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# The Middle American species of *Ambates* SCHÖNHERR

## (Coleoptera: Curculionidae: Baridinae)

With 4 figure plates

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### Summary

Taxonomic and nomenclatural aspects of eight genus group names related to SCHÖNHERR's concept of *Ambates* are reviewed. *Peridinetus schoenherri* CHEVROLAT is designated as the type species of *Drepanambates* JEKEL. Structural details of the male genitalia and character states on the rostrum are employed to distinguish two groups of species with generic rank, which take the names *Embates* CHEVROLAT and *Ambates* SCHÖNHERR (**gen. res.**). *Neaedus* PASCOE and *Pycnambates* CASEY (**syn. n.**) are synonyms of *Ambates*. *Ambatodes* VOSS is a new junior synonym of *Embates*. The Middle American species of *Ambates* are revised. 19 previously described species from South America are listed without revision. Thirteen species of *Ambates* are recognized in the Middle American fauna. Seven new species are described: *A. septimus*, *A. inornatus*, *A. neglectus*, *A. speciosus*, *A. talamancae*, *A. fasciger* and *A. signifer*. *Pantoteles albocinctus* CHAMPION is regarded a subspecies of *A. albiventris* CHAMPION (**stat. n.**). In the South American fauna, *Peridinetus variegatus* HUSTACHE (= *P. hustachei* WIBMER & O'BRIEN) is placed in *Ambates* as *A. variegatus* (HUSTACHE) **comb. n.**, and *Curculio apricans* HERBST is transferred from *Ambates* to *Peridinetus* as *P. apricans* (HERBST) **comb. n.** New synonymies are *A. pusio* (BOHEMAN) (= *A. rufitarsis* KIRSCH, = *A. callangaensis* VOSS) and *A. schoenherri* (CHEVROLAT) (= *A. brasiliensis* JANCZYK).

### Zusammenfassung

Es werden taxonomische und nomenklatorische Aspekte von acht Gattungsnamen betrachtet, die in Zusammenhang zu *Ambates* sensu SCHÖNHERR stehen. *Peridinetus schoenherri* CHEVROLAT wird als Typusart von *Drepanambates* JEKEL festgelegt. Mit Hilfe von Genitalstrukturen und Merkmalen am Rüssel werden zwei Artgruppen auf Gattungsebene unterschieden, welche die Namen *Embates* CHEVROLAT und *Ambates* SCHÖNHERR (**gen. res.**) erhalten. Synonyme von *Ambates* sind *Neaedus* PASCOE und *Pycnambates* CASEY (**syn. n.**). *Ambatodes* VOSS ist ein neues Synonym von *Embates*. Die mittelamerikanischen *Ambates*-Arten werden revidiert. 19 bislang aus Südamerika beschriebene Arten werden aufgezählt, ohne dass die dortige Fauna revidiert wird. Dreizehn *Ambates*-Arten werden in der mittelamerikanischen Fauna erkannt. Sieben neue Arten werden beschrieben: *A. septimus*, *A. inornatus*, *A. neglectus*, *A. speciosus*, *A. talamancae*, *A. fasciger* und *A. signifer*. *Pantoteles albocinctus* CHAMPION wird als eine Unterart von *A. albiventris* CHAMPION (**stat. n.**) aufgefasst. In der südamerikanischen Fauna wird *Peridinetus variegatus* HUSTACHE (= *P. hustachei* WIBMER & O'BRIEN) zu *Ambates* als *A. variegatus* (HUSTACHE) (**comb. n.**) gestellt, und *Curculio apricans* HERBST wird von *Ambates* zu *Peridinetus* als *P. apricans* (HERBST) (**comb. n.**) gestellt. Neue Synonymien sind *A. pusio* (BOHEMAN) (= *A. rufitarsis* KIRSCH, = *A. callangaensis* VOSS) und *A. schoenherri* (CHEVROLAT) (= *A. brasiliensis* JANCZYK).

### Key Words

weevils, taxonomy, revision, pepper, Neotropics

## Introduction

This paper presents results of an ongoing study on baridine weevils associated with Piperaceae. Even though only a moderate number of genera was described, the assignment of new species to them has remained a problematic issue. One problem is centered around SCHÖNHERR's concept of *Ambates*, which was adopted and published by CHEVROLAT (1833) under circumstances that have caused a series of confusions. Those include contrary opinions about the spelling of the genus, the authorship and the type species. As a result, genus-group names were used or described based on faulty assumptions. CASEY (1922) added to the confusion by transferring single species to new genera without previous study of at least a minimum of the material described hitherto. The general need to review the various names proposed in the literature is the more urgent, as a substantial amount of material has accumulated over the last decades, in particular from Costa Rica and the Republic of Panama. The material includes more than a hundred undescribed species, which cannot be classified satisfactorily before a taxonomic concept of those weevils is available. This study examines the relationships of the various species-groups involved and revises the Middle American species of *Ambates* SCHÖNHERR. The paper represents a contribution to the species inventory program conducted under the mandate of the Instituto Nacional de Biodiversidad in Costa Rica.

I would like to express my sincere gratitude to the curators and private collectors listed in the method section, for their help in obtaining specimens and literature. The Instituto Nacional de Biodiversidad (INBio), the Organization for Tropical Studies, the Smithsonian Tropical Research Institute, the Escuela Agrícola Panamericana, the Museo Entomológico León and the Natural History Museum Stockholm provided hospitality and working facilities during temporary visits. Field work was supported by the Ministerio del Ambiente y Energía de Costa Rica, the US National Science Foundation (through ALAS), the Area Conservación de Guanacaste, and INBio. Funding for publication was provided by INBio. Sharon Shute verified the label data of the Champion types. I am indebted to Miguel Alonso-Zarazaga, Bob Anderson, Willy Kuschel and Charles W. O'Brien for helpful comments to issues addressed in the text.

## Material and Methods

The study is based on approximately 2200 Middle American and 1300 South American ambatoid specimens. Approximately 640 of them belong to *Ambates* SCHÖNHERR, and 286 specimens from Middle American are included here.

Middle American material was obtained on loan from the following collections: ALAS, Arthropod Collection of La Selva Biological Station, Puerto Viejo, Costa Rica (D. Brenes); AMNH, American Museum of Natural History, New York (L. Herman jr.); BMNH, The Natural History Museum (British Museum), London (C. Lya); CASC, California Academy of Sciences (via CWOB); CHAH, Henry A. Hesperheide personal collection, Los Angeles; CMNC, Canadian Museum of Nature, Ottawa (R. Anderson); CNCL, Canadian National Collection of Insects, Ottawa (D. Bright); CWOB, Charles W. O'Brien personal collection, Tallahassee; DEIC, Deutsches Entomologisches Institut, Eberswalde (L. Behne, L. Zerche); FAUP, Universidad de Panamá, Facultad de Agricultura (H. Barrios); GBFM, Universidad de Panamá, Museo de Invertebrados G. B. Fairchild (D. Quintero); HAHC, Henry and Anne Howden personal collection, Ottawa; HPSC, Henry P. Stockwell personal collection, Panama; INBC, Instituto Nacional de Biodiversidad, Santo Domingo de Heredia, Costa Rica (A. Solís); MNHN, Museum National d'Histoire Naturelle, Paris (H. Perrin); MUCR, Universidad de Costa Rica, San José (P. Hanson); MZLU, Zoologiska Museet, Lund (via CMNC); RDCC, Ronald D. Cave personal collection, Zamorano, Honduras; SMTD, Staatliches Museum für Tierkunde Dresden (R. Krause); TAMU, Texas A&M University, College Station (E. Riley); USNM, National Museum of Natural History, Washington D.C. (J. Pakaluk, A. Konstantinov). The

codens are used to refer to the collections in the text. JPPC refers to my personal collection located in Rostock. Additional material was seen from the following collections: Martin-Luther-Universität Halle-Wittenberg (K. Schneider), Museo Entomológico León, Nicaragua (J.-M. Maes), Museum für Naturkunde der Humboldt-Universität Berlin (J. Schulze, M. Uhlig), Naturhistorisches Museum Wien (H. Schönmann), Naturhistoriska Riksmuseet Stockholm (P. Lindskog), Zoologisches Institut der Universität Hamburg (R. Abraham) and Frode Oedegaard personal collection, Trondheim.

Measurements of length were made with an ocular micrometer in a dissecting microscope as follows: total length, from anterior margin of eye to elytral apex in dorsal view; pronotal length, longest dorsal extension in lateral view; elytral length, longest dorsal extension between humeri and elytral tip along suture; length of rostrum, straight distance from apex (without mandibles) to anterior margin of eye at middle of rostrum in lateral view; apical portion of rostrum, straight distance from apex (without mandibles) to point of antennal insertion in lateral view. Drawings were made using the grid in the eyepiece of a dissecting microscope. The format used to refer to illustrations is [number of plate]/[number of species as used in the systematic part][lower case letter as explained in the legend]. In addition, references are made to the color plates in the *Biologia Centrali-Americana* (CHAMPION, 1906-09), in the format BCA IV.5 [number of plate]/[number of figure].

## Historical aspects

SCHÖNHERR (1833) introduced the name *Ambates* in a table as a nomen nudum, and provided a valid description in SCHÖNHERR (1836), with *A. pictus* GYLLENHAL designated as the type species. CHEVROLAT (1833) described *Embates caecus*, formally attributing the genus to SCHÖNHERR as “EMBATES, Schoenherr (inédit)”, and spelled it *Ambates caecus* in a table of part 4 of the same paper (CHEVROLAT, 1835). CHAMPION (1907) and HUSTACHE (1938) suppressed *Embates* because of supposed absence of a valid description. O'BRIEN & WIBMER (1982) recognized *Embates* as a formally valid genus-group name, but considered it a lapsus because of the different spelling in CHEVROLAT (1835), which agreed with that used by SCHÖNHERR (1833). This decision was rejected recently by ALONSO-ZARAZAGA & LYAL (1999), who argued that the text does not indicate whether the spelling “*Embates*” was truly a lapsus or intended by the author (pers. comm.). Although there cannot be any doubt that CHEVROLAT adopted the generic concept from SCHÖNHERR, the name *Embates* is valid and must not be amended (ICZN Article 32.1, 32.2) unless approved by the Commission. Neither part 1 (CHEVROLAT, 1833) or part 4 (CHEVROLAT, 1835) of the paper give stringent evidence, that CHEVROLAT's spelling was not intended.

Apart from the controversy about the spelling, the contemporary misconception about the authorship of the genus and its type species led to additional confusion in connection with the name *Drepanambates* JEKEL. JEKEL had seen a manuscript by CHEVROLAT, and his comments on it were published together with that study (CHEVROLAT, 1883; JEKEL, 1883). There, JEKEL elaborated about *Peridinetus schoenherrii* CHEVROLAT and a closely related species, which he would place near *Ambates* rather than in *Peridinetus*. However, the robust and falciform rostrum distinguished them from *A. pictus*, the type species of *Ambates* SCHÖNHERR (1836), and led to the establishment of *Drepanambates*. The principal diagnostic character state was the shape of the rostrum, regardless whether the shape of the body was ovate or oblong. CHAMPION (1907) synonymized *Ambates* SCHÖNHERR with *Drepanambates*, but footnoted that species with an elongate rostrum, such as *A. albiventris*, *A. angustatus*, *A. belti*, *A. immaculatus* and *A. leucopleura*, would belong to *Drepanambates*. This statement was based probably on a faulty translation of the

French text, where JEKEL referred to species of elongate shape of body. HUSTACHE (1938) ignored the proposed synonymy and manifested CHAMPION's slip in his catalogue. Also, he assigned to *Drepanambates* four species of *Peridinetus*, which followed the description of *D. amabilis* in JEKEL (1883). The latter error was recognized and corrected by WIBMER & O'BRIEN (1986), while those five Middle American species described by CHAMPION (1907) remained under *Drepanambates* in BLACKWELDER (1947) and O'BRIEN & WIBMER (1982).

Several other genus-group names were placed or erected near *Embates*, but have been disregarded by most authors. *Neaedus* PASCOE (1872) was based on *N. bivittatus* PASCOE, a little known species described from Sao Paulo, Brazil. CHAMPION (1907) transferred *Neaedus* from Cholinae (now Cholini) to Ambatini, and MARSHALL (1946) synonymized it eventually with *Ambates*. CASEY (1922), in an attempt to split *Ambates*, introduced *Macrambates*, *Cholinambates*, *Batames*, *Pycnambates* and *Anambates*, largely based on the study of the color plates in CHAMPION (1906-09) and a few specimens available to him from his personal collection. Character states used include the color pattern and the shapes of body, rostrum and tarsal claws, even though this information was not consistently available to CASEY. Those genera were sunk indifferently to subgenera by HUSTACHE (1938). VOSS (1954) synonymized *Batames* with *Drepanambates* and acknowledged, that the majority of the species of *Ambates* needs to be assigned to the various subgenera. This statement was followed by the description of three new species of *Ambates* without subgeneric assignment, and one new species of *Ambates* assigned to the subgenus *Ambatodes*. The latter was erected without explaining why.

