



CLASSIFICATION, NATURAL HISTORY, AND EVOLUTION OF THE GENUS APHELOCERUS KIRSCH (COLEOPTERA: CLERIDAE: CLERINAE)

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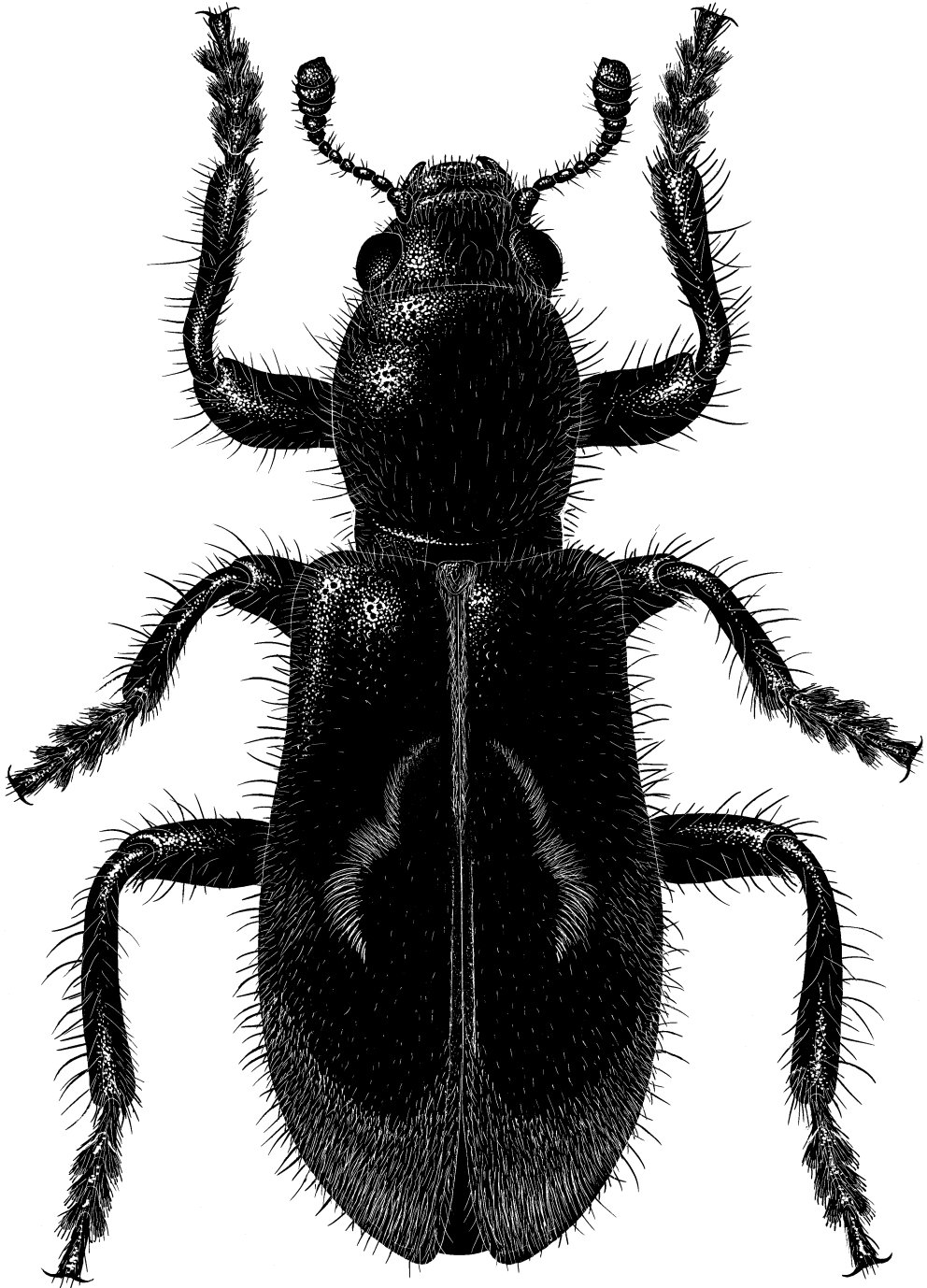
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Habitus of *Aphelocerus coactus*, new species.

