty-two specimens. Costa Rica: Cartago: Turrialba, collection day not noted-VI-1949, K. W. Cooper (WOPC, 1); Guanacaste: Sector Las Pailas, 16-30-III-1995, 800 m, K. Taylor (INBC, 1). Panamá: Colón: Barro Colorado Island, 09°10'N 79°50'W, 30-V-1977, H. A. Hespenheide (HAHC, 1). Venezuela: Bolívar: Gran Sabana Chirima, 29-30-V-1966, J. & B. Bechyne (IZAV, 2; WOPC, 2); Barinas: 40 km SE Socopo, 25-I-1970, 150 m, *Rheedia madruno*, S. L. Wood (WOPC, 1). Guyana: Essequibo: New River, 27-II-10-III-1938, 229 m, C. A. Hudson (BMNH, 1). French Guiana: Guyane: Régina Montagne de Kaw, 9-X-2000, Malaise trap, J.A. Cerda (GMCF, 1); *idem*, 12-X-2000, Malaise trap, J.A. Cerda (WOPC, 1); *idem*, 23-XI-2000, Malaise trap, J.A. Cerda (GMCF, 1); N-2, pk 72.5, 28-I-1995, F.T. Hovore (exact locality not found). Bolivia: Cochabamba: Villa Tunari, Parque Machias, 16°58'S 65°24'W, lowland rain forest, 300 m, 12-II-1999, R. Anderson (CMNC, 1; WOPC, 1); Chaparé: 15-VIII-1950, 400 m, R. Zischka (FMNH, 6; WOPC, 3); *idem*, 5-X-1950, 400 m, R. Zischka. Ecuador: Orellana: Reserva Étnica Waorami, 1 km S Onkone Gare Camp, 3910S 76 26W, 5-II-1996, 220m, fogging leaves of plants in terre firme, T.L. Erwin (USNM, 1). Brazil: Rondônia: 62 km SE Ariquemes, 7-18-XI-1995, W. J. Hanson (EMUS, 2; WOPC, 1); *idem* 1-14-XI-1997, B. Dozier (WOPC, 1); Pará: Belem, APEG forest reserve, 23-27-XI-1974, Malaise trap, J.F. Reinert (WOPC, 1); Faz. Taperinha, 19-22-XI-1969, J. M. & B. A. Campbell (WOPC, 1).

Description. Size. Length 5.5 mm; width 2.0 mm.

Integument: Cranium red-brown, antennal scape yellow, remainder of antenna brown; pronotum red-brown at sides, disc with broad black vertical line at middle; elytra bicolorous, mostly black, humeral yellow inverted T not present, humerus and elytral middle with red-brown macula at humerus and middle of disc; legs yellow.

Head: Antennal funicle filiform (Fig. 26), combined length of pedicel and funicle about as long as combined length of antennomeres 9 and 10, antennomeres 9 and 10 broad triangular, antennal capitulum large.

Thorax: Pronotal arch transversally wrinkled, pronotal discal tubercles not particularly prominent, elytral apex moderately narrowly rounded; anterior margin of protibia with 6 spines.

Abdomen: Aedeagus as in Fig. 59.

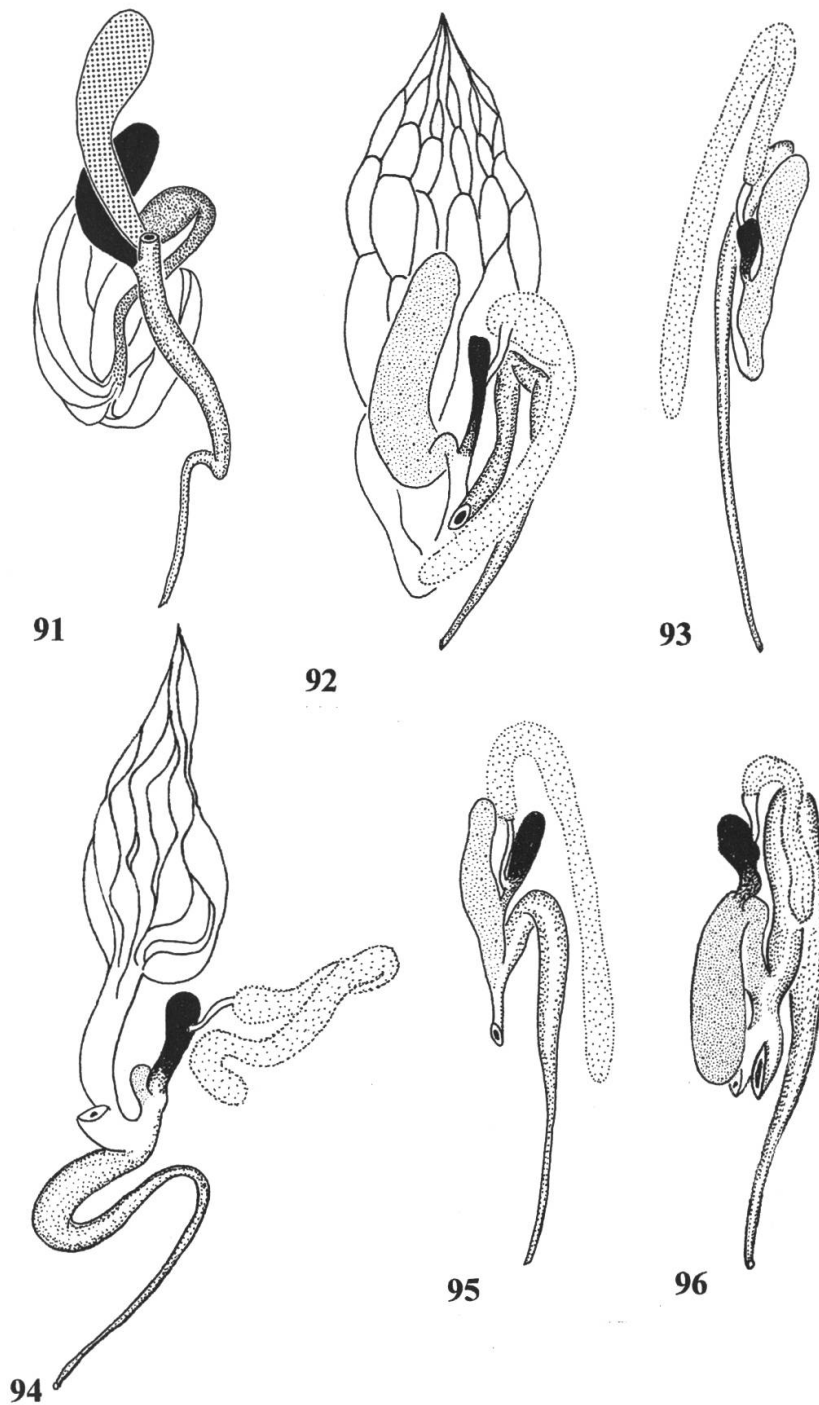
Variation: Length 4.1–5.5 mm; width 1.4–2.0 mm. The pronotum may be mostly black and the elytral humeral and middiscal maculae may be connected. Also, the middiscal pale macula may be absent and there may be a third pale macula near the elytral apex in which case the three maculae are narrowly connected.

Natural history. Specimens were collected from January to March, May, June, October, and November; one specimen each at 150, 300, and 800 m. One specimen was captured within a Malaise trap and one in a lowland rain forest.

Distribution (Fig. 121). This known range of this species extends from the northern Andes of Venezuela and British Guiana south to central Brazil.

Etymology. The trivial name *rictocaliginus* is a Latin compound name that stems from *caligo* (= darkness) and *rictus* (= open mouth). I refer to the black coloration of the apices of the labial palpomeres.

Differential diagnosis. In the members of this species the elytral humeral region is devoid of an inverted T and the pronotum usually shows pale maculae near the posterior corners. These features along with the reddish frons will distinguish the members of this species within the *tricolor* group.



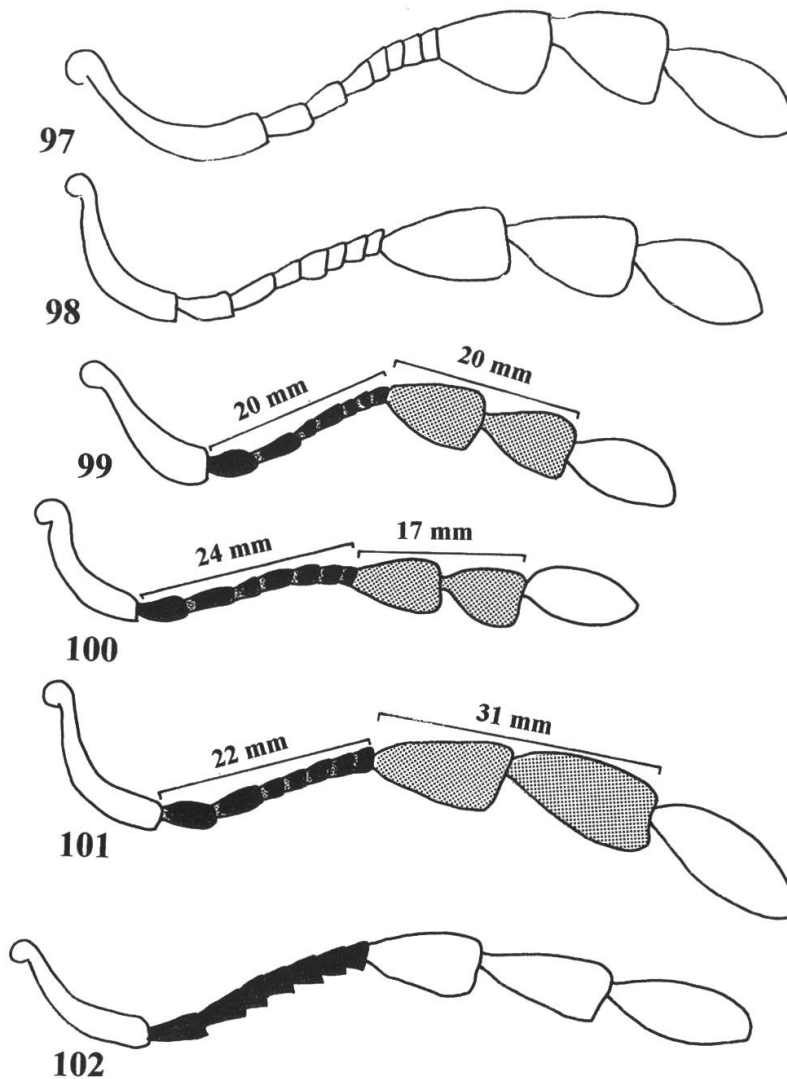
Figs 91–96. Mesodermal internal reproductive organs. 91–92 – *Megaphloeus marginipes* (91, male; 92, female). 93–96 – Female (93, *M. mucoreus*; 94, *M. tigrinus*. 95, *M. variegatus*; 96, *M. sexplagiatus*).

***Megaphloeus tricolor* (Kuwert)**

Figs 32, 65, 71, 80, 86, and 120

Epiphloeus tricolor Kuwert, 1893: 493. CHAPIN 1927: 6. CORPORAAL 1950: 255.

