SYSTEMATICS OF THE ARCHIBORBORINAE (DIPTERA: SPHAEROCERIDAE)

A Thesis

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by

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ABSTRACT

SYSTEMATICS OF THE ARCHIBORBORINAE (DIPTERA: SPHAEROCHERIDAE)

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The Archiborborinae comprise a diverse clade of flies in the family Sphaeroceridae. This thesis presents the first phylogenetic analysis and a thorough taxonomic revision of the subfamily. The phylogenetic revision includes morphological data from all species, and molecular data from a subset of 21 ingroup species. Although the group here treated as the Archiborborinae has been traditionally treated as a tribe within the subfamily Copromyzinae, analysis of morphological, molecular, and combined datasets supports the monophyly of the Archiborborinae and shows that the Archiborborinae and Copromyzinae are not sister taxa. The Copromyzinae are more closely related to the Sphaerocerinae and possibly to the enigmatic genus *Pycnopota* than they are to the Archiborborinae. The elevation of the clade to subfamily rank is supported on the basis of this evidence. Basal relationships within the Archiborborinae are difficult to resolve, but the phylogenetic evidence generally supports a division of the subfamily into the following 8 genera: *Antrops* Enderlein 1909, *Penola* Richards 1941, *Frutillaria* Richards 1961, *Boreantrops* gen. nov., *Coloantrops* gen. nov., *Maculantrops* gen. nov., *Photantrops* gen. nov., and *Poecilantrops* gen. nov. The genus *Archiborborus*, until recently a paraphyletic assemblage including most of the described species in the subfamily, is treated as a junior synonym of *Antrops* (syn. nov.) All genera are described and a generic key is provided. A total of 122 species, including 25 previously described and 89 new, are fully described and illustrated; another 8 new species are diagnosed but not formally named.
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1. INTRODUCTION

The Archiborborinae is a group of sphaerocerid flies almost entirely restricted to the Neotropical region. This revision treats 122 species, placed in 8 genera: Antrops Enderlein 1909, Penola Richards 1941, Frutillaria Richards 1961, Boreantrops gen. nov., Coloantrops gen. nov., Maculantrops gen. nov., Photantrops gen. nov., and Poecilantrops gen. nov.. The genus Archiborborus Duda 1921 is here treated as a junior synonym of Antrops, syn. nov.

Archiborborines occur from the subantarctic islands (South Georgia Island, the Falkland Islands) and the southern tip of South America north to northern Mexico, at elevations ranging from sea level to over 4000 m. Most species occur in forest, with a few temperate species common in beach wrack or other open habitats, and some montane species in open páramo. The highest diversity of known species occurs in the Ecuadorian Andes, where at least 27 species are known. However, this region has also had extensive sampling effort, and the true diversity in poorly sampled areas such as the Peruvian and Colombian Andes and southeastern Brazil are probably higher than current records suggest.

Members of the Archiborborinae can be distinguished from other Sphaeroceridae by a combination of characters. Winged species have a complete vein M and closed cells bm and cup, distinguishing them from the subfamilies Limosininae and Homalomitrinae, and a dense patch of short setae on the margin of the calypter, not known in any other subfamily. While a few species lack ocellar bristles in at least one sex, when present the ocellar bristles are lateral or anterior to the median ocellus, a condition shared only with the subfamily Tucminae; Archiborborines can be distinguished from the latter by the absence of tergite 6 in males, among other characters. All species have a katepisternal bristle, which is absent in the superficially similar Copromyzinae.

Literature review and taxonomic history

The subfamily was previously considered to include about 32 species placed in 4 genera: Antrops, Archiborborus, Penola, and Frutillaria (Roháček et al. 2001). These genera were considered to be closely related by Hackman (1969), and were defined as a tribe in the subfamily Copromyzinae by Norrbom & Kim (1985). The group was first treated as a subfamily by Kits and Marshall (2011).

Two additional published generic names refer to species in this subfamily: Procopromyza Richards 1931 and Huapia Richards 1931. Each of these was described as a subgenus for groups Richards (1931) considered distinctive within his concept of the genus Archiborborus. However, Richards had
overlooked Cresson's (1923) earlier designation of *Archiborborus submaculatus* Duda (=*Antrops femoralis*, syn. nov.) as the type species of *Archiborborus*, and considered *Archiborborus hirtipes* (Macquart) (=*Maculantrops hirtipes*, comb. nov.) as the type. Thus the group he treated as subgenus *Procopromyza* (type species *Archiborborus albicans* Richards) included the true type species of *Archiborborus*, while *hirtipes* was left without an available generic name.

The first described species in the subfamily was *Maculantrops hirtipes* (described in *Borborus* Meigen by Macquart (1844)), a distinctive species found in temperate South America. This species was also described as *Borborus quinquemaculatus* by Walker (1849) based on specimens collected by Charles Darwin in Montevideo and as *Copromyza alternata* by Rondani (1868) (syn. nov.). Five additional currently recognized species were described prior to 1921: *Borborus femoralis* Blanchard 1852 (=*Antrops femoralis* comb. nov.), *Ceroptera hirta* Bigot 1888 (=*Antrops hirtus* comb. nov.), *Ceroptera quadrinotus* Bigot 1888 (=*Antrops quadrinotus* comb. nov.), *Antrops truncipennis* Enderlein 1909, and *Olina nitidicollis* Becker 1920 (=*Antrops nitidicollis*, comb. nov.).

One of the most significant developments in the taxonomic history of the Archiborborinae was Duda's (1921) recognition that the winged species in the group were distinct from the various Holartic genera in which they had been described previously. He described the genus *Archiborborus* to include them, as well as five new species. However, he overlooked most of the previously described species and only included *Maculantrops hirtipes* in his new genus.

Later authors working on the subfamily placed all winged species in the genus *Archiborborus*. New nominal species were described by Duda (in Holdhaus 1932), Richards (1931, 1961, 1963), Steyskal (1973), and Papp (1977). Richards also described the genera *Penola* (Richards 1941) and *Frutillaria* (Richards 1961) for some flightless species, and provided the first key to species (Richards 1961). A key to genera was published by Marshall and Buck (2010).

Biology

Species of Archiborborinae occur widely in high elevation and high latitude regions of the Neotropics. They are among the most common Sphaeroceridae in temperate and sub-Antarctic parts of Chile and Argentina, and are commonly collected in the Andes, in the Atlantic forest region of southeastern Brazil, and in the mountain ranges of Central America and Mexico. They are very rare in or absent from most tropical lowlands; I have only seen two specimens collected in lowland Amazonian Peru and a single specimen from lowland Costa Rica, despite considerable collecting effort in these areas.
habitats for these flies include a variety of forest habitats, including subantarctic *Nothofagus* forest, Magellanic and Valdivian rainforest, cloud and elfin forest, high elevation *Polylepis* forest, lowland and Atlantic rainforest, and northern pine and oak forests, as well as non-forested habitats including beach wrack, subantarctic tussock grassland, dry puna grassland, and moist páramo. Within these habitats, species are often found in moist microhabitats, often with accumulations of decaying vegetation.

The biology of most species is unknown. The physiology and ecology of *Antrops truncipennis* have been studied in some detail on South Georgia Island (Chown 1996a, 1996b), where it is a significant element of the fauna feeding on kelp wrack. Nothing else has been published on species in this subfamily. Adults of most species are attracted to dung and carrion, but it is unknown if any species breed in these substrates. I have observed individuals of *Boreantrops avignis* sp. nov. apparently displaying by waving their fore legs with contrastingly coloured tarsi while sitting on monkey dung. A number of species in the subfamily, in *Poecilantrops* and *Boreantrops*, have similarly contrasting fore tarsi, but the significance of these conspicuous structures and this behaviour is unclear. *Photantrops echinus* sp. nov. has only been collected at lights in Ecuador, and may be nocturnal.

Immature stages are equally poorly known. Harrison (1970, see Fig. 3 in that paper) illustrated a pupa of *Antrops truncipennis*; but did not provide a detailed description, and no other immature stages have been described. I found possible archiborborine larvae in fallen fruiting bodies of the *Nothofagus* parasitizing fungus *Cyttaria* sp. in southern Chile. They were associated with a very high density of *Antrops femoralis* and may belong to that species, but I was unable to rear the larvae. As *A. femoralis* also occurs outside the range of *Nothofagus* and *Cyttaria*, it is clearly not associated exclusively with this genus of fungus. Larvae of all known Sphaeroceridae are saprophagous in various types of decaying organic matter, and this is likely the case for Archiborborinae as well. Dissections of females often reveal eggs at various stages of maturity within the abdomen, and eggs have been observed in representatives of a majority of species within the subfamily. Egg size and counts vary considerably between species, with females of *Frutillaria* having only 2–5 mature eggs, each about two-thirds the length of the abdomen, while some females of *Boreantrops* have as many as 50 small eggs. All eggs observed are similar in structure, being slender and tapered at the ends, with the micropylar end slightly wider and with a diagonal flattened area. The entire surface is covered with reticulate microsculpturing.

Many of the specimens examined over the course of this study are associated with phoretic mites and parasitic fungi in the order Laboulbeniales. The mites have not been studied in detail, but the fungi include species of the dipteran parasite *Stigmatomyces* as well as an undescribed species of
Corethromyces (W. Rossi, in litt.); the latter genus has previously only been recorded parasitizing Coleoptera.

The most effective collecting method for most species of Archiborborinae is pan trapping with baits of dung or carrion. Specimens have also been collected in Malaise traps, flight intercept traps, unbaited pan traps, by sweeping, and by Berlese extraction of leaf litter. Specimens for molecular analysis are probably best collected individually in tubes as they visit baits.

Research objectives

The goal of systematics is to describe and classify species, both to more fully understand Earth's biodiversity and to make named species accessible for other purposes, in fields ranging from ecology and biogeography to ethology and physiology. The objectives of this study are thus to fully describe the species of the Archiborborinae, to determine their relationships and develop a cladistic classification.

Objective 1: Species delimitation and description

The Archiborborinae have received very little taxonomic attention in the past. Recent revisionary studies on other Neotropical Sphaeroceridae have revealed large numbers of undescribed species (eg. Smith and Marshall 2004, Marshall and Cui 2005, Buck and Marshall 2009). The Archiborborinae are no different, with a large number of undescribed species found in museum collections and in material from recent fieldwork. In addition to the 25 valid, previously described species in the subfamily, I have found an additional 97 species. A significant part of this thesis is the description of these species. Eighty-nine of the new species are formally named here, while eight are represented only by female specimens; I have diagnosed but not named the latter to prevent possible future confusion about their identities.

An essential consideration in descriptions of new species is the criteria used to delimit them. There have been many attempts to define the nature of a species, resulting in a profusion of often incompatible species concepts (Mayden 1999). My approach to species is based on that of de Quieroz (2007). He proposes that the common element of all species concepts, that species are separate evolving lineages, should be taken as the only general property of species. The specific properties of species used in alternative species concepts are not expected to be present in all species at all stages of the speciation process, but they are retained as operational criteria that can be selected as necessary depending on the objectives of the taxonomist and the biology of the organisms.
Morphology of the male genitalia has long been considered one of the most important character sets for species delimitation in the Diptera. Male genitalia generally differ greatly between species, while remaining highly conserved within a species. The best explanation for this pattern is sexual selection through cryptic female choice (Eberhard 1985, 2010). In light of this, the primary criterion used here for species delimitation is evidence of specific mate recognition through genitalic morphology. All species considered here have at least one fixed difference, and usually a suite of fixed differences, in the male genitalia. Other morphological differences between populations, which may indicate fixation of traits due to reproductive isolation, can also offer supporting evidence for species delimitation.

Objective 2: Phylogenetics and classification of the Archiborborinae

No phylogenetic hypothesis has previously been published for the Archiborborinae, and the existing generic classification was not based on cladistic principles. The genera *Penola* and *Frutilaria* were thought by Richards to be derived from within the genus *Archiborborus*, thus rendering it paraphyletic, while Hackman (1969) proposed that *Antrops truncipennis* represented a “derivate of *Archiborborus*.” In order to develop a hypothesis of relationships between species and revise the generic classification based on cladistic principles, I conducted a phylogenetic analysis of the subfamily.

My phylogenetic analysis was conducted in two parts. I developed a morphological data set including all species in the subfamily, and a molecular data set covering a subset of species. The species selected for the molecular data set included representatives of most of the clades identified in the morphological analysis. Both datasets included a number of outgroup taxa representing other subfamilies of Sphaeroceridae, especially the Copromyzinae (the putative sister group to the Archiborborinae), to help clarify the position of the Archiborborinae within the Sphaeroceridae.
2. PHYLOGENETICS OF THE ARCHIBORBORINAE

Introduction

This analysis represents the first phylogenetic hypothesis for the Archiborborinae. Previous phylogenetic analyses incorporating archiborborines include Hackman (1969), who conducted an informal analysis of the relationships of the Sphaeroceridae and proposed a close relationship between the genera now included in the subfamily, and Norrbom and Kim (1985) who used representatives of the Archiborborinae as outgroups in their phylogenetic analysis of the Copromyzinae. However, neither of these studies attempted to resolve relationships within the subfamily. The molecular analysis is also the first published for the Sphaeroceridae, although sphaerocerids have been included as outgroups in previous phylogenetic studies on other groups (Han and Ro 2005, Gibson et al. 2010b, Winkler et al. 2010) and were included in the FLYTREE project (Wiegmann et al. 2011). Furthermore, with outgroups representing several major clades of Sphaeroceridae, this is the first study to provide quantitative evidence for subfamily-level phylogenetics of the family.

The phylogenetic analysis was conducted in three stages, beginning with a morphological analysis including all species in the subfamily, followed by a molecular analysis of a subset of species and finally a combined analysis including all species and both datasets.

Material and methods

Taxon sampling

All known species of Archiborborinae were included in the morphological matrix. Outgroups included multiple representatives of four of the five non-archiborborine sphaerocerid subfamilies. An undescribed species of the genus *Pycnopota*, which cannot be confidently placed in any known sphaerocerid subfamily, was also included. Non-sphaerocerid outgroups included two representatives of the heleomyzid subfamily Cnemospathininae (sensu McAlpine 2007). The taxa selected for sequencing represented most of the clades identified in the morphological analysis, as well as outgroups representing the Heleomyzidae, *Pycnopota*, and three other sphaerocerid subfamilies.

Morphological characters

The characters used for the morphological analysis include previously published characters thought to characterize the Archiborborinae or groups within the subfamily, as well as a number of newly recognized characters. Some characters of broader significance within the Sphaeroceridae were included in an effort
to resolve the position of the Archiborborinae within the family. The complete matrix is presented in Appendix 2.1.

1) Shape of hind basotarsomere: 0: thin, longer than second tarsomere; 1: swollen, shorter than second tarsomere. The derived state of this character is frequently used to diagnose members of the family Sphaeroceridae in keys.

2) Tergite 6 in male: 0: present; 1: absent. This character is only present in *Tucma* among the Sphaeroceridae, although it is widespread among other Acalyptratae. Marshall (1996) suggested this indicated a sister-group relationship between *Tucma* and the rest of the family.

3) Interfrontal setae: 0: absent or scattered across frons; 1: present in a distinct row. This character is usually regarded as a synapomorphy for the Sphaeroceridae. The derived state of this character is also found in members of the Milichiidae, and is approached in the Australian genus *Borboroides*, originally described as a sphaerocerid but now placed in the Heleomyzidae.

4) Anepisternum sculpture: 0: smooth; 1: with a gibbose triangle in posteroventral corner.

5) Male cerci: 0: not fused below anus; 1: fused below anus.

6) Katepisternal bristle: 0: absent; 1: present.

7) Epandrium: 0: without a cleft above surstylus; 1: with a cleft above surstylus.

8) Spermathecae: 0: 2 present; 1: 3 present. The number of spermathecae can be a plastic character, even varying within some genera, but may be a valuable character for higher level phylogenetics in some cases. This character could not be coded for *Pycnopota*, as the spermathecae could not be located in the single teneral female available for dissection.

9) Ocellar bristle position: 0: posterior to median ocellus; 1: lateral or anterior to median ocellus.

10) Postocellar bristles: 0: absent or only weakly developed; 1: present, about as long as ocellar bristles.

11) Vein M: 0: reaching costa; 1: ending in membrane before costa. Vein M is usually truncated in members of the subfamily Limosininae and is often used in keys to diagnose the subfamily.

12) Patch of flattened setae on margin of calypter: 0: absent; 1: present.

13) Mid tibia, row of anterodorsal bristles: 0: absent; 1: present.

14) Mid tibia, preapical posterodorsal bristles: 0: absent; 1: present.

15) Mid tibia, preapical anteroventral bristles: 0: absent; 1: one present; 2: two present.

16) Mid tibia, preapical posterovertral bristles: 0: absent; 1: present.

17) Hind tibia, anteroventral bristle: 0: absent; 1: present.

18) Hind tibia, ventroapical bristles: 0: absent; 1: one present; 2: two present; 3: three present.

19) Hind tibia, anterodorsal bristles: 0: absent; 1: present.

20) Hind tibia, posterodorsal bristles: 0: absent; 1: present.

21) Syntergite 1+2: 0: fully sclerotized; 1: with an anteromedial weakly sclerotized notch; 2: with only posterolateral corners and a thin connecting bar sclerotized. The derived states of this character are only found in members of *Boreantrops*.

22) Syntergite 1+2 sculpture: 0: not sculptured; 1: with a raised median ridge.

23) Tergite 5: 0: heavily sclerotized; 1: weakly sclerotized.


26) Fusion of syntergite 1+2 and tergite 3: 0: not fused; 1: fused.

27) Lateral setae on tergites: 0: not strengthened; 1: strong, spine-like.

28) Sculpture of scutum: 0: not foveolate; 1: foveolate.

29) Scutellum: 0: short, evenly curved; 1: long, subtriangular.

30) Dorsocentral bristles, female: 0: none; 1: one; 2: two; 3: three; 4: five. Three dorsocentral bristles is the ancestral state for the Sphaeroceridae. The anterior dorsocentral bristles are very short in males of many Archiborborinae and are difficult to code confidently.

31) Metapleuron: 0: normal size; 1: enlarged.

32) Lateral bristles of mesoscutum: 0: normal size; 1: enlarged.
33) Occipital setae: 0: covering lateral occiput, not in rows; 1: restricted to margin of occiput, in one or two rows.
34) Pseudotrachea: 0: fewer than 12; 1: 12; 2: more than 12.
35) Fore basotarsomere, male: 0: without spur; 1: with spur.
37) Spots on vein CuA1: 0: absent; 1: present.
38) Wing: 0: normal to reduced, not rod-like; 1: reduced to a rod with apical bristle; 2: absent.
40) Hypandrium: 0: without ventral tabs; 1: with ventral tabs. In some members of the Boreantrops mexicanus group, the arms of the hypandrium have transparent tabs extending ventrally.
41) Sternite 5, male: 0: simple; 1: quadrilobus type (Fig. 5.145); 2: anterior apodeme not keeled; 3: setosus type (Fig. 5.42); 4: orbitalis type (Fig. 5.105); 5: Frutillaria type (Fig. 3.107); 6: anterior apodeme keeled; 7: paired anterior apodemes.
42) Cercus, male: 0: immediately below anus; 1: separated from anus by an extension of the epyandrium.
43) Surstylus: 0: ventral margin complete; 1: ventral margin with a deep notch.
44) Distiphallus: 0: without dorsal tube; 1: with a smooth dorsal tube; 2: with a spinose or setose dorsal tube
45) Basiphallus: 0: normal; 1: swollen.
46) Ovipositor length: 0: sclerites as long as wide or longer; 1: sclerites much wider than long
47) Tergites 6 and 7, female: 0: not sclerotized medially; 1: evenly sclerotized
48) Ovipositor: 0: with posterior weakly sclerotized strips; 1: without posterior strips
49) Epiproct: 0: without setae; 1: with setae
50) Cerci, female: 0: shiny; 1: with microtomentum.

Molecular characters

Portions of five genes were sequenced: mitochondrial 12S rDNA, cytochrome c oxidase subunit I (COI), and cytochrome B (CytB), and nuclear alanyl-tRNA synthetase (AATS) and 28S rDNA. The data set thus includes both mitochondrial and nuclear genes, and both ribosomal and protein-coding genes. Genes were selected based on the availability of primers, expected rate of evolution, and prior successful use in phylogenetic analyses of Diptera. A few additional species were sequenced for COI only by the Canadian Center for DNA Barcoding following the methodology of Smith et al. (2006). All sequences will be made publically accessible on Genbank.

Extraction

Most specimens used in my analysis were stored in alcohol, except the representatives of Antrops orbitalis Duda, Antrops siberia sp. nov., and Photantrops echinus, for which dried specimens or legs thereof were used. Extractions were performed with the DNeasy® Blood & Tissue Kit (Qiagen Inc., Santa Clara, CA, USA), using entire specimens when possible. Procedure followed the recommended spin-column protocol, with the specimen left in the lysis solution for approximately 16–20 hours, with the final centrifugation step modified by eluting with 200 uL of pH 8.9 water instead of buffer. This solution was then dried in a DNA110 SpeedVac (ThermoSavant) before resuspension of the DNA in 50 uL of
buffer. Extracted specimens were stored in ethanol until they could be dried in a critical point drier and mounted for morphological study.

**Amplification and purification**

DNA amplification was performed in 25 uL volumes; as concentration of extractions varied considerably, up to 10 uL of template was used with the volume of H$_2$O reduced accordingly. Reactions using Taq polymerase (Promega Corp., Madison, WI, USA) included 0.5 uL of polymerase, 2.5 uL of 10X PCR buffer, 2.5 uL of MgCl$_2$ (25 mM), 0.5 uL each of forward and reverse primers (10 uM), 0.5 uL of 10 uM dNTPs, 2–10 uL of template, and 9–16 uL of ddH$_2$O. Reactions using ExTaq polymerase (Takara Bio USA, Madison, WI, USA) included 0.125 uL of polymerase, 2.5 uL of 10X ExTaq buffer, 0.625 uL of MgCl$_2$ (25 mM), 1.0 uL each of forward and reverse primers (10 uM), 2.0 uL of dNTPs (10 mM), 0.5–10 uL of template, and 7.7–17.3 uL of ddH$_2$O. PCR programs, specific to each primer program, were run in an Eppendorf epGradient S Mastercycler (Eppendorf AG, Hamburg, Germany). Primers and polymerase used are described in Table 2.1. Primer names are standardized following Gibson et al. (in press). All products were visualized on 1% agarose electrophoresis gels with 2.7% ethidium bromide (10 mg/mL) using UV transillumination.

PCR products were purified either using ExoSAP-IT® (USB Corp., Cleveland, OH, USA) following the manufacturer’s instructions, with a QIAquick® Gel Extraction kit (Qiagen Inc., Santa Clara, CA, USA) following the manufacturer’s instructions, or using CloneWell 0.8% SYBR Safe™ precast gels in the E-Gel® system (Invitrogen™, Carlsbad, CA, USA) following the procedures of (Gibson et al. 2010a).

**Sequencing**

Purified products were prepared for sequencing using an ABI BigDye® Terminator v3.1 Cycle Sequencing kit (PE Applied Biosystems, Foster City, CA, USA). DNA sequencing was performed at the Agriculture & Agri-Food Canada Eastern Cereal and Oilseed Research Centre Core Sequencing Facility (Ottawa, ON, Canada) on an ABI 3130xl Genetic Analyzer (PE Applied Biosystems, Foster City, CA, USA) using the ABI ethanol/EDTA/sodium acetate protocol. Sequence chromatograms were viewed and contigs assembled in BioEdit (Hall 1999).
Table 2.1. Primers and PCR programs used for amplification and sequencing.

<table>
<thead>
<tr>
<th>Gene (direction)</th>
<th>Primer</th>
<th>Sequence</th>
</tr>
</thead>
<tbody>
<tr>
<td>12S (f)</td>
<td>12Sbi¹</td>
<td>AAGAGCGACGGGCGATGTGT</td>
</tr>
<tr>
<td>12S (r)</td>
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<td>COI (r)</td>
<td>COI-Dipt-2183F⁵</td>
<td>CAAACYTTATTTGATTTTTTGG</td>
</tr>
<tr>
<td>CytB (f)</td>
<td>CB-J-10933¹</td>
<td>TATGTTTACCTGAGGACAATATC</td>
</tr>
<tr>
<td>CytB (r)</td>
<td>TS1-N-11683¹</td>
<td>AAATTCTATCTTAGTTTCAAAAC</td>
</tr>
<tr>
<td>AATS (f)</td>
<td>1F40⁴</td>
<td>GNATGAAYCARTTYAARCCNAT</td>
</tr>
<tr>
<td>AATS (f)</td>
<td>AATS-Dipt-562F⁵</td>
<td>CGNGCHGGHGGHAARCAAYAYGA</td>
</tr>
<tr>
<td>AATS (f)</td>
<td>AATS-Dipt-611F⁵</td>
<td>TAYCAYCAYACNTTYTGYRATG</td>
</tr>
<tr>
<td>AATS (r)</td>
<td>1R244⁵</td>
<td>CATNCCRCARTCNATRTGYTT</td>
</tr>
<tr>
<td>AATS (r)</td>
<td>AATS-Dipt-955R³</td>
<td>CGATTRWAYTGWATRAANACHARRRTCC</td>
</tr>
<tr>
<td>28S (f)</td>
<td>28S-Dipt-3385F⁵</td>
<td>GGATTTCCTTAGTAGCGGCG</td>
</tr>
<tr>
<td>28S (r)</td>
<td>28B⁴</td>
<td>CCCGTCTTGAACACGGACC</td>
</tr>
</tbody>
</table>


Alignment

Alignment for 12S, COI, CytB, and AATS was performed using the Clustal algorithm implemented in BioEdit. Alignment was straightforward for these genes, with the only indel consisting of an amino acid insertion in AATS for Apteromyia. Alignment of the expansion segments of 28S is difficult with standard alignment algorithms, and so an alternative procedure was followed for this gene. Initial alignment was performed manually based on the published secondary structure for Sophophora melanogaster (Hancock et al. 1988); the expansion segments were then identified and aligned separately with the program LocARNA (Will et al. 2007), which performs multiple alignment based on predicted folding properties of RNA sequences. A single loop region in expansion segment D2, corresponding to positions 454 to 460 in the aligned sequence, was highly variable in length and composition between taxa. It could not be aligned with confidence and was excluded from analysis.

Data analysis

Analyses were based on morphological data for all taxa, molecular data for 28 exemplar taxa, and combined data for all taxa (including additional COI sequences from species not included in the molecular-only analysis). Because third codon positions of protein-coding genes have high degeneracy and often show saturation that can obscure phylogenetic signal, two alternative treatments were used in the molecular analysis: 3rd positions included with transitions and transversions (3SV), and 3rd positions
recoded to include transversions only (3V; Yang et al. 2007). All data sets were analysed using both maximum parsimony and Bayesian methods.

Maximum parsimony analyses were conducted in TNT (Willi Hennig Society edition, Goloboff et al. 2008). For the morphological analysis only, both equal and implied weighting schemes (K = 3) were tested. All characters were treated as unordered and reversible. Bremer indices were calculated after each tree search. Bremer indices for the weighted analysis were rescaled based on the unweighted length of the trees found.

Partitioning strategies for the molecular components of the Bayesian analysis were analysed using Phycas (Lewis et al. 2010). Phycas implements a stepping stone method for accurate calculation of the marginal likelihoods of different models, allowing comparison of different partitioning strategies (Fan et al. 2010). Four different partitioning strategies were compared: no partitioning, partitioning by gene (5 partitions), partitioning by codon position for all 3 protein-coding genes (5 partitions), and partitioning by gene and codon position (11 partitions). The initial reference tree was generated in Phycas using partitioning by gene and allowing polytomies, and used for the marginal likelihood calculations (β=11, with 1000 cycles per β value). Marginal likelihoods were then compared using Bayes factors (Brown and Lemmon 2007).

I selected a substitution model for each gene using jModelTest (Posada 2008); model likelihood scores were computed based on the maximum likelihood tree for each model and dataset. A total of 12 models were compared, with three rate models allowed, as well as equal or variable nucleotide frequencies and gamma-distributed among-site rate (+Γ). Although substitution models incorporating a parameter for a proportion of invariable sites (+I) are often used in phylogenetic analyses, gamma-distributed rates can accommodate a wide range of substitution rates, and combining +Γ and +I parameters in partitioned data sets can result in unreasonable parameter values in the model (Fan et al. 2010). Models were selected from the model likelihood scores using the Bayesian Information Criterion (Table 2.2). In the case of the 3V data set under codon-partitioned models, the Jukes-Cantor substitution model was used for the 3rd codon position partition, as only one type of substitution was present in the data. The morphological data partition was analysed under the Mk+Γ model (Lewis 2001).

Bayesian analyses were conducted using MrBayes (Huelsenbeck and Ronquist 2001, Ronquist and Huelsenbeck 2003). Some MrBayes runs were completed through the CIPRES Science Gateway implemented on the Trestles TeraGrid cluster (Miller et al. 2010). All parameters except topology and
branch lengths were unlinked between partitions. Analyses consisted of 2 runs with 4 chains each, and were run for 10–60 million generations, depending on how rapidly convergence was reached. Convergence was assessed using the *slide* and *compare* options in AWTY (Wilgenbusch et al. 2004) to assess split frequency within and between runs, respectively. Trace plots of model parameters were also examined to assess mixing and the adequacy of priors.

**Results**

Morphological analysis

Parsimony analysis of the unweighted morphological dataset yielded a large number of trees (10000 trees retained, length 208, CI: 0.317, RI: 0.845). The strict consensus tree (Fig. 2.1) resolved a monophyletic Archiborborinae with *Maculantrops* sister to the remaining archiborborines. Within the archiborborines many species were subtended by a single large polytomy. Bremer indices were low, with most nodes collapsing in trees 1 step longer. The weighted dataset produced 3861 equally parsimonious trees (length 16.37 (218 rescaled), CI: 0.303, RI: 0.834). The strict consensus tree (Fig. 2.2) was fairly well-resolved, with mostly similar species groups but a number of topological differences from the unweighted analysis. Bremer supports were generally low along the backbone, although some clades were more strongly supported.

Bayesian analysis yielded a monophyletic Archiborborinae (pp=0.92) and generally similar species groups as the unweighted parsimony analysis, but with most species groups branching from a single polytomy (Fig. 2.3), while *Maculantrops* was weakly resolved (pp=0.51) in a clade with *Frutillaria, Penola*, and *Coloantrops*.

<table>
<thead>
<tr>
<th>Gene</th>
<th>No. of taxa</th>
<th>PI bp/total bp (%)</th>
<th>G+C content</th>
<th>Model</th>
</tr>
</thead>
<tbody>
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<td>12S</td>
<td>28</td>
<td>37/358 (10.3)</td>
<td>23.5%</td>
<td>GTR+G</td>
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<tr>
<td>COI</td>
<td>26</td>
<td>192/655 (29.3)</td>
<td>33.5%</td>
<td>GTR+G</td>
</tr>
<tr>
<td>CytB</td>
<td>27</td>
<td>249/712 (35.0)</td>
<td>27.4%</td>
<td>GTR+G</td>
</tr>
<tr>
<td>AATS</td>
<td>27</td>
<td>120/401 (30.0)</td>
<td>46.8%</td>
<td>GTR+G</td>
</tr>
<tr>
<td>28S</td>
<td>25</td>
<td>98/662 (14.8)</td>
<td>32.6%</td>
<td>HKY+G</td>
</tr>
</tbody>
</table>
Figure 2.1. Parsimony analysis of morphological dataset, no weighting, strict consensus. of 10000 trees
Tree length = 208. Numbers beneath nodes are Bremer support indices.
Figure 2.2. Parsimony analysis of morphological dataset, implied weighting, strict consensus of 3861 trees. Tree length = 16.37. Numbers beneath nodes are Bremer support indices.
Figure 2.3. Bayesian analysis of morphological dataset. Numbers beneath nodes are posterior probabilities.
Molecular analysis

Sequence data were obtained for 25 (COI) to 27 (12S) taxa for each gene fragment, and data for 1 additional taxon were obtained from Genbank. Between 10.3% (12S) and 35.0% (CytB) of the bases for each gene were parsimony informative, while G+C content ranged from 23.5% (12S) to 46.8% (AATS) (Table 2.2). Examination of saturation plots for 3rd codon positions of the protein-coding suggest that transitions in COI (Fig. 2.4) and CytB (Fig. 2.5) may be saturated, while there is no evident saturation of transitions in AATS (Fig. 2.6) or of transversions in any gene.

Parsimony analyses produced well-resolved trees for 3SV (Fig. 2.7; 3 trees, length 3569, CI: 0.368, RI: 0.345) and 3V (Fig. 2.8; 1 tree, length 2360, CI: 0.354, RI: 0.369). Both analyses placed *Poecilantrops* and *Boreantrops* as sister to the remaining archiborborines, and differed only in the positions of *Coloantrops daedalus* and *Antrops vittatus*. Bremer indices were low for the backbone in both analyses.

Bayesian analyses produced similar results as the parsimony analyses for the 3SV dataset (Fig. 2.9), with moderate to strong support along the backbone. The 3V dataset produced an alternative topology, with the *orbitalis* and *guaramacalensis* groups nested in the outgroup (Fig. 2.10). This arrangement was moderately supported (pp=0.79). The relationships of the remaining archiborborines were poorly resolved in general.
Figure 2.5. CytB saturation plot, 3rd position p-distance vs. 1st and 2nd positions K2P distance. Circles represent transitions, triangles represent transversions. Lines are LOESS with degree = 2, \( \alpha = 0.75 \).

Figure 2.6. AATS saturation plot, 3rd position p-distance vs. 1st and 2nd positions K2P distance. Circles represent transitions, triangles represent transversions. Lines are LOESS with degree = 2, \( \alpha = 0.75 \).
Figure 2.7. Parsimony analysis of molecular dataset, 3rd position transitions included, strict consensus of 3 trees. Numbers beneath nodes are Bremer support indices.

Figure 2.8. Parsimony analysis of molecular dataset, 3rd position transitions excluded, most parsimonious tree. Numbers beneath nodes are Bremer support indices.
Figure 2.9. Bayesian analysis of molecular dataset, 3rd position transitions included. Numbers beneath nodes are posterior probabilities.

**Combined analysis**

Due to the limited phylogenetic information and poor resolution of the 3V data set, only the 3SV molecular data was used for the combined analyses. The parsimony analysis produced a very large number of equally parsimonious trees (10000 trees retained, length 4041, CI: 0.348, RI: 0.448). The strict consensus tree (Fig. 2.11) was fairly well-resolved, with most species placed in clades which can be treated as genera. However, Bremer support indices were low. The Bayesian analysis did not reach convergence after 60 million generations and 1136 CPU hours, so a run with a simpler partition model (each gene in a separate partition) was used instead. The consensus tree of this run (Fig. 2.12) was not as well-resolved, although all putative genera identified in the parsimony analysis were recovered with the exception of *Antrops*. 
**Discussion**

Monophyly and position of the Archiborborinae

The Archiborborinae were supported as monophyletic in all analyses. There are several apparent morphological synapomorphies for the subfamily, although all show reversals in at least a few species. All fully-winged species have a dense patch of flattened setae on the calypter, which has not been observed elsewhere in the family. Many species have a distinctive sclerite in the distiphallus, referred to herein as the dorsal tube, which often bears small scale-like spines or hair-like projections. When present, the ocellar bristles are inserted at or anterior to the level of the median ocellus; this character is shared only with *Tucma* in the Sphaeroceridae. The postocellar bristles are also greatly enlarged in all species where they are present; this character also occurs in some Limosininae.

The positions of the Archiborborinae and the Copromyzinae in all of my analyses contradicted their previous treatment as a single subfamily. The Copromyzinae and Sphaerocerinae consistently formed a monophyletic clade to the exclusion of the Archiborborinae. Synapomorphies for the

*Figure 2.10. Bayesian analysis of molecular dataset, 3rd position transitions excluded. Numbers beneath nodes are posterior probabilities.*
Sphaerocerinae-Copromyzinae clade include the presence of only 2 spermathecae and loss of the katepisternal bristle. In the molecular and combined analyses, the exemplars of Lotophila and Parasphaerocera formed a well-supported clade within this group, sister to the the exemplar of Copromyza. While the sphaerocerines clearly form a monophyletic group within the Sphaerocerinae-Copromyzinae clade, there are no clear morphological synapomorphies for the Copromyzinae s.s. and it is plausible that the subfamily is not monophyletic. Further phylogenetic analysis with more extensive taxon sampling in this clade is needed.

The position of the enigmatic taxon Pycnopota varied between analyses. It was placed as sister to the Sphaerocerinae + Copromyzinae clade in the molecular and combined analyses and sister to the Archiborborinae in the morphological analysis. Very little is known of this genus, which includes a single described species from Bolivia and undescribed species from Brazil (specimens in USNM and MZSP) and Costa Rica (specimens in DEBU). Roháček et al. (2001) considered the genus a possible member of the Heleomyzidae, but other than the spinose costa its morphology is that of a sphaerocerid, and the phylogenetic results corroborate this. Final resolution of its position will require broader taxon sampling of non-archiborborine Sphaeroceridae, but it is clearly distinctive and may represent a new monotypic subfamily.

The relationship between the Archiborborinae and the remaining Sphaeroceridae was moderately well resolved from the data. In most analyses it was placed in a clade with Pycnopota and the Sphaerocerinae + Copromyzinae clade, although this clade was only well supported in a few analyses. This grouping (excluding Pycnopota) was suggested by Marshall (1997) as monophyletic based on the presence of the epandrial cleft. This character is present in all Archiborborinae and many Copromyzinae (apparently reversed in a clade of four genera (Norrbom and Kim 1984)), while the Sphaerocerinae have a possibly homologous state with the epandrium completely divided above the anus. However, final resolution of the position of the Archiborborinae and relationships of the subfamilies may require more extensive taxon sampling, particularly including molecular data for Tucma and difficult to place genera such as Palaeoceroptera Duda.

Phylogenetics and generic classification of the Archiborborinae

Analyses produced mixed results within the Archiborborinae. The morphological and combined analyses supported fairly consistent species groups within the subfamily. However, the relationships between the species groups were inconsistent and generally poorly supported, and a number of species were not placed
Figure 2.11. Parsimony analysis of combined dataset, strict consensus of 10000 trees. Numbers beneath nodes are Bremer support indices.
in species groups in some analyses. Basal nodes in particular were poorly resolved in all but the molecular 3SV analysis, with short branch lengths; this may indicate that the subfamily underwent a rapid divergence early in its evolutionary history.

Although different data sets and analytic methods produced somewhat differing results, the combined analysis appears to offer the best estimate of the relationships of the Archiborborinae. Unlike the molecular-only analyses, this analysis includes all species in the subfamily and allows most species to be placed within a genus with some degree of confidence. As well, it is topologically consistent with most of the well-supported nodes in the molecular tree. The generic revision is thus based primarily on the consensus of the combined analysis.

The existing generic classification of the Archiborborinae (Roháček et al. 2001), with all winged species in Archiborborus, is not supported. The type species of Antrops, Penola, and Frutillaria lay within clades of winged species, rendering such a broad concept of Archiborborus paraphyletic. This paraphyly could be resolved with two approaches. The simplest solution would be to treat all members of the Archiborborinae as a single genus, which would take the name Antrops. However, this solution is rather unsatisfying, as Antrops in such a classification would become perhaps the most morphologically diverse genus in the Sphaeroceridae. As well, such a classification would be entirely uninformative with regard to the relationships between species. A more satisfactory treatment is to separate distinctive groups within the subfamily into a number of genera. I have taken this latter approach, while attempting to minimize the number of new genera named. The resulting classification includes eight genera, five of which are newly described here.

The genera in the revised classification are as follows:

A) Poecilantrops: This genus is described for ten new species. This genus is split into two clades in the phylogenetic analyses, with P. marensis and P. flavifemur placed at various positions often distant to the remaining species. However, these two species share several derived morphological characters with members of the remainder of the genus (characters 22, 26, 27, and 45), and separate positions are not strongly supported. This genus is most diverse in Brazil, and additional species from that country as well as denser molecular sampling would be useful to test the monophyly of the genus.
Figure 2.12. Bayesian analysis of combined dataset. Numbers beneath nodes are posterior probabilities.
B)  *Boreantrops*: This genus is described for a large clade of species, mostly new. The two species included in the molecular analysis represent different species groups of this genus, which are resolved in a well-supported clade in all analyses.

C)  *Antrops*: This genus is expanded to include a number of species originally included in *Archiborborus* and becomes a senior subjective synonym of that genus. This genus is rather poorly defined, and includes three morphologically distinct species groups as well as a number of species with poorly resolved positions. The *orbitalis* and *guaramacalensis* groups are together recovered as sister to the remaining Archiborborinae in the molecular 3V analysis, but are otherwise placed within *Antrops* and so are treated as part of that genus. The molecular exemplar of the *quadrilobus* group appears to be the sister species of *Photantrops* in the molecular 3SV analysis, but otherwise appears to belong within *Antrops*.

   1)  *A. orbitalis* group: This group of 17 species is morphologically highly autoapomorphic (including characters 41 and 43), with strong support for its monophyly in all analyses. Species in this group are all small and entirely black with clear wings, and in all but one species are almost entirely shiny. Male genitalia are also distinctive within the group.

   2)  *A. guaramacalensis* group: This species group consists of 9 species, all apterous. They are characterized by a set of modifications of the thoracic bristles and an enlarged metapleuron (characters 31 and 32).

   3)  *A. quadrilobus* group: This species group is described for 9 new species. All species have the presutural dorsocentral bristle greatly reduced or absent, and share very similar male genitalia.

D)  *Coloantrops*: This genus is described for a single morphologically distinctive species. It appears to be the sister group to the *Maculantrops–Penola–Frutillaria* clade.

E)  *Maculantrops*: This genus is described for two closely related species. It appears to be the sister group to the *Penola–Frutillaria* clade.

F)  *Penola*: The circumscription of this monotypic genus is unchanged.

G)  *Frutillaria*: The concept of this genus is unchanged, although several new species are added.

H)  *Photantrops*: This genus is described for a single, highly distinctive species. The position of this taxon is somewhat unstable between analyses, although it is never placed within one of the genera delimited here with high support.

The basal genera in the subfamily, *Poecilantrops* and *Boreantrops*, include all the species known from southeastern Brazil and Central America, in addition to a number of species in the Andes. *Poecilantrops* also includes 2 species occurring on Hispaniola; the occurrence of *P. dominicus* and *P. baorucensis* in the mountains of Hispaniola may be due to either vicariance across land connections.
between South America and the Greater Antilles around the early Oligocene (Iturralde-Vinent and MacPhee 1999) or dispersal through oceanic rafting. Dated estimates of the divergence of these two species from other *Poecilantrops* would be interesting to help distinguish between these possibilities. The subfamily probably diversified in South America prior to the formation of the Panamanian landbridge during the Pliocene, with the Central American and Mexican species of *Boreantrops* representing one or more instances of dispersal along this landbridge. The remaining genera in the subfamily occur primarily in the Andes and Patagonia; the generic diversity within the Andes suggests the region played a significant role in the diversification of the subfamily.

The revised generic classification presented here is still incomplete. There are a number of species only tentatively placed to genera, and the distinct clades within *Antrops* and *Poecilantrops* may not belong in those genera. However, the classification does improve on the current classification and provides a base for the present and future revisionary work and for future phylogenetic analyses.
Appendix 2.1. Matrix for morphological analysis

*Note: / represents polymorphic characters (states 0 or 1)*

<table>
<thead>
<tr>
<th>Species</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
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Boreantrops subfoveolatus
Boreantrops talamanca
Boreantrops zacapa
Coloantrops daedalus
Frutillaria abdita
Frutillaria anticura
Frutillaria calceata
Frutillaria calida
Frutillaria chepuensis
Frutillaria chiloensis
Frutillaria contulmo
Frutillaria furcata
Frutillaria glabra
Frutillaria kuscheli
Frutillaria propinqua
Frutillaria richardi
Frutillaria stenoptera
Frutillaria tenuiforceps
Frutillaria transversa
Frutillaria triangularis
Maculantrops altiplanus
Maculantrops hirtipes
Penola eudyptidis
Photoantrops echinus
Poecilantrops baorucensis
Poecilantrops boraceiensis
Poecilantrops crocidosternum
Poecilantrops domicinus
Poecilantrops flavifemur
Poecilantrops marensis
Poecilantrops plaumanni
Poecilantrops psilosternum
Poecilantrops stellans
Poecilantrops vittifrons
3. A REVISION OF FRUITILLARIA RICHARDS AND PENOLA RICHARDS (DIPTERA: SPHAEROCERIDAE: ARCHIBORBORINAE)


**Introduction**

The Archiborborinae (formerly Copromyzinae: Archiborborini, rev. stat.) is a distinctive clade of Neotropical Sphaeroceridae characterised by ocellar bristles inserted lateral or anterior to the median ocellus, and by enlarged postocellar bristles. The tribe currently includes four genera, *Archiborborus* Duda, *Antrops* Enderlein, *Penola* Richards, and *Frutillaria* Richards, of which the latter two form the distinct monophyletic lineage (the *Penola* clade) revised here. The balance of the subfamily needs significant generic-level reclassification and is currently under revision. Although traditionally placed in the subfamily Copromyzinae, cladistic evidence developed as part of our ongoing revision of this group shows the archiborborines are not closely related to the primarily Holarctic and Old World tribe Copromyzini, and we here elevate the clade to the level of subfamily.

The *Penola* clade is characterized by an unusual form of wing reduction, with the wing blade reduced to a simple cylindrical rod bearing a large bristle at its tip. Wing reduction occurs in a number of clades within the Archiborborinae and the Sphaeroceridae in general, and somewhat similar rod-like or strap-like wings are found in endemic limosinine sphaerocerids found on the Juan Fernandez Islands (Marshall and Smith 1995, Buck & Marshall 2009: see Fig. 13) as well as other Diptera including some Ephydridae and the enigmatic African Mormotomyiidae. However, the “rod and bristle” wing form appears to be unique to the *Penola* clade. Other synapomorphies of the clade are discussed in the phylogeny section below.

*Penola* and *Frutillaria*, along with all their current constituent species, were described by O.W. Richards (1941, 1961,1964). Nothing other than listings in catalogues (Richards 1967, Pitkin 1989, Roháček et al. 2001) and brief distribution notes (Richards 1963, Lewis Smith and Prince 1985) has since been published on these taxa. All of Richards’ holotypes of *Frutillaria*, originally in the Natural History Museum (London) and the collection of the University of Chile (MEUC, now held by Instituto Entomología, Universidad Metropolitana de Ciencias de la Educación, Santiago), have apparently been
lost (Pitkin 1989). However, there are extant paratypes of most species and we have identified recently collected material of all but *F. propinqua* Richards. This has allowed the redescription of all named species in the clade; we also describe 9 new species. Two further undescribed species, represented only by females, are diagnosed but not formally described.

**Material and Methods**

Morphological terminology follows Cumming and Wood (2009). Proposed homologies of the distiphallus and descriptive terms are given in Figure 3.5.

Size was measured using an ocular micrometer and the range given is based on the largest and smallest specimens in the material examined; total length was measured as the sum of the lengths from the anterior margin of the frons to the anterior margin of tergite 1 and from the anterior margin of tergite 1 to the tip of the abdomen. As genitalia had to be examined to identify most specimens, no individuals with intact abdomens were available for measurement for a few species. To facilitate comparisons including these species the length of the head + thorax (measured as anterior margin of frons to tip of scutellum) is given for all species.

Most specimens were initially stored in alcohol and then critical-point dried prior to examination. Wherever possible, specimen colour is described from the freshest material. As storage in alcohol appears to cause fading, colours mentioned in the descriptions may not always be accurate. Where all specimens of a species were dissected for identification, it was not always possible to characterize the pattern of microtomentum on the abdomen.

Genitalia were prepared by removing the entire abdomen or the apical portion and macerating in hot KOH for several minutes, then neutralizing in glacial acetic acid for 10 minutes before transfer to glycerin for examination and storage. All removed parts are stored under the specimen in plastic genitalia vials. Label data is presented in a consistent manner; in a few cases obvious spelling errors were corrected. As we were unable to examine holotypes of the described species, in those cases we reproduce the data stated by Richards in his original descriptions, with inferred data enclosed in square brackets.

Specimens were examined from the following institutions: American Museum of Natural History, New York, USA (AMNH); Museum of Natural History, London, UK (BMNH); Canadian National Collection of Insects, Ottawa, Canada (CNCI); University of Guelph, Guelph, Canada (DEBU); Field
Figures 3.1–2. *Frutillaria* adults, habitus: (1) *F. tenuiforceps*, Zapallar; (2) *F. abdita* paratype, Putú, Chile.

Museum of Natural History, Chicago, USA (FMNH); United States National Museum of Natural History, Smithsonian Institution, Washington, USA (USNM). Holotypes of newly described species are in the Museo Nacional de Historia Natural, Santiago, Chile (MNNC).

**Phylogeny**

The placement of *Penola* and *Frutillaria* within the Archiborborinae is supported by several characters, including two apomorphic characters: head with strongly developed pre- and postocellar bristles, and labellum with twelve pseudotrachea. These genera are further characterized by the following pleisiomorphic characters or characters of uncertain polarity: katepisternal bristle present, hind tibia with a long preapical dorsal bristle and 1 or 2 ventroapical bristles, epandrium with a cleft above surstylus, and basiphallus bearing an epiphallus and a preepiphallus. Characters supporting the monophyly of a clade comprising the two genera are: wing reduced to a rod with an apical bristle; sternites (particularly sternite 2) greatly enlarged; male sternite 5 broadly rectangular with a posteromedial indentation surrounded by setae (Fig. 3.107); female segments 6 and 7 with broad, strongly sclerotized sclerites. *Frutillaria* appears to be the monophyletic sister group to *Penola*, forming a lineage characterized by the loss of an apicoventral spur on the male fore basotarsomere, the loss of an apicoventral bristle on the hind tibia, and the loss of a pair of setae on the female epiproct.
Although the strongly supported sister group relationship between *Penola* and *Frutillaria* suggests the genera could be combined, we feel that the ecological and morphological differences between *P. eudyptidis* and the members of *Frutillaria* justify the retention of two separate genera.

**Habitat and biology:**

*Penola* is only known from the Falkland Islands, mostly from specimens collected amongst Tussac or Tussock grass (*Poa flabellata*). *Frutillaria* is nearly endemic to the Valdivian rainforest of Chile and adjacent Argentina, with a few records from further south in the Magellanic rainforest. Almost all specimens we have examined of the latter genus were collected in forests, with the exception of a series of *F. chepuensis* Richards apparently collected in a meadow on Chiloé Island. Although label data also include forests of exotic pines and 2nd growth or grazed *Nothofagus* forests, *Frutillaria* seems to be restricted to relatively protected microhabitats. We have, for example, collected specimens of both *F. abdita* sp. n. and *F. tenuiforceps* Richards in patches of relatively undisturbed habitat in steep ravines in otherwise disturbed forests or even surrounded by heavily grazed pastures.

Specimens of *Frutillaria* can be collected efficiently using baited pan traps placed in pockets of leaf litter (both carrion and dung baits appear to be effective attractants) or using Berlese extraction of leaf litter; sometimes they are easily found merely by turning over wet litter. This genus is not well represented in most collections but some species are abundant at particular sites as demonstrated by one collection (by A. Newton and M. Thayer) of over 200 specimens of *F. triangularis* Richards from pitfall traps left in place for 3 weeks, and by our collection of almost 100 specimens of *F. calida* sp. n. and *F. stenoptera* Richards in a single day using baited pan traps. Although *Frutillaria* species can be locally abundant, most species seem to have limited distributions and several species are currently known from only a single locality in the highly fragmented northern Valdivian forests. The genus is therefore of potential significance in recognizing and characterizing forest fragments of conservation concern.

Nothing is known of the larval biology of these flies, but presumably the larvae are saprophagous, as are all known *Sphaeroceridae*. The eggs found in dissected females are relatively large but few in number. This suggests that *Frutillaria* species may be K-strategists, in contrast with other *Archiborborinae* for which comparable information is available, which have many more, smaller eggs.
Keys to the known species of Penola Richards and Frutillaria Richards

Males (males of Frutillaria n. sp. A and F. n. sp. B unknown)

1. Thorax yellow with brown medial stripe on scutum (Roháček et al. 2001: Fig. 3.6). Dorsocentraals reduced, only posterior pair distinct. Hind tibia with 2 apicoventral bristles. Fore basotarsomere with an apicoventral spur. Postgonite straplike, not divided apically. Basiphallus much longer than deep (Fig. 3.56). ........................................................................................................................................ Penola eudyptidis

- Thorax black (Figs. 3.1, 3.2). Dorsocentral bristles in 3 distinct pairs. Hind tibia with a single apicoventral bristle. Fore basotarsomere without spur. Postgonite not straplike, divided apically into anterior and posterior arms. Basiphallus about as long as deep........................................ Frutillaria 2

2. Fore femur yellow (Fig. 3.2). Mesoscutum almost entirely shiny. ..............................F. abdita sp. n.

- Fore femur dark reddish brown to black. Mesoscutum entirely covered with microtomentum or with only posterior half shiny. ...................................................................................................................... 3

3. Frons and sternite 2 entirely covered with microtomentum. Anepisternum with shiny spot restricted to ventral ½ or less. Surstylus broadly triangular (Fig. 3.54)..................................F. triangularis

- Frons with shiny spots lateral to ocellar triangle, sternite 2 mostly shiny. Anepisternum more than half shiny. Surstylus not triangular, with a narrow arm projecting from base............................................. 4

4. Posterior half of mesoscutum shiny; posterior and dorsal margins of anepisternum shiny. Distiphallus with a transverse ridge across dorsal tip bearing small denticles on either side (Fig. 3.32)......

........................................................................................................................................ F. glabra sp. n.

- Mesoscutum covered with microtomentum; posterior and dorsal margins of anepisternum with microtomentum. Distiphallus without a transverse ridge across dorsal tip, never with denticles. ............... 5

5. Lateral arm of distiphallus forked. Anterior lobe of postgonite much wider and slightly shorter than posterior lobe (Fig. 3.31)......................................................................................................... F. furcata sp. n.

- Lateral arm of distiphallus not forked. Anterior lobe of postgonite subequal to much narrower than posterior lobe, length variable........................................................................................................ 6

6. Surstylus in posterior view with a long straight arm projecting ventrally from medial side, about as long as basal portion (Figs. 3.10, 3.35)............................................................................................................................... 7

- Surstylus in posterior view with arm either much shorter than basal portion or arising from lateral side and curved medially. ............................................................................................................. 8

7. Lobes of postgonite well-separated, anterior lobe with an anterior concavity. Lateral arm of distiphallus curved medially near apex, distal part of central projecting sclerite not extending dorsally of lateral arms (Fig. 3.37)........................................................................................................ F. kuscheli
- Lobes of postgonite barely separated, anterior lobe very thin without an anterior concavity. Lateral arm of distiphallus not curved medially near apex, distal part of central projecting sclerite extending dorsally past lateral arms (Fig. 3.12)...........................................................................  F. calceata
8. Anterior lobe of postgonite short, either with a cleft making it somewhat double-pointed (Fig. 3.19), or broadly rounded and no longer than wide. ................................. 9
- Anterior lobe of postgonite longer, with a single point and much longer than wide. ............................... 11
9. Anterior lobe of postgonite without a cleft, posterior lobe broad at base and tapered to apex (Fig. 3.13). Inner arm of surstylus subequal in width to base (Fig. 3.15)..............................  F. calida sp. n.
- Anterior lobe of postgonite with a cleft, posterior lobe narrow and not tapered. Inner arm of surstylus much thinner than base. .......................................................................................................................... 10
10. Anterior lobe of postgonite with anterior point subequal in length to posterior point (Fig. 3.19). Distiphallus with apex of lateral arm broadened, central projecting sclerite bearing a ridged plate (Fig. 3.18). ..........................................................  F. chepuensis
- Anterior lobe of postgonite with anterior point much shorter than posterior point (Fig. 3.46). Distiphallus with apex of lateral arm not broadened, central projecting sclerite toothed apically (Fig. 3.45). ..........................................................  F. stenoptera
11. Distiphallus with a dorsal pair of flat, anteriorly curved horns at apex. Preepiphallus barely developed, about half the length of epiphallus (Fig. 3.38)...........................................................................  F. propinqua
- Distiphallus without flat curved horns. Preepiphallus usually well-developed. ..................................... 10
12. Distiphallus with central projecting sclerite very broad and extending beyond lateral arms in dorsal view, with a ventral curved sclerite at base of lateral arms............................................................................. 13
- Distiphallus with central projecting sclerite relatively narrow, not projecting beyond lateral arms in dorsal view, no ventral curved sclerite at base of lateral arms............................................. 14
13. Anterior margin of anepisternum shiny. Tip of lateral arm of distiphallus broadly rounded and toothed (Fig. 3.49). Outer corner of surstylus strongly produced, tip of arm narrowly pointed (Fig. 3.48)...
..........................................................................................................................  F. tenuiforceps
- Anterior margin of anepisternum with microtomentum. Tip of lateral arm of distiphallus pointed, without teeth (Fig. 3.50). Outer corner of surstylus weakly produced, tip of arm broadened (Fig. 3.52). ....
..........................................................................................................................  F. transversa sp. n.
14. Anterior lobe of postgonite very narrow, cleft between arms narrower than width of posterior lobe.  15
- Anterior lobe of postgonite subequal in width to posterior, cleft between arms subequal in width to posterior lobe .................................................................................................................. 17
15.  Both preepiphallus and epiphallus well-developed. Lateral arms of distiphallus tapered to tip (Fig. 3.20). ..................................................................................................................................................  
   - Epiphallus not developed, preepiphallus well-developed or not. Lateral arms of distiphallus not tapered (Figs. 3.25, 3.42). .............................................................................................................................................. 16

16.  Preepiphallus well developed (Fig. 3.42)........................................................................................................ F. richardsi sp. n.  
   - Preepiphallus not developed (Fig. 3.25) ........................................................................................................ F. contulmo sp. n.

17.  Dorsal tip of central projecting sclerite with a medial pair of incurved prongs. Preepiphallus well-developed, longer than epiphallus (Fig. 3.26). Outer corner of surstylus angular (Fig. 3.28). .... F. edenensis  
   - Dorsal tip of central projecting sclerite without medial pair of incurved prongs. Preepiphallus weakly developed, subequal in length to epiphallus (Fig. 3.9). Outer corner of surstylus rounded (Fig. 3.8). .............................................................................................................................................. F. anticura sp. n.

Females (females of Frutillaria chiloensis, F. furcata, F. richardsi, and F. propinqua unknown)

1.  Thorax yellow with brown medial stripe on scutum. Dorsocentrals reduced, only posterior pair distinct. Hind tibia with 2 apicoventral bristles. ................................................................. Penola eudyptidis  
   - Thorax black. Dorsocentrals in 3 distinct pairs. Hind tibia with 1 apicoventral bristle. Frutillaria 2

2.  Fore femur yellow (Fig. 3.2). Mesoscutum almost entirely shiny. ......................... F. abdita sp. n.  
   - Fore femur dark reddish brown to black. Mesoscutum entirely covered with microtomentum or with only posterior half shiny. .............................................................................................................................................. 3

3.  Sternite 2 entirely covered with microtomentum. Anepisternum with shiny spot restricted to ventral ⅓ or less. ............................................................................................................................................... 4
   - Sternite 2 mostly shiny. Anepisternum more than half shiny .................................................. 5

4.  Frons entirely covered with microtomentum. Tergite 8 complete (Fig. 3.95). Sternite 8 with round sclerites (Fig. 3.96). .............................................................................................................................................. F. triangularis  
   - Frons with shiny spots lateral to ocelli. Tergite 8 medially divided (Fig. 3.99). Sternite 8 with subrectangular sclerites (Fig. 3.100).............................................................................................................. n. sp. B

5.  Scutellum and anepisternum entirely shiny ................................................................. F. glabra sp. n.  
   - Scutellum with microtomentum at least medially, anepisternum with microtomentum along dorsal and posterior margins.......................................................................................................................... 6

6.  Scutellum shiny laterally, with a medial triangle of microtomentum. Posterior half of mesoscutum mostly shiny. .............................................................................................................. n. sp. A  
   - Scutellum and posterior half of mesoscutum entirely covered with microtomentum.............. 7

7.  Hypoproct not sclerotized. ................................................................................................. 8
   - Hypoproct sclerotized, in the form of a pair of spots or a U-shaped area.......................... 9
8. Tergite 8 divided medially (Fig. 3.68). ................................................................. *F. calida* sp. n.
   - Tergite 8 complete (Fig. 3.88). ................................................................. *F. tenuiforceps*
9. Tergite 8 divided medially .................................................................................. 10
   - Tergite 8 complete .......................................................................................... 12
10. Medial part of posterior margin of sternite 7 straight (Fig 73). Cerci with a few microtrichia
dorsally (Fig. 3.72).............................................................................................. *F. chepuensis*
   - Medial part of posterior margin of sternite 7 convex (Figs. 3.64, 3.82). Cerci without microtrichia
dorsally (Figs. 3.63, 3.81) .................................................................................. 11
11. Posterior margin of tergite 7 distinctly indented medially. Tergite 7 with very little
microomentum, restricted to lateral edges only. Tergite 8 with sclerites round (Fig. 3.81) ....... *F. kuscheli*
   - Posterior margin of tergite 7 not indented. Tergite 7 with extensive microomentum along
posterior half, interrupted medially. Tergite 8 with sclerites subrectangular (Fig. 3.63)......... *F. calceata*
12. Hypoproct with a distinct U-shaped area of sclerotization (Figs. 3.62, 3.91). Spermathecae
without apical invagination (Figs. 3.66, 3.94) ...................................................... 13
   - Hypoproct with two weakly sclerotized, lateral spots. Spermathecae with an apical invagination...
........................................................................................................................................ 14
13. Tergite 8 with about 8 setae. Epiproct triangular, with fairly long anterior arms (Fig. 3.90).
Sternite 7 with a medial tab-like posterior projection. Sternite 8 with anterior bare portion strongly
sclerotized, triangular, about as long as posterior microomentumose portion (Fig. 3.91)........... *F. transversa* sp. n.
   - Tergite 8 with about 12 setae. Epiproct subrectangular, with short anterior arms (Fig. 3.61).
Sternite 7 without a posterior projection. Sternite 8 with anterior bare portion weakly sclerotized,
subrectangular, almost 2x as long as posterior microtomentose portion (Fig. 3.62). ............ *F. anticura* sp. n.
14. Sternite 8 with subrectangular sclerites (Fig. 3.87). Epiproct with long anterior lobes (Fig. 3.86).
Apical invagination of spermathecae longer than basal invagination (Fig. 3.92)..................... *F. stenoptera*
   - Sternite 8 with round to comma-shaped sclerites (Figs. 3.71, 3.78). Epiproct with short anterior
lobes (Figs. 3.70, 3.77). Apical invagination of spermathecae shorter than basal invaginations (Figs. 3.75,
3.83). 15
15. Inner edge of cercus about 0.3X length of outer edge. Epiproct about as wide as long (Fig. 3.77).
........................................................................................................................................ *F. edenensis*
   - Inner edge of cercus more than 0.5X length of outer edge. Epiproct longer than wide (Fig. 3.70)...
........................................................................................................................................ *F. contulmo* sp. n.
**Frutillaria Richards, 1961: 63**

Type species: *Frutillaria kuscheli* Richards 1961, by original designation

Small flies, 1.5–2.7 mm long.

Head yellowish orange to reddish brown, mostly covered with microtomentum; often with bare shiny patches lateral to ocellar triangle. Face evenly sclerotized, weakly carinate medially, lunule small. Gena about quarter maximum height of eye. Occiput narrow below occipital foramen. Clypeus narrow, slightly produced. Palpus broadest distally, with tiny setae throughout and larger setae along lateral margin. Prementum well-developed, circular, about three-quarters height of eye. Labellum with 12 pseudotrachea. Scape very short, with 1–2 dorsomedial setulae; pedicel subtriangular, often somewhat darker than frons, medial bristles about 4 times longer than outer, upper apical upcurved, with a downcurved bristle posterior to it; first flagellomere round, slightly pointed dorsoapically, covered with tiny hairs that, when dark, make the flagellomere appear bicoloured; arista dorsolateral, preapical, 2-segmented, about as long as head width, short-plumose. Chaetotaxy: orbital bristles in two lateroclinate pairs; irregular orbital setulae along orbital plate; interfrontals in about 6 medioclinate pairs; preocellars lateroproclinate, about 1 ocellus width anterior of median ocellus; irregular, very short ocellar setulae; inner vertical bristles inclinate; outer vertical bristles lateroeclinate; postocellar bristles slightly proclinate; postvertical bristles small, cruciate; setae on median occipital sclerite small, medioclinate; postocular setae in a complete row with an incomplete row of occipital setae behind; vibrissa strong, as long as head; subvibrissal bristle short but usually distinct, about 0.25X length of vibrissa; upturned anterior genal bristle about quarter – ½ length of vibrissa; genal setae in 2 rows.

Thorax black, postalar callus and scutellum sometimes reddish; extent of microtomentum variable between species. Halter absent. Chaetotaxy: postpronotum with a single enlarged bristle; notopleuron with two bristles, anterior very long, about 2x length of posterior; one presutural and one postsutural intra-alar bristles (postsutural may be difficult to distinguish from surrounding setae); one large postalar bristle in line with intra-alar, a smaller postalar between this and scutellum; three dorsocentral bristles (one presutural and two postsutural), posterior pair longer than scutellum, anterior pair slightly shorter to half the length of posterior pair; acrostichal setae in 6–8 irregular rows; scutellum with 2 pairs of long scutellar bristles; proepisternum with 1–4 small setulae; katepisternum with a single large dorsal bristle and long, thin setae ventrally.

Legs mostly black, usually with orange to yellowish joints and tarsi; fore coxa and femur paler in some species. Usually covered with microtomentum except fore coxa, with a shiny patch on fore femur in some species. Fore tibia with a preapical dorsal bristle. Fore basotarsomere without an apical spur in males.
Mid femur with 2–3 anterior bristles. Mid tibia with preapical anterodorsal, anteroventral, and posteroverentral bristles and a ring of 4–5 apical bristles. Hind femur with a few small anterodorsal and anteroventral bristles. Hind tibia with a long preapical dorsal bristle and 1 ventroapical bristle.

Abdomen black, extent of microtomentum variable between species. Both tergites and sternites well sclerotized. Sternites particularly wide, nearly meeting tergites laterally; pleural membrane narrow, occasionally with a few setae.

Male postabdomen: Sternite 5 wide, with a posteromedial indentation. Synsternite 6+7 asymmetrical, complex, a portion often detached and forming an accessory sclerite flanking distiphallus in genital pouch; dorsal corner fused to sternite 8. Sternite 8 broadly fused to epandrium along right side. Genital pouch often with a thin ring-shaped sclerite on right side; a similar structure is found in some Limosininae, and it is possibly a modified campaniform sensillum. Epandrium symmetrical, with a cleft above anterior edge of surstylus. Cerci small and medially fused. Subepandrial sclerite Y or X-shaped, articulated with cerci and surstyli. Surstylus shape variable between species, articulated with epandrium and subepandrial sclerite. Hypandrial arms weakly fused with ventral edge of epandrium; hypandrial apodeme well-developed, rod-like, weakly fused with arms. Phallapodeme well-developed, curved and broadest distally. Postgonites long and usually bilobed, articulated with phallapodeme, hypandrium, and basiphallus. Ejaculatory apodeme small and easily lost in dissections. Basiphallus usually short, with both epiphallus and preepiphallus. Distiphallus complex, often bearing paired lateral arms on either side of a central projecting sclerite; sometimes with paired ventroapical discs and/or paired membranous to sclerotized ventral sacs.

Female postabdomen: Sclerites of segments 6 and 7 unusually broad and strongly sclerotized for Archiborborinae, resembling many Limosininae, but abdomen telescoping, usually retracted in preserved specimens. Tergite 8 strongly sclerotized, sometimes divided medially. Sternite 8 always divided medially, weakly to moderately sclerotized. Tergite 10 always distinct if weakly sclerotized, hypoproct sometimes entirely unsclerotized. Cerci simple, not fused with tergite 10 or each other. Three more or less spherical spermathecae; one pair sharing a duct and the other on a separate duct; base and apex may be invaginated.

Immature stages: Larvae and pupae unknown. Eggs (1–5 per specimen) dissected from females of *F. calida* sp. n., *F. chepuensis* Richards, *F. edenensis* Richards, and *F. transversa* sp. n.: ovoid, about \( \frac{2}{3} \)
length of retracted female abdomen and about 3x as long as wide, sculptured with about 20 longitudinal
furrows, micropylar end ovoid and slightly indented.

Figures 3.3–9. *Frutillaria* male genitalia. *F. abdita*: (3) cerci and surstylus, posterior view, (4) surstylus,
anterior view, (5) phallus and phallapodeme, lateral view; *F. anticura*: (6) postgonite, lateral view, (7)
cerci and surstylus, posterior view, (8) surstylus, anterior view, (9) phallus, postgonite, and phallapodeme,
lateral view.