## Systematic Part

My study of more than 3000 weevils currently placed in Ambatini revealed very little support for the various taxonomic entities erected in previous studies. Moreover, it indicated a close relationship to some genera currently placed in other tribes. Structural details of the male genitalia were very helpful to develop an alternative, phylogenetically more meaningful concept of these weevils. The aedeagus of the species involved accommodates generally a sclerotized transfer apparatus, which is either shortly tubiform or produced to a flagelliform appendage. The same is true for species in the related genus *Peridinetus* SCHÖNHERR, while the species of the "*Megops*" *lineolus*-group (an unacceptable generic combination) have a flagelliform transfer apparatus and should be excluded from *Peridinetus*. A tubiform though more elongate transfer apparatus can be seen also in *Pantoteles* SCHÖNHERR. These three groups of weevils with tubiform transfer apparatus are associated with higher species (sensu BURGER, 1971) of the plant genus *Piper* (Piperaceae), generally with little host specificity (pers. observations). They all have a subcylindrical, little sculptured rostrum with rather poorly developed ventral edge, and lateral antennal scrobes. Species with a flagelliform transfer apparatus have descending antennal scrobes, and are associated more often (apparently secondarily) with evolutionarily more primitive species of *Piper* or, in a few cases, with species of *Peperomia*. My study of approximately 260 ambatoid species did not reveal a single example, where a specimen could not be assigned to one or the other of the two groups described above. An interesting deviation occurs in *Embates cretifer*, *E. melanops* and *E. salamandra*, where the basal portion of the transfer apparatus is thickly tubiform,

and a flagelliform appendage emerges from within that tube. However, the flagelliform appendage is a perfectly continuous extension of the basal tube in the majority of species with elongate transfer apparatus. The complete body of information leads to the conclusion, that *Embates* is a sister group of *Peridinetus* and *Pantoteles*, and that the short, tubiform transfer apparatus is the evolutionarily more primitive condition. The distinction between species with and without elongate filiform appendage of the transfer apparatus, supported by character states on the rostrum, may be minuscule but not trivial, is justifiable from the evolutionary point of view and is of practical value considering the great speciosity of the genera involved.

Before the various species of *Ambates* SCHÖNHERR can be addressed properly, it is necessary to designate a type species for *Drepanambates*. JEKEL (1883) erected *Drepanambates* as a genus distinct from *Ambates* SCHÖNHERR and *Peridinetus* SCHÖNHERR. It is certain, that he applied the name to *D. amabilis* JEKEL (by using the name) and *Peridinetus schoenherri* CHEVOLAT (through the context), but its combination with *Ambates perspicillum* KIRSCH, *A. maerkelii* GERMAR, *A. modestus* KIRSCH and *A. griseolus* ERICHSON, as interpreted by HUSTACHE (1938) and adopted in subsequent catalogues, cannot be deduced unequivocally from the text. However, JEKEL's concept of *Drepanambates* stands in gross conflict to character states of *A. maerkelii* and *A. modestus*. The type of *D. amabilis* could not be located, and I designate here *P. schoenherri* as the type species of *Drepanambates*. The specimen is housed in the CHEVOLAT collection at the Natural History Museum in Stockholm. *Ambates brasiliensis* JANCZYK (1970) is a new junior synonym of *P. schoenherri*, and an informative illustration can be found in that paper.

Previous workers referred to the hypothesized primitive species of *Embates* in various ways. *Ambates* SCHÖNHERR is based on *A. pictus* by original designation and represents the most senior genus-group name available for these weevils. Other available names are *Neaedus* PASCOE and *Pycnambates* CASEY, which are new synonyms of *Ambates* SCHÖNHERR. *Embates* CHEVOLAT applies to the species with a flagelliform transfer apparatus, a condition I consider as a derived character state. *Ambatodes* VOSS is a new junior synonym of *Embates*, because its designated type species, *Embates sagax* (VOSS), is without doubt a sister species of *Embates caecus*. Even though desirable, a reasonable concept for the classification of the numerous species of *Embates* seems not possible. However, a future revision of the genus should decide about the further use of *Drepanambates* JEKEL, *Batames* CASEY, *Macrambates* CASEY and *Cholinambates* CASEY. *Anambates* CASEY belongs to a complex centered around *Pardisomus* PASCOE, species of which are associated with *Pentagonia* (Rubiaceae).

When *Peridinetus* was erected, it was not set in relation to *Embates*/*Ambates*. Subsequent authors relied generally on the distance between the procoxae and the presence of a prosternal canal to distinguish them from each other. These character states are not always unequivocal for the separation of the species with a tubiform transfer apparatus, i.e. those in *Ambates*, *Peridinetus* and *Pantoteles*. Some species of *Ambates* have a more or less developed prosternal canal and slightly separated procoxae, while the procoxae are rather approximated in some species of *Peridinetus*. One example is *Peridinetus apricans* (HERBST) **comb. n.**, which has rested now for almost 170 years in *Ambates* (actually *Embates*). An example for the converse case is *Ambates variegatus* (HUSTACHE) **comb. n.**, originally described as a species of *Peridinetus*. The *Ambates rectirostris* MORITZ in litt.-group demonstrates the close relationship between *Ambates* SCHÖNHERR and *Pantoteles*. Based on the relatively balanced distances between the species centered around *Embates*,

*Ambates*, *Pantoteles*, *Peridinetus* and the “*Megops*” *lineolus*-group, I maintain *Ambates* SCHÖNHERR as a genus distinct from *Embates* CHEVROLAT. I am fully aware that the use of such similar names for closely related genera is problematic. The issue was discussed with several authorities in weevil systematics, and I decided not to call the plenary power of the ICZN, because those weevils appear to be without economic importance and are known only to a relatively small group of entomologists. Not at last, I wish to maintain the “true” authorship of *Ambates* and the combination of the name with its originally intended type species. SCHÖNHERR would be void of credits in this genus, when the spelling *Embates* were suppressed.

### *Ambates* SCHÖNHERR, genus resurrected

*Ambates* SCHÖNHERR, 1836: 278. Type species *A. pictus* GYLLENHAL, 1836 by original designation. Viewed as a junior homonym of *Embates* CHEVROLAT, 1833 [amended to *Ambates*] by O'BRIEN & WIBMER, 1982. Synonymized with *Embates* CHEVROLAT, 1833 by ALONSO-ZARAZAGA & LYAL, 1999. Resurrected here.

*Naeedus* PASCOE, 1872: 474. Type species *N. bivittatus* PASCOE, 1872 by indication. Described in Cholinae, now Cholini in Molytinae. Placed in Ambatini by CHAMPION, 1907. Synonymized with *Ambates* by MARSHALL, 1946.

*Pycnambates* CASEY, 1922: 6. Type species *P. leopardinus* CASEY, 1922 by original designation. Sunk to subgenus of *Ambates* by HUSTACHE, 1938. New synonym of *Ambates* SCHÖNHERR.

The traditional concept of Ambatini encompasses a speciose group of neotropical baridine weevils with concealed pygidium and distinct ventral femoral tooth. The current arrangement of the various systematic groups involved is in need of revision and not the object of this study. The two common and speciose genera *Ambates* SCHÖNHERR and *Embates* CHEVROLAT may be recognized by contiguous procoxae, usually almost completely reduced prosternal canal (exceptions occur in *A. variegatus*, *A. eumerus*, *A. impluriatus*), oblong-ovate antennal club, continuous or weakly depressed transition between head and rostrum, and parallel or slightly converging elytral sides. There are several other genera with slightly to moderately converging elytral sides, which may appear rather similar to *Ambates* and *Embates*. However, those apparently are not associated with Piperaceae, have costate elytral intervals, parallel-sided tibiae and a short-ovate antennal club, respectively.

Diagnostic character states helpful for rapid recognition of species of *Ambates* can be found on the rostrum. The antennal scrobe is placed laterally along the rostrum toward the eye, and its ventral margin does not reach fully the ventral edge of the rostrum (figs. 1/5b, 2/6b, 3/11c, 4/13c). The rostrum is smooth, finely punctate, subcylindrical, with more or less roundly edged ventral margin (slightly produced in the *A. scutiger* group). In the species of *Embates* CHEVROLAT, the antennal scrobe descends to the usually more distinctly edged ventral margin of the rostrum. The antenna of the species of *Ambates* is inserted always in or proximad of the middle of the rostrum, never distally. Males have a short, tubiform transfer apparatus compared to the elongate, flagilliform appendage present in *Embates*. Some species of *Ambates* approach notably the concept of *Peridinetus*, and the principal diagnostic character states, i.e. contiguous

Species included in *Ambates* SCHÖNHERR (\* from South America):

<i>A. angustatus</i> CHAMPION, 1907	<i>A. maerkelii</i> GERMAR, 1843*
<i>A. aurantiacocinctus</i> (LUCAS, 1857)*	<i>A. modestus</i> KIRSCH, 1874*
<i>A. albiventris</i> CHAMPION, 1907	<i>A. neglectus</i> <b>sp. n.</b>
<i>A. albiventris albocinctus</i> (CHAMPION, 1907)	<i>A. obliquevittatus</i> HUSTACHE, 1950*
<i>A. bimaculatus</i> KIRSCH, 1874*	<i>A. pictus</i> GYLLENHAL, 1836*
<i>A. bipartitus</i> KIRSCH, 1874*	<i>A. pusio</i> (BOHEMAN, 1836)*
<i>A. bivittatus</i> (PASCOE, 1872)*	= <i>A. rufitarsis</i> KIRSCH, 1874 <b>syn. n.</b>
<i>A. chaetopus</i> CHAMPION, 1909	= <i>A. callangaensis</i> VOSS, 1954 <b>syn. n.</b>
<i>A. cristulifer</i> GUENTHER, 1936*	<i>A. scutiger</i> CHAMPION, 1907
<i>A. diplostigma</i> (CHEVROLAT, 1879)*	<i>A. schaumii</i> BOHEMAN, 1843*
<i>A. eumerus</i> ERICHSON, 1847*	<i>A. septimus</i> <b>sp. n.</b>
<i>A. fasciger</i> <b>sp. n.</b>	<i>A. signifer</i> <b>sp. n.</b>
<i>A. hyla</i> JANCZYK, 1970*	<i>A. speciosus</i> <b>sp. n.</b>
<i>A. immaculatus</i> CHAMPION, 1907	<i>A. sulphureus</i> HUSTACHE, 1950*
<i>A. impluriatus</i> VOSS, 1954*	<i>A. talamancae</i> <b>sp. n.</b>
<i>A. inornatus</i> <b>sp. n.</b>	<i>A. variegatus</i> (HUSTACHE, 1950)* <b>comb. n.</b>
<i>A. isthmicola</i> CHAMPION, 1909	= <i>Peridinetus hustachei</i> WIBMER & O'BRIEN, 1986
<i>A. lateralis</i> CHAMPION, 1907*	
<i>A. leopardinus</i> (CASEY, 1922)*	

procoxae and obsolete prosternal canal, may fail. However, species of *Peridinetus* have subconnate tarsal claws, while species of *Ambates* have separated claws. The principal distribution of the species of *Ambates* is South America, Panama and Costa Rica. A few species occur further north, up to Honduras, and in the Lesser Antilles (Saint Vincent, Trinidad).

Key to the Middle American species of *Ambates*

For better orientation in this speciose genus, it proved helpful to establish informal groups of closely related species. A typical and preferably better known species is chosen as a nominal representative for each group.

- 1 Tarsal segment 5 rounded ventrodistally. Basal third of femora subparallel, then gradually expanded dorsoventrally. .... 2
- 1' Tarsal segment 5 produced ventrodistally to pointed tooth at each side (fig. 4/12f). Basal half of femora subparallel and slender, then rather abruptly expanded dorsoventrally (fig. 4/12d); *A. scutiger* group. .... 9

- 2 Rostrum moderately slender, antenna inserted approximately at middle of rostrum (fig. 1/4b, 1/5b); *A. pusio* group. .... 3
- 2' Rostrum very slender, antenna inserted distinctly proximad of middle of rostrum (fig. 2/6b); *A. chaetopus* group. .... 7
- 3 Elytra with more or less distinct color pattern of yellow or white scales. .... 4
- 3' Vestiture fuzzy, distinct color pattern absent, scales light yellow to white. .... 6
- 4 Elytra and pronotum with continuous dorsolateral vitta. Panama and Pacific slope in Colombia and Ecuador. .... 5
- 4' Elytra with apical macula and variously developed median fascia (fig. 1/3d) of yellow (<800 m, ssp. *albiventris*) or white (>1000 m, ssp. *albobinctus*) scales. Atlantic slope in Costa Rica. .... **3. *A. albiventris***
- 5 Funicular segment 2 distinctly shorter than segment 1 (fig. 1/1c). Frontal fovea elongate. Dorsal vestiture rather diffuse, dorsolateral vitta arcuate. Aedeagus narrowed to blunt tip anteriorly (fig. 1/1e), transfer apparatus L-shaped (fig. 1/1g). Males with fringe of hairs on ventral margin of tibiae. .... **1. *A. septimus***
- 5' Funicular segment 2 subequal or slightly shorter than segment 1. Frontal fovea short. Dorsum with or without few scattered yellow scales along elytral striae, dorsolateral vitta almost straight. Aedeagus narrowed to round tip anteriorly (similar fig. 1/3e), transfer apparatus U-shaped (similar fig. 1/3g). Ventral margin of tibiae distally with short cluster of hairs. .... **2. *A. isthmicola***
- 6 Honduras and Guatemala. Integument of tarsi and antenna normally piceous. Ante-antennal portion of rostrum slightly curved when viewed laterally (fig. 1/4b). .... **4. *A. inornatus***
- 6' Pacific slope of Cordillera in Costa Rica and Panama. Integument of tarsi and antenna rufous. Ante-antennal portion of rostrum straight when viewed laterally (fig. 1/5b). .... **5. *A. neglectus***
- 7 Vestiture fuzzy, distinct color pattern absent, scales light yellow to white. Pacific slope of Cordillera in Costa Rica and Panama. .... **8. *A. immaculatus***
- 7' Elytra with distinct color pattern of yellow scales. .... 8
- 8 Elytron and pronotum with continuous dorsolateral vitta (fig. 2/6a). .... **6. *A. speciosus***
- 8' Elytron with short yellow streak between subapical umbone and apex (fig. 2/7a). .... **7. *A. chaetopus***
- 9 Length 4.5-7.8 mm. Elytral disk with velvety, subcordate or transverse macula of dark brown scales. .... 10