Epiphloous micaceus Chapin, 1927: 6. Holotype. Gender not known. Bolivia: Tumupasa. (USNM). **syn.nov.** One paratype from Bolivia: Tumupasa (ZMAN). The characteristics used to describe this nominal species fall within the range of variation of the species representing the senior synonym. CORPORAAL 1950: 254.

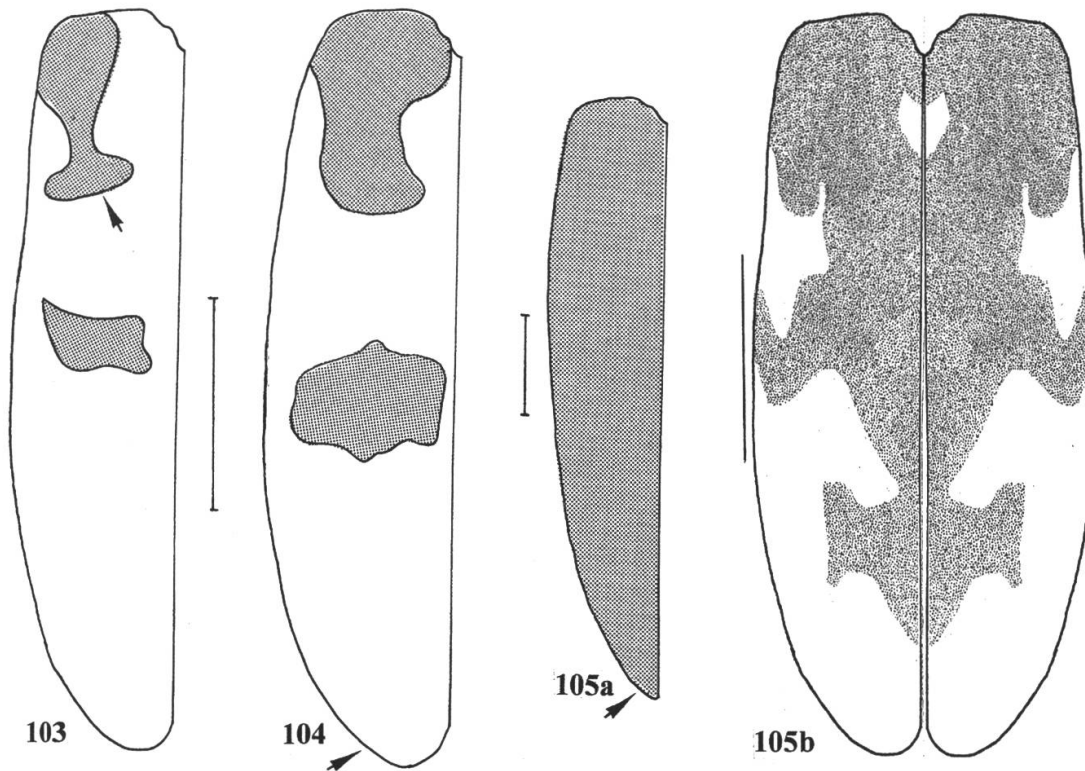


Figs 97–102. Antennae. 97 – *Megaphloeus mucoreus*. 98 – *M. fucoaquilus*. 99 – *M. lividipes*. 100 – *M. longius*. 101 – *M. terzonatus*. 102 – *M. platyglenus*.

Type material. Lectotype. Gender not known (here designated). Brazil, Amazons (MNHN). (Specimen point mounted; support card; locality label; identification label; type label; MNHN acronymic label.)

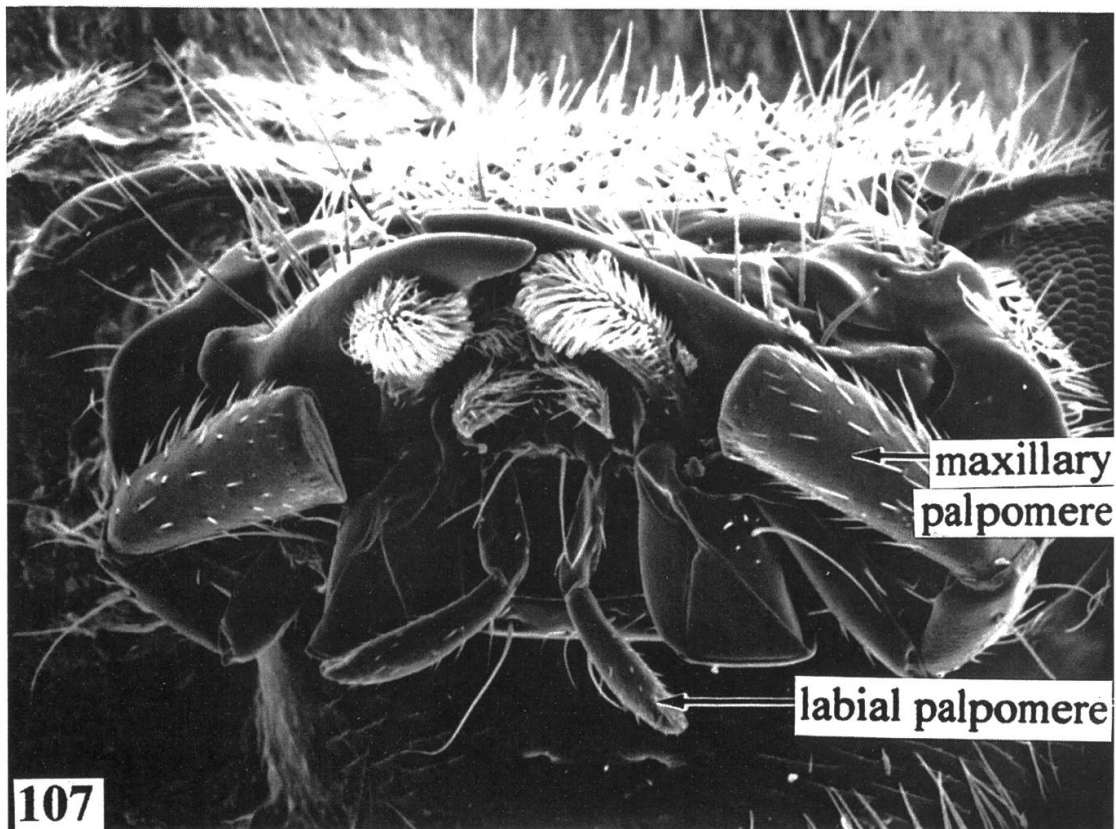
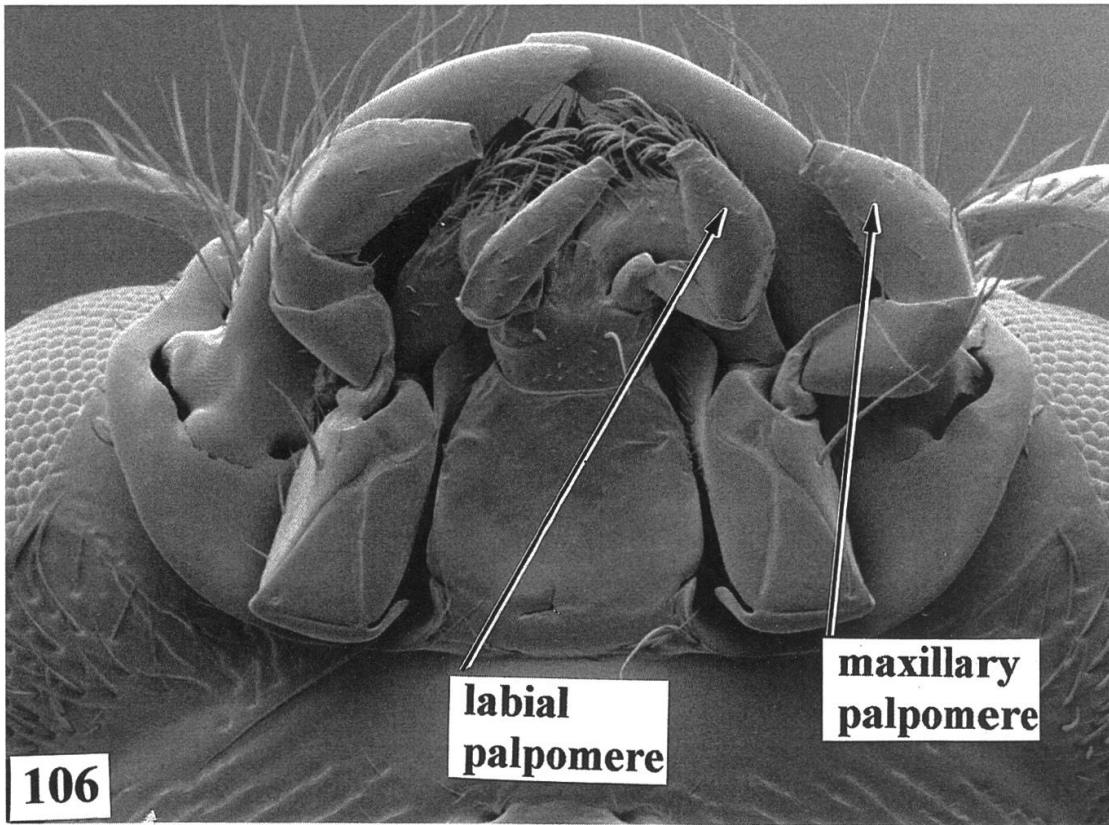
Paralectotypes: One specimen with the same locality and repository as the lectotype (MNHN).