*Frutillaria abdita* sp. n.
(Figs. 3.2–6, 3.59, 3.60, 3.65, 3.108)
Description:
Length 1.5–1.9 mm (head + thorax 0.8–1.0 mm)

Occiput brown, face and gena yellow, frons intermediately coloured. Frons with shiny spots lateral to
ocellar triangle. Antenna yellow. Clypeus and prementum yellow.
Thorax black, postalar callus and scutellum reddish. Wing rudiment brown. Mesoscutum and scutellum extensively shiny, some microtomentum near margins. Anepisternum entirely shiny. Katepisternum with a large shiny patch behind fore coxa extending posteriorly as a triangle to near bristle, narrowly separated from posterior shiny patch by a band of microtomentum. Meron and metapleuron shiny with the exception of a strip of microtomentum between posterior thoracic spiracle and base of hind coxa. Laterotergite mostly shiny.

Legs dark brown, fore coxa, fore femur, trochanters, diffuse area near joints, and tarsi yellow. Mid femur with 2 anterior bristles, mid tibia without posteroventral bristle.

Male abdomen (Figs. 3.3–6): Syntergite 1+2 with some microtomentum in a patch behind scutellum, tergites 3–5 entirely shiny. Sternites 2–5 entirely shiny. Surstylus with broad basal section and fairly long inner arm, outer corner rounded, not produced. Postgonite bilobed, anterior lobe about 0.5X length of posterior. Epiphallus barely produced, broadened laterally; preepipallus well-developed, long and thin. Distiphalus with lateral arm produced from ventral sclerite, pointed apically with 2 medial teeth; a large complex, translucent sclerite apically of uncertain homology; ventral sacs clear, not projecting and barely visible.

Female abdomen (Figs. 3.59, 3.60, 3.65): Syntergite 1+2 with a patch of microtomentum behind scutellum, tergites 3–5 with a band of microtomentum near base. Tergite 6 covered with microtomentum, tergites 7–8 mostly shiny with very little microtomentum apically. Sternites 2–5 shiny, sternite 6 covered with microtomentum, tergite 7 mostly shiny with some microtomentum apically. Tergite 8 complete, epiproct broadly triangular with distinct anterior arms. Sclerites of sternite 8 teardrop-shaped, hypoproct not sclerotized. Spermathecae with basal invagination short, annulated; apical invagination short, subconical, smooth

**Type material.** Holotype ♂: CHILE: Maule: Putú, ~15 km N Constitución, along stream, 26 Nov 2006, S.A. Marshall (MNNC). Paratypes: same data as holotype (2 ♂, 8 ♀, DEBU).

Comments: This species was found in a small wooded ravine on the heavily agricultural coastal plain north of Constitución. The habitat patch was extremely small and completely isolated by a large area of pasture from any other intact forest; it was apparently preserved only by virtue of the steep sides which prevented cattle from entering to browse. The species name refers to the hidden and unexpected collection locality.

*Frutillaria anticura* sp. n.

(Figs. 3.7–9, 3.61, 3.62, 3.66, 3.109)

Description:

Length N/A (head + thorax 0.8–1.0 mm)
Occiput black, face orange, gena and frons intermediately coloured. Frons with shiny spots lateral to ocellar triangle. Antenna orange. Clypeus mostly orange, prementum brown.

Thorax black, postalar callus reddish, wing rudiment brown. Mesoscutum and scutellum entirely covered with microtomentum. Anepisternum mostly shiny, anterior and posterior margins and part of dorsal margin with microtomentum. Katepisternum with a shiny spot behind coxa, not extending toward bristle; posterior part of katepisternum, meron and metapleuron shiny with exception of a stripe of microtomentum between posterior thoracic spiracle and base of hind coxa. Laterotergite mostly shiny.

Legs black, joints narrowly orange, tarsi and trochanters orange, fore coxa dark reddish brown; fore femur very sparsely microtomentose posteriorly. Mid femur with 2 anterior bristles.

Male abdomen (Figs. 3.7–9): Syntergite 1+2 covered with microtomentum, posterior margin shiny. Surstylus with inner arm knobbed at tip, outer corner not projecting. Postgonite bilobed, anterior lobe rounded at tip, posterior lobe pointed. Epiphallus and preepiphallus thin, of similar length. Distiphallus with lateral arm rounded at tip and bearing a preapical medial tooth, not projecting dorsally above central projecting sclerite; central projecting sclerite complex, frilled and ridged, connected to lateral arms dorsally by a translucent membrane, not apparently attached ventrally; ventral sacs not strongly sclerotized.

Female abdomen (Figs. 3.61, 3.62, 3.66): Syntergite 1+2 covered with microtomentum. Sternites 2–4 shiny. Tergite 8 complete, with about 12 setae along posterior margin; mostly shiny, with some microtomentum along posterior margin. Epiroct with parallel sides, very short anterior arms. Cerci without microtrichia dorsally. Spermathecae with basal invagination consisting of a basal sheath of several rings and apical rounded cap; no apical invagination, but variably pointed apically.

**Type material.** Holotype ♂: CHILE: **Los Lagos:** Puyehue Natl. Pk., Anticura, tr. to Mirador El Puma, stream, 40°40.35’S 72°10.18’W, 400 m, dung pans, 4–5 Dec 2008, J.H. Kits & S.A. Marshall (MNNC). Paratypes: same data as holotype (1 ♂, 2 ♀; DEBU); Puyehue Natl. Pk., Anticura, 40°39’42”S 72°08’06”W, 460 m, Valdivian rainforest w/large Saxegothaea, FMHD#96–252, berlese, leaf & log litter, 31 Dec 1996, A.F. Newton & M.K. Thayer (1 ♂, FMNH); Puyehue Natl. Pk., Ruta 215, vic. Laguna Las Mellizas, 40°40'48"S 71°59'24"W, 1000 m, Nothofagus pumilio w/dense bamboo understory, FMHD#2002–089, berlese, leaf & log litter, 19 Dec 2002, A. F. Newton et al. (1 ♂, 2 ♀, FMNH); Puyehue Natl. Pk., Ruta 215, km 4.5 E of Aduana station, 40°40'14"S 72°05'13"W, 580 m, Valdivian rainforest, FMHD#2002–090, M.K. Thayer et al. (1 ♂, 2 ♀, FMNH).

**Other material examined.** CHILE: **Los Lagos:** Vicente Pérez Rosales Natl. Pk., SW slope Volcán Osorno, ca. km 11 to La Burbuja, 41°07’54”S 072°32’00”W, 1090 m, low Nothofagus dombeyi w/bamboo
Comments: This species is named after the type locality, the Anticura sector of Puyehue National Park. The name should be treated as a noun in apposition.

*Frutillaria calceata* Richards

*Frutillaria calceata* Richards, 1961: 67

(Figs. 3.10–12, 3.63, 3.64, 3.67, 3.110)

Description:

Length 1.7–2.5 mm (head + thorax 0.8–1.2 mm)

Occiput dark brown, face orange, frons and gena intermediately coloured. Shiny spots on frons lateral to ocellar triangle. Scape and first flagellomere orange, pedicel brown. Clypeus orange, prementum brown.

Thorax black, postalar calli reddish. Mesoscutum and scutellum entirely covered with microtomentum. Wing rudiment light brown. Anepisternum mostly shiny, anterior, posterior, and dorsal margin with microtomentum. Katepisternum with a shiny spot behind coxa, not extending toward bristle; posterior part of katepisternum, meron and metapleuron shiny with exception of a stripe of microtomentum between posterior thoracic spiracle and base of hind coxa. Laterotergite mostly shiny.

Legs black, trochanters, joints, and tarsi orange, fore coxa dark reddish brown. Fore femur covered with microtomentum. Mid femur with 2 anterior bristles.

Male abdomen (Figs. 3.10–12): Tergites 1–5 covered with microtomentum, shiny along the posterior margins. Sternite 2 shiny, sternites 3–4 mostly shiny with microtomentum medially, sternite 5 extensively covered with microtomentum. Ring-shaped sclerite present. Synsternite 6+7 connected by a narrow band to the accessory sclerite flanking the distiphallus. Surstylus with a long inner arm, subequal to length of basal part; outer corner strongly produced and broadly rounded. Postgonite bilobed, anterior lobe very short and thin, posterior lobe strongly angled anteriorly. Basiphallus with both epiphallus and preepiphallus well-developed. Distiphallus with ventroapical discs very large, extending beyond central projecting sclerite; central projecting sclerite rectangular, extending both dorsally and ventrally to lateral arm; lateral arm slightly longer than central projecting sclerite, pointed at tip; ventral sac strongly sclerotized, projecting perpendicularly.
Female abdomen (Figs. 3.63, 3.64, 3.67): Tergites 1–6 covered with microtomentum, shiny along the posterior margins. Sternite 2 shiny, sternites 3–4 mostly shiny with microtomentum medially, sternites 5–6 mostly covered with microtomentum, shiny along posterior margins. Tergite 7 distinctly convex posteriorly, with a medially interrupted band of microtomentum along posterior margin. Sternite 7 somewhat pointed medially, mostly shiny with a medial patch of microtomentum. Tergite 8 divided medially, epiproct triangular with fairly long anterior arms. Cerci without microtrichia dorsally. Sclerites of sternite 8 subrectangular, hypoproct with lateral sclerotized spots and a medial sclerotized bar. Spermathecae with long, mushroom-shaped apical invagination, short basal invagination, both annulated.


**Other material examined.** CHILE: Aisén: Queulat Pass, 40 km N Puerto Cisnes, mossy beech forest, carrion trap, 500 m, 30 Dec 1984 – 28 Jan 1985, S. & J. Peck (1 ♀, DEBU); Los Lagos: Puaacho (15.1 km W), 40º35’00”S 73º37’42”W, 50 m, Valdivian rainforest remnant in sm. ravine, w/large ferns, FMHD#96–248, 30 Dec 1996, berlese, leaf & log litter, A.F. Newton & M.K. Thayer (2 ♂, 2 ♀, FMNH); as above but FMHD#96–249, berlese, litter under large ferns, A.F. Newton & M.K. Thayer (1 ♂, 1 ♀, FMNH); Vicente Pérez Rosales Natl. Pk., N slope Volcán Osorno, road to Ref. La Picada, 41º03’15”S 72º30’11”W, 660 m, Nothofagus dombeyi w/conifers, dense Chusquea bamboo understory, FMHD#2002–082, berlese, litter, & log litter, 16 Dec 2002, Solodovnikov, Thayer & Newton (4 ♂, FMNH); Vicente Pérez Rosales Natl. Pk., N slope Volcán Osorno, road to Ref. La Picada, 41º01’03”S 72º32’54”W, 430 m, Nothofagus dombeyi w/conifers, FMHD#2002–083, berlese, leaf & log litter, Newton, Solodovnikov, & Chani-Posse (2 ♂, 1 ♀, FMNH); Bahia Mansa, 3 km S Maicolpue, 200 m, 21 Dec 1984 – 3 Feb 1985, carrion trap, mixed forest, S. & J. Peck (1 ♂, DEBU); as above but FMHD#85–933, Berlese, litter, 21 Dec 1984, S. & J. Peck (3 ♂, 1 ♀, FMNH); as above but FMHD#85–994, Berlese, litter, 3 Feb 1985, S. & J. Peck (2 ♂, FMNH).

Comments: The paratype is in poor condition, and the aedeagal and hypandrial complexes are apparently lost. However, based on the surstylist of this specimen and Richards’ figure of the species, it is clear that the more recently collected material belongs to the same species. There is a female (species undetermined) enclosed in a separate glass tube in the vial containing the male paratype, but it is not mentioned specifically by Richards, and is not a paratype.

*Frutillaria calida* sp. n.
(Figs. 3.13–15, 3.68, 3.69, 3.74, 3.111)

Description:
Length 1.8–2.3 mm (head + thorax 0.8–1.1 mm)

Occiput black, face orange, gena and frons intermediately coloured. Frons with shiny spots lateral to ocellar triangle. Scape and first flagellomere orange, pedicel brown. Clypeus mostly yellow, prementum dark brown.
Thorax black, postalar callus often reddish, wing rudiment brown. Mesocutum and scutellum entirely covered with microtomentum. Anepisternum mostly shiny, posterior margin and part of dorsal margin with microtomentum. Katepisternum with a large shiny patch behind fore coxa extending posteriorly as a triangle, almost reaching bristle, narrowly separated from shiny posterior patch. Meron and metapleuron shiny with exception of a stripe of microtomentum between posterior thoracic spiracle and base of hind coxa. Laterotergite mostly shiny.

Legs black, joints narrowly orange, tarsi and trochanters orange, fore coxa dark reddish brown. Mid femur with 2 anterior bristles.

Male abdomen (Figs. 3.13–15): Tergites 1–5 mostly covered with microtomentum, margins shiny. Sternites 2–5 shiny. Surstylus with basal and distal parts of similar width; outer corner broadly produced, inner arm broad. Postgonite bilobed, anterior lobe very short and rounded, posterior lobe long and pointed. Basiphallus with very weakly developed epiphallus and preepiphallus, both present as a slight bump on the ventral surface. Distiphallus with lateral arms projecting above central projecting sclerite, narrow, forked at tip with upper fork recurved medially; central projecting sclerite ovoid with paired clear wings dorsally at tip; ventroapical discs subtriangular in side view, appearing pointed apically; ventral sacs not developed.

Female abdomen (Figs. 3.68, 3.69, 3.74): Tergites 1–6 covered with microtomentum, margins narrowly shiny. Tergites 7–8 mostly shiny with some microtomentum posteriorly. Sternites 2–3 shiny, sternite 4 with some microtomentum medially, sternites 5–6 mostly microtomentose, sternite 7 shiny anteriorly, posterior 2/5 microtomentose. Tergite 8 divided longitudinally. Epiproct parallel-sided, moderately developed anterior arms. Sclerites of sternite 8 round; hypoproct not developed. Spermathecae with long, mushroom-shaped apical invagination, short basal invagination, both annulated.

**Type material.** Holotype ♂: CHILE: Los Lagos: Vicente Pérez Rosales Natl.Pk., Volcán Osorno rd., 41°10’S 72°31’W, 300m, dung pans, 2 Dec 2008, J.H. Kits & S.A. Marshall (MNMC). Paratypes: same data as holotype (14 ♂, 15 ♀, DEBU); same data as holotype but carrion pans (16 ♂, 12 ♀, DEBU); Río San Pedro, 24 km NE of Los Lagos, river bank slope forest, yellow pans, 13–18 Nov 2000, L. Packer (1 ♀, DEBU); Puyehue Natl. Pk., Anticura, tr. to Mirador El Puma, stream, 40°40.35’S 72°10.18’W, 400 m, dung pans, 4–5 Dec 2008, J.H. Kits & S.A. Marshall (2 ♂, 1 ♀, DEBU); Puyehue Natl. Pk., Anticura, above guard station, 40°39’53”S 72°10’07”W, 400 m, carrion pans, 3–4 Dec 2008, J.H. Kits & S.A. Marshall (1 ♀, DEBU); Chiloé I., Terao, nr. Chonchi, 50 m, 2nd growth forest, Chile Exp., 19–21 Feb 1988, L. Masner (2 ♀, DEBU); Chiloé I., Terao, 10 km S Chonchi, 42°43’01”S, 073°38’47”W, 45 m, high meadow, yellow pans, 13–15 Feb 2005 (1 ♂, DEBU); Chiloé I., 11 km NW Castro, 200 m, ravine second growth forest, FMHD#85–948, carrion trap, 27 Dec 1984 – 1 Feb 1985, S. & J. Peck (7 ♂, 3 ♀, FMNH); Chiloé I., Lago Huillinco, S side, road to Bellavista, 1.3 km S road to Cucao, 42°41’49”S 73°55’53”W, 45
Frutillaria chepuensis Richards

Frutillaria chepuensis Richards, 1961: 66–67
(Figs. 3.16–19, 3.72, 3.73, 3.76, 3.109)

Description:
Length 1.9–2.6 mm (head + thorax 0.8–1.1 mm)
Occiput brown, face and gena orange, frons intermediately coloured. Frons with shiny spots lateral to ocellar triangle. Scape and first flagellomere orange, pedicel brown. Clypeus orange, prementum brown.
Thorax black, postalar callus and scutellum reddish, wing rudiment pale brown. Mesoscutum and scutellum covered with microtomentum. Anepisternum mostly shiny, posterior margin and part of dorsal margin with microtomentum, sometimes anterior margin with some microtomentum below spiracle. Katepisternum with a large shiny patch behind fore coxa extending posteriorly as a triangle to near bristle, narrowly separated from posterior shiny patch by a band of microtomentum. Meron and metapleuron shiny with the exception of a stripe of microtomentum between posterior thoracic spiracle and base of hind coxa. Laterotergite mostly shiny.
Legs black, fore coxa dark reddish brown, trochanters, joints, and tarsi orange-yellow. Mid femur with 2 anterior bristles.
Male abdomen (Figs. 3.16–19): Tergites 1–5 with microtomentum. Sternite 2 shiny, sternites 3–4 mostly shiny with some microtomentum medially, sternite 5 mostly covered with microtomentum. Surstylus with broad basal part, clubbed inner arm, outer corner appearing broadly rounded to somewhat pointed, depending on angle of view. Postgonite bilobed, anterior arm short and itself bilobed. Epiphallus short,
broadened laterally at tip; preepiphallus long, nearly parallel-sided. Distiphallus with lateral arms extending narrowly from ventral sclerite, projecting past central projecting sclerite and fan-shaped at tip; central projecting sclerite with apical portion strongly ridged; apicoventral discs present, elongate; ventral sacs clear, projecting perpendicularly.

Female abdomen (Figs. 3.72, 3.73, 3.76): Tergites 1–5 covered with microtomentum, with posterior margins shiny, tergite 6 shiny on basal half, covered with microtomentum on apical half. Sternite 2 shiny, sternites 3–5 mostly shiny with microtomentum medially, sternite 6 shiny on basal half, covered with microtomentum on apical half. Tergites 7 and 8 mostly shiny with some microtomentum along posterior margins, tergite 8 divided medially. Epiproct triangular with fairly long anterior arms. Cerci without microtrichia dorsally, but some apically. Sternite 7 mostly shiny, with some microtomentum along posterior margin. Sclerites of sternite 8 round to comma-shaped. Hypoproct with sclerotized lateral spots connected by a weakly sclerotized bar. Spermathecae with long, mushroom-shaped apical invagination, short basal invagination, both annulated.


**Other material examined.** CHILE: Los Lagos: Chiloé I., Terao, nr. Chonchi, 50 m, 2nd growth forest, Chile Exp., 19–21 Feb 1988, L. Masner (3 ♂, 1 ♀, CNCI); Chiloé I., Terao, 10 km S Chonchi, 42°43'01"S 73°38'47"W, 45 m, high meadow, yellow pans, 13–15 Feb 2005 (13 ♂, 20 ♀, DEBU); Chiloé I., 11 km NW Castro, 200 m, ravine, second growth forest, FMHD#85–948, carrion trap, 27 Dec 1984 – 1 Feb 1985, S. & J. Peck (2 ♂, 2 ♀, FMNH); Chiloé I., Lago Tepuhueico, SE edge, 42°55'00"S 73°55'24"W, 50 m, Valdivian rainforest, FMHD#97–22, berlese, leaf & log litter, 15 Jan 1997, A.F. Newton & M.K. Thayer (2 ♂, FMNH); Chiloé I., Colonia Yungay, road to (3.6 km W Hwy 5), 42°59'00"S 73°41'00"W, 90 m, grazed secondary Valdivian rainforest remnants, FMHD#97–24, berlese, leaf & log litter, 17 Jan 1997, A.F. Newton & M.K. Thayer (4 ♂, 9 ♀, FMNH).

Comments: This species is only known from Chiloé Island. Although we did not examine any paratypes, its identity is unambiguous based on Richards’ illustration and description. Most of the paratypes are apparently lost, with only 13 specimens currently present in the BMNH (Pitkin 1989; N. Wyatt, pers. comm.)

**Frutillaria chiloensis** sp. n.

(Figs. 3.20–22, 3.110)

Description:

Length: N/A (head + thorax 0.7–1.0 mm)

Occiput brown, face orange, frons and gena intermediately coloured. Frons with shiny spots lateral to ocellar triangle. Scape and first flagellomere orange, pedicel brown. Clypeus and prementum orange.
Thorax black, postalar callus reddish, wing rudiment brown. Mesoscutum and scutellum entirely covered with microtomentum. Anepisternum mostly shiny, anterior, posterior, and dorsal. Katepisternum with shiny spot behind coxa not extending posteriorly toward bristle; posterior part of katepisternum, meron and metapleuron shiny with exception of a stripe of microtomentum between posterior thoracic spiracle and base of hind coxa. Laterotergite mostly shiny.

Legs black, joints narrowly orange, tarsi and trochanters orange; fore femur mostly microtomentose posteriorly. Mid femur with 2 anterior bristles.

Male abdomen (Figs. 3.20–22): Inner arm of surstylus broadened at apex, outer corner not strongly projecting. Postgonite with lobes barely separated, both lobes thin, posterior lobe about 2x length of anterior. Epiphallus and preepiphallus both well-developed. Distiphallus with lateral arms thin apically, pointed at tip. central projecting sclerite with a ventral disc-like sclerite, and a medial bearing ridges near apex. Ventral sacs well-developed, sclerotized.

Female unknown.


Comments: The species name refers to this species’ apparent restriction to Chiloé Island.

**Frutillaria contulmo sp. n.**
(Figs. 3.23–25, 3.70, 3.71, 3.75, 3.110)

Description:
Length: N/A (head + thorax 0.8–1.0 mm)
Occiput black, face and gena orange, frons intermediately coloured. Frons with shiny spots lateral to ocellar triangle. Scape and first flagellomere orange, pedicel brown. Clypeus and prementum orange.

Thorax black, postalar callus reddish, wing rudiment brown. Mesoscutum and scutellum entirely covered with microtomentum. Anepisternum mostly shiny, posterior margin and part of dorsal margin with microtomentum; anterior margin with microtomentum in male from Nahuelbuta, shiny in specimens from Contulmo. Katepisternum with shiny spot behind coxa extending posteriorly toward bristle; posterior part of katepisternum, meron and metapleuron shiny with exception of a stripe of microtomentum between posterior thoracic spiracle and base of hind coxa. Laterotergite mostly shiny.

Legs black, joints narrowly orange, tarsi and trochanters orange, fore coxa deep reddish brown; fore femur mostly microtomentose posteriorly. Mid femur with 2 anterior bristles.

Male abdomen (Figs. 3.23–25): Inner arm of surstylus broadened at apex, outer corner projecting, fairly narrow. Postgonite with lobes separated, both lobes long and thin. Epiphallus not developed, preepiphallus barely developed. Distiphallus with thin, parallel-sided lateral arm, bearing a large tooth at apex. central projecting sclerite with a large curved sclerite extensive covered with fine ridges. Ventral sclerite not connected to central projecting sclerite.

Female abdomen (Figs. 3.70, 3.71, 3.75): Tergite 7 with a subapical band of microtomentum, tergite 8 and sternite 7 mostly shiny with some microtomentum along posterior margin. Tergite 8 complete, epiproct triangular with short anterior arms. Sclerites of sternite 8 round, comma-shaped. Hypoproct appearing as a pair of lateral spots with a weakly sclerotized medial bar. Spermathecae with basal invagination long, mushroom-shaped, annulated; apical invagination short, subconical, smooth.


**Other material examined.** Same data as holotype (1 ♀, FMNH).

Comments: The species name is a noun in apposition referring to the type locality of the species. The female associated with this species is somewhat rubbed and faded; although it seems most likely to belong with the male types, this is difficult to verify on the basis of the few available specimens.

*Frutillaria edenensis* Richards

*Frutillaria edenensis* Richards, 1961: 67

(Figs. 3.26–28, 3.77, 3.78, 3.83, 3.112)

Description:

Length 2.0–2.4 mm (head + thorax 1.0–1.1 mm)
Occiput black, face orange, gena and frons intermediately coloured. Frons with shiny spots lateral to ocellar triangle. Scape and first flagellomere orange, pedicel blackish dorsally, orange ventrally. Clypeus mostly yellow, prementum brown to dark brown.

Thorax black, postalar callus sometimes reddish, wing rudiment brown. Mesoscutum and scutellum entirely covered with microtomentum. Anepisternum with microtomentum along anterior and posterior margins and covering dorsal third. Katepisternum with a shiny spot behind coxa, not extending toward bristle; posterior part below bristle, meron and metapleuron shiny with exception of a stripe of microtomentum between posterior thoracic spiracle and base of hind coxa. Laterotergite with a very small ventral shiny spot.

Legs black, tarsi, trochanters, and joints orange, fore coxa black; hind tarsomeres may be dark brown dorsally. Fore femur covered with microtomentum. Mid femur with 2 anterior bristles.

Male abdomen (Figs. 3.26–68): Tergites 1–5 covered with microtomentum, narrowly shiny along margins. Sternites 2–4 shiny, sternite 5 with sparse microtomentum. Ring-shaped sclerite present. Accessory sclerite of synsternite 6+7 attached with a thin band. Surstylus with a broad basal section and thin inner arm, outer corner sharply angled but not produced. Postgonite bilobed, both lobes long and thin. Epiphallus and preepiphallus well-developed, epiphallus laterally expanded. Distiphallus with lateral arm narrow and pointed at tip; central projecting sclerite subtended on a thin band from base of distiphallus, complex, frilled and ridged, with a pair of incurved prongs dorsally at tip.

Female abdomen (Figs. 3.77, 3.78, 3.83): Tergites 1–6 covered with microtomentum, narrowly shiny along margins. Tergite 7 shiny on anterior half with microtomentum on posterior half. Tergite 8 shiny with some microtomentum along posterior margin. Sternite 2 shiny, sternites 3–4 with sparse microtomentum, sternites 5–6 mostly covered with microtomentum with margins shiny, sternite 7 mostly shiny with microtomentum along posterior margin. Tergite 8 complete, epiproct with parallel sides and poorly developed anterior arms. Sclerites of sternite 8 round, hypoproct with a pair of sclerotized discs. Spermathecae with basal invagination consisting of a basal sheath of several rings and apical rounded cap; no apical invagination, but variably pointed apically.


**Other material examined.** **CHILE:** Aisén: Queulat Pass, 40 km N Puerto Cisnes, mossy beech forest, carrion trap, 500 m, 30 Dec 1984 – 28 Jan 1985, S. & J. Peck (1 ♀, DEBU); Río Grande, 16 km NW Cisne Medio, mature beech forest, carrion trap, 200 m, 30 Dec 1984 – 28 Jan 1985, S. & J. Peck (1 ♂, 1 ♀, DEBU); Los Lagos: Chiloé Is., Ancud, Aug 1958, L. Peña (1 ♀, DEBU); Chiloé Is., Miraflores, road to, 0.6 km W Hwy 5, 42°46'42"S 73°47'42"W, 130 m, secondary Valdivian rainforest, FMHD#97–25, berlese, leaf & log litter, 17 Jan 1997, A.F. Newton & M.K. Thayer (2 ♂, FMNH); Chiloé Is., Miraflores, road to, 0.6 km W Ruta 5, 42°46'44""S 73°47'42"W, 130 m, secondary Valdivian rainforest w/few conifers, FMHD#2002–076, carrion trap (octopus), 12–21 Dec 2002, M.K. Thayer & A.F. Newton (2 ♂, FMNH); as above but FMHD#2002–077, berlese, leaf & log litter, 12 Dec 2002, A.F. Newton & M.K. Thayer (1 ♂, FMNH); Chiloé Is., Lago Huillinco, S side, road to Bellavista, 1.3 km S road to Cucao, 42°41'49""S 73°55'53"W, 45 m, Valdivian rainforest w/emergent *Saxegothaesa conspicua*, FMHD#2002–074, berlese, leaf & log litter, 12 Dec 2002, M.K. Thayer & A.F. Newton (1 ♂, FMNH); Alerce Andino Natl. Pk., tr. to Laguna Fria, 41°30’S 72°37’W, dung & carrion pans, 400 m, 1 Dec 2008, J.H. Kits &

Comments: Two females are in the same tube as the paratype males from Chiloé; they are not mentioned by Richards and are not paratypes, but appear to be of the same species. One male was dissected, perhaps by Richards, but the terminalia are missing; we dissected the other male. Based on current records, this is the most widespread species in the genus, stretching from the northern Magallanes region (paratype ♂) to southern Los Ríos region; the record from Puerto Edén is further south than any other for the genus. However, we have seen little material from this region (see also *F. propinqua*), and other species may occur further south than current records indicate.

*Frutillaria furcata* sp. n.
(Figs. 3.29–31, 3.108)

Description:
Length: N/A (head + thorax 1.0 mm)

Occiput dark brown, face, gena brown, frons brown with some orange anteriorly. Frons with shiny spots lateral to ocellar triangle. Scape orange, pedicel and first flagellomere brown. Clypeus and prementum brown.

Thorax black, wing rudiment brown. Mesoscutum and scutellum entirely covered with microtomentum. Anepisternum mostly shiny, anterior, posterior, and dorsal margins with microtomentum. Katepisternum with a large shiny patch behind fore coxa extending posteriorly to near bristle. Meron and metapleuron
shiny with the exception of a stripe of microtomentum between posterior thoracic spiracle and base of
hind coxa. Laterotergite mostly shiny.

Legs black, joints narrowly orange, tarsi and trochanters orange, fore coxa black; fore femur shiny
posteriorly. Mid femur with 2 anterior bristles.

Male abdomen (Figs. 3.29–31): Surstylus nearly linear, apical portion thinner. Postgonite with anterior
lobe very wide and broadly rounded, posterior lobe thinner and acutely pointed. Epiphallus weakly
developed, preepiphallus well-developed, clear apically. Distiphallus with lateral arms forked, lower fork
frilled, upper fork acutely pointed. central projecting sclerite with a strongly dorsal longitudinal ridge,
ventrally with a broad sclerite with ridges on medial surface. Lateral arms thin and long, ventral sclerite
ending just before reaching ventral part of central projecting sclerite.

Female unknown.

**Type material.** Holotype ♂: CHILE: Araucanía: Contulmo Natur. Mon., Sendero Lemu Mau,
38°00'44"S 073°11'08"W, 410 m, *Nothofagus obliqua-Eucryphia cordifolia*++ w/ fern & bamboo
Solodovnikov (MNNC).

Comments: The species name refers to the distinctive forked lateral arm of the distiphallus in this species.

*Frutillaria glabra* sp. n.
(Figs. 3.32–34, 3.79, 3.80, 3.84, 3.109)
Description:
Length 1.9–2.6 mm (head + thorax 0.7–1.1 mm)

Head entirely orange-yellow. Frons with shiny spots lateral to ocellar triangle.

Thorax black, postalar callus and scutellum reddish, wing rudiment brown. Mesoscutum with some
microtomentum anteriorly, bare posteriorly, scutellum mostly bare with some microtomentum around
margins. Anepisternum mostly shiny, some microtomentum around spiracle and along posterior crease.
Katepisternum with a large shiny patch behind fore coxa extending posteriorly as a triangle to near bristle,
narrowly separated from posterior shiny patch by a band of microtomentum. Meron and metapleuron

shiny with the exception of a stripe of microomentum between posterior thoracic spiracle and base of hind coxa. Laterotergite mostly shiny.

Legs black, fore coxa dark reddish brown, trochanters, joints, and tarsi orange-yellow. Fore femur mostly shiny posteriorly. Mid femur with 2 anterior bristles.

Male abdomen (Figs. 3.32–34): Tergites 1–5 with some microomentum on basal third. Tergites 2–4 shiny, tergite 5 mostly shiny with some microomentum along posterior margin. Surstylus with a broad basal part, short inner arm, outer corner not produced. Postgonite bilobed, both lobes long. Epiphallus
short, laterally broadened at tip; preepiphallus long, bulbous distally. Distiphallus with lateral arms short, angled and strongly narrowed just before tip; central projecting sclerite complex, heavily ridged and frilled, with a transverse ridge across dorsal tip bearing small teeth on either side; ventral sacs present, not sclerotized.

Female abdomen (Figs. 3.79, 3.80, 3.84): Tergites 1–4 with some microtomentum on basal third, tergite 5 mostly covered with microtomentum, microtomentum sparse apically, tergite 6 with shiny basal band, covered with microtomentum apically, tergite 7 mostly shiny with some microtomentum apically, tergite 8 shiny. Sternites 2–4 shiny, sternite 5 with some scattered microtomentum, sternite 6 mostly covered with tomentum, shiny on basal ⅓, sternite 7 mostly shiny with some microtomentum apically. Tergite 8 complete, epiproct long-triangular without anterior arms. Sclerites of sternite 8 comma-shaped, hypoproct with a U-shaped sclerite. Spermathecae with basal invagination long, mushroom-shaped, annulated; apical invagination short, subconical, smooth.


Comments: This species is currently only known from the type locality, a nature reserve within the city of Temuco.

**Frutillaria kuscheli** Richards

*Frutillaria kuscheli* Richards, 1961: 66
(Figs. 3.35–37, 3.81, 3.82, 3.85, 3.113)

Description:
Length 1.7–2.7 mm (head + thorax 0.8–1.2 mm)

Occiput dark brown, face orange, frons and gena intermediately coloured. Frons with shiny spots lateral to ocellar triangle. Scape and first flagellomere orange, pedicel dark brown. Clypeus orange, prementum brown.

Thorax black, postalar callus reddish, wing rudiment brown. Mesoscutum and scutellum covered with microtomentum. Anepisternum mostly shiny, anterior, posterior, and margins with microtomentum.
Katepisternum with shiny patch behind fore coxa barely extending toward bristle. Meron and metapleuron shiny with the exception of a stripe of microtomentum between posterior thoracic spiracle and base of hind coxa. Laterotergite mostly shiny.

Legs black, fore coxa black, trochanters, joints, and tarsi orange. Fore femur mostly shiny posteriorly. Mid femur with 2–3 anterior bristles.

Male abdomen (Figs. 3.35–37): Ring-shaped sclerite present. Surstylus with long, thin inner arm, in posterior view arms parallel, extending ventrally. Postgonite with lobes clearly separated, anterior lobe with an anterior concavity but not appearing double-pointed, posterior lobe thin and pointed. Epiphallus and preepiphallus well developed. Distiphallus with lateral arms thin, curved medially near apex. Ventral disc large, ventral sacs long, sclerotized. Central projecting sclerite small, with ridges distally.

Female abdomen (Figs. 3.81, 3.82, 3.85): Tergites 1–5 covered with microtomentum, with thin shiny bands along posterior margins, tergite 6 mostly covered with microtomentum, shiny basally. Tergite 7 mostly shiny, with a small amount of microtomentum along lateral edges, posterior margin indented medially. Tergite 8 divided medially, shiny with a little microtomentum along posterior margin. Epiproct triangular, anterior arms fairly long. No microtrichia dorsally on cerci. Sternite 2 shiny, sternites 3–4 mostly shiny with some microtomentum medially, sternite 5 extensively covered with microtomentum, sternite 6 mostly covered with microtomentum, shiny basally. Sternite 7 with extensive microtomentum on posterior half, posterior margin distinctly convex. Sclerites of sternite 8 long, subrectangular. Hypoproct with sclerotized lateral spots, weakly sclerotized medial bar. Spermathecae with long, mushroom-shaped apical invagination, short basal invagination, both annulated.


**Other material examined.** CHILE: Los Lagos: Chiloé Is., Quemchi (11 km W, 11 km E of Hwy 5), 42°10′24″S 73°35′48″W, 170 m, secondary Valdivian rainforest, FMHD#97–23, berlese, leaf & log litter, 16 Jan 1997, A.F. Newton & M.K. Thayer (2 ♂, 3 ♀, FMNH); Chiloé Is., Quemchi (11 km W, 11 km E of Hwy 5), 42°10′24″S 73°35′44″W, 140 m, Valdivian rainforest remnant w/thick bamboo understory, FMHD#2002–068, berlese, leaf & log litter, 10 Dec 2002, A.F. Newton & A.Y. Solodovnikov (1 ♂, 3 ♀, FMNH); Chiloé Is., Mirafl ores, road to, 0.6 km W Hwy 5, 42°46′42″S 73°47′42″W, 130 m, secondary Valdivian rainforest, FMHD#97–25, berlese, leaf & log litter, 17 Jan 1997, A.F. Newton & M.K. Thayer (2 ♂, FMNH).
Comments: The description is based primarily on the recent material, as the paratypes we examined were in poor condition. This species appears to be restricted to Chiloé Island, and is less commonly collected than *F. chepuensis*, as observed by Richards (1961).


*Frutillaria propinqua* Richards

*Frutillaria propinqua* Richards, 1964: 44
(Figs. 3.38, 3.39, 3.110)

Only the paratype male of this species was available for examination. It is preserved in alcohol and is in poor condition. The antennae and all legs except the right hind leg are missing. The specimen is partially debristled and the colour is generally faded. Little can be said about external characters other than the patterns of microtomentum noted:

Male abdomen (Figs. 3.38, 3.39): Surstylus with outer corner angular, slightly produced, inner arm long, curved, knobbled and toothed at tip. Postgonite bilobed, both lobes long. Basiphallus with well-developed epiphallus, preepiphallus very short, about 0.5X length of epiphallus. Distiphallus extremely complex, with a dorsal pair of flat, anteriorly curved horns at apex; components difficult to homologize.

**Type material.** Holotype ♂: CHILE: [Aisén:] Lago de Bueno Aires, Rio Murta, about 46° S, 15 Jan 1956, [G. Kuschel] (BMNH, apparently lost). Paratype: same data as holotype (1 m, BMNH, examined).

Comments: The original description states that the paratype specimen is female, but this is incorrect. We have not seen any recently collected specimens of this species.

**Frutillaria richardsi sp. n.**
(Figs. 3.40–42, 3.113)

Description:
Length N/A (head + thorax 1.0–1.2 mm)

Occiput brown, face and gena orange, frons intermediately coloured. Frons with shiny spots lateral to ocellar triangle. Scape and first flagellomere orange, pedicel dark brown. Clypeus and prementum orange.

Thorax black, postalar callus and scutellum reddish, wing rudiment brown. Mesoscutum and scutellum covered with microtomentum. Anepisternum mostly shiny, dorsal and posterior margins with microtomentum. Katepisternum with a large shiny patch behind fore coxa extending posteriorly as a triangle to near bristle, narrowly separated from posterior shiny patch by a band of microtomentum. Meron and metapleuron shiny with the exception of a stripe of microtomentum between posterior thoracic spiracle and base of hind coxa. Laterotergite mostly shiny.

Legs black, fore coxa dark reddish brown, trochanters, joints, and tarsi orange. Fore femur with a shinyspot posteriorly. Mid femur with 2 anterior bristles.
Male abdomen (Figs. 3.40–42): Syntergite 1+2 covered with microtomentum. Surstylus with fairly broad inner arm bearing a jagged ridge along apical part, outer corner broadly produced. Postgonite bilobed, both lobes long and pointed. Epiphallus not clearly developed, preepiphallus long and narrow. Distiphallus with lateral arms developed, bifid apically. Ventral discs triangular in side view with a clear flap apically; ventral sacs not apparent.

Female unknown.


Comments: This species is named in honour of O.W. Richards, who published prolifically on Sphaeroceridae, and particularly contributed to our knowledge of the flightless species of the family.

*Frutillaria stenoptera* Richards

*Frutillaria stenoptera* Richards, 1961: 67

(Figs. 3.43–46, 3.86, 3.87, 3.92, 3.114)

Description:

Length 1.8–2.3 mm (head + thorax 0.8–1.0 mm)

Occiput black, face orange to brown, gena and frons intermediately coloured. Frons with shiny spots lateral to ocellar triangle. Scape and first flagellomere orange, pedicel dark brown. Clypeus mostly yellow, prementum dark brown.

Thorax black, postalar callus may be slightly reddish, wing rudiment brown. Mesoscutum and scutellum entirely covered with microtomentum. Anepisternum mostly shiny, anterior and posterior margins and part of dorsal margin with microtomentum. Katepisternum with a shiny spot behind coxa, not extending toward bristle; posterior part below bristle, meron and metapleuron shiny with exception of a stripe of microtomentum between posterior thoracic spiracle and base of hind coxa. Laterotergite mostly shiny.

Legs black, joints narrowly orange, tarsi and trochanters orange, fore coxa black; fore femur with a bare patch posteriorly. Mid femur with 2–3 anterior bristles.
Male abdomen (Figs. 3.43–46): Tergites 1–5 covered with microtomentum, shiny along margins. Sternites 2–5 shiny. A ring-shaped sclerite present on right side between segment 5 and the epandrium. Surstylus with a broad basal part and narrow inner arm; outer corner broadly produced, inner arm somewhat clubbed at tip; in posterior view, inner arm appears to be projecting ventrally and clearly separate from lateral edge of surstylus. Postgonite bilobed, anterior lobe short and feebly bilobed again, posterior lobe long. Epiphallus moderately developed, laterally broadened; preepiphallus well-developed. Distiphallus with lateral arms extending broadly from ventral sclerite, narrow at tip and barely projecting past central projecting sclerite; apicoventral discs present, slightly asymmetrical; central projecting sclerite with dorsally-oriented teeth; ventral sacs rigid, somewhat sclerotized, extending perpendicularly.

Figures 3.59–67. Frutillaria female terminalia. F. abdita: (59) tergite 8, epiproct, cerci, (60) sternite 8, hypoproct; F. anticura: (61) tergite 8, epiproct, cerci, (62) sternite 8, hypoproct; F. calceata: (63) tergites 7–8, epiproct, cerci, (64) sternites 7–8, hypoproct. Spermathecae: (65) F. abdita, (66) F. anticura, (67) F. calceata.
Female abdomen (Figs. 3.86, 3.87, 3.92): Tergites 1–5 mostly covered with microtomentum, margins shiny. Sternites 2–4 shiny, sternite 5 mostly shiny with some sparse microtomentum. Tergite 6 and sternite 6 mostly microtomentum. Tergite 8 complete, with about 8 setae along posterior margin; mostly shiny, some microtomentum along posterior margin. Epiproct parallel-sided with long anterior arms. Sclerites of sternite 8 long and rectangular; hypoproct with 2 weakly sclerotized lateral disks. Spermathecae with long, mushroom-shaped apical invagination, short basal invagination, both annulated.

**Type material.** Holotype ♂: CHILE: [Los Lagos:] Llanquihue Prov., Frutillar, 41º12’ S, 12 Sep 1954, [G. Kuschel] (MEUC, apparently lost).


Comments: Although there are no extant type specimens of this species, the species we treat here as *F. stenoptera* is a good match to the original description and illustration, and we are confident it is correctly identified. The following points support our identification of this species as *F. stenoptera*: the illustration shows a species with 3 distal lobes on the distiphallus, all projecting to a similar degree: these presumably correspond to the pointed lateral arms (Richards’ “paraphalli”), the central projecting sclerite, and the ventroapical discs. The sclerotized and projecting ventral sacs of this species correspond to Richards’ “lateral wings of the aedeagus”, which are stated to be long and illustrated as projecting perpendicularly. The surstylus is stated to have the outer corner “angularly produced” and inner arm short and knobbed at tip; our specimens do not have the outer corner particularly angular, but this is influenced by viewing angle, and they match the illustration fairly well. The anterior lobe of the postgonites (Richards’ “anterior gonapophyses”) are not shown in the original illustration but Richards states they are “apparently
reduced”; as this lobe is fairly short in this species, he may not have been able to see the shape in any detail in a partial dissection.

This is the only species of *Frutillaria* known to occur in Argentina, although additional species may occur in that country in moist forests near the Chilean border.

Figures 3.68–76. *Frutillaria* female terminalia. *F. calida*: (68) tergite 8, epiproct, cerci, (69) sternite 8, hypoproct; *F. contulmo*: (70) tergite 8, epiproct, cerci, (71) sternite 8, hypoproct; *F. chepuensis*: (72) tergites 7–8, epiproct, cerci, (73) sternites 7–8, hypoproct. Spermathecae: (74) *F. calida*, (75) *F. contulmo*, (76) *F. chepuensis*. 
**Frutillaria tenuiforceps** Richards

*Frutillaria tenuiforceps* Richards, 1964: 44–45  
(Figs. 3.1, 3.47–49, 3.88, 3.89, 3.93, 3.108)

Description:
Length 1.8–2.3 mm (head + thorax 0.9–1.1 mm)

Occiput brown, face and gena yellow, frons intermediately coloured. Frons with shiny spots lateral to ocellar triangle. Antenna orange. Clypeus and prementum mostly yellow.

Thorax black, wing rudiment blackish. Mesoscutum and scutellum entirely covered with microtomentum. Anepisternum mostly shiny, posterior and dorsal margin with microtomentum. Katepisternum mostly microtomentose, with shiny spot behind coxa and often a separate spot between this and bristle. Posterior katepisternum, meron and metapleuron shiny with exception of a stripe of microtomentum between posterior thoracic spiracle and base of hind coxa. Laterotergite with a large ventral shiny spot.

Legs dark brown to black, fore coxa, trochanters, and joints orange, tarsi brown. Mid femur with 2 anterior bristles.

Male abdomen (Figs. 3.47–49): Tergites 1–5 covered with microtomentum. Sternite 2 shiny, sternites 3–5 covered with microtomentum. A ring-shaped sclerite present on right side between segment 5 and the epandrium. Surstylus with wide basal part and narrow inner arm, outer corner angularly produced, with a ridge running along inner arm. Postgonite bilobed, both lobes long and pointed. Epiphallus and preepiphallus well-developed, epiphallus broadened laterally. Distiphallus very strongly sclerotized; lateral arms broad, flared and finely frilled at tip; central projecting sclerite very broad in lateral view, frilled and ridged but detail difficult to discern due to strong sclerotization, weakly attached to base of distiphallus; a distinct curved sclerite ventrally attached to base of lateral arms.

Female abdomen (Figs. 3.88, 3.89, 3.93): Tergites 1–6 covered with microtomentum. Tergite 7 mostly shiny, with some microtomentum on posterior corners, tergite 8 mostly shiny, with some microtomentum apically. Sternite 2 shiny, sternites 3–6 covered with microtomentum, sternite 7 shiny on basal half, with microtomentum apically. Tergite 8 complete, epiproct narrowed anteriorly, with small divergent anterior arms. Sclerites of sternite 8 round, hypoproct not developed. Spermathecae with long, mushroom-shaped apical invagination, short basal invagination, both annulated.
**Type material.** Holotype ♂: CHILE: [Valparaíso: Aconcagua, Zapallar, about 33°S, 24 Mar 1957, [G. Kuschel] (BMNH, apparently lost). Paratypes: same data as holotype (2 m, BMNH, examined).

**Other material examined.** CHILE: Valparaíso: Zapallar, Quebrada el Tigre, above tennis club, dung pans, 32°33.12'S 71°26.99'W, 100 m, 9 Dec 2008, J.H. Kits & S.A. Marshall (5 ♂ 6 ♀, DEBU); Zapallar, Quebrada el Tigre, upper trail, 32°33.67'S 71°26.70'W, 250m, 9 Dec 2008, J.H. Kits & S.A. Marshall (4 ♀, DEBU); Zapallar, 24 Mar 1957, G. Kuschel (3 ♀, BMNH).

Comments: This species occurs further north than any known congener. The locality for the recently collected material, Quebrada el Tigre, is a relict forest with botanical affiliation to the temperate rainforest from much further south (Pérez and Villagrán 1985). Other relict forests in Chile’s mediterranean zone may yet prove to hold this or other *Frutillaria* species.

**Frutillaria transversa** sp. n.
(Figs. 3.50–52, 3.90, 3.91, 3.94, 3.115)

Description:
Length 1.7–2.3 mm (head + thorax 0.8–1.0 mm)

Occiput black, face orange, gena and frons intermediately coloured. Frons with shiny spots lateral to ocellar triangle. Antenna orange. Clypeus mostly orange, prementum dark brown.

Thorax black, postalar callus occasionally reddish, wing rudiment brown. Mesoscutum and scutellum entirely covered with microtomentum. Anepisternum mostly shiny, anterior and posterior margins and part of dorsal margin with microtomentum. Katepisternum with a shiny spot behind coxa, not extending toward bristle; posterior part of katepisternum, meron and metapleuron shiny with exception of a stripe of microtomentum between posterior thoracic spiracle and base of hind coxa. Laterotergite mostly shiny.

Legs black, joints narrowly orange, tarsi and trochanters orange, fore coxa black; fore femur shiny or very sparsely microtomentose posteriorly. Mid femur with 2 anterior bristles.

Male abdomen (Figs. 3.50–52): Tergites 1–5 mostly covered in microtomentum, shiny along margins. Sternites 1–5 shiny. Surstylus with a broad basal part and a thin inner arm, outer corner sharply angular, with a ridge running between outer corner to tip of inner arm; in posterior view, inner arm forms a continuous curve with lateral edge of surstylus, projecting medially. Postgonite bilobed, both lobes long and thin. Epiphallus and preepiphallus well-developed, epiphallus laterally broadened at tip. Distiphallus
with central projecting sclerite very wide in dorsal view, projecting well beyond lateral arms, complex and with multiple fringes and projections. Lateral arms slightly narrower apically, upturned at tip, with a distinct curved projection below lateral arms.

Female abdomen (Figs. 3.90, 3.91, 3.94): Syntergite 1+2 with irregular patches of microtomentum, tergites 3–6 mostly covered with microtomentum. Sternites 2–3 mostly shiny, sternite 4 with a medial patch of microtomentum, sternites 5–6 mostly covered with microtomentum, margins shiny. Tergites 7 and 8 and sternite 7 mostly shiny with some microtomentum along posterior margin. Tergite 8 complete, with about 8 setae along posterior margin, epiproct triangular with distinct anterior arms. Sclerites of sternite 8 strongly sclerotized, teardrop-shaped. Hypoproct strongly sclerotized, U-shaped with arms
anterior. Spermathecae with basal invagination consisting of a basal sheath of several rings and apical rounded cap; no apical invagination, but variably pointed apically.

**Type material.** Holotype ♂: CHILE: **Los Lagos:** Puyehue Natl. Pk., Anticura, trail to Mirador El Puma, 40°40.35’S 72°10.18’W, 400 m, carrion pans, 3–5 Dec 2008, J.H. Kits & S.A. Marshall (MNNC). Paratypes: same data as holotype (2 ♂, 2 ♀, DEBU); same data as holotype but dung pans (4 ♂, 3 ♀, DEBU); Puyehue Natl. Pk., Anticura, Sendero Repucura, 40°39’53”S 72°10’02”W, 447 m, *Nothofagus/Chusquea* forest, yellow pans, 17–18 Feb 2005 (2 ♂, DEBU); Puyehue Natl. Pk., Aguas Calientes, Pionero Forest Trail, 500 m, sifted forest litter, FMHD#85–928, Berlese, 20 Dec 1984, S. & J. Peck (1 ♀, FMNH); Puyehue Natl. Pk., Anticura, 40°39’42”S 72°08’06”W, 460 m, Valdivian rainforest w/large *Saxegothaea*, FMHD#96–252, berlese, leaf & log litter, 31 Dec 1996, A.F. Newton & M.K. Thayer (2 ♀, FMNH); Puyehue Natl. Pk., Ruta 215, km 4.5 E of Aduana station, 40°40’14”S 72°05’13”W, 580 m, Valdivian rainforest, FMHD#2002–090, berlese, leaf & log litter, 19 Dec 2002, Thayer et al. (2 ♂, 3 ♀, FMNH); Bahia Mansa, 3 km S Maicolpue, 200 m, 21 Dec 1984 – 3 Feb 1985, carrion trap, mixed forest, S. & J. Peck (1 ♂, DEBU); as above but FMHD#85–933, Berlese, litter, 21 Dec 1984, S. & J. Peck (1 ♀, FMNH); Maicolpue (hills S), 40°36’36”S 073°44’54”W, 160 m, disturbed Valdivian rainforest, FMHD#96–247, berlese, leaf & log litter, 30 Dec 1996, A.F. Newton & M.K. Thayer (5 ♂, 4 ♀, FMNH); **Los Ríos:** Las Trancas, 30 km W La Unión, *Nothofagus*, Chile Exp., 7–11 Feb 1988, L. Masner (3 ♂, 1 ♀, CNCI)

Comments: The name refers to the very broad tip of the distiphallus, which projects beyond the lateral arms of the distiphallus in dorsal view.

**Frutillaria triangularis** Richards

*Frutillaria triangularis* Richards, 1964: 44
(Figs. 3.53–55, 3.95, 3.96, 3.101, 3.108)

Description:

Length 1.7–2.7 mm (head + thorax 0.7–1.3 mm)

Head dark to reddish brown, anterior part of frons orange, frons entirely covered with microtomentum. Scape and first flagellomere orange, pedicel brown. Clypeus mostly brown, prementum orange-brown.

Thorax black with some reddish areas, particularly postalar callus and scutellum. Wing rudiment brown. Mesoscutum and scutellum entirely covered with microtomentum. Anepisternum mostly covered in microtomentum, with a shiny bare patch medially on ventral third. Katepisternum with two shiny bare patches, one immediately behind coxa and another slightly posterior, the two patches sometimes merged. Meron with a narrow shiny band immediately behind katepisternum, metapleuron entirely covered with microtomentum, laterotergite with a small shiny spot ventrally.

Legs black; joints, trochanters, and tarsi orange, fore coxa reddish brown. Mid femur with 3 (rarely 4–5) anterior bristles.

Male abdomen (Figs. 3.53–55): Tergites 1–5 and sternites 2–5 covered in microtomentum, hind margin narrowly shiny. Surstylus triangular apically. Postgonites with sinuate margins, bilobed at tip, both lobes fairly short and blunt. Epiphallus not clearly separated from basiphallus. No ring-shaped sclerite present. Distiphallus in side view with 4 areas of sclerotization surrounding a clear central area. Dorsal sclerite
with a pair of lateral ridges and a medial dorsal ridge. Lateral arms not developed. Ventral sacs present, clear.

Female abdomen (Figs. 3.95, 3.96, 3.101): Tergite 1–5 and sternites 2–5 covered in microtomentum, hind margin narrowly shiny. Tergite 6 and sternite 6 shiny anteriorly, with microtomentum posteriorly. Tergites 7–8 and sternite 7 mostly shiny. Tergite 8 complete; epiproct parallel-sided with short, broad anterior arms. Cerci covered with microtomentum apically. Sternite 8 with rounded sclerites, hypoproct not sclerotized. Spermathecae with short basal and apical mushroom-shaped invaginations, basal annulated, apical smooth.

**Type material.** Holotype ♂: CHILE: [Biobío:] Concepción, Oca de Bio-Bio, about 37ºS, 24 May 1957, [G. Kuschel] (BMNH, apparently lost).

**Material examined.** CHILE: Biobío: San Pedro de La Paz, ~6km S, *Pinus* sp. forest, 360 m, 12 Dec 1982 – 2 Jan 1983, A. Newton and M. Thayer (115 ♂, 95 ♀, DEBU, FMNH).

Comments: Although the type specimen is lost, the unique shape of the surstylus and Richards' (1964) illustration of the male terminalia enable recognition of this distinctive species. The type locality, recorded as “Oca de Bio-Bio” by Richards, may refer to the mouth (=boca) of the Biobío River, which is just to the north of Newton and Thayer’s collection site.

**Additional species:**
We have found specimens of two species which are clearly distinct from the known species, but are only represented by females in collections. These species are diagnosed below, but not formally named pending the discovery of associated males.

**Frutillaria n. sp. A**
Description:
Length: 1.8 mm (head + thorax 0.9 mm)

Head entirely reddish brown, slightly darker on occiput. Frons with shiny spots lateral to ocellar triangle.

Thorax black, postalar callus and apex of scutellum reddish, wing rudiment dark brown. Mesoscutum with some microtomentum anteriorly, bare posteriorly, disc of scutellum bare laterally with a medial band of microtomentum. Anepisternum mostly shiny, posterior and dorsal margin with microtomentum.
Katepisternum with a shiny spot behind coxa, not extending toward bristle; posterior part below bristle, meron and metapleuron shiny with exception of a stripe of microtomentum between posterior thoracic spiracle and base of hind coxa. Laterotergite mostly shiny.

Legs black, fore coxa dark reddish brown, trochanters, joints, and tarsi orange. Fore femur mostly shiny posteriorly. Mid femur with 2 anterior bristles.

Male unknown.

Female abdomen (Figs. 3.97, 3.98, 3.102): Tergites 1–5 with some microtomentum basally, mostly shiny apically, tergites 6–7 covered with microtomentum on apical half, tergite 8 shiny with some microtomentum along apical margin. Sternites 2–4 shiny, sternite 5 with some scattered microtomentum, sternite 6 covered with microtomentum on apical half, sternite 7 mostly shiny with microtomentum on apical third. Tergite 8 complete, epiproct long with short anterior arms, parallel-sided between arms and base of cerci. Sclerites of sternite 8 sub-rectangular, hypoproct with a U-shaped sclerite. Spermathecae with basal invagination long, mushroom-shaped, annulated; no apical invagination, but variably pointed apically.


Comments: This species shares the extensively shiny mesoscutum with *F. glabra*, but is clearly distinct from that species based on external and internal characters.

**Frutillaria n. sp. B**

Description:
Length: 1.9 mm (head + thorax 1.0 mm)

Head dark brown. Frons with shiny spots lateral to ocellar triangle. Scape and pedicel brown, first flagellomere orange. Clypeus and prementum brown.

Thorax black, postalar callus and scutellum reddish. Wing rudiment brown. Mesoscutum and scutellum entirely covered with microtomentum. Anepisternum mostly covered in microtomentum, with a shiny bare patch medially on ventral third. Katepisternum with shiny patch behind coxa extending slightly
toward bristle. Meron with a narrow shiny band immediately behind katepisternum, metapleuron entirely covered with microtomentum, laterotergite mostly microtomentose with a small shiny spot ventrally.

Legs black, joints, trochanters, and tarsi orange, fore coxa reddish brown. Mid femur with 3–4 anterior bristles.

Male unknown.
Female abdomen (Figs. 3.99, 3.100, 3.103): Tergites 1–6 and sternites 2–6 covered in microtomentum, hind margins narrowly shiny. Tergites 7–8 and sternite 7 mostly shiny, with microtomentum along posterior margins. Tergite 8 divided medially; epiproct U-shaped with long anterior arms. Cerci covered with microtrichia dorsally. Sternite 8 with large subrectangular sclerites, hypoproct with a medial sclerotized patch. Spermathecae with short basal and apical mushroom-shaped invaginations, basal annulated, apical smooth.


Comments: This species is similar to F. triangularis both in the extent of microtomentum on the thorax and abdomen and in the shape of the spermathecae.

Penola Richards, 1941: 324

Type species: Penola eudyptidis, Richards, 1941, by monotypy

Description as for the only included species, P. eudyptidis.

Penola eudyptidis Richards

Penola eudyptidis Richards, 1941: 324–326

(Figs. 3.56–58, 3.104–106, 3.109)

Small flies, 2.4–3.2 mm long.

Head, clypeus, and prementum yellow, a medial brown patch on upper occiput extending anteriorly onto frons. Head mostly covered with very fine microtomentum, but frons with a medial shiny patch behind ocellar triangle, surrounding postocellar bristles, and a lateral patch along eye anterior to vertical bristles. Face evenly sclerotized, lunule small. Gena about quarter maximum height of eye. Occiput narrow below occipital foramen. Clypeus narrow, slightly produced. Palpus broadest distally, with tiny setae throughout and larger setae along lateral margin. Prementum well-developed, circular, about three-quarters height of eye. Labellum with 12 pseudotrachea. Scape very short, with 2 dorsal setulae; pedicel subtriangular, with a single row of apical bristles, medial bristles about 3 times the length of outer bristles, uppermost apical upcurved, with a downcurved bristle posterior to it; first flagellomere round, slightly pointed dorsoapically; arista dorsolateral, preapical, 2-segmented, about as long as head length, finely plumose. Chaetotaxy: orbital bristles in two laterocline pairs; orbital setulae situated irregularly along orbital plate; interfrontals in 4–5 mediocline pairs; preocellars about 1 ocellus width anterior of central ocellus,
lateroprocline; ocellar setulae irregular; inner vertical bristles inclinate; outer vertical bristles laterorecline; postocellar bristles slightly procline; postvertical bristles small, cruciate; inner occipital setae small, medioclinate; outer occipital setae two rows, inner row incomplete; vibrissa strong, as long as head; no distinct subvibrissal bristle; upturned genal bristle about 0.25X length of vibrissa; genal setae in 2 rows.

Thorax appearing somewhat dorsoventrally compressed, scutum quite flat, scutellum very short (width about 4X length); wing rudiment less than 0.5X length of thorax. Yellow with a brown stripe in middle of mesoscutum between dorsocentral rows, metapleuron brown, wing rudiment yellow. Mesoscutum without microtomentum but medially microsculptured with fine irregular ridges, so not appearing shiny. Scutellum covered with microtomentum. Anepisternum mostly shiny, with a patch of microtomentum along anterior margin. Proepisternum with 1–2 setulae. Katepisternum mostly covered with microtomentum, with a shiny patch posteriorly extending onto meron; metapleuron entirely covered with microtomentum. Halter absent. Chaetotaxy: postpronotum with a single enlarged bristle; notopleuron with two bristles, anterior very long, about 2X length of posterior; one postsutural intra-alar bristles; one large postalar bristle behind wing rudiment and a smaller postalar between this and scutellum; one pair of prescutellar dorsocentral bristles; scutellum with 2 pairs of bristles, basal bristles about as long as scutellum, apical bristles variable, from similar length to basal bristles to as long as width of scutellum; acrostichal setae in 2 rows; katepisternum with a single large dorsal bristle and long, thin setae ventrally.

Legs yellow. Fore tibia with a preapical dorsal bristle. Fore basotarsomere with a ventral projection apically in males, unmodified in female. Mid femur with 2 anterior bristles, 1 dorsal bristle. Mid tibia with preapical anterodorsal, anteroventral, and posteroverentral bristles and a ring of 4–5 apical bristles; posteroverentral bristle apparently absent in some individuals. Hind femur with a long curved dorsal bristle. Hind tibia with a long preapical dorsal bristle and 2 apicoventral bristles.

Male abdomen (Figs. 3.56–58): Black, flattened. Syntergite 1+2 with a patch of microtomentum at base, otherwise shiny, tergites 3–5 entirely shiny. Sternites wide, strongly sclerotized, shiny. Sternite 5 with a posteromedial indentation surrounded by setae. Synsternite 6+7 asymmetrical, dorsal corner fused to sternite 8. No ring-shaped sclerite between segment 5 and epandrium. Sternite 8 broadly fused to epandrium along right side. Epandrium symmetrical, with a cleft above anterior edge of surstylus. Cerci small and medially fused. Surstylus broad and scoop-like, articulated with epandrium posterior to epandrial cleft and with subepandrial sclerite. Subepandrial sclerite Y-shaped, articulated with cerci and surstyli. Hypandrial arms weakly fused with ventral edge of epandrium; hypandrial apodeme well

devolved, rodlike, weakly fused with arms. Postgonite thin, parallel-sided, without lobes; articulated with phallapodeme, hypandrium, and basiphallus. Phallapodeme well-developed, curved and broader distally. Ejaculatory apodeme very small, narrow and sinuous. Basiphallus long, epiphallus and preepiphallus distinct but fairly short. Distiphallus without developed lateral arms, but with a possibly homologous ventral sclerite not reaching level of central projecting sclerite. Tip of ventral sclerite with a round, spinose, translucent area on each side. Central projecting sclerite very thin, rod-like at tip, a spinose area just basal to tip.

Female abdomen (Figs. 3.104–106): Black, flattened. Sclerites of segments 6 and 7 unusually broad and strongly sclerotized for Archiborborinae, abdomen telescoping. Syntergite 1+2 with a patch of microtomentum at base, otherwise shiny. Tergites 3–5 and possibly 6 entirely shiny, tergite 7 with some microtomentum in lateral patches, shiny medially. Tergite 8 shiny, weakened medially, epiproct triangular, without anterior arms. Sternites 2–7 apparently entirely shiny. Sclerites of sternite 8 comma-shaped, hypoproct partly sclerotized, round posteriorly. Cerci yellow, simple, not fused with epiproct or each other. Spermathecae 3; one pair sharing a duct and a single on a separate duct; slightly oblong, without invaginations, extended at base, with distinct but irregular transverse ribbing.

Immature stages: Unknown.
**Type material.** Holotype ♀: FALKLAND IS: Kidney Island, from neck of the penguin *Eudyptes chrysocome nigrivestis* Gould (Rock-hopper Penguin), 10 Apr 1936, British Graham Land Expedition (BMNH, not examined).


Comments: This species is only known from the Falkland Islands, where it appears to be associated primarily with Tussac grass (*Poa flabellata*). In addition to the specimens from Kidney Island and Port William, this species has also been recorded from Beauchêne Island (Lewis Smith and Prince 1985).

The presence of a member of this flightless clade on the Falkland Islands is intriguing, as there is no evidence that the islands have ever shared a land connection with mainland South America (McDowall 2005). The species may have travelled to the islands by rafting on flotsam (Heatwole and Levins 1972) or perhaps by passive sea surface drift (Peck 1994); these dispersal methods have been invoked to explain the distribution of other flightless arthropods across oceanic barriers (eg. Peck 1990, Howden 1992, Trewick 2000). Intriguingly, another flightless archiborborine, *Antrops truncipennis* Enderlein, also shows evidence of such dispersal, occurring on several widely separated islands in the area, including the Cape Horn archipelago, Isla de los Estados, the Falkland Islands, and South Georgia Island.
4. REVISION OF THE ARCHIBORBORINAE (OTHER THAN *FRUTILLARIA* AND *PENOLA*)

**Introduction**

The genera of Archiborborinae other than *Frutillaria* and *Penola* form an artificial assemblage of genera treated together here because they lack the distinctive apomorphies, particularly the modified wing structure, of the highly distinctive flightless genera *Frutillaria* and *Penola*. The six genera treated here (*Antrops*, *Boreantrops*, *Coloantrops*, *Maculantrops*, *Photantrops*, and *Poecilantrops*) thus do not share any synapomorphies. This portion of the revision includes descriptions or redescriptions of 96 species, diagnoses of 6 additional unnamed species known only from females, and 7 new synonyms, as follows: *Antrops femoralis* (Blanchard 1852) **comb. nov.** = *Archiborborus argentinensis* Papp 1977, and *Archiborborus submaculatus* Duda 1921, both **syn. nov.**; *Antrops hirtus* (Bigot 1888) = *Archiborborus edwardsi* Richards 1931, **syn. nov.**; *Antrops quadrinotus* Bigot 1888 **comb. nov.** = *Archiborborus albicans* Richards 1931, *Archiborborus chilensis* Richards 1981, *Archiborborus koenigi* Duda 1932, all **syn. nov.**; *Maculantrops hirtipes* (Macquart 1844) **comb. nov.** = *Copromyza alternata* Rondani 1868, **syn. nov.**

**Material and Methods**

Morphological terminology follows Cumming and Wood (2009). Size was measured using an ocular micrometer and the range given is based on the largest and smallest specimens in the material examined. Most specimens were initially stored in alcohol and then critical-point dried prior to examination. Genitalia were prepared by removing the entire abdomen or the apical portion and macerating in hot KOH for several minutes, then neutralizing in glacial acetic acid for 10 minutes before transfer to glycerin for examination and storage. All removed parts are stored under the specimen in plastic genitalia vials. Label data are presented in a consistent manner; in a few cases obvious spelling errors were corrected.