- 9' Length 7.3-10.6 mm. Elytral disk with ovate maculae and continuous post-macular fascia (fig. 4/13a), or with broad, oblique fascia (fig. 4/12a). ..... 12
- 10 Male transfer apparatus simple, not accommodated in sclerotized shell, basal process variously developed (figs. 3/11f, 3/11'f). Elytral macula usually longer than wide. Widely distributed between Mexico and Panama. ... **11. *A. scutigera***
- 10' Male transfer apparatus accommodated in sclerotized shell (figs. 3/9f, 3/10f). Elytral macula usually more or less transverse. Pacific slope of Cordillera in Costa Rica and Panama. .... 11
- 11 Pronotum proportionately larger, basolateral angle not sharply pointed (fig. 3/9 b). Prosternum without dense, light-colored vestiture. Elytra normally with narrow ante- and post-macular fasciae of light yellow scales. Basal portion of transfer apparatus elongate and protruding from shell (fig. 3/9f). Lowlands. .... **9. *A. angustatus***
- 11' Pronotum proportionately smaller, basolateral angle sharp (fig. 3/10b). Prosternum with dense, light yellow vestiture. Elytral fascia of light yellow scales absent. Transfer apparatus almost completely accommodated in shell (fig. 3/10f). Above 1000 m . .... **10. *A. talamancae***
- 12 Elytron with broad, oblique fascia of yellow scales (fig. 4/12a). Subapical umbone moderately developed. Apex of aedeagus broadly rounded, transfer apparatus minute (fig. 4/12i). Atlantic slope of Costa Rica, Reserva La Fortuna in Panama. .... **12. *A. fasciger***
- 12' Elytron with oblong, velvety macula of black scales and post-macular fascia of yellow scales (fig. 4/13a). Subapical umbone strongly developed. Apex of aedeagus slightly emarginated. Transfer apparatus U-shaped, tubiform (fig. 4/13i). Cerro Campana in Panama. .... **13. *A. signifer***

### The *Ambates pusio* group

The species of the *A. pusio* group are characterized by the ventrodistally unmodified tarsal segment 5, separated claws, the slender, often awl-shaped rostrum (figs. 1/4b, 1/5b), and usually subtriangularly shaped elytra (fig. 1/4a). The antenna is inserted generally at about the middle of the rostrum. The group includes numerous South American species. Four of the five Middle American species (*A. isthmicola*, *A. albiventris*, *A. inornatus*, *A. neglectus*) form a complex of morphometrically very similar species. Subpopulations of the hypothesized shared ancestral species appear to have been isolated from each other during their northward dispersal by the topographic relief of the Cordillera and aridization during glacial episodes.

### 1. *Ambates septimus* sp. n.

Figs. 1/1c, g

Holotype male, PANAMA, labeled "CENTRAL AMERICA/ Summit Gardens/ Canal Zone: Panama", "Coll. E. G. Riley/ 9 May 1971", my red label "HOLOTYPE/ *Ambates*/ *septimus* Prena/ Prena det. 2001" (CMNC); Paratypes (6 males, 3 females), labeled "PANAMÁ: ZONA DEL CANAL;/ Fort Gulick Road/ Johnson 7 May 1980" (HPSC); "Panamá C. Z./ Margarita, 4 km SW/ 21 May 1971/ H. Stockwell" (CMNC); "CANAL ZONE, Ft./ Kobbe, at night/ VI-28-1974 C.W. & L./ O'Brien & Marshall" (JPPC); "CANAL ZONE, night/ Coco Solo Hospital/ VII-2-1974 C.W. & L./ O'Brien & Marshall" (CWOB); "MARGARITA/ CANAL ZONE/ MAY 1960/ S. BREELAND" (HAHC); "CANAL ZONE/ Ft. Sherman, Aug./ 2, 1974 C.W & L./ O'Brien & Marshall" (CWOB); "Panamá, C. Z./ Coco Solo Hosp./ 9° 21' N, 79° 51' W/ 15 Apr. '72 Stockwell" (HPSC); "Panamá: Canal Zone/ Summit Gardens/ 26 June, 1976/ Coll. E. G. Riley" (CWOB); "PANAMA: Canal Area/ Fort Sherman/ 10 June 1994/ H.P. Stockwell" (JPPC).

**Description:** Habitus: similar fig. 1/4a, slightly more ovate, total length 6.1-7.9 mm (mean=7.0, n=10). Color: integument piceous, antenna (without club) and tarsi rufous-castaneous; scales yellow, dense in broad dorsolateral vitta between head and elytral apices, diffuse elsewhere. Head: frons with elongate fovea medially, transition between head and rostrum very slightly depressed, rostrum slender, awl-shaped, slightly curved, more so over antennal insertion, ventral edge rounded, ante-antennal portion tapered dorsoventrally and constricted laterally, dorsomedian carina developed in basal half (particularly in males), rostral length males 1.03-1.17x (mean=1.10, n=6), females 1.10-1.16x (mean=1.14, n=4) pronotal length, ante-antennal portion males 0.45-0.47x (mean=0.46, n=6), females 0.50-0.51x (mean=0.51, n=4) total rostral length. Antenna: funicular segment 1 distinctly longer than 2 (fig. 1/1c), club oblong-ovate. Pronotum: length 0.81-0.86x (mean=0.84, n=10) maximum width, subconical, greatest width at base, sides gradually rounded toward front and constricted near apex; disk convex, densely punctate, intervals tuberculate, dorsomedian carina indistinct or absent. Elytra: length 1.50-1.61x (mean=1.55, n=10) width at humeri, width 1.17-1.26x (mean=1.21, n=10) maximum pronotal width, sides gradually converging in basal half, subapical umbone moderately developed, striae fine, punctures indistinct, interval 9 subcostate. Legs: femora moderately expanded dorsoventrally, femoral tooth distinct, ventral margin of tibia bisinuate, distally with fringe (males) or cluster (females) of yellow hairs, tarsal claws arcuate and separated. Genitalia: sides of median lobe gradually narrowed anteriorly to blunt tip (fig. 1/1e), in lateral view similar fig. 1/3f; length of transfer apparatus little more than half of width of median lobe, L-shaped, base with short, thick appendage to endophallic tissue, flagellum tubiform (fig. 1/1g).

**Plant association:** Not known.

**Specific epithet:** The specific name is derived from the Latin numeral. STOCKWELL recognized this weevil as his seventh new species of *Ambates*, and thus it shall be named.

**Discussion:** *Ambates septimus* occurs sympatrically with *A. isthmicola*, and can be distinguished from that species by the piceous integument of the legs, shorter second antennal segment (figs. 1/1c and 1/2c), fuzzy dorsal vestiture and more elongate frontal fovea. Males can be recognized by the fringe of hairs on the ventral edge of the

tibia. Differences of the male transfer apparatus and the anterior portion of the median lobe indicate, that *A. septimus* does not belong to the complex formed by *A. isthmicola*, *A. albiventris*, *A. inornatus* and *A. neglectus*.

## 2. *Ambates isthmicola* CHAMPION

Figs. 1/2c; BCA IV.5 23/12, 12a

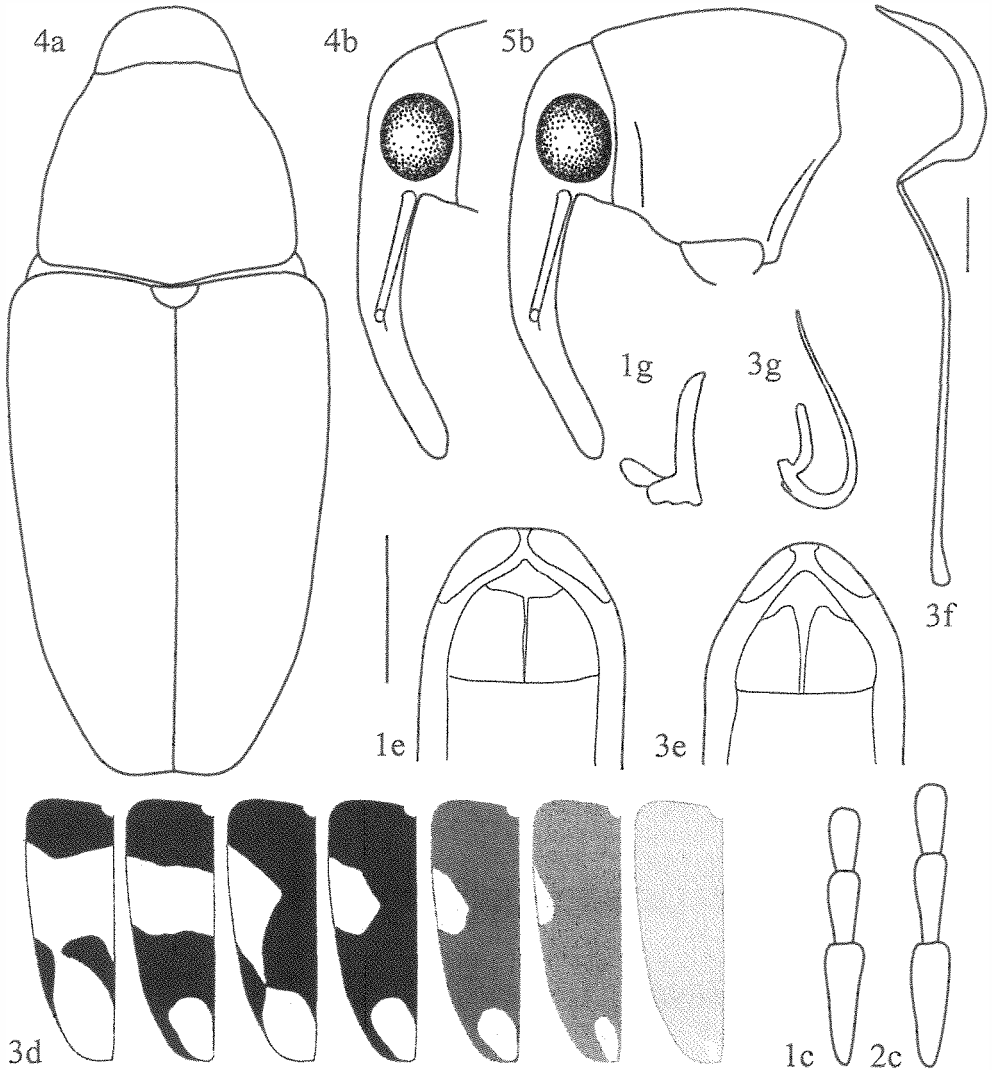
*Ambates isthmicola* CHAMPION, 1909: 481. Holotype male, Panama, labeled "May/ 9.07", "Tabernilla/ Canal Zone/ Panama", "Aug. Busck/ Collector", "Type of/ Species.", "♂", "Type/ No. 12601", "Ambates/ isthmicola/ Type Cha" (USNM). HUSTACHE, 1938 (cat.); BLACKWELDER, 1947 (cat.); O'BRIEN & WIBMER, 1982 (cat.).

**Redescription:** Habitus: similar fig. 1/4a, total length 7.0-8.4 mm (mean=7.4, n=10). Color: terra typica: integument piceous, appendages rufous; scales yellow on venter, in continuous dorsolateral vitta between head and elytral apices, in narrow dorsomedian pronotal vitta, and scattered along elytral striae; other subpopulations: integument including that of appendages piceous to black, yellow scales scarce or absent on pronotal and elytral disks (see discussion below). Head: frons with minute fovea medially, transition between head and rostrum very slightly depressed, rostrum slender, awl-shaped to subcylindrical, slightly and rather evenly curved throughout (similar fig. 1/4b), ventral edge rounded, ante-antennal portion constricted laterally, rostral length males 1.03-1.14x (mean=1.09, n=5), females 1.06-1.11x (mean=1.08, n=5) pronotal length, ante-antennal portion males 0.46-0.48x (mean=0.49, n=5), females 0.47-0.54x (mean=0.50, n=5) total rostral length. Antenna: funicular segment 1 very slightly longer than 2 (fig. 1/2c), club oblong-ovate to subcylindrical. Pronotum: length 0.83-0.92x (mean=0.89, n=10) maximum width, greatest width at or near base, sides slightly rounded in basal third, more rounded toward front and slightly constricted near apex; disk densely punctate, intervals tuberculate, dorsomedian carina indistinct or absent. Elytra: length 1.58-1.71x (mean=1.63, n=10) width at humeri, width 1.21-1.31x (mean=1.26, n=10) maximum pronotal width, sides gradually converging in basal half, subapical umbone moderately developed, striae fine, punctures indistinct, interval 9 costate. Legs: femora moderately expanded dorsoventrally, femoral tooth distinct, ventral margin of tibia bisinuate, distally with cluster of cupreous hairs, tarsal claws arcuate and separated. Genitalia: sides of median lobe gradually narrowed anteriorly to round tip (similar fig. 1/3e), lateral view similar fig. 1/3f; length of transfer apparatus little less than width of median lobe, basal portion curved, with slightly curved, cylindrical appendage to endophallic tissue, flagellum short, tubiform (similar fig. 1/3g).

**Distribution:** *Ambates isthmicola* is a complex of local subpopulations, which includes specimens of uncertain status from the Pacific lowlands in Colombia and Ecuador (BMNH, CWOB, HAHC, MZLU). A total of 43 specimens (5 males, 5 females, 33 not sexed) was studied from the following locations: PANAMA. Canal Area: numerous locations (BMNH, CHAH 4, CMNC, CWOB, GBFM, HPSC 9, JPPC, TAMU, USNM 4). Chiriquí: Reserva La Fortuna, VIII/1976, V/1978, VII/1995 (CWOB, FAUP, HPSC). Coclé: 5 km N El Copé, 750-850 m, V/1973, VI/1991 (HPSC 3); El Valle, 700 m, V/1973, III/1993 (CMNC, TAMU); Cerro Goital, VII/1985 (CWOB). Panamá: Cerro Campana, 850 m, VI/1971, VIII/1971, VII/1972, VI-VII/1974, VI/1977 (CHAH, CWOB 2, HPSC 3); El Llano-Cartí rd. km 8, 300 m, V/1995 (JPPC); Parque Soberania, V/1993, VII/1995 (FAUP, TAMU). Veraguas: 6 km N Santa Fe, VI/1996 (CMNC 2).