Other material examined. I examined 85 specimens from Costa Rica: Cartago: Braulio Carrillo, Sector Carrillo, 12-VI-1988, E. Giesbert: Puntarenas: Peninsula Osa, Cerro Rincon, 08°31'N 83°28'W, 45 m, Virgin Forest, 745 m, collection day not noted-XI-1990, Malaise trap, Hanson & Godoy: Heredia: Pto. Viejo, La Selva, 100 m, collection day not noted-II-III-1993, Hanson & Godoy; *idem*, Est. Biol. La Selva, 50-150 m, 10°26'N 84°01'W, 16-IV-1993, collector not noted; *idem*, 18-V-1993, collector not noted; *idem*, 2-VI-1993, collector not noted, 14-VI-1993, collector not noted; *idem*, 1-VII-1993, collector not noted; *idem*, 3-VIII-1993, collector not noted; *idem*, 15-XI-1993, collector not noted; *idem*, 1-XII-1993, collector not noted; *idem*, 3-I-1994, collector not noted; *idem*, 16-VIII-1995, collector not noted; *idem*, 1-XI-1995, collector not noted; *idem*, 15-XI-1995, collector not noted; *idem*, 14-XII-1995, collector not noted; *idem*, 2-I-1996, collector not noted; *idem*, 31-V-1996, collector not noted; 11 km SE La Virgen, 450-550 m, 10°20'N 84°04'W, 8-IV-2003, collector not noted; *idem*, 11 km ESE La Virgen, 250-350 m, 10°21'N 84°03'W, 22-II-2004, collector not noted; *idem*, 9-III-2004, collector not noted; *idem*, 18-IV-2004, collector not noted; *idem*, 6-IV-2004, collector not noted; *idem*, 18-IV-2004, collector not noted. Panamá: Panamá: Cerro Campana, 519 km, 29-VI-1974, Erwin &

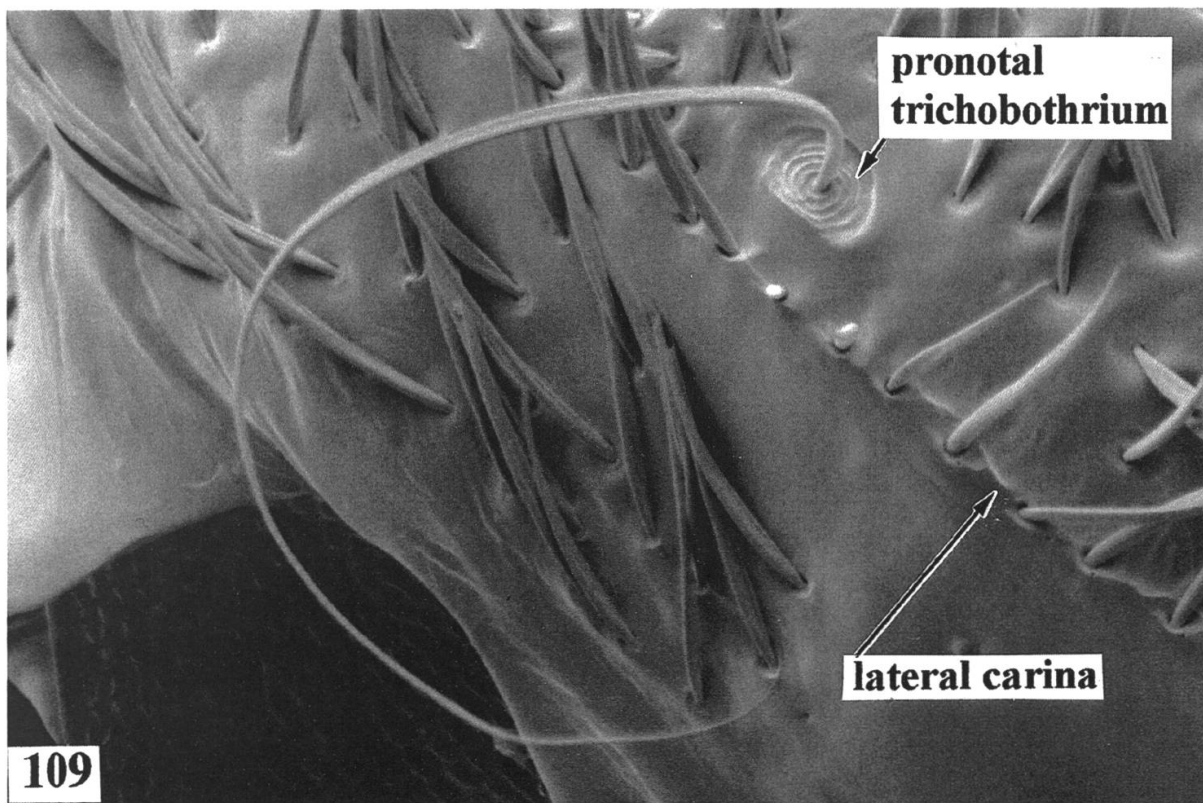
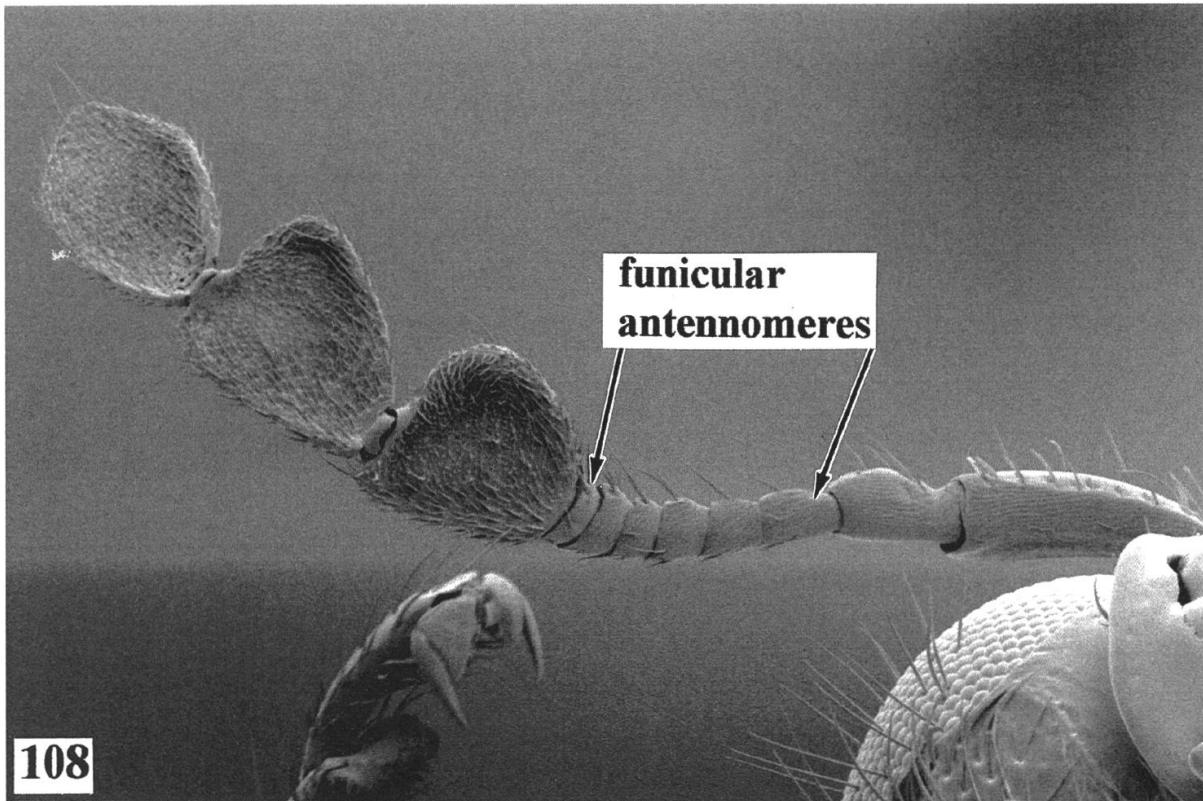


Figs 103–105. Elytra. 103 – *Megaphloeus absentis*. 104 – *M. pectillus*. 105a – *M. velutinus*. 105b – *M. lividipes*.

Whitehead; Cerro Azul, 29-V-1983, J. E. Wappes; Darién: Est. Cruce Mono, 5-28-II-1993, Malaise trap, R. Cambra & J. Coronado; *idem*, Pirre Est. R. Frio, 450 m, 1-21-IV-2004, Malaise trap, R. Cambra; Colón: Fort Sherman, 16-V-1991, R. Turnbow; 100 m Cerro Viejo Mine Rd., 10 k SW Nombre de Dios, 25-IV-1992, A. R. Gillogly; *idem*, Fort Sherman, 09°17'N 79°59'W, 10-XII-2001, F. Ødegaard; 14 km E Portobelo, 25-IV-2-V-1992, E. Giesbert; 5 km SE Pina, 20 m, 11-VI-1996, Atlantic rain forest general collecting, R. Anderson; Soberania Nat'l Pk. 26-30-1997, Huether & Wappes; Pipeline Rd. K 1-12, 26-30-VI-1997, Wappes & Morris; *idem*, 8-9-VII-1997, Wappes & Morris; Altos de Pacora, 4-10-I-collection year not noted, E. Giesbert. Colombia: Amazonas: Leticia, 213 m, 23-II-2-III-1974, H. & A. Howden; Amacayacu Matamata, 3°41'S 70°15'W, 150 m, Malaise trap, 29-I-12-II-2001, A. Alvarado Leg; *idem*, 2-15-X-2001, Malaise trap, D. Chota; *idem*, Amacayacu Cabaña Lorena, 03°0'S 69°59'W, 1-15-IX-2001, Malaise trap, D. Deaza; Caquetá: Serranía de Chiribiquete Río Cuñaré, bos. tierra firme, 00°31'N 72°38' W, 300 m, Malaise trap, 10-14-XI-2000, E. González & M. Ospina; Putumayo: 320 m, La Paya Cabaña Viviano Choca, 00°7'S 74°56'W, 15-30-X-2001, Malaise trap, R. Cobete; *idem*, 1-15-XI-2001, R. Cobete; La Paya Resguardo Cecillo Cocha, 00°11'S 74°55'W, 210 m, 20-24-I-2003, Malaise trap, C. Sarmiento; Vaupés: Mosiro-Itajura (Caparú) Terrazas, 01°4'S 69°31'W, 60 m, 22-IX-7-X-2002, Malaise trap, L. Benavides; *idem*, 24-XI-1-XII-2003, J. Pinzón. Venezuela: Aragua: Rancho Grandé, 1200-1400 m, 13-VIII-1933, C. W. & L. O'Brien & Wibmer. French Guiana: Guyane: Régina, Montagne de Kaw, PK 38.5, 8-V-1999, Malaise trap, O. Morvan. Ecuador: Zemora-Chinchipe: Rio Bombuscaro, 1000 m, 04°07'0"S 78°37'48"W, 26-VI-4-VII-1996, Malaise trap, P. Hibbs; Napo: Yasuni Res. Sta., 19-30-X-1998, 250 m, W. J. Hanson. Bolivia: La Paz: Tumupasa, collection day not noted- XII-1921-1922, W. M. Mann; Beni: Cavinás, collection day not noted- XII-1921-1922, W. M. Mann; Cochabamba: Cochabamba, Germaín, collection day not noted-collection month not noted-1906; Santa Cruz: Amboro National Park, Los Volcanes, 1000 m, 18°06'S 63°36'W, 20-XI-12-XII-2004, Malaise trap on tree fall, Barclay, M. V. L. & H. Mendel; Tumupasa, collection day not noted-XII-collection year not noted, W. M. Mann; *idem*, collection day not noted-collection month not noted-1921-1922, W. M. Mann. Brazil: Rondônia: Vilheria,



Figs 106–107. Mouthparts. 106 – *Megaphloeus setulosus* 107 – *Epiphloeus duodecimmaculatus*.



Figs 108–109. *Megaphloeus setulosus*. 108 – Antenna. 109 – Pronotum.

collection day not noted-XI-1973, M. Alvarenga; 62 km SE Ariquemes, 8-20-XI-1994, W. J. Hanson: Mato Grosso: Vila Vera, collection day not noted-X-1973, M. Alvarenga; Vilhena, collection day not noted-XI-1973, M. Alvarenga: Amazonas: Manaus, 1 km W Taruma Falls, 16-II-1981, 100 m, C. Young. Specimens are deposited in BMNH, CMNC, EMUS, FMNH, FSCA, INBC, JNRC, MIUP, MNHN, MUCR, NHMB, OXUM, SEMC, USNM, and WOPC.