Collection abbreviations are as follows:

- AMNH: American Museum of Natural History, New York, USA
- ANCB: Museo Nacional de Historia Natural, La Paz, Bolivia
- BMNH: Museum of Natural History, London, UK
- BPBM: Bernice P. Bishop Museum, Honolulu, USA
- CASC: California Academy of Sciences, San Francisco, USA
- CNCI: Canadian National Collection of Insects, Ottawa, Canada
- DCMP: Universidade Federal do Paraná, Curitiba, Brazil
- DEBU: University of Guelph, Guelph, Canada
- DEI: Deutsches Entomologisches Institut, Müncheberg, Germany
- EMUS: Utah State University, Logan, USA
Key to the genera of the Archiborborinae

1. Wing normal or slightly reduced, halter present. ............................................................................. 2
   - Wing strongly reduced or absent, halter absent. ............................................................................. 7

2. Wing with well-defined brown marks around crossveins and round brown spots on vein tips and along veins R4+5 and CuA1. Tibiae with 4 well-marked bands beyond base: first and third brown, second and fourth pale (Fig. 8.1). Legs and katepisternum covered in dense, soft setae subequal in length to bristles. Clypeus strongly projecting. ............................................................................................................. Maculantrops
   - Wing unmarked or with pale marks around crossveins, any round spots present on longitudinal veins pale. Tibiae never with 4 well-marked bands of colour. Setae on legs and katepisternum variable, but usually not long and dense as above. Clypeus not strongly projecting. ................................................................. 3

3. Ocellar bristles absent, 1 orbital bristle. Syntergite 1+2 twice the width of tergite 3. Thorax, legs, and abdomen with many enlarged bristles, often helical in shape (Fig. 9.1). ......................... Photonants
   - Ocellar bristles usually present, 2 orbital bristles. Syntergite 1+2 barely wider than tergite 3. Thorax, legs, and abdomen with normal bristles, never helical in shape ................................................................. 4

4. Tergite 5 weakly sclerotized. Tergite 1–4 usually partially or extensively weakly sclerotized. Males with one of the following states: portion of epandrium above cerci fused or nearly fused medially; hypandrial arms with a transparent ventral extension and scutum foveolate; or hypopygium retracted inside segment 4 when at rest. .................................................................................................................... Boreantrops (in part)
- Tergites 1–5 heavily sclerotized. Males never with any of the states above. ................................. 5
5. With at least one of the following characters: Wing with one or more white spots on CuA1 (Fig. 10.1). Fore tarsus with basal 2 tarsomeres dark brown, distal 3 tarsomeres white. Syntergite 1+2 with a median ridge. Syntergite 1+2 fused with tergite 3 .................................................................Poecilantrops
- Without any of the above characters................................................................................................6

7. Wing with a pale spot on vein M1 between crossveins r-m and dm-cu. Female ovipositor short, tergites 6–7 and sternites 6–7 broad and heavily sclerotized. Epiproct without setae. ...............Coloantrops
- Wing without spots on vein M1. Female ovipositor long, tergite 6–7 and sternites 6–7 narrow, usually weakly sclerotized. Epiproct with 2–4 setae. ..........................................................Antrops (in part)
7. Wing reduced to a rod-like structure without any membrane, with a single long bristle at the tip (Figs. 3.1–2). ........................................................................................................................................8
- Wing strap-like to broad, with at least some membrane, or absent, without a long bristle at the tip. .................................................................................................................................9

8. Thorax yellow with brown medial stripe on scutum. Dorsocentrals reduced, only posterior pair distinct. Hind tibia with 2 apicoventral bristles. Fore basotarsomere of male with a spur. ...Penola
- Thorax black. Dorsocentral bristles in 3 distinct pairs. Hind tibia with a single apicoventral bristle. Fore basotarsomere without spur. ..................................................................................................Frutillaria
9. Abdominal tergites 3–5 weakly sclerotized, at least around margins ..........Boreantrops (in part)
- Abdominal tergites 3–5 entirely heavily sclerotized..................................................Antrops (in part)
5. ANTROPS ENDERLEIN 1909

*Antrops* Enderlein 1909: 15

Type species: *Antrops truncipennis* Enderlein 1909, by monotypy.

=*Archiborborus* Duda 1921: 125

Type species: *Archiborborus submaculatus* Duda, by subsequent designation (Cresson 1923)

=*Huapia* Richards 1931: 65 (as subgenus)

Type species: *Archiborborus (Huapia) microphthalmus* Richards, by original designation

=*Procopromyza* Richards 1931: 67 (as subgenus)

Type species: *Archiborborus (Procopromyza) albicans* Richards, by original designation

**Description:**

Head colour and microtomentum variable. Face evenly sclerotized, ventral margin slightly wavy, lunule small. Occiput narrow below occipital foramen. Clypeus narrow, slightly produced. Palpus with tiny setae throughout and longer setae along lateral margin. Prementum well-developed, circular, about 0.5X height of head. Labellum with 12 pseudotrachea. Scape very short, with 1–2 dorsomedial setulae; pedicel subtriangular, medial bristles much longer than outer; first flagellomere round, slightly pointed dorsoapically; arista dorsolateral, preapical, 2-segmented, about as long as head width, short-plumose.

Chaetotaxy: orbital bristles in two lateroclinate pairs; irregular orbital setulae along orbital plate; interfrontal setae in 4–8 medioclinate pairs; ocellar bristles lateroproclinate, anterior to median ocellus; irregular, very short ocellar setulae; inner vertical bristles inclinate; outer vertical bristles lateroreclinate; postocellar bristles as long as ocellar bristles, slightly proclinate; postvertical bristles small, cruciate; setae on median occipital sclerite small, medioclinate; postocular setae in a complete row with an incomplete row of occipital setae behind; vibrissa strong, as long as head; usually with a subvibrissal bristle and upturned anterior genal bristle; genal setae in 2 rows.

Thorax brown to black; extent of microtomentum variable between species. Chaetotaxy: postpronotum with a single bristle; notopleuron with two bristles, posterior about 0.5X length of anterior; one presutural and one postsutural intra-alar bristle; one postalar bristle at posterior corner of scutum and a shorter postalar between this and scutellum; three dorsocentral bristles (one presutural and two postsutural); acrostichal setae in 6–8 irregular rows; scutellum with 2 pairs of scutellar bristles; proepisternum with several small setulae; katepisternum with a single large dorsal bristle and irregular setae ventrally.
Wing membrane clear to brown, veins may be surrounded by a darker cloud. Often with pale spots around crossveins and along vein R4+5. Vein M reaching wing margin, CuA1 extending somewhat past crossvein dm-cu, not reaching wing margin, A1+CuA2 parallel to CuA1, distal part not vascularised, not reaching wing margin. Calypter with a dense marginal patch of flattened setae.


Abdomen brown to black, extent of microtomentum variable between species. Pleural membrane with setae on segments 3–5, occasionally on 2.

Male postabdomen: Sternite 5 variable between species. Synsternite 6+7 asymmetrical, complex, a portion often detached and forming an accessory sclerite flanking distiphallus in genital pouch; dorsal corner fused to sternite 8. Sternite 8 broadly fused to epandrium along right side. Epandrium more or less symmetrical, with a cleft above anterior edge of surstylus. Cerci small and medially fused. Subependrial sclerite Y or X-shaped, articulated with cerci and surstyli. Surstylus shape variable between species, articulated with epandrium and subependrial sclerite. Hypandrial arms weakly fused with ventral edge of epandrium; hypandrial apodeme well-developed, rod-like, weakly fused with arms. Phallapodeme well-developed, curved and broadest distally. Postgonites long and usually bilobed, articulated with phallapodeme, hypandrium, and basiphallus. Pregonites tiny, more or less fused with postgonites. Ejaculatory apodeme usually small, often lost in dissections. Basiphallus usually with both epiphallus and preepiphallus. Distiphallus complex, structure variable between species.

Female postabdomen: Abdomen telescoping, usually retracted in preserved specimens. Tergites and sternites 6–7 usually weakly sclerotized, narrow. Tergite 8 heavily sclerotized, sternite 8 divided medially, heavily sclerotized. Epiproct and hypoproct moderately sclerotized. Cerci simple, not fused with epiproct or each other. Three spermathecae, one pair sharing a duct and the other on a separate duct.

Comments: This genus contains 52 species, incorporating most of the species formerly placed in the genus *Archiborborus* and including the type species of that former genus. Members of the genus are morphologically quite diverse, and are difficult to characterize except by elimination of the other genera.
in the subfamily. Three subgroups within the genus, the *A. guaramacalensis*, *A. orbitalis*, and *A. quadrilobus* groups, are distinctive and are treated separately from the remaining species.

The genus name may be derived from Greek *antron* (hole or cave) + *ops* (eye), referring to the reduced eye similar to that common in troglothyic animals. Although *ops* is feminine, ICZN 30.1.4.3 states that “A compound genus-group name ending in -ops is to be treated as masculine, regardless of its derivation or of its treatment by its author.” Thus the generic name and all new names derived from it are masculine.

**Key to the species of Antrops**

1. Wing and halter greatly reduced or absent ................................................................. 51
   - Wing and halter normal or slightly reduced .............................................................. 2

   **Doubtful cases will key either way.**

2. Gena entirely shiny. Halter entirely brown. Wing clear, unmarked ................................. 30
   - Gena with at least some microtomentum. Halter partly to entirely white. Wing usually yellow to brown, often with pale spots at least around crossveins ................................................................. 3

3. Mesoscutum brown to blackish with yellow dorsocentral stripes. Hind femur with a brown apical band bordered by yellow basally ................................................................. 4
   - Mesoscutum without yellow dorsocentral stripes. Hind femur brown to black ............... 5

4. Femora mostly brown with a well-defined subapical yellow band (Fig. 5.1). Mid tibia without posterodorsal bristles. Hind tibia with 3 ventroapical bristles, no antero- or posterodorsal bristles. Gena without strong subvibrissal bristle ................................................................. *A. annulatus*
   - Femora mostly yellow, slightly darker basally and with a brown apical band on hind femur. Mid tibia with posterodorsal bristles. Hind tibia with 2 ventroapical bristles and rows of antero- and posterodorsal bristles. Gena with strong subvibrissal bristle ......................................................... *A. vittatus*

5. Eight irregular acrostichal rows. Male sternite 5 with a long anterior apodeme, apodeme with a dorsal keel, posterolateral corners produced with tufts of setae. Scutum and scutellum extensively shiny, microtomentum restricted to edges (Fig. 5.138). No presutural dorsocentral bristle ................................................................. 6
   - Six or fewer acrostichal rows. Male sternite 5 without anterior apodeme, or if present apodeme without a keel. Scutum and scutellum shiny to covered with microtomentum. Presutural dorsocentral bristle usually developed, sometimes very short or absent ................................................................................................. 14

6. Hind tibia with 2 apicoventral bristles ........................................................................... 7
   - Hind tibia with 3 apicoventral bristles ........................................................................... 9
7. Gena dark brown to black, entirely covered with microtomentum. Frons mostly covered with microtomentum, with shiny spots lateral to ocellar triangle. .................................................... A. papallacta
   - Gena orange, mostly shiny with microtomentum along ventral margin and in a spot below eye.
   Frons mostly shiny, with at most microtomentum on orbital plates and at bases of postvertical bristles. ... 8
8. Occiput orange. Trochanters yellow. ................................................................. A. fulgiceps
   - Occiput black. Trochanters brown................................................................. A. sierrazulensis
9. Head orange except occiput and posterior part of frons. Abdominal tergites 4–5 with basal threequarters covered with microtomentum. ................................................................. A. tachira
   - Head mostly black to dark brown, at most reddish brown anteriorly with orange antenna.
   Abdominal tergite 4–5 less than half covered with microtomentum. ........................................ 10
10. Hind tibia with a long thin anteroventral bristle. .................................................. 11
   - Hind tibia without a long thin anteroventral bristle. ............................................. 12
11. Occiput with shiny spots lateral to foramen. Frons with microtomentum at bases of ocellar bristles. .................................................................................................................. A. coroico
   - Occiput entirely covered with microtomentum. Frons with little to no microtomentum at bases of ocellar bristles. ........................................................................ 7
12. Gena mostly covered with microtomentum, with medial shiny spot. .................. A. bellavista
   - Gena with microtomentum restricted to ventral half and a small posterior spot below eye........ 7
13. Male distiphallus with sclerite immediately ventral to curve of dorsal tube convex in lateral view (Fig. 5.148). Female with anterior half of tergite 8 mostly shiny, epiproct with 2 pairs of setae. A. zongo
   - Male distiphallus with sclerite immediately ventral to curve of dorsal tube concave in lateral view (Fig. 5.142). Female with anterior half of tergite 8 covered with microtomentum except corners, epiproct with 3 pairs of setae. ........................................................................................................ A. inca
14. Anepisternum with a ventral shiny patch up to or past level of spiracle. Proepisternum partly or entirely shiny. ....................................................................................................................................... 15
   - Anepisternum covered in microtomentum, at most with a small ventral shiny patch.
   Proepisternum covered with microtomentum. ........................................................................... 22
15. Scutum with shiny patches medially. Scutellum shiny with some microtomentum around edges.16
   - Scutum and scutellum entirely covered in microtomentum. ............................................. 18
16. Fore coxa and femur orange. ................................................................................. A. aurantifemur
   - Fore coxa and femur black......................................................................................... 17
17. Anepisternum shiny below spiracle. Katepisternum broadly shiny dorsally. Mid tibia without a row of strong posterodorsal bristles. ........................................................................ A. baeza
- Anepisternum with microtomentum below spiracle. K atepisternum microtomentose dorsally, with only a small shiny patch behind fore coxa. Mid tibia with a row of strong posterodorsal bristles. *A. setosus*

18. Fore femur and coxa orange. Acrostichal setae in 2 rows. ............................................. *A. diversipennis*

- Fore femur and coxa black. Acrostichal setae in 6 irregular rows. ........................................... 19

19. Head entirely orange. Hind tibia with 2 ventroapical bristles. ........................................... *A. sp A*

- Head at least black on occiput. Hind tibia with 3 ventroapical bristles. ................................... 20

20. Frons with shiny spots on either side of ocellar triangle. Hind femur and posterior face of fore femur mostly shiny. Frons and gena reddish, lighter than occiput and concolourous with antenna........... 21

- Frons and femora entirely covered in microtomentum. Frons and gena black, concolourous with occiput and darker than antenna.................................................................................................................. 22

21. Face mostly shiny with microtomentum covering lunule and below antenna. Anepisternum with a large ventromedial shiny spot covering about half length and two-thirds height. ................. *A. variegatus*

- Face mostly covered with microtomentum, with only a small ventromedial shiny patch. Anepisternum with a smaller ventromedial shiny spot, covering about 0.3X length and 0.5X height of sclerite. .......................................................................................................................... *A. anovariegatus*

22. Wing normal. Shiny patch on anepisternum reaching level of posterior edge of spiracle. Mid tibia of males with a row of strong posterodorsal spines, these spines weak to indistinguishable in females. Hind basotarsomere without two strong basal bristles. ................................................................. *A. fuliginosus*

- Wings reduced, about same length as scutum. Shiny patch on anepisternum small, not reaching level of posterior edge of spiracle. Mid tibia of males without a row of strong posterodorsal spines (female unknown). Hind basotarsomere with two strong basal bristles. ........................................ *A. papallacta*

23. Hind tibia with a row of anterodorsal bristles. .......................................................................... 24

- Hind tibia without anterodorsal bristles. ...................................................................................... 25

24. Eye height less than gena height. Hind tibia with a row of postero-dorsal bristles. Wing with pale spots restricted to crossveins................................................................. *A. microphthalmus*

- Eye height greater than gena height. Hind tibia without postero-dorsal bristles. Wing with pale spots on veins R4+5 and M................................................................. *A. maculipennis*

25. Anterior 2 pairs of dorsocentral bristles very short (female) or absent (male). Fore and mid tibia reddish, hind tibia and femora black. Dorsal postocular bristles in several irregular rows. Male with shiny scutum. ................................................................. *A. maximus*

- Anterior 2 pairs of dorsocentral bristles well developed in both sexes. Fore and mid tibia brown to blackish, concolourous or darker than femora. Dorsal postocular bristles in 1 or 2 rows. Scutum entirely covered with microtomentum. ................................................................................................. 26
26. Interfrontal plates black with brown stripe at base of interfrontal bristles. Wing clear to yellowish, without spots. Male sternite 5 simple, rectangular. ................................................................. A. hirtus
   - Interfrontal plates uniformly coloured or paler anteriorly, but without distinct stripe at base of interfrontal bristles. Wing brownish, with faint to well-developed spots around crossveins and along vein R4+5. Male sternite 5 pointed medially or with lateral lobes and medial cleft. .............................................. 27
27. Sternites 3 and 4 square. Male sternite 5 with lateral lobes and deep medial cleft. Female sternite 5 square. ................................................................................................................................. 28
   - Sternites 3 and 4 wider than long. Male sternite 5 without lateral lobes, pointed medially. Female sternite 5 narrowed posteriorly. .................................................................................................................. 29
28. Lateral lobes of male sternite 5 pointed. Usually with shiny patches on head lateral to ocelli. Fore coxae usually contrastingly lighter than fore femur. Scutellum often partly shiny. .............. A. femoralis
   - Lateral lobes of male sternite 5 rounded and recurved. Never with shiny patches on head lateral to ocelli. Fore coxae usually similar in colour to fore femur. Scutellum usually entirely covered with microtomentum ................................................................. A. quadrinotus

Note: some females of these species may be unidentifiable.

29. Scutellum with medial triangle of microtomentum and bare patches laterally, hind femur mostly shiny. Male sternite 5 without medial processes ................................................................. A. simplicimanus
   - Scutellum and hind femur entirely covered in microtomentum. Male sternite 5 with thin medial processes. .................................................................................................................. A. didactylos
30. Scutum and pleuron extensively pollinose. Acrostichal setae in 6 irregular rows .......................... A. guandera (male only)
   - Scutum and pleuron mostly shiny. Acrostichal setae in 4 or fewer regular rows. ....................... 31
31. Orbital plate covered with microtomentum at least to the anterior orbital bristle. Lateral and posterior margins of mesoscutum with microtomentum ................................................................. 32
   - Orbital plate shiny. Lateral and posterior margins of mesoscutum with microtomentum or shiny. 37
32. Orbital plate with microtomentum reaching anterior margin of plate. Female without sclerotized discs on pleural membrane ................................................................. A. guandera (female only)
   - Orbital plate with microtomentum reaching just past anterior orbital bristle. Female with sclerotized discs at bases of setae on pleural membrane .......................................................... A. tumbrensis
33. Abdominal tergite 3 with microtomentum reaching posterior margin. ........................................ 34
   - Abdominal tergite 3 shiny or with microtomentum restricted to basal quarter. ............................ 36
34. Abdominal tergite 4 with microtomentum reaching posterior margin. Acrostichal setae in 4 rows. ................................................................................................................................. A. tumbrensis
   - Abdominal tergite 4 shiny. Acrostichal setae in 2 rows. ............................................................. 35
35. Mesoscutum with an additional pair of acrostichal setae at level of suture. ..........  
   - Mesoscutum without additional acrostichal setae at level of suture. ..........  
36. Postpronotum with microomentum along anterior and lateral margins, anepimeron with microomentum dorsally. ..........................................................  
   - Postpronotum and anepimeron shiny. .........................................................  
37. Presutural acrostichal setae in 4 rows. Notopleuron and metapleuron covered with microomentum. Tergites 4 and 5 with some microomentum. Base of wing evenly microtrichose. Outer vertical bristles with microomentum at base. .................................................................  
   - Presutural acrostichal setae in 2 rows. Notopleuron and metapleuron shiny. Tergites 4 and 5 completely shiny. Cells bc, c, bm, cup, and base of cell br with reduced microtrichia and some bare areas, distal part of cell br (beyond base of Rs) with distinctly heavier microtrichia than surrounding cells. Outer vertical bristles shiny at base ..................................................................................  
38. Anterior edge of surstylus above cleft with a long, sharp, posteriorly-directed ridge forming a plate covered in microsetae, no sharp medial ridge, antero-dorsal bump with ~8 setae (Fig. 5.124). ..........................................................  
   - Anterior edge of surstylus without a ridge, some microsetae along anterior edge of surstylus but not on a distinct plate, medial ridge between posterior corner of cleft and antero-dorsal bump, antero-dorsal bump with ~4 setae (Fig. 5.114). ..........................................................  
39. Males ..................................................................................................................  
   - Females ..........................................................................................  
40. Surstylus with broad, striated raised ridge on anterior edge, antero-dorsal corner strongly projecting (Fig. 5.109). ..........................................................  
   - Surstylus without striated raised ridge on anterior edge, smooth or with narrow smooth ridge, antero-dorsal corner not projecting or hidden behind median ridge. ........................................  
41. Surstylus with broad, flat median ridge. .........................................................  
   - Surstylus with thin median ridge. ...............................................................  
42. Surstylus with anteroventral portion below median ridge broadly projecting, ventral tooth without a secondary tooth at base (Fig. 5.77). ..........................................................  
   - Surstylus with anteroventral portion below median ridge narrow, toothlike, ventral tooth with a secondary tooth at base (Fig. 5.82). ..........................................................  
43. Surstylus with anteroventral corner smoothly rounded, ventral tooth narrow ..................  
   - Surstylus with anteroventral corner angular, ventral tooth broad. ....................  
44. Surstylus with median ridge projecting past anterior edge, depressed medially (Fig. 5.99). ......  
   - Surstylus with median ridge projecting past anterior edge, depressed medially (Fig. 5.99). ......  

A. cochinoca
A. orbitalis
A. juninensis
A. mucarensis
A. unduavi
A. tetrastichus
A. pecki
A. cotopaxi
A. eurus
A. nitidicollis
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- Surstylus with median ridge not projecting past anterior edge, not depressed medially (Fig. 5.70).
- Surstylus with anteroventral corner right angled, median ridge very narrow (Fig. 5.129).
- Surstylus with anteroventral corner acute, median ridge broader (Fig. 5.134).
- Epiproct with 1 pair of setae (may also have a medial, unpaired seta). ................................................. 47
- Epiproct with 2 pairs of setae (may also have a medial, unpaired seta). ............................................... 48
- Sclerites of sternite 8 gradually widening posteriorly, apices without hooks (Fig. 5.111). Epiproct with a medial unpaired seta (Fig. 5.110). ........................................................................................... 47
- Sclerites of sternite 8 parallel-sided for posterior two-thirds, apices with hook-like structure................. 48
- Tergite 8 emarginated anteriorly. Epiproct with a medial, unpaired seta. Spermathecae with basal and apical invaginations meeting.......................................................... 49
- Tergite 8 not emarginated anteriorly. Epiproct without medial, unpaired seta (Fig. 5.100).

Spermathecae with basal and apical invaginations not meeting (Fig. 5.102) ............................................ A. nitidicollis
- Tergite 8 strongly pinched medially, anterior corners strongly produced (Fig. 5.130). A. versabilis
- Tergite 8 weakly pinched medially, anterior corners slightly produced................................................. 50
- Sclerites of sternite 8 with distal third covered with microtomentum (Fig. 5.136). A. yungas
- Sclerites of sternite 8 with distal quarter covered with microtomentum (Fig. 5.84) A. eurus

- Head almost entirely covered with short setae, frons projecting over face. Wing blade-like (Fig. 5.2).
- Head with normal setae only, frons not projecting over face. Wing shape variable.................................. 52
- Hind tibia with 3 ventroapical bristles. Wing rudiment at least as long as scutellum. ......................... 53
- Hind tibia with 1 or 2 ventroapical bristles. Wing entirely absent............................................................ 55
- Abdominal tergites with row of enlarged subapical bristles. Wing straplike. A. chaetosus
- Abdominal tergites without enlarged bristles. Wing shape more or less normal.............................. 54
- Fore femur and coxa orange. Ventral half of face and spots lateral to ocellar triangle shiny................. 54
- Fore femur and coxa black. Face and frons entirely covered with microtomentum.............................. A. bucki

- Scutum and abdominal tergites shiny. ................................................................................................. 56
- Scutum and abdominal tergites mostly or entirely covered with microtomentum............................... 59
- Microtomentum covering most of ventral half of thoracic pleuron, dorsal margin of anepisternum shiny. Antenna dark brown ................................................................. 48
- At least meron and metapleuron shiny, dorsal margin of anepisternum with microtomentum. Antenna orange. ........................................................................................................................................... 49

57. Face mostly shiny with a broad band of microtomentum below antenna and lunule. Ocellar and posterior orbital bristles absent. Shiny part of anepisternum extending below level of spiracle. Hind tibia with 2 ventroapical bristles. ............................................................................................................ A. siberia

- Face mostly covered with microtomentum, lunule and ventral third shiny. Ocellar bristle usually present, posterior orbital bristle present. Anepisternum entirely covered with microtomentum below level of spiracle. Hind tibia with 1 ventroapical bristles. .................................................. A. coniobaptos

58. Head orange, concolourous with antenna and prementum. Microtomentum on katepisternum reaching katepisternal bristle. Posterior postsutural dorsocentral bristle present. Scutellum longer than high. ........................................................................................................................................... A. tequendama

- Head reddish orange, darker than antenna and prementum. Microtomentum on katepisternum not reaching katepisternal bristle. Posterior postsutural dorsocentral bristle not separable from surrounding setae. Scutellum as long as high........................................................................................................................................... A. sp E

59. Scutum shiny between dorsocentral rows, scutellum shiny A. sp. D

- Scutum and scutellum covered with microtomentum....................................................................... 60

60. Fore and mid femur yellow........................................................................................................... A. biflavus

- Fore and mid femur black................................................................................................................ 61

61. Abdominal tergites with long subapical bristles. A. carpishensis

- Abdominal tergites without long bristles....................................................................................... 62

62. Postpronotal bristle long. Posterior orbital and outer vertical bristles present......................... 63

- Postpronotal bristle short. Posterior orbital and outer vertical bristles absent............................ 64

63. Head reddish brown, frons covered with microtomentum. Ocellar bristles absent .......... A. sp. B

- Head dark brown, frons with a shiny V-shaped spot anteriorly. Ocellar bristles present.............. A. podocarpus

64. Frons with microtomentum medially to bases of ocellar bristles. A. guaramacalensis

- Frons shiny medially................................................................................................................... A. sp. C
Figures 5.1–7: *Antrops* adults, habitus: (1) *A. annulatus*, Olmue, Chile; (2) *A. truncipennis*, Bird Island, South Georgia Islands; (3) *A. femoralis*, Olmue, Chile. *Antrops* male terminalia: *A. annulatus*: (4) phallus, postgonite, and phallapodeme, lateral view, (5) surstylus, anterior view, (6) sternite 5; *A. anovariegatus*: (7) phallus, postgonite, and phallapodeme, lateral view.
Antrops annulatus (Richards)

Archiborborus annulatus Richards 1963: 232
(Figs. 5.1, 5.4–6, 5.149)

Description:
Head yellow, upper occiput and posterior frons orange to brown, covered with microtomentum except shiny stripes on interfrontal plates outlining frontal triangle. Distance from ocellar bristles to medial ocellus equal to distance between ocelli, ocellar bristles reclinate-divergent. Anterior genal bristle about 0.6X length of vibrissa, no strong subvibrissal bristle.

Thorax reddish-brown to dark brown, lateral margins of scutum and pleural sclerites may be mottled with yellow, entirely covered with microtomentum. Scutum with paler dorsocentral stripes, yellow to reddish-brown. Halter whitish, brown at base of knob.

Legs yellowish brown to dark brown. Male fore basotarsomere with a small apical spur. Femora 1–3 with a yellow band at two-thirds, otherwise reddish brown to dark brown. Tibia 2 with row of anterodorsal, 1 anteroventral, 1 posteroverentral, 4 subapical bristles. Tibia 3 with strong anteroverentral, 3 ventroapical bristles.

Wing brown. White spots on crossveins r-m and dm-cu, and two on vein R4+5 distal to r-m crossvein.

Abdomen with tergites brown to dark brown, strongly sclerotized, covered with microtomentum. Sternites moderately sclerotized. Tergites 3–5 with a strong bristle in posterolateral corners.

Male postabdomen: Sternite 5 with lateral margins rounded, converging, posterior margin with a pair of thin, incurved lobes, anterior apodeme short and broad (Fig. 5.6). Surstylus very broad, posterior edges nearly meeting medially (Fig. 5.5). Pregonite distinct, relatively large. Postgonite with lobes widely separated, anterior lobe curved anteriorly, long, rounded, posterior lobe pointed. Basiphallus with broad, very short epiphallus, short, narrow preepiphallus. Ejaculatory apodeme somewhat enlarged. Distiphallus simple, with a smooth, weakly curved dorsal tube (Fig. 5.4).

Female postabdomen: Tergites 6–7 and sternites 6–7 moderately sclerotized, slightly wider than long, entirely covered with microtomentum. Tergites with 3 posterior strips, sternites with 2 posterior strips. Tergite 8 slightly narrower posteriorly, anterior margin shallowly emarginated, posterior two-thirds
covered with microtomentum. Epiproct broad, with long anterior arms, posterior portion covered with microtomentum, with 1 pair of setae. Cerci narrow. Sclerites of sternite 8 subrectangular, distal half covered with microtomentum. Hypoproct subrectangular, anterior margin notched, edge lateral to notch shiny. Spermathecae barrel-shaped, about 1.5X longer than wide, with basal and apical invaginations, sclerotized duct short.

**Type material.** Holotype ♂: CHILE: Biobío: Ñuble, 40 km E of San Carlos, 28 Dec 1950, Ross & Michelbacher (CASC; not examined). Paratype ♀: same data as holotype (CASC).

**Other material examined.** CHILE: Aisén: 15 km S of Las Juntas and 30 km N of Payhauoi, 100 m, Nothofagus forest, carrion trap, 30 Dec 1984 – 29 Jan 1985, S. & J. Peck (2 ♀, DEBU); Cisnes Medio, 16 km NW, Rio Grande, 200 m, mature beech forest, carrion trap, 30 Dec 1984 – 28 Jan 1985, S. & J. Peck (2 ♀, DEBU); Puerto Cisnes, 40 km N, Queulat Pass, 500 m, mossy beech for., carrion trap, 30 Dec 1984 – 28 Jan 1985, S. & J. Peck (1 ♂, 1 ♀, DEBU); Yelcho Chio, Ventiisquero Br., 70 km SE of Chaitén, 200 m, mixed beech forest, carrion trap, 29 Dec 1984 – 29 Jan 1985, S. & J. Peck (2 ♀, DEBU); Araucanía: Flor del Lago, 15 km NE of Villarrica, 300 m, Nothofagus forest, carrion trap, 14 Dec 1984 – 10 Feb 1985, S. & J. Peck (2 ♀, DEBU); Lago Tinquilco, 30 km E Pucón, 750 m, yellow pans, 7–10 Dec 2002, L. Masner (5 ♂, 3 ♀, DEBU); Malleco, 6 km W Curacautín, 750 m, grazed Nothofagus forest remnant, carrion traps, 12 Dec 1984 – 16 Feb 1985, S. & J. Peck (1 ♂, 1 ♀, DEBU); Chiloé I., 11 km NW of Castro, 200 m, ravine, 2nd growth for., carrion trap, 27 Dec 1984 – 1 Feb 1985, S. & J. Peck (4 ♂, 4 ♀, DEBU); Chiloé I., Chiloé Natl. Pk., 42°19′19″S 74°07′07″W, 0 m, yellow pans, 11–12 Dec 2002, A. Newton & M. Thayer (1 ♂, 4 ♀, DEBU); Parque Nac. Puyehue, 1600 m, 18–24 Dec 1982, A. Newton & Thayer (5 ♂, 5 ♀, DEBU); Puyehue Natl. Pk., Anticura, 40°40′40″S 72°10′10″W, 375 m, 3–4 Dec 2008, Kits & Marshall (1 ♀, DEBU); Chiloé I., 11 km NW of Castro, 200 m, ravine, 2nd growth for., carrion trap, 27 Dec 1984 – 1 Feb 1985, S. & J. Peck (4 ♂, 4 ♀, DEBU); Chiloé I., Chiloé Natl. Pk., 42°19′19″S 74°07′07″W, 0 m, yellow pans, 11–12 Dec 2002, L. Masner (4 ♂, 1 ♀, DEBU); Chiloé I., Lago Huinchillo, 42°37′37″S 72°00′00″W, 10 m, yellow pans, 11–12 Dec 2002, L. Masner (2 ♂, 5 ♀, DEBU); Parque Nat. Puyehue, 1600 m, 18–24 Dec 1982, A. Newton & M. Thayer (1 ♂, 2 ♀, DEBU); as above but 965 m, 18–25 Dec 1982 (1 ♀, DEBU); as above but 690 m, 18–24 Dec 1982 (1 ♀, DEBU); Puyehue Nat. Park, Anticura, 250 m, Nothfagus for., Chile Exp., 13 Feb 1988, L. Masner (1 ♂, DEBU); Puyehue Natl. Pk., 1600 m, 18–24 Dec 1982, Newton & Thayer (1 ♀, DEBU); Puyehue Natl. Pk., Anticura, 40°40′40″S 72°10′10″W, 375 m, 3–4 Dec 2008, Kits & Marshall (1 ♀, DEBU); Río San Pedro, 24 km NE of Los Lagos, river bank slope forest, yellow pans, 13–18 Nov 2000, L. Packer (2 ♂, 12 ♀, DEBU); **Los Ríos:** Puerto Fuy, 800 m, Nothofagus, 16 Dec 1984 – 11 Feb 1985, S. & J. Peck (1 ♂, DEBU); Maule: Altos del Lircay Natl. Res., 35°36′36″S 71°04′04″W, 1256 m, 29 Nov 2006, S. A. Marshall (1 ♂, 1 ♀, DEBU); as above but ~3000 m, streamsides pans (2 ♂, 2 ♀, DEBU); Pelluhue, along Río Curanilahue, 26 Nov 2006, S. A. Marshall (2 ♂, DEBU); Putú, ~15 km N Constitución, along stream, 26 Nov 2006, S. A. Marshall (4 ♂, 5 ♀, DEBU); **Valparaíso:** La Campana Nat. Pk., 900 m, hygrophilous forest, FIT, 2 Dec 1984 – 21 Feb 1985, S. & J.
Peck (3 ♀, DEBU); Zapallar, Quebrada El Tigre, above tennis club, 32°33'33"S 71°26'26"W, 100 m, 9 Dec 2008, Kits & Marshall (1 ♂, 1 ♀, DEBU).

Comments: Although the type specimen was not examined, Richards’ description is detailed and clearly refers to this distinctive species.

*Antrops anovariegatus* sp. nov.

(Figs. 5.7, 5.150)

Description:
As described for *A. variegatus*. Face more extensively covered with microtomentum, with only a small ventromedial shiny patch. Pale areas on thorax dark reddish brown rather than reddish. Shiny patch on anepisternum smaller, about 0.3X length and 0.5X height of sclerite.


Female postabdomen: Tergites 6–7 wider than long, weakly sclerotized medially, covered with microtomentum except anterior margin. Sternites 6–7 moderately sclerotized, covered with microtomentum except anterior margin. Tergites with 3 posterior strips, sternites with 2 posterior strips. Tergite 8 approximately square, with anterior and posterior margins shallowly emarginated, covered with microtomentum except anteromedial patch. Epiproct with long anterior arms, 1 pair of setae, distal portion with microtomentum. Cerci thin. Sclerites of sternite 8 broad, pinched near base, distal half covered with microtomentum. Hypoproct subrectangular, with a curved unsclerotized band medially, covered with microtomentum except anterior margin. Spermathecae barrel-shaped, slightly longer than wide, with long basal invagination, sclerotized duct about 1.5X as long as spermathecae.

*Type material.* Holotype ♂: ECUADOR: Napo: Lago Papallacta, nr., 0°20'20"S 78°10'10"W, 3400 m, forest above lake, pans/ dung, 4–8 Nov 1999, S.A. Marshall (QCAZ). Paratypes: same data as holotype (2 ♂, 4 ♀, DEBU); Quito–Baena pass, 1 km E, 0°20'20"S 78°10'10"W, 3950 m, forest edge, dung traps, 4–8 Nov 1999, S.A. Marshall (1 ♀, DEBU); Quito–Baena road, Papallacta, 3200 m, elfin forest, above thermal spgs., pan traps, 16–21 Feb 1983, L. Masner (1 ♀, DEBU).
Comments: The species name is derived from the Greek *ano-* (above) and the Latin *variegatus*, referring to the varicoloured thorax and the altitudinal distribution relative to *A. variegatus*.

*Antrops aurantifemur* sp. nov.
(Figs. 5.8, 5.11, 5.151)

Description:
Head dark brown, anterior part of frons, face, and gena may be reddish brown. Clypeus and prementum orange to dark brown, antenna brownish orange, maxillary palp brown. Mostly covered with microtomentum, frons with large shiny areas lateral to ocelli, face shiny on ventral half. Ocellar bristles about one ocellus width anterior to median ocellus. Subvibrissal and anterior genal bristles about 0.25X to 0.3X length of vibrissa.

Thorax black, may have some areas reddish brown. Mostly covered with microtomentum; posterior half of postpronotum, small spots on scutum posterolateral to posterior dorsocentral bristle, scutellum, most of anepisternum except a small patch below spiracle and a concave patch on posterior third, and a patch on katepisternum below base of katepisternal bristle shiny. Halter whitish, with orange or brown below knob. Presutural and anterior postsutural dorsocentral bristles very short in males.

Legs black, some orange at joints, trochanters, coxa 1 and femur 1 orange, tarsus 2 yellowish on basal tarsomeres. Tibia 2 with anterior and posterior rows, 1 anteroventral, 1 posteroventral, and 6 subapical bristles. Tibia 3 with rows of thin anterodorsal and posterodorsal, 1 thin anteroventral, and 3 ventroapical bristles. Male fore basotarsomere with a small spur.

Wing light brown, crossveins slightly paler but without spots.

Abdomen with tergites dark brown, strongly sclerotized. Tergite 2 covered with microtomentum, tergites 3–5 with microtomentum anteriorly, shiny posteriorly, border irregular. Sternites of both sexes weakly sclerotized. Pleural setae long, soft.

Male postabdomen: Sternite 5 with curved lateral margins, narrow anteriorly with short narrow anterior apodeme (Fig. 5.11). Surstylus narrow, slightly scooped. Pregonite fully fused with postgonite. Postgonite with fully separated lobes, anterior lobe broad and rounded, posterior lobe narrow and pointed.
Basiphallus with long epiphallus, narrow pointed preepiphallus. Distiphallus with a strongly curved dorsal tube, mostly smooth with some teeth distally, flanked by a single spike-like sclerite (Fig. 5.8).

Female postabdomen: Tergites 6–7 and sternites 6–7 slightly longer than wide, covered with microtomentum, weakly sclerotized medially. Tergites with 3 posterior strips, sternites with 2 posterior strips. Tergite 8 narrow, with anterior margin shallowly emarginated, widest at about one third of length, entirely covered with microtomentum. Epiproct narrow with narrow anterior arms, 2 pairs of setae, covered with microtomentum except anterior arms. Cerci thin. Sclerites of sternite 8 shaped like an elongate comma, somewhat pinched at about one third of length, covered with microtomentum except thin anterior tip. Hypoproct subrectangular, somewhat weakly sclerotized medially. Spermathecae round, about as long as wide, without invaginations, sclerotized duct about 2X as long as spermathecae.

**Type material.** Holotype ♂: ECUADOR: Napo: Lago Papallacta, nr., 0°20'20"S 78°10'10"W, 3400 m, forest above lake, pans/ dung, 4–8 Nov 1999, S.A. Marshall (QCAZ). Paratypes: same data as holotype (100 ♂, 96 ♀, DEBU); Baeza, 27km NW, 2700 m, dung trap, 2–6 Mar 1976, S. Peck (1 ♂, 10 ♀, DEBU); Baeza, 42 km NW, 3300 m, dung trap, 2–6 Mar 1976, S. Peck (21 ♂, 29 ♀, DEBU); Quito–Baeza road, Papallacta, 3200 m, elfin forest, above thermal spgs., pan traps, 16–21 Feb 1983, L. Masner (1 ♂, 3 ♀, DEBU); Carchi: Bosque El Arrayán, 6 km E San Gabriel, 0°32'32"N 77°47'47"W, 2830 m, forest, dung traps, 2–4 Nov 1999, S.A. Marshall (2 ♂, 1 ♀, DEBU); Guandera For. Res., 15 km E San Gabriel, 3400 m, sweeping forest trail, 1 Nov 1999, S.A. Marshall (3 ♂, 1 ♀, DEBU); as above but hand (3 ♂, 3 ♀, DEBU); Páramo El Angel, 14.1 km NW El Angel, 0°42'42"N 77°58'58"W, 3450 m, under *Polylepis* litter, 1 Nov 1999, S.A. Marshall (2 ♀, DEBU); Páramo El Angel, 18.8 km NW El Angel, 0°42'42"N 78°00'00"W, 3300 m, pan in *Polylepis* litter, 3 Nov 1999, S.A. Marshall (2 ♂, 3 ♀, DEBU); **Pichincha**: Campamento Pichan nr. Nono, 0°07'07"S 78°33'33"W, 3200 m, 24 Oct 1999, S.A. Marshall (5 ♂, 2 ♀, DEBU); as above but sweeping (11 ♂, 2 ♀, DEBU); as above but dung (25 ♂, 22 ♀, DEBU); Cotopaxi Natl. Pk., Quebrada Mishahuaiucu, 0°38'38"S 78°29'29"W, 3600 m, along stream, pan traps, 26 Oct–8 Nov 1999, S.A. Marshall (1 ♀, DEBU); Maquipucuna Biol. Res., river trail, 0°07'07"N 78°37'37"W, 1200 m, sweeping, 29 Oct 1999, S.A. Marshall (1 ♀, DEBU); Quito, 10 km NW, Valley nr. Hostería San Jorge, 0°07'07"S 78°31'31"W, stream valley, sweeping, 23 Oct 1999, S.A. Marshall (3 ♀, DEBU); Tandapi, 21.7 km E., mossy forest, dung trap, 24–29 Jun 1975, S. Peck (2 ♂, 2 ♀, DEBU); Tandapi, 34.5 km E, 2835 m, bamboo shrub, dung trap, 24–29 Jun 1975, S. Peck (27 ♂, 65 ♀, DEBU).

Comments: The species name refers to the distinctive orange fore femur in this species (also found in *A. diversipennis* sp. nov.). Although only known from a few localities in northern Ecuador, this species appears to be abundant where it occurs.
Figures 5.8–13: *Antrops* male terminalia. (8) *A. aurantifemur*, phallus, postgonite, and phallapodeme, lateral view; (9) *A. baeza*, phallus, postgonite, and phallapodeme, lateral view; (10) *A. bucki*, phallus, postgonite, and phallapodeme, lateral view; (11) *A. aurantifemur*, sternite 5; (12) *A. baeza*, sternite 5; (13) *A. bucki*, sternite 5.
Antrops baeza sp. nov.
(Figs. 5.9, 5.12, 5.152)

Description:
Head dark reddish brown, face, prementum, antenna, clypeus, and maxillary palp reddish orange. Covered with microtomentum, frons with shiny spots lateral to ocelli, face mostly shiny except lunule and small patch below antenna, gena with a small shiny spot medially. Ocellar bristles at level of anterior margin of median ocellus. Subvibrissal bristle about 0.3X length of vibrissa, anterior genal bristle about 0.5X length of vibrissa. Gena about 0.5X height of eye.

Thorax mostly dark brown, postpronotum, lateral margins of scutum, anepimeron, and dorsal part of katepisternum reddish. Microtomentum along anterior and lateral margins of scutum, in a thin band along posterior margin of anepisternum, and along ventral margin and dorsal suture of katepisternum, anepimeron mostly covered with microtomentum except anteromedial shiny spot, meron, metapleuron, and laterotergite covered with microtomentum. Halter whitish, pale brown below knob.

Legs black, joints, trochanters, and tarsi reddish brown. Mid tibia with row of anterodorsal, 1 anteroventral, 1 posteroverentral, 5 subapical bristles. Hind tibia with 3 ventroapical bristles.

Wing light brown, veins brown, crossveins r-m and dm-cu paler.

Abdominal tergites dark brown, heavily sclerotized, synergite 1+2 with microtomentum on anterior half, tergites 3–5 with microtomentum on anterior third. Sternites moderately sclerotized in both sexes, brown, in male very thin and shiny, in female slightly narrower than wide, covered with microtomentum. Pleural setae long and soft.

Male postabdomen: Sternite 5 with curved lateral margins, narrow anteriorly with narrow anterior apodeme about as long as external portion (Fig. 5.12). Surstylus narrow, scooped. Pregonite small, distinct. Postgonite with lobes well separated, anterior lobe broad and rounded, posterior lobe pointed. Basiphallus with short epiphallus, long, narrow preepiphallus. Distiphallus with a curved, spinose dorsal tube, with small ventral sacs (Fig. 5.9).

Female postabdomen: Tergites 6–7 and sternites 6–7 longer than wide, anterior and lateral margins sclerotized. Tergites with 3 posterior strips, sternites with 2 posterior strips. Tergite 8 narrow, anterior
margin emarginated, entirely covered with microtomentum. Epiproct with long anterior arms, distal portion covered with microtomentum, with 2 pairs of setae. Cerci long, narrow. Sclerites of sternite 8 subtriangular, covered with microtomentum except anterior end. Hypoproct subrectangular, with a curved unsclerotized band medially, covered with microtomentum except anterior margin. Spermathecae cylindrical, about 2X longer than wide, without invaginations, sclerotized duct about 1.2X longer than spermathecae.

**Type material.** Holotype ♂: ECUADOR: Napo: Baeza, 15km NW, 2200m, dung trap, 2–6 Mar 1976, S. Peck (QCAZ). Paratypes: same data as holotype (1 ♀, DEBU).

Comments: The species name is derived from the nearest town to the type locality. It should be treated as a noun in apposition.

*Antrops bucki* sp. nov.

(Figs. 5.10, 5.13, 5.153)

Description:

Head black, face, clypeus, and prementum dark brown, antenna orangish brown with base of pedicel black. Entirely covered with microtomentum. Gena about 0.8X eye height. Ocellar bristles just anterior to median ocellus. Anterior genal bristle and subvibrissal bristle about 0.3X length of vibrissa.

Thorax black. Mostly covered with microtomentum, ventromedial shiny spot on anepisternum about 0.3X height and length of sclerite. Presutural and anterior postsutural dorsocentral bristles very short in holotype. Halter well developed, whitish with brown below knob.

Legs black, fore coxa, trochanters, joints, and tarsi dark reddish brown. Fore basotarsomere with a small yellow spur in holotype. Mid tibia with row of anterodorsal, 1 medial posterodorsal, 1 anteroventral, 2 posteroventral, 5 subapical bristles. Mid basotarsomere with a strong basal ventral bristle. Hind tibia with 1 anteroventral, 3 ventroapical bristles. Hind basotarsomere with 2 strong basal anteroventral bristles.

Wing reduced, about length of thorax, all veins recognizable. Wing brown with dark brown veins, crossveins r-m and dm-cu and distal part of vein R4+5 whitish.
Abdominal tergites black, heavily sclerotized, covered with microtomentum in both sexes. Sternites black, heavily sclerotized in male, moderately sclerotized in female, covered with microtomentum in both sexes. Sternites slightly wider than long in male, longer than wide in females.

Male postabdomen: Sternite 5 with curved lateral margins, widest at about one-third length, anterior apodeme broad, about as long as external portion (Fig. 5.13). Surstylus long, narrow. Pregonite small, distinct. Postgonite with lobes well separated, anterior lobe rounded, posterior lobe somewhat pointed. Basiphallus with moderately long, very broad epiphallus, narrow preepiphallus. Distiphallus with curved spinose dorsal tube flanked by one spike-like sclerite, ventral sacs fairly well developed, covered with small spinules (Fig. 5.10).

Female unknown.


Comments: The area around Papallacta pass has been quite well collected for Sphaeroceridae, but only a single specimen of this species is known. This may be due to the very high altitude at which the type specimen was collected, as very few specimens were examined from 4200 m. This species is named to honour M. Buck, co-collector of the holotype and an accomplished taxonomist.

*Antrops chaetosus* (Richards)

*Archiborborus chaetosus* Richards 1961: 60

(Figs. 5.14, 5.15, 5.18, 5.159)

Description:
Occiput reddish brown, face and gena yellow, frons intermediately coloured. Clypeus, prementum, and maxillary palp yellow, antenna yellowish brown. Covered with microtomentum except shiny spots lateral to ocellar triangle. Distance from ocellar bristles to medial ocellus equal to distance between ocelli, ocellar bristles reclinate-divergent. Anterior genal bristle about 0.6X length of vibrissae.

Thorax orange to reddish brown, entirely covered with microtomentum. Halter absent.
Legs yellow, tibia 1, medial part of tibia 2, basal three-quarters of tibia 3, and basal two-thirds of femora 2 and 3 brown. Tibia 2 with row of anterodorsal, 1 anteroventral, 1 posteroventral, about 3 subapical bristles.

Wing reduced, straplike. Only veins R1 and R2+3 apparently remaining. Membrane and veins brown.

Abdomen with tergites and sternites dark brown and heavily sclerotized in both sexes, covered with microtomentum. Tergites 2–4 with a row of greatly enlarged subapical bristles.

Male postabdomen: Sternite 5 broad, posterior margin shallowly emarginated, anterior apodeme about as long, two-thirds width of external portion (Fig. 5.18). Surstylus with distal portion narrow, pointed (Fig. 5.15). Pregonite distinct, relatively large. Postgonite strongly curved, lobes well separated, anterior lobe broad, with truncate tip covered with microtrichiae, posterior lobe short, truncate. Basiphallus with short epiphallus, preepiphallus strongly curved, broad apically. Distiphallus with short, smooth dorsal tube, ventrally with a dorsally curved distal sclerite (Fig. 5.14).

Female postabdomen: Tergites 6–7 and sternites 6–7 broad, moderately sclerotized, posterior half covered with microtomentum. Tergites with 3 posterior strips, sternites with 2 posterior strips. Tergite 8 trapezoidal, anterior margin emarginated, posterior half covered with microtomentum. Epiproct with short anterior arms, shiny, with 1 pair of setae. Cerci broad. Sclerites of sternite 8 broad, subrectangular, distal third covered with microtomentum. Hypoproct subrectangular, with a heavily sclerotized inverted triangle medially covered with microtomentum. Spermathecae (1+3) sausage-shaped, about 3X longer than wide, annulated, with a shallow apical invagination, sclerotized duct short. Dissected female with 7 eggs.

**Type material.** Holotype ♂: CHILE: [Los Lagos:] Chiloé I., 42° S, Chepu, 2 Oct 1958, G. Kuschel (MNNC; not examined). Paratypes: same data as holotype (1 ♀, BMNH); same data as holotype but dates 3–13 Oct 1958 (3 ♀, BMNH).

**Other material examined.** CHILE: Araucanía: P.N. Ñielol, Temuco, 38°43'43"S 72°34'34"W, 250 m, native forest remnants with Nothofagus, FMHD#82–824, dung trap (human), 14–30 Dec 1982, Newton & Thayer (1 ♀, FMNH); Purén, Contulmo Nat. Mon., 350 m, evergreen forest, rotten mushroom, 11 Nov 1984, S. & J. Peck (1 ♂, DEBU); as above but mixed forest litter, FMHD#85–1001, Berlese, 13 Feb 1985 (1 ♀, FMNH); Los Lagos: 3 km S Maicolpue, Bahía Mansa, 200m, mixed forest, FMHD#85–933, Berlese, litter, 21 Dec 1984, S. & J. Peck (1 ♀, FMNH).

Comments: Although I was unable to examine type material of this species, Richards' description is complete and the species is distinctive.
Antrops didactylos sp. nov.
(Figs. 5.16, 5.19, 5.154)

Description:
Head reddish brown to black, interfrontal plates usually darker than frontal triangle and orbital plates, prementum and maxillary palp brown. Face reddish brown laterally, blackish medially. Antenna with scape, pedicel, and base of 1st flagellomere orange, rest of flagellomere dark brown. Pollinose except shiny spots lateral to ocellar triangle. Ocellar bristles about 1 ocellus width anterior to medial ocellus. Interfrontal setae in about 5 pairs. Anterior genal bristle enlarged about 0.5X length of vibrissae.

Thorax dark brown to black, covered with microtomentum except tiny ventral spot on anepisternum. Halter whitish with some brown below knob.

Legs dark brown to black, coxa 1, trochanters, and joints of femora and tibiae paler. First basotarsomere with a small, dark spur in males. Tibia 2 with row of anterodorsal, 1 anteroventral, 1 posteroventral, and 3 subapical bristles. Tibia 3 with 3 ventroapical bristles.

Wing pale brown, slightly paler spots on crossveins and 2 on vein R4+5.

Abdomen with tergites and sternites dark brown and heavily sclerotized in both sexes, covered with microtomentum.

Male postabdomen: Sternite 5 broad, posterior margin with a medial projection bearing a pair of finger-like projections, anterior apodeme about as long and 0.4X width of external portion (Fig. 5.19). Surstylus narrow, distal portion parallel-sided. Pregonite distinct, fairly large. Postgonite with lobes well-separated, anterior lobe broad, rounded, posterior lobe long, pointed. Basiphallus with short, narrow epiphallus, broad bilobed preepiphallus. Ejaculatory apodeme relatively large. Distiphallus with a short smooth dorsal tube (Fig. 5.16).

Female postabdomen: Tergites 6–7 and sternite 6–7 moderately sclerotized, slightly wider than long, entirely covered with microtomentum, tergite 7 shiny with anterior margin doubly emarginated, microtomentum along posterior margin, sternites with anterior margin rounded. Tergites with 3 posterior strips, sternites with 2 posterior strips. Tergite 8 slightly narrower posteriorly, anterior margin deeply emarginated, posterior third covered with microtomentum. Epiproct with narrow anterior arms, shiny,
with 1 pair of setae. Cerci narrow. Sclerites of sternite 8 pointed anteriorly, sculptured apically, distal quarter covered with microtomentum. Hypoproct semicircular, heavily sclerotized. Spermathecae round, with basal invagination, sclerotized duct about 2X length of spermathecae.

**Type material.** Holotype ♂: CHILE: Maule: Altos del Lircay Natl. Res., ~3000 m, streamside pans, 29 Nov 2006, S.A. Marshall (MNMC). Paratypes: same data as holotype (2 ♂, 3 ♀, DEBU); Aisén: Cerro Castillo Res. Nac., 40 km SW of Balmaceda, 1100 m, dry open beech forest, carrion trap, 2–27 Jan 1985, S. & J. Peck (1 ♂, DEBU); Valparaíso: La Campana Natl. Pk., Ber. hygrophilous forest, leaf litter, 2 Dec 1984, S. & J. Peck (1 ♀, DEBU). ARGENTINA: Neuquén: Lolog, 7 km N San Martin de Los Andes, 900 m, nr. muddy bank of pond, pan traps, 23–30 Nov 1989, S.A. Marshall (1 ♂, DEBU); Lolog, 7km N San Martin de Los Andes, 1000 m, 20 Nov 1989, S.A. Marshall (1 ♂, DEBU); Lolog, 7km N San Martin de Los Andes, Gentili Cabin, forest and meadow, pooled pan & FIT traps, 18–21 Nov 1989, S.A. Marshall (1 ♂, DEBU); as above but pans & FIT along streambed (1 ♂, DEBU); Lolog, 7km N San Martin de Los Andes, Gentili property, 900 m, nr. pond, FIT, 23 Nov – 1 Dec 1989, S.A. Marshall (1 ♀, DEBU).

Comments: The species name is from the Greek *di* (two) + *dactylos* (finger), referring to the paired finger-like projections of the male sternite 5.

**Antrops diversipennis** sp. nov.

(Figs. 5.17, 5.20, 5.155)

Description:

Head black, face, clypeus, prementum, and maxillary palp dark brown. Covered with microtomentum except large spots lateral to ocelli and ventral half of face. Antenna orange to dark brown. Ocellar bristles about 1 ocellus width anterior to median ocellus. Anterior genal bristle about 0.3X length of vibrissa, subvibrissal bristle barely strengthened, about 0.25X length of vibrissa.

Thorax black, covered with microtomentum except proepisternum, ventromedial patch on anepisternum, and small patch behind fore coxa. Halter whitish, reduced in brachypterous specimens. Acrostichal bristles in 2 rows. Presutural dorsocentral sometimes barely differentiated from surrounding setae.

Legs black with orange at joints, coxae 1 and 3, trochanters, and femur 1 orange. Tarsi dark brown. Tibia 2 with row of anterodorsal, 1 anteroventral, 1 posteroventral, and 5 subapical bristles. Tibia 3 with 1 strong anteroventral, 3 ventroapical bristles.
Wing pale brown, with whitish spots on crossveins r-m, bm-cu, dm-cu, and 2 on vein R4+5 distal to r-m. Wing length variable, from less than 0.25X length of abdomen to slightly longer than abdomen.

Abdomen with tergites and sternites black, heavily sclerotized in both sexes, covered with microtomentum. Pleural setae short.

Male postabdomen: Sternite 5 with lateral margins rounded, posterior margin deeply emarginated, anterior apodeme slightly narrower and about 0.75X length of external portion (Fig. 5.20). Surstylus scooped, fairly narrow. Pregonite small, distinct. Postgonite with lobes well-separated, anterior lobe broad and rounded, posterior lobe narrower, somewhat pointed. Basiphallus with very broad, short epiphallus, narrow, long preepiphallus. Distiphallus with spinose dorsal tube, flanked by a single spike-like sclerite, with ventral lateral clear sacs (Fig. 5.17).

Female postabdomen: Tergites 6–7 and sternites 6–7 slightly wider than long, covered with microtomentum, weakly sclerotized medially except sternite 6. Tergites with 3 posterior strips, sternites with 2 posterior strips. Tergite 8 approximately square, with anterior margin shallowly emarginated, covered with microtomentum except anterior margin. Epiproct with long anterior arms, 1 pair of setae, distal portion with microtomentum. Cerci thin. Sclerites of sternite 8 subtriangular, distal two-thirds covered with microtomentum, nearly meeting tergite 8 along lateral margins. Hypoproct subrectangular, with an unsclerotized hole medially near anterior margin, distal half covered with microtomentum. Spermathecae barrel-shaped, slightly longer than wide, with long apical invagination, sclerotized duct about 1.2X as long as spermathecae.

**Type material.** Holotype ♂: ECUADOR: Napo: Lago Papallacta, nr., 0°20'20"S 78°10'10"W, 3400 m, forest above lake, pans/ dung, 4–8 Nov 1999, S.A. Marshall (QCAZ). Paratypes: same data as holotype (10 ♂, 5 ♀, DEBU); Lago Papallacta, 0°20'20"S 78°10'10"W, 3400 m, elfin forest, leaf litter, 6 Nov 1999, R. Anderson (3 ♂, 2 ♀, DEBU); Quito–Baeza road, 4000 m, open páramo, pan traps, 10–18 Feb 1983, L. Masner (2 ♀, DEBU); as above but low páramo, 18–23 Feb 1983 (3 ♀, DEBU); Cotopaxi: Latacunga, 45km NNE, 3700 m, shrub grass páramo, carrion traps, 19–25 Jul 1985, S. & J. Peck (1 ♀, DEBU); Pichincha: Quito–Baeza pass, 6 km W, pans/ dung, 4–8 Nov 1999, S.A. Marshall (2 ♀, DEBU).

Comments: The species name refers to the variable wing length within this species. While there are many brachypterous or apterous species of Archiborborinae, and a few individuals of some normally macropterous species have been found with somewhat reduced wings, the range of variation in wing length in this species is unique. Without field observations, it is unclear whether or not macropterous individuals can fly.
**Antrops femoralis** (Blanchard)

*Borborus femoralis* Blanchard 1852: 467

*Archiborborus submaculatus* Duda 1921: 130 *syn. nov.*

*Archiborborus argentinensis* Papp 1977: 92 *syn. nov.*

(Figs. 5.3, 5.21, 5.26, 5.156)

Description:
Occiput dark brown, face and gena yellow to orange, frons intermediately coloured. Clypeus yellowish brown, prementum yellowish brown, antenna orangish brown, maxillary palp yellowish brown. Mostly covered with microtomentum, but usually with shiny spots lateral to ocelli. Ocellar bristles just anterior to medial ocellus. Anterior genal bristle about 0.6X length of vibrissa, subvibrissal bristle barely or not developed, about 0.3X length of vibrissa.

Thorax reddish brown to dark brown, covered with microtomentum except thin shiny strip at lower edge of anepisternum. Scutellum sometimes with shiny patches. Halter whitish, brown at base of knob.

Leg colour variable, variation apparently geographically based. Often dark brown, paler at joints, with yellowish fore coxa. In more northern populations, femur 1 and 2 often partially or entirely orange. Tibia 2 with row of anterodorsal, 1 anteroventral, 1 posteroventral, 5 subapical bristles. Tibia 3 with 3 ventroapical bristles, sometimes with thin anteroventral bristle. Male fore basotarsomere with a small curved spur.

Wing pale brown, with whitish spots on crossveins r-m and dm-cu, and 2 on vein R4+5 distal to r-m.

Abdomen with tergites brown to dark brown, covered with microtomentum. Stermites weakly sclerotized in both sexes.

Male postabdomen: Sternite 5 with short, broad anterior apodeme, posterior margin with corners projecting, not recurved, pointed, not emarginated medially (Fig. 5.26). Surstylus scooped, anterior face concave, posterior face rounded. Pregonite apparently fused with postgonite. Postgonite with anterior lobe nearly right-angled, posterior lobe broad and pointed. Basiphallus with short broad epiphallus, short narrow preepiphallus. Distiphallus with a short, smooth dorsal tube, distal portion without a dorsal medial rounded plate, ventral tip long and thin (Fig. 5.21).
Female postabdomen: Tergites 6–7 and sternites 6–7 fully sclerotized, rectangular, wider than long, covered with microtomentum. Tergites with 3 posterior strips, sternites with 2 posterior strips. Tergite 8 nearly square, about two-thirds covered with microtomentum, shiny laterally and anteriorly. Epiproct with 2 pairs of setae, anterior arms long and broad, with microtomentum distally. Cerci thin, covered with microtomentum. Sclerites of sternite 8 with anterolateral corners extended, nearly reaching base of tergite 8, pinched near base, apical two-thirds broad and covered with microtomentum. Hypoproct round, mostly sclerotized medially, anterior margin shiny. Spermathecae barrel-shaped, slightly longer than wide, with long apical invagination, sclerotized duct slightly shorter than spermathecae.

**Type material.** *Borborus femoralis*: Lectotype ♂ (here designated): “MUSEUM PARIS/CHILI/GAY 1836” (MNHN; examined). Paralectotype: same data as lectotype (1 ♀, MNHN).

*Archiborborus submaculatus*: Holotype ♂: CHILE: [Magallanes] Punta Arenas, 6 Feb 1908 (SMTD; examined).


**Other material examined.** ARGENTINA: Neuquén: Lolog, 7 km N San Martin de Los Andes, 900 m, nr. stream, pans, 23 Nov 1989, S.A. Marshall (2 ♂, DEBU); Lolog, 7 km N San Martin de Los Andes, Gentili Cabin, pans & FIT along streambed, 18–21 Nov 1989, S.A. Marshall (1 ♂, DEBU); Lolog, 7 km N San Martin de Los Andes, Gentili property, 900 m, nr. pond, FIT, 23 Nov – 1 Dec 1989, S.A. Marshall (1 ♂, 2 ♀, DEBU); Río Negro: Villa La Angostura, forest nr. Laguna Verde, dung traps, 26–28 Nov 1989, S.A. Marshall (1 ♀, DEBU); Tierra del Fuego: Ushuaia, seashore, rabbit burrow, 12 Feb 1992, S.A. Marshall (1 ♂, 1 ♀, DEBU). CHILE: Aisén: Chaitén, 37 km SE, 60 m, riverside 2nd forest, carrion trap, 28 Dec 1984 – 30 Jan 1985, S. & J. Peck (1 ♂, DEBU); Puerto Aisén, Río Simpson Nat. Pk., 33 km E, 70 m, select, cut forest, carrion trap, 31 Dec 1984 – 26 Jan 1985, S. & J. Peck (1 ♀, DEBU); Puerto Cisnes, 40 km N, Queulat Pass, 500 m, mossy beech for., carrion trap, 30 Dec 1984 – 28 Jan 1985, S. & J. Peck (1 ♂, 1 ♀, DEBU); Yelcho Chio, Ventisquero Br., 70 km SE of Chaitén, 200 m, mixed beech forest, carrion trap, 29 Dec 1984 – 29 Jan 1985, S. & J. Peck (1 ♂, DEBU); Araucanía: Lago Tinquilco, 30 km E Pucón, 750 m, yellow pans, 7–10 Dec 2002, L. Masner (4 ♂, DEBU); Pucón, lakeshore, carrion trap, 15 Nov – 2 Dec 1989, S.A. Marshall (4 ♂, 3 ♀, DEBU); as above but in lakeside debris, pan traps, 8–13 Nov 1989 (1 ♂, DEBU); as above but near lake, dung traps, 9–16 Nov 1989 (1 ♂, DEBU); as above but in lakewrack, pan, 15 Nov – 2 Dec 1989 (1 ♀, DEBU); as above but lakeshore, FIT (12 ♂, 7 ♀, DEBU); as above but on peninsula, malaise trap (1 ♀, DEBU); Pucón, Villarrica Nat. Pk., old Beech slash nr. treeline, 8 Nov 1989, S.A. Marshall (1 ♂, DEBU); Purén, Contulmo Nat. Mon., 350 m, evergreen forest, rotten mushroom, 11 Nov 1984, S. & J. Peck (1 ♀, DEBU); Salto de la Princesa, 25 km E Curacautín, 750 m, yellow pans, 7–8 Dec 2002, L. Masner (1 ♂, DEBU); Termas de Palquín, 33 km E Pucón, 680 m, 6 Nov 1989, S.A. Marshall (2 ♂, DEBU); Volcán Villarrica, 1120 m, 15–29 Dec 1982, A. Newton & M. Thayer (1 ♂, DEBU); as above but near treeline, FIT, 9 Nov 1989, S.A. Marshall (2 ♂, DEBU); as above but nr. treeline, pan, 10 Nov – 3 Dec 1989 (1 ♂, DEBU); as above but nr. edge of old lava flow, FIT (2 ♂, DEBU); Biobío: La Raqueta, 37°10'10"S 73°10'10"W, yellow pans, 10–25 Jan 1993, P. Salinas (11 ♂, 8 ♀, DEBU); Puchacay, 26°19'19"S 69°47'47"W, 16 Jan 1980, O. Madrid (1 ♂, 1 ♀, DEBU); Los Lagos: Anticura, 4 km E, 430 m, 19–26 Dec 1982, Newton & Thayer (2 ♂, DEBU); Anticura, 6 km E, 430 m, 19–25 Dec 1982, Newton & Thayer (5 ♂, DEBU); Antillanca Road, 40°45'45"S 72°09'09"W, 1235 m, Nothofagus forest, yellow pans, 10 Dec 2003, L. Masner (2 ♂, DEBU); Chiloé L., Chiloé Natl. Pk., 42°19'19"S 74°07'07"W, 0 m, yellow pans, 11–12 Dec 2002, L. Masner (6 ♂, DEBU); Chiloé L., Lago Huinchillo, 42°37'37"S 72°00'00"W, 10 m, yellow pans, 11–12 Dec 2002, L. Masner (1 ♂, 1 ♀, DEBU);
Chiloé I., Terao, 10 km S Chonchi, lower meadow, yellow pans, 13–15 Feb 2005 (1 ♂, 1 ♀, DEBU); El Chinque, N Correntoso, 1 Jan 1990, L.E. Peña (1 ♀, DEBU); Los Muermos, 12km S, 100m, *Nothofagus* swamp, 12 Nov 1966, E.I. Schlinger & M.E. Irwin (1 ♂, DEBU); Parque Nac. Puyehue, 1600 m, 18–24 Dec 1982, A. Newton & M. Thayer (5 ♂, 2 ♀, DEBU); Petruhue, 100 m, *Nothofagus* forest, 15 Nov 1966, M.E. Irwin & E.I. Schlinger (1 ♂, DEBU); Puyehue Natl. Pk., Agus Caliente, 40°44'44"S 72°18'18"W, 480 m, river edge, bamboo, 3 Dec 2008, Kits & Marshall (1 ♂, DEBU); Puyehue Natl. Pk., Anticura, 19–25 Dec 1982, Newton & Thayer (1 ♀, DEBU); Puyehue Natl. Pk., Agus Calientes, 600 m, *Nothofagus* forest, malaise, 18 Dec 1984 – 8 Feb 1985, S. & J. Peck (1 ♀, DEBU); Río San Pedro, 24 km NE of Los Lagos, river bank slope forest, yellow pans, 13–18 Nov 2000, L. Packer (11 ♂, 3 ♀, DEBU); Los Ríos: La Union, 34 km WNW, 700 m, mixed evergreen forest, FIT, 17 Dec 1984 – 7 Feb 1985, S. & J. Peck (2 ♂, 1 ♀, DEBU); Magallanes: Laguna Parillar Natl. Res., trail to Tres Morros, 53°22'22"S 71°15'15"W, 300 m, 26–29 Nov 2008, Kits & Marshall (12 ♂, 8 ♀, DEBU); Magallanes Natl. Res., trail to Mirador Zapador Austral, 53°07'07"S 71°01'01"W, 400 m, 27 Nov 2008, Kits & Marshall (1 ♀, DEBU); Puerto Natales, 135km N, Torres del Payne Nat. Pk., Lago Pehoe, *N. pumilio* groves, steppe, carrion trap, 10–12 Jan 1985, S. & J. Peck (1 ♀, DEBU); Río San Pedro, river mouth, 53°41'41"S 70°58'58"W, 5 m, forest, 27 Nov 2008, Kits & Marshall (3 ♂, 1 ♀, DEBU); Rubens, 60km ESE of Puerto Natales, 200 m, beech woodland, carrion trap, 9–14 Jan 1985, S. & J. Peck (1 ♂, 2 ♀, DEBU); San Juan, 1.5 km S, 53°41'41"S 70°58'58"W, 1 m, dung pans, 27 Nov 2008, Kits & Marshall (5 ♂, 4 ♀, DEBU); Maule: Pelluhue, along Río Curanilahue, 26 Nov 2006, S.A. Marshall (3 ♂, 1 ♀, DEBU); Putú, ~15 km N Constitución, along stream, 26 Nov 2006, S.A. Marshall (1 ♂, DEBU); Valparaíso: La Campana Natl. Pk., 22 Nov 2006, S.A. Marshall (2 ♂, 4 ♀, DEBU); La Campana Natl. Pk., Granizo, 32°58'58"S 71°01'01"W, 500 m, along stream, 7 Dec 2008, Kits & Marshall (2 ♂, 4 ♀, DEBU); La Campana Natl. Pk., Palmas de Ocoa, 32°55'55"S 71°05'05"W, 400 m, dry streambed, malaise, 6–8 Dec 2008, Kits & Marshall (1 ♂, 2 ♀, DEBU); Olmué, along stream, 21 Nov 2006, S.A. Marshall (2 ♂, 1 ♀, DEBU); as above but pans by stream, 27 Nov 2006 (2 ♂, 1 ♀, DEBU); Robinson Crusoe I., open forest, dung traps, 23–28 Jan 1992, S.A. Marshall (2 ♂, 4 ♀, DEBU); as above but malaise traps, 24–29 Jan 1992, Marshall & Schisler (1 ♀, DEBU); Robinson Crusoe I., above Plazoleta, intermittent streambed, pan traps, 1–9 Jan 1993, S.A. Marshall (1 ♂, DEBU); Robinson Crusoe I., Bahía Cumberland, malaise trap, 1–11 Jan 1993, Marshall & González (3 ♀, DEBU); Robinson Crusoe I., Damajuanas, pan traps, 8–11 Jan 1993, S.A. Marshall (1 ♂, DEBU); Robinson Crusoe I., English Bay, open forest, 5 Jan 1993, S.A. Marshall (1 ♀, DEBU); Robinson Crusoe I., lower El Yunque trail, near town, sweep, 29 Dec 1992, Marshall & González (1 ♀, DEBU); Robinson Crusoe I., Mirador de Selkirk, top, pan traps, 1–10 Jan 1993, S.A. Marshall (1 ♀, DEBU); Robinson Crusoe I., N side El Yunque, 1–9 Feb 1973, L.E. Peña (2 ♂, DEBU); Robinson Crusoe I., nr. Plazoleta del Yunque, wet areas, pan traps, 24–28 Jan 1992, S.A. Marshall (2 ♂, DEBU); Robinson Crusoe I., Plazoleta del Yunque, crushed vegetation, 24 Jan 1992, S.A. Marshall (1 ♀, DEBU); as above but among crushed bramble leaves, 25 Jan 1992 (5 ♂, 12 ♀, DEBU); Robinson Crusoe I., Plazoleta trail, crushed vegetation, 24 Jan 1992, S.A. Marshall (3 ♂, DEBU); Robinson Crusoe I., Plazoleta/El Yunque trail, near Plazoleta campsite, FITs/pans, 23–29 Jan 1992, S.A. Marshall (1 ♂, DEBU); as above but in wet area, pans (1 ♂, DEBU); as above but dung traps, 23 Jan 1992 (1 ♀, DEBU); as above but among crushed bramble leaves, 25 Jan 1992 (4 ♂, 16 ♀, DEBU); Robinson Crusoe I., quebrada on S side Mirador de Selkirk, fern forest, pan traps, 1–10 Jan 1993, S.A. Marshall (6 ♂, 2 ♀, DEBU); as above but 4 Jan 1993 (1 ♂, DEBU); Robinson Crusoe I., S side Mirador de Selkirk, 500 m, seep, 1 Jan 1993, S.A. Marshall (2 ♂, DEBU); as above but along creek, pans, 5–10 Jan 1993 (1 ♂, 1 ♀, DEBU); Robinson Crusoe I., slopes of El Yunque, open forest, 23–28 Jan 1992, S.A. Marshall (1 ♂, 1 ♀, DEBU); Robinson Crusoe I., Villagras, aspirated in litter, 4 Jan 1993, Marshall & González (2 ♀, DEBU); Zapallar, Quebrada El Tigre, above tennis club, 32°33'33"S 71°26'26"W, 100 m, 9 Dec 2008, Kits & Marshall (3 ♀, DEBU).
Comments: *Borborus femoralis* was treated as an unrecognizable species by Richards (1967) and Roháček et al. (2001). Two specimens located by A. Norrbom in the MNHN appear to be part of the type series. Although neither is labelled as such, they match the description given by Blanchard, and as part of the Gay collection they were almost certainly examined by Blanchard while describing Chilean Diptera. The male is here designated as the lectotype, while the female is labelled as a paralectotype.