**Plant association:** ENGLEMAN collected one adult specimen in the Canal Area from *Piper dilatatum*.

**Discussion:** The material studied is as heterogeneous as that of *A. albiventris* from Costa Rica. For example, specimens from Chiriquí have black rather than rufous appendages and a more sharply defined color pattern. I have seen a few specimens of



**Plate 1.** *Ambates pusio* group: 1 *A. septimus*, 2 *A. isthmicola*, 3 *A. albiventris*, 4 *A. inornatus*, 5 *A. neglectus*; a habitus, dorsal view, b head and prothorax, lateral view, c funicular segments 1-3, d elytral color patterns, from Tapantí, Orosi, Monteverde (2x), San Ramon, La Selva, Ceiba/Rio Sarapiquí (from left to right), e apex of median lobe of aedeagus, dorsal view, f median lobe, lateral view, g transfer apparatus. Scale bars 0.25 mm, refer to f (small bar), e and g (large bar).

other subpopulations from Colombia and Ecuador, which belong to *A. isthmicola* in the wider sense. The entire population may have to be re-examined, when more material is available for study. No difference in the male genitalia is apparent between *A. isthmicola*, *A. albiventris* and *A. neglectus*. It is hypothesized here, that the latter two species derive from *A. isthmicola* and represent independent lineages from the Atlantic and Pacific sides of the Cordillera Central (see discussion of *A. albiventris*).

### 3. *Ambates albiventris* CHAMPION

Figs. 1/3d-g; BCA IV.5 10/10, 10a, 11/3, 3a

*Ambates albiventris* CHAMPION, 1907: 169. Holotype male, COSTA RICA, labeled: printed circular type label with red margin, "♂", "Sp. figured", "Reventazon, 200 m./ Costa Rica/ Biolley", "B.C.A. Col. iv.5./ Ambates/ albiventris/ Champ.", handwritten black ink "A. albiventris Ch.", "120/ Reventazon/ Plaines de Sta. Clara/ alt. 200 m/ XII. 1904" (BMNH). Original generic combination resurrected here.

*Drepanambates albiventris* (CHAMPION). CHAMPION, 1907: 155 (footnote); HUSTACHE, 1938 (cat.); BLACKWELDER, 1948 (cat.); O'BRIEN & WIBMER, 1982 (cat.).

*Pantoteles albocinctus* CHAMPION, 1907: 184. Holotype male, COSTA RICA, labeled: printed circular type label with red margin, "♂", "Sp. figured", "Cache/ Costa Rica/ H. Rogers", "B.C.A. Col. iv.5./ Pantoteles/ albocincta/ Champ.", handwritten black ink "P. albocinctus Ch." (BMNH). HUSTACHE, 1938 (cat.); BLACKWELDER, 1948 (cat.); O'BRIEN & WIBMER, 1982 (cat.); PRENA, 2001.

*Ambates albocinctus* (CHAMPION). PRENA, 2001.

The specimens of the *A. pusio* group occurring on the Atlantic slope of the Cordillera Central form a species complex, which appears to have evolved as an Atlantic lineage from *A. isthmicola*. *Ambates neglectus* represents the corresponding lineage from the Pacific flank of the Cordillera. It is possible, that a rigid distinction between *A. isthmicola*, *A. neglectus*, *A. albiventris* and *A. inornatus* cannot be maintained in the future, because there is considerable variation in the color pattern, and we may not be aware of all subpopulations present. The typical form of *A. albiventris* is known from the Atlantic lowlands of Costa Rica. Specimens from higher elevations (up to 800 m) tend to have more contrast in the color pattern than specimens from lower elevations. The color pattern is very weak in a series from near the Nicaraguan border, at 20 m elevation. *Ambates albocinctus*, with a white continuous elytral fascia and black integument, was described from a specimen collected near Paraiso, in the central valley of Costa Rica (ca. 1000 m, possibly higher). In the same area, I collected a specimen with notably deviating color pattern. Other color patterns are known from a population in Monteverde, at approximately 1000 m elevation. The entire material taken together forms a series of morphologically very similar specimens with variously modified color pattern (fig. 1/3d). The nature of this variation is not well understood. On the one hand, the elevation of the collecting site seems to affect the length of the body and the color pattern, respectively. A plausible explanation could be an effect of temperature on larval development and metamorphosis. On the other hand, a series of nearly uniformly gray to yellowish colored specimens similar to the lowland population of *A. albiventris* was collected at various elevations (200-1400 m) in Honduras and Guatemala, and elevation seems to exhibit no influence on color pattern and size there. Additional material from Nicaragua and Guatemala may help to resolve this issue. The members of this group appear to be associated with species of the *Piper hispidum* complex, a

group of plants which exhibits a similar frustrating degree of variability as is prevailing in the entire *Ambates pusio* group. At the moment it seems appropriate to place *A. albocinctus* as a subspecies under *A. albiventris* (**stat. n.**).

**Redescription:** Habitus: similar fig. 1/4a, total length 5.3-9.9 mm (mean=7.3, n=39). Color: integument variously piceous to black, antenna occasionally castaneous; color and distribution of vestiture variable between locations (fig. 1/3d), see diagnosis of subspecies. Head: frons with minute fovea medially, transition between head and rostrum very slightly depressed, rostrum slender, subcylindrical to awl-shaped, slightly and rather evenly curved throughout (similar fig. 1/4b), ventral edge rounded, ante-antennal portion constricted laterally, rostral length males 1.05-1.25x (mean=1.15, n=21), females 1.07-1.30x (mean=1.23, n=16) pronotal length, ante-antennal portion males 0.47-0.54x (mean=0.49, n=21), females 0.50-0.58x (mean=0.54, n=16) total rostral length. Antenna: funicular segment 1 subequal or slightly longer than 2, club oblong-ovate to subcylindrical. Pronotum: length 0.82-0.95x (mean=0.88, n=39) maximum width, subconical, greatest width at base, sides gradually rounded toward front and slightly constricted near apex; disk convex, densely punctate, intervals tuberculate, dorsomedian carina indistinct. Elytra: length 1.55-1.75x (mean=1.64, n=39) width at humeri, width 1.18-1.36x (mean=1.26, n=39) maximum pronotal width, sides gradually converging in basal half, subapical umbone moderately developed, striae fine, punctures indistinct, interval 9 costate. Legs: femora moderately expanded dorsoventrally, femoral tooth distinct, ventral margin of tibia bisinuate, distally with cluster of cupreous hairs, tarsal claws arcuate and separated. Genitalia: sides of median lobe gradually narrowed anteriorly to round tip (fig. 1/3e), lateral view as fig. 1/3f; length of transfer apparatus little less than width of median lobe, basal portion curved, with cylindrical, slightly arcuate appendage to endophallic tissue, flagellum short, tubiform (fig. 1/3g).

**Plant association:** Several observations suggest an association with species of the *Piper hispidum* complex.

***Ambates albiventris* ssp. *albiventris* CHAMPION stat. n.**

Figs. 1/3d; BCA IV.5 10/10, 10a

**Diagnosis:** The nominal form of *A. albiventris* occurs in the Atlantic lowlands of Costa Rica. The specimens are on average smaller (5.3-8.6 mm) than specimens of the ssp. *albocinctus* (7.4-9.9 mm). The basic vestiture of pronotum and elytron consists of yellowish scales sufficiently large to cover the dark integument to some degrees and to compound to a fuzzy yellowish background tone to the naked eye (fig. 1/3d, right three patterns). The color pattern is usually rather indistinct when viewed from above. In lateral view, the dense imbricate vestiture of yellow scales is discontinued on mesepimera and ventrite 1 (not in very small specimens though), thus forming two oblique fasciae. In specimens from locations of several hundred meters altitude, those fasciae tend to reach up higher on pronotum and elytron, and become visible from above. At the same time, the apical elytral streak of yellowish scales increases in size. The color of the pattern turns whitish at approximately 1000 m, and the scales of the basic vestiture dwindle to microscopic size. Those specimens with white color pattern approach the ssp. *albocinctus*.

**Plant associations:** Single adult specimens were collected in La Selva from *Piper arietanum*, *P. sancti-felicis*, *P. xanthostachyum* (all MARQUIS), *P. glabrescens* and *P. hispidum* (both PRENA).

**Distribution:** A total of 44 specimens (16 males, 11 females, 17 not sexed) was examined from the following locations. COSTA RICA. Alajuela: San Ramon de Dos Rios, 600 m, III, VI, VII/1993 (INBC 4). Cartago: Turrialba, 700 m (BMNH, USNM), VI/1964 (CWOB). Cartago: Rio Banano, 750 m, IV/1935 (USNM); San Carlos, 800 m (BMNH, SMTD, USNM). Heredia: Puerto Viejo, Est. La Selva, 100 m, III/1980, I, V, VIII, IX/1982, III/1988, III/1991, VII/1992, IV/2001 (ALAS 2, CHAH 4, CWOB, HAHC 2, JPPC 2, USNM 4); Rio Sarapiquí, Ceiba, 20 m, IV/1996 (AMNH, INBC, JPPC 3). Limón: Reventazon, 200 m (BMNH), XI/1926 (USNM); 30 km N Cariari, Sector Cerro Cocorí, Fca. Rojas, 150 m, II/1993, VIII/1994 (INBC 2); P.N. Tortuguero, Cerro Tortuguero and Cuatro Esquinas, 0-120 m, XII/1989, IX/1992, XII/1992 (INBC 3); Guápiles, III/2000 (INBC 3); 7 mi N Guacima, II-III/1988 (CWOB); Valle de la Estrella, Pandora, II/1984 (HAHC); Amubri, 70 m, VI/1993 (INBC).

***Ambates albiventris* ssp. *albocinctus* (CHAMPION) stat. n.**

Figs. 1/3d; BCA IV.5 11/3, 3a

**Diagnosis:** The ssp. *albocinctus* includes generally Costa Rican specimens of *A. albiventris* from elevations higher than 1000 m. The color pattern consists of relatively large white rather than small yellowish scales, and the basic vestiture is reduced to clear microscopic scales. The color pattern itself is quite variable (figs. 1/3d, left four patterns). No rigid distinction can be made to the nominal form (see discussion).

**Plant association:** I collected one adult specimen in Tapantí from *Piper epigynium*.

**Distribution:** A total of 21 specimens (7 males, 7 females, 7 not sexed) was examined from the following locations. COSTA RICA. Alajuela: Peñas Blancas, VII/1987 (HAHC). Cartago: Cachí (BMNH); Paraiso, IV/1991 (MUCR); Orosi, 1500 m (SMTD, DEIC 3); P.N. Tapantí, 1200 m, IV/2000 (JPPC). Puntarenas: Monteverde, 1040-1400 m, V/1979, VI/1986, VII-IX/1992, V-VI/1994 (CWOB 3, HAHC 3, INBC 5, JPPC 2).

**Discussion:** This taxon was described originally as a species of *Pantoteles*, although the assignment was put in question already by its author. The typical form is known only from Orosi valley, an area influenced by the Atlantic fauna. Specimens with discontinued elytral fascia occur in Monteverde, and document the close relationship to *A. albiventris*. It is not clear, whether or not the color pattern is influenced by the temperature during larval development and metamorphosis. Specimens with white color pattern and without fuzzy basic vestiture are regarded here as a subspecies of *A. albiventris*, until it has been demonstrated whether or not this is actually an environmental expression without taxonomic value.

**4. *Ambates inornatus* sp. n.**

Figs. 1/4a, b

Holotype male, HONDURAS, labeled: "HONDURAS, Cor., 7 mi/ SE. Puerto Cortez/ VII-23-1974 C.W. & L./ O'Brien & Marshall", "C.W. O'BRIEN/ COLLECTION",

my red label "HOLOTYPE/ *Ambates/ inornatus* Prena/ Prena det. 2001" (CASC, currently as a long-term loan in CWOB). Paratypes (5 males, 2 females), labeled: "GUAT. Zacapa/ 3 km S. La Union/ 1400 m 15.VI.1993/ H. & A. Howden", "day/ Beating", "H. & A. Howden/ Collection" (HAHC); "HONDURAS: Sta. Bárbara/ 5 km NW Peña Blanca/ 1.VI.1994 820 m/ H & A Howden", "H. & A. Howden/ Collection" (HAHC); "HONDURAS, Vic. El/ Porvenir, base Cordil-/ lera Nombre de Dios/ (Pico Bonito) 600-700", "May 28, 1993/ broadleaf hardwood forest, J. Rifkind" (CWOB, JPPC); "HONDURAS/ Siguatepeque/ 15 July 1974/ J. Mankins", "on *Psidium/ guayava*" (CWOB, JPPC); "HONDURAS, S.C.Y./ Lago Yojoa/ VII-21-1974 C.W. & L./ O'Brien & Marshall" (CWOB).