Description: Length 5.0 mm; width 1.8 mm.

Integument: Cranium reddish-brown, antenna yellow except 10th and 11th antennomeres brown; pronotum brown; elytra bicolorous, mostly brown, humeral yellow inverted T poorly developed, humerus and elytral middle with yellow fascia; legs yellow except femora infuscated.

Head: Antennal funicle filiform (Fig 80), combined length of pedicel and funicular antennomeres about equal in length as combined length of antennomeres 9 and 10, antennomeres 9 and 10 narrow triangular, antennal capitulum intermediate in size.

Thorax: Pronotal arch transversally wrinkled, pronotal discal tubercles not prominent; anterior margin of protibia with 8 spines.

Abdomen: Aedeagus as in Fig. 65.

Male Mesodermal Internal Reproductive Organs (Fig. 86): Medial accessory gland considerably longer than lateral gland; testis comprised of 12 follicles.

Variation: Length 5.0–6.4 mm; width 1.8–2.0 mm. There is some variation in the shape of the capitulum antennomeres (Figs 32, 80) and in the apex of the phallus (Figs 65, 71).

Natural history. Specimens were collected during November and December. In South America, specimens were collected in the Brazilian Amazon and highlands of Bolivia

Distribution (Figs 121, 125). This species is known from Costa Rica to Brazil.

Differential diagnosis. There are two species in the *tricolor* group whose specimens have two yellow maculae on the elytral disc. The group involves *M. animosus* and *M. tricolor*. *M. tricolor* specimens may be distinguished from *M. animosus* specimens by the configuration of the midelytral fascia. The fascia extends to the epipleural margin in specimens of *M. tricolor*, which is not the case in specimens of the other aforementioned species. Also, the short phallobasic rod in the male members of this species will distinguish them from males of *M. animosus* in which the rod is considerably longer.

Megaphloeus velutinus (Gorham)

Figs 39, 66, 84, 105a, and 125

Epiphloeus velutinus Gorham, 1877: 247. CORPORAAL 1950: 247.

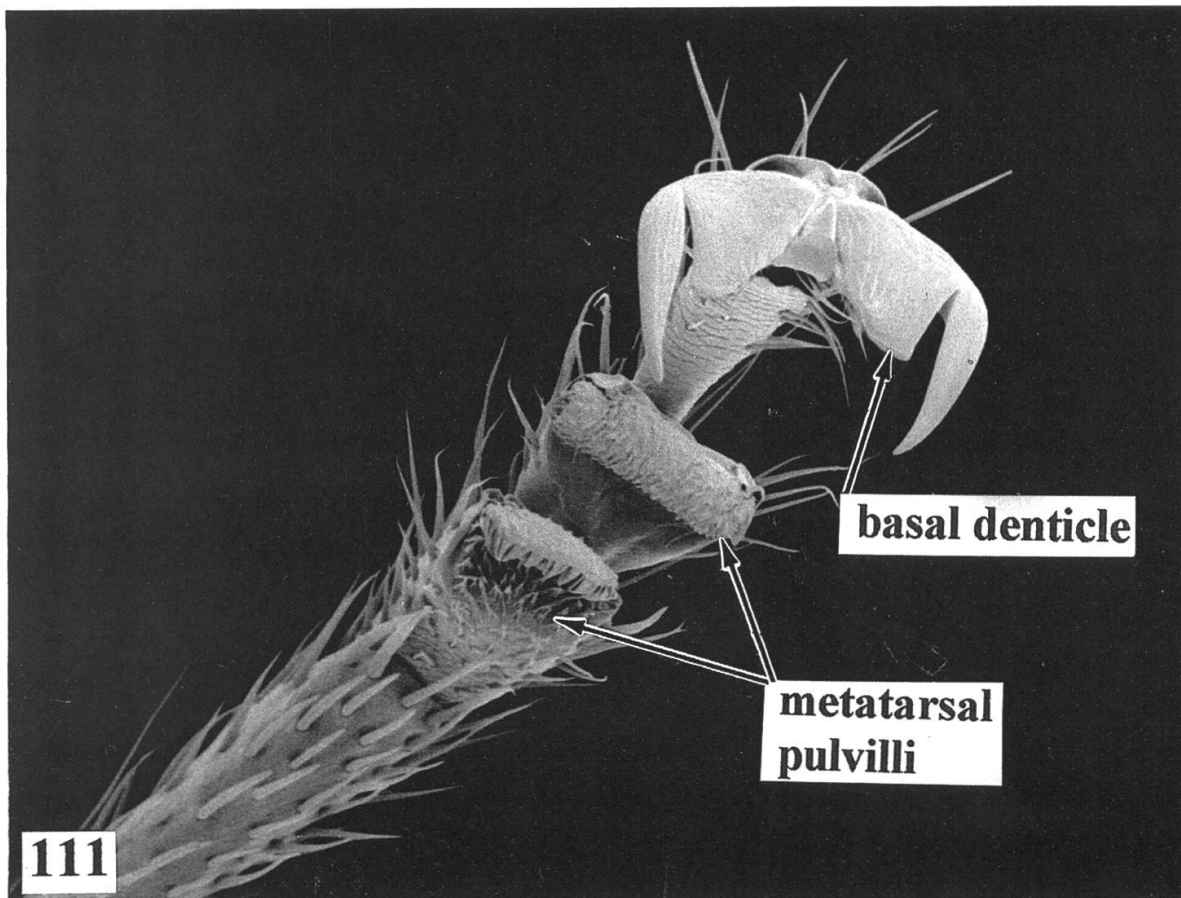
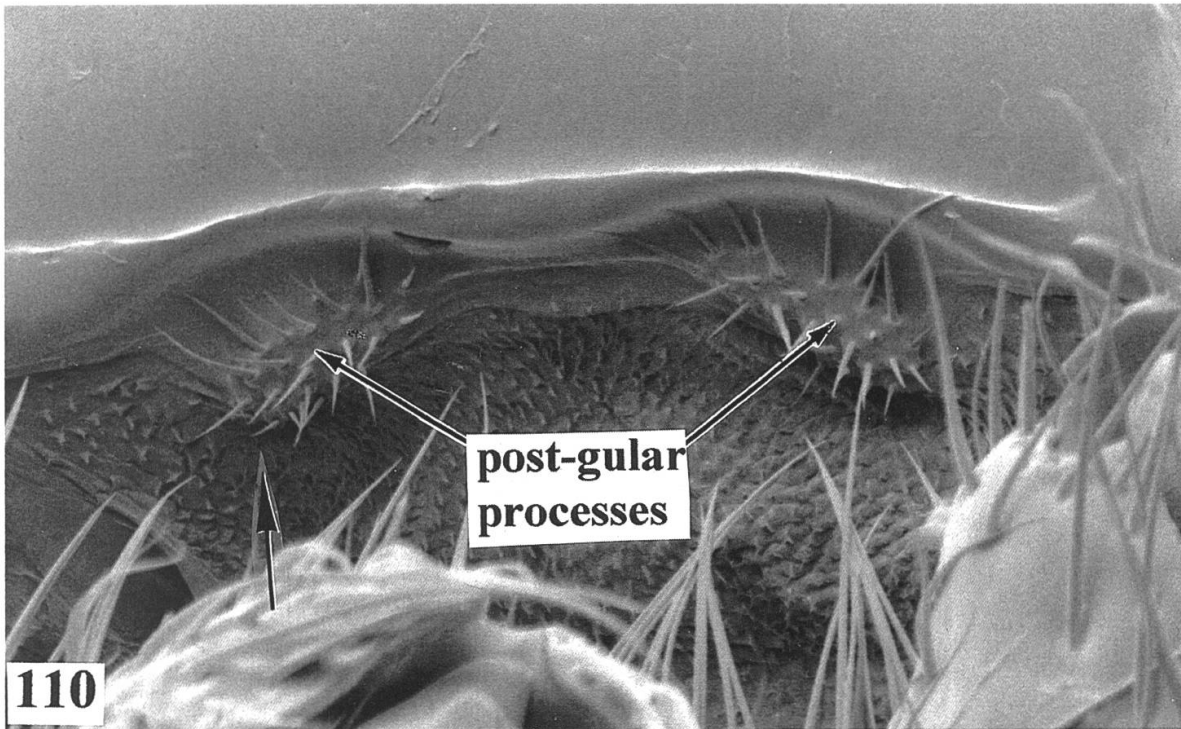
Epiphloeus ruficeps Kuwert, 1893: 492. Amazon (MNHN). GAHAN 1910: 72. CORPORAAL 1950: 255.

Epiphloeus tibialis Kuwert, 1893: 495. Amazon (MNHN). **syn.nov.** The characteristics that form the basis of the nominal species fall within the range of variation of the species represented by the senior synonym name. CHAPIN 1927: 6. CORPORAAL 1950: 254.

Type material. Lectotype: Male (here designated). Brazil: Amazon (BMNH). (Specimen point mounted, gender symbol affixed to paper point; support card; locality label; identification label; round type label; rectangular type label; BMNH acronymic label; lectotype label.)

Paralectotypes: Eight specimens. Brazil: Amazonas: Amazon (BMNH, 3; MNHN, 3); Pará (MNHN, 2).

Other material examined. I examined 51 specimens. Panamá: Colón: Barro Colorado Island, 22-I-1959, H. S. Dybas; *idem*, 6-VII-1961, J. M. Campbell; *idem*, 8-VII-1961, J. M. Campbell; *idem*, 9°10'N 79°50'W, 17-



Figs 110–111. *Megaphloeus setulosus*. 110 – Head (ventral view). 111 – Metatarsus.

VIII-1974, H. A. Hespenheide; *idem*, 20-VI-1977, H. A. Hespenheide; *idem*, 2-VII-1977, H. A. Hespenheide; *idem*, 11-VII-1977, H. A. Hespenheide; *idem*, 23-VII-1977, H. A. Hespenheide; *idem*, 27-VII-1978, H. A. Hespenheide; *idem*, 28-VI-1978, N. Woodley; *idem*, 14-VII-1978, E. M. Fisher: Panamá: Cerro Campana, 16-II-1959, H. S. Dybas; *idem*, 08°40'N 79°56'W, 12-VI-1970, H. A. Hespenheide. Colombia: Amazonas: Amacayacu Matamata, 03°41'S 70°15'W, 150 m, 24-31-VII-2000, Malaise trap, A. Parente; *idem*, 17-31-XII-2001, Malaise trap, D. Chota; Amacayacu Cabaña Lorena, 03°00'S 69°59'W, 210 m, 1-15-IX-2001, Malaise trap, J. Parente; Putumayo: La Paya Fca. Charapa, 00°08'S 74°57'W, 330 m, 12-27-IV-2002, Malaise trap, R. Cobete. Suriname: Saramacca: West Suriname Road, 178 km WSW Zanderij Airport, 25 m, 04°59'06"N 56°18'48"W, 13-VI-1999, splintered tree trunk (pyrethrum fogging), Z. H. Falin. Ecuador: Orellana: Reserva Étnica Waorami, 1 km S Onkone Gare Camp, 39°10'S 76°26'W, 16-I-1994, 220m, fogging leaves of plants in terre firme, T.L. Erwin; *idem*, 21-VI-1996, 220 m, fogging leaves of plants in terre firme, T.L. Erwin. Brazil: Mato Grosso: Sinop, collection day not noted-X-1973, M. Alvarenga; *idem*, Sinop Coordenadas, collection day not noted-X-1974, 350 m, M. Alvarenga; Vila Vera, collection day not noted-X-1973, M. Alvarenga; Chapada, collection day not noted-II-1974, Ekis; *idem*, collection day not noted-X-1975, M. Alvarenga: Amazonas: 20 km 26 Reserva Ducke, 25-VII-1978, armadilha de Malaise, collector not noted: Rondônia: 62 km SE Ariquemes, 8-20-XI-1994, W. J. Hanson; *idem*, 5-16-XI-1996, W. J. Hanson: Pará: collection site not noted, collection date not noted, collector not noted; Santarém, collection date not noted, collector not noted. Peru: Lareto: Iguitos, Quisto Cocha, 8-10-II-1984, L. Huggert. Bolivia: Tumupasa, collection day not noted-XII-1921-1922, W. M. Mann: Chaparé: collection site not noted, 10-XI-1949, R. Zischka. Specimens deposited in AMNH, BMNH, CMNC, CMNH, DZUP, EMUS, FMNH, FSCA, JNRC, MCZC, MNHN, OXUM, RGCG, TAMU, WFBC, WFBM, WOPC, and ZMAN.