Although not dissected, the holotype of *Archiborborus submaculatus* has shiny patches on the frons and a yellow fore coxa contrasting with a dark brown femur, and thus can be confidently determined as this species.

Papp (1977) suggested the relative contrast of the wing spots and the form of the male sternite 5 distinguished *Archiborborus argentinensis* from other species in the genus. However, the contrast of the wing spots are quite variable within *Antrops* and do not signify species-level differences. Sternite 5 in the holotype is typical of this species, although apparently distorted during the drying process.

*Antrops fuliginosus* sp. nov.
(Figs. 5.22, 5.27, 5.157)

Description:
Head black, face and prementum dark reddish brown, antenna and maxillary palp orange. Mostly covered with microtomentum, face with a ventromedial shiny spot. Ocellar bristles about 1 ocellus width anterior to median ocellus. Subvibrissal bristle about 0.3X length of vibrissa, anterior genal bristle about 0.5X length of vibrissa. Gena height about 0.8X eye height.

Thorax black, mostly covered with microtomentum. Proepisternum shiny, anepisternum with a subrectangular shiny spot on ventral half extending from just posterior to anterior margin to posterior quarter of sclerite, katepisternum with a small shiny spot behind fore coxa. Dorsocentral bristles very short in male, barely distinguishable from surrounding setae, longer and clearly distinguishable in female. Halter mostly pale brown, tip of knob white.

Legs black, trochanters, joints, and tarsi reddish brown. Fore basotarsomere with a short spur in male. Mid tibia with rows of anterodorsal and posterodorsal bristles, 1 anteroventral, 1 posteroventral, 4 subapical bristles. Hind tibia with 1 anteroventral, 3 ventroapical bristles.
Wing yellowish brown.

Abdominal tergites black, heavily sclerotized, covered with micromomentum in both sexes. Sternites black, heavily sclerotized in male, moderately sclerotized in female, covered with micromomentum in both sexes. Sternites slightly wider than long in male, longer than wide in females.

Male postabdomen: Sternite 5 with curved lateral margins, widest at about two-thirds length, anterior apodeme broad, about as long as external portion (Fig. 5.27). Surstylus scooped, with wavy margins. Pregonite small, distinct. Postgonite with lobes well separated, anterior lobe rounded, posterior lobe somewhat pointed. Basiphallus with very short epiphallus, long narrow preepiphallus. Distiphallus with curved spinose dorsal tube flanked by one spike-like sclerite, ventral sacs fairly well developed, covered with small spinules (Fig. 5.22).

Female postabdomen: Tergites 6–7 wider than long, margins sclerotized, covered with micromomentum. Sternite 6 entirely sclerotized, sternite 7 with a medial unsclerotized spot, both covered with micromomentum. Tergites with 3 posterior strips, sternites with 2 posterior strips. Tergite 8 longer than wide, anterior margin emarginated, distal two-thirds covered with micromomentum. Epiproct with long anterior arms, distal portion covered with micromomentum, with 2 pairs of setae. Cerci long. Sclerites of sternite 8 narrow, anterior end pointed, pinched medially, anterior quarter shiny. Hypoproct subrectangular, with a curved unsclerotized band medially, covered with micromomentum except anterior margin. Spermathecae barrel-shaped, about 1.3X longer than wide, without invaginations, sclerotized ducts about as long as spermathecae.

**Type material.** Holotype ♀: ECUADOR: Napo: Quito–Baeza road, 4000 m, elfin for., dung trap, 1 Mar 1979, S.A. Marshall (QCAZ). Paratypes: same data as holotype (16 ♂, 16 ♀, DEBU); as above but 4100 m, summit, pan traps, 18–22 Feb 1983, L. Masner (1 ♂, DEBU); Quito–Baeza pass, 4000 m, elfin for., dung trap, 1 Mar 1979, S.A. Marshall (4 ♂, 3 ♀, DEBU); Quito–Baeza pass, 1 km E, 0°20'00"S 78°10'10"W, 3950 m, forest edge, dung traps, 4–8 Nov 1999, S.A. Marshall (4 ♀, DEBU); Carchi: Páramo El Angel, 18.2 km NW El Angel, 0°42'24"N 77°59'59"W, 3400 m, aspirated under dead *Puya* stems, 3 Nov 1999, S.A. Marshall (1 ♀, DEBU); Páramo El Angel, 24 km NW El Angel, 0°44'44"N 78°02'02"W, 3800 m, dung traps in moss, 3 Nov 1999, S.A. Marshall (3 ♂, 2 ♀, DEBU); **Napo/Pichincha**: Quito–Baeza pass, 0°18'18"S 78°11'11"W, 4000 m, pans traps in moss, 4–8 Nov 1999, S.A. Marshall (6 ♂, 7 ♀, DEBU); **Pichincha**: Cotopaxi Natl. Pk., Lago Limpiopungo, 0°36'36"S 78°28'28"W, 3800 m, edge lake, pan nr. cow dung, 25 Oct 1999, S.A. Marshall (1 ♂, DEBU); as above but shore, pan traps, 25 Oct–8 Nov 1999 (2 ♂, 1 ♀, DEBU); Quito–Baeza pass, 6 km W, pans/ dung, 4–8 Nov 1999, S.A. Marshall (4 ♂, 5 ♀, DEBU); Quito, 46km E, 4000m, elfin forest, dung traps, 2–6 Mar 1976, S. Peck (3 ♂, 5 ♀, DEBU).
Comments: The species name is from the Latin *fuliginosus* (sooty) referring to the dark, pollinose appearance of this species

*Antrops hirtus* (Bigot)

*Ceroptera hirta* Bigot 1888: 41

*Archiborborus edwardsi* Richards 1931: 71 syn. nov.

(Fig. 5.23, 5.24, 5.158)

Description:

Head brown, interfrontal plates black except a brown line along insertions of interfrontal setae. Head covered with microtomentum except shiny patches lateral to ocellar triangle. Ocellar bristles just anterior to medial ocellus. Anterior genal bristle about 0.5X length of vibrissa.

Thorax brown, covered with microtomentum. Halter pale brown.

Legs brown, paler at joints. First basotarsomere with a spur in males. Tibia 2 with variable row of anterodorsals, 1 anteroventral, 1 posteroventral, 3 subapical bristles. Tibia 3 with 2–3 ventroapical bristles.

Wing clear to pale brown, no spots.

Abdomen with tergites brown, heavily sclerotized, covered with microtomentum, sternites weakly sclerotized in both sexes. Pleural setae with tiny sclerotized discs around insertions in females.

Male postabdomen: Sternite 5 rectangular, broader than wide, no anterior apodeme. Surstylus narrow, subrectangular (Fig. 5.24). Pregonite small, fused with postgonite. Postgonite with lobes narrowly separated, anterior lobe very broad and rounded, posterior lobe sharply pointed. Ejaculatory apodeme relatively large. Basiphallus with moderately sized epiphallus, fairly long, narrow preepiphallus. Distiphallus simple, without apparent dorsal tube (Fig. 5.23).

Female postabdomen: Tergites 6–7 and sternites 6–7 slightly wider than long, weakly sclerotized medially. Tergites with 3 posterior strips, sternites with 2 posterior strips. Tergite 8 narrow, covered with microtomentum, shallowly pinched. Epiproct with short anterior arms, distal part covered with
microtomentum, with 2 pairs of setae. Cerci narrow. Sclerites of sternite 8 subtriangular, covered with microtomentum. Hypoproct semicircular, margins and medial patch sclerotized, anterior margin shiny. Spermathecae round, with very long apical invagination reaching base, sclerotized duct about 1.5X as long as spermathecae.

**Type material.** *Ceraptera hirta*: Syntypes: CHILE: Cape Horn (OXUM; not examined).


Comments: The holotype of *Archiborborus edwardsi* (examined in BMNH by S. Marshall, 1989) is in poor shape, with only a wing and part of the thorax remaining. The original description is not detailed, but the characters in the description and what remains of the holotype only match *A. hirtus* among the known species of Chilean Archiborborinae. Richards (1931) describes the two species as very similar, but the differences he ascribes to them do not appear to have any significance.

**Antrops maculipennis** Duda

*Archiborborus maculipennis* Duda 1921: 133

(Figs. 5.25, 5.28, 5.159)

Description:

Head black, face and gena dark brown, frons with some reddish along anterior margin, covered with microtomentum. Clypeus orangish brown, prementum dark brown, maxillary palp brown. Vibrissal and anterior genal bristle barely enlarged, about 0.25X length of vibrissa. Ocellar bristles about 1 ocellus width anterior to median ocellus.

Thorax black, some reddish along margins of sclerites, covered with microtomentum except small shiny ventral strip on anepisternum. Halter yellowish, darker below knob. Presutural and anterior postsutural dorsocentral very short or indistinguishable in males, distinguishable but much shorter than posterior dorsocentral in females.

Legs black, joints and sometimes trochanters orange, tarsi brown to dark brown. Tibia 2 with row of anterodorsal and posterodorsal, 1 anteroventral, 1 posteroventral, and 5 subapical bristles. Tibia 3 with row of anterodorsal, 1 anteroventral, 3 ventroapical bristles. Male forebasotarsomere with a small spur.

Wing light brown, with brown markings along vein R4+5 distal to crossvein r-m and vein M distal to crossvein bm-cu, and slightly paler spots on crossveins r-m and dm-cu, 3 on vein R4+5 distal to crossvein and medial on vein M between crossveins.
Abdomen with tergites dark brown to black, heavily sclerotized, covered with microtomentum. Sternites weakly sclerotized in both sexes. Pleural setae dense, long, soft.

Male postabdomen: Sternite 5 longer than wide, narrowed posteriorly with posterior corners produced as thin curved lobes, anterior apodeme short, slightly narrower than external portion (Fig. 5.28). Surstylus narrow, not strongly scooped. Pregonite small but distinct. Postgonite with lobes narrowly separated, both pointed, anterior lobe broader. Basiphallus with short, broad epiphallus, slightly longer, narrow preepiphallus. Distiphallus with short, smooth dorsal tube, ventral point projecting (Fig. 5.25).

Female postabdomen: Tergites 6–7 and sternites 6–7 slightly wider than long, covered with microtomentum, weakly sclerotized medially. Tergites with 3 posterior strips, sternites with 2 posterior strips. Tergite 8 with anterior margin shallowly emarginated, narrow posteriorly, covered with microtomentum except anterior margin. Epiproct with narrow anterior arms, 2 pairs of setae, distal portion with microtomentum. Cerci thin. Sclerites of sternite 8 pinched medially, distal portion somewhat broader and covered with microtomentum, nearly meeting tergite 8 along lateral margins. Hypoproct subrectangular, somewhat weakly sclerotized medially. Spermathecae round, about as long as wide, with basal and apical invaginations, sclerotized duct about as long as spermatheca.

**Type material.** Syntypes: CHILE: [Magallanes:] Punta Arenas, 6 Feb 1908 (SMTD; examined). There are 4 specimens of this species with the same label data in SMTD (2 ♂, 1 ♀, labelled as cotypes) and ZMHB (1 ♂, labelled “Typus”). Duda only mentioned 1 of each sex in his description, and it cannot be determined which of the males is a true syntype; however, all are the same species.

**Other material examined.** ARGENTINA: Chubut: Puerto Madryn, 9 Feb 1992, S.A. Marshall (3 ♂, 2 ♀, DEBU); Tierra del Fuego: Lago Fagnano, swampy area, sweeping, 13 Feb 1992, S.A. Marshall (1 ♂, DEBU); Tierra del Fuego, along river, pantrap, 11–14 Feb 1992 (2 ♂, DEBU); Ushuaia, along river in beech forest, sweep, 12 Feb 1992, S.A. Marshall (2 ♀, DEBU); as above but old wrack, Beagle Channel (1 ♂, 1 ♀, DEBU); as above but in sphagnum, dung traps, 12–14 Feb 1992 (11 ♂, 1 ♀, DEBU); as above but dry bog, pans (1 ♀, DEBU); Ushuaia, 3 km E, marshy area nr. river, pan traps, 11–14 Feb 1992, S.A. Marshall (1 ♂, 1 ♀, DEBU); Tierra Del Fuego: Ushuaia, 4 km E, Rio Grande trail, many cattle, 11 Feb 1992, S.A. Marshall (14 ♂, 15 ♀, DEBU). CHILE: Aisén: Puerto Ibañez, Lago Buenos Aires, 12–15 Jan 1961, L.E. Peña (1 ♀, DEBU); Los Lagos: Antillanca Road, 40°45'45"S 72°09'09"W, 1235 m, Nothofagus forest, yellow pans, 10 Dec 2003, L. Masner (1 ♀, DEBU); Chiloé I., Chiloé Natl. Pk., 42°19'19"S 74°07'07"W, 0 m, yellow pans, 11–12 Dec 2002, L. Masner (93 ♂, 84 ♀, DEBU); Chiloé I., Lago Huinchillo, 42°37'37"S 72°00'00"W, 10 m, yellow pans, 11–12 Dec 2002, L. Masner (30 ♂, 38 ♀, DEBU); Chiloé I., Terao, 10 km S Chonchi, lower meadow, north side, yellow pans, 13–15 Feb 2005 (3 ♂, 9 ♀, DEBU); El Chinque, N Correntoso, 1 Jan 1990, L.E. Peña (12 ♂, 15 ♀, DEBU); Puyehue Natl. Pk., Antica, trail to Mirador El Puma, 40°40'40"S 72°10'10"W, 400 m, dung pans, 3–5 Dec 2008, Kits & Marshall (1 ♀, DEBU); Magallanes: Estancia Vicuna, SE of Cameron, 1–5 Dec 1960, L.E. Peña (1 ♂, DEBU); Laguna Parillar Natl. Res., trail to Tres Morros, 53°22'22"S 71°15'15"W, 300 m, 26–29 Nov 2008, Kits & Marshall (5 ♂, DEBU); as above but sweeps, 26 Nov 2008 (4 ♂, 5 ♀, DEBU); as above but
53°23'23"S 71°15'15"W, bog, *Cyttaria* pans, 26–29 Nov 2008 (1 ♀, DEBU); as above but 53°22'22"S 71°15'15"W, forest stream, dung pans, 29 Nov 2008 (23 ♂, 16 ♀, DEBU); as above but 53°23'23"S 71°15'15"W, shrubby bog (8 ♂, 7 ♀, DEBU); Magallanes Natl. Res., trail to Mirador Zapador Austral, 53°07'07"S 71°01'01"W, 400 m, 27 Nov 2008, Kits & Marshall (1 ♀, DEBU); as above but (17 ♂, 18 ♀, DEBU); Río Rubens, nr. Kerber, 52°05'05"S 72°02'02"W, 220 m, grazed riparian, 28 Nov 2008, Kits & Marshall (1 ♂, DEBU); Rubens, 60km ESE of Puerto Natales, 200 m, beech woodland, carrion trap, 9–14 Jan 1985, S. & J. Peck (2 ♂, 1 ♀, DEBU).

Comments: Individuals of this species were common on cow dung during field work around Punta Arenas, and were the only archiborborines collected on that substrate. Although cows are not native to South America and there is no evidence that this species is restricted to mammal dung, there may have been ecological relationships between archiborborine species such as this and the diverse Patagonian megafauna extant until the late Pleistocene.

*Antrops maximus* (Richards)

*Archiborborus maximus* Richards 1961: 59

(Figs. 5.29–31, 5.160)

Description:
Occiput, orbital plates, posterior portion of frontal plate, pedicel and first flagellomere black, anteromedial portion of frons, gena, face, clypeus, maxillary palp, and prementum reddish brown, scape reddish brown to black. Head entirely covered with microtomentum. Ocellar bristles absent. Subvibrissal and anterior genal bristles variable in length, up to 0.5X length of vibrissa. Gena about 0.6X eye height. Occipital setae in several irregular rows.

Thorax black, margins of sclerites and most of anepimeron may be reddish, entirely covered with microtomentum. Presutural dorsocentral bristle barely distinguishable from surrounding setae in female, only posterior postsutural dorsocentral bristle distinguishable in male. Halter stem orange, knob whitish.

Fore coxa, trochanters, bases and apices of femora, fore and mid tibia reddish brown, mid and hind coxae mostly dark brown with some reddish brown, femora and hind tibia black, tarsi black dorsally and reddish brown ventrally. Male fore basotarsomere with a fairly thick apical spur. Mid tibia with a row of anterodorsal bristles (the most apical of these shifted dorsally), 1 anteroventral, 1 posteroventral, and 6 apical bristles. Hind tibia with 1 thin anteroventral bristle and 3 apicoventral bristles.
Wing yellowish brown, veins brown to dark brown, crossveins r-m and dm-cu whitish. Vein R4+5 distal to crossvein r-m and vein M1 between r-m and dm-cu outlined with dark brown, vein R4+5 with 3 paler spots distal to r-m.

Abdominal tergites heavily sclerotized, black, covered with microtomentum. Male with sternites heavily sclerotized, black, covered with microtomentum, female with sternites weakly sclerotized. Pleural membrane with long, soft setae.

Male postabdomen: Sternite 5 with straight lateral margins, widest posteriorly, posterior margin slightly emarginated medially, anterior apodeme short, narrow (Fig. 5.31). Surstylus short, broad, bilobed, with a transparent, narrow ridge between lobes (Fig. 5.30). Pregonite fused with anterior extension of postgonite. Postgonite with lobes narrowly separated, both lobes pointed, posterior lobe longer. Basiphallus with long, broad epiphallus, short, very narrow preepiphallus. Distiphallus with very short, smooth dorsal tube, flanked by a bilobed spike-like sclerite (Fig. 5.29).

Female postabdomen: Tergites 6–7 wider than long, with lateral and anterior margins sclerotized. Sternites 6–7 wider than long, entirely sclerotized. Tergites with 3 posterior strips, sternites with 2 posterior strips. Tergite 8 narrow anteriorly, broad posteriorly with rounded posterior corners, anterior margin with a deep V-shaped notch, nearly splitting tergite, posterior margin shallowly emarginated, mostly covered with microtomentum, anterior margin shiny. Epiproct broad, subtriangular, with a long pair of setae and a number of shorter setae, mostly covered with microtomentum, anterior corners shiny. Cerci long. Sclerites of sternite 8 with narrow, pinched, shiny anterior half, broad, microtomentumse posterior half, membrane between sclerites with a square sclerotized patch. Hypoproct broad, semicircular, with weakly sclerotized patch on either side of medial line, covered with microtomentum except depressed anterior medial patch. Spermathecae (1+1) barrel-shaped, slightly longer than wide, apex evaginated.


Comments: This species was described from a single male, with the left wing removed and mounted on a slide (Figure 1 in Richards 1961). The specimen is now apparently lost, with only the wing slide
Figures 5.29–36: *Antrops* male terminalia. *A. maximus*: (29) phallus, postgonite, and phallapodeme, lateral view, (30) surstylus, anterior view, (31) sternite 5; *A. microphthalmus*: (32) phallus, postgonite, and phallapodeme, lateral view, (33) surstylus, anterior view; (34) sternite 5; *A. niger*: (35) phallus, postgonite, and phallapodeme, lateral view, (36) sternite 5.
remaining in the BMNH (Pitkin 1989). However, Richards’ description is quite detailed and matches the examined specimens perfectly. We have seen no specimens of this species other than a small series we collected in yellow pan traps baited with dung placed along a small stream. Other sets of pan traps placed elsewhere in the same forest did not produce any specimens of this species. However, as the type specimen was collected “on seaweed”, it is unlikely this species is habitat restricted and it may simply be rare with highly localized populations.

*Antrops microphthalmus* (Richards)

*Archiborborus microphthalmum* Richards 1931: 65

(Figs. 5.32–34, 5.160)

Description:

Head blackish, interfrontal plates sometimes brown. Prementum and antenna dark brown, maxillary palp brown. Eye small, gena height about 1.5x eye height. Ocellar bristles about one ocellus width anterior to medial ocellus. One subvibrissal bristle about 0.6X length of vibrissa, anterior genal bristle about 0.5X length of vibrissa.

Thorax dark brown to blackish, covered with microtomentum except small ventral shiny spot on anepisternum. Halter whitish.

Legs yellowish to light brown, femora dark brown. First basotarsomere with a curved spur in males. Tibia 2 with 3 medial and 1 preapical anterodorsal, 2 medial posterodorsal, 1 preapical dorsal, 1 anteroventral, 1 posteroverentral, and about 5 subapical bristles. Tibia 3 with rows of anterodorsal and posterodorsal, 1 strong anteroventral, and 3 ventroapical bristles.

Wing pale brown, crossveins paler but no distinct spots.

Abdomen with tergites and sternites dark brown and heavily sclerotized in both sexes, covered with microtomentum.

Male postabdomen: Sternite 5 wide, posterior margin with a thin posterior projection, no anterior apodeme (Fig. 5.34). Surstylus bilobed, lateral lobe pointed, medial lobe broad and rounded (Fig. 5.33). Pregonite large, mostly fused with postgonite. Postgonite with lobes barely distinguishable, anterior
margin strongly projecting and rounded. Basiphallus with a short broad epiphallus and preepiphallus, both distant from distiphallus. Distiphallus without a distinct dorsal tube, ventrally with clear lateral sacs covered with spines (Fig. 5.32).

Female postabdomen: Tergites 6–7 and sternite 6–7 much wider than long, heavily sclerotized, covered with microtomentum. Tergites with 3 posterior strips, sternites with 2 posterior strips. Tergite 8 trapezoidal, weakly sclerotized medially, distal half covered with microtomentum. Epiproct broad, with short anterior arms, shiny, with 2 pairs of setae. Cerci short and broad. Sclerites of sternite 8 very broad, subrectangular, pinched medially, with microtomentum apically. Hypoproct very broad, subrectangular, covered with microtomentum. Spermathecae round, slightly longer than wide, with long apical invagination reaching base of spermatheca, sclerotized duct very short.


**Other specimens examined.** ARGENTINA: Neuquén: Epu Lauquen Res., campgroup by Laguna Superior, 36°49'49"S 71°04'04"W, 1485 m, FIT, 9–10 Jan 2003, Ocampo & Smith (1 ♂, DEBU); Lolog, 7km N San Martin de Los Andes, 950 m, clearing, *Nothofagus* lenga, Masner malaise (wet), 23 Nov – 1 Dec 1989, S.A. Marshall (1 ♂, DEBU); Lolog, 7km N San Martin de Los Andes, Gentili property, 900 m, nr. pond, FIT, 23 Nov – 1 Dec 1989, S.A. Marshall (1 ♀, DEBU); as above but 950 m, clearing, *Nothofagus*, Masner malaise (1 ♂, DEBU).

Comments: The paratype male is dissected, and unpublished drawings by S. A. Marshall closely match the genitalia of examined specimens. This species is not known from Chile, despite the proximity of the Argentine localities to the border.

**Antrops niger** sp. nov.

(Figs. 5.35–36, 5.153)

Description:
Occiput and posterior two-thirds of frons black, anterior third of frons, orbital plates, face, gena, antenna, and prementum reddish brown, clypeus and maxillary palp orange. Head mostly covered with microtomentum, frons shiny except orbital plates to bases of interfrontal setae and patch from base of postverticals anteriorly through middle of ocellar triangle to around bases of preocellars, face mostly
shiny with some microtomentum below lunule and below antennal bases. Ocellar bristles just anterior to median ocellus. Anterior genal bristle and subvibrissal bristle about 0.3X length of vibrissa.

Thorax black, mostly covered with microtomentum. Ventromedial shiny patch on anepisternum, covering about three-fifths height and two-thirds length of sclerite, posterior half of metapleuron shiny. Presutural and anterior postsutural dorsocentral bristles short in both sexes. Halter whitish, some brown below knob.

Legs black, trochanters and tarsi brown. Mid tibia with anterodorsal row, 1 anteroventral, 1 posteroventral, 5 subapical bristles. Hind tibia with 2 ventroapical bristles.

Wing brown, with white spots on crossveins r-m, bm-cu, and dm-cu, at tips of veins R2+3, R4+5, and M, and 1 basal and 2 distal to r-m on vein R4+5.

Abdomen with tergites heavily sclerotized, black, covered with microtomentum. Sternites wider than long, heavily sclerotized, black, and covered with microtomentum in male, longer than wide and weakly sclerotized in female.

Male postabdomen: Sternite 5 with lateral margins rounded, broadest posteriorly; posterior margin with a triangular notch medially, posterolateral corners with a tuft of setae; anterior apodeme short, extending to base of segment 4, without dorsal keel (Fig. 5.36). Surstylus oblong. Postgonite with anterior and posterior lobes widely separated, posterior lobe pointed, anterior lobe broadly rounded. Basiphallus with short, thick epiphallus, thin short preepiphallus. Distiphallus with a short spinose dorsal tube, enlarged ventral sclerite projecting beyond other sclerites (Fig. 5.35).

Female postabdomen: Tergites 6–7 not sclerotized medially and posteriorly, anterior margin heavily sclerotized and shiny, lateral margins moderately sclerotized, covered with microtomentum, each with 3 short weakly sclerotized posterior strips. Tergite 8 moderately sclerotized, covered with microtomentum. Epiproct with parallel sides, pointed posteriorly, with 2 setae. Cerci normal. Sternites 6–7 not sclerotized medially and posteriorly, anterior margin heavily sclerotized and shiny, lateral margins moderately sclerotized, covered with microtomentum, each with 2 short weakly sclerotized posterior strips. Sclerites of sternite 8 with narrow shiny anterior portion, broad posterior portion covered with microtomentum and setae. Hypoproct trapezoidal, covered with microtomentum. Spermathecae not observed.

Comments: The species name refers both to the predominately black colouration of this species and the type locality. This species acts as a rogue taxon in phylogenetic analysis and its position is uncertain. It does not appear to be closely related to any species of *Antrops*.

*Antrops quadrinotus* (Bigot)
*Ceroptera quadrinota* Bigot 1888: 42
*Borborus varipes* Bigot 1888: 42 (not available, junior homonym of *Borborus varipes* Meigen 1830)
*Archiborborus albicans* Richards 1931: 68 syn. nov.
*Archiborborus chilensis* Richards 1931: 71 syn. nov.
*Archiborborus koenigi* Duda (in Holdhaus 1932): 175 syn. nov.
(Figs. 5.37, 5.41, 5.161)

Description:
Occiput dark brown to blackish, face and gena brownish yellow to brown, frons intermediately coloured. Clypeus yellowish to brown, prementum orangish brown to dark brown, antenna orange to dark brown, maxillary palp brown. Entirely covered with microtomentum. Ocellar bristles just anterior to medial ocellus. Anterior genal bristle about 0.6X length of vibrissa, subvibrissal bristle barely or not developed, about 0.3X length of vibrissa.

Thorax reddish brown to dark brown, covered with microtomentum except thin shiny strip at lower edge of anepisternum. Halter whitish, brown at base of knob.

Legs reddish brown to dark brown, paler at joints. Tibiae 1 and 2 may be lighter than rest of legs. Tibia 2 with row of anterodorsal, 1 anteroventral, 1 posteroventral, 5 subapical bristles. Tibia 3 with 3 ventroapical bristles, sometimes with thin anteroventral bristle. Male forebasotarsomere with a small curved spur.

Wing pale brown, with whitish spots on crossveins r-m and dm-cu, and 2 on vein R4+5 distal to r-m.
Abdomen with tergites brown to dark brown, covered with microtomentum. Sternites weakly sclerotized in both sexes.

Male postabdomen: Sternite 5 with short, broad anterior apodeme, posterior margin with corners projecting, recurved and rounded, deeply emarginated medially (Fig. 5.41). Surstylus paddle-shaped, anterior face flat and covered with short setae, posterior face rounded. No distinct pregonite. Postgonite with anterior lobe nearly right-angled, posterior lobe broad and pointed. Basiphallus with short broad epiphallus, short narrow preepiphallus. Distiphallus with a short, smooth dorsal tube, distal portion with a dorsal medial rounded plate, ventral tip barely projecting (Fig. 5.37).

Female postabdomen: Tergites 6–7 and sternites 6–7 fully sclerotized, rectangular, wider than long, covered with microtomentum. Tergites with 3 posterior strips, sternites with 2 posterior strips. Tergite 8 nearly square, about two-thirds covered with microtomentum, shiny laterally and anteriorly. Epiproct with 2 pairs of setae, anterior arms long and thin, with microtomentum distally. Cerci thin, covered with microtomentum. Sclerites of sternite 8 with anterolateral corners extended, nearly reaching base of tergite 8, pinched medially, apical half broad and covered with microtomentum. Hypoproct round, not sclerotized medially, anterior margin shiny. Spermathecae barrel-shaped, slightly longer than wide, with long apical invagination, sclerotized duct slightly shorter than spermatheca.

**Type material.** *Ceroptera quadrinota*: Lectotype ♂ (designated by Richards (1931)): CHILE: Cape Horn (OXUM; not examined).
*Borborus varipes*: Syntypes: CHILE: Cape Horn (MNHN; 2 ♂, 4 ♀ examined).
*Archiborborus chilensis*: Holotype ♂: CHILE: Lake Correntosos (BMNH; not examined).
*Archiborborus koenigi*: Holotype ♂: SOUTH GEORGIA (NHMW; not examined).

**Other material examined.** ARGENTINA: **Neuquén**: Lolog, 7 km N San Martin de Los Andes, 900 m, nr. muddy bank of pond, pan traps, 23–30 Nov 1989, S.A. Marshall (25 ♂, 8 ♀, DEBU); Lolog, 7km N San Martin de Los Andes, Gentili Cabin, forest and meadow, pooled pan & FIT traps, 18–21 Nov 1989, S.A. Marshall (1 ♂, DEBU); as above but pans & FIT along streambed (6 ♂, 3 ♀, DEBU); Lolog, 7km N San Martin de Los Andes, Gentili property, 900 m, nr. pond, FIT, 23 Nov – 1 Dec 1989, S.A. Marshall (2 ♂, 1 ♀, DEBU); **Río Negro**: Villa La Angostura, forest nr. Laguna Verde, dung traps, 26–28 Nov 1989, S.A. Marshall (1 ♂, DEBU); as above but (1 ♂, 1 ♀, DEBU); **Tierra del Fuego**: Tierra del Fuego, along river, pantrap, 11–14 Feb 1992, S.A. Marshall (1 ♂, DEBU); Ushuaia, seashore, rabbit burrow, 12 Feb 1992, S.A. Marshall (1 ♂, DEBU); as above but old wrack, Beagle Channel (40 ♂, 30 ♀, DEBU); as above but wet wrack, Beagle Channel (5 ♂, DEBU); Ushuaia Harbour, wet wrack, Beagle Channel, dirty seaweed, 15 Feb 1992, S.A. Marshall (8 ♂, 11 ♀, DEBU); Ushuaia, 3 km E, marshy area nr. river, pan traps, 11–14 Feb 1992, S.A. Marshall (2 ♂, 1 ♀, DEBU). CHILE: **Aisén**: Cerro Castillo Res. Nac., 40 km SW of Balmaceda, 1100 m, dry open beech forest, carrion trap, 2–27 Jan 1985, S. & J. Peck (5 ♂, 3 ♀, DEBU); Coihaique Res. Nat., 10km NW, 900 m, beech forest, carrion trap, 22–27 Jan 1985, S. & J. Peck
(1 ♂, 3 ♀, DEBU); Coihaique, Dos Lagunas Nat. Mon., 20 km ENE, 600 m, carrion trap, beechn groves in steppe, 23–27 Jan 1985, S. & J. Peck (3 ♂, DEBU); Palena, 113 km S of Chaitén, Rt. 235, 100 m, mossy beech forest, carrion trap, 29 Dec 1984 – 29 Jan 1985, S. & J. Peck (1 ♂, DEBU); Araucanía: Curacautín, 40 km W, 1500 m, Nothofagus, malaise, 12 Dec 1984 – 16 Feb 1985, S. & J. Peck (2 ♂, DEBU); Lago Tinquilco, 30 km E Pucón, 750 m, yellow pans, 7–10 Dec 2002, L. Masner (14 ♂, DEBU); Pucón, carrion trap, 6–8 Nov 1984, S.A. Marshall (3 ♂, 1 ♀, DEBU); as above but lakeshore, 15 Nov – 2 Dec 1989 (12 ♂, 6 ♀, DEBU); as above but in drift near lake, pan traps, 6–8 Nov 1989 (2 ♂, 1 ♀, DEBU); as above but near lake, FIT, 8–13 Nov 1989 (1 ♂, DEBU); as above but in lakeside debris, trap pans (2 ♂, DEBU); as above but on point, pan traps, under malaise, 8 Nov 1989 (1 ♂, DEBU); as above but near lake, dung traps, 9–16 Nov 1989 (23 ♂, 8 ♀, DEBU); as above but lakeshore, pan, 15 Nov – 2 Dec 1989 (1 ♂, DEBU); as above but in lakewrack (2 ♂, DEBU); as above but lakeshore, FIT (3 ♂, DEBU); Purén, Contulmo Nat. Mon., 350 m, evergreen forest, rotten mushroom, 11 Nov 1984, S. & J. Peck (1 ♂, DEBU); Termas de Palguin, 30 km E of Pucón, under Araucaria branches, ridge above valley, 12 Nov 1989, S.A. Marshall (5 ♂, 4 ♀, DEBU); Termas de Palguin, 33 km E Pucón, 680 m, 6 Nov 1989, S.A. Marshall (1 ♂, DEBU); Volcán Villarrica, 1120 m, 15–29 Dec 1982, A. Newton & M. Thayer (2 ♂, DEBU); as above but near treeline, swept in Nothofagus, 9 Nov 1989, S.A. Marshall (2 ♂, DEBU); as above but nr. treeline, pan, 10 Nov – 3 Dec 1989 (6 ♂, 2 ♀, DEBU); as above but nr. edge of old lava flow, FIT (3 ♂, 1 ♀, DEBU); as above but near treeline, 10 Nov 1989 (1 ♂, DEBU); as above but nr. treeline, 9 Nov 1989 (1 ♂, DEBU); Biobío: Chillán Las Trancas, 72 km SE, nr. Termas, 1700 m, beech forest carrion trap, 6 Dec 1984 – 19 Feb 1985, S. & J. Peck (1 ♂, DEBU); Laraquete, 37°10’10”S 73°10’10”W, yellow pans, 10–25 Jan 1993, P. Salinas (1 ♂, DEBU); Los Lagos: Antillanca Road, 40°45’45”S 72°09’09”W, 1235 m, Nothofagus forest, yellow pans, 10 Dec 2003, L. Masner (2 ♂, DEBU); Parque Nac. Puyehue, 1600 m, 18–24 Dec 1982, A. Newton & M. Thayer (1 ♂, 1 ♀, DEBU); as above but 965 m, 18–25 Dec 1982 (1 ♂, 1 ♀, DEBU); Puyehue Nat. Park, Anticura, 250 m, Nothofagus for., Chile Exp., 13 Feb 1988, L. Masner (1 ♂, DEBU); Puyehue Natl.Pk., Anticura, trail to Mirador El Puma, 40°40’40”S 72°10’10”W, 400 m, dung pans, 3–5 Dec 2008, Kits & Marshall (3 ♂, 2 ♀, DEBU); Río San Pedro, 24 km NE of Los Lagos, river bank slope forest, yellow pans, 13–18 Nov 2000, L. Packer (1 ♂, DEBU); Vicente Pérez Rosales Natl. Pk., Sendero El Solitario, 41°10’10”S 72°30’30”W, 300 m, ex. litter, 2 Dec 2008, Kits & Marshall (1 ♂, DEBU); Los Ríos: Niebla, dry wrack, pan, 14–15 Nov 1989, S.A. Marshall (1 ♂, 3 ♀, DEBU); as above but old wrack, upper beach (23 ♂, 52 ♀, DEBU); Niebla, 15 km W Valdivia, wet wrack on beach & upper beach, pan, 14–15 Nov 1989, S.A. Marshall (4 ♂, 3 ♀, DEBU); Panguipulli, 26 km SE, 300 m, carrion trap, Nothofagus remnant, 16 Dec 1984 – 11 Feb 1985, S. & J. Peck (1 ♂, DEBU); Magallanes: Puerto Bulnes, 53°37’37”S 70°54’54”W, 27 Nov 2008, Kits & Marshall (1 ♂, 3 ♀, DEBU); Lago Parrillar Res. Nac., 51 km SW of Puntarenas, 100 m, Nothofagus antar. for., carrion traps, 7–9 Jan 1985, S. & J. Peck (2 ♂, DEBU); Laguna Parillar Natl. Res., trail to Tres Morros, 53°22’22”S 71°15’15”W, 300 m, 26–29 Nov 2008, Kits & Marshall (3 ♂, DEBU); as above but sweeps, 26 Nov 2008 (4 ♂, 2 ♀, DEBU); as above but 53°23’23”S 71°15’15”W, bog, Cyttaria pans, 26–29 Nov 2008 (5 ♂, 8 ♀, DEBU); as above but 53°22’22”S 71°15’15”W, forest stream, dung pans, 29 Nov 2008 (19 ♂, 6 ♀, DEBU); as above but 53°23’23”S 71°15’15”W, shrubby bog (3 ♂, 3 ♀, DEBU); as above but 53°22’22”S 71°15’15”W, forest, yellow pans, 26 Nov 2008 (2 ♂, 1 ♀, DEBU); Magallanes Natl. Res., trail to Mirador Zapador Austral, 53°07’07”S 71°01’01”W, 400 m, 27 Nov 2008, Kits & Marshall (1 ♂, DEBU); as above but dung pans (3 ♂, DEBU); Puerto Natales, 135 km N, Torres del Payne Nat. Pk., Lago Pehoe, N. pumilio groves, steppe, carrion trap, 10–12 Jan 1985, S. & J. Peck (15 ♂, 4 ♀, DEBU); Punta Canelo, 9 km E, 53°08’08”S 19°23’23”W, 1 m, beach wrack, 28 Nov 2008, Kits & Marshall (12 ♂, 9 ♀, DEBU); as above but beach wrack, yellow pans (17 ♂, 15 ♀, DEBU); Río Agua Fresca, 1 km N of river mouth, 53°23’23”S 70°59’59”W, 5 m, beach wrack, yellow pans, 27–28 Nov 2008, Kits & Marshall (1 ♂, DEBU); Rubens, 60 km ESE of Puerto Natales, 200 m, beech woodland, carrion trap, 9–14 Jan 1985, S. & J. Peck (11 ♂, 18 ♀, DEBU); San Juan, 1.5 km S, 53°41’41”S 70°58’58”W, 1 m, beach wrack, yellow pans, 27 Nov 2008, Kits & Marshall (8 ♂, 7 ♀, DEBU); as above but beach wrack (8 ♂, 7 ♀, DEBU); Maule: Altos del Lircay Natl. Res., ~3000 m, streamside pans, 29 Nov 2006, S.A. Marshall (1 ♂, DEBU); Valparaíso:
Portillo, Río Juncalillo, 32°50'50"S 70°07'07"W, 2500 m, stream vegetation, 10 Dec 2008, Kits & Marshall (1 ♂, 3 ♀, DEBU).

Comments: This species is rather variable, which may explain why two different authors (Bigot and Richards) described it twice each. Richards separated his species *A. albicans* and *A. chilensis* on the basis of a perceived difference in the shape of the male sternite 5 as well as differences in leg chaetotaxy. However, examination of large series of specimens show that these characters are variable within populations and do not signify species-level differences. As well, there are no significant differences in the internal genitalia across the wide range of this species. *A. quadrinotus* is closely related to *A. femoralis*, and shows very few sequence differences for the gene segments analysed. Although males are readily separated by genitalic morphology, females are very similar and some appear to be indistinguishable.

**Antrops setosus (Duda)**

*Archiborborus setosus* Duda 1921: 135  
(Figs. 5.38, 5.42, 5.162)

Description:  
Head dark reddish brown, occiput, frons except anterior margin, and gena black. Covered with microtomentum except shiny spots lateral to ocelli and a small ventromedial spot on face. Ocellar bristles about 1 ocellus width anterior to median ocellus. Subvibrissal and anterior genal bristles about 0.25X length of vibrissa. Gena height equal to eye height.

Thorax black. Mostly covered with microtomentum, scutum shiny except anterior and lateral margins and patches anterior to scutellum, dorsal surface of scutellum shiny, proepisternum shiny, anepisternum mostly shiny except dorsal margin beginning at corner of postpronotum and extending along posterior margin, katepisternum with a small shiny spot behind fore coxa. Dorsocentral bristles very short, only posterior bristle at all distinguishable in male, normal in female. Halter mostly whitish, dark brown below knob.

Legs dark brown to black, joints orange. Male with a short spur on fore basotarsomere. Mid tibia with complete rows of stout anterodorsal and posterodorsal bristles in male, posterodorsal bristles fewer and thinner in female, both sexes with 1 anteroventral, 1 posteroventral, 5 subapical bristles. Hind tibia with rows of long thin anterodorsal and posterodorsal bristles, 1 anteroventral, and 3 ventroapical bristles.
Wing light brown, veins brown, crossveins r-m and dm-cu whitish.

Abdominal tergites black, heavily sclerotized, syntergite 1+2 with microtomentum on anterior two-thirds, tergites 3–5 with microtomentum on anterior third. Sternites moderately sclerotized in both sexes. Pleural setae dense, long and soft.

Male postabdomen: Sternite 5 with curved lateral margins, narrow anteriorly with short narrow anterior apodeme (Fig. 5.42). Surstylus narrow, scooped. Pregonite partially fused with postgonite. Postgonite with moderately separated lobes, anterior lobe very broad and rounded, posterior lobe narrow and pointed. Basiphallus with moderately long epiphallus, long, rounded preepiphallus. Distiphallus with a strongly curved, spinose dorsal tube, flanked by a single spike-like sclerite, with enlarged ventral sacs (Fig. 5.38).

Female postabdomen: Tergites 6–7 and sternite 6–7 slightly longer than wide, sclerotized along anterior and lateral margins only, anterior margin shiny. Tergites with 3 posterior strips, sternites with 2 posterior strips. Tergite 8 longer than wide, anterior margin emarginated, lateral margin wavy, anterior corners shiny. Epiproct with long, barely separated anterior arms, distal part covered with microtomentum, with 2 pairs of setae. Sclerites of sternite 8 narrow, pointed apically, somewhat pinched medially, covered with microtomentum except anterior third. Hypoproct with anterior margin notched, shiny laterally to notch. Spermathecae barrel-shaped, about 1.5X longer than wide, with invaginations, sclerotized duct about as long as spermathecae.

**Type material.** Lectotype ♂ (designated by Papp (1977)): BOLIVIA: [La Paz] Cillutincara (HMNH; photos examined). Paralectotype: same data as holotype (1 ♀, HMNH).

**Other material examined.** BOLIVIA: Cochabamba: along Hwy.7, 17°14′14″S 65°53′53″W, 3303 m, pine gardens, FMHD#93–186, bait trap (squid carrion), 19 Nov 1993, Parrillo & Rojas (1 ♂, FMNH); Serrania de Siberia, along Hwy.4, 17°15′15″S 64°42′42″W, 2722 m, cloud forest, FMHD#93–179, bait trap (squid carrion), 17–25 Nov 1993, Parrillo & Rojas (1 ♀, FMNH); La Paz: Unduavi, 16°19′19″S 67°54′54″W, 3500 m, grass, pan traps, 5–17 Apr 2001, S.A. Marshall (3 ♀, DEBU); as above but moss (1 ♂, DEBU); Zongo road, 16°10′10″S 68°07′07″W, ~3800 m, alpine shrub, on cow dung, 18 Apr 2001, S.A. Marshall (3 ♂, 5 ♀, DEBU).

Comments: The type locality for this species, "Cullutincara", probably refers to Cerro Sillutincara, a mountain range northeast of La Paz along the road to Coroico.
Figures 5.37–43: *Antrops* male terminalia. (37) *A. quadrinotus*, phallus, postgonite, and phallapodeme, lateral view; (38) *A. setosus*, phallus, postgonite, and phallapodeme, lateral view; (39) *A. simplicimanus*, phallus, postgonite, and phallapodeme, lateral view; (40) *A. simplicimanus*, surstylus, anterior view; (41) *A. quadrinotus*, sternite 5; (42) *A. setosus*, sternite 5; (43) *A. simplicimanus*, sternite 5.
*Antrops simplicimanus* (Richards)

*Archiborborus simplicimanus* Richards 1931: 72
(Figs. 5.40, 5.43, 5.163)

Description:
Head brown to blackish, frontal triangle and orbital plates brown, divided by black interfrontal plates. Face, clypeus, and prementum orange. Maxillary palp yellowish to brown. Scape, pedicel, and base of 1st flagellomere orange to dark brown, distal part of 1st flagellomere dark brown. Pollinose except for shiny spots lateral to ocelli. Ocellar bristles about 1 ocellus width anterior to medial ocellus. Upper genal bristle about 0.6X length of vibrissae. Frontal setae in about 4 pairs.

Thorax dark brown to reddish brown. Covered with microtomentum, except lateral parts of scutellum, forming a distinct triangle of microtomentum medially, and a small ventral patch on anepisternum. Halter brownish, white at tip of knob.

Legs dark brown, paler at joints, coxae 1 and 3, trochanters, and tarsi 1 and 2 paler, orange to reddish brown. First basotarsomere with a small spur in males. Tibia 2 with row of anterodorsal, 1 anteroventral, 1 posteroventral, about 4 subapical bristles. Tibia 3 with 3 ventroapical bristles.

Wing brown with pale spots on crossveins and 2 on vein R4+5.

Abdomen with tergites and sternites dark brown and heavily sclerotized in both sexes, covered with microtomentum.

Male postabdomen: Sternite 5 with lateral margins rounded, converging, posterior margin with a pair of unsclerotized, microtrichose lobes, anterior apodeme short and broad (Fig. 5.43). Surstylus very broad, posterior edge with a row of strong setae, posterior edges nearly meeting medially. Pregonite distinct, relatively large. Postgonite with lobes widely separated, both narrow, rounded, and incurved. Basiphallus with broad, short, bilobed epiphallus, long preepiphallus with broad tip. Ejaculatory apodeme relatively large. Distiphallus complex and compact, sclerite apparently homologous with dorsal tube very short with a large dorsal keel (Fig. 5.40).

Female postabdomen: Tergites 6–7 and sternite 6–7 moderately sclerotized, slightly wider than long, entirely covered with microtomentum. Tergites with 3 posterior strips, sternites with 2 posterior strips.
Tergite 8 slightly narrower posteriorly, anterior margin deeply emarginated, posterior two-thirds covered with microtomentum. Epiproct broad, with long anterior arms, posterior portion covered with microtomentum, with 2 pairs of setae. Cerci narrow. Sclerites of sternite 8 subtriangular, pinched medially, distal quarter covered with microtomentum. Hypoproct subrectangular, anterior margin notched, edge lateral to notch shiny. Spermathecae round, with basal invagination, sclerotized duct about 2X length of spermatheca.

**Type material.** Holotype ♂: ARGENTINA: Lake Correntoso, 18–25 Nov 1926, F.W. Edwards (BMNH; examined by S. A. Marshall).

**Other material examined.** ARGENTINA: Catamarca: Sumalao, 28°28'28"S 65°43'43"W, wet muddy area along field, sweeping, 19 Feb 1992, S.A. Marshall (1 ♂, DEBU); Neuquén: Catán Lil, 39°45'45"S 70°37'37"W, spring used by cattle, pan traps, 21–22 Nov 1989, S.A. Marshall (1 ♂, DEBU); Lolo, 7 km N San Martin de Los Andes, 900 m, nr. muddy bank of pond, pan traps, 23–30 Nov 1989, S.A. Marshall (2 ♂, DEBU); Río Negro: Villa La Angostura, forest nr. Laguna Verde, dung traps, 26–28 Nov 1989, S.A. Marshall (41 ♂, 26 ♀, DEBU); as above but near lake Laguna Verde, pans (2 ♂, DEBU); Tierra del Fuego: Ushuaia, 3 km E, marshy area nr. river, pan traps, 11–14 Feb 1992, S.A. Marshall (3 ♂, DEBU); as above but along river, sweeping (1 ♂, DEBU). CHILE: Aisén: Cerro Castillo Res. Nac., 40 km SW of Balmaceda, 1100 m, dry open beech forest, carrion trap, 2–27 Jan 1985, S. & J. Peck (1 ♂, DEBU); Chaitén, 37 km SE, 60 m, riverside 2nd forest, carrion trap, 28 Dec 1984 – 30 Jan 1985, S. & J. Peck (1 ♂, DEBU); Cochrane, 25 km S, 3 Feb 1990, L.E. Peña (6 ♂, 6 ♀, DEBU); Coihaique Res. Nat., 10 km NW, 900 m, beech forest, carrion trap, 22–27 Jan 1985, S. & J. Peck (2 ♂, DEBU); Coihaique, Dos Lagunas Nat. Mon., 20 km ENE, 600 m, carrion trap, beech groves in steppe, 23–27 Jan 1985, S. & J. Peck (4 ♂, 3 ♀, DEBU); Palena, 113 km S of Chaitén, Río 235, 100 m, mossy beech forest, carrion trap, 29 Dec 1984 – 29 Jan 1985, S. & J. Peck (2 ♂, 1 ♀, DEBU); Puerto Aisén, Río Simpson Nat. Pk., 33 km E, 70 m, select, cut forest, carrion trap, 31 Dec 1984 – 26 Jan 1985, S. & J. Peck (1 ♂, DEBU); Yelcho Chio, Ventisquero Br., 70 km SE of Chaitén, 200 m, mixed beech forest, carrion trap, 29 Dec 1984 – 29 Jan 1985, S. & J. Peck (2 ♂, 1 ♀, DEBU); Araucanía: Curacautín, 40 km W, 1500 m, Nothofagus, malaise, 12 Dec 1984 – 16 Feb 1985, S. & J. Peck (2 ♂, DEBU); Curacautín, 40 km W, 1700 m, Nothofagus, Arucaria, FIT-malaise, 12 Dec 1984 – 16 Feb 1985, S. & J. Peck (1 ♂, DEBU); Flores del Lago, 15 km NE of Villarrica, 300 m, Nothofagus forest, carrion trap, 14 Dec 1984 – 10 Feb 1985, S. & J. Peck (1 ♂, 2 ♀, DEBU); Lago Tinquilco, 30 km E Pucón, 750 m, yellow pans, 7–10 Dec 2002, L. Masner (8 ♂, DEBU); Malleco, 6 km W Curacautín, 750 m, grazed Nothofagus forest remnant, carrion traps, 12 Dec 1984 – 16 Feb 1985, S. & J. Peck (1 ♂, DEBU); Princesa, 20 km E of Caucaucatín, 1500 m, Nothofagus, malaise, 12 Dec 1984 – 16 Feb 1985, S. & J. Peck (1 ♂, 2 ♀, DEBU); Pucón, lakeshore, carrion trap, 15 Nov – 2 Dec 1989, S. A. Marshall (3 ♂, DEBU); as above but in drift near lake, pan traps, 6–8 Nov 1989 (1 ♂, DEBU); as above but near lake, FIT, 8–13 Nov 1989 (1 ♂, DEBU); as above but in lakeside debris, pan traps (1 ♂, DEBU); as above but near lake, dung traps, 9–16 Nov 1989 (4 ♀, DEBU); Pucón Peninsula, 7 Nov 1989, S.A. Marshall (2 ♂, 1 ♀, DEBU); Pucón, Villarrica Nat. Pk., old Beech slash nr. treeling, 8 Nov 1989, S.A. Marshall (1 ♂, DEBU); Pucón, Vol. Villarrica N.P., 10 km S, 900 m, Nothofagus forest, on ash, 15 Dec 1984 – 10 Feb 1985, S. & J. Peck (2 ♂, DEBU); Purén, Contulmo Nat. Mon., 350 m, evergreen forest, rotten mushroom, 11 Nov 1984, S. & J. Peck (15 ♂, 7 ♀, DEBU); as above but mixed evergreen forest, carrion traps, 11 Dec 1984 – 13 Feb 1985 (1 ♂, DEBU); as above but FIT (1 ♂, 1 ♀, DEBU); Salto de la Princesa, 25 km E Curacautín, 750 m, yellow pans, 7–8 Dec 2002, L. Masner (17 ♂, DEBU); Termas de Palque, beech forest, 6–7 pm, 70 degrees F, screen sweep, 12 Nov 1989, S. A. Marshall (5 ♂, 1 ♀, DEBU); Termas de Palquin, 33 km E Pucón, 680 m, 6 Nov 1989, S. A. Marshall (1 ♂, DEBU); as above but cow dung high on Nothofagus slope (1 ♀, DEBU); as above but Nothofagus forest, FIT in drainage...
ditch, 10–13 Nov 1989 (2♂, DEBU); Villarrica, 15km NE, 300 m, spruce plant, sifted Boletus, 14 Dec 1984, S. & J. Peck (1♀, DEBU); Volcán Villarrica, 1120 m, 13–29 Dec 1982, A. Newton & M. Thayer (1♂, DEBU); as above but 15–29 Dec 1982 (2♂, 3♀, DEBU); as above but near treeline, FIT, 9 Nov 1989, S.A. Marshall (5♂, DEBU); as above but swept in *Nothofagus* (1♂, DEBU); as above but 10 Nov–3 Dec 1989 (7♂, DEBU); as above but nr. treeline, pan (29♂, 20♀, DEBU); as above but nr. edge of old lava flow, FIT (6♂, 5♀, DEBU); as above but nr. treeline, FIT in bamboo (8♂, 5♀, DEBU); *Biobío*: Chillán Las Trancas, 72 km SE, nr. Termas, 1700 m, beechn forest carrion trap, 6 Dec 1984 – 19 Feb 1985, S. & J. Peck (2♂, 1♀, DEBU); as above but *Nothofagus* forest (1♀, DEBU); Chillán, 60 km SE, Termas Rd., 1300 m, beechn for., FIT, 7 Dec 1984 – 19 Feb 1985, S. & J. Peck (1♂, DEBU); Concepción, 6km S, San Pedro, 360 m, 12 Nov 1983, S. & J. Peck (10♂, 25♀, DEBU); as above but Pinus sp. forest, trap site 648 (15♂, 7♀, DEBU); Laraquete, 37°10’10”S 73°10’10”W, yellow pans, 10–25 Jan 1993, P. Salinas (2♂, 1♀, DEBU); Las Trancas, 1250 m, 10 Dec 1982–3 Jan 1983, A. Newton & M. Thayer (1♀, DEBU); *Los Lagos*: Antillanca Road, 40°45’45”S 72°09’00”W, 1253 m, *Nothofagus* forest, yellow pans, 10 Dec 2003, L. Masner (9♂, DEBU); Chiloé I., Lago Huinchillo, 42°37’37”S 72°00’00”W, 10 m, yellow pans, 11–12 Dec 2002, L. Masner (3♂, DEBU); El Chinque, N Correntoso, 1 Jan 1990, L.E. Peña (1♂, DEBU); Lago Chapo, 34 km E Puerto Montt, 300m, 2nd growth Noth., 24 Dec 1984 – 26 Nov 1988, S. & J. Peck (1♂, 2♀, DEBU); Parque Nac. Puyehue, 1600 m, 18–24 Dec 1982, A. Newton & M. Thayer (1♂, 1♀, DEBU); as above but 965 m, 18–25 Dec 1982 (3♂, 2♀, DEBU); as above but 690 m, 18–27 Dec 1982 (2♂, DEBU); as above but 440 m, 17–26 Dec 1982 (1♀, DEBU); Parque Nac. Puyehue, Antillanca Rd., 690 m, Valdivian Rainforest, trap site 661, 18–24 Dec 1982, A. Newton & M. Thayer (3♂, 7♀, DEBU); Petruhue, 100 m, *Nothofagus* forest, 15 Nov 1966, M.E. Irwin & E.I. Schlinger (2♂, 1♀, DEBU); Puyehue Natl. Pk., Anticura, 500 m, Repucura forest trail, carrion trap, 19 Dec 1984 – 6 Feb 1985, S. & J. Peck (1♂, DEBU); Puyehue Natl. Pk., Anticura, trail to Mirador El Puma, 40°40’40”S 72°10’10”W, 400 m, carrion pans, 3–5 Dec 2008, Kits & Marshall (4♂, 1♀, DEBU); Puyehue Natl. Pk., Antillanca, 1200 m, *Nothofagus* tree line, 16 Feb 1988, L. Masner (1♂, DEBU); *Los Ríos*: La Union, 30 km W, Las Trancas, 500m, Chile Exp., *Nothofagus*, 7–11 Feb 1988, L. Masner (1♂, DEBU); La Union, 34 km WNW, 700 m, mixed evergreen forest, FIT, 17 Dec 1984 – 7 Feb 1985, S. & J. Peck (3♂, 3♀, DEBU); Panguipulli, 26km SE, 300 m, carrion trap, *Nothofagus* remnant, 16 Dec 1984 – 11 Feb 1985, S. & J. Peck (2♂, DEBU); Puerto Fuy, 800 m, 4 Mar 1955, L.E. Peña (1♀, DEBU); as above but *Nothofagus*, 16 Dec 1984 – 11 Feb 1985, S. & J. Peck (1♂, DEBU); *Magallanes*: Laguna Parillar Natl. Res., trail to Tres Morros, 53°22’22”S 71°15’15”W, 300 m, 26–29 Nov 2008, Kits & Marshall (5♂, 5♀, DEBU); as above but sweeps, 26 Nov 2008 (1♀, DEBU); as above but 53°22’22”S 71°15’15”W, forest stream, dung pans, 29 Nov 2008 (1♂, DEBU); as above but 53°23’23”S 71°15’15”W, shrubby bog (1♂, DEBU); as above but 53°22’22”S 71°15’15”W, forest, yellow pans, 26 Nov 2008 (1♂, DEBU); *Maule*: Altos del Lircay Natl. Res., ~3000 m, streamside pans, 29 Nov 2006, S.A. Marshall (1♂, 2♀, DEBU); Pelluhue, along Rio Curanilahue, 26 Nov 2006, S.A. Marshall (1♂, DEBU); *Valparaíso*: La Campana Natl. Pk., Ber. hygrophilous forest, leaf litter, 2 Dec 1984, S. & J. Peck (1♀, DEBU).

Comments: The holotype was examined by S.A. Marshall in 1989; although the specimen was not dissected, external characters and the distinctive male sternite 5 are sufficient to confirm the species’ identity.
Figures 5.44–47: Antrops male terminalia. (44) *A. truncipennis*, phallus, postgonite, and phallapodeme, lateral view; (45) *A. variegatus*, phallus, postgonite, and phallapodeme, lateral view; (46) *A. variegatus*, sternite 5; (47) *A. vittatus*, phallus, postgonite, and phallapodeme, lateral view.

**Antrops truncipennis** Enderlein

*Antrops truncipennis* Enderlein 1909: 228

(Figs. 5.2, 5.44, 5.163)

Description:

Head brown, antenna, clypeus, and maxillary palp yellow, almost entirely covered with short setae. Mostly covered with micromomentum, interfrontal plates shiny in male. Ocelli absent. Frons and lateral portions of occiput covered with setae. Bristles on frons very short and thick in male, slightly longer and
thinner in female. Subvibrissal ridge with 3–5 setae below vibrissa, none enlarged, anterior genal bristle not enlarged. Head shape modified, length of frons about 2X head height, projecting over face, gena height slightly greater than eye height. Labellum with 18–20 pseudotrachea.

Thorax brown, covered with microtomentum. Postpronotum with 1 longer lateral bristle and 1 shorter medial bristle, notopleuron squeezed posteriorly, with 2 bristles, scutellum greatly reduced, not projecting at all beyond mediotergite, with 2 bristles, other bristles absent or indistinguishable from surrounding setae. Halter not developed.

Legs brown. Fore first tarsomere with a broad apicoventral spur in male. Mid tibia with anterodorsal row of very short stout bristles, 1 anteroventral, 1 or 2 posteroventral bristles, 7 apical bristles. Hind tibia with 1 anteroventral bristle, 3 apicoventral bristles.

Wing brown, membrane opaque. Shape blade-like, in male longer than thorax, strongly falcate, in female about as long as thorax, pointed (Fig. 5.2).

Abdomen with sternites and tergites brown, heavily sclerotized, covered with microtomentum. Pleural setae short anteriorly, long on posterior segments.

Male postabdomen: Sternite 5 simple, subrectangular, wider than long. Surstyle long, widest medially, thin apically, posterior face entirely covered with long setae. Postgonite with lobes moderately separated, posterior lobe long and pointed, anterior lobe short and rounded. Basiphallus long, with short, broad epiphallus, long, thin preepiphallus. Distiphallus with a short smooth dorsal tube, long ventral distal extension (Fig. 5.44).

Female postabdomen: Tergites 6–7 not sclerotized medially, moderately sclerotized along anterior and lateral margins, with 3 weakly sclerotized anterior strips. Tergite 8 with anterior margin notched, covered with microtomentum and setae. Epiproct with long anterior arms, covered with setae. Cerci normal. Sternites 6–7 not sclerotized medially, moderately sclerotized along anterior and lateral margins, with 2 weakly sclerotized anterior strips. Sclerites of sternite 8 subrectangular, with basal half depressed, shiny, distal half with microtomentum and setae. Hypoproct trapezoidal, with a circular anteromedial depression. Spermathecae about as long as wide, with a deep apical invagination and short basal invagination, sclerotized duct about as long as spermathecae.
**Type material.** Syntypes: CHILE: Cape Horn archipelago, 1885, Hyades & Hahn (1 ♂, 1 ♀, MNHN; not examined).

**Other material examined.** ARGENTINA: Isla de los Estados, Bahia Blosssom, 10 May 1971, Flint & Hevel (2 ♀, USNM); Isla de los Estados, Bahia Colnett, 25 May 1971, Flint & Hevel (17 ♂, 15 ♀, USNM); Isla de los Estados, Puerto Pte. Roca, 22–23 May 1971, Flint & Hevel (2 ♀, USNM). FALKLAND ISLANDS: [no locality], 1902, R. Vallentin (1 ♂, 1 ♀, BMNH). SOUTH GEORGIA: Bird I., Freshwater Bay, ex. rotting kelp, 14 Feb 1963, H.B. Clagg BI-35A (2 ♂, 6 ♀, BPBM); Bird I., Iceberg Point, under rocks on beach, hand coll., 24 Apr 1963, H.B. Clagg BI-243D (1 ♂, 4 ♀, BPBM); Bird I., Landing Beach, under rocks, 24 Apr 1963, H.B. Clagg, BI-242C (19 ♂, 15 ♀, BPBM); Bird I., Stinker Cape, under stones on beach, 19 Apr 1963, H.B. Clagg BI-222C (2 ♂, 2 ♀, BPBM); South Georgia I., Barff Peninsula, Sörling Valley, under rotting kelp on beach, 21 Jan 1964, H.B. Clagg SG-189 (7 ♂, 3 ♀, BPBM); South Georgia I., Hound Bay, shoreline, 21 Jan 1982, M. Vogel (1 ♂, 1 ♀, USNM).

Comments: This species occurs on several widely separated oceanic islands, as well as southern tip of the South American mainland (specimens in Lyman Entomological Museum, Montreal, Canada, T. Wheeler, pers. comm.). There seem to be two alternate explanations for such a wide distribution of a brachypterous fly: anthropogenic dispersal, or oceanic rafting, perhaps on floating masses of the kelp that this species feeds on. At present there is insufficient data to distinguish between these possibilities.

*Antrops variegatus* sp. nov.

(Figs. 5.45–46, 5.152)

Description:
Occiput black, frons dark brown to reddish brown posteriorly, orange anteriorly, rest of head orange. Prementum and maxillary palp yellow. Mostly covered with microtomentum, frons with shiny spots lateral to ocelli and a small spot between ocellar bristles, face mostly shiny with microtomentum covering lunule and below antenna. Ocellar bristles just anterior to median ocellus. Subvibrissal and anterior genal bristles about 0.3X length of vibrissa. Gena height about 0.4x height of eye.

Thorax black, postpronotum, posterior corners of scutum, and a band from base of wing to mid coxa reddish. Mostly covered with microtomentum, proepisternum shiny, anepisternum with a large ventromedial shiny spot covering about half length and two-thirds height. Halter whitish, brown below knob.
Legs dark brown, joints, trochanters, and tarsi orange, fore coxa reddish brown. Mid tibia with row of anterodorsal, 1 anteroventral, 1 posteroventral, 5 subapical bristles. Hind tibia with a thin anteroventral, 3 ventroapical bristles.

Wing light brown, veins brown, crossveins r-m and dm-cu white. Faint indication of 2 paler spots on vein R4+5.

Abdominal tergites heavily sclerotized, black, covered with microtomentum. Sternites heavily sclerotized, black, wider than long, covered with microtomentum in male, weakly sclerotized, longer than wide in female. Pleural setae long and soft.

Male postabdomen: Sternite 5 with curved lateral margins, widest at about two-thirds length, anterior apodeme broad, about 1.4X length of external portion (Fig. 5.46). Surstylus scooped, with a shallow projection along posterior margin. Pregonite distinct. Postgonite with lobes well separated, anterior lobe short and rounded, posterior lobe longer and pointed. Basiphallus with short broad epiphallus and preepiphallus, preepiphallus transparent. Distiphallus with curved spineose dorsal tube flanked by two spike-like sclerites (Fig. 5.45).