**Description:** Habitus: fig. 1/4a, total length 5.8-7.6 mm (mean=6.8, n=8). Color: integument piceous, antenna and tarsi occasionally dark castaneous; scales light yellow to white, evenly distributed, small, larger and dense ventrally. Head: frons with minute fovea medially, transition between head and rostrum very slightly depressed, rostrum slender, subcylindrical to awl-shaped, slightly and rather evenly curved throughout (fig. 1/4b), ventral edge rounded, ante-antennal portion constricted laterally, rostral length males 1.14-1.25x (mean=1.19, n=6), females 1.24-1.28x (n=2) pronotal length, ante-antennal portion males 0.47-0.52x (mean=0.50, n=6), females 0.54x (n=2) total rostral length. Antenna: funicular segment 1 subequal or slightly longer than 2, club oblong-ovate to subcylindrical. Pronotum: length 0.83-0.89x (mean=0.86, n=8) maximum width, subconical, greatest width at base, sides gradually rounded toward front and slightly constricted near apex; disk convex, densely punctate, intervals tuberculate, dorsomedian carina indistinct. Elytra: length 1.57-1.72x (mean=1.63, n=8) width at humeri, width 1.20-1.30x (mean=1.27, n=8) maximum pronotal width, sides gradually converging in basal half, subapical umbone moderately developed, striae fine, punctures indistinct, interval 9 costate. Legs: femora moderately expanded dorsoventrally, femoral tooth distinct, ventral margin of tibia bisinuate, distally with cluster of cupreous hairs, tarsal claws arcuate and separated. Genitalia: sides of median lobe gradually narrowed anteriorly to round tip (similar fig. 1/3e), lateral view similar fig. 1/3f; length of transfer apparatus little less than width of median lobe, basal portion curved, with cylindrical, slightly arcuate appendage to endophallic tissue, flagellum short, tubiform (similar fig. 1/3g).

**Plant association:** MANKINS collected two adult specimens in Siguatepeque from *Psidium guayava* (label data). This association is probably accidental.

**Specific epithet:** The name is a Latin adjective and used to describe the plain ornamentation of this species.

**Discussion:** *Ambates inornatus* is very similar to *A. neglectus*. Both species may be distinguished morphologically by the color of antenna and tarsi and the rostral shapes (figs. 1/4b, 1/5b). Both populations seem to have evolved independently from each other under reduction of the color pattern. *Ambates neglectus* is isolated geographically by the Cordillera Talamanca, and further dispersal along the Pacific coast toward Nicaragua is inhibited by increasingly arid climatic conditions unsuitable for the host plant. *Ambates inornatus* represents the corresponding Atlantic lineage in the northward radiation of the *A. pusio* group. Specimens from Nicaragua may prove helpful to explore the relationship between *A. inornatus* and *A. albiventris*. It is interesting to note, that none of the elements of the color pattern apparent in *A. albiventris* shows up in *A. inornatus* even at elevations of 1400 m.



### 5. *Ambates neglectus* sp. n.

Fig. 1/5b

Holotype male, COSTA RICA, labeled: "Albergue Cerro de Oro, Puntarenas,/ Costa Rica. 150-170 m. 10 ENE 1996./ L. Angulo, L\_S\_279650\_518450/ #6974", CRI002 369423, my red label "HOLOTYPE/ *Ambates neglectus* Prena/ Prena det. 2001" (INBC). Paratypes (4 males, 1 female), labeled: "Est. Esquinas, Pen. de Osa., A. C. Osa,/ Prov. Punta, COSTA RICA. 200 m. Dic/ 1993, M. Segura, L S 301400\_542200/ 2536", CRI001 853419 (JPPC); "COSTA RICA, Puntarenas/ Prov. Osa Peninsula,/ 3.5 mi. S. Rincón,/ 28.II-12.III.1969/ 08° 42' N, 83° 29' W." (CWOB); "COSTA RICA, Punt, R./ F. Golfo Dulce, 10 m, 3 k./ S. Rincon, X-1991, ma-/ *laisé* trap, P. Hansen" (CWOB); circular printed cotype label with blue margin, "♂", "Bugaba/ 800-1500 ft./ Champion", "B.C.A. Col. iv.5./ *Ambates immaculatus*/ Champ.", handwritten black ink "A. *immaculatus*" (BMNH 2).

**Description:** Habitus: similar fig. 1/4a, total length 6.1-7.4 mm (mean=6.6, n=4). Color: integument piceous, antenna (without club) and tarsi rufous; scales light yellow to white, evenly distributed, small, larger and dense ventrally. Head: frons with minute fovea medially, transition between head and rostrum very slightly depressed, rostrum slender, awl-shaped, slightly curved, more so over antennal insertion, ventral edge rounded, ante-antennal portion dorsoventrally compressed and nearly straight (fig. 1/5b), rostral length males 1.07-1.16x (mean=1.10, n=3), female 1.19x (n=1) pronotal length, ante-antennal portion males 0.48-0.50x (mean=0.49, n=3), female 0.52x (n=1) total rostral length. Antenna: funicular segments 1 and 2 of subequal length, club oblong-ovate. Pronotum: length 0.84-0.89x (mean=0.87, n=4) maximum width, subconical, greatest width at base, sides gradually rounded toward front and slightly constricted near apex; disk convex, densely punctate, intervals tuberculate, dorsomedian carina indistinct. Elytra: length 1.62-1.68x (mean=1.65, n=4) width at humeri, width 1.19-1.24x (mean=1.22, n=4) maximum pronotal width, sides gradually converging in basal half, subapical umbone moderately developed, striae fine, punctures indistinct, interval 9 costate. Legs: femora moderately expanded dorsoventrally, femoral tooth distinct, ventral margin of tibia bisinuate, distally with cluster of cupreous hairs, tarsal claws arcuate and separated. Genitalia: sides of median lobe gradually narrowed anteriorly to round tip (similar fig. 1/3e), lateral view similar fig. 1/3f; length of transfer apparatus little less than width of median lobe, basal portion curved, with cylindrical, slightly arcuate appendage to endophallic tissue, flagellum short, tubiform (similar fig. 1/3g).

**Plant association:** AZOFEIFA collected two adult specimens in Corcovado N.P. from *Piper phytolaccaefolium*.

**Specific epithet:** The name is a Latin adjective and used to refer to the circumstance, that this species has been overseen for more than 90 years.

**Discussion:** *Ambates neglectus* is a distinct species of the *A. pusio* group occurring on the Pacific slope of the Cordillera. The similarity of the color pattern between *A. neglectus* and *A. immaculatus* is convergent and without phylogenetic value (see introducing paragraph of the *A. chaetopus* group). However, the two paratypes of *A. immaculatus* belong to *A. neglectus*. Great similarity exists between *A. neglectus* and *A. inornatus*. Apart from their different geographic distribution, *A. neglectus* may be recognized by the

dorsoventrally compressed ante-antennal portion and the rufous integument of antenna and tarsi. Both species appear to have evolved from a shared ancestor as independent lineages on each side of the Cordillera. I interpret their similar fuzzy vestiture as a convergent loss of a previously existing color pattern.

### The *Ambates chaetopus* group

The three Middle American species (plus one undescribed species from Peru, AMNH) placed in this group belong to the *A. pusio* group in the wider sense. Their very slender, slightly curved rostrum is approximately as long as the head and the pronotum combined (fig. 2/6b), and the antenna is inserted notably proximad of the middle of the rostrum. The group accommodates larger-sized (7-12 mm) weevils with the general appearance of species of *Cholus*, Molytinae (fig. 2/6a). The Middle American species agree in all details of the male genitalia what suggests a close phylogenetic relationship. The color patterns of these three species are remarkably similar to sympatrically occurring species of the *A. pusio* group. These couples are *A. isthmicola*/*A. speciosus*, *A. albiventris*/*A. chaetopus* and *A. neglectus*/*A. immaculatus*. It is possible, that the species of the *A. chaetopus* group evolved independently from each other from those species of the *A. pusio* group, and that their similarity results from a convergent functional adaptation. However, it appears more likely, that certain color patterns have evolved systematically rather than by chance, possibly under climatic influence and/or by convergent mimicry. The distributional records suggest a South American origin of both groups. The seemingly continuous dorsolateral elytral vitta present in a number of species of *Embates* and *Ambates*, among them *A. septimus*, *A. isthmicola*, *A. chaetopus* and *A. bivittatus*, almost always consists of several compound elements probably derived from a light colored circumferential line of a previously existing elytral macula. A simple explanation for the parallel development of color patterns in the same region is, that single elements of the compound vitta were altered or lost systematically during the northward dispersal of the ancestral population. Examination of several species complexes with clinal color pattern reveals for example, that the fuzzy nature of the vestiture intensifies with increasing disintegration of the color pattern. These changes occur most often along a north-south gradient, both in Middle and South America, and suggest some sort of systematic effect of weather on the expression of the color pattern. Experimental studies about the nature of this phenomenon would be desirable, particularly since it does not seem to be inherent only to this group of weevils.

#### 6. *Ambates speciosus* sp. n.

Figs. 2/6a, b

Holotype male, Panama, labeled: "PANAMA: COLON/ 5 km. SE. Pina, 20 m/ 11.VI.1996, R. Anderson/ trop. Atlantic rain forest/ general collecting, 96-123", my red label "HOLOTYPE/ *Ambates*/ *speciosus* Prena/ Prena det. 2001" (CMNC). Paratypes (2 males, 5 females), labeled: "Panama-Chiriqui/ Fortuna / 8° 44' N; 82° 15' W,/ 12-17 August 1976/ Henk Wolda" (HPSC); "PANAMA, Chiriqui,/ Fortuna, 82°

15° W/ 8° 44' N, May 19, 1978/ O'Briens & Marshall" (CWOB); "PANAMA, Chiriqui,/ Fortuna (82° 15' W,/ 8° 44' N) Nov. 27/ 1977 R.W. Flowers" (JPPC); "PANAMA: Veraguas Pr./ Alto de Piedra/ above Santa Fe, El. 850 m./ 31 Jul 95 H. Stockwell" (HPSC); "COLOMBIA: Choco,/ Munguirri-Motordo,/ 30 km e. Quibdo, 400 m/ 1° for. 27 June 1985/ leg. D.G. Furth" (CWOB); "COLOMBIA Dept. Valle/ Lower Anchicayá Alt./ 400 M. Tropical/ Very Wet Forest", "Netted/ R. Wilkerson/ III-5-76.1" (CWOB); "COSTA RICA, Prov. Limón,/ Sendero entre San Miguel Cabecar/ y Cerro Mirador, 325-500 m. 17-21/ FEB 1997. M.A. Zumbado,/ L\_S\_397300\_576200 #45313", CRI002 540409 (INBC).

**Description:** Habitus: fig. 2/6b, total length 7.4-12.7 mm (mean=10.5, n=8). Color: integument piceous to black, antenna and claws occasionally dark castaneous; light yellow scales condensed on flanks and venter, in continuous dorsolateral vitta between head and elytral apices (fig. 2/6b), and in variable number of clusters along striae; minute indistinct scales of various colors intermixed elsewhere. Head: frons minutely foveate medially, rostrum very slender and slightly arcuate (fig. 2/6b), ventral edge rounded, dorsomedian carina obsolete (males) or absent (most females), ante-antennal portion constricted laterally, length of rostrum males 1.36-1.45x (mean=1.39, n=3), females 1.44-1.53x (mean=1.50, n=5) pronotal length, ante-antennal portion males 0.56-0.58x (mean=0.58, n=3), females 0.60-0.62x (mean=0.61, n=5) total rostral length. Antenna: funicular segments 1 and 2 notably elongate, subequal in length, club oblong-ovate. Pronotum: length 0.79-0.86x (mean=0.82, n=8) maximum width, subconical, anterior portion tubulate, sides slightly rounded, dorsomedian line partially impunctate. Elytra: length 1.52-1.64x (mean=1.57, n=8) width at humeri, width 1.23-1.35x (mean=1.29, n=8) maximum pronotal width, sides gradually converging in apical half, subapical umbone moderately developed, intervals slightly convex and rugosely punctate in anterior half, usually smoother caudally, interval 9 costate, interval 3 (near base) and interval 2 (near middle) often slightly wider and raised, one female from La Fortuna with strongly developed basal callosity, striae fine, punctures indistinct. Legs: femora moderately expanded dorsoventrally, femoral tooth acute, ventral margin of tibiae very slightly bisinuate, distally with cluster of light yellow hairs, tarsal segment 5 rounded ventrodistally, tarsi with light yellow hairs, tarsal claws arcuate and separated. Genitalia: sides of median lobe gradually rounded anteriorly to acute tip (similar fig. 2/7c), in lateral view similar fig. 2/7d; length of transfer apparatus little less than width of median lobe, basal portion curved, with cylindrical, arcuate appendage to endophallic tissue, flagellum short, robust, tubiform (similar fig. 2/7e).

**Plant association:** Not known.

**Specific epithet:** The name is a Latin adjective meaning "beautiful".

**Discussion:** I place in *A. speciosus* specimens of the *A. chaetopus* group with continuous dorsolateral vitta. The four specimens from the lowlands are smaller (7.4-9.7 mm) than those from Santa Fe and La Fortuna (12.4-12.7 mm). The same relationship between body size and elevation is apparent in *A. chaetopus*. Some of the variability in the type series of *A. speciosus*, such as in body size, color and elytral texture, may or may not be influenced by the local climatic conditions. *Ambates speciosus* is with great certainty the ancestral population of *A. chaetopus*. In the latter species, the phenotypic expression of one element of the dorsolateral vitta seems to be suppressed. The only Costa Rican specimen of *A. speciosus*, collected by the dipterologist Manuel Zumbado, agrees in all

details with *A. chaetopus* (*i.e.* rufous tarsi and antenna, golden yellow hairs of tibiae and tarsi) except the elytral vitta. It is possible, that the populations of *A. speciosus* and *A. chaetopus* are not as well separated as the material available suggests. However, I prefer to give this taxon specific rather than subspecific rank, because I wish to include two specimens from the Pacific coast of Colombia, an area with greater faunal similarity to Middle America than to South America. The entire series of specimens with continuous dorsolateral vitta would be rather variable for accommodation in a subspecies. This issue may need to be re-addressed, when more material is available for study.