Description. Size: Length 7.1 mm; width 2.0 mm.

Integument: Cranium reddish-brown, antennal scape yellow, remainder of antenna brown; pronotal proper brown, pronotal arch red; elytra bicolorous, mostly dark brown, humeral yellow inverted T not well defined, humerus and elytral middle with yellow fascia; legs, protibia dark brown in anterior fascies, yellow in remainder, other femora yellow, tibia mostly yellow but dark in ventral fascies.

Head: Antennal funicle filiform (Fig 39), combined length of pedicel and funicular antennomeres about equal in length as combined length of antennomeres 9 and 10, antennomeres 9 and 10 narrow triangular, antennal capitulum slender and large.

Thorax: Pronotal arch transversally wrinkled, pronotal discal tubercles not very prominent, elytral epipleural margin flared at middle, elytral apex strongly narrowed at apex (Fig. 105a); anterior margin of protibia with 6 spines.

Abdomen: Aedeagus as in Fig. 67.

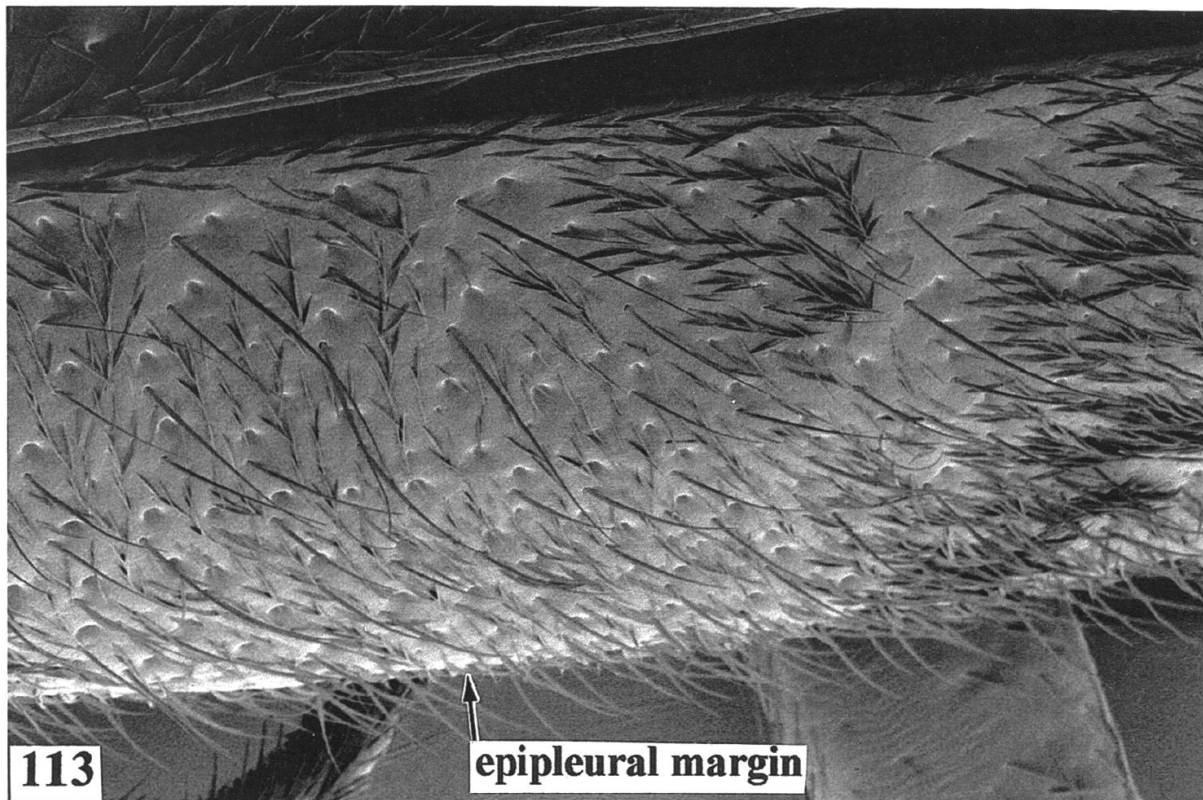
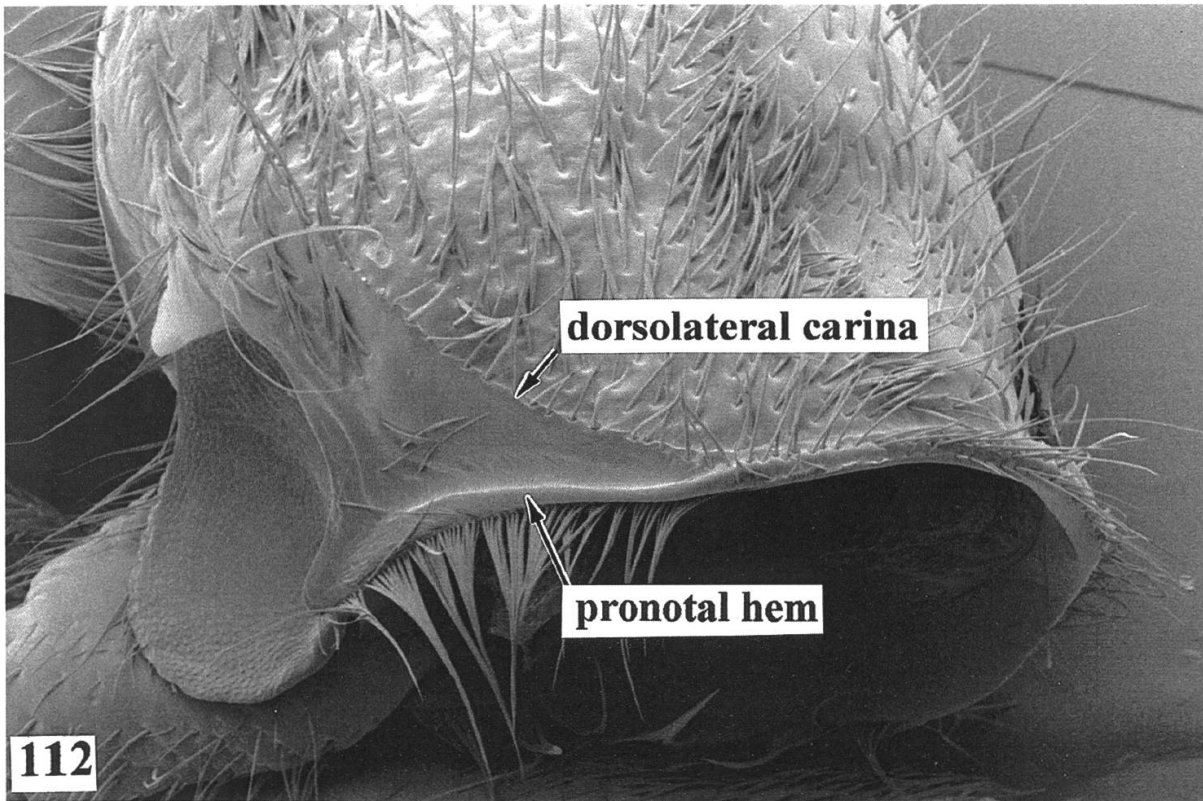
Female internal reproductive organs (Fig. 84): Spermatheca not capsular; spermathecal gland attached to subapex of spermatheca; bursa copulatrix greatly reduced in size.

Variation: Length 6.0–9.0 mm; width 2.0–2.5 mm.

Natural history. Specimens were collected throughout the year at altitudes ranging from 25 to 350 m, in a Malaise trap or from splintered tree trunk.

Distribution (Fig. 125). The composite range for this species extends from Panamá to Brazil.

Differential diagnosis. There are two species in the *tricolor* group whose members have the pronotal arch at least partially red. These are *M. velutinus*, where the reddish marking on the pronotal arch is slender, and *M. circinus*, in which the pronotal arch is broadly red. *M. velutinus* specimens may be distinguished from *M. circinus* specimens by the more acute apices of the elytra. The apex of the elytra of *M. circinus* specimens is broadly rounded.



Figs 112–113. *Megaphloeus setulosus*. 112 – Pronotum (lateral view). 113 – Elytra (dorsal view).

Evolutionary considerations

A benefit of inclusion of evolutionary discussions in taxonomic efforts is that such discussions must involve rigorous efforts in gathering empirical data. Indeed, one of the collateral advantages of HENNIG'S (1965) tenets in evolutionary systematics is that they stimulate the investigator to inventory multiple suites of an organism's characteristics. This increases the opportunity to find credible synapotypies for hypotheses of phylogeny. Such gestalt-level analyses may involve attributes of micromorphology, mesodermic morphology, ethology, and if possible genomic considerations. Overshadowing these parameters in taxonomic efforts is that ultimately our taxonomic results should have a level of practicality that makes them useful to all of biology. It is of utmost importance that our taxonomic endeavors relate to the widest possible spectrum among the systematic community; to the hobbyist, agriculturist, and any other discipline of science and humanity that requires the name and information of a taxon.

Tab. 1. The character state matrix.