Female postabdomen: Tergites 6–7 slightly wider than long, with anterior and lateral margins sclerotized, tergite 6 also with a medial stripe sclerotized, anterior margin shiny. Sternites 6–7 entirely sclerotized. Tergites with 3 posterior strips, sternites with 2 posterior strips. Tergite 8 longer than wide, anterior margin emarginated, covered with microtomentum. Epiproct with long anterior arms, distal portion covered with microtomentum, with 2 pairs of setae. Cerci long. Sclerites of sternite 8 pointed anteriorly, pinched medially, distal half covered with microtomentum. Hypoproct subrectangular, with a curved unsclerotized band medially, covered with microtomentum except anterior margin. Spermathecae barrel-shaped, about 1.2X longer than wide, without invaginations, sclerotized duct about 1.5X longer than spermatheca. One dissected female with 32 eggs.

**Type material.** Holotype ♂: ECUADOR: Pichincha: Tandapi, 35km E, 24 Jun 1975, S. & J. Peck (QCAZ). Paratypes: same data as holotype (5 ♂, 1 ♀, DEBU); as above but bamboo, moss (1 ♀, DEBU) Tandapi, 34.5 km E, 2835 m, bamboo shrub, dung trap, 24–29 Jun 1975, S. Peck (2 ♀, DEBU); as above but dung traps (1 ♂, DEBU);.

Comments: The species name refers the the varicoloured thorax. This species is quite similar to *A. anovariegatus sp. nov.*, but appears to occur at lower elevations.
*Antrops vittatus* sp. nov.
(Figs. 5.47, 5.160)

Description:
Head yellow, covered with microtomentum except shiny stripes on interfrontal plates outlining frontal triangle. Ocellar bristles about one ocellus width anterior to medial ocellus. One enlarged subvibrissal bristle, about 0.5X length of vibrissa, anterior genal bristle about 0.6X length of vibrissa.

Thorax reddish brown mottled with yellow at edges of scutum and on pleural sclerites, entirely covered with microtomentum. Scutum with distinct yellow dorsocentral stripes. Halter whitish, brown at base of knob.

Legs yellow, with thin brown band at apex of femur 3, tarsus 3 brown. Tibia 2 with anterodorsal and posterodorsal rows, 1 anteroventral, 1 posteroventral, and ring of 4 subapical bristles. Tibia 3 with anterodorsal and posterodorsal rows and 2 ventroapical bristles. spur?

Wing brown, with white spots on crossveins r-m and dm-cu and on vein R4+5 distal to r-m.

Abdomen with tergites brown and strongly sclerotized, covered with microtomentum, sternites weakly sclerotized. Tergites 3–5 with a strong bristle in posterolateral corners.

Male postabdomen: Sternite 5 simple, rectangular. Surstylus long, narrow. Postgonite with lobes moderately separated, anterior lobe rounded, posterior lobe pointed. No distinct pregonite. Basiphallus with broad and short epiphallus and preepiphallus. Distiphallus small, with smooth dorsal tube flanked by a long spine-like sclerite, distal ventral sclerite subtriangular, separated from other sclerites by unsclerotized membrane (Fig. 5.47).


Comments: The species name refers to the stripes on the mesoscutum. Despite the large number of archiborborine specimens from Chile that were examined, only two specimens of this species were located. Although superficially similar to A. annulatus, it does not appear to be closely related to that species, and its relationships within the genus are unclear.

Antrops sp. A

Description:
Head orange, maxillary palp yellow. Mostly covered with microtomentum, frons with shiny spots lateral to ocellar triangle. Ocellar bristles at level of anterior margin of median ocellus. Subvibrissal and anterior genal bristle about 0.25X length of vibrissa. Gena about 0.4X eye height.

Thorax black, postalar callus reddish, mostly covered with microtomentum. Proepisternum shiny, anepisternum with ventromedial shiny spot covering 0.5X length and 0.5X height of sclerite. Halter white.

Legs black, trochanters reddish brown, joints and 2 basal tarsomeres yellow, 3 distal tarsomeres brown. Mid tibia with anterodorsal row, 1 anteroventral, 1 posteroventral, 5 apical bristles. Hind tibia with 2 ventroapical bristles, anterior bristle thin.

Wing light brown, veins dark brown. White spots on crossveins r-m, bm-cu, and dm-cu, and on vein R4+5 with 1 basal and 2 distal to r-m crossvein and at tip.

Abdominal tergites heavily sclerotized, black, covered with microtomentum, anterior margins of tergites 3–5 wavy. Sternites weakly sclerotized.

Material examined. ECUADOR: Napo: SierrAzul Res., 14 km W Cosanga, 0°40'40"S 77°56'56"W, 2200 m, 10 May 2002, S.A. Marshall (1 ♀, DEBU); as above but treefall, 10–11 May 2002, Marshall & Paiero (1 ♀, DEBU).

Comments: This species is not described here pending discovery of male specimens. As well, examination of males may help resolve to uncertain phylogenetic position of this species. It has a strong
superficial similarity to members of the genus *Boreantrops*, but lacks the synapomorphies of that genus. It is placed in *Antrops* here strictly out of convenience.

**Antrops guaramacalensis** group

This species group consists of 9 species, which occur in the Andes from Bolivia to Venezuela. All are apterous, and seven of the nine species are known from only 1 or 2 specimens of a single sex. Possible synapomorphies of the clade include an enlarged metapleuron with the posterior spiracle approximately twice as far from the hind coxa as from the posterior margin of the scutum, a reduction or loss of the outer vertical bristles, and loss of the intra-alar bristles. There also appears to be a tendency to have more than 12 pseudotrachea on the labellum, but only a few specimens have the labellum inflated so that these can be counted. However, wing loss is often associated with a suite of correlated morphological changes, and so these characters may represent convergence associated with wing loss rather than synapomorphies. Some specimens of *Boreantrops apterus* sp. nov. approach the states seen in this group, although synapomorphies of the male genitalia in that species clearly place it within *Boreantrops*.

**Antrops biflavus** sp. nov.

(Figs. 5.49–51, 5.164)

Description:
Head dark brown, occiput black, face and clypeus brown, antenna and prementum orange, maxillary palp yellow. Mostly covered with microtomentum, frons with shiny spots lateral to ocellar triangle, ventral half of face shiny. Ocellar and outer vertical bristles short, about 0.5X length of postocellar bristles, ocellar bristles just anterior to median ocellus, both pairs of orbital bristles present. Subvibrissal and anterior genal bristles about 0.3X length of vibrissa. Gena about 0.25X eye height. Labellum with 12 pseudotrachea.

Thorax black, entirely covered with microtomentum. Postpronotal, anterior notopleural, lateral postalar, and apical scutellar bristles long, posterior notopleural, lateral scutellar, and katepisternal bristles about half length, medial postalar bristle very short, other bristles absent. Wing and halter absent.
Coxae and hind femur and tibia black, fore and mid tibia, hind trochanter, and two basal tarsomeres of hind leg brown, trochanters, femora, and tarsi of fore and mid leg and three distal tarsomeres of hind leg yellow. Mid tibia with row of anterodorsal, 1 anteroventral, 1 posteroventral, and 5 apical bristles. Hind tibia with 1 anteroventral bristle at two-thirds to three-quarters, 2 ventroapical bristles.

Abdominal tergites black, heavily sclerotized, covered with microtomentum. Male with sternites 2–4 black, heavily sclerotized, covered with microtomentum, female with sternites 2–5 moderately sclerotized, covered with microtomentum.

Male postabdomen: Sternite 5 with lateral margins straight, posterior margin rounded with medial V-shaped notch, anterior apodeme long, reaching segment 2, without keel (Fig. 5.51). Surstylus bilobed, anterior lobe short, both rounded apically (Fig. 5.50). Pregonite large, not fused with postgonite. Postgonite narrow, without distinct lobes, tip excavated anteriorly. Basiphallus without epiphallus, preepiphallus short, transparent. Distiphallus with a strongly curved spinose dorsal tube (Fig. 5.49).

Female postabdomen: Tergites 6–7 heavily sclerotized along anterior and lateral margins, anterior margin shiny, not sclerotized medially, with 3 posterior weakly sclerotized strips. Tergite 8 with microtomentum covering posterior two-thirds. Epiproct with 1 pair of setae. Tergites 6–7 narrow, heavily sclerotized along anterior and lateral margins, anterior margin shiny, not sclerotized medially. Sclerites of tergite 8 subrectangular, anterior end pointed, posterior third with microtomentum and setae. Hypoproct trapezoidal, covered with microtomentum. Spermathecae sausage-shaped, about 2.5X longer than wide, annulated, with apical invagination, sclerotized duct about as long as spermathecae.

**Type material.** Holotype ♂: Loja: Cajanuma, Podocarpus Natl. Pk., trail Los Miradores, 3000m, blue pan traps, 20–27 Feb 2009, Pollet & De Braekeleer (UTPL). Paratypes: same data as holotype (2 ♀, DEBU, UTPL); same as above but yellow pan traps (1 ♂, UTPL).

Comments: The species name is from the Latin *bi* (two) + *flavus* (yellow), referring to the yellow fore and mid femora.
*Antrops carpishensis* sp. nov.  
(Figs. 5.52–54, 5.165)

Description:
Head reddish brown, occiput black, gena and median part of frons dark brown. Mostly covered with microtomentum, frons with a shiny V-shaped patch reaching from anterior margin posteriorly on either side of ocellar triangle to posterior margin, face mostly shiny with patches of microtomentum below antenna and lunule. Ocellar bristles absent, outer vertical bristle less than 0.5X length of inner vertical bristle. Subvibrissal bristle about 0.5X length of vibrissa, anterior genal bristle not developed. Gena about 0.3X eye height. Labellum with 14 pseudotrachea.

Thorax black. Mostly covered with microtomentum, proepisternum shiny, anepisternum with microtomentum along dorsal third and posterior quarter of sclerite, katepisternum with shiny spot behind fore coxa and with posterior portion above mid coxa shiny, meron and metapleuron shiny. Postpronotal, anterior notopleural, lateral postalar, and apical scutellar bristles long, posterior notopleural, basal scutellar, and katepisternal bristles short, posterior dorsocentral bristle very short, other bristles absent or indistinguishable from surrounding setae. Scutellum very short, wing and halter absent.

Legs black, trochanters and joints reddish brown, fore tarsus whitish, mid and hind tarsi brown. Mid tibia with row of anterodorsal, 1 anteroventral, 1 posteroventral, 5 apical bristles. Hind tibia with 2 ventroapical bristles.

Abdominal tergites heavily sclerotized, black, covered with microtomentum, with 4 enlarged bristles near posterior margin. Sternites heavily sclerotized, black, covered with microtomentum.

Male postabdomen: Sternite 5 widest posteriorly, posterior margin with a median projection subtended by a dorsal keel, posterior corners with detached curved lobes, anterior apodeme broad (apodeme broken in holotype, Fig. 5.54). Surstylus broad, anterior lobe with a small projection (Fig. 5.53). Pregonite fused with postgonite. Postgonite with very short, barely distinct lobes. Basiphallus without distinct epiphallus, narrow preepiphallus. Distiphallus with long, spinose dorsal tube (Fig. 5.52).

Female postabdomen: Tergites 6–7 and sternites 6–7 wider than long, fully sclerotized, shiny. Tergites with 3 posterior strips, sternites with 2 strips. Tergite 8 narrowest posteriorly, shallowly emarginated anteriorly and posteriorly, posterior third and medial section covered with microtomentum. Epiproct with

**Type material.** Holotype ♂: PERU: Huánuco: Paso Carpish, vic. Chinchao, 9°43′43″S 76°04′04″W, 2650 m, cloud forest, FMHD#83–903, berl., litter, 15 Jan 1983, Newton & Thayer (FMNH). Paratypes: same data as holotype (2 ♀, FMNH).

Comments: The species name is derived from the type locality, and should be treated as a noun in apposition.

**Antrops coniobaptos sp. nov.**

(Figs. 5.55–56, 5.165)

**Description:**

As described for *A. siberia*. Face mostly covered with microtomentum, lunule and ventral third shiny. Ocellar bristles present (left bristle absent in holotype), at level of anterior margin of median ocellus, both orbital bristles present. Labellum with 12 pseudotrachea. Anepisternum with microtomentum covering sclerite at and below level of spiracle. Hind tibia with 1 ventroapical bristle.

Male postabdomen: Sternite 5 broad, posterior margin about half as wide as anterior, with detached lateral lobes, anterior apodeme long, broad, without keel. Surstylus narrow, relatively long (Fig. 5.56). Pregonite small, distinct. Postgonite with lobes widely separated, anterior lobe narrow, rounded, posterior lobe broader, pointed. Basiphallus without distinct epiphallus or preepiphallus. Distiphallus with a slightly curved, smooth dorsal tube (Fig. 5.55).

Female unknown.

**Type material.** Holotype ♂: BOLIVIA: Cochabamba: along Hwy. 7, 17°14′14″S 65°53′53″W, 3303 m, pine gardens, FMHD#93–186, bait trap (squid carrion), 19 Nov 1993, Parrillo & Rojas (FMNH). Paratype: same data as holotype (1 ♂, FMNH).

Comments: The species name is derived from the Greek *konios* (dust) + *baptos* (dipped), referring to the microtomentose ventral parts of this species.
**Antrops guaramacalensis** sp. nov.
(Figs. 5.57–59, 5.164)

Description:
Head reddish brown to dark brown, occiput and face black, first flagellomere light brown, maxillary palp yellow. Occiput and gena covered with microtomentum, frons mostly shiny with microtomentum on orbital plates and medially from postocellar bristles through ocellar triangle to bases of ocellar bristles, face entirely shiny. Posterior orbital and outer vertical bristles absent. Ocellar bristles at level of median ocellus. Anterior genal and subvibrissal bristles not developed. Gena about 0.4X eye height. Labellum with 26 pseudotrachea.

Thorax black. Mostly covered with microtomentum, proepisternum shiny, anepisternum with microtomentum above level of spiracle and on posterior quarter, katepisternum with shiny spot behind fore coxa and with posterior portion above mid coxa shiny, meron with microtomentum along anterior margin, metapleuron shiny. Lateral postalar, apical scutellar, and katepisternal bristles long, postpronotal, notopleural, and basal scutellar bristles short, other bristles absent or indistinguishable from surrounding setae. Thorax slightly narrower than head, about two-thirds width of abdomen, scutellum very short, wing and halter absent.

Legs black, trochanters and tarsi brown. Mid tibia without preapical bristles, 5 apical bristles. Hind tibia with 2 ventroapical bristles.

Abdomen strongly convex. Tergites and sternites heavily sclerotized, black, covered with microtomentum.

Male postabdomen: Sternite 5 with lateral margins slightly rounded, shallowly emarginated posteriorly, anterior apodeme long, reaching segment 2, without keel (Fig. 5.59). Surstylus curved, narrow apically (Fig. 5.58). Pregonite small, distinct. Postgonite with lobes clearly separated, nearly equal width, posterior lobe long, pointed, anterior lobe rounded. Basiphallus broad, without epiphallus, preepiphallus short, transparent. Distiphallus simple, with a stout spinose dorsal tube, ventral sclerites heavily sclerotized (Fig. 5.57).

Female postabdomen: Tergites 6–7 weakly sclerotized medially, tergite 6 with anterior margin heavily sclerotized, tergite 7 with anterior and lateral margins heavily sclerotized. Sternite 6 weakly sclerotized
medially, with anterior margin, and 2 posterior spots heavily sclerotized, sternite 7 heavily sclerotized, narrow posteriorly, covered with microtomentum. Tergites with 3 posterior weakly sclerotized strips, sternites with 2 posterior strips. Tergite 8 broad, shallowly emarginated anteriorly and posteriorly, with microtomentum except along anterior margin. Epiproct with long parallel anterior arms, covered with microtomentum posteriorly, with 1 pair of setae. Sclerites of tergite 8 broad, pinched medially, posterior third with microtomentum and setae. Hypoproct round, with a square anterior notch, shiny lateral to notch. Spermathecae round, without invaginations, sclerotized ducts about as long as spermathecae.

**Type material.** Holotype ♂: VENEZUELA: Trujillo: Guaramacal Natl. Pk., 19.3 km SE Boconó, 9°14'14"N 70°11'11"W, 2800 m, páramo, shrub litter, 19 May 1998, R. Anderson (MIZA). Paratypes: same data as holotype (3 ♂, 2 ♀, DEBU); Boconó, Páramo de Guaramacal, 2800m, 8–28 Jul 1986, B. Gill (1 ♂, 1 ♀, DEBU).

Comments: This species is the only member of the *A. guaramacalensis* group which has been collected more than once, and is only known from the Páramo de Guaramacal. The species name is derived from the type locality.

**Antrops podocarpus sp. nov.**
(Figs. 5.60–62, 5.164)

Description:
Head dark brown, occiput black, first flagellomere and maxillary palp yellow. Mostly covered with microtomentum, frons with a shiny V-shaped spot, reaching from lateral ocelli to ptilinal suture, ventral third of face shiny. Ocellar and outer vertical bristles short, about 0.5X length of postocellar bristles, ocellar bristles just anterior to median ocellus, both pairs of orbital bristles present. Subvibrissal and anterior genal bristles about 0.4X length of vibrissa. Gena about 0.3X eye height. Labellum with 20 pseudotrachea.

Thorax black, mostly covered with microtomentum. Anepisternum with ventromedial shiny spot covering half height of sclerite, meron and metaepron shiny. Postpronotal, anterior notopleural, lateral postalar, apical scutellar, and katepisternal bristles long, lateral scutellar bristles about half length, posterior notopleural, medial postalar, and posterior postsutural dorsocentral bristles about quarter length, other bristles absent. Scutellum nearly fused with mesoscutum, wing and halter absent.
Legs black, trochanters and tarsi brown. Mid tibia with 1 anteroventral, 1 posteroventral, and 4 apical bristles. Hind tibia with 2 ventroapical bristles.

Abdomen relatively large, much wider than thorax, syntergite 1+2 longer than thorax. Tergites black, heavily sclerotized, covered with microtomentum. Male with sternites 2–4 black, heavily sclerotized, covered with microtomentum, female with sternites 2–5 moderately sclerotized, covered with microtomentum.

Male postabdomen: Sternite 5 with lateral margins slightly rounded, posterior margin notched medially, sides of notch parallel, anterior apodeme long, reaching segment 2, without keel (Fig. 5.60). Surstylus bilobed, posterior lobe longer, both broadly rounded (Fig. 5.62). Pregonite large, not fused with postgonite. Postgonite with lobes indistinct, posterior lobe pointed, anterior lobe truncate. Basiphallus without epiphallus, preepiphallus short, transparent. Distiphallus simple, with a stout spinose dorsal tube, ventral sclerites heavily sclerotized (Fig. 5.61).

Female postabdomen: Tergites 6–7 heavily sclerotized, shiny along anterior and lateral margins, not sclerotized medially, with 3 posterior weakly sclerotized strips. Tergite 8 with microtomentum covering posterior half. Epiproct with long parallel anterior arms, covered with microtomentum posteriorly, with 1 pair of setae. Tergites 6–7 heavily sclerotized, shiny along anterior and lateral margins, not sclerotized medially, with 2 posterior weakly sclerotized strips. Sclerites of tergite 8 subrectangular, posterior third with microtomentum and setae. Hypoproct trapezoidal, covered with microtomentum. Spermathecae barrel-shaped, annulated, about 1.5X longer than wide, apical and basal invaginations meeting medially, sclerotized duct about as long as spermathecae.

**Type material.** Holotype ♂: Loja: Cajanuma, Podocarpus Natl. Pk., trail Los Miradores, 3000m, blue pan traps, 20–27 Feb 2009, Pollet & De Braekeleer (UTPL). Paratypes: same data as holotype (1 ♂, UTPL); same as above but yellow pan traps (2 ♀, DEBU, UTPL).

Comments: The species name refers to the type locality and should be treated as a noun in apposition.
Antrops siberia sp. nov.

(Figs. 5.63–65, 5.165)

Description:
Head black, frons, antenna and prementum dark brown, maxillary palp brown. Occiput shiny medially, with microtomentum along lateral and dorsal margins, frons mostly shiny with microtomentum on orbital plates, gena covered with microtomentum, face mostly shiny with a broad band of microtomentum below antenna and lunule. Ocellar and posterior orbital bristles absent, outer vertical bristle much shorter and thinner than inner vertical bristle. Subvibrissal and anterior genal bristles less than 0.25X length of vibrissa. Gena about 0.25X eye height. Number of pseudotrachea on labellum not discernable on available specimens.

Thorax black, shiny dorsally, scutum with microtometum at base of posterior notopleural bristle and between postalar bristle and scutellum, proepisternum covered with microtomentum, anepisternum with microtomentum ventrally from spiracle to posteroventral corner, covering katepisternum except shiny spot behind fore coxa, meron, anepimeron, and laterotergite shiny medially with microtomentum around margins, metapleuren covered with microtomentum. Anterior notopleural, lateral postalar, and apical scutellar bristles long, postpronotal, posterior notopleural, and basal scutellar bristles short, other bristles absent or indistinguishable from surrounding setae. Scutellum very short, wing and halter absent.

Legs black, trochanters, extreme bases of femora, and tarsi orange. Fore basotarsomere with a thin spur in male. Mid tibia with anteroventral and posteroventral bristles, 6 apical bristles. Hind tibia with 2 ventroapical bristles.

Abdomen with tergites very wide, strongly convex. Tergites and sternites heavily sclerotized, black, shiny.

Male postabdomen: Sternite 5 broad, posterior margin about half as wide as anterior, with detached lateral lobes, anterior apodeme long, broad, without keel (Fig. 5.65). Surstylus curved, narrow apically (Fig. 5.64). Pregonite small, distinct. Postgonite with lobes widely separated, anterior lobe narrow, rounded, posterior lobe broader, pointed. Basiphallus without distinct epiphallus or preepiphallus. Distiphallus with a short, straight, smooth dorsal tube (Fig. 5.63).

Female unknown.
**Type material.** Holotype ♂: BOLIVIA: Santa Cruz: Yungas de la Siberia, 26.4 km NW Comarapa, 17°49'49"S 64°39'39"W, 2640 m, Yungas, mixed litter, 28 Jan 1999, R. Anderson (UASC). Paratype: same data as holotype (1 ♂, DEBU).

Comments: The species name is derived from the type locality, and should be treated as a noun in apposition.

*Antrops tequendama* sp. nov.

(Figs. 5.66–68, 5.164)

Description:

Head orange, medial occipital sclerite brown. Occiput and gena covered with microtomentum, frons shiny except extreme anterior corners with microtomentum, face shiny with a small spot of microtomentum below lunule. Ocellar, posterior orbital, and outer vertical bristles absent. Subvibrissal bristle about 0.4X length of vibrissa, anterior genal bristle not developed. Gena about 0.5X eye height. Number of pseudotrachea on labellum unknown.

Thorax black, mostly shiny. Microtomentum at lateral corners and just lateral to scutellum, on dorsal third of anepisternum, covering katepisternum except spot behind fore coxa, covering anepimeron except anterodorsal corner, and covering laterotergite. Anterior notopleural and lateral postalar bristles long, postpronotal, presutural intra-alar, posterior notopleural, posterior postsutural dorsocentral, and medial postalar bristles short. Scutellar and katepisternal bristles broken on holotype, other bristles appear to be absent or indistinguishable from surrounding setae. Wing and halter absent.

Legs black, shiny, trochanters, joints, and tarsi brown. Mid tibia with 1 anterodorsal, 1 anteroventral, 1 posterodorsal, and 4 apical bristles. Hind tibia with 2 ventroapical bristles.

Abdominal tergites heavily sclerotized, black, shiny. Sternite 2 heavily sclerotized, black, shiny, sternites 3–4 weakly sclerotized.

Male postabdomen: Sternite 5 flared and emarginated posteriorly, anterior apodeme about as long as external portion, without keel (Fig. 5.68). Surstylus subrectangular with a curved anterior projection, anterior corner with a row of stout setae (Fig. 5.67). Pregonite small, distinct. Postgonite with long lobe,
anterior lobe very thin, posterior lobe wider, pointed apically. Basiphallus without distinct epiphallus, preepiphallus very short. Distiphallus with a strongly curved, smooth dorsal tube (Fig. 5.66).

Female unknown.


Comments: The holotype has some broken bristles on the head and thorax and is somewhat greasy, but is otherwise in good condition. There are no sockets present for the bristles noted as missing in the description, and they do not appear to be merely broken off. It is unclear what the name “C. Amara” on the label of the holotype refers to. It may be a poorly transcribed abbreviation for Cundimarca, the department which includes the municipality of Tequendama. The species name is derived from the type locality and should be treated as a noun in apposition.

**Antrops sp. B**

Description:
Head reddish brown, occiput black, prementum and maxillary palp yellow. Mostly covered with microtomentum, ventral half of face shiny, occiput with shiny spots lateral to foramen. Ocellar bristles absent with no trace of sockets, both pairs of orbital bristles apparently present, outer vertical bristle present. Subvibrissal bristle about 0.3X length of vibrissa, anterior genal bristle about 0.25X length of vibrissa. Gena about 0.3X eye height. Labellum with 16 pseudotrachea.

Thorax black. Mostly covered with microtomentum, proepisternum shiny, anepisternum with ventromedial shiny spot covering two-thirds height and three-quarters length of sclerite, katepisternum with shiny spot behind fore coxa and posterior third shiny, meron and metapleuron shiny. Postpronotal, anterior notopleural, lateral postalar, and apical scutellar bristles with large sockets, probably long. Posterior notopleural and lateral scutellar with smaller sockets, probably short. Katepisternal, medial postalar, and posterior dorsocentral bristles short, anterior dorsocentral bristles not separable from surrounding setae, other bristles apparently absent. Thorax about two-thirds width of abdomen, scutellum very short, wing and halter absent.

Legs black, trochanters, joints, and tarsi reddish brown. Mid tibia with row of anterodorsal, 1 anteroventral, 1 posteroventral, 5 apical bristles. Hind tibia with 2 ventroapical bristles.
Figures 5.63–68: *Antrops* male terminalia. *A. siberia*: (63) phallus, postgonite, and phallapodeme, lateral view, (64) surstylus, anterior view, (65) sternite 5; *A. tequendama*: (66) phallus, postgonite, and phallapodeme, lateral view, (67) surstylus, anterior view, (68) sternite 5.

Abdominal tergites heavily sclerotized, black, covered with microtomentum. Sternites weakly sclerotized.

**Material examined.** COLOMBIA: **Norte de Santander**: 30km S of Chinácota, 2438 m, dung, 10–14 May 1974, S. Peck (2 ♀, DEBU).
Antrops sp. C
Description:
Head dark brown, frons, first flagellomere, and maxillary palp brown. Occiput with a shiny spot on either side of foramen, frons shiny medially with microtomentum covering orbital plates and extending to bases of interfrontal setae, face mostly shiny with microtomentum on lunule, gena covered with microtomentum. Ocellar bristles at level of median ocellus, posterior orbital and outer vertical bristles absent. Subvibrissal and anterior genal bristles not developed. Gena about 0.5X eye height. Occiput strongly rounded.

Thorax black. Mostly covered with microtomentum, proepisternum shiny, anepisternum with microtomentum along dorsal third and posterior quarter of sclerite, katepisternum with shiny spot behind fore coxa and with posterior portion above mid coxa shiny, meron and metapleuron shiny. Lateral postalar and apical scutellar bristles long, postpronotal, notopleural, and katepisternal bristles short, other bristles absent or indistinguishable from surrounding setae. Scutellum very short, wing and halter absent.

Legs black, trochanters reddish brown, tarsi dark brown. Mid tibia with 1 anteroventral, 5 apical bristles. Hind tibia with 2 ventroapical bristles.

Abdominal tergites heavily sclerotized, black, covered with microtomentum. Sternites weakly sclerotized.


Comments: This species is not described formally here, pending discovery of male specimens. It is very similar to A. guaramacalensis, but seems to be distinct from that species.

Antrops sp. D
Description:
Head reddish orange, antenna orange, maxillary palp and prementum yellow. Occiput and gena covered with microtomentum, frons shiny except extreme anterior corners with microtomentum, face shiny with a
small spot of microtomentum below lunule. Ocellar, posterior orbital, and outer vertical bristles absent. Subvibrissal and anterior genal bristles not developed. Gena about 0.3X eye height. Labellum with 22 pseudotrachea.

Thorax black. Microtomentum covering mesoscutum lateral to dorsocentral row, on lateral corners of scutellum, on dorsal third and posterior quarter of anepisternum, anterior two-thirds of katepisternum, anepimeron, and laterotergite. Anterior notopleural, lateral postalar, and apical scutellar bristles long, postpronotal, posterior notopleural, medial postalar, lateral scutellar, and katepisternal bristles short. Other bristles absent or indistinguishable from surrounding setae. Wing and halter absent.

Legs black, shiny, trochanters, joints, and tarsi pale brown. Mid tibia with 1 anterodorsal, 1 anteroventral, 1 posteroventral, and 4 apical bristles. Hind tibia with 2 apicoventral bristles.

Abdominal tergites heavily sclerotized, black, covered with microtomentum. Sternites weakly sclerotized.

**Material examined.** COLOMBIA: Cundimarca: Bogota, 10000’, 3 May 1946, E.A. Chapin (1 ♀, USNM).

Comments: This species is not described formally here, pending discovery of male specimens.

**Antrops sp. E**

Description:
Frons, face and gena dark brown, occiput black, antenna, clypeus, and prementum orange, and maxillary palp yellow. Occiput shiny medially, with microtomentum along lateral and dorsal margins covered with microtomentum, frons shiny except extreme anterior corners, face shiny with microtomentum just below antenna, gena covered with microtomentum. Ocellar, posterior orbital, and outer vertical bristles absent. Subvibrissal and anterior genal bristles thin, about 0.25X length of vibrissa. Gena about 0.4X eye height. Number of pseudotrachea on labellum unknown.

Thorax black, mostly shiny. Microtomentum at lateral corners and just lateral to scutellum, along dorsal margin of anepisternum, on anterior two-thirds of katepisternum except spot behind fore coxa, posterior half of anepimeron, and laterotergite. Anterior notopleural, lateral postalar, and apical scutellar bristles long, postpronotal, medial postalar, lateral scutellar, and katepisternal bristles short. Other bristles absent or indistinguishable from surrounding setae. Wing and halter absent.
Legs black, shiny except anterior face of fore femur, trochanters and tarsi yellow. Mid tibia with 1 anterodorsal, 1 anteroventral, 1 posteroventral, and 4 apical bristles. Hind tibia with 2 apicoventral bristles.

Abdominal tergites heavily sclerotized, tergite 5 moderately sclerotized, black, shiny. Sternites weakly sclerotized, anterior part of sternite 2 heavily sclerotized, black.

**Material examined.** COLOMBIA: Cundimarca: road Sibate to Aguadita, 2600 m, 5 Jul 1967, P. & B. Wygodzinsky (1 ♀, AMNH).

Comments: This species is not described formally here, pending discovery of male specimens.

**Antrops orbitalis** group

The *Antrops orbitalis* group is a clade of 15 species, 12 of which were previously undescribed. This clade was keyed as the *Archiborborus orbitalis* group by Marshall and Buck (2010), and suggested to be an unnamed subgenus. Although this group is highly distinct within the subfamily, the phylogeny suggests it belongs within the genus *Antrops*. Members of the group are small (<3 mm), entirely black to dark brown, and usually almost entirely shiny. Species occur exclusively in the Andes and the Venezuelan coastal ranges, from approximately 1200 m to over 4000 m ASL. Several species occur in the dry puna of northern Argentina and Chile to Peru, while other species occur in moister páramo and cloud forest habitats from Bolivia north to Venezuela.

The *A. orbitalis* group is clearly monophyletic. Synapomorphies for the clade (states found in other Archiborborinae in parentheses) include 1) the nearly uniform structure of the male fifth sternite (Fig. 5.105), broad and parallel-sided at the base with the apical portion narrowed triangularly (various, but never exactly as above); 2) the characteristic apical tooth of the surstylus (surstylus entire, not toothed); 3) entirely brown halters (halters predominately white); 4) interfrontal plates darker than orbital and frontal plates, shiny, and striate (interfrontal plates usually smooth and/or microtomentose, if shiny and striate then paler than orbital and interfrontal plates); 5) gena entirely shiny (gena with at least some microtomentum). The extensively shiny appearance of all members of the group except the male of *A. guandera* **sp. nov.** is also distinctive, and combined with the unmarked wings with pale veins this group is readily recognizable. Within the species group, *A. guandera* is likely the sister group to the remaining species, based on the plesiomorphic retention of extensive microtomentum and 6 acrostichal rows in the
male. The *A. nitidicollis* complex is derived within the group, with the greatest reduction of microtomentum and partial loss of the microtrichia at the base of the wing as derived characters for the clade.

*A. nitidicollis* complex:
The 7 species in the *A. nitidicollis* complex are indistinguishable from each other based on external characters. The male genitalia, particularly the surstylus, are the most distinctive characters distinguishing species. Females of some species are identifiable by combinations of characters of the postbadomen, while others appear to be inseparable. Only the diagnostic characters of the genitalia are described for species other than *A. nitidicollis*.

**Antrops nitidicollis** (Becker)

*Oлина nitidicollis* Becker 1920: 184
*Archiborborus orbitalis* var. *latifrons* Duda: 143
(Figs. 5.98–102, 5.168)

Description:
Head blackish brown, interfrontal plates, suture between gena and postgena, and a median band on gena black, with striated microsculpture. Occiput covered with microtomentum, dorsal margin of microtomentum below level of postocellar bristles, face with a thin band of microtomentum below base of antenna and across lunule, frons and gena shiny. Ocellar bristles just anterior to median ocellus. Subvibrissal and anterior genal bristles about 0.25X length of vibrissa. Gena about 0.8X eye height.


Legs blackish brown, shiny. Mid tibia with 1 anteroventral, 1 posteroventral, 6 apical bristles. Hind tibia with 1 anteroventral bristle just distal to half, 2 ventroapical bristles. The ventroapical bristles are separated by an unmodified seta and may represent the 1st and 3rd ventroapical bristles found in other groups.

Wing clear, with reduced microtrichia at base.
Abdominal tergites blackish brown, heavily sclerotized. Syntergite 1+2 with microtomentum on basal half, extending in middle to or near posterior margin, tergite 3 with microtomentum on basal third sometimes extending posteriorly in middle, tergites 4–5 shiny, sternites shiny. Male without setae on pleural membrane, female with setae and sclerotized bases on sides of segments 3–5.

Male postabdomen: Sternite 5 as described for the species group. Surstylus with medial ridge thin, projecting past anterior edge, at about same level as posterior cleft, ventral tooth narrow, anteroventral corner smoothly rounded (Fig. 5.99). Pregonite indistinct, fully fused with postgonite. Postgonite with lobes barely separated, anterior lobe quadrate, posterior lobe pointed, long, with a narrow tab projecting from medial face. Basiphallus narrow, with long epiphallus and preepiphallus. Distiphallus with small, setose dorsal knob (Fig. 5.98).

Female postabdomen: Tergites 6–7 and sternites 6–7 wider than long, moderately sclerotized, covered with microtomentum. Tergites with 3 posterior strips, sternites with 2 posterior strips. Tergite 8 shiny, widest anteriorly, posterior margin emarginated medially, anterior corners nearly meeting sternite 8 laterally. Epiproct with very short, broad anterior arms, covered with microtomentum except arms, with 2 pairs of setae (Fig. 5.100). Cerci narrow. Sclerites of sternite 8 narrow anteriorly, becoming gradually wider posteriorly, microtomentum covering posterior quarter, apices pointed but without hooks. Hypoproct depressed and emarginated antero-medially (Fig. 5.101). Spermathecae round, apical invagination not meeting basal invagination, sclerotized duct about half as long as spermatheca (Fig. 5.102).

**Type material.** *Olina nitidicollis*: Lectotype ♂ (by present designation): ECUADOR: [Carchi:] Tulcán, 1902, G. Rivet (MNHN; examined). The specimen is double-mounted (minuten in a strip of card) and is in good condition. A red lectotype label has been added to the pin. Paralectotype: ECUADOR: [Carchi:] El Angel, 3000m, 1903, P. Rivet (MNHN).

*Archiborborus orbitalis* var. *latifrons*: Holotype ♂: PERU: [Cuzco:] Cuzco, 22 Mar 1905, 3500 m (SMTD; examined).

**Other material examined.** ECUADOR: Azuay: Tarqui, 2800 m, 7–8 Mar 1965, L.E. Peña (1 ♂, CNCI); Cañar: El Tambo, 2800 m, 4–7 Mar 1965, L.E. Peña (1 ♂, CNCI); Cotopaxi: Latacunga, 45km NNE, 3700 m, shrub grass páramo, carrion traps, 19–25 Jul 1985, S. & J. Peck (1 ♂, DEBU); Pichincha: Cotopaxi Natl. Pk., Quebrada Mishahuaiucu, 0°38'38"S 78°29'29"W, 3600 m, along stream, pan traps, 26 Oct–8 Nov 1999, S.A. Marshall (6 ♂, DEBU); Pichincha Pk., 4km W Aloag, 3000 m, pasture at ravine edge, carrion trap, 19–25 Jul 1985, S. & J. Peck (4 ♂, 20 ♀, DEBU); Quito, 10 km NW, Valley nr. Hostería San Jorge, 0°07'07"S 78°31'31"W, 3000 m, pans in grasspile, 23 Oct 1999, S.A. Marshall (3 ♂, DEBU); as above but stream valley, sweeping (1 ♂, DEBU).
Comments: This species was described from two male specimens from Ecuador. A. Norrbom located and borrowed these syntypes from the MNHN (labelled as this species by Becker, although not explicitly marked as types) and allowed me to examine them. The specimen from Tulcán has the surstyli visible and it is designated as the lectotype to clarify the application of this name. The genitalia of the paralectotype are not visible and I did not dissect the specimen, so its identity is unconfirmed.

The type of *A. latifrons* is the only specimen of this species known from Peru, but the genitalia match specimens from Ecuador closely. Little material of this group was available from Peru, and this species may prove to be more widespread there.

*Antrops cochabamba* sp. nov.
(Figs. 5.69–73, 5.166)

Description:
Male postabdomen: Sternite 5 as described for the species group. Surstylus with medial ridge thin, at about same level as posterior cleft, not projecting past anterior edge, ventral tooth narrow, anteroventral corner smoothly rounded (Fig. 5.70). Pregonite indistinct, fully fused with postgonite. Postgonite with lobes barely separated, anterior lobe quadrate, posterior lobe pointed, long, with a narrow tab projecting from medial face. Basiphallus narrow, with long epiphallus and preepiphallus. Distiphalus with small, setose dorsal knob (Fig. 5.69).

Female postabdomen: Tergites 6–7 and sternites 6–7 wider than long, moderately sclerotized, covered with microtomentum. Tergites with 3 posterior strips, sternites with 2 posterior strips. Tergite 8 shiny, widest anteriorly, posterior margin emarginated medially, anterior corners nearly meeting sternite 8 laterally. Epiproct with very short, broad anterior arms, covered with microtomentum except arms, with 1 pair of setae and an additional medial seta (Fig. 5.71). Cerci narrow. Sclerites of sternite 8 very narrow, microtomentum covering posterior quarter, apices with a two-armed hook-like structure. Hypoproct depressed antero-medially (Fig. 5.72). Spermathecae round, apical invagination meeting basal invagination, sclerotized duct about half as long as spermatheca (Fig. 5.73).

Figures 5.69–75: *Antrops* terminalia. *A. cochabamba*: (69) male, phallus, postgonite, and phallapodeme, lateral view, (70) male, surstylus, anterior view, (71) female, tergite 8, epiproct, cerci, (72) female, sternite 8, hypoproct, (73) female, spermathecae; *A. cochinoca*: (74) male, phallus, postgonite, and phallapodeme, lateral view, (75) male, surstylus, anterior view.
Comments: The species name is derived from the department which includes the type locality and should be treated as a noun in apposition.

**Antrops cotopaxi** sp. nov.
(Figs. 5.76–80, 5.167)

**Description:**
Male postabdomen: Sternite 5 as described for the species group. Surstylus with medial ridge broad, flat, ventral tooth broad at base, narrow distally, anteroventral corner narrowly rounded (Fig. 5.77). Pregonite indistinct, fully fused with postgonite. Postgonite with lobes barely separated, anterior lobe quadrate, posterior lobe pointed, long. Basiphallus narrow, with long epiphallus and preepiphallus. Distiphallus with broad, setose dorsal knob (Fig. 5.76).

Female postabdomen: Tergites 6–7 and sternites 6–7 wider than long, moderately sclerotized, covered with microtomentum. Tergites with 3 posterior strips, sternites with 2 posterior strips. Tergite 8 shiny, widest anteriorly, posterior margin emarginated medially, anterior corners nearly meeting sternite 8 laterally. Epiproct with short anterior arms, covered with microtomentum except arms, with 1 pair of setae (Fig. 5.78). Cerci narrow. Sclerites of sternite 8 narrow anteriorly, parallel-sided for posterior two-thirds, microtomentum covering posterior quarter, apices with a two-armed hook-like structure. Hypoproct depressed antero-medially, with a small protuberance in depression (Fig. 5.79). Spermathecae round, deep apical invagination meeting basal invagination, sclerotized duct about half as long as spermatheca (Fig. 5.80).

**Type material.** Holotype ♂: ECUADOR: Pichincha: Cotopaxi Natl. Pk., Quebrada Mishahuaiyucau, 0°38'38"S 78°29'29"W, 3600 m, along stream, pan traps, 26 Oct–8 Nov 1999, S.A. Marshall (QCAZ). Paratypes: same data as holotype (12 ♂, DEBU); Cotopaxi Natl. Pk., Lago Limpiopungo, 0°36'36"S 78°28'28"W, 3800 m, páramo, shrub litter, 25 Oct 1999, R. Anderson (1 ♂, DEBU); as above but shore, pan traps, 25 Oct–8 Nov 1999, S.A. Marshall (3 ♂, DEBU); Quito–Baeza pass, 6 km W, pans/ dung, 4–8 Nov 1999, S.A. Marshall (2 ♂, DEBU); Azuay: Cerro Tinajillas, 3100 m, 18–21 Mar 1965, L.E. Peña (1 ♂, CNCI); Carchi: Páramo El Angel, 17.3 km NW El Angel, 0°42'42"N 78°00'00"W, 3400 m, pan traps among *Espeletia*, 1–3 Nov 1999, S.A. Marshall (1 ♂, DEBU); Páramo El Angel, 18.8 km NW El Angel, 0°42'42"N 78°00'00"W, 3300 m, pan in *Polylepis* litter, 3 Nov 1999, S.A. Marshall (1 ♂, DEBU); Cotopaxi: Latacunga, 45km NNE, 3700 m, shrub grass páramo, carrion traps, 19–25 Jul 1985, S. & J. Peck (3 ♂, 3 ♀, DEBU); Napo: Quito–Baeza pass, 4000 m, elfin for., dung trap, 1 Mar 1979, S.A. Marshall (2 ♂, DEBU).
Figures 5.76–85: *Antrops* terminalia. *A. cotopaxi*: (76) male, phallus, postgonite, and phallapodeme, lateral view, (77) male, surstylus, anterior view, (78) female, tergite 8, epiproct, cerci, (79) female, sternite 8, hypoproct, (80) female, spermathecae; *A. eurus*: (81) male, phallus, postgonite, and phallapodeme, lateral view, (82) male, surstylus, anterior view, (83) female, tergite 8, epiproct, cerci, (84) female, sternite 8, hypoproct, (85) female, spermathecae.
Comments: The species name is derived from the volcano Cotopaxi, one of the localities where this species occurs and a dominant geographical feature. The name should be treated as a noun in apposition.

*Antrops eurus* sp. nov.

(Figs. 5.81–85, 5.167)

Description:

Male postabdomen: Sternite 5 as described for the species group. Surstylus with medial ridge broad, flat, strongly projecting, ventral tooth broad with a small secondary tooth at base, anteroventral section below below medial ridge narrow, toothlike (Fig. 5.82). Pregonite indistinct, fully fused with postgonite. Postgonite with lobes barely separated, anterior lobe quadrate, posterior lobe pointed, long. Basiphallus narrow, with long epiphallus and preepiphallus. Distiphallus with large, broad, setose dorsal knob (Fig. 5.81).

Female postabdomen: Tergites 6–7 and sternites 6–7 wider than long, moderately sclerotized, covered with microtomentum. Tergites with 3 posterior strips, sternites with 2 posterior strips. Tergite 8 shiny, widest anteriorly, anterior corners slightly produced, shallowly pinched medially, anterior and posterior margins emarginated medially, anterior corners nearly meeting sternite 8 laterally. Epiproct with short, broad anterior arms, covered with microtomentum except arms, with 2 pairs of setae (Fig. 5.83). Cerci narrow. Sclerites of sternite 8 narrow anteriorly, becoming wider posteriorly, microtomentum covering posterior quarter, apices pointed, without hooks. Hypoproct depressed antero-medially (Fig. 5.84). Spermathecae round, long apical invagination meeting basal invagination, sclerotized duct short (Fig. 5.85).

**Type material.** Holotype ♂: ECUADOR: Napo: SierrAzul Lodge, 14 km W Cosanga, 0°40'40"S 77°56'56"W, 2200 m, forest, sweeping, 5 Nov 1999, S.A. Marshall (QCAZ). Paratypes: SierrAzul Res., 14 km W Cosanga, 0°40'40"S 77°56'56"W, 2200 m, treefall, yellow pans, 9–10 May 2002, M. Buck (1 ♂, DEBU); as above but sweeping trail, 9 May 2002 (1 ♂, DEBU); Loja: Cajanuma, Podocarpus Natl. Pk., trail Bosque Nublado, 3000m, malaise, 16 Feb – 5 Mar 2009, Pollet & De Braekeleer (3 ♂, 2 ♀, DEBU). COLOMBIA: Cundinamarca: Bogota, above Tarbio, 21 Aug 1982, K.A. Spencer (9 ♂, MNWC); Huila: San Agustin, Hotel Yoleonia, at lights, 31 Aug 1969, D.H. Messersmith (1 ♂, USNM).

Comments: This species is named after the Greek god of the east wind, referring to the eastern slope of the Andes where this species occurs.
Antrops pecki sp. nov.
(Figs. 5.108–112, 5.170)

Description:
Male postabdomen: Sternite 5 as described for the species group. Surstylus with anterodorsal corner strongly projecting, acute, with a striated raised ridge along anterior edge, ventral tooth narrow, with a medial tooth, anteroventral corner rounded (Fig. 5.109). Pregonite indistinct, fully fused with postgonite. Postgonite with lobes barely separated, anterior lobe quadrate, posterior lobe pointed, long, with a narrow tab projecting from interior face. Basiphallus narrow, with long epiphallus and preepiphallus. Distiphallus with small, setose dorsal knob (Fig. 5.108).

Female postabdomen: Tergites 6–7 and sternites 6–7 wider than long, moderately sclerotized, covered with microtomentum. Tergites with 3 posterior strips, sternites with 2 posterior strips. Tergite 8 shiny, widest anteriorly, strongly pinched medially, anterior and posterior margins emarginated medially, anterior corners nearly meeting sternite 8 laterally. Epiproct with short anterior arms, covered with microtomentum except arms, with 1 pair of setae and a medial unpaired seta (Fig. 5.110). Cerci narrow. Sclerites of sternite 8 narrow anteriorly, becoming gradually wider posteriorly, microtomentum covering posterior quarter, apices rounded and without hooks. Hypoproct depressed antero-medially (Fig. 5.111). Spermathecae round, apical invagination meeting basal invagination, sclerotized duct short (Fig. 5.112).

Type material. Holotype ♂: ECUADOR: Napo: Quito–Baeza road, Papallacta, 3200 m, elfin forest, above thermal spgs., pan traps, 16–21 Feb 1983, L. Masner (QCAZ). Paratypes: same data as holotype (25 ♂, 10 ♀, DEBU); Baeza, 27km NW, 2700 m, dung trap, 2–6 Mar 1976, S. Peck (4 ♀, DEBU); Baeza, 42 km NW, 3300 m, carrion trap, 2–6 Mar 1976, S. Peck (2 ♂, DEBU); Papallacta, above thermal springs, 3200 m, elfin forest, pantraps, 16–21 Feb 1983, L. Masner (4 ♂, DEBU); Azuay: Cerro Tinajillas, 3100 m, 18–21 Mar 1965, L.E. Peña (1 ♂, CNCI); Carchi: Guandera For. Res., 15 km E San Gabriel, 3400 m, sweeping forest trail, 1 Nov 1999, S.A. Marshall (1 ♂, 2 ♀, DEBU); as above but hand (2 ♀, DEBU); as above but 0°35′35″N 77°44′44″W, 3300 m, trail to station, sweeping (2 ♂, 1 ♀, DEBU); Pichincha: Maquipucuna Biol. Res., river trail, 0°07′07″N 78°37′37″W, 1200 m, 29 Oct 1999, S.A. Marshall (1 ♂, DEBU); Tandapi, 34.5 km E, 2835 m, bamboo shrub, dung trap, 24–29 Jun 1975, S. Peck (3 ♀, DEBU); Tandapi, 35km E, bamboo, 24–29 Jun 1975, S. Peck (1 ♂, 1 ♀, DEBU). COLOMBIA: Norte de Santander: above Pamplona, 2743 m, dung trap, 9–13 May 1974, S. Peck (1 ♂, 1 ♀, DEBU)

Comments: The species name honours Stewart Peck, a prolific and generous collector who obtained many of the specimens used in this revision including part of the type series of this species.
Figures 5.86–92: *Antrops* terminalia. *A. guandera*: (86) male, phallus, postgonite, and phallapodeme, lateral view, (87) male, surstylus, anterior view, (88) female, tergite 8, epiproct, cerci, (89) female, sternite 8, hypoproct, (90) female, spermathecae; *A. juninensis*: (91) male, phallus, postgonite, and phallapodeme, lateral view, (92) male, surstylus, anterior view.
Antrops versabilis sp. nov.
(Figs. 5.128–132, 5.168)

Description:
Male postabdomen: Sternite 5 as described for the species group. Surstylus with medial ridge thin, curved around anterodorsal corner, slightly projecting, ventral tooth broad, anteroventral corner right-angled (Fig. 5.129). Pregonite indistinct, fully fused with postgonite. Postgonite with lobes barely separated, anterior lobe short, rounded, posterior lobe pointed, long, with a tooth projecting from anterior edge. Basiphallus narrow, with long epiphallus and preepiphallus. Distiphallus with broad, flattened, setose dorsal knob (Fig. 5.128).

Female postabdomen: Tergites 6–7 and sternites 6–7 wider than long, moderately sclerotized, covered with microtomentum. Tergites with 3 posterior strips, sternites with 2 posterior strips. Tergite 8 shiny, widest anteriorly, strongly pinched medially, anterior and posterior margins emarginated medially, anterior corners nearly meeting sternite 8 laterally. Epiproct with short, broad anterior arms, covered with microtomentum except arms, with 2 pairs of setae and a medial unpaired seta (Fig. 5.130). Cerci narrow. Sclerites of sternite 8 narrow anteriorly, becoming gradually wider posteriorly, microtomentum covering posterior quarter, apices pointed, without hooks. Hypoproct depressed antero-medially (Fig. 5.131). Spermathecae round, long apical invagination meeting basal invagination, sclerotized duct short (Fig. 5.132).


Comments: The species name refers to the apparent ecological versatility of this species, which occurs from just over 1000 m to 4000 m elevation. No other Andean species is known to have such a broad elevational distribution.
**Antrops yungas sp. nov.**

(Figs. 5.133–137, 5.166)

Description:

Male postabdomen: Sternite 5 as described for the species group. Surstylus with medial ridge narrow, strongly projecting, ventral tooth broad, sharply pointed, anteroventral corner subtriangular (Fig. 5.134). Pregonite indistinct, fully fused with postgonite. Postgonite with lobes barely separated, anterior lobe narrow, quadrate, posterior lobe pointed, long. Basiphallus narrow, with long epiphallus and preepiphallus. Distiphallus with broad, rounded, setose dorsal knob (Fig. 5.133).

Female postabdomen: Tergites 6–7 and sternites 6–7 wider than long, moderately sclerotized, covered with microtomentum. Tergites with 3 posterior strips, sternites with 2 posterior strips. Tergite 8 shiny, widest anteriorly, anterior corners slightly produced, shallowly pinched medially, anterior and posterior margins emarginated medially, anterior corners nearly meeting sternite 8 laterally. Epiproct with short, broad anterior arms, covered with microtomentum except arms, with 2 pairs of setae and a medial unpaired seta (Fig. 5.135). Cerci narrow. Sclerites of sternite 8 narrow anteriorly, becoming gradually wider posteriorly, microtomentum covering posterior third, apices pointed, without hooks. Hypoproct depressed antero-medially (Fig. 5.136). Spermathecae round, long apical invagination meeting basal invagination, sclerotized duct short (Fig. 5.137).

**Type material.** Holotype ♂: PERU: Cusco: Wayqecha Biol. Stn., ~9 km NE Challabamba, 13°10’10”S 71°34’34”W, ~2800 m, cloud forest, 14–15 May 2007, compost, ypt, Marshall & Kits (QCAZ). Paratypes: same data as holotype (1 ♂, 1 ♀, DEBU); same as above but dung pans in wood chips (1 ♂, 1 ♀, DEBU); Challabamba, ~3 km NE, 13°11’56”S 71°38’27”W, ~3450 m, dry grass, ypt, 13–16 May 2007, Marshall, Kits, & Paiero (1 ♀, DEBU); Puente Pilco, ~5.3 km NNW Challabamba, along creek, 13°10’10”S 71°46’46”W, ~2800 m, yellow pans, 13–16 May 2007, Marshall & Kits (1 ♀, DEBU).


Comments: The species name refers to the yungas ecoregion, and should be treated as a noun in apposition.
Figures 5.93–102: *Antrops* terminalia. *A. mucarensis*: (93) male, phallus, postgonite, and phallapodeme, lateral view, (94) male, surstylus, anterior view, (95) female, tergite 8, epiproct, cerci, (96) female, sternite 8, lateral margins of tergite 8, hypoproct (97) female, spermathecae; *A. nitidicollis*: (98) male, phallus, postgonite, and phallapodeme, lateral view, (99) male, surstylus, anterior view, (100) female, tergite 8, epiproct, cerci, (101) female, sternite 8, hypoproct, (102) female, spermathecae.
Other species of the *orbitalis* group:
Most species not included in the *nitidicollis* complex (except the *A. tetrastichus/A. unduavi* species pair) can be distinguished by external characters.

*Antrops orbitalis* (Duda)
Archiborborus orbitalis Duda, 1921: 141
(Figs. 5.103–108, 5.169)

Description:
As described for *A. nitidicollis*. Microtomentum on frons extending from occiput anteriorly along orbital plates to anterior edge of plate, and anteriorly on frontal plate to bases of postocellar bristles, microtomentum on face with thick crescents below antennal bases. Lateral and posterior margins of scutum and a spot at the base of anteriormost acrostichals, margins of scutellum, latero- and mediотergite, meron and metapleuron covered with microtomentum, anepisternum with a small spot of microtomentum in posterdorsal corner, rest of thorax shiny. Acrostichal setae in 2 rows. Microtrichia not reduced at base of wing. Abdomen with syntergite 1+2 and tergite 3 mostly covered with microtomentum, shiny laterally, male sternite 5 with a thin band of microtomentum basally, rest of preabdominal sternites and tergites shiny.

Male postabdomen: Sternite 5 broad and parallel-sided at the base with the apical portion narrowed triangularly (Fig. 5.105). Surstylus with medial ridge broad, strongly projecting, anteroventral corner subtriangular, ventral tooth broad, rounded apically (Fig. 5.104). Pregonite indistinct, fully fused with postgonite. Postgonite with lobes barely separated, anterior lobe very short, quadrate, posterior lobe pointed, long. Basiphallus narrow, with long epiphallus and preepiphallus, preepiphallus mostly transparent, only posterior edge sclerotized. Distiphallus with broad, flat-topped, spinose dorsal knob (Fig. 5.103).

Female postabdomen: Tergites 6–7 and sternites 6–7 wider than long, moderately sclerotized, covered with microtomentum. Tergites with 3 posterior strips, sternites with 2 posterior strips. Tergite 8 shiny, widest anteriorly, posterior margin emarginated medially, anterior corners produced anteriorly and nearly meeting sternite 8 laterally. Epiproct with very short anterior arms, covered with microtomentum except arms, with 1 pair of setae and a medial unpaired seta (Fig. 5.106). Cerci narrow. Sclerites of sternite 8 with anterior third thin, pinched, shiny, distal two-thirds broad, covered with microtomentum, apices bilobed, sharply pointed, without hooks. Hypoproct depressed antero-medially, depression with a raised
trilobed ridge (Fig. 5.107). Spermathecae round, long apical invagination meeting basal invagination, sclerotized duct about one-third as long as spermatheca (Fig. 5.108).

**Type material.** Lectotype ♂ (here designated): PERU: Puno, “Titicaca-See”, 12 Jun 1903 (SMTD; examined). Paralectotypes: same data as lectotype and BOLIVIA: "Cordillere", 4–5000 m, 14 May 1903 (3 ♂, 3 ♀, not examined). I examined 4 specimens labelled as co-types, including the lectotype here designated, as well as 1 ♂ from the type locality with the date 16 Nov 1902, 1 ♀ from the type locality with the date 7 Jun 1903, and 1 ♂ from PERU: Juliaca, 14 Jun 1903. Presumably the first two, at least, are part of the type series, and Duda only mentioned the collecting date of the specimen here designated as lectotype.

**Other material examined.** BOLIVIA: La Paz: Alto de La Paz, 4500–4600 m, 28 Oct 1968, L.E. Peña (3 ♂, CNCI); Desaguadero, 3 km E, shore Lago Titicaca, 16°33'33"S 69°01'01"W, shoreline drift, sweeping, 19 Apr 2001, S.A. Marshall (10 ♂, DEBU); Lago Titicaca, Mapac, Sahuiña, 16°10'10"S 69°04'04"W, 3812 m, 23 Apr 1997, L. Masner (2 ♂, 8 ♀, DEBU); Lake Titicaca W Guaqui, 16°35'35"S 68°53'53"W, 3810 m, shoreline, sweeping, 19 Apr 2001, S.A. Marshall (4 ♂, 2 ♀, DEBU).

Comments: This species, as well as 4 similar species (A. tumbensis, A. mucarensis, A. cochinoca, and A. juninensis) is found in drier habitats than other members of the A.orbitalis group, or indeed most other montane Archiborborinae. It has been collected in association with *Maculantrops altiplanus sp. nov.* along the margins of Lake Titicaca in Bolivia.

**Antrops cochinoca sp. nov.**

(Figs. 5.74–75, 5.169)

Description:
As described for *A. orbitalis*. Acrostichal setae in 2 rows, with an additional pair at suture.

Male postabdomen: Sternite 5 as described for the species group. Surstylus with medial ridge broad, strongly projecting, anteroventral corner projecting, rounded, ventral tooth broad, pointed apically (Fig. 5.75). Pregonite indistinct, fully fused with postgonite. Postgonite with lobes barely separated, anterior lobe very short, quadrate, posterior lobe pointed, long. Basiphallus narrow, with long epiphallus and preepiphallus, preepiphallus mostly transparent, sclerotized along posterior edge only. Distiphallus with broad, flattened, spinose dorsal knob, distal edge toothed (Fig. 5.74).

Female unknown.
**Type material.** Holotype ♂: ARGENTINA: **Jujuy**: Cochinoca, ~3700 m, small stream, llama dung, debris, sweep, 26 Feb 1992, S.A. Marshall (DEBU).

Comments: The species name is derived from the type locality, and should be treated as a noun in apposition.

*Antrops juninensis* sp. nov.

(Figs. 5.91–92)

Description:
As described for *A. orbitalis*. Postpronotum with microtomentum along anterior and lateral margins. Anepimeron with microtomentum dorsally. Syntergite 1+2 mostly covered with microtomentum, posterior corners shiny, tergites 3–4 with thin band of microtomentum basally, tergite 5 shiny. Sternite 5 covered with microtomentum (anterior sternites not visible in holotype). Bristles on scutum rubbed off, number of acrostichal rows cannot be determined.

Male postabdomen: Sternite 5 as described for the group, but with a small medial tab projecting from posterior margin. Surstylus without any setae in anteroventral corner, with a strong medial ridge reaching base of ventral tooth (Fig. 5.92). Postgonite with posterior lobe long and straight, anterior lobe short, projecting laterally. Basiphallus narrow, with long epiphallus and preepiphallus, preepiphallus mostly sclerotized, tip transparent. Distiphallus with dorsal tube truncated distally, with very small spines, ventral clear sac with a small lateral spinose projection and a larger ventral spinose projection (Fig. 5.91).

Female unknown.

**Type material.** Holotype ♂: PERU: **Junin**: Ondores, puna and wet pastures, 4100 m, 28–31 Dec 1980, Gärdensfors, Hall, & Samuelsson (USNM).

Comments: This species is named after the type locality.
**Antrops mucarensis sp. nov.**
(Figs. 5.93–97, 5.169)

Description:
As described for *A. orbitalis*. Acrostichal setae in 2 rows with an additional pair at posterior margin of scutum. Abdominal tergite 3 with microtomentum restricted to base.

Male postabdomen: Sternite 5 as described for the species group. Surstylus with medial ridge broad, strongly projecting, anteroventral corner slightly broader than right-angled, ventral tooth broad, rounded apically (Fig. 5.94). Pregonite indistinct, fully fused with postgonite. Postgonite with lobes barely separated, anterior lobe very short, quadrate, posterior lobe pointed, long. Basiphallus narrow, with long epiphallus and preepiphallus, preepiphallus mostly transparent, sclerotized along posterior edge only. Distiphallus with broad, flattened, spinose dorsal knob (Fig. 5.93).

Female postabdomen: Tergites 6–7 and sternites 6–7 wider than long, moderately sclerotized, covered with microtomentum. Tergites with 3 posterior strips, sternites with 2 posterior strips. Tergite 8 shiny, widest anteriorly. In only available female, lateral edges of tergite 8 are folded around abdomen and lie next to sternite 8, and folded portion is concave (Fig. 5.96). It is unclear whether this is the normal state or if this is a drying artifact. Epiproct with moderately long anterior arms, shiny, with 2 pairs of setae (Fig. 5.95). Cerci narrow. Sclerites of sternite 8 narrow, parallel-sided for most of length, strongly pinched near base, distal third with microtomentum, apices bilobed, sharply pointed, without hooks. Hypoproct depressed antero-medially (Fig. 5.96). Spermathecae round, apical invagination not meeting basal invagination, sclerotized duct about as long as spermatheca (Fig. 5.97).

**Antrops tumbrensis sp. nov.**
(Figs. 5.118–122, 5.169)

Description:
As described for *A. orbitalis*. Subvibrissal and anterior genal bristles about 0.5X length of vibrissa. Acrostichal setae in 4 rows. Abdominal tergite 4 mostly covered with microtomentum, shiny laterally, tergite 5 with microtomentum anteromedially.
Male postabdomen: Sternite 5 as described for the species group. Surstylus with medial ridge broad, strongly projecting, anteroventral corner nearly right-angled, ventral tooth broad, rounded apically (Fig. 5.119). Pregonite indistinct, fully fused with postgonite. Postgonite with lobes barely separated, anterior lobe very short, quadrate, posterior lobe pointed, long. Basiphallus narrow, with long epiphallus and preepiphallus, preepiphallus mostly sclerotized, tip transparent. Distiphallus with small, round, spinose dorsal knob, distal edge toothed (Fig. 5.118).

Female postabdomen: Tergites 6–7 and sternites 6–7 wider than long, moderately sclerotized, covered with microtomentum. Tergites with 3 posterior strips, sternites with 2 posterior strips. Tergite 8 shiny, as wide anteriorly as posteriorly, pinched medially, anterior and posterior margins emarginated medially, nearly meeting sternite 8 laterally. Epiproct with moderately long anterior arms, shiny, with 2 pairs of setae and a medial unpaired seta (Fig. 5.120). Cerci narrow. Sclerites of sternite 8 broad, strongly pinched near basal third, distal third covered with microtomentum, apices pointed, without hooks. Hypoproct depressed antero-medially (Fig. 5.121). Spermathecae round, broad shallow apical invagination, short basal invagination, sclerotized duct short (Fig. 5.122).

**Type material.** Holotype ♂: CHILE: Antofagasta: Tumbre, 4 Oct 1955, L.E. Peña (CNCI). Paratypes: same data as holotype (1 ♂, 1 ♀, CNCI).

Comments: This species is named after the type locality.

**Type material.** Holotype ♂: CHILE: Antofagasta: on Argentina border, 4000–4100 m, 12–16 Dec 1965, L.E. Peña (CNCI). Paratypes: same data as holotype (1 ♀, CNCI).

Comments: This species is named after the type locality.

*Antrops guandera* sp. nov.
(Figs. 5.86–90, 5.171)

**Description:**
As described for *A. nitidicollis*. Male with microtomentum on frons covering frontal triangle and orbital plates, female with microtomentum on frons covering orbital plates to just anterior of anterior orbital bristle. Anterior genal bristle about 0.5X length of vibrissa, subvibrissal bristle about 0.6X length of vibrissa. Male with thorax entirely covered with microtomentum. Female with microtomentum on lateral
and posterior margins of scutum and a spot at the base of anteriormost acrostichals, margins of scutellum, and latero- and medioltergite, thorax otherwise shiny. Acrostichal setae in 6 irregular rows. Microtrichia not reduced at base of wing. Male with abdominal tergites covered with microtomentum, sternites 2–3 covered with microtomentum, sternites 4–5 with a thin band of microtomentum at bases. Female with tergites 1–3 covered with microtomentum, shiny laterally, tergite 4 with microtomentum across basal quarter, tergite 5 shiny, sternites shiny.

Male postabdomen: Sternite 5 as described for the group. Surstylus with strong medial ridge with 7 setae, setae on ventral tooth strong, anteroventral corner rounded (Fig. 5.87). Pregonite indistinct, fused with postgonite. Postgonite with anterior lobe relatively long. Preepiphallus narrow. Distiphallus with small, setose dorsal knob (Fig. 5.86).

Female postabdomen: Tergites 6–7 and sternites 6–7 wider than long, moderately sclerotized, shiny. Tergites with 3 posterior strips, sternites with 2 posterior strips. Tergite 8 shiny, widest anteriorly, posterior margin emarginated medially, anterior corners nearly meeting sternite 8 laterally. Epiproct with short anterior arms, covered with microtomentum except anterior arms, with 2 pairs of setae, may have some additional unpaired setae (Fig. 5.88). Cerci long. Sclerites of tergite 8 with anterior portion narrow, pinched, microtomentum restricted to apical sixth, no apical hooks. Hypoproct not distinctly depressed (Fig. 5.89). Spermathecae round, slightly shorter than wide, with deep apical invagination, no basal invagination, sclerotized duct short (Fig. 5.90).

**Type material.** Holotype ♂: ECUADOR: Carchi: Guandera For. Res., 15 km E San Gabriel, 0°35′35″N 77°44′44″W, 3300 m, trail to station, sweeping, 1 Nov 1999, S.A. Marshall (QCAZ). Paratypes: same data as holotype (27 ♂, 14 ♀, DEBU).

Comments: The male of species is very distinctive within the *A. orbitalis* group, with the most of the body covered with microtomentum. The species name is derived from the type locality and should be treated as a noun in apposition.
Figures 5.118–127: Antrops terminalia. *A. tumbrensis*: (118) male, phallus, postgonite, and phallapodeme, lateral view, (119) male, surstylus, anterior view, (120) female, tergite 8, epiproct, cerci, (121) female, sternite 8, hypoproct, (122) female, spermathecae; *A. unduavi*: (123) male, phallus, postgonite, and phallapodeme, lateral view, (124) male, surstylus, anterior view, (125) female, tergite 8, epiproct, cerci, (126) female, sternite 8, hypoproct, (127) female, spermathecae.
Figures 5.128–137: *Antrops* terminalia. *A. versabilis*: (128) male, phallus, postgonite, and phallapodeme, lateral view, (129) male, surstylus, anterior view, (130) female, tergite 8, epiproct, cerci, (131) female, sternite 8, hypoproct, (132) female, spermathecae; *A. yungas*: (133) male, phallus, postgonite, and phallapodeme, lateral view, (134) male, surstylus, anterior view, (135) female, tergite 8, epiproct, cerci, (136) female, sternite 8, hypoproct, (137) female, spermathecae.
**Antrops tetrastichus** sp. nov.
(Figs. 5.113–117, 5.171)

Description:
As described for *A. nitidicollis*. Microtomentum on occiput reaching dorsally to bases of postocellar bristles. Lateral and posterior margins of scutum, margins of scutellum, latero- and mediotergite, meron and metapleuron covered with microtomentum, rest of thorax shiny. Presutural acrostichal setae in 4 rows. Microtrichia not reduced at base of wing. Abdominal tergites 4–5 with microtomentum on basal third, shiny laterally.

Male postabdomen: Sternite 5 as described for the species group. Surstylus with anterior margin raised as a broad smooth ridge, anteroventral corner nearly right-angled, rounded, ventral tooth broad, pointed apically (Fig. 5.114). Pregonite indistinct, fully fused with postgonite. Postgonite with lobes barely separated, anterior lobe short, narrow, quadrate, posterior lobe pointed, long. Basiphallus narrow, with long epiphallus and preepiphallus. Distiphallus with narrow, rounded, spinose dorsal knob (Fig. 5.113).