### 7. *Ambates chaetopus* CHAMPION

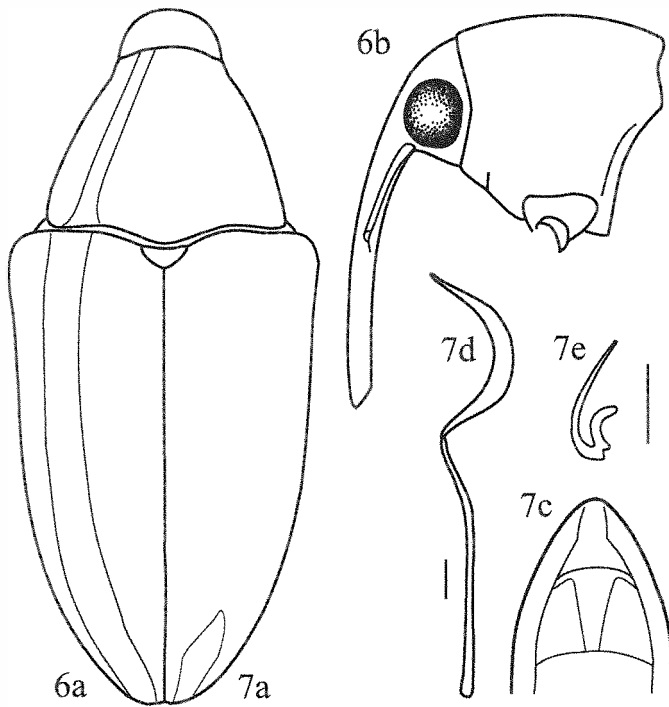
Figs. 2/7a, c-e; BCA IV.5 23/13, 13a

*Ambates chaetopus* CHAMPION, 1909: 483. Holotype female, COSTA RICA, labeled: "♀", "San Carlos/ Costa Rica", "Coll. Schild/ & Burgdorf", "Champion/ determined", "Type of/ Species.", "Type/ No. 12600/ U.S.N.M.", "Ambates/ chaetopus/ Type Ch." (USNM). HUSTACHE, 1938 (cat.); BLACKWELDER, 1948 (cat.); O'BRIEN & WIMMER, 1982 (cat.). MARQUIS, 1991 (plant association).

**Redescription:** Habitus: fig. 2/7a, total length 6.0-10.9 mm (mean=8.0, n=45). Color: integument piceous, antenna and tarsi rufous-castaneous; occasionally body completely rufous-castaneous; yellow scales condensed on flanks and venter, in short apical elytral streak, in numerous clusters along striae and in variously reduced dorsolateral pronotal vitta; intermixed with minute clear and obscure scales elsewhere. Head: frons minutely foveate medially, rostrum very slender and slightly arcuate (similar fig. 2/6b), ventral edge rounded, dorsomedian carina obsolete (males) or absent (most females), ante-antennal portion constricted laterally, length of rostrum males 1.28-1.66x (mean=1.44, n=12), females 1.39-1.66x (mean=1.53, n=13) pronotal length, ante-antennal portion males 0.56-0.62x (mean=0.59, n=12), females (0.50-) 0.60-0.63x (mean=0.61, n=13) total rostral length. Antenna: funicular segments 1 and 2 notably elongate, subequal in length, club oblong-ovate. Pronotum: length 0.75-0.84x (mean=0.80, n=25) maximum width, subconical, anterior portion tubulate, sides slightly rounded, dorsomedian line partially impunctate. Elytra: length 1.47-1.67x (mean=1.58, n=25) width at humeri, width 1.22-1.34x (mean=1.27, n=25) maximum pronotal width, sides gradually converging in apical half, subapical umbone moderately developed, intervals slightly convex and rugosely punctate in anterior half, smoother caudally, interval 9 costate, interval 3 near base and interval 2 near middle often slightly wider and raised, striae fine, punctures indistinct. Legs: femora moderately expanded dorsoventrally, femoral tooth acute, ventral margin of tibiae very slightly bisinuate, distally with cluster of golden yellow hairs, tarsal segment 5 rounded ventrodistally, tarsi with golden yellow hairs, tarsal claws arcuate and separated. Genitalia: sides of median lobe gradually rounded anteriorly to acute tip (fig. 2/7c), in lateral view as fig. 2/7d, length of transfer apparatus little less than width of median lobe, basal portion curved, with cylindrical, arcuate appendage to endophallic tissue, flagellum short, robust, tubiform (fig. 2/7e).

**Plant association:** Adult specimens were found primarily in association with *Piper arieianum* (MARQUIS 2, PRENA 9) and *P. urostachyum* (MARQUIS, PRENA 5). Other collections were made on *P. garagaranum* (MARQUIS, PRENA), *P. glabrescens* (MARQUIS, PRENA), *P. holdridgeianum*, *P. multiplinervum*, *P. pseudobumbratum* and *P. riparense* (all MARQUIS).

**Distribution:** A total of 74 specimens (21 males, 25 females, 28 not sexed) was examined from the following locations. COSTA RICA. Alajuela: San Carlos, 800 m (USNM); San Ramón, 700-900 m (CWOB, INBC 2). Heredia: Puerto Viejo, Est. La Selva (ALAS, CHAH, CMNC, CWOB, HAHC, JPPC, USNM, numerous specimens); P.N. Braulio Carrillo, Est. Magsasay, 200 m (INBC 5), Est. El Ceibo, 450 m (INBC), Transect, 600 m (ALAS, JPPC 4). Limón: Carrillo, 650 m (BMNH); 30 km N Cariari, Sector Cocorí, Fca. Rojas, 150 m (INBC 14, JPPC); P.N. Tortuguero, Cerro Tortuguero and Cuatro Esquinas, 0-120 m (INBC 4, JPPC). Cartago: Grano de Oro, Chirripo, Turrialba, 1120 m (INBC, JPPC); Río Segundo/Río Platano, 500 m (INBC 2); M.N. Guayabo, 7 km N Turrialba, 1100 m (JPPC); Tuis, 800 m (BMNH, MNHN). Guanacaste: Río San Lorenzo, 1050 m (INBC); P.N. Guanacaste, Est. Cacao, 1000-1400 m (INBC), Est. Pitilla, 700 m (INBC). Puntarenas: Volcan Arenal, 700-800 m (INBC); Monteverde, San Luis, 900 m (INBC 2). HONDURAS. Gracias A Dios: Río Platano nr. Río Cuyamel, 200 m (JPPC, RDCC). The species occurs probably throughout the Mosquitia, a lowland rainforest formerly stretching from north-east Honduras to Costa Rica. Specimens were collected throughout the year.



**Plate 2.** *Ambates chaetopus* group. 6 *A. speciosus*, 7 *A. chaetopus*; a dorsal habitus and color pattern, b head and prothorax, lateral view, c apex of median lobe of aedeagus, dorsal view, d median lobe, lateral view, e transfer apparatus. Scale bars 0.25 mm, refer to d (small bar), c and e (large bar).

**Discussion:** *Ambates chaetopus* is probably not as common as the numerous collecting data suggest. It is rather one of the few larger-sized showy species which occur on the well visited Atlantic slope of Costa Rica, and was collected frequently as by-catch. The species has been identified occasionally as *Cholus* sp. in the collections. *Ambates chaetopus* is related closely to *A. speciosus*, and both populations may not be separated perfectly from each other in the frontal zone between Costa Rica and Panama (see discussion of *A. speciosus*). Both species agree in all details except their vestiture. It is interesting to note, that *A. chaetopus* and *A. sinuatus* occur primarily on *Piper arieianum* on the Atlantic slope. *Embates sinuatus* and *A. immaculatus*, a close relative of *A. chaetopus*, occur on *P. phytolaccaefolium* on the Pacific slope. Both plants are considered to be closely related to each other (BURGER, 1971). It is possible, that *A. speciosus* is associated with this group of pipers as well.

### 8. *Ambates immaculatus* CHAMPION

Figs. BCA IV.5 10/11, 11a

*Ambates immaculatus* CHAMPION, 1907: 169. Lectotype female, PANAMA, designated here, labeled: printed circular syntype label with blue margin, red circular type label, "♀", "Sp. figured", "Bugaba/ 800-1500 ft./ Champion", "B.C.A. Col. iv.5./ *Ambates immaculatus*/ Champ.", handwritten black ink "A. immaculatus" (BMNH). Paralectotypes 2, designated here, labeled: "♂", "Bugaba/ 800-1500 ft./ Champion", "B.C.A. Col. iv.5./ *Ambates immaculatus*/ Champ.", handwritten black ink "A. immaculatus" (BMNH 2). Original generic combination resurrected here.

*Drepanambates immaculatus*. CHAMPION, 1907: 155 (footnote); HUSTACHE, 1938 (cat.); BLACKWELDER, 1948 (cat.); O'BRIEN & WIBMER, 1982 (cat.).

**Redescription:** Habitus: similar fig. 2/6a, total length 6.3-9.1 mm (mean=7.8, n=7). Color: integument piceous, antenna, tarsi and occasionally tibiae rufous-castaneous; white scales evenly distributed throughout, scales larger on flanks and venter; scales light yellow rather than white in one specimen from Cerro Chucuyo. Head: frons minutely foveate medially, rostrum very slender and slightly arcuate, ventral edge rounded, dorsomedian carina obsolete (males) or absent (females), ante-antennal portion constricted laterally, length of rostrum males 1.34-1.51x (n=2), females 1.34-1.41x (mean=1.31, n=5) pronotal length, ante-antennal portion males 0.58x (n=2), females 0.60-0.62x (mean=0.61, n=5) total rostral length. Antenna: funicular segments 1 and 2 notably elongate, subequal in length, club oblong-ovate. Pronotum: length 0.79-0.81x (mean=0.81, n=7) maximum width, subconical, anterior portion tubulate, sides slightly rounded, disk densely granulate, granula rarely confluent to very short, impunctate scar. Elytra: length 1.54-1.59x (mean=1.57, n=7) width at humeri, width 1.23-1.31x (mean=1.27, n=7) maximum pronotal width, sides gradually converging in apical half, subapical umbone moderately developed, intervals flat, punctuation dense, somewhat rugose in anterior half, interval 9 subcostate or not, striae fine, punctures indistinct. Legs: femora moderately expanded dorsoventrally, femoral tooth acute, ventral margin of tibiae very slightly bisinuate, distally with cluster of golden yellow hairs, tarsal segment 5 rounded ventrodistally, tarsi with golden yellow hairs, tarsal claws arcuate and separated. Genitalia: sides of median lobe gradually rounded to acute tip (similar fig. 2/7c), in lateral view similar fig. 2/7d, length of transfer apparatus little less than width of median lobe, basal portion curved, with cylindrical, arcuate appendage to endophallic tissue, flagellum short, robust, tubiform (similar fig. 2/7e).

**Plant associations:** Adult specimens were collected from *Piper phytolaccaefolium* (P.N. Corcovado, PRENA 3) and *P. glabrescens* (Cerro Chucuyo, PRENA).

**Distribution:** A total of 8 specimens (2 males, 6 females) was examined from the following locations. COSTA RICA. Puntarenas: Osa Peninsula, P.N. Corcovado, 50-300 m, VII/1977, II/1995, III/2000 (INBC 2, JPPC 3); P.N. La Amistad, Las Mellizas, Fca. Cafrosa, 1300 m, XI/1989 (JPPC). San José: 12 km NE San Isidro, Cerro Chucuyo, 1350 m, III/2000 (JPPC). PANAMA. Chiriquí: Bugaba, 300-500 m (BMNH).

**Discussion:** The type series of *A. immaculatus* includes two species. The female specimen illustrated in the BCA is designated here as the lectotype of *A. immaculatus*, the two male specimens belong to *A. neglectus*. CHAMPION noticed the different antennal insertion in his specimens, but attributed it to sexual dimorphism. Both species occur in the same general area, and were found on the same plant species in the vicinity of the field station Agujas, in Corcovado National Park. However, they can be distinguished unequivocally by means of meristic and genital character states. A hypothesis about the co-occurrence of several species with similar color pattern is proposed in the general discussion of the *A. chaetopus* group further above. Genital differences were not observed between *A. immaculatus*, *A. chaetopus* and *A. speciosus*. Apart from the vestiture, *A. immaculatus* can be distinguished from the other two species by means of the non-costate elytral interval 9.

### The *Ambates scutiger* group

The Middle American species of the *Ambates scutiger* group are quite distinctive and can be recognized by the ventrodistally pointed tarsal segment 5 (fig. 4/12f), the relatively long, arcuate rostrum and abruptly clavate femora (fig. 4/12d). An undescribed species from Venezuela and Trinidad (BMNH, CWOB) is intermediate to the *A. modestus* group, which includes oblong-ovate species with less elongate rostrum. The peculiar modification of the fifth tarsal segment occurs in one undescribed species of *Embates*, but seems to have evolved independently in that species.

### 9. *Ambates angustatus* CHAMPION

Figs. 3/9b, d, f; BCA IV.5 10/7

*Ambates angustatus* CHAMPION, 1907: 169. Holotype female, Panama, labeled: printed circular type label with red margin, “♀”, “Sp. figured”, “V. de Chiriquí/ below 4000 ft/ Champion”, “B.C.A. Col. iv.5/ Ambates/ angustatus/ Champ.”, handwritten black ink “A. angustatus Ch.” (BMNH). Original generic combination resurrected here.

*Drepanambates angustatus*. CHAMPION, 1907: 155 (footnote); HUSTACHE, 1938 (cat.); BLACKWELDER, 1948 (cat.); O'BRIEN & WIBMER, 1982 (cat.).