Characters	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	2	2	2	2	2			
Taxa	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5
<i>Opitzius</i>	1	1	1	1	1	1	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Epiphloeus</i>	1	1	1	1	1	1	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0
<i>platyglenus</i> group	1	1	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	1
<i>vitellinus</i> group	1	1	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	0	1
<i>ustus</i> group	1	1	1	1	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	1	1	0	1
<i>variegatus</i> group	1	1	1	1	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	1	1	0	0
<i>tigrinus</i> group	1	1	1	1	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	1	0
<i>tricolor</i> group	1	1	1	1	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	1	0

Characters selected for phylogenetic analysis. Twenty-six adult morphological characters were used to prepare a phylogenetic analysis of the *Megaphloeus* species groups. Despite extensive efforts I did not find sufficient evidence among the morphology of these beetles to predict relationships at the species level. Specimens of *Epiphloeus* Spinola, *Pteroferus* Opitz, *Opitzius* Barr, and *Turbophloeus* Opitz served as outgroup taxa to establish the primitiveness or derivativeness of character states. Character states designated as "0" are considered plesiotypic whereas those given a value of "1" are judged apotypic. I concur with TUOMIKOSKY (1967: 138) who introduced the terms "apotypic" and "plesiotypic" as a replacement for "apomorphic" and "plesiomorphic", "because phylogenetic work is not confined to use of morphological characters...."

Character states

- Character 0 Scape length: (0) not extraordinarily long; (1) extraordinarily long.
- Character 1 Cross-vein MP4-MP5: (0) present; (1) absent.
- Character 2 Pronotal arch: (0) not transversally wrinkled; (1) transversally wrinkled.
- Character 3 Profemur; (0) not extraordinarily robust; (1) extraordinarily robust.
- Character 4 Size of elytral punctations at elytral basal half: (0) small; (1) large.
- Character 5 Shape of maxillary terminal palpomere: (0) digitiform; (1) sub-securiform.
- Character 6 Distribution of elytral disc punctations: (0) unevenly distributed; (1) evenly distributed.
- Character 7 Elytral punctations: (0) rowed; (1) not rowed.
- Character 8 Contour of terminal maxillary palpomere: (0) not curvate; (1) curvate.
- Character 9 Macrosculpture of pronotal disc: (0) not asperate; (1) asperate.
- Character 10 Pronotal lateral carina: (0) not entire; (1) entire.
- Character 11 Cranial vertex: (0) plane; (1) with furrow.
- Character 12 Genal setal tuft: (0) absent; (1) present.
- Character 13 Ocular setal tuft: (0) absent; (1) present.
- Character 14 Size of antennal capitulum: (1) not abbreviated; (1) abbreviated.
- Character 15 Elytral 2° setae: (0) not matted; (1) matted.
- Character 16 Antennal capitular antennomeres: (0) not slender; (1) slender.
- Character 17 Antennal funicle: (0) filiform; (1) serrate.
- Character 18 Antennal funicle length: (0) short; (1) long.
- Character 19 Antennal capitulum: (0) not large; (1) large.
- Character 20 Elytral disc: (0) without rows of spots; (1) with rows of spots.
- Character 21 Elytral markings: (0) not fasciate; (1) fasciate.
- Character 22 Combined length of pedicel and funicular antennomeres in relation to combined length of antennomeres 9 and 10: (0) shorter; (1) longer.
- Character 23 Combined length of pedicel and funicular antennomeres in relation to combined length of antennomeres 9 and 10: (0) not equal; (1) equal.
- Character 24 Color of basal half of elytra: (0) not red; (1) red.
- Character 25 Phallic apex: (0) not large triangular; (1) large triangular.

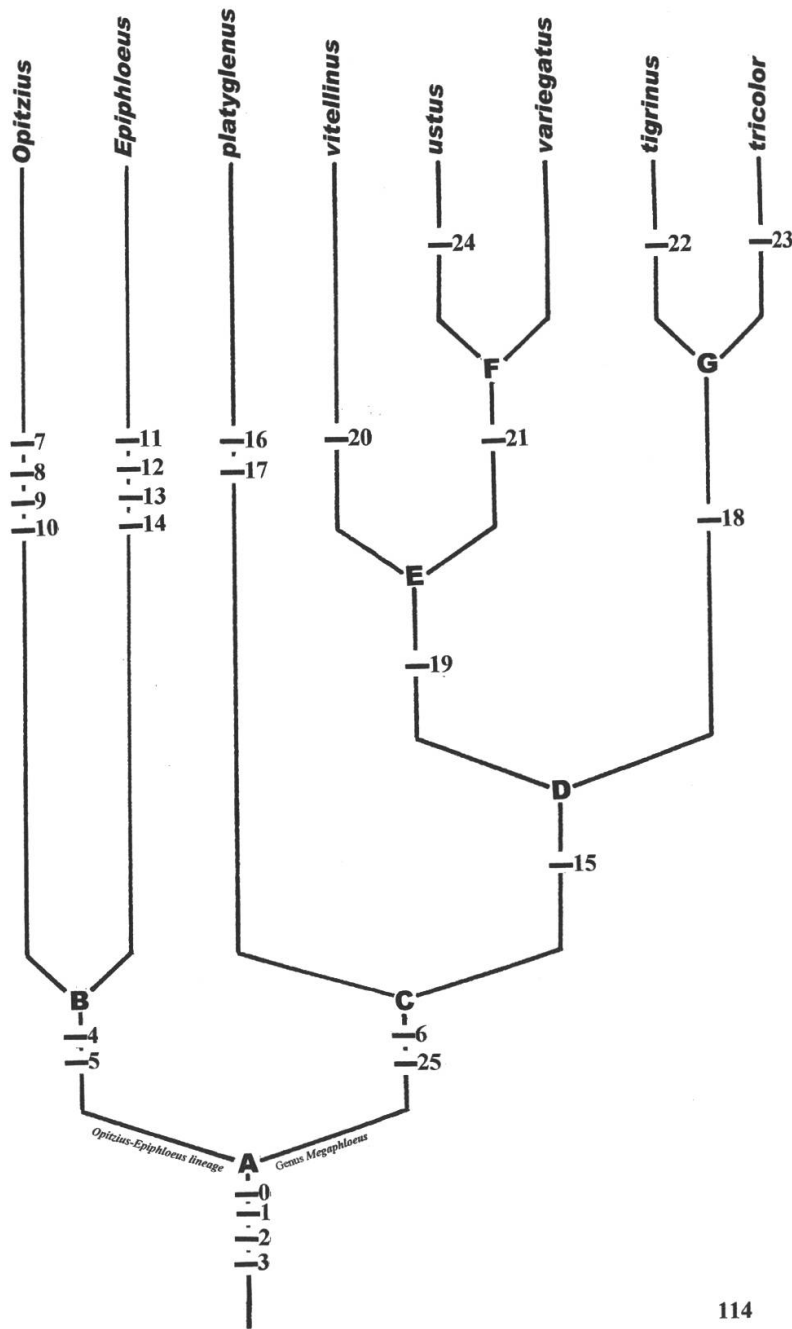
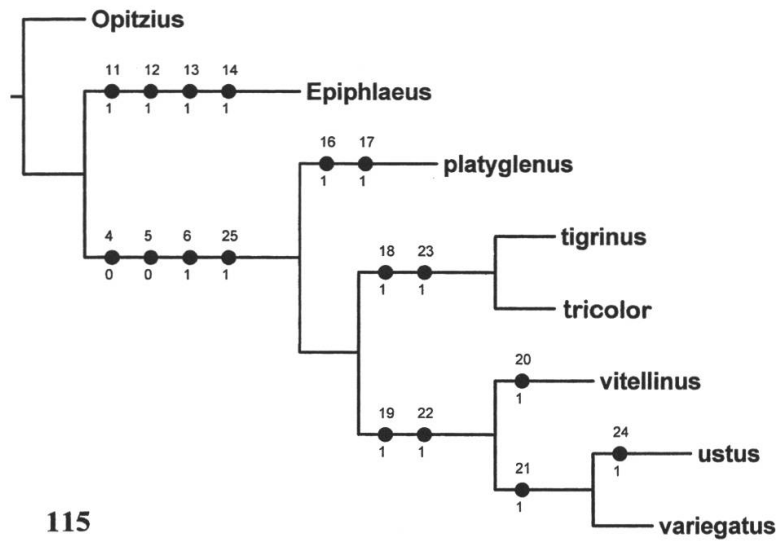


Fig. 114. Phylogenetic hypothesis (manually prepared).

Zoogeographic considerations

The distribution of *Megaphloeus* species groups in Middle and South American areas of endemism (*sensu* OPITZ 2005: 105) are presented in table 2. These distribution patterns accentuate the observation that with very few exceptions the members of *Megaphloeus* primarily occur latitudinally between the Tropic of Cancer and the Tropic of Capricorn, with the majority of species centered in environs of the Andes and the Amazon Basin. The exceptions to this are the slight northern extension of *M. setulosus*



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Fig. 115. Phylogenetic hypothesis (prepared via Winclada/NONA).

and the southern movement into southern Brazil and Argentina of *T. mucoreus*, *T. parvulus*, and *T. ustus*. Of the 26 species that comprise *Megaphloeus*, four are restricted to Middle America and 16 to South America. Six species extend from South America northward to regions of Middle America; four from the *tricolor* group and two from the *tigrinus* group.

Evidence of the distribution patterns of the extant species suggest that *Megaphloeus* originated in South America. At species-group levels, there were two independent waves of migrations to northwestern Middle America. Such northwestward movements from the center of origin would have occurred after multiple closures of the portals of Insular

Tab. 2. Distribution of species of *Megaphloeus* in areas of endemism (Endemic areas as defined by OPITZ (2005: 105).

Areas of Endemism	<i>platyglenus</i> group	<i>vitellinus</i> group	<i>ustus</i> group	<i>variegatus</i> group	<i>tigrinus</i> group	<i>tricolor</i> group
Mexo-America					•	•
Nuclear Central America				•	•	•
Insular Central America				•	•	•
SA-Cordillera Occidental				•	•	•
SA-Cordillera Oriental				•	•	•
Guiana Highlands				•	•	•
SA-Amazon Basin	•			•	•	•
SA-Altiplano Complex				•	•	•
SA-Brazilian Highlands		•	•	•	•	•

Central American (OPITZ 2005: Fig. 285). Proliferation of South American species of *Megaphloeus* was probably promulgated by Miocene orogenic uplift events that created the Andes some 27 MYA (FORD 2006: 99). Such orogenic events led to the extensive mid-altitude hardwood forests; excellent habitats for extant megaphloeans. Moreover, drastic South American climatic fluctuations, particularly in Amazonia would have greatly contributed towards speciation events (VUILLEUMIE 1971: 771; VANZOLINI 1973: 255; SIMPSON 1975: 273), perhaps in pulse cycles as described by ERWIN (1981: 170).

Phylogenetic interpretations

Analysis of the character matrix (Table 1) produced two similar phylogenetic trees. The manually generated tree (Fig. 114) shows resolution of all phyletic lines except the one pertaining to the *variegatus* lineage. In the computer generated tree non-resolutions occur among the *tigrinus*, *micaceus*, and *variegatus* lineages. The latter tree involves 23 steps, index of consistency of 95, and an index of retention of 92. Heuristic analysis [maximum trees (hold)] = 100, number of replications 9 (must) = 100, and multiple TBR = TBR (mult max) was used. The following narrative is based on the phylogenetic hypothesis produced manually.

Distributional evidence suggests that ancestral *Opitzius-Epiphloeus-Megaphloeus* originated in South America. This ancestor had a basic body plan that includes presence of an extraordinarily long scape, the cross-vein MP4-MP5 was lost, and transverse wrinkles developed on the pronotal arch. A very robust profemora would have been part of the morphologic arsenal for pouncing on lignicolous prey.