Female postabdomen: Tergites 6–7 and sternites 6–7 wider than long, moderately sclerotized, covered with microtomentum. Tergites with 3 posterior strips, sternites with 2 posterior strips. Tergite 8 shiny, widest anteriorly, pinched medially, shallowly emarginated anteriorly and posteriorly, anterior corners nearly meeting sternite 8 laterally. Epiproct with short, broad anterior arms, with 2 pairs of setae and a medial unpaired seta (Fig. 5.115). Cerci narrow. Sclerites of sternite 8 narrow, pinched medially, distal third broader and covered with microtomentum, apices pointed. Hypoproct depressed antero-medially (Fig. 5.116). Spermathecae round, long apical invagination meeting basal invagination, sclerotized duct short (Fig. 5.117).

**Type material.** Holotype ♂: ECUADOR: Napo: Quito–Baeza pass, 4000 m, elfin for., dung trap, 1 Mar 1979, S.A. Marshall (QCAZ). Paratypes: same data as holotype (5 ♂, 10 ♀, DEBU); Baeza, 42 km NW, 3300 m, dung trap, 2–6 Mar 1976, S. Peck (1 ♂, DEBU); as above but carrion trap (1 ♂, 1 ♀, DEBU); Quito–Baeza pass, 1 km E, 0°20'20"S 78°10'10"W, 3950 m, elfin forest, dung traps, 4–8 Nov 1999, S.A. Marshall (1 ♂, DEBU); as above but forest edge (15 ♂, 14 ♀, DEBU); Quito–Baeza road, 4000 m, elfin for., dung trap, 1 Mar 1979, S.A. Marshall (14 ♂, 12 ♀, DEBU); as above but pan traps, 1–2 Mar 1979 (1 ♀, DEBU); as above but elfin forest, dung trap, 8 Mar 1979 (16 ♂, 1 ♀, DEBU); as above but elfin for., 1 Mar 1979 (5 ♂, DEBU); as above but open páramo, pan traps, 10–18 Feb 1983, L. Masner (4 ♂, 6 ♀, DEBU); as above but low páramo, 18–23 Feb 1983 (2 ♂, 1 ♀, DEBU); as above but elfin forest, 18 Feb 1983 (2 ♀, DEBU); as above but 4100 m, summit, 18–22 Feb 1983 (1 ♀, DEBU); as above but páramo, 1 Mar 1983 (4 ♂, 3 ♀, DEBU); as above but in páramo, H. Tituana (2 ♂, DEBU); Cotopaxi: Latacunga, 45 km NNE, 3700 m, shrub grass páramo, carrion traps, 19–25 Jul 1985, S. & J. Peck (3 ♂, 4 ♀, DEBU); Napo/Pichincha: Quito–Baeza pass, 0°18'18"S 78°11'11"W, 4000 m, pans traps in moss, 4–8 Nov 1999,
S.A. Marshall (2 ♂, 1 ♀, DEBU); **Pichincha**: Quito–Baeza pass, 6 km W, pans/ dung, 4–8 Nov 1999, S.A. Marshall (1 ♂, DEBU); Río Palenque Stn., 27 km S Santo Domingo, 0°00'00"N 0°00'00"E, 250 m, 17–25 Feb 1979 (1 ♂, DEBU); Ecuador, 0°16'16"S 78°12'12"W, 4200 m, pan traps, 1–2 Mar 1979, S.A. Marshall (2 ♀, DEBU).

Comments: The species name is derived from the Greek *tetra* (four) and *stichos* (row), referring to the four rows of acrostichal setae.

**Antrops unduavi** sp. nov.
(Figs. 5.123–127, 5.172)

Description:
As described for *A. tetrastichus*.

Male postabdomen: Sternite 5 as described for the species group. Surstylus with dorsal portion of anterior margin raised as a broad smooth ridge, anteroventral corner rounded with a narrow setose ridge, ventral tooth broad, rounded apically (Fig. 5.124). Pregonite indistinct, fully fused with postgonite. Postgonite with lobes barely separated, anterior lobe short, narrow, quadrate, posterior lobe pointed, long. Basiphallus narrow, with long epiphallus and preepiphallus. Distiphallus with narrow, rounded, spinose dorsal knob (Fig. 5.123).

Female postabdomen: Tergites 6–7 and sternites 6–7 wider than long, moderately sclerotized, covered with microtomentum. Tergites with 3 posterior strips, sternites with 2 posterior strips. Tergite 8 shiny, widest anteriorly, posterior margin emarginated medially, anterior corners nearly meeting sternite 8 laterally. Epiproct with moderately long anterior arms, with 2 pairs of setae and a medial unpaired seta (Fig. 5.125). Cerci narrow. Sclerites of sternite 8 broad, slightly narrower and pinched medially, distal two-thirds covered with microtomentum, apices with a hook-like projection. Hypoproct depressed anteromedially (Fig. 5.126). Spermathecae round, long apical invagination meeting basal invagination, sclerotized duct short (Fig. 5.127).

**Type material.** Holotype ♂: **BOLIVIA: La Paz**: Unduavi, 16°19'19"S 67°54'54"W, 3500 m, moss, 5–17 Apr 2001, S.A. Marshall (UASC). Paratypes: same data as holotype (1 ♂, 1 ♀, DEBU); as above but grass, pan traps (2 ♀, DEBU).
Comments: The species name is derived from the type locality and should be treated as a noun in apposition.

*Antrops quadrilobus* group

The *A. quadrilobus* group is a clade of 9 species. Synapomorphies for the species group are the near loss of the presutural dorsocentral bristle and the shape of male sternite 5, which has a broad anterior apodeme with a dorsal keel and posterolateral corners produced with tufts of setae. The group is also characterized by an extensively shiny scutum. As species in this group are very similar in external morphology, species descriptions are abbreviated and only include characters which differ between species.

Description:

Head colour and microtomentum variable. Face evenly sclerotized, ventral margin straight, lunule small. Occiput narrow below occipital foramen. Gena about 0.8X height of eye. Clypeus narrow, slightly produced. Palpus with dark setae concentrated along lateral margin. Prementum well-developed, circular, about 0.5X height of head. Labellum with 12 pseudotrachea. Scape very short, with 1–2 dorsomedial setulae; pedicel subtriangular, medial bristles slightly longer than outer; first flagellomere round, slightly pointed dorsoapically; arista dorsolateral, preapical, 2-segmented, about as long as head width, short-plumose. Chaetotaxy: orbital bristles in two lateroclinate pairs; irregular orbital setulae along orbital plate; interfrontal setae in 4–6 medioclinate pairs; ocellar bristles lateroapically, just anterior to median ocellus; irregular, very short ocellar setulae; inner vertical bristles inclinate; outer vertical bristles lateroapically; postocellar bristles as long as ocellar bristles, slightly procline; postvertical bristles small, cruciate; setae on median occipital sclerite short, medioclinate; postocular setae in a complete row with an incomplete row of occipital setae behind; vibrissa strong, as long as head; 1 subvibrissal bristle; 1 upturned anterior genal bristle; genal setae in 2–3 rows.

Thorax black, mostly shiny. Scutum with microtomentum along lateral margin, anepisternum with microtomentum along posterior margin, katepisternum with microtomentum on anterior third and ventral margin except shiny spot behind fore coxa, metapleuron with microtomentum between posterior spiracle and hind coxa, anepimeron and laterotergite covered with microtomentum. Halter whitish, brown below knob. Chaetotaxy: postpronotum with a single bristle; notopleuron with two bristles, posterior about 0.5X length of anterior; one presutural and one postsutural intra-alar bristle; one long postalar bristle in line with intra-alars and a shorter postalar between this and scutellum; three dorsocentral bristles (one
presutural and two postsutural), presutural very short, barely or not distinguishable from surrounding setae; acrostichal setae in 6–8 irregular rows; scutellum with 2 pairs of scutellar bristles; proepisternum with several small setulae; katepisternum with a single large dorsal bristle and irregular setae ventrally.

Wing membrane pale brown, crossveins may be surrounded by a slightly darker cloud. Vein M reaching wing margin, CuA1 extending somewhat past crossvein dm-cu, not reaching wing margin, A1+CuA2 diverging from CuA1, distal part not vascularised, not reaching wing margin. Calypter with a dense marginal patch of flattened setae.


Abdominal tergites black, syntergite 1+2 entirely covered with microtomentum, posterior tergites with less microtomentum, tergites 4–5 usually with only basal third covered. Sternites weakly sclerotized in female, weakly to heavily sclerotized in male. Pleural membrane with setae on segments 2–5.

Male postabdomen: Sternite 5 generally similar between species, with lateral sides curved, posterolateral corners projecting with tufts of long setae, anterior apodeme broad with a strong dorsal keel. Synsternite 6+7 asymmetrical, complex, a portion often detached and forming an accessory sclerite flanking distiphallus in genital pouch; dorsal corner fused to sternite 8. Sternite 8 broadly fused to epandrium along right side. Epandrium more or less symmetrical, with a cleft above anterior edge of surstylus. Cerci small and medially fused. Subependrial sclerite Y -shaped, articulated with cerci and surstyli. Surstylus broad, scoop-shaped, articulated with epandrium and subependrial sclerite. Hypandrial arms weakly fused with ventral edge of epandrium; hypandrial apodeme well-developed, somewhat flattened, weakly fused with arms. Phallapodeme well-developed, curved and broadest distally. Postgonites long and bilobed apically, articulated with phallapodeme, hypandrium, and basiphallus. Pregonites tiny, more or less fused with postgonites. Ejaculatory apodeme small, often lost in dissections. Basiphallus usually with both epiphallus and preepiphallus. Distiphallus complex, structure variable between species.
Figures 5.138–143: (138) Antrops inca, habitus, Wayqecha, Peru. Antrops male terminalia: (139) A. bellavista, phallus, postgonite, and phallapodeme, lateral view; (140) A. coroico, phallus, postgonite, and phallapodeme, lateral view; (141) A. fulgiceps, phallus, postgonite, and phallapodeme, lateral view; (142) A. inca, phallus, postgonite, and phallapodeme, lateral view; (143) A. papallacta, phallus, postgonite, and phallapodeme, lateral view.
Female postabdomen: Abdomen telescoping, usually retracted in preserved specimens. Tergites and sternites 6–7 usually weakly sclerotized, narrow. Tergite 8 heavily sclerotized, sternite 8 divided medially, heavily sclerotized. Epiproct and hypoproct moderately sclerotized. Cerci simple, not fused with epiproct or each other. Three spermathecae, one pair sharing a duct and the other on a separate duct.

*Antrops bellavista* sp. nov.
(Figs. 5.139, 5.173)

Description:
Occiput black, face reddish brown, frons and gena intermediately coloured, antenna orange, prementum dark brown. Mostly covered with microtomentum, frons with frontal triangle and interfrontal plates mostly shiny, microtomentum around bases of postvertical bristles, microtomentum on orbital plates reaching bases of interfrontal setae, face mostly shiny, microtomentum on lunule and below base of antenna, gena with large median shiny spot. Subvibrissal bristle about 0.5X length of vibrissa, anterior genal bristle about 0.3X length of vibrissa.

Anterior postsutural dorsocentral bristle short in male, about 0.25X length of posterior dorsocentral.

Trochanters and mid tarsus yellow, fore and hind tarsi brown. Hind tibia with an anteroventral bristle, barely thicker but distinctly longer than surrounding setae, 3 ventroapical bristles.

Abdominal sternites 2–3 weakly sclerotized in male, sternite 4 black, heavily sclerotized, covered with tomentum.

Male postabdomen: Sternite 5 with curved lateral margins, widest medially, posterior corners projecting strongly and bearing tufts of long setae, posterior margin emarginated forming two shallow lobes, anterior apodeme about as long as external portion, pointed, with a dorsal keel. Surstylus scooped. Pregonite small, distinct. Postgonite with lobes well separated, anterior lobe rounded, posterior lobe acutely pointed. Basiphallus with short epiphallus, short, narrow preepiphallus. Distiphallus simple, with nearly straight, spinose dorsal tube (Fig. 5.139).

Female postabdomen: Tergites 6–7 and sternites 6–7 wider than long, sclerotized along anterior and lateral margins only. Tergites with 3 posterior strips, sternites with 2 posterior strips. Tergite 8 with a
shallow cleft in anterior margin, strongly pinched medially, medial section and posterior margin covered with microtomentum. Epiproct with short anterior arms, shiny, with 1 pair of setae. Cerci broad. Sclerites of sternite 8 broad, subrectangular, pinched and sculptured medially, distal third with microtomentum. Hypoproct subrectangular, with anterior margin and posterior inverted triangle sclerotized. Spermathecae cylindrical, about 2X longer than wide, annulated, without invaginations, sclerotized duct about half as long as spermathecae.

**Type material.** Holotype ♂: ECUADOR: Pichincha: Bellavista Reserve, 0°00'00"S 78°40'40"W, 2200 m, 28 Oct 1999, S.A. Marshall (QCAZ). Paratypes: same data as holotype but ridge trail, pans nr. dung, 28–30 Oct 1999 (1 ♂, 4 ♀, DEBU); as above but sweeping/aspirating, 28 Oct 1999 (2 ♂, DEBU); Bellavista Reserve, trail 'B', 0°00'00"N 78°40'40"W, 2200 m, sweeping, 30 Oct 1999, S.A. Marshall (1 ♀, DEBU); Tandapi, 21.7km E., mossy forest, dung trap, 24–29 Jun 1975, S. Peck (5 ♂, 5 ♀, DEBU).

Comments: The species name is derived from the type locality and should be treated as a noun in apposition.

**Antrops coroico sp. nov.**
(Figs. 5.140, 5.174)

Description:
Head black, anterior margin of frons, face, and antenna reddish brown. Clypeus orange, maxillary palp yellow, prementum dark brown. Mostly covered with microtomentum, frons with frontal triangle and interfrontal plates mostly shiny, microtomentum around bases of postvertical bristles and bases of ocellar bristles, may reach anteriorly from ocellar bristles, microtomentum on orbital plates reaching bases of interfrontal setae, face mostly shiny, microtomentum on lunule and below base of antenna, gena may have small median shiny spot, occiput with shiny spots lateral to foramen. Subvibrissal and anterior genal bristles about 0.5X length of vibrissa.

Trochanters and tarsi reddish brown. Hind tibia with a long thin anteroventral bristle, 3 ventroapical bristles.

Sternites heavily sclerotized, black, covered with microtomentum in male.

Male postabdomen: Sternite 5 with curved lateral margins, widest medially, posterior corners projecting slightly and bearing tufts of long setae, posterior margin shallowly emarginated, anterior apodeme about
as long as external portion, pointed, with a dorsal keel. Surstylus broad, scooped. Pregonite small, fused with postgonite. Postgonite with lobes long, clearly separated, anterior lobe rounded, posterior lobe slightly longer, pointed. Basiphallus with short epiphallus and preepiphallus, preepiphallus transparent. Distiphallus with dorsal tube of unusual shape, spinose basal portion right-angled, with a smooth, fan-shaped apical sclerite, ventral sclerite curved dorsally at apex, forming a shield-like sclerite (Fig. 5.140).

Female postabdomen: Tergites 6–7 and sternites 6–7 wider than long, sclerotized along anterior and lateral margins only. Tergites with 3 posterior strips, sternites with 2 posterior strips. Tergite 8 with a shallow cleft in anterior margin, pinched medially, covered with microtomentum except anterior corners. Epiproct with short anterior arms, shiny, with 2 pairs of setae. Cerci broad. Sclerites of sternite 8 broad, subrectangular, pinched medially, distal third with microtomentum. Hypoproct subrectangular, with an hourglass-shaped sclerotized patch. Spermathecae barrel-shaped, about 1.2X longer than wide, without invaginations, sclerotized duct about as long as spermathecae.

**Type material.** Holotype ♂: BOLIVIA: La Paz: Coroico, Cerro Uchumachi, 16°12’12"S 67°42’42"W, 2550 m, cloud forest, 5 Apr 2001, S.A. Marshall (UASC). Paratypes: same data as holotype (1 ♀, DEBU); as above but elfin forest, dung pans, 5–6 Apr 2001 (2 ♂, 3 ♀, DEBU); as above but pan traps, 5–16 Apr 2001 (2 ♀, DEBU); as above but 6 Apr 2001 (1 ♀, DEBU).

Comments: The species name is derived from the type locality, and should be treated as a noun in apposition.

**Antrops fulgiceps sp. nov.**
(Figs. 5.141, 5.173)

Description:
Head orange, maxillary palp yellow. Occiput covered with microtomentum, frons entirely shiny except orbital plates, face mostly shiny, microtomentum on lunule and below base of antenna, gena mostly shiny with microtomentum along ventral margin and in a spot below eye. Subvibrissal and anterior genal bristles about 0.3X length of vibrissa.

Thorax reddish around sutures of sclerites. Halter white.

Trochanters and mid and hind tarsi yellow, fore tarsus brown. Hind tibia with 2 ventroapical bristles.
Sternites heavily sclerotized, black, covered with microtomentum in male.

Male postabdomen: Sternite 5 with curved lateral margins, widest medially, posterior corners projecting and bearing tufts of long setae, anterior apodeme about two-thirds as long as external portion, pointed, with a dorsal keel. Surstylus broad, scooped. Pregonite distinct. Postgonite with lobes narrowly separated, anterior lobe rounded, posterior lobe longer, pointed. Basiphallus with short epiphallus, short, transparent preepiphallus. Distiphallus strongly curved spinose dorsal tube (Fig. 5.141).

Female postabdomen: Tergites 6–7 and sternites 6–7 wider than long, sclerotized along anterior and lateral margins only. Tergites with 3 posterior strips, sternites with 2 posterior strips. Tergite 8 with a deep cleft in anterior margin, strongly pinched medially, distal half covered with microtomentum. Epiproct with short anterior arms, shiny, with 1 pair of setae. Cerci broad. Sclerites of sternite 8 broad, subrectangular, pinched and sculptured medially, distal third with microtomentum. Hypoproct subrectangular, weakly sclerotized. Spermathecae cylindrical, about as long as wide, with shallow basal and apical invaginations, sclerotized duct about as long as spermathecae.

**Type material.** Holotype ♂: VENEZUELA: Táchira: San Cristobal, 55 km NE, 3048 m, 17–18 May 1974, J. Peck (MIZA). Paratypes: same data as holotype (1 ♂, 2 ♀, DEBU).

Comments: The species name is from the Latin *fulgis* (shining) + *caput* (head), referring to the mostly bare and contrastingly orange head.

**Antrops inca sp. nov.**
(Figs. 5.142, 5.175)

Description:
Head black, anterior margin of frons, face, and antenna reddish brown. Clypeus orange, maxillary palp yellow, prementum dark brown. Mostly covered with microtomentum, frons with frontal triangle and interfrontal plates mostly shiny, microtomentum around bases of postvertical bristles and bases of ocellar bristles, may reach anteriorly from ocellar bristles, microtomentum on orbital plates reaching bases of interfrontal setae, face mostly shiny, microtomentum on lunule and below base of antenna, gena may have small median shiny spot. Subvibrissal and anterior genal bristles about 0.5X length of vibrissa.

Trochanters and tarsi reddish brown. Hind tibia with 3 ventroapical bristles.
Sternites heavily sclerotized, black, covered with microtomentum in male.

Male postabdomen: Sternite 5 with curved lateral margins, widest medially, posterior corners projecting slightly and bearing tufts of long setae, posterior margin shallowly emarginated, anterior apodeme about as long as external portion, pointed, with a dorsal keel. Surstylus broad, scooped. Pregonite small, distinct. Postgonite with lobes clearly separated, anterior lobe rounded, posterior lobe pointed. Basiphallus with short, broad epiphallus, narrow, transparent preepiphallus. Distiphallus with long, curved spinose dorsal tube, sclerite immediately ventral to curve of dorsal tube concave in lateral view (Fig. 5.142).

Female postabdomen: Tergites 6–7 and sternite 6 wider than long, sclerotized along anterior and lateral margins only. Sternite 7 mostly sclerotized, with a weakly sclerotized medial spot. Tergites with 3 posterior strips, sternites with 2 posterior strips. Tergite 8 with a shallow cleft in anterior margin, covered with microtomentum except anterior corners. Epiproct with short anterior arms, shiny, with 3 pairs of setae. Cerci broad. Sclerites of sternite 8 broad, subrectangular, pinched and sculptured medially, distal third with microtomentum. Hypoproct subrectangular, with median stripe moderately sclerotized. Spermathecae cylindrical, about 3.5X longer than wide, annulated, with long apical invagination, sclerotized duct slightly shorter than spermatheca.

**Type material.** Holotype ♂: PERU: Cusco: Puente Pilco, ~5.3 km NNW Challabamba, along creek, 13°10'10"S 71°46'46"W, ~2800 m, yellow pans, 13–16 May 2007, Marshall & Kits (MUSM). Paratypes: same data as holotype (12 ♂, 12 ♀, DEBU); Wayqecha Biol. Stn., ~9 km NE Challabamba, 13°10'10"S 71°34'34"W, ~2800 m, cloud forest, 13–15 May 2007, J.H. Kits (2 ♂, DEBU); as above but Marshall & Kits (18 ♂, 12 ♀, DEBU); as above but S.M. Paiero (4 ♂, 1 ♀, DEBU); as above but cloud forest, leaf litter, dung pans, 14–15 May 2007, Marshall & Kits (1 ♂, DEBU). BOLIVIA: La Paz: Unduavi, 16°19'00"S 67°54'00"W, 3500 m, grass, pan traps, 5–17 Apr 2001, S.A. Marshall (2 ♀, 3 ♂); as above but moss, S.A. Marshall (1 ♂).

Comments: This species is named after the Incan empire, whose empire encompassed most of the range of *Antrops* and whose capital Cusco was near the type locality of this species. The name should be treated as a noun in apposition.
Figures 5.144–148: *Antrops* male terminalia. (144) *A. quadrilobus*, phallus, postgonite, and phallapodeme, lateral view; (145) *A. quadrilobus*, sternite 5; (146) *A. sierrazulensis*, phallus, postgonite, and phallapodeme, lateral view; (147) *A. tachira*, phallus, postgonite, and phallapodeme, lateral view; (148) *A. zongo*, phallus, postgonite, and phallapodeme, lateral view.
Antrops papallacta sp. nov.
(Figs. 5.143, 5.173)

Description:
Head black, anterior margin of frons, face, and antenna reddish brown. Clypeus orange, maxillary palp yellow, prementum dark brown. Occiput mostly covered with microtomentum, shiny lateral to foramen, frons mostly covered with microtomentum, with shiny spots lateral to ocelli, face mostly shiny, microtomentum on lunule and below base of antenna, gena entirely covered with microtomentum. Subvibrissal bristle about 0.5X length of vibrissa, anterior genal bristle about 0.3X length of vibrissa.

Anterior postsutural dorsocentral bristle absent in male.

Trochanters and tarsi brown. Hind tibia with 2 ventroapical bristles.

Sternites heavily sclerotized, black, covered with microtomentum in male.

Male postabdomen: Sternite 5 with curved lateral margins, widest medially, posterior corners projecting slightly and bearing tufts of long setae, posterior margin shallowly emarginated, anterior apodeme about two-thirds as long as external portion, pointed, with a dorsal keel. Surstylus broad, scooped. Pregonite small, distinct. Postgonite with lobes short, clearly separated, anterior lobe rounded, posterior lobe pointed. Basiphallus with very short epiphallus, short transparent preepiphallus. Distiphallus with curved spinose dorsal tube with a distal extension (Fig. 5.143).

Female postabdomen: Tergites 6–7 and sternites 6–7 wider than long, covered with microtomentum, sclerotized along anterior and lateral margins only, except sternite 7 mostly sclerotized. Tergites with 3 posterior strips, sternites with 2 posterior strips. Tergite 8 with a deep cleft in anterior margin, pinched medially, mostly covered with microtomentum, anterior corners shiny. Epiproct with short anterior arms, shiny, with 2 pairs of setae. Cerci broad. Sclerites of sternite 8 broad, subrectangular, pinched and sculptured medially, distal third with microtomentum. Hypoproct subrectangular, inverted medial triangle and posterior margin sclerotized. Spermathecae tubular, about 2.5X longer than wide, annulated, with a shallow apical invagination, sclerotized duct about half as long as spermathecae.

Type material. Holotype ♂: ECUADOR: Napo: Lago Papallacta, nr., 0°20'20"S 78°10'10"W, 3400 m, forest above lake, pans/ dung, 4–8 Nov 1999, S.A. Marshall (QCAZ). Paratypes: same data as holotype (5 ♂, 8 ♀, DEBU); Baeza, 42 km NW, 3300 m, dung trap, 2–6 Mar 1976, S. Peck (1 ♂, DEBU); Quito–
Baeza pass, 1 km E, 0°20'20"S 78°10'10"W, 3950 m, forest edge, dung traps, 4–8 Nov 1999, S.A. Marshall (1 ♀, DEBU); Quito–Baeza road, 4000 m, elfin forest, pan traps, 10–18 Feb 1983, L. Masner (1 ♀, DEBU).

Comments: This species is named after the type locality.

Antrops quadrilobus sp. nov.
(Figs. 5.144–145, 5.176)

Description:
Head black, anterior margin of frons, face, and antenna reddish brown. Clypeus orange, maxillary palp yellow, prementum dark brown. Mostly covered with microtomentum, frons with frontal triangle and interfrontal plates mostly shiny, microtomentum around bases of postvertical bristles and a little at bases of ocellar bristles, may reach anteriorly from ocellar bristles, microtomentum on orbital plates reaching bases of interfrontal setae, face mostly shiny, microtomentum on lunule and below base of antenna, gena with microtomentum on ventral half and in a spot below eye. Subvibrissal and anterior genal bristle about 0.3X length of vibrissa.

Trochanters and tarsi reddish brown. Hind tibia with a long thin anteroventral bristle, 3 ventroapical bristles.

Abdominal sternites 2–3 weakly sclerotized, sternite 4 heavily sclerotized, black, covered with microtomentum in male.

Male postabdomen: Sternite 5 with curved lateral margins, widest medially, posterior corners projecting strongly and bearing tufts of long setae, posterior margin emarginated forming two shallow lobes, anterior apodeme about as long as external portion, pointed, with a dorsal keel (Fig. 5.145). Surstylus broad but slightly narrowed apically, scooped. Pregonite small, distinct. Postgonite with lobes well separated, anterior lobe rounded, posterior lobe longer, pointed. Basiphallus with short, broad epiphallus, short, narrow preepiphallus. Distiphallus simple, with nearly straight, spinose dorsal tube (Fig. 5.144).

Female postabdomen: Tergites 6–7 and sternites 6–7 wider than long, sclerotized along anterior and lateral margins only. Tergites with 3 posterior strips, sternites with 2 posterior strips. Tergite 8 with a deep cleft in anterior margin, strongly pinched medially, medial section and posterior margin covered
with microtomentum. Epiproct with short anterior arms, shiny, with 2 pairs of setae. Cerci broad.
Sclerites of sternite 8 broad, subrectangular, pinched and sculptured medially, posterior margins with microtomentum. Hypoproct subrectangular, with two anterior crescent-shaped patches and posterior margin sclerotized. Spermathecae cylindrical, about 2X longer than wide, annulated, without invaginations, sclerotized duct about half as long as spermathecae.

Type material. Holotype ♂: ECUADOR: Carchi. Bosque El Arrayán, 6 km E San Gabriel, 0°32’32”N 77°47’47”W, 2830 m, in moss, 1 Nov 1999, S.A. Marshall (QCAZ). Paratypes: same data as holotype but forest, dung traps, 2–4 Nov 1999 (13 ♂, 5 ♀, DEBU). VENEZUELA: Mérida: Azulita, 6km S, near road, 3 May 1988, S.A. Marshall (2 ♂, 6 ♀, DEBU); Los Chorros, dung traps, 1–5 May 1988, S.A. Marshall (1 ♀, DEBU); Santa Rosa Trail, dung traps, 23–30 Apr 1988, S.A. Marshall (1 ♀, DEBU); Táchira: San Cristobal, 45 km NE, 2743 m, dung traps, 20 May 1974, S. Peck (1 ♂, DEBU); San Cristobal, 55 km NE, 3048 m, 17–18 May 1974, J. Peck (1 ♂, 2 ♀, DEBU).

Comments: The species name refers to the shape of the male sternite 5, which appears to be 4-lobed.

Antrops sierrazulensis sp. nov.
(Figs. 5.146, 5.176)

Description:
Occiput and posterior part of frons black, rest of head orange. Occiput covered with microtomentum, frons with frontal triangle and interfrontal plates mostly shiny, microtomentum around bases of postvertical bristles, microtomentum on orbital plates reaching bases of interfrontal setae, face mostly shiny, microtomentum on lunule and below base of antenna, gena mostly shiny with microtomentum along ventral margin and in a spot below eye. Subvibrissal and anterior genal bristles about 0.3X length of vibrissa.

Halter white.

Trochanters and fore tarsus brown, mid and hind tarsus yellow. Hind tibia with 2 ventroapical bristles.

Sternites heavily sclerotized, black, covered with microtomentum in male.

Male postabdomen: Sternite 5 with curved lateral margins, widest medially, posterior corners projecting strongly and bearing tufts of long setae, posterior margin emarginated forming two shallow lobes, anterior
apodeme about as long as external portion, pointed, with a dorsal keel. Surstylus scooped. Pregonite small, distinct. Postgonite with lobes short, well separated, anterior lobe rounded, posterior lobe pointed. Basiphallus with short, broad epiphallus, short, transparent preepiphallus. Distiphallus with long, curved, spinose dorsal tube (Fig. 5.146).

Female postabdomen: Tergites 6–7 and sternites 6–7 wider than long, sclerotized along anterior and lateral margins only. Tergites with 3 posterior strips, sternites with 2 posterior strips. Tergite 8 with a deep cleft in anterior margin, strongly pinched medially, distal half covered with microtomentum. Epiproct with short anterior arms, shiny, with 1 pair of setae. Cerci broad. Sclerites of sternite 8 broad, subrectangular, pinched and sculptured medially, distal third with microtomentum. Hypoproct subrectangular, weakly sclerotized. Spermathecae barrel-shaped, about 1.2X longer than wide, with an apical invagination, sclerotized duct about as long as spermathecae.

**Type material.** Holotype ♂: ECUADOR: Napo: SierrAzul Res., 14 km W Cosanga, 0°40'40”S 77°56'56”W, 2200 m, dung baits, 8–11 May 2002, M. Buck (QCAZ). Paratypes: same data as holotype (3 ♀, DEBU); as above but 10 May 2002, S.A. Marshall (1 ♂, DEBU); as above but treefall, yellow pans, 10–11 May 2002, Marshall & Paiero (1 ♀, DEBU).

Comments: This species is named after the type locality, the Reserva Ecológica SierrAzul, a remarkable cloud forest reserve with many interesting archiborborine species.

**Antrops tachira** sp. nov.
(Figs. 5.147, 5.176)

Description:
Head orange, occiput and posterior part of frons black. Occiput covered with microtomentum, frons with frontal triangle and interfrontal plates mostly shiny, microtomentum around bases of postvertical bristles and bases of ocellar bristles, microtomentum on orbital plates not reaching bases of interfrontal setae, face mostly shiny, microtomentum on lunule and below base of antenna, gena with microtomentum on ventral half and in a spot below eye. Subvibrissal and anterior genal bristles about 0.3X length of vibrissa.

Anterior postsutural dorsocentral bristle very short in male.

Trochanters and tarsi reddish brown. Hind tibia with 3 ventroapical bristles.
Sternites heavily sclerotized, black, covered with microtomentum in male. Microtomentum covering anterior three-quarters of tergites 3–5.

Male postabdomen: Sternite 5 with curved lateral margins, widest medially, posterior corners projecting slightly and bearing tufts of long setae, anterior apodeme about two-thirds as long as external portion, pointed, with a dorsal keel. Surstylus broad, boot-shaped. Pregonite small, distinct. Postgonite with lobes short, clearly separated, anterior lobe rounded, posterior lobe pointed. Basiphallus with long, thin epiphallus and preepiphallus. Distiphallus with long dorsal sclerite with a short spinose lobe near apex and triangular, transparent lobe apically (Fig. 5.147).

Female postabdomen: Tergites 6–7 and sternites 6–7 wider than long, sclerotized along anterior and lateral margins only. Tergites with 3 posterior strips, sternites with 2 posterior strips. Tergite 8 with anterior margin shallowly emarginate, pinched medially, medial section and posterior margin covered with microtomentum. Epiproct with short anterior arms, shiny, with 1 pair of setae. Cerci long. Sclerites of sternite 8 subrectangular, pinched and sculptured medially, posterior third with microtomentum. Hypoproct subrectangular, with medial stripe and posterior margin sclerotized. Spermathecae barrel-shaped, about as long as wide, with basal and apical invaginations, sclerotized duct very short.

**Type material.** Holotype ♂: VENEZUELA: Táchira: San Cristobal, 55 km NE, 3048 m, 17–18 May 1974, J. Peck (MIZA). Paratypes: same data as holotype (3 ♂, 3 ♀, DEBU); Trujillo: Boconó, Guaramacal Road, 2520m, creekside, dung trap, 2–4 Mar 1995, S.A. Marshall (1 ♂, DEBU).

Comments: The species name refers to the state of the type locality. It should be treated as a noun in apposition.

**Antrops zongo** sp. nov.
(Figs. 5.148, 5.174)

Description:
Head black, anterior margin of frons, face, and antenna reddish brown. Clypeus orange, maxillary palp yellow, prementum dark brown. Mostly covered with microtomentum, frons with frontal triangle and interfrontal plates mostly shiny, microtomentum around bases of postvertical bristles and bases of ocellar bristles, may reach anteriorly from ocellar bristles, microtomentum on orbital plates reaching bases of
interfrontal setae, face mostly shiny, microtomentum on lunule and below base of antenna, gena may have small median shiny spot. Subvibrissal and anterior genal bristles about 0.5X length of vibrissa.

Trochanters and tarsi reddish brown. Hind tibia with 3 ventroapical bristles.

Abdominal sternites heavily sclerotized, black, covered with microtomentum in male.

Male postabdomen: Nearly identical to A. inca. Distiphallus with sclerite immediately ventral to curve of dorsal tube convex in lateral view (Fig. 5.148).

Female postabdomen: Tergites 6–7 and sternite 6 wider than long, sclerotized along anterior and lateral margins only. Sternite 7 mostly sclerotized, with a weakly sclerotized medial spot. Tergites with 3 posterior strips, sternites with 2 posterior strips. Tergite 8 with a shallow cleft in anterior margin, microtomentum on distal half and a band reaching anteriorly to cleft. Epiproct with short anterior arms, shiny, with 2 pairs of setae. Cerci broad. Sclerites of sternite 8 broad, subrectangular, pinched and sculptured medially, distal third with microtomentum. Hypoproct subrectangular, with median stripe moderately sclerotized. Spermathecae cylindrical, about 3.5X longer than wide, annulated, with long apical invagination, sclerotized duct slightly shorter than spermatheca.

Type material. Holotype ♂: BOLIVIA: La Paz: Zongo Valley, 16°07'07"S 68°06'06"W, 2600 m, forest, pan traps, 18 Apr 2001, S.A. Marshall (UASC). Paratypes: same data as holotype (3 ♀, DEBU); Cochabamba: Serrania de Siberia, Chua Khocha, 2360m, cloud forest, window trap, 26 Aug–6 Sep 1990, P. Parrillo (1 ♂, FMNH).

Comments: The species name is derived from the type locality for this species, and should be treated as a noun in apposition. This species is very similar to A. inca and can only be distinguished the characters in the key. COI barcodes were obtained from a single specimen of each species; the uncorrected p-distance between the two sequences is 4.3%, considerably higher than that observed within species with multiple sequences available. A single female specimen from Boconó, Venezuela (DEBU) keys to the same couplet and may represent another species, but without male specimens this can’t be confirmed.
Figures 5.149–154: *Antrops* distribution maps. (149) *A. annulatus*; (150) *A. anovariegatus*; (151) *A. aurantifemur*; (152) *A. baeza* (circles), *A. variegatus* (diamonds); (153) *A. bucki* (circles), *A. niger* (diamonds); (154) *A. didactylos*. 
Figures 161–166: Antrops distribution maps. (161) A. quadrinotus; (162) A. setosus; (163) A. simplicimanus (circles), A. truncipennis (stars), South Georgia Islands inset; (164) A. biflavus and A. podocarpus (diamonds), A. guaramacalensis (circles), A. tequendama (stars); (165) A. carpishensis (stars), A. coniobaptos (circles), A. siberia (diamonds); (166) A. cochabamba (circles), A. juninensis (stars), A. yungas (diamonds).
Figures 5.167–172: Antrops distribution maps. (167) A. cotopaxi (diamonds), A. eurus (circles); (168) A. nitidicollis (circles), A. versabilis (diamonds); (169) A. cochinoca (triangle), A. mucarensis (diamonds), A. orbitalis (circles), A. tumbensis (stars); (170) A. pecki; (171) A. guandera (diamonds), A. tetrastichus (circles); (172) A. unduavi.
6. BOREANTROPS GEN. NOV.

Type species: *Archiborborus mexicanus* Steyskal, by present designation

Description:
Head orange to black, microtomentum variable. Face evenly sclerotized, ventral margin straight, lunule small. Occiput narrow below occipital foramen. Clypeus narrow, slightly produced. Palpus with dark setae concentrated along lateral margin. Prementum well-developed, circular, about 0.5X height of head. Labellum with 12 pseudotrachea. Scape very short, with 1–2 dorsomedial setulae; pedicel subtriangular, medial bristles slightly longer than outer; first flagellomere round, slightly pointed dorsoapically; arista dorsolateral, preapical, 2-segmented, about as long as head width, short-plumose. Chaetotaxy: orbital bristles in two lateroclinate pairs; irregular orbital setulae along orbital plate; interfrontal setae in 4–6 medioclinate pairs; ocellar bristles lateroproclinate; irregular, very short ocellar setulae; inner vertical bristles inclinate; outer vertical bristles lateroreclinate; postocular bristles as long or longer than ocellar bristles, slightly proclinate; postvertical bristles small, cruciate; setae on median occipital sclerite short, medioclinate; postocular setae in a complete row with an incomplete row of occipital setae behind; vibrissa strong, as long as head; 1 subvibrissal bristle; 1 upturned anterior genal bristle; genal setae in 2–3 rows.

Thorax mostly black, microtomentum variable between species. Chaetotaxy: postpronotum with a single bristle; notopleuron with two bristles, posterior slightly shorter than anterior; one presutural and one postsutural intra-alar bristle; one long postalar bristle at posterior corner of scutum and a shorter postalar between this and scutellum; three dorsocentral bristles (one presutural and two postsutural); acrostichal setae in about 6 irregular rows; scutellum with 2 pairs of scutellar bristles; proepisternum with several small setulae; katepisternum with a single large dorsal bristle and irregular setae ventrally.


Abdominal tergites, or at least tergite 5, with reduced sclerotization. Sternites weakly sclerotized in female, weakly to heavily sclerotized in male. Pleural membrane with setae on segments 3–5, occasionally a few on segment 2.

Male postabdomen: Sternite 5 variable between species. Synsternite 6+7 asymmetrical, complex, a portion often detached and forming an accessory sclerite flanking distiphallus in genital pouch; dorsal corner fused to sternite 8. Sternite 8 broadly fused to epandrium along right side. Epandrium more or less symmetrical, with a cleft above anterior edge of surstylus. Cerci small and medially fused. Subepandrial sclerite X- or Y-shaped, articulated with cerci and surstyli. Surstylus usually paddle-shaped. Hypandrial arms weakly fused with ventral edge of epandrium; hypandrial apodeme well-developed, somewhat flattened, weakly fused with arms. Phallapodeme well-developed, curved and broadest distally. Postgonites long and bilobed apically, articulated with phallapodeme, hypandrium, and basiphallus. Pregonites tiny, more or less fused with postgonites. Ejaculatory apodeme small, often lost in dissections. Basiphallus usually with both epiphallus and preepiphallus. Distiphallus complex, structure variable between species.
Female postabdomen: Abdomen telescoping, usually retracted in preserved specimens. Tergites and sternites 6–7 usually weakly sclerotized, narrow. Tergite 8 heavily sclerotized, sternite 8 divided medially, heavily sclerotized. Epiproct and hypoproct moderately sclerotized. Cerci simple, not fused with epiproct or each other. Three spermathecae, one pair sharing a duct and the other on a separate duct.

Comments: This genus is described for a large clade of species, including all archiborborine species occurring in Central America. The genus can be distinguished from other Archiborborinae by the reduced sclerotization of tergite 5 in all species and further reduced sclerotization of the other tergites in most species. The genus can be divided into 3 species groups. The *emarginatus* group includes 10 species ranging from Bolivia to Mexico and is characterized by the convergence or fusion of a portion of the epandrium above the cerci. The *mexicanus* group includes 18 species ranging from Brazil and lowland Peru to northern Mexico and is characterized by a ventral extension from the hypandrial arms and a foveolate scutum. A single species from Bolivia constitutes the *cryptopygium* group, characterized by the retraction of the male hypopygium inside segment 4 when at rest.

The genus name is derived from the Greek *boreas* (north) combined with the genus name *Antrops*, and refers to the more northern distribution of this genus relative to the rest of the subfamily. It is masculine in accordance with ICZN 30.1.4.3.

**Key to the species of Boreantrops**

1. Wing absent. .................................................................................................................................*B. apterus*
   - Wing normal. .................................................................................................................................2

2. Syntergite 1+2 complete and strongly sclerotized. Male sternite 5 with lateral accessory sclerites (Fig. 6.57), hypopygium withdrawn into segment 4 when at rest.................................*B. cryptopygium*
   - Syntergite 1+2 with an anterior weakly sclerotized notch, or weakly sclerotized with only posterolateral corners and a connecting bar strongly sclerotized. Male sternite 5 without lateral accessory sclerites, although apical corners may be detached (Fig. 6.46) .................................................................3

3. Mesoscutum foveolate. Hypandrial arms with transparent ventral extensions. At least one of the following characters present: syntergite 1+2 mostly heavily sclerotized; scutellum with fine additional setae; or scutellum subtriangular and concave dorsally.................................................................4
   - Mesoscutum smooth. Hypandrial arms without ventral extensions. Syntergite 1+2 weakly sclerotized, with posterolateral corners and a connecting bar strongly sclerotized. Scutellum without discal setae, evenly rounded, convex dorsally.................................................................19
4. Syntergite 1+2 mostly weakly sclerotized. Scutellum subtriangular and concave dorsally or with fine additional setae, or both. ........................................................................................................................ 5
   - Syntergite 1+2 mostly strongly sclerotized. Scutellum evenly rounded, convex dorsally, without fine additional setae. .................................................................................................................... 10
5. Femora orange on distal quarter to third. Scutellum with fine setae scattered on disc of scutellum.
   Wing brown with contrasting white crossveins. .................................................................................. 6
   - Femora black with slight orange suffusion around joints. Scutellum usually without additional setae. Wing pale brown to clear, crossveins pale but not strongly constrasting. .......................... 7
6. Tibiae predominately black, with some orange near joints. ........................................................................ B. hispidus
   - Mid and hind tibiae predominately orange, with a darker band at two-thirds. ....... B. frigurguensis
7. Occiput entirely black, orange not extending posteriorly behind gena. Anepisternum with microtomentum covering dorsal quarter or more. Katepisternum mostly covered with microtomentum, with a shiny spot behind fore coxa.......................................................... 8
   - Orange from gena extending posteriorly onto occiput. Anepisternum with microtomentum restricted to posterior third. Katepisternum mostly shiny, with microtomentum outlining a spot behind fore coxa and along ventral suture. ........................................................................................................ 9
8. Frons shiny medially. Male sternite 5 without medial cleft (Fig. 6.25). Distiphallus with broad apex of dorsal tube (Fig. 6.22) ................................................................................................................. B. masneri
   - Frons with microtomentum medially. Male sternite 5 with medial cleft (Fig. 6.11). Distiphallus with pointed apex of dorsal tube (Fig. 6.8). ........................................................................................................ B. costaricensis
9. Mesoscutum mostly shiny with some scattered microtomentum in acrostichal area. Occiput mostly brown with orange restricted to semicircle behind gena........................................... B. peruvianus
   - Mesoscutum covered with microtomentum. Occiput mostly orange, brown or black colour usually restricted to area around foramen .................................................................................................................... B. avignis
10. Distal ends of femora and both ends of tibiae broadly orange, reaching or beyond first anterior bristle of mid femur and distal ring of bristles on mid tibia. Prementum entirely pale orange.............. 11
    - Distal end of femora and ends of tibiae narrowly orange, not reaching bristles; prementum often partially dark brown......................................................................................................................... 12
11. Mid tibia orange with a narrow dark band medially......................................................... B. oaxacensis
    - Mid tibia mostly black, with orange bands at ends......................................................... B. hondurensis
12. Mid tibia with 2 or more antero-dorsal bristles. Foveolae of mesoscutum shallow, difficult to see. ......................................................................................................................................................... 13
    - Mid tibia with 1 antero-dorsal bristle. Foveolae of mesoscutum prominent. (Only males are identifiable past this couplet) ........................................................................................................ 14
13. Prementum brown. Basal 2 tarsomeres yellow, distal 3 tarsomeres brown .............. *B. zacapa*
   - Prementum orange. Tarsomeres yellow................................................................. *B. subfoveolatus*.  
14. Sternite 5 with continuous row of setae along hind margin (Fig. 6.5).............. *B. alytothrix*
   - Sternite 5 with row of setae along hind margin interrupted medially by a notch. .......... 15
15. Sternite 5 bell-shaped, strongly flared posteriorly (Figs. 6.12, 6.23).................. 16
   - Sternite 5 more or less square (Figs. 6.17, 6.24, 6.36). ........................................ 17
16. Distiphallus with dorsal tube broad at tip (Fig. 6.20). ........................................ *B. inbio*
   - Distiphallus with dorsal tube narrow at tip (Fig. 6.9). .......................................... *B. durango*
17. Sternite 5 weakly sclerotized medially (Fig. 6.17). ............................................. *B. guatemalensis*
   - Sternite 5 uniformly strongly sclerotized (Figs. 6.24, 6.36). ............................ 20
18. Distiphallus with a thin extension at tip of dorsal tube (Fig. 6.21)................. *B. longiphallus*
   - Distiphallus without extension at tip, sharply pointed (Fig. 6.32).................... *B. suchistepcepsis*
19. Wing brown with strongly contrasting white spots at tips of veins R2+3, R4+5, and M, and on basal portion of vein R4+5 before crossvein r-m. Mid tibia without row of anterodorsal bristles.
   - Wing pale brown to brown, without spots at vein tips or on basal portion of vein R4+5. Mid tibia with row of anterodorsal bristles. Other characters variable....................................................... 21
20. Postgonite with posterior margin straight, without a tooth. Basiphallus with preepiphallus subtriangular, sides not parallel. Distiphallus with distal spike-like sclerite projecting dorsally (Fig. 6.44). ............................................................. *B. pollex*
   - Posterior margin of postgonite with a triangular tooth-like projection. Basiphallus with parallel-sided preepiphallus. Distiphallus with distal spike-like sclerite not projecting dorsally (Fig. 6.47). .......... ................................................................. *B. punctipennis*
   - Wing pale brown to brown, without spots at vein tips or on basal portion of vein R4+5. Mid tibia with row of anterodorsal bristles. Other characters variable....................................................... 21
22. Anterior margin of anepisternum shiny below spiracle. Hind tibia without a well-developed anteroventral bristle just past half. Male sternite 5 deeply notched (Figs. 6.43, 6.52). ........... 22
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Boreantrops mexicanus group

Boreantrops alyothrix sp. nov.
(Figs. 6.2, 6.5, 6.58)

Description:
As described for B. inbio. Occiput black with orange around hind margin of eye, prementum brown with ventral third orange. Face with patch of microtomentum below antenna reaching ventrally to level of U-shaped mark. Trochanters and joints of legs orange, mid tarsus with 2 basal tarsomeres whitish and 3 distal tarsomeres brown. Tergites 3–4 mostly heavily sclerotized.

Hind femur thinner, apex of scutellum thinner.

Male postabdomen: Sternite 5 longer than wide, slightly wider posteriorly, posterior margin straight, with unbroken row of setae, anterior apodeme broad, slightly shorter than exterior portion, without keel (Fig. 6.5). Surstylus paddle-shaped. Hypandrial arms with clear ventral extension. Pregonite small, distinct. Postgonite with lobes widely separated, anterior lobe broad, rounded, posterior lobe longer, pointed.
Basiphallus with long epiphallus, broad, transparent preepiphallus. Distiphallus with strongly curved spinose dorsal tube, distal portion long, pointed apically (Fig. 6.2).

Female postabdomen: As in A. mexicanus.

**Type material.** Holotype ♀: MEXICO: Jalisco: Atenquique, 18 mi. W, 2835 m, fir forest, dung, , A. Newton (DEBU). Paratypes: same data as holotype (5 ♂, 1 ♀, DEBU); México: Santa Marta, 5 mi E, km 8.5, 3078 m, fir forest, human dung, 29 Aug–4 Sep 1971, A. Newton (1 ♂, DEBU); Morelos: Tres Cumbres, 4 mi S, km 57, 2591 m, human dung, 29 Aug–4 Sep 1971, A. Newton (1 ♂, DEBU); Tres Cumbres, 7 mi W, km 12, 2926 m, oak, pine, fir, dung, 29 Aug–4 Sep 1971, A. Newton (1 ♂, DEBU).

Comments: The species name is from the Greek *alytos* (unbroken) + *thrix* (hair), referring to the continuous row of setae on the male sternite 5.

**Boreantrops apterus** sp. nov.
(Figs. 6.3, 6.6, 6.59)

Description:
Head orange, postcranium brown to blackish medially, maxillary palp yellow. Occiput and gena covered with microtomentum, frons mostly covered with microtomentum, with shiny spots lateral to ocellar triangle and interfrontal plates shiny medially to interfrontal setae, face mostly shiny with a broad band of microtomentum below antenna and lunule. Ocellar bristles at or just anterior to level of anterior margin of median ocellus. Specimens from Costa Rica occasionally missing ocellar bristles, one pair of orbital bristles, or outer vertical bristles, specimens from Panama with only one pair of orbital bristles. Subvibrissal and anterior genal bristles about 0.3X length of vibrissa. Gena about 0.8X eye height.

Thorax black, postalar callus reddish. Mostly covered with microtomentum, proepisternum shiny, anepisternum with an anteroventral shiny spot covering anterior three-fifths and ventral two-thirds, katepisternum with a shiny spot behind fore coxa, metapleuron with a shiny spot ventral to posterior spiracle. Presutural and anterior postsutural dorsocentral bristles about 0.5X length of posterior dorsocentral bristle. Wing reduced to a small brown flap, halter absent.

Legs black, trochanter reddish brown, joints and tarsi orange. Mid tibia with anterodorsal row, 1 anteroventral, 1 posteroventral, and 6 apical bristles. Hind tibia with anteroventral bristle at three-quarters, 2 ventroapical bristles.
Abdomen with syntergite 1+2 completely heavily sclerotized, black, covered with microtomentum, tergite 3 mostly heavily sclerotized, tergite 4 with a median heavily sclerotized spot in female and a thin heavily sclerotized bar in male, tergite 5 not sclerotized in female, weakly sclerotized with anterior corners heavily sclerotized in male. Sternites weakly sclerotized in both sexes.

Male postabdomen: Sternite 5 narrow anteriorly, strongly flared posteriorly, shallowly emarginated posteriorly, anterior apodeme about as long as external portion (Fig. 6.6). Surstylus paddle-shaped. Pregonite narrow, distinct. Postgonite with lobes narrowly separated, anterior lobe rounded, posterior lobe long, pointed. Basiphallus with long epiphallus, broad, transparent preepiphallus. Distiphallus with curved, spinose dorsal tube, distal portion of tube long, flattened (Fig. 6.3).

Female postabdomen: Tergite 6 not sclerotized, tergite 7 with anterior and lateral margins sclerotized. Sternite 6 with anterior margin only sclerotized, sternite 7 mostly sclerotized, unsclerotized patch medially. Tergites with 3 posterior strips, sternites with 2 posterior strips. Tergite 8 trapezoidal, covered with microtomentum except anterior corners. Epiproct with microtomentum medially, one pair of setae. Cerci broad. Sclerites of sternite 8 broad, posterior third with microtomentum. Hypoproct subrectangular. Spermathecae very long, annulated, without invaginations, sclerotized duct about as long as spermatheca.

**Type material.** Holotype ♂: PANAMA: Chiriquí: Cerro Punta, 5 km ESE, 2600 m, dung traps, 23–28 May 1977, S. Peck. Paratypes: same data as holotype (20 ♂, 28 ♀, DEBU); as above but carrion traps (10 ♂, 9 ♀, DEBU). COSTA RICA: San José: San José, km 74 SE, dung trap, 25 Feb 1984, H.F. Howden (3 ♂, 8 ♀, DEBU).

Comments: This is the only known species in *Boreantrops* with reduced wings.

**Boreantrops avignis sp. nov.**

(Figs. 6.4, 6.7, 6.61)

Description:
Head yellow to orange, occiput with some black to dark brown medially, extent variable. Microtomentum on frons at anterolateral corners, along ventral and anterior margins of gena, thin band on face below lunule and antenna, on prementum, and on occiput. Ocellar bristles just anterior to median ocellus. Subvibrissal bristle and anterior genal bristle about 0.5X length of vibrissa.
Figures 6.2–7: *Boreantrops* male terminalia: (2) *B. alytothrix*, phallus, postgonite, and phallapodeme, lateral view; (3) *B. apterus*, phallus, postgonite, and phallapodeme, lateral view; (4) *B. avignis*, phallus, postgonite, and phallapodeme, lateral view; (5) *B. alytothrix*, sternite 5; (6) *B. apterus*, sternite 5; (7) *B. avignis*, sternite 5.

Thorax black, microtomentum on scutum and scutellum, lateral surface of postpronotum, on anepisternum along posterior third except ventral corner, on katepisternum around patch behind fore coxa and ventrally, on anepimeron and laterotergite, and metapleuron. Halter whitish. Scutum foveolate. Scutellum subtriangular, dorsal surface indented medially.
Legs black, trochanters yellow, joints paler. Fore tarsus whitish, mid and hind tarsi with 3 basal
tarsomeres whitish, distal 2 pale brown. Mid tibia with one preapical anterodorsal, 4 subapical bristles.
Hind tibia with one small ventroapical bristle.

Wing clear, veins yellow to light brown.

Abdomen with tergites and sternites weakly sclerotized. Syntergite 1+2 with posterolateral corners and a
thin band between them strongly sclerotized, tergites 3–4 with a thin posterior band moderately
sclerotized. Pleural setae on small discs, about the diameter of spiracles.

Male postabdomen: Sternite 5 narrow, posterior corners strongly flared, posterior margin not notched,
anterior apodeme about half as long as external portion (Fig. 6.7). Surstylus long, paddle-shaped.
Pregonite fused with postgonite. Postgonite with lobes not separated, anterior lobe truncate, posterior lobe
pointed. Basiphallus with long epiphallus, thin, transparent preepiphallus. Distiphallus with curved
spinose dorsal tube, distal tip slightly recurved (Fig. 6.4).

Female postabdomen: Tergites 6–7 and tergites 6–7 moderately sclerotized. Tergites with 3 posterior
strips, sternites with 2 posterior strips. Tergite 8 trapezoidal, shallowly emarginated anteriorly, covered
with microtomentum except anterior margin. Epiproct without anterior arms, with microtomentum
medially, with 1 pair of setae. Cerci broad. Sclerites of sternite 8 broad posteriorly, pointed anteriorly,
posterior two-thirds covered with microtomentum. Hypoproct broad, shallowly emarginated anteriorly.
Spermathecae barrel-shaped, about 1.5X longer than wide, invaginated apically, sclerotized duct short.

**Type material.** Holotype ♂: COSTA RICA: Alajuela: Volcán Tenorio, N slope nr. Bijagua Biol. Stn.,
700 m, rain forest, RET over *Atta* mound, 16–20 Jun 2000, S.A. Marshall (INBC). Paratypes: same data
as holotype (1 ♀, DEBU); as above but sweeping trail, 18 Jun 2000 (1 ♀, DEBU); San Gerardo Biol. Stn.,
10°52′51″N 85°23′20″W, 590 m, on monkey dung. 15 Aug 2010, J.H. Kits (5 ♂, 11 ♀, DEBU); Fca. San
Gabriel, 2km SE Dos Rios, 600m, 1 May 1990 (1 ♀, INBC); Guanacaste: Guanacaste Cons. Area,
Maritza Field Stn., 875 m, malaise, 3–9 Feb 1994, J. Noyes (1 ♀, DEBU); Limón: Cuatro Esuinhas, P.N.
Maracay-Choroni highway, km 19, 1330 m, creek, 15 Apr 1994, L. Masner (1 ♀, DEBU); Henri Pittier
Natl. Pk., Maracay-Choroni highway, km 32, 100 m, forest, 15 Apr 1994, L. Masner (1 ♀, DEBU); Henri
Pittier Natl. Pk., Rancho Grande, 1500 m, 3 Sep 1992, L. Masner (2 ♂, 2 ♀, DEBU); Henri Pittier Natl.
Pk., Rancho Grande Biol. Stn., 10°20′20″N 67°40′40″W, 1250 m, 1 May 1998, Ashe, Brooks & Hanley
(1 ♀, DEBU); Henri Pittier Natl. Pk., Rancho Grande, La Cumbre, 1500 m, cloud forest, FIT, 1–10 Aug
1987, Borden & Peck (1 ♀, DEBU); Henri Pittier Natl. Pk., Rancho Grande, La Toma, 1150 m, 17 Apr
1994, L. Masner (1 ♀, DEBU).
Comments: The species name is derived from the Latin *avius* (remote) + *ignis* (fire), referring to the remote volcanoes where this species occurs. Some individuals of this species collected at San Gerardo Biological Station were observed slowly waving their forelegs in the air while standing near splatters of monkey dung. No associated behaviours or interactions were observed and the sex of the waving flies could not be determined in the field. The contrastingly white tarsi may serve as signalling devices, but it is unclear what the purpose of the signalling might be. The specimen from Tortuguero Natl. Pk. is from a very different habitat from the other specimens of this species (lowland rainforest), and may be incorrectly labelled.

*Boreantrops costaricensis* sp. nov.

(Figs. 6.8, 6.11, 6.63)

Description:
Head orange, occiput black, area around ocelli may be dark brown. Prementum dark brown on dorsal two-thirds, orange on ventral third. Mostly covered with microtomentum except face, with shiny spots lateral to ocellar triangle, face with only a thin band of microtomentum below antenna and lunule. Ocellar bristles lateral to median ocellus. Subvibrissal and anterior genal bristles about 0.3X length of vibrissa. Gena about 0.5X height of eye.

Thorax black, mostly covered with microtomentum, proepisternum, a spot on anepisternum covering anterior two-thirds and ventral three-quarters, a spot on katepisternum behind fore coxa, and meron and posterior katepisternum shiny. Halter whitish. Scutum foveolate. Scutellum subtriangular, dorsal surface indented medially.

Legs black, joints paler, trochanters yellow. Fore tarsus with 4 basal tarsomeres whitish and distal tarsomere pale brown in males, 2 basal tarsomeres whitish and distal 3 brown in females. Mid and hind tarsi with 2 basal tarsomeres whitish, distal 3 brown. Mid tibia with one preapical anterodorsal, 4 subapical bristles. Hind tibia with one small ventroapical bristle.

Wing clear, veins yellow to light brown, crossveins whitish.
Abdomen with tergites and sternites weakly sclerotized. Syntergite 1+2 with most of posterior half strongly sclerotized, sclerotized section thinner medially, tergites 3–4 with a thin posterior band moderately sclerotized. Pleural setae on small discs, about the diameter of spiracles.

Male postabdomen: Sternite 5 narrow, slightly wider posteriorly, posterior margin with a V-shaped notch, anterior apodeme about two-thirds as long as external portion (Fig. 6.11). Surstylus paddle-shaped. Pregonite fused with postgonite. Postgonite with lobes narrowly separated, anterior lobe rounded, posterior lobe pointed. Basiphallus with long epiphallus, narrow, transparent preepiphallus. Distiphallus with strongly curved, spinose dorsal tube, apex of tube pointed (Fig. 6.8).


**Type material.** Holotype ♂: COSTA RICA: Puntarenas: Monteverde Biol. Res., 1500 m, cloud forest, 11–13 Jun 2000, S.A. Marshall (INBC). Paratypes: same data as holotype (1 ♂, 1 ♀, DEBU); as above but sweeping, 11 Jun 2000, M. Buck (1 ♀, DEBU); as above but sweeping tree fall & trail, 14 Jun 2000 (2 ♂, 2 ♀, DEBU); Monteverde, 1500 m, 2–10 May 1988, D. Bell (1 ♀, DEBU); as above but dung traps, 27 Feb 1991, H. & A. Howden (1 ♀, DEBU); Alajuela: Volcán Tenorio, N slope nr. Bijagua Biol. Stn., 700 m, rain forest, RET over *Atta* mound, 16–20 Jun 2000, S.A. Marshall (1 ♂, DEBU); Guanacaste: Est. Cacao, Lado SO Vol. Cacao, P.N. Guanacaste, 1000–1400m, 1 Jun 1990 (3 ♀, INBC); as above but 21–28 May 1992, R. Vargas (1 ♂, INBC); Est. Cacao, SO de Volcán Cacao, 800–1600m, 12–17 Jul 1993, M. Rayes (1 ♂, 1 ♀, INBC); as above but 1 Jul 1993, Mora, Fonseca, Sabario & Varela (2 ♂, INBC); San José: Est. Cacao, SO de Volcán Cacao, 800–1600m, 12–17 Jul 1993, M. Rayes (1 ♂, 1 ♀, INBC); as above but 1 Jul 1993, Mora, Fonseca, Sabario & Varela (2 ♂, INBC); as above but J.F. Quesada (1 ♂, INBC); Heredia: Braulio Carrillo Natl. Pk., 1400–1500 m, cool moist river bed, selva premontana s.s., 11 Apr 1985, Goulet & Masner (1 ♀, DEBU); San José: Braulio Carrillo Natl. Pk., 9.5km E tunnel, 1000 m, 1 Oct–1 Dec 1989, P. Hanson (1 ♀, INBC); Hwy 2, km 68, around *Sphagnum* bog/pond, sweeping, 6 Aug 1995, D.C. Caloren (1 ♂, 1 ♀, DEBU).

Comments: The sexually dimorphic colouration of the fore tarsi in this species suggest a possible courtship signalling role, perhaps associated with leg waving behaviour similar to that observed in *B. avignis* (see comments under that species).
**Boreantrops durango sp. nov.**
(Figs. 6.9, 6.12, 6.59)

Description:
As described for *B. inbio*.

Male postabdomen: Sternite 5 longer than wide, narrow anteriorly, strongly flared posteriorly, posterior margin broadly notched, anterior apodeme broad, about as long as external portion, without keel (Fig. 6.12). Surstylus paddle-shaped. Hypandrial arms with clear ventral extension. Pregonite small, distinct. Postgonite with lobes widely separated, anterior lobe broad, rounded, posterior lobe longer, narrow, pointed. Basiphallus with long epiphallus, broad, transparent preepiphalus. Distiphallus with strongly curved spinose dorsal tube, distal portion long moderate length, flattened dorsally (Fig. 6.9).

Female postabdomen: As in *A. mexicanus*.


Comments: The species name refers to the type locality and should be treated as a noun in apposition.

**Boreantrops friburguensis sp. nov.**
(Figs. 6.10, 6.13, 6.66)

Description:
Head orange, occiput black, frons dark reddish brown posteriorly. Prementum and maxillary palp yellow. Occiput and gena covered with microtomentum, frons covered with microtomentum except large spots lateral to ocelli, face with a thin band of microtomentum below antenna and lunule. Ocellar bristles at level of or just anterior to median ocellus. Subvibrissal and anterior genal bristles about 0.5X length of vibrissa. Gena about 0.6X height of eye.

Thorax black, mostly covered with microtomentum, proepisternum, a spot on anepisternum covering anterior two-thirds and ventral two-thirds, a spot on katepisternum behind fore coxa, and meron and
Figures 6.8–13: *Boreantrops* male terminalia: (8) *B. costaricensis*, phallus, postgonite, and phallapodeme, lateral view; (9) *B. durango*, phallus, postgonite, and phallapodeme, lateral view; (10) *B. friburguensis*, phallus, postgonite, and phallapodeme, lateral view; (11) *B. costaricensis*, sternite 5; (12) *B. durango*, sternite 5; (13) *B. friburguensis*, sternite 5.


Coxae and most of femora black, basal tips and distal quarter to third of femora orange, trochanters yellow. Fore tibia reddish brown with darker brown band at two-thirds, mid and hind tibiae orange with dark brown band at two-thirds. Tarsi with 2 basal tarsomeres yellow and distal 3 pale brown. Mid tibia with one preapical anterodorsal, 4 subapical bristles. Hind tibia with one small ventroapical bristle.
Wing light brown, white spots around crossveins r-m and dm-cu.

Abdomen with tergites and sternites weakly sclerotized. Syntergite 1+2 with posterolateral corners and a thin band between them strongly sclerotized, tergites 3–4 with a thin posterior band moderately sclerotized. Pleural setae on small discs, about the diameter of spiracles.

Male postabdomen: Sternite 5 narrow, flared posteriorly, posterior margin with a shallow notch medially, anterior apodeme short (Fig. 6.13). Surstylus paddle-shaped. Pregonite fused with postgonite. Postgonite with lobes narrowly separated, anterior lobe rounded, posterior lobe pointed. Basiphallus with long epiphallus, narrow, transparent preepiphallus. Distiphallus with strongly curved, spines dorsal tube, flattened near apex (Fig. 6.10).

Female unknown.


Comments: The species name is derived from the type locality.

*Boreantrops guatemalensis* sp. nov.

(Figs. 6.14, 6.17, 6.59)

Description:
As described for *B. inbio*. Occiput mostly orange, some black around foramen, prementum brown with ventral third orange. Anepisternum without microtomentum below spiracle. Joints and trochanters reddish brown, mid tarsus with 2 basal tarsomeres whitish and 3 distal tarsomeres brown. Tergites 3–4 mostly heavily sclerotized.

Male postabdomen: Sternite 5 slightly longer than wide, slightly wider posteriorly, posterior margin deeply notched medially, anterior apodeme broad, about as long as exterior portion, without keel (Fig. 6.17). Surstylus paddle-shaped. Hypandrial arms with clear ventral extension. Pregonite small, distinct. Postgonite with lobes narrowly separated, anterior lobe broad, rounded, posterior lobe narrow, rounded.
Basiphallus with long epiphallus, broad, transparent preepiphallus. Distiphallus with strongly curved spinose dorsal tube, distal portion short, broad (Fig. 6.14).

Female unknown.

**Type material.** Holotype ♂: GUATEMALA: Zacapa: San Lorenzo, 7 km N, 2000 m, dung, 10–17 Jun 1993, B.D. Gill (DEBU). Paratypes: (8 ♂, DEBU); Baja Verapaz: Purulhá, 8 km S, FIT, 29 May 1991, H. & A. Howden (1 ♂, DEBU); Quetzaltenango: Zunil, 8 km SE, 2650 m, FIT, 19–21 Jun 1993, Ashe & Brooks (1 ♂, DEBU); as above but 2630 m, FIT #4, 17–19 Jun 1993 (1 ♂, DEBU); as above but 19–21 Jun 1993 (1 ♂, DEBU); as above but 2480 m, FIT #2, 17–19 Jul 1993 (1 ♂, DEBU); as above but 2620 m, FIT #5, 17–19 Jun 1993 (1 ♂, DEBU); as above but 2450 m, FIT #1 (2 ♂, DEBU). MEXICO: Chiapas: Lagos de Montebello, Lago Pojoj, 1500 m, FIT, 2–12 Jun 1990, B. Gill (1 ♂, DEBU).

**Boreantrops hispidus sp. nov.**
(Figs. 6.15, 6.18, 6.66)

Description:
Head orange, occiput black, frons dark reddish brown posteriorly. Prementum and maxillary palp yellow. Occiput and gena covered with microtomentum, frons covered with microtomentum except spots lateral to ocelli, face with a thin band of microtomentum below antenna and lunule. Ocellar bristles at level of or just anterior to median ocellus. Subvibrissal and anterior genal bristles about 0.5X length of vibrissa. Gena about 0.6X height of eye.

Thorax black, mostly covered with microtomentum, proepisternum, a spot on anepisternum covering anterior three-fifths and ventral two-thirds, a spot on katepisternum behind fore coxa, and meron and posterior katepisternum shiny. Halter whitish. Scutum foveolate. Scutellum with scattered short setae dorsally.

Legs black, distal quarter to third of femora orange, basal quarter and distal tip of tibia orange, trochanters yellow. Fore tarsus with 3 basal tarsomeres whitish and distal 2 pale brown in male, mid and hind tarsus in male and all 3 tarsi in female with 2 basal tarsomeres whitish and distal 3 pale brown. Mid tibia with one preapical anterodorsal, 4 subapical bristles. Hind tibia with one small ventroapical bristle.