**Redescription:** Habitus: fig. 3/9b, full illustration in BCA IV.5 10/7; total length 4.5-6.2 mm (mean=5.4, n=6). Color: integument castaneous to piceous, antenna and legs partially rufous; scales light yellow in basic vestiture, cupreous to velvety black in elytral macula; basic vestiture little to moderately dense, pronotum with narrow dorsolateral

and dorsomedian vittae of light yellow scales, elytral macula transverse, ante- and post-macular fasciae obsolete, separated from basal vestiture by narrow light-colored line. Head: frons normally not foveate medially, rostrum moderately arcuate in both sexes, ventral edge slightly produced, dorsomedian carina distinct, ante-antennal portion constricted laterally, length of rostrum males 1.08-1.15x (mean=1.13, n=3), females 1.22-1.31x (mean=1.25, n=3) pronotal length, ante-antennal portion males 0.40-0.51x (mean=0.45, n=3), females 0.48-0.55x (mean=0.52, n=3) total rostral length. Antenna: funicular segment 2 usually longer than segment 1, club oblong-ovate. Pronotum: length 0.93-1.00x (mean=0.98, n=6) maximum width, basal half parallel-sided, then gradually or roundly narrowed to front, basolateral angle approximately rectangular (fig. 3/9b). Elytra: length 1.59-1.78x (mean=1.70, n=6) width at humeri, width 1.23-1.34x (mean=1.29, n=6) maximum pronotal width, sides subparallel or slightly converging in basal half, subapical umbone moderately developed, intervals not costate, striae fine, punctures indistinct. Legs: femora slender in basal half, then more or less abruptly expanded dorsoventrally, femoral tooth well developed (similar fig. 4/12d), ventral margin of tibiae bisinuate, distally with indistinct fringe of yellow hairs, tarsal segment 5 ventrodistally produced at each side (similar fig. 4/12f), tarsal claws arcuate and separated. Genitalia: sides of median lobe roundly narrowed anteriorly to broad, blunt or slightly emarginated tip (fig. 3/9d), lateral view similar fig. 3/11e; length of transfer apparatus subequal to width of median lobe, flagellum short and tubiform, partially accommodated in elongate sclerotized shell, base with elongate, apically curved appendage to endophallic tissue (fig. 3/9f).

**Plant association:** Not known.

**Distribution:** A total of 6 specimens (3 males, 3 females) was examined from the following locations. COSTA RICA. Puntarenas: Quepos, P.N. Manuel Antonio, 80 m, IX-X/1991 (INBC, JPPC); P.N. Corcovado, VIII/1980 (USNM); Res. For. Golfo Dulce, 5 km W Piedras Blancas, 100-200 m, VI/1991, III/1993 (CWOB 2). PANAMA. Chiriquí: Volcan de Chiriquí, below 4000 ft. (BMNH).

**Discussion:** *Ambates angustatus* is related very closely to *A. talamancae* and *A. scutiger*, and has been found only in a small area on the Pacific side of the Cordillera Central. These three species can be distinguished from each other by means of the color pattern and their geographic distribution. The elytral macula of *A. angustatus* and *A. talamancae* is relatively small and transverse, while it is usually larger and subcordate in *A. scutiger*. Ante- and post-macular fasciae are similarly vestigial in *A. scutiger* and *A. talamancae*, but are separated from the basic vestiture by a narrow line of light colored scales in *A. angustatus*. *Ambates talamancae* can be distinguished from *A. angustatus* and *A. scutiger* by the more prominent humeri and denser prosternal vestiture.

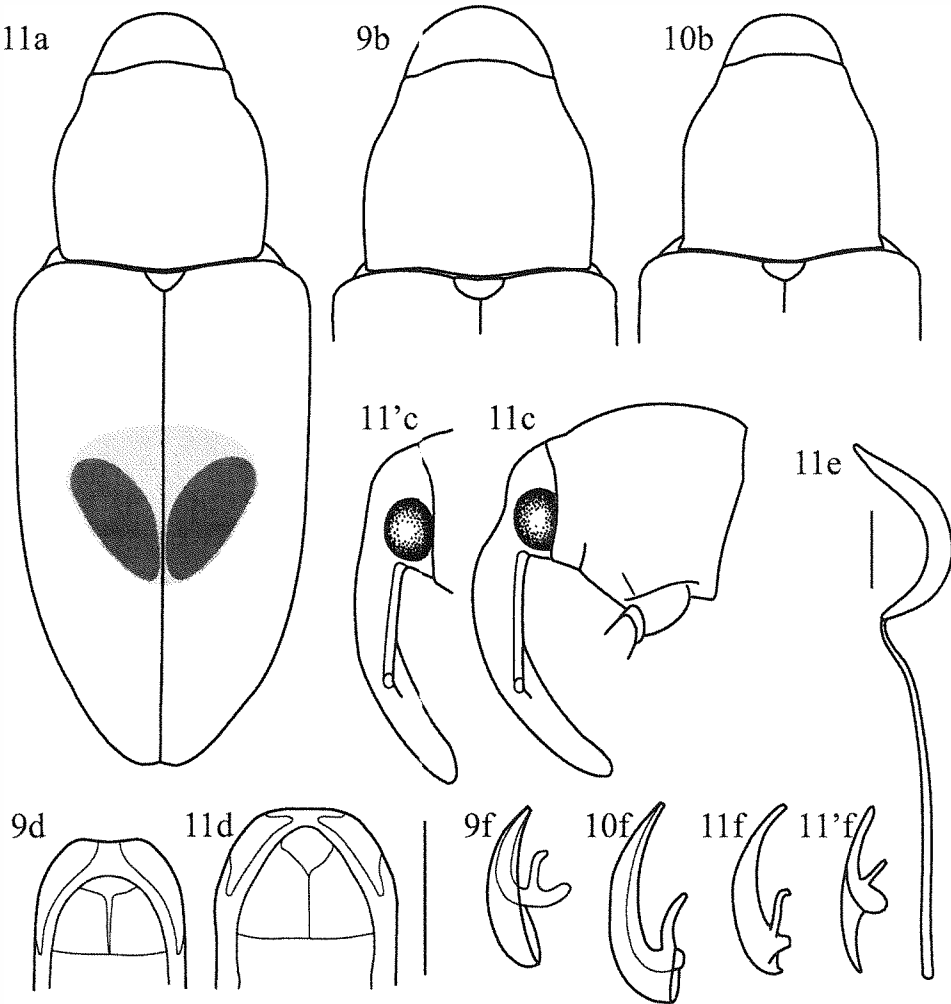
## 10. *Ambates talamancae* sp. n.

Figs. 3/10b, f

Holotype male, Panama, labeled: "PANAMA; Chiriquí/ Prov. Santa Clara/ May 23-25, 1980/ E. Riley & LeDoux", my red label "HOLOTYPE/ *Ambates/ talamancae* Prena/ Prena det. 2001" (CASC, currently as a long-term loan in CWOB). Paratypes (4 females, 1 not sexed), labeled: "Est. Biol. Las Alturas,/ 1500 m, Coto Brus, Prov./ Puntarenas,



Costa Rica, / May 1992, M. Ramirez / L-S 322500, 591300", CRI000 683874 (INBC); "COSTA RICA, Prov. Puntarenas, Fil./ Cruces, Laguna Gamboa. 1400 m. 20/ MAY 1996. I.A. Chacón. / L\_S\_304200\_574350 #8241", CRI002 448221 (CMNC); "COSTA RICA. Puntarenas. Est./ Pittier. Send. La Escuadra. 1.1 km/ E. de la Est. 1600-1700 m. 8-20 JUL/ 1997. M. Moraga. Red de Golpe. / L\_S\_330400\_578500 #47393", CRI002 542698" (INBC); "PANAMA: Chiriqui, / Hartmann's finca. / St. Clara, VI-15- / 18-85 Riley & Rider" (JPPC); "PANAMA: Chiriqui / N. Sta. Clara / 8° 51' N; 82° 46' W. / 4 Jul. '76 Stockwell" (HPSC).



**Plate 3.** *Ambates scutiger* group. **9** *A. angustatus*, **10** *A. talamancae*, **11** *A. scutiger* (locus typicus), **11'** *A. scutiger* (Cerro Campana, Panama); **a** dorsal habitus, **b** head and pronotum, dorsal view, **c** head and prothorax, male, lateral view, **d** apex of median lobe of aedeagus, dorsal view, **e** median lobe, lateral view, **f** transfer apparatus. Scale bars 0.25 mm, refer to **e** (small bar), **d** and **f** (large bar).

**Description:** Habitus: fig. 3/10b, elytra slightly more parallel-sided and elongate than in *A. scutigera* (fig. 3/11a); total length 5.3-7.1 mm (mean=6.1, n=5). Color: integument castaneous to piceous, antenna and legs partially rufous; scales light yellow in basic vestiture, cupreous to velvety black in elytral macula; basic vestiture little to moderately dense, slightly mottled along striae, imbricate at prosternum, pronotum with narrow dorsolateral and dorsomedian vittae of light yellow scales, elytral macula subcordate to round, periphery and anterior portion cupreous, ante- and post-macular fasciae obsolete. Head: frons not or indistinctly foveate medially, rostrum moderately and evenly arcuate in both sexes, ventral edge slightly produced, dorsomedian carina distinct, ante-antennal portion constricted laterally, length of rostrum male 1.22x, females 1.43-1.51x (mean=1.48, n=4) pronotal length, ante-antennal portion male 0.41x, females 0.47-0.51x (mean=0.49, n=4) total rostral length. Antenna: funicular segment 2 usually longer than segment 1, club oblong-ovate. Pronotum: length 0.97-1.03x (mean=0.99, n=5) maximum width, basal half parallel-sided, then roundly narrowed and tubulate in front, basolateral angle sharply produced (fig. 3/10b). Elytra: length 1.72-1.85x (mean=1.78, n=5) width at humeri, width 1.45-1.49x (mean=1.47, n=5) maximum pronotal width, sides subparallel in basal half, subapical umbone well developed, intervals not costate, striae fine, punctures indistinct. Legs: femora slender in basal half, then more or less abruptly expanded dorsoventrally, femoral tooth well developed (similar fig. 4/12d), ventral margin of tibiae weakly bisinuate, distally with indistinct fringe of yellow hairs, tarsal segment 5 ventrodistally produced at each side (similar fig. 4/12f), tarsal claws arcuate and separated. Genitalia: sides of median lobe roundly narrowed anteriorly to broad, blunt tip (similar fig. 3/11d, more slender), in lateral view as fig. 3/11e, length of transfer apparatus subequal to width of median lobe, flagellum short and tubiform, nearly completely accommodated in elongate sclerotized shell, base with elongate, slightly curved appendage to endophallic tissue (fig. 3/10f).

**Plant association:** Not known.

**Specific epithet:** The name is the genitive case of the female noun "Talamanca", the name of the mountain chain where the specimens were collected.

**Discussion:** *Ambates talamancae* is very similar to *A. scutigera* and *A. angustatus*. The species has been found only on the Pacific slope of the Cordillera de Talamanca between 1400-1700 m, and seems to occur at higher elevations than *A. angustatus*. *Ambates talamancae* can be recognized by the dense prosternal vestiture, sharply produced basolateral angles of the pronotum and more exposed humeri. It is on average more slender than all other species of the *A. scutigera* group, and has more elongate appendages. The male transfer apparatus is accommodated in a shell-like structure, a synapomorphy shared with *A. angustatus*.

## 11. *Ambates scutigera* CHAMPION

Figs. 3/11a, c-f; 3/11'c, f; BCA IV.5 10/6, 6a

*Ambates scutigera* CHAMPION, 1907: 167. Holotype female, Guatemala, labeled: printed circular type label with red margin, "♀", "Sp. figured", "Sinanja/ Vera Paz/ Champion", "B.C.A. Col. iv.5./ Ambates/ scutigera/ Champ.", handwritten black ink "A. scutigera Ch." (BMNH). HUSTACHE, 1938 (cat.); BLACKWELDER, 1948 (cat.); O'BRIEN & WIBMER, 1982 (cat.).

**Redescription:** Habitus: figs. 3/11a and BCA IV.5 10/6, total length 4.7-7.8 mm (mean=5.6, n=30). Color: integument castaneous to piceous, antenna and legs partially rufous; scales light yellow in basic vestiture, cupreous to velvety black in elytral macula; basic vestiture little to moderately dense, variously condensed on prosternum, pronotum with narrow dorsolateral and dorsomedian vittae of light yellow scales, elytral macula subcordate, anterior portion cupreous, ante-macular fascia completely reduced, post-macular fascia broad and vestigial. Head: frons normally not foveate medially, base of rostrum notably arcuate in (particularly male) specimens from Guatemala and Mexico (fig. 3/11c), less so in Costa Rica and least in Panama (fig. 3/11'c), ventral edge slightly produced, dorsomedian carina distinct, ante-antennal portion constricted laterally, length of rostrum males 0.96-1.23x (mean=1.08, n=14), females 1.16-1.36x (mean=1.24, n=16) pronotal length, ante-antennal portion males 0.39-0.43x (mean=0.41, n=14), females 0.40-0.50x (mean=0.47, n=15) total rostral length. Antenna: funicular segment 2 usually longer than segment 1, club oblong-ovate. Pronotum: length 0.93-1.04x (mean=0.98, n=30) maximum width, basal half parallel-sided, occasionally slightly gibbous, gradually or roundly narrowed to front, basolateral angle subrectangular (fig. 3/11a). Elytra: length 1.61-1.75x (mean=1.70, n=30) width at humeri, width 1.22-1.37x (mean=1.28, n=30) maximum pronotal width, sides usually slightly converging in basal half (fig. 3/11a), subapical umbone moderately developed, intervals not costate, striae fine, punctures indistinct. Legs: femora slender in basal half, then more or less abruptly expanded dorsoventrally, femoral tooth well developed (similar fig. 4/12d), ventral margin of tibiae weakly bisinuate or straight, distally with indistinct fringe of yellow hairs, tarsal segment 5 ventrodistally produced at each side (similar fig. 4/12f), tarsal claws arcuate and separated. Genitalia: sides of median lobe gradually narrowed anteriorly to broad, blunt tip (fig. 3/11d), in lateral view as fig. 3/11e, length of transfer apparatus subequal to width of median lobe, basal portion produced to blade-like appendage of variable shapes: apex arcuately produced in Guatemala (fig. 3/11f), apex less pointed in Costa Rica (not illustrated), apex very elongate in Cerro Campana, Panama (fig. 3/11'f), base with elongate, apically usually curved appendage to endophallic tissue, flagellum short and tubiform.