This groundplan ancestor (A, Fig. 114) generated a progenitor (ancestor B) who subsequently evolved the highly relictual monotypic genus *Opitzius* Barr and predominantly South American genus *Epiphloeus* Spinola. The characterization and suggested hypothesis of evolution of these two genera are discussed elsewhere (OPITZ 2008: 32). The sister taxon of ancestor B, ancestor C, evolve small, evenly distributed punctations on the elytral disc and the phallic apex became exceptionally large, larger than usually observed in other epiphloeines.

The widening of the funicular antennomeres, to an extent that the entire funicle becomes subserrate, and a narrow antennal capitulum, became established in the precursors of *M. platyglenus*. In the complementary stock, grounded by ancestor D, the 2° setae became abundant to the extent that the elytral surface acquired a somewhat matted appearance. From ancestor D there evolved a lineage, rooted by ancestor E, in which the antennal capitulum became enlarged, and the funicular antennomeres shortened.

One of the offshoots of ancestor E evolved towards a mimetic relationship with spotted Chrysomelidae and generated the monotypic *vitellinus* group. The complementary stock of the *vitellinus* line of evolution generated ancestor F whose basic ancestral plan developed towards colorful fascia on the elytral disc. Thus, was generated the exclusively South American *ustus* group and the more widespread *variegatus* group. Finally, the funicular antennomeres became lengthened in some of the descendants of ancestor D. This historical progeny generated the specious *tigrinus* and *tricolor* groups.

Acknowledgements

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Resumen

Este trabajo presenta las relaciones intergenéricas entre *Opitzius* Barr, *Epiphloeus* Spinola, y *Megaphloeus* Opitz. La mayor parte del trabajo agrupa una serie de especies de Epiphloeinae que fueron clasificados históricamente como *Epiphloeus*; como se puede leer en el catálogo de Corporaal publicado en 1950. *Megaphloeus* incluye 26 especies, de las cuales 12 estaban descritas: *M. animosus* (Wolcott) (localidad del tipo: Costa Rica, Turrialba), *M. lividipes* (Chevrolat) (localidad del tipo: Venezuela), *M. marginipes* (Chevrolat) (localidad del tipo: México, Córdoba), *M. mucoreus* (Klug) (localidad del tipo: Brasil), *M. nubilus* (Klug) (localidad del tipo: Brasil), *M. parvulus* (Schenkling) (localidad del tipo: Brasil, Goyas), *M. setulosus* Thomson (localidad del tipo: México), *M. sexplagiatus* (Kuwert) (localidad del tipo: Perú, Amazonas), *M. terzonatus* (Gorham) (localidad del tipo: Brasil, Ega), *M. tricolor* (Kuwert) (localidad del tipo: Brasil, Amazonas), *M. velutinus* (Gorham) (localidad del tipo: Brasil, Amazonas), *M. variegatus* (Klug) (localidad del tipo: Brasil, Para). Las especies siguientes son descritas como nuevas en *Megaphloeus*: *M. absentis* (localidad del tipo: México, Puebla, 4.6 km E Teziutlán), *M. bulatus* (localidad del tipo: Costa Rica, Puntarenas, Est. Aguhas), *M. cartus* (localidad del tipo: Belice, Orange Walk, Río Bravo, La Milpa), *M. circinus* (localidad del tipo: Colombia, Vaupés, R. N. Mosiro-Itajura (Caparú), Centro Abiental), *M. fucoaquilus* (localidad del tipo: Brasil, Rondônia, 62 km SE Ariquemes), *M. longius* (localidad del tipo: Honduras, Olancho, P. N. La Muralla), *M. megasensibilis* (localidad del tipo: Brasil, Rondônia, 62 km SE Ariquemes), *M. pectilis* (localidad del tipo: Guyana, Región 8, Iwokrama Forest, 1 km W Kurupukari, Iwokrama Field Station), *M. platyglenus* (localidad del tipo: Ecuador, Orellana, 1 km S Onkone Gare Camp.), *M. rictocaliginus* (localidad del tipo: Brasil, Rondônia, 62 km SE Ariquemes), *M. tigrinus* (localidad del tipo: Colombia, Putumayo, PNN La Paya Fea Charapa), *M. ustafinis* (localidad del tipo: Brasil, Mato grosso, Sinop), *M. ustus* (localidad del tipo: Brasil, Nova Teutonia), y *M. vitellinus* (localidad del tipo: Brasil, Amazonia). Ocho sinonimias nuevas se establecen en este trabajo: como sinónimo de *Megaphloeus mucoreus* (Klug) ubicamos *Enoplium fasciatum* Klug, *Epiphloeus balteatus* Chevrolat, y *Epiphloeus tomentosus* Spinola; como sinónimo de *M. setulosus* (Thomson), ubicamos *Epiphloeus debilis* Kuwert y *Epiphloeus obscurus*; bajo *M. tricolor* (Kuwert), ubicamos *Epiphloeus micaceus* Chapin; y bajo *M. velutinus*, ubicamos *Epiphloeus tibialis* Kuwert. Nueve Lectotipos son designados para las especies *Epiphloeus lividipes* Chevrolat, *Epiphloeus marginipes* Chevrolat, *Enoplium mucoreum* Klug, *Epiphloeus parvulus* Schenkling, *Epiphloeus setulosus* Thomson, *Epiphloeus terzonatus* Gorham, *Epiphloeus tricolor* Kuwert, *Enoplium variegatum* Klug, y *Epiphloeus velutinus* Gorham. Los Megaphloeinae son insectos arbofilicos (que le gusta los árboles) que forman parte de una relación tritrófica con la planta hospedera y Scolytidae. Existen evidencias que sugieren que los *Megaphloeus* tiene una respuesta kairomonal a los agregados de Scolytidae y los terpenos de los árboles hospederos. Se han colectados especímenes en trampa de intercepción cebadas con etanol, o mezclas de sulcatol-etanol y á-pinine+etanol en bosques de *Eucalyptus grandis* W. Hill ex Maid, *Araucaria angustifolia* (Bertol.) Kuntze, *Pinus taeda* Linnaeus, y *Pinus caribaea* Morelet v. *nondurensis*. Estos Scolytidae se colectaron a lo largo del año en áreas tropicales o subtropicales, en altitudes de 10 a 1850 m. Lo que diferencia *Megaphloeus* de otros Epiphloeinae es que el ápice fálico es ancho y triangular. Las evidencias de distribución geográfica sugieren que los *Megaphloeus* ancestrales se originaron de Suramérica, tal vez en los Andes o en las regiones de la Amazonía baja. Los descendientes se dispersaron hasta toda Mesoamérica después del cierre del portal de Centroamérica insular. Una matriz de 26 caracteres fue analizada, manualmente y con Winclada, que resultó en dos propuestas de filogenias muy similares de grupos intergenéricos e interespecíficos de *Megaphloeus*. Se postula que *Megaphloeus* es taxón hermano de un linaje que produjo los miembros de *Opitzius* Barr y *Epiphloeus* Spinola. Adicionalmente a las secciones taxonómicas convencionales, se incluye en este trabajo una traducción en

español del resumen y de las claves de grupos y especies. Se presentan 104 dibujos, dos ilustraciones de habitus (uno a color), ocho microfotografías electrónicas, once mapas de distribución, dos árboles filogenéticos, una matriz de 26 caracteres y una tabla ilustrando la distribución de los grupos de especies de *Megaphloeus* en la montañas y planicies de Meso- y Suramérica.

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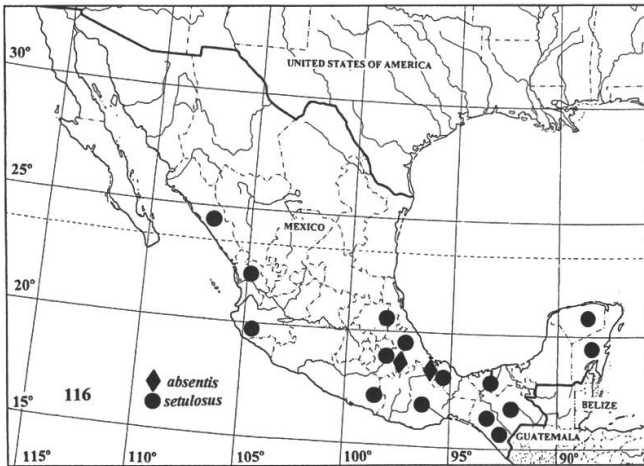


Fig. 116. Map 1. Geographical distributions of species as indicated.

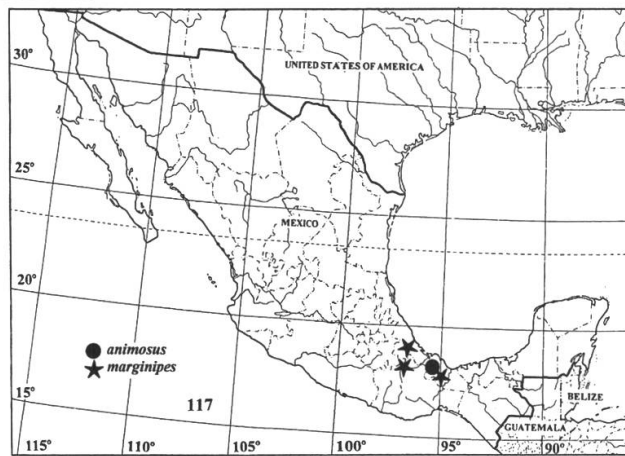


Fig. 117. Map 2.

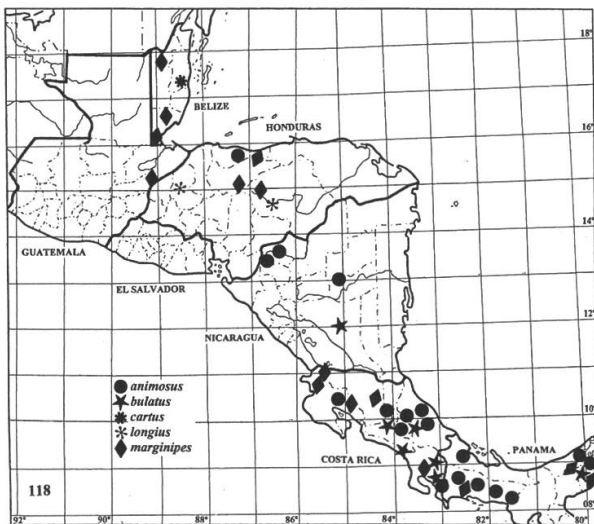


Fig. 118. Map 3.