Wing light brown, crossveins r-m and dm-cu whitish.
Abdomen with tergites and sternites weakly sclerotized. Syntergite 1+2 with posterolateral corners and a thin band between them strongly sclerotized, tergites 3–4 with a thin posterior band moderately sclerotized. Pleural setae on small discs, about the diameter of spiracles.

Male postabdomen: Sternite 5 narrow, flared posteriorly, posterior margin shallowly emarginated, anterior apodeme short (Fig. 6.18). Surstylus paddle-shaped. Pregonite fused with postgonite. Postgonite with lobes narrowly separated, anterior lobe rounded, posterior lobe narrow, pointed. Basiphallus with long epiphallus, narrow, transparent preepiphallus. Distiphallus with strongly curved, spinose dorsal tube, pointed apically (Fig. 6.15).

Female postabdomen: Tergite 6 not sclerotized, tergite 7 and sternite 6 sclerotized along anterior and lateral margins only, sternite 7 sclerotized around margins. Tergites with 3 posterior strips, sternites with 2 posterior strips. Tergite 8 emarginated anteriorly, covered with microtomentum. Epiproct with short anterior arms, microtomentum anteriorly, 1 pair of setae. Cerci broad. Sclerites of sternite 8 pointed anteriorly, posterior half broad, covered with microtomentum. Hypoproct broad, notched anteriorly. Spermathecae sausage-shaped, about 3X longer than wide, not invaginated.


Comments: The species name refers to the setose scutellum in this species, also found in *B. friburguensis* sp. nov.

*Boreantrops hondurensis* sp. nov.

(Figs. 6.16, 6.19, 6.71)

**Description:**

Head orange, occiput black medially, ocellar triangle may be brownish, maxillary palp yellow. Mostly covered with microtomentum, frons with microtomentum medially reaching from postocellar bristles anteriorly through ocellar triangle to anterior margin of frons, microtomentum on orbital plates reaching bases of interfrontal setae, face with thin line of microtomentum below lunule and antenna. Ocellar
bristles at level of anterior margin of median ocellus. Subvibrissal bristle and anterior genal bristles about 0.3X length of vibrissa. Gena about 0.7X eye height.

Thorax black, mostly covered with microtomentum. Proepisternum shiny, anepisternum with microtomentum along dorsal third and posterior third and in a thin line along anterior margin below spiracle, katepisternum with a shiny spot behind fore coxa, meron shiny, metapleuron shiny with a stripe of microtomentum between posterior spiracle and hind coxa. Scutum shallowly foveolate. Halter white, brownish below knob.

Legs black, trochanters, bases and tips of femora orange, fore tarsus with 2 basal tarsomeres whitish, mid and hind tarsi with 2 basal tarsomeres yellow, all tarsi with 3 distal tarsomeres brown. Mid tibia with 1 anteroventral, 1 posteroventral, 6 subapical bristles. Hind tibia with 1 ventroapical bristle.

Wing brown, veins dark brown, crossveins r-m, bm-cu, and dm-cu white, vein R4+5 with 2 spots distal to r-m.

Abdominal tergites 1–4 mostly heavily sclerotized, black, covered with microtomentum, syntergite 1+2 with a semicircular weakly sclerotized patch anteriorly. Tergite 5 weakly sclerotized. Sternites weakly sclerotized.

Male postabdomen: Sternite 5 longer than wide, parallel-sided, slightly narrower anteriorly, deeply emarginated posteriorly, anterior apodeme broad, shorter than exterior portion, without keel (Fig. 6.19). Surstylus paddle-shaped. Hypandrial arms with clear ventral extension. Pregonite small, distinct. Postgonite narrowed above lobes, lobes widely separated, anterior lobe broad, rounded, posterior lobe pointed. Basiphallus with long epiphallus, broad, transparent preepiphallus. Distiphallus with strongly curved spinose dorsal tube, distal portion short, pointed apically, ventral portion projecting as far as tip of dorsal tube (Fig. 6.16).

Female postabdomen: As in *A. mexicanus*.

**Type material.** Holotype ♂: HONDURAS: Francisco Morazán: Cerro Uyuca, 1800 m, malaise, 27 May 1994, H. Howden (DEBU). Paratypes: same data as holotype (2 ♂, 3 ♀, DEBU); as above but malaise trap, 30 May 1994 (2 ♂, DEBU); Uyuca, 1800 m, malaise trap, 6 Jun 1994, H. & A. Howden (1 ♂, DEBU); as above but 1798 m, 10 May 1994, H. & A. Howden (1 ♂, DEBU); as above but malaise, 3 Jun 1994, H. Howden (1 ♂, 2 ♀, DEBU); as above but malaise trap, 6 Jun 1994, H. & A. Howden (1 ♀, DEBU); as above but dung traps, 10 Jun 1994 (2 ♂, 2 ♀, DEBU). GUATEMALA: Quetzaltenango:
Zunil, 8 km SE, 2650 m, FIT, 19–21 Jun 1993, Ashe & Brooks (1 ♀, DEBU); as above but 2630 m, FIT #4, 17–19 Jun 1993 (2 ♀, DEBU); as above but 2620 m, FIT #5 (1 ♂, DEBU); as above but 19–21 Jun 1993 (1 ♂, DEBU); as above but 2500 m, FIT #3, 17–19 Jun 1993 (1 ♀, DEBU); as above but ext. FIT, 19–21 Jun 1993 (2 ♂, DEBU); as above but FIT, trap #3, 17–19 Jul 1993 (1 ♂, DEBU); Zacapa: San Lorenzo, 4 Apr 1987 (2 ♀, DEBU).

*Boreantrops inbio* sp. nov.

(Figs. 6.20, 6.23, 6.58)

Description:

Head orange, occiput ranging from mostly orange with black restricted to area around foramen to mostly black with orange around hind margin of eye, ocellar triangle may be brownish, prementum orange to dark brown with ventral third orange, maxillary palp yellow. Mostly covered with microtomentum, frons with microtomentum medially reaching from postocellar bristles anteriorly through ocellar triangle to anterior margin of frons, microtomentum on orbital plates reaching bases of interfrontal setae, bare in a small patch just anterior to vertical bristles, face with thin line of microtomentum below lunule and antenna. Ocellar bristles at level of anterior margin of median ocellus. Subvibrissal bristle and anterior genal bristles about 0.5X length of vibrissa. Gena about 0.6X eye height.

Thorax black, mostly covered with microtomentum. Proepisternum shiny, anepisternum with microtomentum along dorsal third and posterior third and in a thin line along anterior margin below spiracle, katepisternum with a shiny spot behind fore coxa, meron shiny, metapleuron shiny with a stripe of microtomentum between posterior spiracle and hind coxa. Scutum shallowly foveolate. Halter white, brownish below knob.

Legs black, joints and trochanters reddish brown to dark brown, fore and hind tarsi with 2 basal tarsomeres whitish and 3 distal tarsomeres brown, mid tarsus with all tarsomeres yellow, or with 2 basal tarsomeres whitish and 3 distal tarsomeres brown. Mid tibia with 1 anteroventral, 1 posteroventral, 6 subapical bristles. Hind tibia with 1 ventroapical bristle.

Wing brown, veins dark brown, crossveins r-m, and dm-cu white, vein R4+5 may have 2 pale spots distal to r-m, spots more prominent in specimens with darker occiputs.

Male postabdomen: Sternite 5 narrow anteriorly, posterior corners strongly divergent, deeply emarginated posteriorly, anterior apodeme broad, about as long as exterior portion, without keel (Fig. 6.23). Surstylus paddle-shaped. Hypandrial arms with clear ventral extension. Pregonite small, distinct. Postgonite with lobes widely separated, anterior lobe broad, rounded, posterior lobe pointed. Basiphallus with long epiphallus, broad, transparent preepiphallus. Distiphallus with strongly curved spinose dorsal tube, distal portion long, broad apically (Fig. 6.20).

Female postabdomen: As in A. mexicanus.

**Type material.** Holotype ♂: COSTA RICA: Tapantí Natl.Pk., above Ranger Stn., ca. 1250 m, human dung trap, 11–12 Oct 1999, S.A. Marshall (INBC). Paratypes: same data as holotype (3 ♂, 2 ♀, DEBU); as above but sweeping trail/road, 12 Oct 1999 (1 ♂, 1 ♀, DEBU); Cerro de la Muerte, La Cangreja, 1 Jul 1991, P. Hanson (1 ♂, DEBU); Tapantí Natl. Pk., 1550 m, pans in fallen tree, 7–12 Oct 1999, Marshall & Buck (1 ♀, DEBU); as above but 1650–1750 m, 7 Oct 1999 (1 ♂, DEBU); Tapantí Natl. Pk., Arboles Caídos Trail, ca. 1300 m, 11 Oct 1999, S.A. Marshall (1 ♂, DEBU); Tapantí Natl. Pk., Ranger Stn., 1200 m, pans in kitchen refuse, 7–11 Oct 1999, M. Buck (1 ♂, DEBU); as above but human dung, hand & traps, 9–12 Oct 1999, Buck & Marshall (1 ♀, DEBU); Tapantí Natl. Pk., Rd. nr. represa, 1650 m, Agouti dung, 8 Oct 1999, M. Buck (1 ♀, DEBU); Heredia: Braulio Carrillo Natl. Pk., Barva Biol. Stn., trail to laguna, 10°07'07"N 84°07'07"W, 2600–2760 m, 20 Feb 2003, S.A. Marshall (1 ♂, DEBU); Puntarenas: Estación la Casona, R.B. Monteverde, 1520 m, 9–31 Mar 1993, N. Obando, G. Barbosa, A. Pound & A. Pereira (1 ♀, INBC); Estación la Casona, R.B. Monteverde, A.C. Arenal, 1520 m, 31 Dec 1993, N.G. Obando (1 ♀, INBC); Las Alturas Bio. Stn., Cerro Chai, 2500 m, 15 Aug 1995, S.A. Marshall (3 ♂, 1 ♀, DEBU); Monteverde, 1500 m, 20 Feb 1980, D.M. Wood (1 ♂, DEBU); as above but rain forest, 29 Feb 1980, Mason & Wood (1 ♂, 1 ♀, DEBU); as above but malaise trough, 23–27 Feb 1991, B.J. Sinclair (1 ♀, DEBU); as above but cloud forest, dung traps, 19–25 Aug 1993, E.R. Barr (1 ♂, 1 ♀, DEBU); as above but FIT, 25 Feb 1991, H. & A. Howden (1 ♀, DEBU); as above but dung traps, 27 Feb 1991 (5 ♂, 3 ♀, DEBU); as above but 1560 m, dung trap, 11–18 Jun 1983, D.H. Lindeman (1 ♂, DEBU); Monteverde Biol. Res., 1500 m, sweeping, 26 May 1998, S.A. Marshall (1 ♂, DEBU); as above but on log over trail, 11 Jun 2000 (1 ♂, DEBU); as above but on log over trail, 14 Jun 2000, M. Buck (1 ♂, DEBU); as above but on log over trail, 11 Jun 2000, M. Buck (1 ♀, DEBU); as above but on log over trail, 14 Jun 2000, M. Buck (2 ♀, DEBU); Monteverde Biol. Stn., 1500 m, dung RET, 26 May 1998, S.A. Marshall (1 ♂, DEBU); Puntarenas, 2000 m, 12 Aug 1995, S.A. Marshall (1 ♂, DEBU); San José: San Antonio de Escazu, 1300 m, 1 Jun 1988, W. Eberhard (1 ♂, 1 ♀, INBC); San Gerardo de Dota, 9°33'33"N 83°47'47"W, 2500 m, wet trail, sweeping, 10 Aug 1995, S.A. Marshall (1 ♂, DEBU); as above but 2400–2600 m, nr. trail, 8–9 Aug 1995 (1 ♂, DEBU); San José, km 74 SE, dung trap, 25 Feb 1984, H.F. Howden (2 ♂, DEBU); Zurquí de Moravia, 10°03'03"N 84°01'01"W, 1600 m, 1 Feb 1989, P. Hanson (1 ♀, INBC); as above but malaise trap, 1 May 1989 (1 ♂, 1 ♀, DEBU).
GUATEMALA: **Baja Verapaz**: Chilasco, 6.6km W, 1700m, dung, 30 May 1991, H. Howden (1 ♂, DEBU); Purulhá, 8 km S, dung trap, 25 May 1991, H. & A. Howden (2 ♂, DEBU); **Guatemala**: Fraijanes, Finca San Antonio, 1800 m, 14 Feb 1987, J. Manger (4 ♂, DEBU); Guatemala City, Universidad del Valle, dung traps, 11–13 Jun 1991, B.D. Gill (1 ♂, DEBU); Santa Catarina Pinula, 1840 m, 10–11 Jun 1991, B.D. Gill (1 ♂, DEBU); as above but 11–13 Jun 1991 (31 ♂, DEBU); **Zacapa**: San Lorenzo, 7 km N, 2000 m, dung, 10–17 Jun 1993, B.D. Gill (1 ♂, DEBU). HONDURAS: **Francisco Morazán**: Cerro Uyuca, 1800 m, malaise, 27 May 1994, H. Howden (3 ♂, DEBU); Uyuca, 1798 m, malaise trap, 10 Jun 1994, H. & A. Howden (2 ♂, DEBU); as above but FIT, 3 Jun 1994, H. Howden (1 ♂, DEBU); as above but dung traps, 10 Jun 1994, H. & A. Howden (1 ♂, DEBU). MEXICO: **Chiapas**: Lagos de Montebello, Lago Pojoj, 1500 m, FIT, 2–12 Jun 1990, B. Gill (4 ♂, DEBU). PANAMA: **Chiriquí**: Cerro Punta, 2 km E, 1760 m, Baldwin forest, carrion, 30 May–8 Jun 1977, S. Peck (3 ♂, 1 ♀, DEBU); as above but dung traps (3 ♂, 2 ♀, DEBU); Cerro Punta, 2 km W, 1760 m, Baldwin forest, dung, 5 Jun 1977, S. Peck (1 ♂, DEBU); Cerro Punta, 5 km ESE, 2600 m, dung traps, 23–28 May 1977, S. Peck (1 ♂, 1 ♀, DEBU); Hartmann's Finca, 15 km NW Hato de Volcán, 1200 m, dung trap, 20–25 May 1977, S. Peck (2 ♂, DEBU); as above but 20–31 May 1977 (1 ♂, 2 ♀, DEBU); La Fortuna Dam, 1000 m, 5–6 Jul 1981, B. Gill (10 ♂, 7 ♀, DEBU).

Comments: The species name honours the Instituto Nacional de Biodiversidad of Costa Rica, and should be treated as a noun in apposition. The head of a specimen of this species was illustrated in Marshall and Buck (2010 --- see Fig. 3.3 in that paper) as *Archiborborus* sp.

*Boreantrops longiphallus* sp. nov.

(Figs. 6.21, 6.24, 6.67)

Description:

As described for *B. inbio*. Occiput black with orange around hind margin of eye, ventral third of prementum orange. Microtomentum on orbital plates only reaching 1 or 2 anterior interfrontal setae, face with patche of microtomentum below antenna reaching ventrally to level of U-shaped mark. Joints and trochanters reddish brown, mid tarsus with 2 basal tarsomeres whitish and 3 distal tarsomeres brown. Tergites 3–4 mostly heavily sclerotized.

Male postabdomen: Sternite 5 slightly longer than wide, slightly wider posteriorly, posterior margin broadly notched, anterior apodeme broad, short, without keel (Fig. 6.24). Surstylus paddle-shaped. Hypandrial arms with clear ventral extension. Pregonite small, distinct. Postgonite with lobes widely separated, anterior lobe broad, rounded, posterior lobe narrow, pointed. Basiphallus with long epiphallus, broad, transparent preepiphallus. Distiphallus with strongly curved spinose dorsal tube, distal portion long with a thin extension at tip (Fig. 6.21).
Female postabdomen: As in *A. mexicanus*.

**Type material.** Holotype ♂: GUATEMALA: **Guatemala:** Santa Catarina Pinula, 1840 m, dung traps, 11–13 Jun 1991, B.D. Gill (DEBU). Paratypes: same data as holotype (6 ♂, DEBU); **Baja Verapaz:** Purulhá, 8 km S, FIT, 29 May 1991, H. & A. Howden (2 ♂, DEBU). MEXICO: **Chiapas:** Lagos de Montebello, Lago Pojoj, 1500 m, FIT, 2–12 Jun 1990, B. Gill (1 ♂, DEBU); San Cristóbal de las Casas, dung traps, 26–28 May 1990, B. Gill (23 ♂, DEBU); as above but 2200 m, FIT, 20–27 May 1990, Howden & Gill (1 ♂, DEBU); **Durango:** La Ciudad, 24 mi W, 2134 m, 4 Aug 1964, W.R.M. Mason (1 ♂, DEBU); **México:** Temascaltepec, 3 mi NE, 1920 m, oak, madrono, pine, human dung, 2–7 Sep 1971, A. Newton (1 ♂, DEBU); Tenancingo, 3 mi SW, 2164 m, oak, juniper, human dung, 6 Sep 1971, A. Newton (1 ♂, DEBU); **Oaxaca:** Ixtlan de Juarez, 14.2 mi S, 2316 m, oak woodland, dung, 10–18 Aug 1973, A. Newton (1 ♂, DEBU); Suchixepec, 8 km S, 10 Aug 1986, H. & A. Howden (3 ♂, 1 ♀, DEBU).

Comments: The species name refers to the extended tip of the dorsal tube in the male distiphallus.

*Boreantrops masneri* sp. nov.

(Figs. 6.22, 6.25, 6.60)

**Description:**

Head orange, occiput black, frons dark reddish brown medially. Prementum and maxillary palp yellow. Occiput and gena covered with microtomentum, frons with microtomentum in anterolateral corners, face with a thin band of microtomentum below antenna and lunule. Ocellar bristles at level of anterior margin of median ocellus. Subvibrissal and anterior genal bristles about 0.3X length of vibrissa. Gena about 0.5X height of eye.

Thorax black, mostly covered with microtomentum, proepisternum, a spot on anepisternum covering anterior three-fifths and ventral three-quarters, a spot on katepisternum behind fore coxa, and meron and posterior katepisternum shiny. Halter whitish. Scutum foveolate. Scutellum subtriangular, dorsal surface indented medially.

Legs black, joints paler, trochanters yellow. Tarsi with 2 basal tarsomeres whitish and distal 3 pale brown. Mid tibia with one preapical anterodorsal, 2 subapical bristles. Hind tibia with one small ventroapical bristle.

Wing clear, veins yellow to light brown, crossveins whitish.
Abdomen with tergites and sternites weakly sclerotized. Syntergite 1+2 with posterolateral corners and a thin band between them strongly sclerotized, tergites 3–4 with a thin posterior band moderately sclerotized. Pleural setae on small discs, about the diameter of spiracles.

Male postabdomen: Sternite 5 narrow, long, posterior corners flared, posterior margin not notched, anterior apodeme about as long as external portion (Fig. 6.25). Surstylus paddle-shaped. Pregonite fused with postgonite. Postgonite with lobes widely separated, anterior lobe rounded, posterior lobe pointed. Basiphallus with long epiphallus, narrow, transparent preepiphallus. Distiphallus with strongly curved, spinose dorsal tube, apex of tube broad (Fig. 6.22).

Female unknown.

**Type material.** Holotype ♂: VENEZUELA: Aragua: Henri Pittier Natl. Pk., Maracay-Choroni highway, km 19, 1330 m, creek, 15 Apr 1994, L. Masner (MIZA). Paratypes: same data as holotype (1 ♂, DEBU); Henri Pittier Natl. Pk., Rancho Grande, Portachuelo Pass, 10°20'20"N 67°40'40"W, 1100 m, 9 Apr 1994, L. Masner (1 ♂, DEBU).

Comments: The species name honours Lubomir Masner, a prolific and generous collector who obtained many of the specimens used in the revision, including the entire type series of this species.

**Boreantrops mexicanus** (Steyskal)

*Archiborborus mexicanus* Steyskal 1973: 155

**Description:**
Head orange, occiput black, posterior half of frons and prementum reddish brown. Mostly covered with microtomentum, frons shiny with microtomentum medially reaching from postocellar bristles anteriorly through ocellar triangle to anterior margin of frons, orbital plates with microtomentum, reaching bases of interfrontal setae, face with patch of microtomentum below lunule and antenna. Ocellar bristles just anterior to median ocellus. Subvibrissal bristle about 0.4X length of vibrissa, anterior genal bristle about 0.3X length of vibrissa. Gena about 0.5X eye height.

Thorax black, mostly covered with microtomentum. Proepisternum shiny, anepisternum with microtomentum along dorsal third and posterior third, katepisternum with a shiny spot behind fore coxa,
Figures 6.20–25: Boreantrops male terminalia: (20) *B. inbio*, phallus, postgonite, and phallapodeme, lateral view; (21) *B. longiphallus*, phallus, postgonite, and phallapodeme, lateral view; (22) *B. masneri*, phallus, postgonite, and phallapodeme, lateral view; (23) *B. inbio*, sternite 5; (24) *B. longiphallus*, sternite 5; (25) *B. masneri*, sternite 5.
meron shiny, metapleuron shiny with a stripe of microtomentum between posterior spiracle and hind coxa. Scutum shallowly foveolate. Halter white, brownish below knob.

Legs black, trochanters, bases and tips of femora orange, fore tarsus with 2 basal tarsomeres whitish, mid and hind tarsi with 2 basal tarsomeres yellow, all tarsi with 3 distal tarsomeres brown. Mid tibia with 1 anteroventral, 1 posteroventral, 6 apical bristles. Hind tibia with 1 ventroapical bristle.

Wing brown, veins dark brown, crossveins r-m, bm-cu, and dm-cu white, vein R4+5 with 2 spots distal to r-m.

Abdominal tergites 1–3 mostly heavily sclerotized, black, covered with microtomentum, syntergite 1+2 with a semicircular weakly sclerotized patch anteriorly. Tergite 4 with a median band heavily sclerotized, tergite 5 weakly sclerotized. Sternites weakly sclerotized.

Male unknown.


**Type material.** Holotype ♀: MEXICO: Tamaulipas: 2 km NW Gomez Farías, Sótano del Porvenir, 13 Jan 1971, Elliot & Cooke (USNM; examined). Paratype: same data as holotype (USNM; examined).

**Other material examined.** MEXICO: Tamaulipas: nr. Gomez Farías, Rancho del Cielo, 1000 m, cloud forest, FIT, 6 Jun – 7 Aug 1983, S. & J. Peck (1 ♀, DEBU).

Comments: This species may be a senior synonym of one of the species described here, but it belongs to a group of very similar species only distinguishable based on male genitalia. As the types and all known specimens from the type locality are female, they cannot be confidently associated with any particular species described from males. Male specimens from the type locality are needed to confirm the identity of this species.
Boreantrops oaxacensis sp. nov.
(Figs. 6.26, 6.29, 6.71)

Description:
Head orange, occiput black medially, maxillary palp yellow. Mostly covered with microtomentum, frons with microtomentum medially reaching from postocellar bristles anteriorly through ocellar triangle to anterior margin of frons, microtomentum on orbital plates reaching bases of interfrontal setae, face with patch of microtomentum below lunule and antenna. Ocellar bristles just anterior to median ocellus. Subvibrissal bristle and anterior genal bristles about 0.3X length of vibrissa. Gena about 0.8X eye height.

Thorax black, mostly covered with microtomentum. Proepisternum shiny, anepisternum with microtomentum along dorsal third and posterior third, katepisternum with a shiny spot behind fore coxa, meron shiny, metapleuron with shiny spot in posteroventral corner. Scutum shallowly foveolate. Halter white, brownish below knob.

Coxae, basal three-fifths of fore femur, basal two-thirds of mid and hind femur, and distal half of fore and hind tibia dark reddish brown to black, extreme bases and distal portions of femora, mid tibia and basal half of fore and hind tibia orange, mid tibia sometimes with dorsal brown spot at 4/5, fore tarsus with 2 basal tarsomeres whitish, mid and hind tarsi with 2 basal tarsomeres yellow, all tarsi with 3 distal tarsomeres brown. Mid tibia with 1 anteroventral, 6 subapical bristles. Hind tibia with 1 ventroapical bristle.

Wing brown, veins dark brown, crossveins r-m and dm-cu white, vein R4+5 with 2 spots distal to r-m.

Abdominal tergites 1–4 mostly heavily sclerotized, black, covered with microtomentum, syntergite 1+2 with a semicircular weakly sclerotized patch anteriorly. Tergite 5 weakly sclerotized. Sternites weakly sclerotized.

Male postabdomen: Sternite 5 longer than wide, lateral margins straight, widest posteriorly, shallowly emarginated posteriorly, posteromedial patch weakly sclerotized, anterior apodeme broad, about as long as exterior portion, without keel (Fig. 6.29). Surstylus paddle-shaped. Hypandrial arms with clear ventral extension. Pregonite small, distinct. Postgonite narrowed above lobes, lobes widely separated, anterior lobe broad, rounded, posterior lobe pointed. Basiphallus with long epiphallus, long, transparent
preepiphallus. Distiphallus with strongly curved spinose dorsal tube, distal portion short, pointed apically (Fig. 6.26).

Female postabdomen: As in *A. mexicanus*.

**Type material.** Holotype ♂: MEXICO: Oaxaca: 1.7 mi W Jct Mex. 175-Yuvila Rd., 2865 m, mesic oak, fish trap, 9–19 Aug 1973, A. Newton (DEBU). Paratypes: same data as holotype (2 ♂, 2 ♀, DEBU); as above but mesic oak forest (3 ♂, 4 ♀, DEBU); Suchixtepec, 8 km S, 10 Aug 1986, H. & A. Howden (2 ♂, 8 ♀, DEBU); Valle Nacional, 29.7 mi S, 2073 m, cloud forest, dung, 11 Aug 1973, A. Newton (1 ♀, DEBU).

**Boreantrops peruvianus** sp. nov.
(Figs. 6.27, 6.30, 6.64)

Description:
Head yellow to orange, occiput mostly brown with yellowish orange semicircle behind gena. Microtomentum on frons around base of postvertical bristles, along ventral margin of gena, thin band on face below lunule and antenna, on prementum, and on occiput. Ocellar bristles just anterior to median ocellus. Subvibrissal bristle and anterior genal bristle about 0.5X length of vibrissa.

Thorax black, mostly shiny with scattered microtomentum on scutum in acrostichal area, on scutellum in a medial stripe and along lateral margins, on anepisternum along posterior third except ventral corner, on katepisternum around patch behind fore coxa and ventrally, on anepimeron and laterotergite, and metapleuron. Halter whitish. Scutum foveolate. Scutellum subtriangular, dorsal surface indented medially.

Legs black, trochanters yellow, joints paler. Tarsi with 3 basal tarsomeres yellow, distal 2 brown. Mid tibia with one preapical anterodorsal, 4 subapical bristles. Hind tibia with one ventroapical bristle.

Wing clear, veins yellow to light brown.

Abdomen with tergites and sternites weakly sclerotized. Syntergite 1+2 with posterolateral corners and a thin band between them strongly sclerotized, tergites 3–4 with a thin posterior band moderately sclerotized. Pleural setae on small discs, about the diameter of spiracles.
Male postabdomen: Sternite 5 narrow, posterior corners strongly flared, posterior margin notched medially, anterior apodeme about half as long as external portion (Fig. 6.30). Surstylus long, paddle-shaped. Pregonite fused with postgonite. Postgonite with lobes not separated, anterior lobe truncate, posterior lobe pointed. Basiphallus with long epiphallus, thin, transparent preepiphallus. Distiphallus with curved spinose dorsal tube, distal tip slightly recurved (Fig. 6.27).

Female postabdomen: Tergites 6–7 and sternites 6–7 very broad, somewhat narrower anteriorly, moderately sclerotized. Tergites with 3 posterior strips, sternites with 2 posterior strips. Tergite 8 very broad, trapezoidal, shallowly emarginated anteriorly, covered with microtomentum except anterior margin and corners. Epiproct with very short anterior arms, with microtomentum medially, 1 pair of setae. Cerci broad. Sclerites of sternite 8 very broad, somewhat narrower anteriorly, posterior two-thirds covered with microtomentum. Hypoproct broad, notched anteriorly. Spermathecae barrel-shaped, about 1.5X longer than wide, invaginated apically, sclerotized duct short.


Comments: This is the only species of archiborborine currently known from the Amazon basin. A female paratype contained 3 very large eggs, each about two-thirds the length of the abdomen, similar in size and number to those in the genus *Frutillaria*.

**Boreantrops subfoveolatus** sp. nov.
(Figs. 6.28, 6.31, 6.71)

Description:
Head orange, maxillary palp yellow. Mostly covered with microtomentum, frons with microtomentum medially reaching from postocellar bristles anteriorly through ocellar triangle to anterior margin of frons, microtomentum on orbital plates reaching bases of interfrontal setae, face with patch of microtomentum below lunule and antenna. Ocellar bristles at level of anterior margin of median ocellus. Subvibrissal bristle and anterior genal bristles about 0.5X length of vibrissa. Gena about 0.7X eye height.
Thorax black, mostly covered with microtomentum. Proepisternum shiny, anepisternum with microtomentum along dorsal third and posterior third, katepisternum with a shiny spot behind fore coxa, meron shiny. Scutum shallowly foveolate. Halter white, brownish below knob.

Legs black, trochanters and joints reddish brown, tarsi yellow. Mid tibia with row of anterodorsal, 1 anteroventral, 1 posteroventral, and 5 subapical bristles. Hind tibia with 1 thin anteroventral, 1 ventroapical bristle.

Wing brown, crossveins r-m and dm-cu paler.


Male postabdomen: Sternite 5 parallel-sided near base, wider distally, slightly longer than wide, deeply emarginated posteriorly, anterior apodeme broad, slightly longer than exterior portion, without keel (Fig. 6.31). Surstylus paddle-shaped. Hypandrial arms with clear ventral extension. Pregonite small, distinct. Postgonite narrowed above lobes, lobes widely separated, anterior lobe broad, rounded, posterior lobe pointed. Basiphallus with long epiphallus, short, broad, transparent preepiphallus. Distiphallus with strongly curved spinose dorsal tube, distal portion flattened, extending well beyond ventral portion of distiphallus (Fig. 6.28).

Female postabdomen: As in A. mexicanus.

**Type material.** Holotype ♂: PANAMA: Chiriqui: Cerro Punta, 5 km ESE, 2600 m, dung traps, 23–28 May 1977, S. Peck (DEBU). Paratypes: same data as holotype (1 ♂, 1 ♀, DEBU).

Comments: The species name refers to the weakly foveolate scutellum, which distinguishes this species and the similar B. zacapa from other members of the B. mexicanus group.
**Boreantrops suchistepcensis sp. nov.**
(Figs. 6.32, 6.36, 6.58)

Description:
As described for *B. alyothrix*.

Male postabdomen: Sternite 5 longer than wide, wider posteriorly, posterior margin rounded, notched medially, anterior apodeme broad, slightly shorter than exterior portion, without keel (Fig. 6.36). Surstylus paddle-shaped. Hypandrial arms with clear ventral extension. Pregonite small, distinct. Postgonite with lobes widely separated, anterior lobe broad, rounded, posterior lobe pointed. Basiphallus with long epiphallus, broad, transparent preepiphallus. Distiphallus with strongly curved spinose dorsal tube, distal portion short, pointed apically (Fig. 6.32).

Female unknown.

**Type material.** Holotype ♂: MEXICO: Oaxaca: [San Miguel de] Suchistepec, 8 km S, 10 Aug 1986, H. & A. Howden (DEBU).

Comments: The species name refers to the type locality.

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**Boreantrops zacapa sp. nov.**
(Figs. 6.33, 6.37, 6.67)

Description:
Head orange, occiput blackish medially, prementum brown, maxillary palp yellow. Mostly covered with microtomentum, frons with microtomentum medially reaching from postocellar bristles anteriorly through ocellar triangle to anterior margin of frons, microtomentum on orbital plates reaching bases of interfrontal setae, face with patch of microtomentum below lunule and antenna, occiput with shiny patches lateral to foramen. Ocellar bristles at level of anterior margin of median ocellus. Subvibrissal bristle about 0.3X length of vibrissa, anterior genal bristle about 0.5X length of vibrissa. Gena about 0.7X eye height.

Thorax black, mostly covered with microtomentum. Proepisternum shiny, anepisternum with ventromedial shiny spot covering about two-thirds height and two-thirds length of sclerite, katepisternum
with a shiny spot behind fore coxa, meron shiny. Scutum shallowly foveolate. Halter white, brownish below knob.

Legs black, trochanters and joints orange, tarsi with 2 basal tarsomeres yellow, distal 3 tarsomeres brown. Mid tibia with row of anterodorsal, 1 anteroventral, 1 posteroventral, and 5 subapical bristles. Hind tibia with 1 thin anteroventral, 1 ventroapical bristle.

Wing brown, faint spots around crossveins r-m and dm-cu, very faint paler spots on vein R4+5 distal to r-m.

Abdominal tergites 1–4 heavily sclerotized, black, covered with microtomentum, syntergite 1+2 with a semicircular weakly sclerotized patch anteriorly. Tergite 5 weakly sclerotized, anterolateral corners heavily sclerotized. Sternites weakly sclerotized.

Male postabdomen: Sternite 5 parallel-sided, slightly longer than wide, broadly and shallowly emarginated posteriorly, anterior apodeme broad, slightly longer than exterior portion, without keel (Fig. 6.37). Surstylus paddle-shaped. Hypandrial arms with clear ventral extension. Pregonite small, distinct. Postgonite narrowed above lobes, lobes widely separated, anterior lobe broad, rounded, posterior lobe pointed. Basiphallus with long epiphallus, short, broad, transparent preepiphallus. Distiphallus with strongly curved spinose dorsal tube, distal portion flattened, extending just beyond ventral portion of distiphallus (Fig. 6.33).

Female postabdomen: As in A. mexicanus.

**Type material.** Holotype ♂: GUATEMALA: Zacapa: San Lorenzo, 7 km N, 2000 m, dung, 10–17 Jun 1993, B.D. Gill (DEBU). Paratypes: same data as holotype (28 ♂, 46 ♀, DEBU); San Lorenzo, 5 mi N, FIT, 4–18 Jul 1986, J.M. Campbell (1 ♀, DEBU).

Comments: The species name is derived from the province in which the type series was collected; it should be treated as a noun in apposition.
**Boreantrops emarginatus** group:

**Boreantrops auranticeps sp. nov.**

(Figs. 6.34–35, 6.38, 6.60)

Description:

Head orange, occiput with a black U-shaped mark around foramen. Maxillary palp yellow. Occiput and gena covered with microtomentum, frons with microtomentum on orbital plate in a line medial to inner vertical and around bases of orbital bristles to bases of interfrental setae and between ocelli to bases of ocellar bristles, face with microtomentum below lunule and in dense crescent below antenna. Ocellar bristles at level of anterior margin of median ocellus Subvibrissal and anterior genal bristle about 0.5X length of vibrissa. Gena about 0.5X height of eye.

Thorax black, mostly covered with microtomentum. Proepisternum shiny, anepisternum mostly shiny with microtomentum covering dorsal quarter and posterior third, katepisternum with a shiny spot behind fore coxa, meron and metapleuron shiny with band of microtomentum behind posterior spiracle and hind coxa. Halter white, brownish below knob.

Legs black, joints and fore tarsus dark brown, trochanters and mid and hind tarsus yellow. Mid tibia with 1 preapical anterodorsal at two-thirds, 1 anteroventral, 1 posteroventral, 6 subapical bristles. Hind tibia with 2 ventroapical bristles.

Wing brown, veins dark brown. White spots on crossveins r-m, bm-cu, dm-cu, and on vein R4+5 with 2 distal to r-m. Vein R2+3 contorted, joining costa at nearly right angle.

Abdomen with tergites and sternites weakly sclerotized. Syntergite 1+2 with posterolateral corners and a thin band between them strongly sclerotized, tergites 3–4 with a thin posterior band moderately sclerotized.

Male postabdomen: Sternite 5 with lateral margins strongly rounded, posterolateral corners folded over dorsally, posterior margin broadly but shallowly notched, anterior apodeme slightly longer than external portion, without keel (Fig. 6.38). Epandrium fused between anal opening and cerci. Surstylus with broad anterior thumb-like projection, ventral portion broad, posterior margin with long, thick setae ventrally (Fig. 6.35). Pregonite not fused with postgonite, fairly large. Postgonite narrow, lobes narrowly separated, anterior lobe thin, angled relative to posterior lobe. Basiphallus with long, broad-based epiphallus,
preepiphallus narrow, pointed. Distiphallus with strongly curved, spinose dorsal tube, flanked by one spike-like sclerite, distally with a second projecting spike-like sclerite (Fig. 6.34).

Female postabdomen: Tergites 6–7 and sternites 6–7 very wide, crescent-shaped; tergite 6 sclerotized along anterior margin, tergite 7 mostly sclerotized, with two large unsclerotized spots medially, sternites sclerotized along margins, not sclerotized medially. Tergites with 3 posterior strips, sternites with 2 posterior strips. Tergite 8 very wide anteriorly, narrower posteriorly, posterior half covered with microtomentum. Epiproct with barely separated anterior arms, 1 pair of setae, some microtomentum medially. Cerci long, narrow. Sternite 8 with anterior, weakly connected patch sculptured with ridges, posterior portion with posterior half covered with microtomentum. Hypoproct with 3 anterior patches and posterior margin moderately sclerotized. Spermathecae sausage-shaped, about 5X longer than wide, with shallow apical invagination.

**Type material.** Holotype ♂: ECUADOR: Napo: SierrAzul Res., 14 km W Cosanga, 0°40'40"S 77°56'56"W, 2200 m, dung baits, 8–11 May 2002, M. Buck (QCAZ). Paratypes: same data as holotype (1 ♂, 6 ♀, DEBU); as above but S.M. Paiero (1 ♂, DEBU); as above but on dung, 9–10 May 2002, M. Buck (1 ♂, DEBU); Pichincha: Bellavista Reserve, 0°00'00"S 78°40'40"W, 2200 m, 30 Oct 1999, S.A. Marshall (2 ♀, DEBU).

Comments: The species name refers to the striking orange head in this species.

**Boreantrops boliviensis sp. nov.**

(Figs. 6.39, 6.62)

Description:
Occiput black, posterior three-quarters of frons, gena, and prementum dark brown, antenna and anterior quarter of frons orange to dark brown, maxillary palp yellow. Face mostly orange to brown, lateral corners and sometimes middle stripe between lunule and U-shaped mark dark brown to black. Mostly covered with microtomentum, frons shiny medially, microtomentum on orbital plates reaching bases of interfrontal setae, face with microtomentum below lunule and in dense crescent below antenna. Ocellar bristles just anterior to median ocellus. Subvibrissal and anterior bristles about 0.5X length of vibrissa. Gena about 0.6X eye height.

Thorax black, mostly covered with microtomentum. Proepisternum shiny, anepisternum mostly shiny with microtomentum covering dorsal margin and posterior quarter, katepisternum with a shiny spot
behind fore coxa, meron shiny, metapleuron with a shiny spot in posteroventral corner. Halter white, brownish below knob.

Legs black, joints, trochanters, and tarsi yellow, distal 3 tarsomeres of fore tarsus brown. Posterior face of fore femur covered with microtomentum. Fore basotarsomere with a small spur in male. Mid tibia with row of anterodorsals, 1 anteroventral, 1 posteroventral, 5 subapical bristles. Hind tibia with 1 ventroapical bristle.

Wing brown, veins dark brown, crossveins r-m and dm-cu paler.

Abdomen with tergites and sternites weakly sclerotized. Syntergite 1+2 with posterolateral corners and a thin band between them strongly sclerotized, tergites 3–4 with a thin posterior band moderately sclerotized.

Male postabdomen: Sternite 5 with sides straight, slightly wider at apex, hind margin shallowly notched, anterior apodeme about as long as exterior portion, not keeled. Epandrium fused between anal opening and cerci. Surstylus with both lateral margins rounded. Pregonite fused with postgonite. Postgonite with a posterior triangular flap, boundary between lobes indistinct, posterior lobe with serrated margin, truncate apically, anterior lobe overlapping with posterior, rounded. Basiphallus expanded medially, without distinct epiphallus, preepiphallus short and transparent. Distiphallus with spinose dorsal tube not touching medial sclerite distally, with a single spike-like sclerite laterally, dorsal distal corner produced (Fig. 6.39).

Female postabdomen: Tergites 6–7 and sternites 6–7 wider than long, sclerotized. Tergites with 3 posterior strips, sternites with 2 posterior strips. Tergite 8 nearly square, emarginated anteriorly, covered with microtomentum except anterior margin. Epiproct parallel-sided, with wide anterior arms, 2 pairs of setae, with microtomentum medially. Cerci long, narrow. Sclerites of sternite 8 subrectangular, reaching anterior corners of sternite 8 laterally, anterior third slightly narrower, pinched, posterior two-thirds covered with microtomentum. Hypoproct with an anterior notch, posterior margin and medial band moderately sclerotized. Spermathecae very long, twisted, not invaginated, sclerotized duct about as long as spermathecae.

**Type material.** Holotype ♂: BOLIVIA: La Paz: Chulumani, Apa Apa Reserve, 16°21'21"S 67°30'30"W, 2000 m, 1 Apr 2001, S.A. Marshall (UASC). Paratypes: same data as holotype but dung baits (5 ♀, DEBU); as above but pan traps, 1–3 Apr 2001 (1 ♂, 6 ♀, DEBU); as above but sweeping, 1 Apr 2001 (1 ♀, DEBU); Coroico, 0.5 km SE, 16°10'10"S 67°43'43"W, dung bait, 15 Apr 2001, S.A. Marshall (1 ♀,
DEBU); Cumbre Alto Beni, 28 km E Caranavi, 15°40'40"S 67°29'29"W, ~1400 m, cloud forest, 14 Apr 2001, S.A. Marshall (1 ♂, DEBU); as above but dung pans (4 ♂, DEBU).

**Boreantrops calceatus** (Duda)

*Archiborborus calceatus* Duda 1921: 138

Description:
The female holotype of this species appears identical to *B. wayqecha* in external characters. The abdomen is shrivelled, and the specimen was not available for dissection to examine internal characters.

**Type material.** Holotype ♀: COLOMBIA: [Magdalena:] Sierra S. Lorenzo, Ujhelyi (HMNH; photos examined).

Comments: The similarity of this species to *B. wayqecha* suggests that these two species might be synonyms. However, given the lack of records between northern Colombia and southern Peru and the typically small ranges of Andean taxa in the genus, it seems prudent to treat these as separate species until topotypic males of *B. calceatus* can be examined.

**Boreantrops challabamba** sp. nov.

(Figs. 6.40–41, 6.62)

Description:
Occiput black, frons, gena, face, antenna, and prementum reddish brown, maxillary palp yellow. Mostly covered with microtomentum, frons shiny medially, microtomentum medially reaching from postocellar bristles anteriorly through ocellar triangle to ocellar bristles, microtomentum on orbital plates reaching bases of interfrontal setae, face with microtomentum below lunule and in dense crescent below antenna. Ocellar bristles just anterior to median ocellus. Subvibrissal and anterior bristles about 0.5X length of vibrissa. Gena about 0.6X eye height.

Thorax black, mostly covered with microtomentum. Proepisternum shiny, anepisternum mostly shiny with microtomentum covering dorsal margin and posterior quarter, katepisternum with a shiny spot behind fore coxa, meron shiny, metapleuron with a shiny spot in posteroventral corner. Halter white, brownish below knob.
Legs black, joints, trochanters, and tarsi yellow, distal 2 or 3 tarsomeres of fore and hind tarsi brown. Posterior face of fore femur shiny. Fore basotarsomere with a small spur in male. Mid tibia with row of anterodorsals, 1 anteroventral, 5 subapical bristles. Hind tibia with 2 ventroapical bristles.

Wing brown, veins dark brown, crossveins r-m and dm-cu paler.

Abdomen with tergites and sternites weakly sclerotized. Syntergite 1+2 with posterolateral corners and a thin band between them strongly sclerotized, tergites 3–4 with a thin posterior band moderately sclerotized.

Male postabdomen: Sternite 5 with sides slightly curved, hind margin shallowly notched, anterior apodeme pointed, about as long as exterior portion, not keeled. Epandrium fused between anal opening and cerci. Surstylus with anterior margin straight, posterior margin rounded (Fig. 6.41). Pregonite fused with postgonite. Postgonite with a long posterior extension dorsally, boundary between lobes indistinct, posterior lobe longer, pointed. Basiphallus expanded medially, without distinct epiphallus, preepiphallus short and transparent. Distiphallus with spinose dorsal tube not touching medial sclerite distally, with a single spike-like sclerite laterally, dorsal distal corner produced, long ventral sac apically (Fig. 6.40).

Female unknown.

**Type material.** Holotype ♂: PERU: Cusco: Puente Pilco, ~5.3 km NNW Challabamba, along creek, 13°10′10″S 71°46′46″W, ~2800 m, yellow pans, 13–16 May 2007, Marshall & Kits (MUSM).

Comments: This species is named after the type locality; the name should be treated as a noun in apposition.

_Boreantrops emarginatus_ sp. nov.

(Figs. 6.42–43, 6.65)

Description:
Head orange, occiput black, ocellar triangle brown, prementum brown to dark brown. Ventral corners of face may be somewhat darker. Mostly covered with microtomentum, frons with shiny spots lateral to ocelli, face mostly shiny with microtomentum below antenna and lunule. Ocellar bristles just anterior to
median ocellus. Subvibrissal and anterior genal bristles about 0.5X length of vibrissa. Gena about 0.7X eye height.

Thorax black, mostly covered with microtomentum. Proepisternum shiny, anepisternum with ventromedial shiny spot covering about three-quarters height and half length of sclerite, katepisternum with a shiny spot behind fore coxa, thin shiny stripe along margin of meron and metapleuron, metapleuron with a shiny spot in posteroventral corner. Halter white, brownish below knob.

Legs black, joints and trochanters reddish brown, tarsi yellow, distal 3 tarsomeres of fore tarsus brown. Fore basotarsomere with a small spur in male. Mid tibia with row of anterodorsals, 1 anteroventral, 1 posteroventral, 5 subapical bristles. Hind tibia with 2 ventroapical bristles.

Wing brown, veins dark brown, crossveins r-m and dm-cu paler.

Abdomen with tergites and sternites weakly sclerotized. Syntergite 1+2 with posterolateral corners and a thin band between them strongly sclerotized, tergites 3–4 with a thin posterior band moderately sclerotized.

Male postabdomen: Sternite 5 long, lateral margins rounded, posterior corners projecting posteriorly, posterior margin with a deep V-shaped notch, anterior apodeme broad, with a dorsal keel (Fig. 6.43). Epandrium fused between anal opening and cerci. Surstylus paddle-shaped, anterior face covered with setae. Pregonite indistinct, fused with postgonite. Postgonite with distal portion narrow, lobes overlapping, both narrow, truncate, posterior lobe longer. Basiphallus with very broad epiphallus, narrow preepiphallus. Distiphallus with long dorsal tube, straight and with a few spines medially, flanked by a single spike-like sclerite (Fig. 6.42).

Female postabdomen: Tergites 6–7 sclerotized along anterior and lateral margins only, sternites 6–7 mostly sclerotized. Tergites with 3 posterior strips, sternites with 2 posterior strips. Tergite 8 covered with microtomentum except anterior margin, shallowly emarginated anteriorly and posteriorly. Epiproct with very short anterior arms, microtomentum medially, with 2 pairs of setae. Cerci long, narrow. Sclerites of sternite 8 subrectangular, broadened at apex, covered with microtomentum except anterior margin. Hypoproct subrectangular. Spermathecae barrel-shaped, slightly longer than wide, long apical invagination meeting basal invagination, sclerotized duct about as long as spermathecae.
Figures 6.39–47: Boreantrops male terminalia. B. boliviensis: (39) phallus, postgonite, and phallapodeme, lateral view; B. challabamba: (40) phallus, postgonite, and phallapodeme, lateral view, (41) surstylus, anterior view; B. emarginatus: (42) phallus, postgonite, and phallapodeme, lateral view, (43) sternite 5; B. pollex: (44) phallus, postgonite, and phallapodeme, lateral view; (45) surstylus, anterior view, (46) sternite 5; B. punctipennis: (47) phallus, postgonite, and phallapodeme, lateral view.
Type material. Holotype ♂: GUATEMALA: Guatemala: Santa Catarina Pinula, 1840 m, dung traps, 10–11 Jun 1991, B.D. Gill (DEBU). Paratypes: same data as holotype (51 ♂, 49 ♀, DEBU); as above but no collection method, 11–13 Jun 1991 (1 ♂, 1 ♀, DEBU); Baja Verapaz: Purulhá, 7.4 km S, 1650 m, FIT, 2 Jul 1993, Ashe & Brooks (1 ♂, DEBU); Purulhá, 8 km S, dung trap, 25 May 1991, H. & A. Howden (8 ♂, 11 ♀, DEBU); as above but FIT, 29 May 1991 (5 ♂, 1 ♀, DEBU); Quetzaltenango: Zunil, 8 km SE, 2480 m, FIT #2, 17–19 Jul 1993, Ashe & Brooks (1 ♂, 1 ♀, DEBU); as above but 2450 m, FIT #1, 17–19 Jun 1993 (3 ♂, 1 ♀, DEBU); as above but FIT, 19–21 Jun 1993 (2 ♂, 2 ♀, DEBU); San Marcos: San Antonio Sacatepéquez, 14°58′58″N 91°43′43″W, 8000 ft, 29 Sep 1986, M.J. Sharkey (1 ♂, DEBU); Zacapa: San Lorenzo, 7 km N, 2000 m, dung, 10–17 Jun 1993, B.D. Gill (6 ♂, 15 ♀, DEBU). MEXICO: Chiapas: Lagos de Montebello, Lago Pojoj, 1500 m, FIT, 2–12 Jun 1990, B. Gill (5 ♀, DEBU); San Cristóbal de las Casas, dung traps, 26–28 May 1990, B. Gill (11 ♂, 7 ♀, DEBU); Hidalgo: 12 mi SW of Jacala, 1890 m, walnut, oak, dung, 23–30 Jun 1971, A. Newton (2 ♂, 6 ♀, DEBU); Morelos: Tres Cumbres, 4 mi W, 2713 m, oak, human dung, 29 Aug–4 Sep 1971, A. Newton (2 ♀, DEBU); Tres Cumbres, 8 mi S, 7400 ft, oak/pine forest, dung, 29 Aug–4 Sep 1971, A. Newton (1 ♀, DEBU); Oacaca: Valle Nacional, 29.7 mi S, 2073 m, cloud forest, carrion, 11–17 Aug 1973, A. Newton (1 ♂, DEBU); as above but dung, 11 Aug 1973 (1 ♂, DEBU).

Comments: The species name is from the Latin *emarginatus* (notched), referring to the deeply notched male sternite 5.

*Boreantrops pollex* sp. nov.

(Figs. 6.44–46, 6.68)

Description:

As described for *B. punctipennis*.

Male postabdomen: Sternite 5 with lateral margins strongly rounded, posterior margin broadly but shallowly notched, anterior apodeme slightly longer than external portion, without keel (Fig. 6.46). Anal opening keyhole shaped. Surstylus with anterior thumb-like projection, ventral portion narrow, posterior margin with peg-like setae ventrally (Fig. 6.45). Pregonite not fused with postgonite, fairly large. Postgonite very narrow, posterior margin straight, lobes not separated, posterior lobe longer. Basiphallus narrow, with long epiphallus, preepiphallus broad, triangular. Distiphallus with a long dorsal tube with spines near base, flanked by two spike-like sclerites, distal sclerite projecting dorsally (Fig. 6.44).

Female postabdomen: As described for *B. punctipennis*. Sternite 6 with thin, irregular sclerotization around margins.

Type material. Holotype ♂: ECUADOR: Napo: Baeza, 5 Mar 1979, S.A. Marshall (QCAZ). Paratypes: same data as holotype (11 ♀, DEBU); Cosanga, 3.5 km S, trail above pipeline, 2250 m, sweeping, 6 Nov
Comments: The species name refers to the thumb-like projection on the surstylus (Latin pollex, thumb). This species is very similar to *B. punctipennis*, their ranges do not appear to overlap.

*Boreantrops punctipennis* sp. nov.
(Figs. 6.47, 6.69)

Description:
Occiput black, frontal triangle and orbital plates reddish brown to dark brown, interfrontal plates orange to reddish brown, face, gena, and antenna orange. Maxillary palp and prementum yellow. Occiput and gena covered with microtomentum, frons mostly shiny with microtomentum on orbital plate in a line medial to inner vertical and around bases of orbital bristles, face with microtomentum below lunule and in dense crescent below antenna. Ocellar bristles just anterior to median ocellus. Subvibrissal and anterior genal bristle about 0.5X length of vibrissa. Gena about 0.6X height of eye.

Thorax black, mostly covered with microtomentum. Proepisternum shiny, anepisternum mostly shiny with microtomentum covering dorsal quarter and posterior third, katepisternum with a shiny spot behind fore coxa, meron and metapleuron shiny with band of microtomentum behind posterior spiracle and hind coxa. Halter white, brownish below knob.

Legs black, trochanters and joints dark reddish brown, mid and hind tarsi yellow. Mid tibia with 1 anteroventral, 6 subapical bristles. Hind tibia with 1 long thin anteroventral, 1 ventroapical bristle.

Wing brown, veins dark brown. White spots on crossvein r-m, bm-cu, and dm-cu, at tip of vein R2+3 and on vein R4+5 with 1 spot basal to r-m, 2 distal to r-m, and 1 at tip. Vein R2+3 slightly contorted.

Abdomen with tergites and sternites weakly sclerotized. Syntergite 1+2 with posterolateral corners and a thin band between them strongly sclerotized, tergites 3–4 with a thin posterior band moderately sclerotized.
Male postabdomen: Sternite 5 with lateral margins strongly rounded, posterior margin broadly but shallowly notched, anterior apodeme slightly longer than external portion, without keel. Anal opening keyhole shaped. Surstylus with anterior thumb-like projection, ventral portion narrow, posterior margin with peg-like setae ventrally. Pregonite not fused with postgonite, fairly large. Postgonite very narrow, posterior margin with a triangular tooth-like projection, lobes not separated, posterior lobe longer. Basiphallus narrow, with long epiphallus, preepiphallus broad with sides parallel medially. Distiphallus with a long dorsal tube with spines near base, flanked by two spike-like sclerites, distal sclerite not projecting dorsally (Fig. 6.47).

Female postabdomen: Tergites 6–7 and sternites 6–7 much wider than long, tergite 6 not sclerotized or with irregular sclerotization along margins, tergite 7 sclerotized along anterior and lateral margins only, sternite 6 with some irregular sclerotization along anterior margin, sternite 7 sclerotized around margins, medial unsclerotized patch round. Tergite 8 broad, heavily sclerotized, lateral margins rounded, anterior margin with a narrow notch, shallowly emarginated posteriorly, posterior two-thirds covered with microtomentum. Epiproct with fairly long anterior arms, 1 pair of setae, microtomentum medially. Cerci long, narrow. Sclerites of sternite 8 with anterior half shiny and sculptured, posterior half slightly wider, covered with microtomentum. Hypoproct rounded, moderately sclerotized except small, central weakly sclerotized spot. Spermathecae sausage-shaped, about 5X longer than wide, with shallow apical invagination, sclerotized duct about two-thirds as long as spermathecae.

**Type material.** Holotype ♂: BOLIVIA: La Paz: Coroico, Cerro Uchumachi, 16°12'12"S 67°42'42"W, 2550 m, cloud forest, 5 Apr 2001, S.A. Marshall (UASC). Paratypes: same data as holotype (5 ♂, 5 ♀, DEBU); as above but elfin forest, dung pans, 5–6 Apr 2001 (6 ♂, 7 ♀, DEBU); Caranavi, ca. 10 km NW, road to ENTEL tower, 15°46'46"S 67°35'35"W, 1400 m, dung baits, 13 Apr 2001, S.A. Marshall (1 ♂, DEBU); as above but dung pans (6 ♂, 5 ♀, DEBU); as above but 1700 m, bamboo (3 ♂, 1 ♀, DEBU); Chulumani, Apa Apa Reserve, 16°21'21"S 67°30'30"W, 2000 m, 1 Apr 2001, S.A. Marshall (2 ♂, DEBU); as above but dung baits (3 ♂, 2 ♀, DEBU); as above but pan traps, 1–3 Apr 2001 (3 ♀, DEBU); as above but sweeping, 1 Apr 2001 (1 ♂, DEBU); Corico, 0.5 km SE, 16°10'10"S 67°43'43"W, 15 Apr 2001, S.A. Marshall (1 ♂, DEBU); Zongo, 16°06'06"S 68°04'04"W, roadside, sweeping cut foliage, 18 Apr 2001, S.A. Marshall (1 ♂, DEBU).

Comments: The species name refers to the boldly spotted wings, which distinguish this species (as well as *B. pollex* sp. nov.) from other *Boreantrops*. 
Figures 6.48–57: *Boreantrops* male terminalia. *B. subemarginatus*: (48) phallus, postgonite, and phallopodeme, lateral view, (49) surstylus, anterior view (50) sternite 5; *B. talamanca*: (51) phallus, postgonite, and phallopodeme, lateral view, (52) sternite 5; *B. wayqecha*: (53) phallus, postgonite, and phallopodeme, lateral view; *B. zamora*: (54) phallus, postgonite, and phallopodeme, lateral view; *B. cryptopygium* (55) surstylus, anterior view; (56) phallus, postgonite, and phallopodeme, lateral view, (57) sternite 5.
**Boreantrops subemarginatus** sp. nov.
(Figs. 6.48–50, 6.71)

Description:
Occiput black, frons, gena, lateral corners of face, and prementum reddish brown, median part of face and antenna orange, maxillary palp yellow. Mostly covered with microtomentum, frons shiny medially, microtomentum on orbital plates reaching bases of interfrontal setae, face with microtomentum below lunule and in dense crescent below antenna. Ocellar bristles just anterior to median ocellus. Subvibrissal and anterior bristles about 0.5X length of vibrissa. Gena about 0.6X eye height.

Thorax black, mostly covered with microtomentum. Proepisternum shiny, anepisternum mostly shiny with microtomentum covering dorsal margin and posterior quarter, katepisternum with a shiny spot behind fore coxa, meron shiny, metapleuron with a shiny spot in posteroventral corner. Halter white, brownish below knob.

Legs black, joints, trochanters, and tarsi yellow, distal 2 or 3 tarsomeres of fore and hind tarsi brown. Posterior face of fore femur shiny. Fore basotarsomere with a small spur in male. Mid tibia with row of anterodorsals, 1 anteroventral, 1 posteroventral, 5 subapical bristles. Hind tibia with 2 ventroapical bristle.

Wing brown, veins dark brown, crossveins r-m and dm-cu paler.

Abdomen with tergites and sternites weakly sclerotized. Syntergite 1+2 with posterolateral corners and a thin band between them strongly sclerotized, tergites 3–4 with a thin posterior band moderately sclerotized.

Male postabdomen: Sternite 5 longer than wide, sides parallel, with a shallow V-shaped notch apically, anterior apodeme about as long as external portion, pointed, with small dorsal keel (Fig. 6.70). Anal opening narrowed above cerci. Surstylus with distal portion about as broad as long, lateral margins rounded (Fig. 6.49). Pregonite fused with postgonite. Postgonite with a hook-shaped posterior extension, lobes long, overlapping, both truncate. Basiphallus subtriangular, no distinct epiphallus, preepiphallus short, narrow. Distiphallus with a weakly curved, spinose dorsal tube, flanked by a single spike-like sclerite (Fig. 6.48).
Female postabdomen: Tergites 6–7 and sternites 6–7 wider than long, sclerotized. Tergites with 3 posterior strips, sternites with 2 posterior strips. Tergite 8 nearly square, slightly narrower posteriorly, emarginated anteriorly, covered with microtomentum except anterior margin. Epiproct parallel-sided, with wide anterior arms, 2 pairs of setae, with microtomentum medially. Cerci long, narrow. Sclerites of sternite 8 subrectangular, reaching anterior corners of sternite 8 laterally, posterior two-thirds covered with microtomentum. Hypoproct with an anterior notch, posterior margin and medial band moderately sclerotized. Spermathecae sausage-shaped, about 6X longer than wide, with shallow apical invagination, sclerotized duct about two-thirds as long as spermathecae.

**Type material.** Holotype ♂: VENEZUELA: Mérida: Los Chorros, 1–5 May 1987, S.A. Marshall (MIZA). Paratypes: same data as holotype (6 ♀, DEBU); as above but FIT, 23–30 Apr 1988 (2 ♂, DEBU); Mucuy, 10 km E Tabay, 2000m, 28 Apr 1981, H. Townes (1 ♀, DEBU); Santa Rosa, dung traps, 23–30 Apr 1988, S.A. Marshall (1 ♂, 2 ♀, DEBU); Tabay, La Mucuy, Truchicola trail, 2300 m, cloud forest, FIT, 17 Jun–3 Jul 1989, S. & J. Peck (3 ♂, 1 ♀, DEBU). ECUADOR: Napo: Baeza, 5 Mar 1979, S.A. Marshall (2 ♀, DEBU); Baeza, 15 km NW, 2200m, dung trap, 2–6 Mar 1976, S. Peck (1 ♂, 2 ♀, DEBU); Cosanga, 4.2 km S, pipeline trail, 0°37’37”S 77°50’50”W, 2200 m, 7 Nov 1999, S.A. Marshall (1 ♂, DEBU); El Chaco, 4.8 km W, 0°18’18”S 77°50’50”W, 1750 m, 7 Nov 1999, S.A. Marshall (2 ♂, DEBU); El Chaco, 5 km N, malaise trap/wet net, 15 Feb 1983, M.J. Sharkey (1 ♂, DEBU); SierrAzul Lodge, 14 km W Cosanga, 0°40’40”S 77°56’56”W, 2200 m, forest, sweeping, 5 Nov 1999, S.A. Marshall (1 ♂, DEBU); SierrAzul Res., 14 km W Cosanga, 0°40’40”S 77°56’56”W, 2200 m, 8–11 May 2002, S.A. Marshall (1 ♀, DEBU).

Comments: The species name refers to the male sternite 5, which is weakly notched compared to the deeply notched sternites of *B. emarginatus* and *B. talamanca*.

**Boreantrops talamanca** sp. nov.

(Figs. 6.51–52, 6.65)

Description:

Head brown to dark brown, occiput black, prementum brown to dark brown, ventral corners of face may darker than rest of face, antenna orange. Mostly covered with microtomentum, frons with shiny spots lateral to ocelli, face mostly shiny with microtomentum below antenna and lunule. Ocellar bristles just anterior to median ocellus. Subvibrissal and anterior genal bristles about 0.3X length of vibrissa. Gena about 0.6X eye height.

Thorax black, mostly covered with microtomentum. Proepisternum shiny, anepisternum with ventromedial shiny spot covering about three-quarters height and half length of sclerite, katepisternum
with a shiny spot behind fore coxa, thin shiny stripe along margin of meron and metapleuron, metapleuron with a shiny spot in posteroventral corner. Halter white, brownish below knob.

Legs black, joints, trochanters, and tarsi yellow, distal 3 tarsomeres of fore tarsus brown. Fore basotarsomere with a small spur in male. Mid tibia with row of anterodorsals, 1 anteroventral, 1 posteroventral, 5 subapical bristles. Hind tibia with 1 ventroapical bristle.

Wing brown, veins dark brown, crossveins r-m and dm-cu paler.

Abdomen with tergites and sternites weakly sclerotized. Syntergite 1+2 with posterolateral corners and a thin band between them strongly sclerotized, tergites 3–4 with a thin posterior band moderately sclerotized.

Male postabdomen: Sternite 5 long, lateral margins rounded, posterior corners projecting posteriorly, posterior margin with a deep U-shaped notch, anterior apodeme broad, with a dorsal keel (Fig. 6.52). Anal opening keyhole-shaped. Surstylus paddle-shaped, anterior face with setae concentrated near margins. Pregonite indistinct, fused with postgonite. Postgonite with distal portion narrow, lobes overlapping, both narrow, truncate, posterior lobe longer. Basiphallus with very broad epiphallus, narrow preepiphallus. Distiphallus with long dorsal tube, straight and with a few spines medially, flanked by a single spike-like sclerite (Fig. 6.51).

Female postabdomen: Tergites 6–7 and sternite 6 sclerotized along anterior and lateral margins only, sternites 7 sclerotized around margins with oval-shaped central unsclerotized spot. Tergites with 3 posterior strips, sternites with 2 posterior strips. Tergite 8 covered with microtomentum except anterior margin, shallowly emarginated anteriorly and posteriorly. Epiproct with very short anterior arms, microtomentum medially, with 1 pair of setae. Cerci long, narrow. Sclerites of sternite 8 subrectangular, broadened at apex, covered with microtomentum except anterior third, pinched near anterior third. Hypoproct with a bilobed anterior notch, weakly sclerotized laterally. Spermathecae sausage-shaped, about 4X longer than wide, with shallow apical invagination, sclerotized duct about as long as spermathecae.

**Type material.** Holotype ♂: PANAMA: Chiriqui: Cerro Punta, 2 km E, 1760 m, Baldwin forest, Dung traps, 30 May–8 Jun 1977, S. Peck (DEBU). Paratypes: same data as holotype (5 ♂, 1 ♀, DEBU); Cerro Punta, 2 km W, 1760 m, dung, 5 Jun 1977, S. Peck (2 ♂, DEBU); Cerro Punta, 5 km ESE, 2600 m, dung traps, 23–28 May 1977, S. Peck (1 ♂, DEBU); Hartmann's Finca, 1550 m, dung trap, 31 May 1977, S.
Peck (1 ♀, DEBU); Hartmann's Finca, 15 km NW Hato de Volcán, 1200 m, dung trap, 20–25 May 1977, S. Peck (2 ♂, 2 ♀, DEBU). COSTA RICA: Guanacaste: Las Pailas Biol. Stn., 800–1200 m, 18 Feb 1996, S.A. Marshall (1 ♀, INBC); Puntarenas: Monteverde, 1500 m, 20 Feb 1980, D.M. Wood (1 ♂, DEBU); as above but FIT, 25 Jun–2 Jul 1983, H.F. Howden (1 ♂, DEBU); as above but dung traps, 19–25 Aug 1993, E.R. Barr (5 ♂, 3 ♀, DEBU); as above but site C, malaise, 20–26 Aug 1993 (1 ♂, DEBU); as above but near biology station, sweep, 25 May 1998, S.A. Marshall (1 ♂, DEBU); as above but 1560 m, dung trap, 11–18 Jun 1983, D.H. Lindeman (1 ♂, DEBU); as above but 1520 m, 1 Nov 1992, N. Obando (1 ♀, INBC); Monteverde Biol. Res., 1500 m, cloud forest, 11–13 Jun 2000, S.A. Marshall (3 ♂, DEBU); as above but sweeping, 11 Jun 2000, M. Buck (1 ♂, DEBU); as above but on dung, 12 Jun 2000, S.A. Marshall (2 ♂, DEBU); as above but pans along stream, 12–13 Jun 2000, M. Buck (1 ♂, DEBU); as above but 13 Jun 2000, S.A. Marshall (1 ♂, DEBU); as above but 13–14 Jun 2000, M. Buck (1 ♂, 2 ♀, DEBU); as above but malaise trap, 13 Jun 2000, L.W. Quate (10 ♂, DEBU); as above but sweeping tree fall & trail, 14 Jun 2000, M. Buck (1 ♂, DEBU); Monteverde Biol. Stn., lower trail, cloud forest, 11 Jun 2000, S.A. Marshall (1 ♂, DEBU).

Comments: The species name refers to the Cordillera de Talamanca, which comprises most of the range of this species. The name should be treated as a noun in apposition.

*Boreantrops wayqecha* sp. nov.
(Figs. 6.53, 6.69)

Description:
Occiput black, posterior three-quarters of frons, gena, and prementum dark brown, face, antenna, and anterior quarter of frons orange to dark brown, maxillary palp yellow to brown. Face sometimes with lateral corners and middle stripe below lunule darker. Mostly covered with microtomentum, frons with shiny spots lateral to ocelli, face with microtomentum below lunule and in dense crescent below antenna. Ocellar bristles just anterior to median ocellus. Subvibrissal bristle about 0.3X length of vibrissa, anterior genal bristle about 0.5X length of vibrissa. Gena about 0.6X eye height.

Thorax black, mostly covered with microtomentum. Proepisternum shiny, anepisternum mostly shiny with microtomentum covering dorsal quarter and posterior third, katepisternum with a shiny spot behind fore coxa, meron and metapleuron shiny with band of microtomentum behind posterior spiracle and hind coxa. Halter white, brownish below knob.

Legs black, joints, trochanters, and tarsi yellow, distal 3 tarsomeres of fore tarsus brown. Posterior face of fore femur covered with microtomentum. Fore basotarsomere with a small spur in male. Mid tibia with row of anterodorsals, 1 anteroventral, 1 posteroventral, 5 subapical bristles. Hind tibia with 2 ventroapical bristles.
Wing brown, veins dark brown, crossveins r-m and dm-cu whitish.