**Plant association:** I collected three adult specimens from *Piper hispidum*, one in Guanacaste N.P., two in La Selva.

**Distribution:** A total of 40 specimens (15 males, 17 females, 8 not sexed) was examined from the following locations. COSTA RICA. Alajuela: Sector San Ramón, 620 m, IV/1994, III/1995 (INBC 3, JPPC). Guanacaste: Est. Pitilla, 9 km S Sta Cecilia, 700 m, III-VIII, XII/1989-96 (AMNH, INBC 12, JPPC); Tierras Morenas, Rio San Lorenzo, 1050 m, III-IV/1992 (INBC 5). Heredia: Puerto Viejo, La Selva, IV/1983, VI/1991, III/2001 (ALAS, CHAH 2, JPPC); Est. Magsasay, VII/1991 (INBC). Limón: 30 km N Cariari, Sector Cerro Cocorí, Fca. Rojas, 150 m, III/1992 (JPPC). GUATEMALA. Vera Paz: Sinanja (BMNH); Trece Aguas, IV/1906 (USNM). Izabal: Montañas del Mico, Cerro San Gil, VI/1993 (CWOB). MEXICO. Oaxaca: Hwy 131, 115 mi S Oaxaca, 6000', V/1971 (CNCI). PANAMA. Panamá: Cerro Campana, V/1970, IV-V/1973, V/1974, V/1975, VII/1976, VIII/1978 (HPSC 3, TAMU, CHAH 2, CMNC).

**Discussion:** *Ambates scutigera* is dispersed widely between Mexico and Panama, and the population is not perfectly homogeneous. Specimens from Mexico and Guatemala have the rostral base curved abruptly, and the prosternum is clothed moderately densely

with light yellow scales. These character states are less developed in specimens from Costa Rica and least in specimens from Panama. Also, the shape of the basal portion of the male transfer apparatus is variable between locations. On the Pacific side of the Cordillera Central, *A. scutigera* is replaced by *A. angustatus* and *A. talamancae*, both with rather transverse elytral maculae and (obsolete) post-macular fasciae. The post-macular fascia is transverse also in *A. signifer*, one of the relatively large species of the group.

## 12. *Ambates fasciger* sp. n.

Figs. 4/12a, d-g, i

Holotype male, Costa Rica, labeled "COSTA RICA, Heredia:/ Est. Biol. La Selva, 50- / 150m, 10° 26' N, 84° 01' W/ Apr 1996, INBio-OET", "Locality: L[inderero] OC[cidental]/ Date: 1-4-96/ Host: /Coll: Nelci Oconitrillo M.", my red label "HOLOTYPE/ *Ambates/ fasciger* Prena/ Prena det. 2001" (ALAS, deposited in INBC). Paratypes (4 males, 4 females), labeled: "COSTA RICA. Prov./ Heredia, F. La Selva/ 3 km S Pto. Viejo/ 10° 26' N 84° 01' W", "29.iii.1987/ H.A. Hesperheide", "101" (CHAH); "Costa Rica, GUANA/ Est. Pitilla, 9 km S/ Sta Cecilia, 700 m/ 6-12.3.96 lg. Prena" (JPPC); "Est. Cuatro Esquinas, P.N. Tortuguero,/ Prov. Limón. COSTA RICA. 0 m. Feb 1993./ R. Delgado, L N 280000\_590500 #/ 1804" (CMNC); "Quebrada Segunda Ref./ Nac. Fauna Silv. Tapanti./ 1250 m, Prov. Cartago, Costa Rica, R. Vargas, abr/ 1992, L-N 194000, 560000" (INBC); "PANAMA, Chiriqui,/ Reserva La Fortuna, Divide Trail, V-26-/ 1993, E.G. Riley" (CWOB); "PANAMA: Chiriqui/ Continental Divide Trail/ 3 July 1997/ R. Turnbow" (JPPC); "PANAMA Chiriqui/ Cont'l Divide Trail/ 12-14 May 1999/ Wappes & Morris" (CWOB).

**Description:** Habitus: fig. 4/12a, total length 7.3-10.6 mm (mean=8.7, n=9). Color: integument castaneous to piceous; scales light yellow and dense at pronotum (except dorsomedially) and in broad V-shaped elytral fascia reaching down to metasternum, scales cupreous adjacent to elytral fascia. Head: frons foveate medially, rostrum evenly arcuate, ventral edge slightly produced, dorsomedian carina present, ante-antennal portion constricted laterally, length of rostrum males 1.31-1.43x (mean=1.34, n=5), females 1.41-1.45x (mean=1.43, n=4) pronotal length, ante-antennal portion males 0.45-0.47x (mean=0.46, n=5), females 0.49-1.51x (mean=1.50, n=4) total rostral length. Antenna: funicular segment 2 longer than segment 1, club oblong-ovate. Pronotum: length 0.86-0.96x (mean=0.93, n=9) maximum width, conical, anterior portion not tubulate, sides slightly rounded. Elytra: length 1.54-1.79x (mean=1.67, n=6) width at humeri, width 1.28-1.49x (mean=1.38, n=9) maximum pronotal width, sides slightly converging or subparallel in basal half, subapical umbone moderately developed, intervals not costate, striae fine, punctures indistinct. Legs: femora slender in basal half, then more or less abruptly expanded dorsoventrally, femoral tooth well developed (fig. 4/12d), ventral margin of tibiae moderately (fig. 4/12e) to strongly (similar fig. 4/13e) sinuate, distally with cluster of cupreous hairs, tarsal segment 5 ventrodistally produced at each side (fig. 4/12f), tarsal claws arcuate and separated. Genitalia: Apex of median lobe broadly rounded (fig. 4/12g), lateral view similar fig. 4/13h, transfer apparatus minute, length <0.5x width of median lobe, with blade-like crest and short appendage to endophallic tissue, flagellum vestigial (fig. 4/12i).

**Plant association:** One adult weevil was collected from an unidentified species of *Piper*.

**Specific epithet:** The name is a Latin compound noun derived from *fascia* and *gero*.

**Discussion:** The three specimens from La Fortuna, Chiriquí, differ slightly from the Costa Rican specimens collected at four different sites between sea level and 1250 m. They are on average larger, have a darker integument (particularly the antenna and tarsi) and, because of the microscopic size of the cupreous scales, have more contrast in the color pattern. A similar change in size and color with elevation is apparent in several other species of *Ambates*, e.g. *A. albiventris* and *A. speciosus*. Specimens from the Atlantic slope of Bocas del Toro would be helpful to explore the relationship between these subpopulations.

### 13. *Ambates signifer* sp. n.

Figs. 4/13a-c, e, g-i

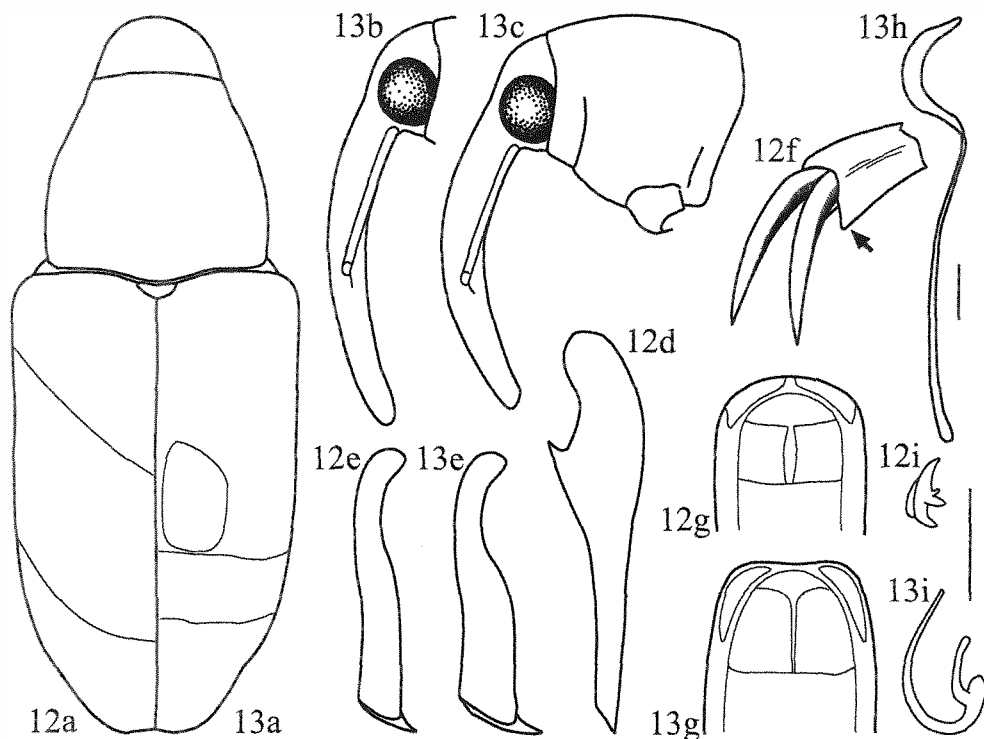
Holotype male, PANAMA, labeled "Panamá Pr./ Cerro Campana, 850 m/ 8° 40' N, 79° 56' W/ 12 Mar. '72 Stockwell", my red label "HOLOTYPE/ *Ambates/ signifer* Prena/ Prena det. 2001" (CMNC). Paratypes (3 females), labeled "Cerro Campana, 800m/ Panamá Prov., R. P./ 29 Apr. '70/ H. P. Stockwell", "Ambates sp. #3", "Henry P. Stockwell/ Collection, Panama" (HPSC); "Panamá Pr./ Cerro Campana, 850 m/ 8° 40' N, 79° 56' W/ 12 Mar. '72 Stockwell" (JPPC); "Panama, Pan. Prv./ Cerro Campana 2600'/ V-10, 20-1981/ J.E. Wappes" (CWOB).

**Description:** Habitus: fig. 4/13a, total length 8.7-10.1 mm (mean=9.2, n=4). Color: integument piceous; scales light yellow and dense at sides of pronotum, metasternum and in subapical fascia, scales velvety black in ill-defined oval elytral macula, scales clear, yellow or cupreous elsewhere. Head: frons foveate medially, rostrum evenly arcuate, ventral edge slightly produced, dorsomedian carina present, ante-antennal portion constricted laterally, length of rostrum male 1.39x (n=1), females 1.52-1.56x (mean=1.54, n=3) pronotal length, ante-antennal portion male 0.45x (n=1), females 0.49-0.50x (mean=0.50, n=3) total rostral length. Antenna: funicular segment 2 longer than segment 1, club oblong-ovate. Pronotum: length 0.91-0.96x (mean=0.94, n=4) maximum width, conical, anterior portion not tubulate, sides slightly rounded. Elytra: length 1.67-1.72x (mean=1.69, n=4) width at humeri, width 1.43-1.49x (mean=1.47, n=4) maximum pronotal width, sides slightly converging or subparallel in basal half, subapical umbone well developed, intervals not costate, striae fine, punctures indistinct. Legs: femora slender in basal half, then more or less abruptly expanded dorsoventrally, femoral tooth well developed (similar fig. 4/12d), ventral margin of tibiae strongly sinuate (fig. 4/13e), distally with cluster of cupreous hairs, tarsal segment 5 ventrodistally produced at each side (similar fig. 4/12f), tarsal claws arcuate and separated. Genitalia: Apex of median lobe broadly rounded and emarginated (fig. 4/13g), lateral view as fig. 4/13h, length of transfer apparatus little less than width of median lobe, arcuate, base with cylindrical, elongate appendage to endophallic tissue, flagellum robust and tubiform (fig. 4/13i).

**Plant association:** Not known.

**Specific epithet:** The name is a Latin compound noun derived from *signum* and *fero*.

**Discussion:** *Ambates signifer* and *A. fasciger* represent the large-sized members of the *A. scutigera* group. They can be distinguished by means of the color pattern, structural details of the genitalia and the development of the subapical umbone. The male transfer apparatus of *A. signifer* bears greater similarity to those of *A. angustatus* and *A. talamancae* rather than to that of *A. fasciger*, except that it is not accommodated in a shell-like structure. They agree also in the more or less transverse elytral ornamentation. On the other hand, the transfer apparatus of *A. fasciger* is rather similar to that of *A. scutigera*, and both species share a V-shaped elytral ornamentation. These observations could indicate, that *A. fasciger* is related more closely to *A. scutigera*, whereas *A. signifer* is related to *A. angustatus* and *A. talamancae*, from the Pacific slope.



**Plate 4.** *Ambates scutigera* group. 12 *A. fasciger*, 13 *A. signifer*; a dorsal habitus and color pattern, b lateral aspect of head, female, c lateral aspects of head and prothorax, male, d profemur, e metatibia, f apex of tarsal segment 5, g apex of median lobe of aedeagus, dorsal view, h median lobe, lateral view, i transfer apparatus. Scale bars 0.25 mm, refer to g (small bar), h and i (large bar).

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