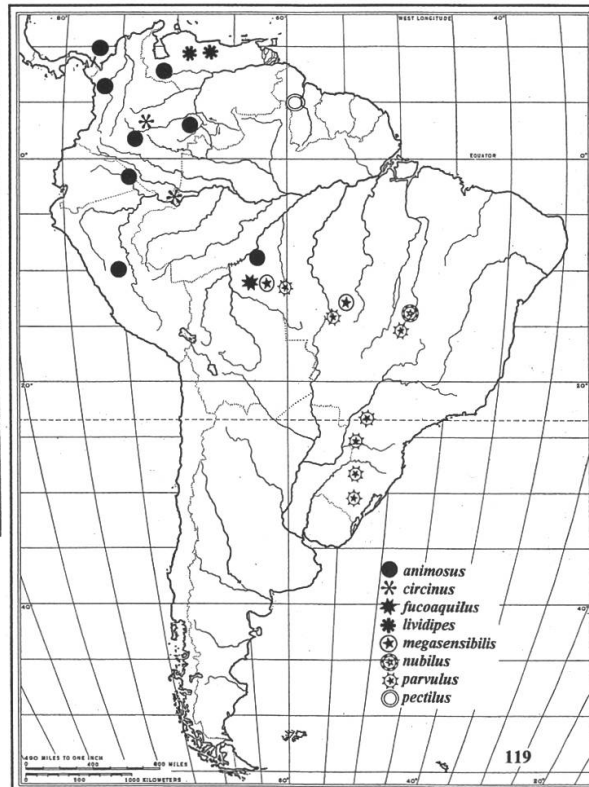


Fig. 119. Map 4.

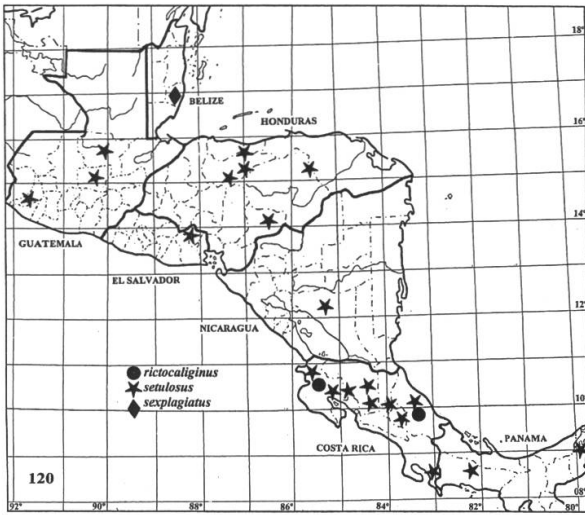


Fig. 120. Map 5.

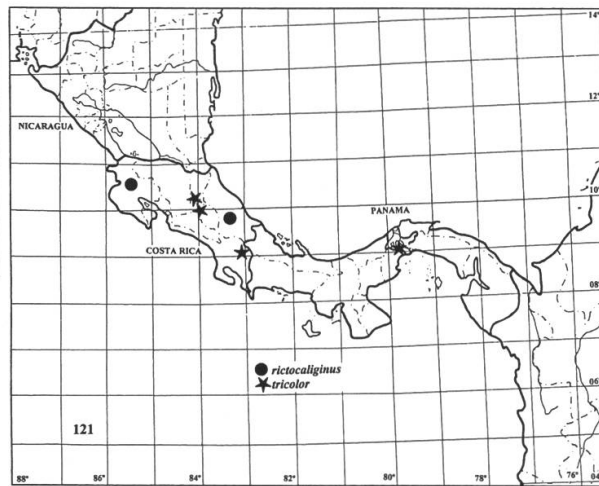


Fig. 121. Map 6.

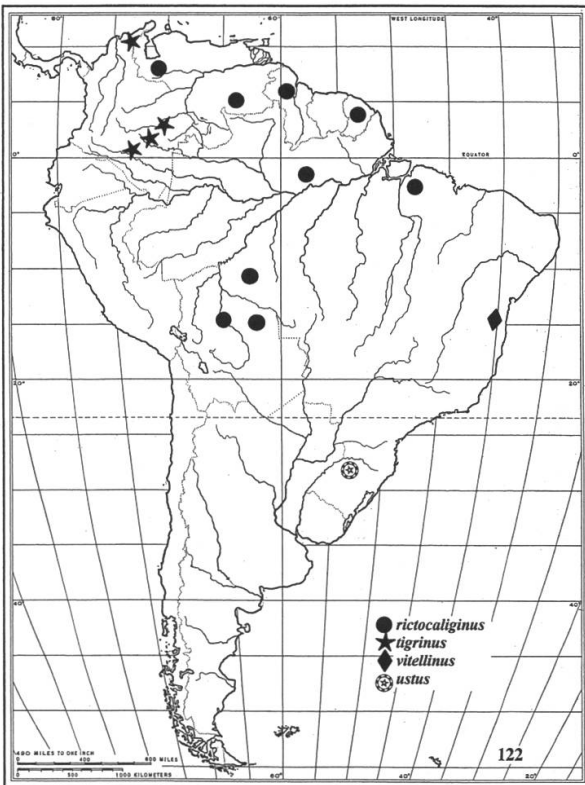


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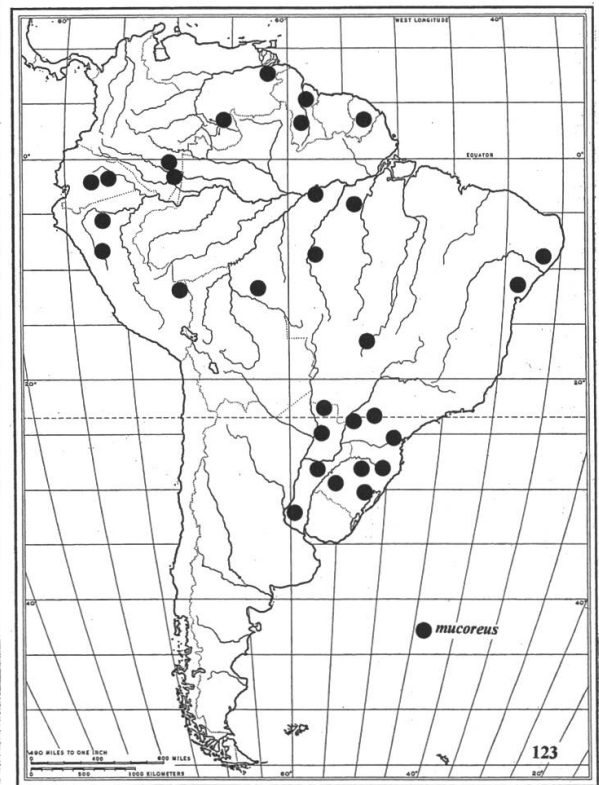


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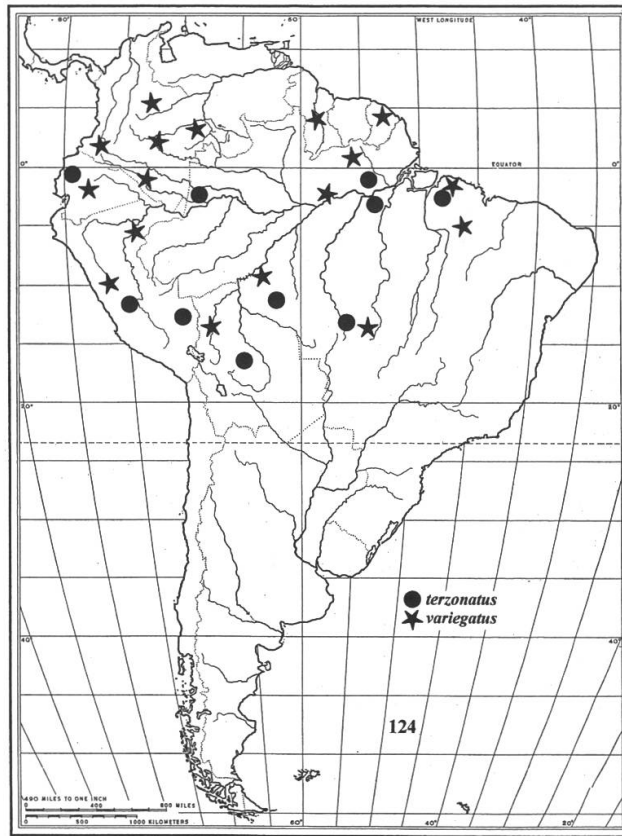


Fig. 124. Map 9.

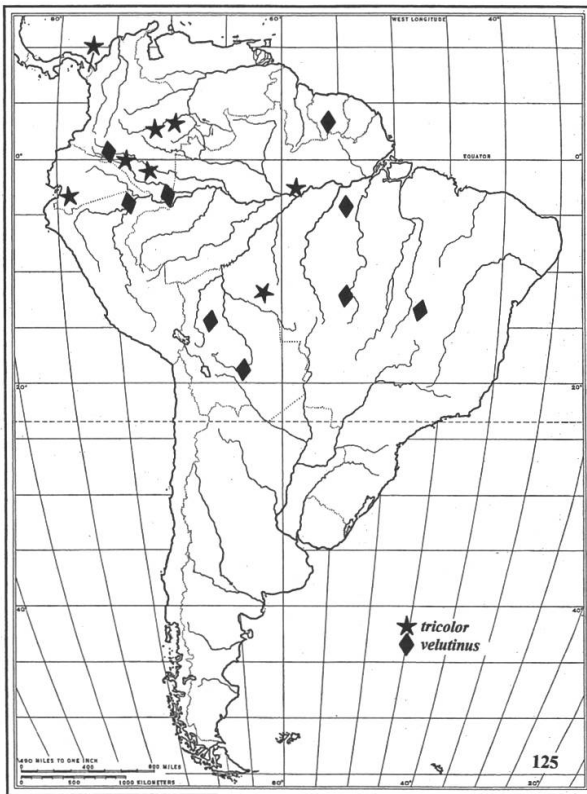


Fig. 125. Map 10.

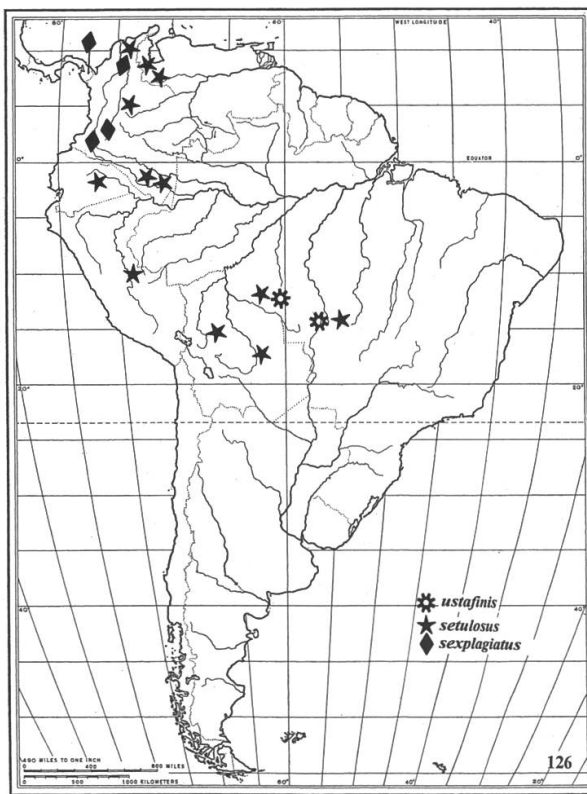


Fig. 126. Map 11.