Abdomen with tergites and sternites weakly sclerotized. Syntergite 1+2 with posterolateral corners and a thin band between them strongly sclerotized, tergites 3–4 with a thin posterior band moderately sclerotized.

Male postabdomen: Sternite 5 with sides straight, slightly wider at apex, hind margin shallowly notched, anterior apodeme about as long as exterior portion, not keeled. Surstylus with distal portion longer than wide, lateral margins rounded. Pregonite fused with postgonite. Postgonite without flap on posterior margin, boundary between lobes indistinct, posterior lobe long, rounded. Basiphalus expanded medially, without distinct epiphallus, preepiphallus long, transparent distally. Distiphallus with spinose dorsal tube, blunt at tip, flanked by a single spike-like sclerite laterally (Fig. 6.53).

Female postabdomen: Tergites 6–7 wider than longer, sclerotized along anterior and lateral margins only. Sternites 6–7 mostly sclerotized, sternite 7 with a small unsclerotized spot medially. Tergites with 3 posterior strips, sternites with 2 posterior strips. Tergite 8 nearly square, slightly wider anteriorly, shallowly emarginated anteriorly, covered with microtomentum except anterior margin. Epiproct subtriangular, with wide anterior arms, 2 pairs of setae, with microtomentum medially. Cerci long, narrow. Sclerites of sternite 8 subrectangular, reaching anterior corners of sternite 8 laterally, anterior half shiny with a subconical protuberance. Hypoproct with an anterior notch, posterior margin and medial band moderately sclerotized. Spermathecae round, about as long as wide, with long apical invagination, sclerotized ducts about 1.5X longer than spermatheca.


Comments: The species name refers to the type locality, and should be treated as a noun in apposition.
**Boreantrops zamora sp. nov.**

(Figs. 6.54, 6.70)

Description:
Occiput, posterior portion of frons, and lateral portion of face black, anterior part of frons, gena, median portion of face, clypeus, and prementum dark brown, antenna dark orange, maxillary palp yellow. Mostly covered with microtomentum, frons shiny medially with microtomentum reaching interfrontal setae and around bases of ocellar bristles, face mostly shiny with microtomentum below lunule and in crescents below antennal bases. Ocellar bristles just anterior to median ocellus. Subvibrissal and anterior genal bristles about 0.6X length of vibrissa. Gena about 0.7X eye height.

Thorax black, mostly covered with microtomentum. Proepisternum shiny, anepisternum mostly shiny with microtomentum covering dorsal margin and posterior quarter, katepisternum with a shiny spot behind fore coxa, meron shiny, metapleuron with a shiny spot in posteroventral corner. Halter white, brownish below knob.

Legs black, joints, trochanters, and tarsi yellow, distal 3 tarsomeres of fore tarsus brown. Posterior face of fore femur covered with microtomentum. Fore basotarsomere with a small spur in male. Mid tibia with row of anterodorsals, 1 anteroventral, 5 subapical bristles. Hind tibia with 1 ventroapical bristle.

Wing brown, veins dark brown, crossveins r-m and dm-cu paler.

Abdomen with tergites and sternites weakly sclerotized. Syntergite 1+2 with posterolateral corners and a thin band between them strongly sclerotized, tergites 3–4 with a thin posterior band moderately sclerotized.

Male postabdomen: Sternite 5 with sides straight, slightly wider at apex, hind margin shallowly notched, anterior apodeme about as long as exterior portion, not keeled. Surstylus with distal portion about as broad as long, lateral margins rounded. Postgonite with posterior lobe with serrated margin, truncate apically, anterior lobe overlapping with posterior, rounded. Basiphallus expanded medially, without distinct epiphallus, preepiphallus short and transparent. Distiphallus with spinose dorsal tube touching medial sclerite distally, with a single spike-like sclerite laterally, ventral distal sclerite transparent, with pseudotrichae (Fig. 6.54).
Female unknown.


Comments: The species name is derived from the province of the type locality. It should be treated as a noun in apposition.

*Boreantrops cryptopygium* group

*Boreantrops cryptopygium* sp. nov. 
(Figs. 6.55–57, 6.64)

Description:

Head dark brown, face, anterior margin of frons, antenna, and clypeus orange, occiput black, prementum and maxillary palp yellow. Mostly covered with microtomentum, frons shiny except orbital plates and patch from base of postverticals anteriorly through middle of ocellar triangle to around bases of preocellars, face shiny on ventral third. Ocellar bristles just anterior to median ocellus. Anterior genal and one or two subvibrissal bristles enlarged, about 0.3X length of vibrissa.

Thorax black, mostly covered with microtomentum, anepisternum with a ventromedial shiny patch about two-thirds height of sclerite, katepisternum with a shiny patch behind fore coxa, metapleuron shiny with a stripe of microtomentum between posterior spiracle and hind coxa. Halter whitish. Acrostichal bristles in 4 rows.

Legs black, orange at joints, coxae dark brown, trochanters yellow. Tarsus 1 with basal 2 tarsomeres dark brown, distal tarsomere yellow, tarsomeres 3–4 intermediately coloured. Tarsi 2 and 3 yellow, distal tarsomere palest. Tibia 2 with 1 anterodorsal, 1 anteroventral, 1 posteroventral, 5 subapical bristles. Tibia 3 with one ventroapical bristle.

Wing light brown, slightly lighter around crossveins r-m and dm-cu, and 2 spots on vein R4+5 distal to r-m.
Abdomen with tergites 1–4 black, heavily sclerotized, covered with microtomentum. Tergite 5 weakly sclerotized in females, weakly sclerotized medially in males. Sternites black, heavily sclerotized, covered with microtomentum in males, weakly sclerotized in females.

Male postabdomen: Sternite 5 widest at apex, posterolateral corners separated from central portion by unsclerotized articulation, with a very long anterior apodeme reaching level of sternite 2, apodeme without a keel (Fig. 6.57). The apparent resting state of the genitalia is with the hypopygium withdrawn inside segment 4 while the posterolateral corners of sternite 5 are folded dorsally over the central portion of the sternite. Surstylus subrectangular, scooped, medial margin notched near the apex (Fig. 6.55). Postgonite with anterior and posterior lobes of similar size, widely separated, anterior lobe round, posterior lobe pointed apically. Basiphallus L-shaped, with several short projections but no distinct epiphallus or preepiphallus. Distiphallus with a short spinose dorsal tube and a patch of hair-like structure on barely sclerotized ventral sclerites (Fig. 6.56).

Female postabdomen: Tergites 6–7 square, margins weakly sclerotized, center not sclerotized, with 3 weakly sclerotized posterior strips. Tergite 8 square, moderately sclerotized, covered with microtomentum. Epiproct parallel-sided with long diverging anterior arms, pointed apically, with 2 setae, covered with microtomentum except on arms. Cerci long and thin, covered with microtomentum. Sternites 6–7 slightly longer than wide, margins weakly sclerotized, center not sclerotized, with 2 weakly sclerotized posterior strips. Sclerites of sternite 8 weakly sclerotized with posteromedial corners strongly sclerotized, slightly broader apically, covered with microtomentum. Hypoproct trapezoidal, covered with microtomentum. Spermathecae ovoid, about 1.5X longer than wide, annulated, with sclerotized duct about as long as spermathecae.

**Type material.** Holotype ♂: BOLIVIA: La Paz: Chulumani, Apa Apa Reserve, 16°21'21"S 67°30'30"W, 2000 m, pan traps, 1–3 Apr 2001, S.A. Marshall (UASC). Paratypes: same data as holotype (3 ♂, 3 ♀, DEBU); as above but hand collected, 1 Apr 2001, S.A. Marshall (1 ♀, DEBU); as above but dung baits (2 ♂, DEBU); as above but sweeping, 1 Apr 2001, S.A. Marshall (1 ♂, DEBU); Caranavi, ca. 10 km NW, road to ENTEL tower, 15°46'60"S 67°35'35"W, 1400 m, dung pans, 13 Apr 2001, S.A. Marshall (2 ♀, DEBU); Coroico, Cerro Uchumachi, 16°12'12"S 67°42'42"W, 2550 m, elfin forest, dung pans, 5–6 Apr 2001, S.A. Marshall (1 ♂, DEBU); Caranavi, ca. 10 km NW, road to ENTEL tower, 15°46'60"S 67°35'35"W, 1400 m, dung pans, 13 Apr 2001, S.A. Marshall (2 ♀, DEBU); Serrania de Siberia, Chua Khocha, 2360m, cloud forest, window trap, 26 Aug–6 Sep 1990, P. Parrillo (2 ♂, 2 ♀, FMNH); Santa Cruz: Yungas de la Mairana, 18°03'03"S 63°54'54"W, 2300 m, Yungas, litter, 29 Jan 1999, R. Anderson (1 ♀, DEBU).
Comments: The species name is from the Greek *kryptos* (hidden) + *pygium* (buttocks), referring to the retracted hypopygium of males.

Figures 6.64–69: *Boreantrops* distribution maps. (64) *B. cryptopygium* (circles), *B. peruvianus* (stars); (65) *B. emarginatus* (diamonds), *B. talamanca* (circles); (66) *B. friburguensis* (stars), *B. hispidus* (circles); (67) *B. longiphallus* (circles), *B. zacapa* (diamonds); (68) *B. pollex*; (69) *B. punctipennis* (circles), *B. wayqecha* (stars).
Figures 6.70–71: Boreantrops distribution maps.; (70) B. subemarginatus (circles), B. calceata (diamonds), B. zamora (stars); (71) B. subfoveolatus (diamonds), B. hondurensis (circles), B. oaxacensis (stars).
7. **COLOANTROPS GEN. NOV.**

Type species: *Coloantrops daedalus* sp. nov., by present designation

Description as for the only included species.

Comments: This genus is described for a single species that appears to be a sister lineage to the clade including the apterous genera *Penola* and *Frutillaria*. This genus can be distinguished from other Archiborborinae by the shortened ovipositor with broad, heavily sclerotized tergites and sternites on segments 6 and 7 of the female, the retention of wings unlike its apterous relatives, absence of setae on the epiproct, and the presence of a white spot on vein M1 between the crossveins.

The genus name is derived from the Greek *kolos* (shortened, docked) and the generic name *Antrops*, referring to the short ovipositor in the female. It is masculine in accordance with ICZN 30.1.4.3.

**Coloantrops daedalus** sp. nov.

(Figs. 7.1–4)

Description:

Head orange, postcranium with some black around foramen, ocellar triangle may be brown to blackish, face may have brown along ventral margin, clypeus brown, prementum brown with an orange ventromedial spot, maxillary palp yellow. Ocellar bristles about 1 ocellus width anterior to median ocellus. Subvibrissal and anterior genal bristle about 0.3X length of vibrissa. Gena about 0.5X eye height.

Thorax black, margins of sclerites and postalar callus may be reddish. Mostly covered with microtomentum, anepisternum with a small ventral shiny patch, katepisternum with a shiny spot posterior to fore coxa. Halter white, some brown below knob.

Legs black, trochanters, joints, and tarsi yellow, hind tarsus blackish dorsally. Mid tibia with anterodorsal row, 1 anteroventral, 1 posteroventral, and 4 apical bristles. Hind tibia with 2 ventroapical bristles.
Wing pale brown, veins R4+5 and M1 outlined with brown to about two-thirds length of wing. Crossveins r-m and dm-cu with white spots, vein R4+5 with 1 pale spot basal and 2 distal to crossvein r-m, vein M1 with 1 pale spot between r-m and dm-cu.

Abdomen with tergites and sternites heavily sclerotized, black, covered with microtomentum. Tergites 2–5 with 2 pairs of enlarged bristles laterally along posterior margin.

Male postabdomen: Sternite 5 simple, rectangular (Fig. 7.3). Surstylus subrectangular (Fig. 7.2). Pregonite not apparent. Postgonite thin, straplike, notched apically. Basiphallus short, without separate epiphallus, short preepiphallus. Distiphallus with paired lateral arms, central sclerite with a dorsal point flanked by sclerotized lateral ridges (Fig. 7.1).

Female postabdomen: Tergites 6–8 and sternites 6–7 wide, heavily sclerotized, without weakly sclerotized longitudinal strips. Epiproct wider than long, posterior margin sinuous, anterior margin weakly pointed, anteromedial area covered with microtomentum, without setae. Sternite 8 with a pair of round sclerites, covered with microtomentum except basal third. Hypoproct with a pair of small, irregular, weakly sclerotized patches and an unsclerotized diamond-shaped area of microtomentum with 2 setae. Spermathecae oval, about 1.25x longer than wide, heavily sclerotized, paired spermathecae fused.


Comments: The species is named after the Greek craftsman Daedalus.
Figures 7.1–4: *Coloantrops daedalus* male terminalia. (1) Phallus, postgonite, and phallapodeme, lateral view, (2) surstylus, anterior view, (3) sternite 5. (4) *C. daedalus* distribution map.
8. **MACULANTROPS** GEN. NOV.

Type species: *Borborus hirtipes* Macquart 1844, by present designation

Description:

Head brown, sometimes with gena, anterior part of frontal triangle, or antenna orange, entirely covered with microtomentum. A V-shaped patch of microtomentum on upper occiput distinctly lighter, almost silvery. Maxillary palp yellow, with setae concentrated along lateral margin. Face evenly sclerotized, ventral margin notched medially, lunule small. Occiput narrow below occipital foramen. Clypeus prominently produced, shelflike. Prementum well-developed, circular, about 0.6X height of head. Labellum with 22 pseudotrachea. Scape very short, with 1–2 dorsomedial setulae; pedicel subtriangular, medial bristles no longer than outer; first flagellomere round, slightly pointed dorsoapically; arista dorsolateral, preapical, 2-segmented, about as long as head width, short-plumose. Chaetotaxy: orbital bristles in two lateroclinate pairs; irregular orbital setulae along orbital plate; interfrontal setae usually in 6 medioclinate pairs; ocellar bristles lateroprocline, just anterior to medial ocellus; irregular, very short ocellar setulae; inner vertical bristles inclinate; outer vertical bristles laterorecline; postocellar bristles as long as ocellar bristles, slightly procline; postvertical bristles small, cruciate; setae on median occipital sclerite small, medioclinate; setae covering most of lateral part of occiput; vibrissa strong, as long as head; subvibrissal bristle and upturned anterior genal bristle each about 0.5X length of vibrissa; genal setae in 3 rows. Postvertical bristles sometimes and ocellar bristles usually absent in male, both usually present in female.

Thorax dark brown, usually with margins of sclerites lighter, entirely covered with microtomentum. Microtomentum on scutum patterned, with a pair of spots of lighter, almost silvery microtomentum between anterior dorsocentrals, another pair of spots just posterior to these, lateral spots just anterior and posterior to suture, and a medial patch following line of acrostichals and extending onto scutellum. Halter dark brown, stem lighter. Chaetotaxy: postpronotum with a single bristle; notopleuron with two bristles, posterior about 0.5X length of anterior; one presutural and one postsutural intra-alar bristle, postsutural about 0.5X length of anterior; one postalar bristle at posterior corner of scutum and a shorter postalar between this and scutellum; three dorsocentral bristles (one presutural and two postsutural); acrostichal setae in 2 closely-spaced rows; scutellum with 2 pairs of scutellar bristles; proepisternum covered with thin setulae; katepisternum with a single large dorsal bristle, covered with thin setae. Dorsocentral bristles somewhat variable, usually all present in females, presutural and anterior postsutural often absent in males, occasionally with a 2nd enlarged presutural in addition to normal presutural.
Wing membrane light brown. Brown spots on crossveins, on vein R4+5 (1 basal and 3–4 distal to crossvein r-m), on CuA1 (usually 2), and at apices of veins R2+3, R4+5, and M1. Apex of vein R1 with a pale spot. Wing veins brown on base of wing, whitish between spots on apical part of wing. Vein M reaching wing margin, CuA1 barely or not extending past crossvein dm-cu, not reaching wing margin, A1+CuA2 parallel to CuA1, distal part not vascularised, not reaching wing margin. Calypter with a dense marginal patch of short setae.

Legs pale to dark brown, trochanters paler, yellow at bases of femora. Poorly defined pale bands on femur 1 at two-thirds and all femora at apex, well-defined yellow bands on femora 2 and 3 at two-thirds. Tarsi dark brown at base and apex, with medial tarsomeres yellow to brown. Femora and tibiae covered with dense, fine setae. Tibia 1 with a preapical dorsal bristle. First basotarsomere with a short, stout dark spur in males. Tibia 2 with a long, fairly fine dorsal subapical bristle, 1 anteroventral and 1 posteroventral bristle inserted in area of apical yellow band, and 4 subapical bristles. Femur 3 with a few dorsal and ventral bristles near apex. Tibia 3 with a long, thin preapical dorsal bristle, 3 apicoventral bristles, the most dorsal of these bristles long and fine.

Abdomen with tergites and sternites dark brown and heavily sclerotized in both sexes, covered with microtomentum. Pleural membrane with dense, fine setae on segments 2–5.

Comments: This genus is described for two closely related species, *M. hirtipes* and *M. altiplanus* sp.n. The included species can be distinguished from other Archiborborinae by the numerous dark spots on the wings, the banding pattern on the legs (Fig. 8.1), and presence of only 2 spermathecae. The two species are very similar, and species descriptions are abbreviated.

The genus name is formed from a combination of the Latin *macula* (spot) and the name of the genus *Antrops*. It is masculine in accordance with ICZN 30.1.4.3.

**Key to the species of Maculantrops**

1. Basal brown portion of mid and hind femora paler than subapical brown band. Distal brown band of hind tibia paler and distinctly longer than proximal brown band of tibia......................... *M. altiplanus*  
   - Basal brown portion of mid and hind femora same shade as subapical brown band. Proximal and distal brown bands of hind tibia subequal in length and concolourous. ............................................. *M. hirtipes*
Maculantrops altiplanus sp. nov.
(Figs. 8.2, 8.6)

Description:
Femora 2 and 3 pale brown basal to yellow band, dark brown distal to yellow band. Tibiae 1 and 2 with dark brown with yellow bands at half and apex, tibia 3 with yellow bands at third and apically, dark brown basally, pale brown between yellow bands.

Male postabdomen: Sternite 5 simple, rectangular. Surstylus pointed apically, with a rectangular lobe projecting from posterior margin. Pregonite completely fused with postgonite, setae very short. Postgonite with lobes widely separated, anterior lobe very broad, posterior lobe narrow and pointed. Ejaculatory apodeme long, thick. Basiphallus with long epiphallus, broad, barely projecting preepiphallus. Distiphallus simple, dorsal sclerite flat, possibly homologous with dorsal tube, ventrally with a large, setose, clear sac (Fig. 8.2).

Female postabdomen: Tergites 6–7 and sternites 6–7 very broad, moderately sclerotized, covered with microtomentum, without posterior strips. Tergite 8 broad, anterior margin with a small weakly sclerotized patch medially, covered with microtomentum. Epiproct broad, anterior arms broad, without setae, distal third covered with microtomentum. Cerci very broad. Sclerites of sternite 8 short, nearly meeting lateral margin of tergite 8, very narrow and shiny anteriorly, broad and covered with microtomentum posteriorly. Hypoproct broad, U-shaped, arms shiny. Spermathecae (1 pair) barrel-shaped, about 2X longer than wide, with short basal invagination, longer apical invagination.

Type material. Holotype ♂: BOLIVIA: La Paz: La Paz, 15 km NE, 16°24.6'S 68°02.9'W, 4300 m, 29 Mar 2001, S.D. Gaimari (ANCB). Paratype: Lago Titicaca, Mapac, Sahuiña, 16°10'10"S 69°04'04"W, 3812 m, 23 Apr 1997, L. Masner (1 ♀, DEBU).

Comments: The species name is the Latin translation of Altiplano, the Spanish name for the vast Andean plateau where the type specimens of this species were collected.
Maculantrops hirtipes (Macquart)

Borborus hirtipes Macquart 1844: 424
Borborus quinquemaculatus Walker 1849: 1130
Copromyza alternata Rondani 1868: 31 syn. nov.
(Figs. 8.1, 8.3–5, 8.7)

Description:

Femora 2 and 3 dark brown basal and distal to yellow band. Tibiae dark brown with yellow bands at half and apex.

Male postabdomen: Sternite 5 simple, rectangular (Fig. 8.5). Surstylus pointed apically, with a rectangular lobe projecting from posterior margin (Fig. 8.4). Pregonite completely fused with postgonite, setae very short. Postgonite with lobes widely separated, anterior lobe short and broad, posterior lobe longer and pointed. Basiphallus with long epiphallus, shorter, fairly broad preepiphallus. Distiphallus simple, dorsal sclerite flat, possibly homologous with dorsal tube, ventrally with a large, setose, clear sac (Fig. 8.3).

Female postabdomen: Tergites 6–7 and sternites 6–7 very broad, moderately sclerotized, covered with microtomentum, without posterior strips. Tergite 8 broad, anterior margin with a weakly sclerotized square patch medially, covered with microtomentum. Epiproct broad, anterior arms broad, shiny, without setae. Cerci very broad. Sclerites of sternite 8 short, nearly meeting lateral margin of tergite 8, very narrow and shiny anteriorly, broad and covered with microtomentum posteriorly. Hydroproct broad, U-shaped, arms shiny. Spermathecae (1 pair) barrel-shaped, about 2X longer than wide, with short basal invagination, longer apical invagination.

Type material. Borborus hirtipes: Syntypes: “Chili” (MNHN, 2 ♂, 1 ♀ examined).
Borborus quinquemaculatus: Lectotype ♂ (designated by Richards (1931), see Roháček et al. (2001)): [URUGUAY:] Montevideo (BMNH; not examined).
Copromyza alternata: Syntypes: [ARGENTINA:] Buenos Aires (MZUF, not examined).

Other material examined. ARGENTINA: Buenos Aires: Arroyo Carnaval, Villa Elisa, 23 Dec 1979, C.M. & O.S. Flint, Jr (7 ♂, 9 ♀, USNM); Arroyo Vitel, N Chascomus, 27–28 Nov 1979, C.M. & O.S. Flint, Jr (2 ♂, 1 ♀, USNM); Arroyo Las Encadenadas, 17 km NW, M. J. Cobo, 29 Nov 1979, C.M. & O.S. Flint, Jr (1 ♂, USNM); Arroyo Dulce, Rt. 188, 15 km N Rojas, 13–14 Dec 1979, C.M. & O.S. Flint, Jr (2 ♂, USNM); Arroyo Azul, Azul, 26 Feb 1968, O.S. Flint, Jr. (1 ♂, USNM); Canada Arregui, Rt. 11, 11 km W Magdalena, 21 Dec 1979, C.M. & O.S. Flint, Jr (1 ♂, USNM); Olivos, 1 Oct 1952, F.H. Walz (1 ♂, USNM); Pacheco, Nov 1952, F.H. Walz (1 ♂, USNM); San Isidro, 1 Nov 1975, S. Bolle (1 ♀, DEBU); San Isidro, 25 Aug 1926, R. & E. Shannon (2 ♂, 2 ♀, USNM); Neuquén: Catán Lil, 39°45′45″S 70°37′37″W, nr. dirty pond in poplar copse, 21 Nov 1989, S.A. Marshall (1 ♂, DEBU); Río Negro: Bariloche, Nov 1926, R. & E. Shannon (1 ♀, USNM); Zapala, 22 Dec 1946, Hayward & Willinot (1 ♂, 1
♀, USNM); Tierra Del Fuego: Ushuaia, 4km E, Rio Grande trail, many cattle, 11 Feb 1992, S.A. Marshall (1 ♂, DEBU). CHILE: Araucanía: Pucon, *Nothofagus* forest nr. golf course on peninsula, 5–7 Nov 1989, S.A. Marshall (3 ♀, DEBU); as above but in drift near lake, pan traps, 6–8 Nov 1989 (2 ♂, 2 ♀, DEBU); as above but near lake in drift, FIT (11 ♂, DEBU); as above but in lakeside debris, pan traps, 8–13 Nov 1989 (8 ♂, 4 ♀, DEBU); as above but near lake, dung traps, 9–16 Nov 1989 (3 ♂, 4 ♀), DEBU); as above but lakeshore, pan, 15 Nov – 2 Dec 1989 (1 ♂, 1 ♀, DEBU); as above but in lakewrack (1 ♂, DEBU); Pucón, carrion trap, 6–8 Nov 1984, S.A. Marshall (1 ♂, 1 ♀, DEBU); as above but lakeshore, 15 Nov – 2 Dec 1989 (60 ♂, 43 ♀, DEBU); Los Lagos: Chiloé L., Chiloé Natl. Pk., 42°19'19"S 74°07'07"W, 0 m, yellow pans, 11–12 Dec 2002, L. Masner (3 ♂, 6 ♀, DEBU); Río San Pedro, 24 km NE of Los Lagos, river bank slope forest, yellow pans, 13–18 Nov 2000, L. Packer (1 ♀, DEBU); Maule: Romeral, 2km SE, 30 Nov 1982, R.L. Brown (1 ♂, 2 ♀, DEBU); Teno, 12 km NW Curicó, 34°52'52"S 71°10'10"W, 1 Dec 1982, R.L. Brown (1 ♀, DEBU); Santiago: La Granja, 28 Dec 1982, R.L. Brown (1 ♂, 3 ♀, DEBU); Padre Hurtado, sweeping, 26 Nov 1982, R.L. Brown (1 ♂, 4 ♀, DEBU); Pudahuel, 435 m, 4 Jan 1983, A. Newton & M. Thayer (1 ♂, 11 ♀, DEBU); Valparaíso: La Campana Nat. Pk., 900 m, hygrophilous forest, FIT, 2 Dec 1984 – 21 Feb 1985, S. & J. Peck (1 ♂, DEBU); Olmué, along stream, 21 Nov 2006, S.A. Marshall (1 ♂, 1 ♀, DEBU); as above but pans by stream, 27 Nov 2006 (1 ♂, DEBU). URUGUAY: Montevideo: Montevideo, South American Parasite Lab, 28 Aug 1943, Parker, Berry & Silveira (1 ♀, USNM).

Comments: Although I did not examine the types of *Copromyza alternata*, the description clearly refers to *M. hirtipes*. This is also the only archiborborine known from the type locality for *C. alternata*. 
9. **PHOTANTROPS GEN. NOV.**

Type species: *Photantrops echinus* sp. nov., by present designation

Description as for the only included species.

Comments: This genus is described for a single, highly distinctive species. It can be distinguished from other Archiborborinae by the greatly enlarged thoracic and leg bristles (Fig. 9.1), the lack of ocellar bristles, presence of a single ocellar bristle, and syntergite 1+2 twice the width of tergites 3–5.

The genus name is formed from a combination of the Greek *photos* (light) and the genus name *Antrops*, in reference to the collection method of the type species. It is masculine in accordance with ICZN 30.1.4.3.

**Photantrops echinus** sp. nov.

(Figs. 9.1–5)

Description:
Head yellow, interfrontal plates and a small spot at ventral margin of eye brown. Mostly covered with microtomentum, frons with thin shiny lines lateral to ocelli. Ocellar bristles absent, only 1 orbital bristle. Subvibrissal bristle about 0.5X length of vibrissa, anterior genal bristle about 0.3X length of vibrissa. Gena about 0.3X height of eye in male, about 0.3x height of eye in female. Occiput strongly rounded.

Thorax mostly brown, yellow on postpronotum, in a spot anterior to presutural dorsocentral, proepisternum, in a median spot on anepisternum, and ventral half of anepimeron, black on scutal suture. Mostly shiny; scutum, ventral margin of katepisternum, metapleuron, and laterotergite with microtomentum. Bristles greatly enlarged, other setae on scutum greatly reduced, barely visible in male. Halter whitish, brown below knob.

Legs mostly yellow, base of fore femur and all of mid and hind coxae and femora dark brown. Hind femur greatly swollen in male, about 7X width of tibia. Mid tibia with row of anterodorsal, row of posterodorsal, 1 anteroventral, and 4 subapical bristles. Hind tibia with row of anterodorsal, row of posterodorsal, and 2 ventroapical bristles.

Wing yellowish, with a small dark smudge at tip of vein R1.
Abdomen with tergites brown, shiny. Syntergite 1+2 twice the width of tergite 3–5. Tergites 4 and 5 narrow anteriorly, with a shallow notch posteriorly. Setae along posterior margins of tergites and some pleural setae enlarged, longer in male than female. Sternites 2–3 narrow, weakly sclerotized, sternite 4 wider, lateral edges heavily sclerotized.

Male postabdomen: Sternite 5 with curved lateral margins, narrow anteriorly, without anterior apodeme (Fig. 9.4). Synsternite 6+7 asymmetrical, narrow, one section detached and forming a fan-shaped accessory sclerite flanking distiphallus in genital pouch; dorsal corner fused to sternite 8. Sternite 8 fused to epandrium along right side. Epandrium more or less symmetrical, with a cleft above anterior edge of surstylus, anterior setae greatly enlarged (Fig. 9.3). Cerci small and medially fused. Subepandrial sclerite Y-shaped, articulated with cerci and surstyli. Surstylus broad, subrectangular, articulated with epandrium and subepandrial sclerite. Hypandrial arms weakly fused with ventral edge of epandrium; hypandrial apodeme well-developed, rod-like, weakly fused with arms. Phallapodeme well-developed, rod-like. Pregonite small, fully fused with postgonite. Postgonite long, bilobed apically, anterior lobe rounded, posterior lobe narrow, curved, pointed, articulated with phallapodeme, hypandrium, and basiphallus. Ejaculatory apodeme large, fan-shaped apically. Basiphallus long, with a long thin epiphallus with a spur near base, no distinct preepiphallus. Distiphallus complex, without a distinct dorsal tube (Fig. 9.2).


**Type material.** Holotype ♂: ECUADOR: Napo: SierrAzul Lodge, 14 km W Cosanga, 0°40'40"S 77°56'56"W, 2200 m, at light, 8 May 2002, S.M. Paiero (QCAZ). Paratypes: same data as holotype but 8–10 May 2002, O. Lonsdale (1 ♀, DEBU).

Comments: The species name is the Latin word for a sea urchin and refers to the spiny appearance of this fly which has enlarged bristles on the thorax and legs.
Figures 9.1–5: Photantrops echinus. (1) Adult habitus, holotype, (2) male phallus, postgonite, and ejaculatory apodeme, lateral view, (3) epandrium, cerci, and surstyli, posterior view, (4) sternite 5, (5) distribution map.
10. **POECILANTROPS** GEN. NOV.

Type species: *Poecilantrops baorucensis* **sp. nov.**, by present designation

Description:
Head colour and microtomentum variable. Face evenly sclerotized, ventral margin slightly wavy, lunule small. Occiput narrow below occipital foramen. Clypeus narrow, slightly produced. Palpus with tiny setae throughout and longer setae along lateral margin. Prementum well-developed, circular, about 0.5X height of head. Labellum with 12 pseudotrachea. Scape very short, with 1–2 dorsomedial setulae; pedicel subtriangular, medial bristles much longer than outer; first flagellomere round, slightly pointed dorsoapically; arista dorsolateral, preapical, 2-segmented, about as long as head width, short-plumose. Chaetotaxy: orbital bristles in two lateroclinate pairs; irregular orbital setulae along orbital plate; interfrenal setae in 3–5 medioclinate pairs; ocellar bristles lateroprocline, anterior to median ocellus; irregular, very short ocellar setulae; inner vertical bristles inclinate; outer vertical bristles lateroreclinate; postocellar bristles as long as ocellar bristles, slightly procline; postvertical bristles small, cruciate; setae on median occipital sclerite small, medioclinate; postocular setae in a complete row with a few additional setae medially; vibrissa strong, as long as head; usually with a subvibrissal bristle and upturned anterior genal bristle; genal setae in 2 rows.

Thorax black; extent of microtomentum variable between species. Chaetotaxy: postpronotum with a single bristle; notopleuron with two bristles, posterior shorter than anterior; one presutural and one postsutural intra-alar bristle; one postalar bristle at posterior corner of scutum and a shorter postalar between this and scutellum; three dorsocentral bristles (one presutural and two postsutural); acrostichal setae in 6–8 irregular rows; scutellum with 2 pairs of scutellar bristles; proepisternum with several small setulace; katepisternum with a single large dorsal bristle and irregular setae ventrally.


Abdomen brown to black, extent of microomentum variable between species. Pleural membrane with setae on segments 3–5.

Male postabdomen: Sternite 5 variable between species. Synsternite 6+7 asymmetrical, complex, a portion often detached and forming an accessory sclerite flanking distiphallus in genital pouch; dorsal corner fused to sternite 8. Sternite 8 broadly fused to epandrium along right side. Epandrium more or less symmetrical, with a cleft above anterior edge of surstylus. Cerci small and medi ally fused. Subependrial sclerite Y or X-shaped, articulated with cerci and surstyli. Surstylus shape variable between species, articulated with epandrium and subependrial sclerite. Hypandrial arms weakly fused with ventral edge of epandrium; hypandrial apodeme well-developed, rod-like, weakly fused with arms. Phallapodeme well-developed, curved and broadest distally. Postgonites long, bilobed apically, articulated with phallapodeme, hypandrium, and basiphallus. Pregonites tiny, more or less fused with postgonites. Ejaculatory apodeme usually small, often lost in dissections. Basiphallus usually swollen, with epiphallus and preepiphallus reduced or absent. Distiphallus complex, with a dorsal tube-like structure, usually flanked by 1 or 2 pairs of spike-like sclerites.

Female postabdomen: Abdomen telescoping, usually retracted in preserved specimens. Tergites and sternites 6–7 usually weakly sclerotized, narrow. Tergite 8 heavily sclerotized, sternite 8 divided medially, heavily sclerotized. Epiproct and hypoproct moderately sclerotized. Cerci simple, not fused with epiproct or each other. Three spermathecae, one pair sharing a duct and the other on a separate duct.

Comments: This genus is described for 8 species, all newly described here. The genus is characterized by a set of derived characters: wing with one or more white spots on CuA1; fore tarsus with basal 2 tarsomeres dark brown, distal 3 tarsomeres white (Fig. 10.1); syntergite 1+2 with a median ridge; and syntergite 1+2 fused with tergite 3. Males often have a strongly swollen, nearly semicircular basiphallus and strong lateral setae on the apical tergites. No single species has all of these characters, but each has at least one and none of these derived states are present in other genera in the subfamily.

The genus name is derived from the Greek poikilos (varicoloured, spotted) and the generic name Antrops. It is masculine in accordance with ICZN 30.1.4.3.

This group has an unusual distribution: most species occur in the Atlantic Forest of Brazil, but there are disjunct species in the Andes and in the cloud forest of the Dominican Republic. Few specimens
from Brazil were available for this revision, and it is likely that more material would contain additional
species and localities from that country.

Key to the species of Poecilantrops

1. Vein CuA1 without white spots. .......................................................... 2
   - Vein CuA2 with at least 1 white spot. ........................................... 3

2. Scutellum shiny. Syntergite 1+2 not fused with tergite 3. Subvibrissal bristle about one-third
   length of vibrissa. .............................................................................. P. flavifemur
   - Scutellum covered with microtomentum. Syntergite 1+2 fused with tergite 3. Subvibrissal bristle
     not developed. ................................................................................ P. marensis

3. Hind tibia with 1 ventral apical bristle. ........................................ 4
   - Hind tibia with 2 ventral apical bristles. ....................................... 5

4. Vein CuA1 usually with 2 white spots (rarely 1 or 3 spots, sometimes each wing different). Fore
   femur usually entirely yellow to orange, occasionally brownish with a diffuse yellow area apically........
   ........................................................................................................ P. dominicus
   - Vein CuA1 with 1 white spot. Fore femur usually brown with a distinct apical yellow band. .......
   ........................................................................................................ P. baorucensis

5. Scutum, scutellum and gena extensively shiny............................... P. stellans
   - Scutum, scutellum, and gena entirely covered with microtomentum. ...................... 6

6. Fore coxa and femur yellow to brown. ......................................... 7
   - Fore coxa and femur black............................................................... P. plaumanni

7. Fore and mid femur brown, hind femur black.................................. P. vittifrons
   - Fore femur orange, mid and hind femur black basally, orange distally...................... 8

8. Katepisternum covered in tomentum, with a small shiny spot behind fore coxa. Fore tarsomere 2
   yellow. Hind leg with tibia and 2 basal tarsomeres dark brown. Vein M1 with a white spot between
   crossveins................................................................. P. crocidosternum
   - Katepisternum mostly shiny. Fore tarsomere 2 dark brown. Hind leg with tibia brown to orange
     or banded, 2 basal tarsomeres yellow. Vein M1 without a white spot between crossveins......... 9

9. Katepisternum shiny posteriorly. Distal part of vein M1 with 1 white spot at wing margin. Vein
   CuA1 with 2 white spots................................................................. P. psilosternum
   - Katepisternum with microtomentum posteriorly. Vein M1 with 2 white spots. Vein CuA1 with 1
     white spot.................................................................................. P. boraceiensis
Poecilantrops baorucensis sp. nov.
(Figs. 10.6, 10.21)

Description:
Head orange. Occiput, orbital plates and bases of interfrontal setae, gena, a band on face below lunule and antenna, and frontal plate around postocellars, through middle of ocellar triangle, and around bases of ocellar bristles with microtomentum. Ocellar bristles just anterior to median ocellus. Anterior genal bristle about 0.3X length of vibrissa, subvibrissal bristle about 0.5X length of vibrissa.

Thorax black, covered with microtomentum except for a patch extending from proepisternum and the ventral half and anterior two-thirds of the anepisternum, stretching ventrally to the katepisternum behind the fore coxa, and meron. Microtomentum on scutellum densest medially, sparse laterally. Halter white. Acrostichal setae in 4 irregular rows. Proepisternum with 1 seta.

Fore leg with coxa and trochanter orange, femur brown to dark brown with sharply-defined apical yellow band, tibia orange to brown, tarsus yellow to brown. Mid leg with coxa and basal half of femur brown to dark brown, trochanter and apical half of femur orange, tibia orange to brown, tarsus yellow. Hind leg with coxa and basal two-thirds of femur dark brown to black, trochanter and apical third of femur orange, tibia brown to dark brown, tarsus orange to brown. Mid tibia with row of anterodorsal, 1 preapical and 1–2 median posterodorsal, 2–3 anteroventral, 1 posteroventral, ring of 4 subapical bristles. Hind tibia with 1 long ventroapical, length about 1.5X width of tibia.

Wing dark brown, white spots on crossveins r-m and dm-cu, at tip of R1, on R4+5, 1 basal and 2 distal to r-m, 1 on CuA1.

Abdomen with tergites black, covered with microtomentum. Syntergite 1+2 with a median ridge. Tergites 1+2 and 3 fused. Sternites square, well-sclerotized in males, weakly sclerotized in females. Males with strong lateral setae on tergites 4 and 5.

Male postabdomen: Sternite 5 cup-shaped, with medium to long thin anterior apodeme, posterior margin notched (see fig 10.8). Surstyli asymmetrical, left surstylus more strongly produced anteriorly, both scooped with distal portion scooped. Postgonite with lobes approximated, posterior lobe short, narrowly rounded, anterior lobe broad, truncated. Basiphallus swollen, without distinct epiphallus or preepiphallus.
Distiphallus short, with short smooth dorsal tube, not projecting past flanking spike, ventral sclerites very short (Fig. 10.2).

Female postabdomen: Tergites 6–7 wider than long, weakly sclerotized medially, with weakly sclerotized posterior strips. Tergite 8 with anterior margin notched, posterior half covered with microtomentum. Epiproct parallel-sided, with short anterior arms, posterior half covered with microtomentum, with 2 setae. Cerci short. Sternites 6–7 slightly wider than long, evenly but weakly sclerotized, with weakly sclerotized posterior strips. Sclerites of sternite 8 broadened apically, with microtomentum on posterior half. Hypoproct lozenge shaped, covered with microtomentum and setae. Spermathecae round, slightly longer than wide, with apex projecting slightly, sclerotized duct about 0.3X length of spermatheca.

**Type material.** Holotype ♂: DOMINICAN REPUBLIC: Pedernales: Las Abejas, 30 km N of Cabarete, 1300 m, cloud forest, 17 Jan 1989, S.A. Marshall (DEBU). Paratypes: same data as holotype but dung vac., 19 Jan 1989 (4 ♂, 2 ♀, DEBU); as above but sweep (3 ♀, DEBU); as above but J.E. Swann (1 ♀, DEBU); Sierra de Baoruco, Las Abejas Valley, 1300 m, cloud forest, 17 Jan 1989, L. Masner (1 ♂, DEBU).

Comments: The species name refers to this species’ occurrence in the Sierra de Baoruco. It may be endemic to this mountain range; it is not known from the other mountain ranges in the Dominican Republic, where *P. dominicus* has been collected. The Sierra de Baoruco is separated from other ranges by the Valle de Nieba and was isolated as a separate island during the Pleistocene, and Baoruco endemics have been documented in other animal taxa. Although not yet recorded from Haiti, this species may occur there if similar habitats have been preserved.

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**Poecilantrops boraceiensis** sp. nov.
(Figs. 10.3, 10.7, 10.22)

Description:
Head reddish brown, anterior margin of frons and antenna orange, prementum and maxillary palp yellow. Orbital plates, most of frontal triangle (except adjacent to ocellar triangle), bases of interfrontal setae, and occiput covered with microtomentum, face with small patch of microtomentum below lunule, gena with microtomentum on ventral two-thirds. Ocellar bristles just anterior to median ocellus. One subvibrissal and anterior genal bristle enlarged, about 0.5X length of vibrissa.

Fore leg with coxa, trochanter, and femur orange, tibia and basal 2 tarsomeres dark brown, distal 3 tarsomeres whitish. Mid leg orange, coxa black, basal two-thirds of femur dark brown. Hind leg orange, coxa black, basal two-thirds of femur black, distal half of tibia brown. Mid tibia with anterior row of anterodorsal, 1 anteroventral, 1 posteroventral, 5 subapical bristles. Hind tibia with 2 ventroapicals, length of longest about 1.5X width of tibia.

Wing light brown, white spots on crossveins r-m, bm-cu, dm-cu, at tip of vein R1, on vein R4+5 with 1 basal to r-m, 2 distal to r-m, 1 at tip, 1 on vein M distal to dm-cu and 1 at tip, 1 on vein CuA1 basal to dm-cu.

Abdominal tergites black, covered with microtomentum. Tergite 3 fused to tergite 2. Anterior margin of tergite 4 irregularly excavated. Syntergite 1+2 with a median ridge. Sternites heavily sclerotized, black, covered with microtomentum in male, weakly sclerotized in female.

Male postabdomen: Sternite 5 parallel-sided, with posterior margin broadly excavated, two very narrow, divergent apodemes (Fig. 10.7). Surstylus very broad, portion projecting below cerci with a quarter-circle shape, posterior margin straight. Pregonite distinct. Postgonite with very broad, rounded anterior lobe, narrow, pointed posterior lobe. Basiphallus swollen, without distinct epiphallus, preepiphallus short, curved. Distiphallus with a thin, smooth dorsal tube flanked by a single spike-like sclerite (Fig. 10.3).

Female postabdomen: Tergites 6–7 very broad, tergite 6 weakly sclerotized, tergite 7 heavily sclerotized except lateral edges, both covered with microtomentum. Sternite 6–7 weakly sclerotized along anterior and posterior margins only. Tergites with very weakly sclerotized posterior strips, sternites without visible strips. Tergite 8 broad, lateral margins rounded, anterior margin broadly emarginated, anterior margin shiny. Epiproct with distal half covered with microtomentum, 1 pair of setae. Sclerites of sternite 8 weakly sclerotized, anterior portion narrow, shiny, distal portion broad, covered with microtomentum. Hypoproct lozenge-shaped, weakly sclerotized. Spermathecae relatively large, round, not invaginated.

**Type material.** Holotype ♂: BRAZIL: São Paulo: USP Biology Station, 5–6 Feb 1979, R. Woodruff & J. Runnacles (MZSP). Paratypes: same data as holotype (1 ♂, 3 ♀, DEBU, MZSP); Boracéia, 1 Feb 1994, M. Carrera (1 ♀, MZSP); as above but 850m, 22–25 Jul 1949, L. Trav. F. & E.X. Rabello (1 ♀, MZSP);
Comments: The species name refers to the Boracéia Biological Station, where this and several other members of *Poecilantrops* have been collected.

*Poecilantrops crocidosternum* sp. nov.
(Figs. 10.4, 10.6, 10.23)

Description:
Head orange, occiput black, posterior two-thirds of frons mostly brown. Mostly covered with microtomentum, interfrontal plates shiny, extending to lateral ocelli, also with a shiny stripe between ocellar bristles, and a small ventromedial spot on face. Ocellar bristles about 1 ocellus width anterior to median ocellus. One subvibrissal and anterior genal bristle enlarged, about 0.3X length of vibrissa.

Thorax black, with extensive microtomentum. Proepisternum, rectangular ventromedial spot on anepisternum, spot on katepisternum behind fore coxa, and metapleuron shiny, except stripe between posterior spiracle and hind coxa. Halter white, brown below knob. Acrostichal bristles in 6 rows.

Fore leg orange, tibia except base and basal tarsomere dark brown, distal 4 tarsomeres yellow. Mid leg orange, coxa black, basal half of femur brown. Hind leg with coxa and trochanter orange, basal half of femur black, distal half orange, tibia and basal 2 tarsomeres dark brown, distal 3 tarsomeres orange. Mid tibia with 1 anterodorsal, 3 posterodorsal, 1 anteroventral, 1 posteroventral, 4 subapical bristles. Hind tibia with 2 ventroapicals, length of longest less than width of tibia.

Wing light brown, white spots on crossveins r-m, bm-cu, dm-cu, at tip of vein R1, on vein R4+5 with 1 basal to r-m, 2 distal to r-m, 1 at tip, 1 on vein M basal to dm-cu and 1 at tip, 2 on vein CuA1 basal to dm-cu.

Abdominal tergites black, covered with microtomentum. Tergite 3 fused to tergite 2. Tergite 4 with a depressed crescent on posterior half. Tergite 5 with strong lateral setae in male. Sternites heavily sclerotized and covered with microtomentum in male, weakly sclerotized in female.
Male postabdomen: Sternite 5 with lateral sides curved, narrow posteriorly (Fig. 10.6). Surstylus paddle-shaped, distal portion subrectangular. Postgonite with anterior lobe broad, subrectangular, posterior lobe thin, rounded apically. Basiphallus not swollen, longer than deep, with very short epiphallus, short unsclerotized preepiphallus. Distiphallus short, with short dorsal spinose tube, long ventral projection. Ejaculatory apodeme thin, about as long as width of basiphallus (Fig. 10.4).

Female postabdomen: Tergites 6–7 and sternite 6–7 wider than long, moderately sclerotized medially, with weakly sclerotized lateral patches, covered with microtomentum. Tergites with 3 posterior strips, sternites with 2 posterior strips. Tergite 8 longer than wide, hourglass-shaped, emarginated anteriorly, covered with microtomentum. Epiproct broad, covered with microtomentum, with 1 pair of setae. Cerci broad. Sclerites of sternite 8 broad, covered with microtomentum, pinched medially. Hypoproct broad, subtriangular, anterior margin shiny, notched medially. Spermathecae barrel-shaped, slightly longer than wide, shallowly invaginated apically, evaginated basally, sclerotized duct about as long as spermathecae.


Comments: The species name is derived from the Greek *krokidos* (woollen nap) + *sternon* (breast), referring to the microtomentose katepisternum (see *P. psilosternum*).

**Poecilantrops dominicus** sp. nov.
(Figs. 10.5, 10.8, 10.21)

Description: As described for *P. baorucensis* sp. nov., with the following differences:

Fore leg with femur usually entirely yellow to orange, occasionally brown with a diffuse yellow area apically, but not distinctly banded.

Wing with 2 white spots on CuA1 (rarely 1 or 3).

Male postabdomen very similar to that of *P. baorucensis*. Posterior lobe of postgonite slightly more pointed. Distiphallus longer, with smooth dorsal tube projecting clearly past flanking spike (Fig. 10.5).
Female postabdomen as described for *P. baorucensis*.

**Type material.** Holotype ♂: DOMINICAN REPUBLIC: Independencia: La Descubierta, 30km NW, Sabana Real, 1646 m, 25 Sep–5 Dec 1991, S. & J. Peck (DEBU). Paratypes: same data as holotype (6 ♂, DEBU); as above but cloud forest, dung traps, 25 Nov – 5 Dec 1991 (41 ♀, DEBU); as above but carrion, 25 Sep–5 Dec 1991 (7 ♀, DEBU); as above but dung traps, 25 Nov – 5 Dec 1991 (34 ♂, 2 ♀, DEBU); La Descubierta, 32km NW, Sabana Real, 1800 m, cloud forest, carrion traps, 26 Nov – 5 Dec 1991, S. & J. Peck (13 ♂, 26 ♀, DEBU); as above but trail sweep, 26 Nov 1991, Masner & Peck (1 ♀, DEBU); La Vega: La Ciénega, human dung cups, 11–13 Jan 1989, S.A. Marshall (2 ♂, DEBU); as above but 13–22 Jan 1989 (1 ♂, 3 ♀, DEBU).

Comments: The species name refers to the Dominican Republic. Apparently allopatric from *P. baorucensis* – see that species for discussion. Like that species, *P. dominicus* may also occur in Haiti where similar habitats have been conserved. There is a single specimen labelled as being from from Trinidad in DEBU; it is presumably mislabelled, and it is unlikely this species occurs outside of Hispaniola.

*Poecilantrops flavifemur* sp. nov.
(Figs. 10.9, 10.13, 10.25)

Description:
Head dark brown to black, face and clypeus brown, prementum orange-brown, antenna orange. Anterior genal bristle and one subvibrissal bristle about 0.3X length of vibrissal bristle.

Thorax mostly covered with microtomentum, scutellum, ventral three-quarters of anepisternum, katepisternum, meron, and posterior half of metapleuron shiny.

Foreleg with coxa, trochanter, and femur yellow, tibia and 2 basal tarsomeres dark brown, distal 3 tarsomeres whitish. Midleg with coxa and femur dark brown, femur becoming paler on distal third, trochanter yellow, tibia and tarsus yellow to pale brownish. Hind leg with coxa, trochanter, distal third of femur, and tarsus yellow, tibia and basal two-thirds of femur dark brown.

Wing with membrane nearly clear, veins pale brown, white spots on crossveins r-m, bm-cu, dm-cu, and 2 along vein R4+5 distal to crossvein r-m.
Abdomen with tergites not fused. Tergites covered with microtomentum except shiny anteromedial patch on syntergite 1+2.

Male postabdomen: Sternite 5 slightly longer than wide, posterior margin notched, covered with setae and microtomentum (Fig. 10.13). Surstylus scooped, subrectangular, slightly asymmetrical with anteroventral corner of right surstylus more acutely pointed. Postgonite with lobes broadly separated, anterior lobe broad, rounded, posterior lobe narrow, short. Basiphallus swollen, no distinct epiphallus or preepiphallus. Distiphallus short, with a thin spinose dorsal tube and a long ventral projection (Fig. 10.9).

Female postabdomen: Tergite 6 barely sclerotized, tergite 7 weakly sclerotized along anterior and lateral margins, not sclerotized medially, both wider than long and without posterior strips. Tergite 8 trapezoidal, moderately sclerotized, covered with microtomentum. Epiproct parallel-sided, pointed apically, with very short anterior arms, without setae. Cerci broad. Sternite 6 barely sclerotized, sternite 7 weakly sclerotized, both square, without posterior strips. Sclerites of sternite 8 rectangular, with microtomentum on apical third. Hypoproct lozenge-shaped, covered with microtomentum. Spermathecae ovoid, about 1.75X longer than wide, annulated, sclerotized duct short.


Comments: The species name refers to the yellow femur in this species, unique among known Bolivian species of Archiborboriniae.

**Poecilantrops marensis** sp. nov.
(Figs. 10.10, 10.14, 10.26)

Description:
Head dark brown, prementum and antenna orange. Anterior genal bristle about 0.5X length of vibrissal bristle.

Thorax mostly covered with microtomentum, ventral three-quarters of anepisternum, katepisternum, meron, and posterior half of metapleuron shiny.
Foreleg with coxa, trochanter, and femur yellow, tibia and 2 basal tarsomeres dark brown, distal 3 tarsomeres whitish. Midleg orange, coxa black, femur brownish on basal half. Hind leg orange, femur black on basal half, tibia slightly brownish on distal half.

Wing with membrane and veins pale brown, white spots on crossveins r-m, bm-cu, dm-cu, and 2 along vein R4+5 distal to crossvein r-m.

Abdomen with syntergite 1+2 fused with tergite 3. Tergites covered with microtomentum.

Male postabdomen: Sternite 5 slightly longer than wide, lateral margins rounded, posterior margin notched, 2 divergent anterior apodemes, both thin, extending to level of sternite 3 (Fig. 10.14). Surstylus scooped, subrectangular, slightly asymmetrical with anteroventral corner of right surstylus more acutely pointed. Postgonite with lobes broadly separated, anterior lobe broad, rounded, posterior lobe narrow, pointed, short. Basiphallus swollen, no distinct epiphallus or preepiphallus. Distiphallus short, with a thin spinose dorsal tube and a long ventral projection (Fig. 10.10).

Female unknown.


Comments: The species name refers to this species’ occurrence in the Serro do Mar.

**Poecilanthrops plaumanni sp. nov.**
(Figs. 10.11, 10.15, 10.22)

Description:
Head dark reddish brown, occiput black, antenna orange. Mostly covered with microtomentum, shiny on interfrontal plates, reaching to lateral ocelli medially, and ventral triangle on face. Ocellar bristles just anterior to median ocellus. Anterior genal bristle about 0.3X length of vibrissa, subvibrissal bristle about 0.5X length of vibrissa.
Thorax black. Covered with microtomentum, rectangular ventromedial shiny spot on anepisternum, katepisternum with spot behind fore coxa, meta pleuron shiny except stripe between posterior spiracle and hind coxa. Halter whitish, brown below knob. Acrostichal bristles in about 6 rows.

Legs black, trochanters and tarsi yellow except first and hind basotarsomerbes brown. Mid tibia with row of anterodorsal, 1 anteroventral, 1 posteroventral, 5 subapical bristles. Hind tibia with 2 ventroapical bristles, longest about as long as width of tibia.

Wing brown, whitish at junctions of veins, spots on crossveins r-m and dm-cu, at tips of veins R2+3 and R4+5, 1 on vein R4+5 basal to r-m and 2 distal to r-m, and on vein CuA1.

Abdomen with tergites black, covered with microtomentum, heavily sclerotized. Sternites square, black, covered with microtomentum, and heavily sclerotized in male, weakly sclerotized in female. Strong lateral setae on tergites 3–4 in male. Tergite 5 with a small depression medially on posteromedial margin.

Male postabdomen: Sternite 5 square, with slightly projecting paired medial lobes on posterior margin (Fig. 10.15). Surstylus expanded distally, ventral margin pointed, medial margin notched. Postgonite with posterior lobe very short, anterior lobe very broad, rectangular. Basiphallus slightly longer than wide, no distinct epiphallus, preepiphallus short, transparent. Distiphallus with a short smooth dorsal tube, flattened flanking spines (Fig. 10.11).


**Type material.** Holotype ♂: BRAZIL: Santa Catarina: Nova Teutônia, 27°10'10"S 52°22'22"W, 300–500 m, 1 Mar 1972, F. Plaumann (FMNH). Paratypes: same data as holotype but 1 Sep 1972 (3 ♀, FMNH); as above but 1 Oct 1972 (1 ♂, 8 ♀, FMNH); as above but 1 Aug 1978 (2 ♂, 3 ♀, FMNH); as above but 1 Nov 1978 (2 ♀, FMNH).

Comments: This species is named in recognition of the remarkable collecting effort and skill of the late Fritz Plaumann, who collected the entire type series of *P. plaumanni*, as well as a significant number of other specimens of Brazilian Archiborborinae.
**Poecilantrops psilosternum sp. nov.**

(Figs. 10.12, 10.16, 10.24)

Description:
Head orange, occiput black, prementum and maxillary palp yellow. Orbital plates, most of frontal triangle (except adjacent to ocellar triangle and a strip between ocellar bristles), gena and occiput covered with microtomentum, face with a band of microtomentum below antenna. Ocellar bristles just anterior to median ocellus. One subvibrissal and anterior genal bristle enlarged, about 0.5X length of vibrissa.

Thorax black, with extensive microtomentum. Proepisternum, anteroventral patch covering about quarter of anepisternum, katepisternum, meron and metapleuron except stripe between posterior spiracle and hind coxa shiny. Halter yellow. Acrostichal bristles in 6 rows.

Fore leg with coxa, trochanter, and femur orange, tibia and basal 2 tarsomeres dark brown, distal 3 tarsomeres whitish. Mid leg orange, coxa and basal two-thirds of femur black. Hind leg orange, basal two-thirds of femur black, distal half of tibia brown. Mid tibia with anterior row of anterodorsal, 0–2 posterodorsal, 1 anteroveltral, 1 posteroventral, 4–5 subapical bristles. Hind tibia with 2 ventroapical bristles, length of longest about 1.25X width of tibia.

Wing light brown, white spots on crossveins r-m, bm-cu, dm-cu, at tip of vein R1, on vein R4+5 with 1 basal to r-m, 2 distal to r-m, 1 at tip, 1 at tip of vein M, 2 on vein CuA1 basal to dm-cu.

Abdominal tergites black, covered with microtomentum. Syntergite 1+2 with a median ridge. Tergite 3 fused to tergite 2. Anterior margin of tergite 4 irregularly excavated. Sternites irregularly sclerotized in male, weakly sclerotized in female.

Male postabdomen: Sternite 5 with external portion rectangular, longer than wide, shallowly emarginated posteriorly, 2 divergent anterior apodemes, each about half as long as external portion (Fig. 10.16). Surstylus boot-shaped, scooped. Pregonite small, distinct. Postgonite with anterior lobe very broad, rounded, posterior lobe narrow, pointed. Basiphallus swollen, with a smooth dorsal tube flanked by a single spike-like sclerite, ventral projection short (Fig. 10.12).

Female postabdomen: Tergites 6–7 and sternites 6–7 very wide, moderately sclerotized, covered with microtomentum, tergite 6 with round, weakly sclerotized, lateral patches. Tergites with 3 posterior strips,
sternites with 2 posterior strips. Tergite 8 broad, shallowly emarginated anteriorly, anterior margin shiny. Epiproct nearly circular, anterior arms broad and very short, microtomentum on posterior half, with 1 pair of setae. Cerci broad, fairly long. Sclerites of sternite 8 broad, subrectangular, nearly reaching tergite 8 laterally, anterior third with irregular margin, shiny, posterior two-thirds covered with microtomentum. Hypoproct broad, lozenge shaped, anterior margin shiny with a slight notch. Spermathecae relatively large, round, not invaginated, sclerotized duct about as long as spermathecae.


Comments: The species name is derived from the Greek *psilos* (bare) + *sternon* (breast), referring to the bare katepisternum, which distinguishes this species in part from the similar *P. crocidosternum*.

**Poecilantrops stellans** sp. nov.  
(Figs. 10.17, 10.19, 10.21)

**Description:**  
Head black, clypeus, maxillary palp, and prementum dark brown. Antenna reddish brown. Occiput, frontal plate behind ocelli, orbital plates, ventral part of gena, face immediately below antenna, and ventral half of prementum with microtomentum. Ocellar bristles just anterior to median ocellus. Anterior genal and subvibrissal bristle about 0.3X length of vibrissa.

Thorax black, mostly shiny; lateral and posterior margins of mesoscutum, lateral corners of scutellum, small dorsal posterior patch on anepisternum, ventral margin of katepisternum, dorsal half of anepimeron, stripe between posterior spiracle and hind coxa, and laterotergites covered with microtomentum. Halter whitish, brown below knob. Acrostichal bristles in 6 irregular rows, proepisternum with 2 setae.

Legs black, femora orange at base, trochanters orange, tarsi dark brown. Mid tibia with anterodorsal and posterodorsal rows, 1 anteroventral, 1 posteroventral, ring of 4 subapical bristles. Hind tibia with 2 ventroapicals, slightly longer than width of tibia.
Wing with membrane brown, veins dark brown, white spots on crossveins r-m and dm-cu, 2 circular spots on vein R4+5 distal to r-m and 2 on CuA1.

Abdomen with tergites black, heavily sclerotized, covered with microtomentum. Syntergite 1+2 with a median ridge. Sternites of male strongly sclerotized, black, covered with microtomentum, sternites of female weakly sclerotized.

Male postabdomen: Sternite 5 longer than wide, somewhat ovoid, posterior margin notched, with a thin, short anterior apodeme (Fig. 10.19). Surstylus subrectangular distally, somewhat scooped. Postgonite with very broad anterior lobe, thin and strongly curved posterior lobe. Basiphallus somewhat swollen, no distinct epiphallus, preepiphallus very short. Distiphallus with a thin spinose dorsal tube flanked by paired spike-like sclerites (Fig. 10.17).


Type material. Holotype ♂: ECUADOR: Napo: Quito–Baeza pass, 1 km E, 0°20'20"S 78°10'10"W, 3950 m, forest edge, dung traps, 4–8 Nov 1999, S.A. Marshall (QCAZ). Paratypes: same data as holotype (10 ♂, 5 ♀, DEBU); as above but elfin forest (1 ♀, DEBU); Papallacta, 14km W, 4200 m, 27 Mar 1983, G. & M. Wood (1 ♂, DEBU); Quito–Baeza pass, 4000 m, elfin for., dung trap, 1 Mar 1979, S.A. Marshall (2 ♂, 3 ♀, DEBU); Quito–Baeza road, 4000 m, elfin for., dung trap, 1 Mar 1979, S.A. Marshall (3 ♂, 2 ♀, DEBU); as above but open páramo, pan traps, 10–18 Feb 1983, L. Masner (43 ♂, 46 ♀, DEBU); as above but low páramo, 18–23 Feb 1983 (3 ♂, 7 ♀, DEBU); as above but elfin forest, 18 Feb 1983 (2 ♂, 3 ♀, DEBU); as above but 4100 m, summit, 18–22 Feb 1983 (7 ♂, 5 ♀, DEBU); as above but páramo, 1 Mar 1983 (8 ♂, 17 ♀, DEBU); as above but in páramo, H. Tituana (6 ♂, 16 ♀, DEBU); Santa María, below, 4000 m, elfin forest, pans, 10–18 Feb 1983, L. Masner (3 ♂, 1 ♀, DEBU); Carchi: Bosque El Arrayán, 6 km E San Gabriel, 0°32'32"N 77°47'47"W, 2830 m, in moss, 1 Nov 1999, S.A. Marshall (1 ♂, DEBU); as above but forest, dung traps, 2–4 Nov 1999 (3 ♂, 2 ♀, DEBU); as above but leaf litter, 2 Nov 1999, R. Anderson (1 ♀, DEBU); Páramo El Angel, 18.8 km NW El Angel, 0°42'42"N 78°00'00"W, 3300 m, pan in Polylepis litter, 3 Nov 1999, S.A. Marshall (4 ♂, 7 ♀, DEBU); Napo/Pichincha: Cayambe-Coca Res., Papallacta Pass, 0°19'19"S 78°11'11"W, 4200 m, páramo, yellow pans, 29 Apr–11 May 2002, Marshall & Buck (3 ♂, 6 ♀, DEBU); Quito–Baeza pass, 0°18'18"S 78°11'11"W, 4000 m, pans traps in moss, 4–8 Nov 1999, S.A. Marshall (26 ♂, 28 ♀, DEBU); Pichincha: Cotopaxi Natl. Pk., Lago Limpiopungo, 0°36'36"S 78°28'28"W, 3800 m, páramo, shrub litter, 25 Oct 1999, R. Anderson (1 ♀, DEBU); as above but shore, pan traps, 25 Oct–8 Nov 1999, S.A. Marshall (2 ♂, 2 ♀, DEBU); Cotopaxi
Poecilantrops vittifrons sp. nov.

(Figs. 10.18, 10.20, 10.23)

Description:
Head yellowish brown, frontal triangle brown, interfrontal plates, gena, prementum, and antenna yellow, face brown with vertical yellow band below antenna, pollinose except interfrontal plates extending medially to lateral ocelli, and ventro-medial patch on face. Interfrontal setae in 3 pairs. Ocellar bristle just anterior to median ocellus. Anterior genal bristle about two-thirds length of vibrissa, subvibrissal bristle about 0.3X length of vibrissa.

Thorax black, covered with microtomentum except anterior patch on ventral half of anepisternum and patch on katepisternum behind fore coxa. Microtomentum on scutum patterned, with apparent spots and stripes of silver or gold depending on viewing angle. Halter whitish, some brown below knob. Acrostichal setae in two rows. Proepisternum with 2 small setae.

Foreleg with coxa and trochanter yellow, femur and tibia brown, anterior face of femur paler at base, tarsus yellowish brown. Mid leg with coxa dark brown, trochanter yellow, femur light brown, tibia and tarsus brown. Hind leg with coxa, trochanter, and distal 3 tarsomeres yellow, femur dark brown, tibia and basal 2 tarsomeres brown. Mid tibia with row of anterodorsal, 1 anteroventral, 1 posterodorsal, 5 subapical bristles. Hind tibia with 1 anteroventral, 2 ventroapical bristles.

Wing brown, white spots on crossveins r-m and dm-cu, at tips of R1, R2+3, R4+5, and M, 1 on R4+5 basal to r-m and 2 distal of r-m, 1 on CuA1.

Abdomen with tergites heavily sclerotized, black, entirely covered with microtomentum. Tergites not fused, syntergite 1+2 with posterior margin excavated. Sternites heavily sclerotized in both sexes, square, black, covered with microtomentum. Tergite 5 with a small depression medially on posteromedial margin.
Male postabdomen: Sternite 5 slightly longer than wide, with posterolateral corners truncated, no anterior apodeme (Fig. 10.20). Surstylus long, slightly scooped. Postgonite with lobes widely separated, posterior lobe narrow, strongly curved, anterior lobe broad, rounded. Basiphallus long, with broad short epiphallus, short transparent preepiphallus. Distiphallus with long thin smooth dorsal tube, flanked by a single pair of spines, with a very long complex of transparent ventral sclerites (Fig. 10.18).

Female postabdomen: Tergites 6–7 fully sclerotized, wider than long, with 2 weakly sclerotized posterior strips. Tergite 8 heavily sclerotized, shiny, with 3 posterior strips. Epiproct broad, with short anterior arms, pointed posteriorly, with 4 setae. Cerci with some microtomentum apically. Sternites 6–7 fully sclerotized, square, with 2 weakly sclerotized posterior strips. Sclerites of sternite 8 subrectangular, apical half covered with microtomentum. Hypoproct lozenge shaped, apical half covered with microtomentum and setae. Spermathecae about 1.75X longer than wide, basal half with annuli, without a sclerotized duct.

**Type material.** Holotype ♂: BRAZIL: Santa Catarina: Nova Teutônia, 27°10’10"S 52°22’22"W, 300–500 m, 1 May 1963, F. Plaumann (FMNH). Paratypes: same data as holotype but 1 Sep 1964 (1 ♀, DEBU); as above but 1 Jun 1973 (1 ♂, FMNH); as above but 1 Oct 1973 (1 ♂, FMNH); as above but 1 Nov 1978 (1 ♂, FMNH).

Comments: The species name refers to the prominent vertical stripes on the face.
Figures 10.21–26: *Poecilantrops* distribution maps. (21) *P. baorucensis* (stars), *P. dominicus* (circles), *P. stellans* (diamonds); (22) *P. boraceiensis* (circles), *P. plaumanni* (stars); (23) *P. crocidosternum* (circles), *P. vittifrons* (stars); (24) *P. psilosternum*. (25) *P. flavifemur*; (26) *P. marensis*. 
DISCUSSION

This thesis completely revises the Archiborborinae, including descriptions of eight genera and 122 species. The revision provides significant new taxonomic data on a large clade in the poorly known Neotropical sphaerocerid fauna. The descriptions, keys, and illustrations enable the identification of all known species in the subfamily, and provide a useful context for future taxonomic work on the subfamily. A phylogenetic analysis of the subfamily, including all species and incorporating both morphological and molecular characters, provides the first estimate of relationships within the subfamily. The phylogeny shows that the clade does not belong in the subfamily Copromyzinae and supports its elevation to subfamily level. It also provides significant evidence that the Sphaerocerinae are nested within the current subfamily Copromyzinae, although more thorough sampling is needed to confirm this.

Although this revision incorporated most of the existent material of the subfamily, there are significant gaps in the geographic coverage. Brazil, Colombia, and Peru in particular are poorly collected for archiborborines and seem likely to host additional undescribed species. Further undescribed species may also be found even in more thoroughly collected regions, and eight of the species treated in the revision were not named due to a lack of male specimens. Further collections throughout the range of the subfamily would also be useful to gain a better understanding of the distribution and habits of known species.

The phylogenetic analyses including all species were poorly resolved and different datasets and analytic methods produced conflicting results. The genetic data suggests that the subfamily may have undergone a rapid basal radiation, making resolution of basal nodes difficult. However, the five genes used did provide significant support for the relationships of the taxa included in that part of the analysis, and more extensive taxonomic sampling and additional genes may help improve the resolution and support levels. Any new species found may also be useful to clarify relationships between the genera and their constituent species.
REFERENCES