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ABSTRACT

The genus *Aphelocerus* is redefined to include 66 species as follows: *A. leucomelas* (Chevrolat); *A. coalitus*, n.sp.; *A. echinatus*, n.sp.; *A. affaniatis*, n.sp.; *A. delicatulus* (Barr); *A. aeneus*, n.sp.; *A. bispineus*, n.sp.; *A. extensivus*, n.sp.; *A. primigenious*, n.sp.; *A. ciliaris*, n.sp.; *A. acuticolis*, n.sp.; *A. citimus*, n.sp.; *A. sturnus* Kirsh; *A. acanthus*, n.sp.; *A. inconstans* (Gorham); *A. cirritus*, n.sp.; *A. patulus*, n.sp.; *A. chiriqui*, n.sp.; *A. sculptilus*, n.sp.; *A. sabulosus*, n.sp.; *A. chondrus*, n.sp.; *A. cohibilis*, n.sp.; *A. irroratus*, n.sp.; *A. immarginatus* (Chevrolat); *A. acutus*, n.sp.; *A. torosus*, n.sp.; *A. olanchoensis*, n.sp.; *A. vietus*, n.sp.; *A. turnbowi*, n.sp.; *A. cornuatus*, n.sp.; *A. humerus*, n.sp.; *A. domus*, n.sp.; *A. capillus*, n.sp.; *A. coactus*, n.sp.; *A. scalenus*, n.sp.; *A. yungas*, n.sp.; *A. extensivus*, n.sp.; *A. lividus*, n.sp.; *A. nitidus*, n.sp.; *A. sagittarius*, n.sp.; *A. triangulus*, n.sp.; *A. batesi*, n.sp.; *A. ebenus*, n.sp.; *A. catie*, n.sp.; *A. monteverde*, n.sp.; *A. arenatus*, n.sp.; *A. bufustis*, n.sp.; *A. anticus*, n.sp.; *A. naevius*, n.sp.; *A. protenus*, n.sp.; *A. argus*, n.sp.; *A. panus*, n.sp.; *A. hespenheidei*, n.sp.; *A. collaris*, n.sp.; *A. dispilis*, n.sp.; *A. formicoides*, n.sp.; *A. akis*, n.sp.; *A. chelonus*, n.sp.; *A. cheliferosus*, n.sp.; *A. scutellaris* (Chevrolat); *A. improcerus*, n.sp.; *A. propinquus*, n.sp.; *A. calvus*, n.sp.; *A. myrmecoides*, n.sp.; *A. inbatus*, n.sp.; *A. eriodes*, new species, and *A. discapillus*, new species. Lectotypes have been designated for *A. inconstans*, *A. leucomelas*, *A. nitidus*, and *A. immarginatus*, and for the junior synonyms *Clerus laevigatus* Spinola, *C. mollifascia* Chevrolat (*new synonymy*), *C. subfasciatus* (Chevrolat), and *C. cyaneus* (Chevrolat) (*new synonymy, new combination*; transferred from *Enoclerus* Gahan).

Aside from the conventional subject categories of generic revisions, this work also includes a translation of the abstract into Spanish, a treatise about natural history, discussions of species groups and troublesome key couplets, and evolutionary considerations involving phylogeny and zoogeography. There are 28 habitus illustrations, 239 line drawings, 29 distribution maps, 9 maps depicting the distribution of the major New World clerofauna, 13 electron micrographs, 5 photographs, 1 phylogenetic tree generated by the Hennig 86 computer program, a table involving character analysis, and a table depicting the geographical distribution of the apheloceran species groups.

Members of the genus *Aphelocerus* are thought to be involved in a mimetic complex that also includes species of ants, buprestids, and chrysomelid beetles, weevils, and spiders. These checkered beetles have been observed to scurry on broad-leafed herbaceous plants, and particularly along leaf stems, often in the company of black ants of approximately the same size. A few have been observed foraging on a variety of tree canopy blossoms, although it is not known whether the clerids were consuming anthophilic insects or taking nourishment from flower products such as nectar or pollen.

Specimens have been collected throughout the year; however, most were captured from May to July, at elevations ranging from 97 to 3000 m. The "beating sheet" method of collecting seems to be the most productive manner of gathering these beetles, although specimens have been collected with an aspirator while the insect was scurrying on foliage or bark (fig. 1b). Other collecting techniques that yielded specimens include the use of sweep nets, light traps, and Malaise traps. A few specimens were aspirated from flowers of forest trees.

It is postulated that the initial division of ancestral *Aphelocerus* occurred on the current land mass geologically formed by the union of the Mexican/Mayan blocks. The evolution of the group probably began some time after the major Caribbean tectonic events had taken place. The relative paucity of structural diversity among the extant members of the genus suggests a recent evolution for the group or strong selection to resemble a common model for mimicry.

The available evidence indicates that there have been three major evolutionary trends among the extant species of *Aphelocerus*. The first involves the progressive increase of elytral convexity among the mimetic species of the genus, i.e., mimicry of ants, spiders, and *Myrmex* weevils. The second trend involves the development of white secondary (2°) setae on the elytra, and third, the consolidation of these setae into white setal patches on various organs of the integument.

The prominent association of checkered beetles with temperate and tropical montane regions suggests that checkered beetles, in general, occur in seven New World geographical areas, each of which is illustrated: North America, Middle America, South America, Mexico, Central America, Nuclear Central America, and Insular Central America.

RESUMEN

Se redefine el género *Aphelocerus* que incluye las 66 especies siguientes: *A. leucomelas* (Chevrolat); *A. coalitus*, especie nueva; *A. echinatus*, especie nueva; *A. affaniatis*, especie nueva; *A. delicatulus* (Barr); *A. aeneus*, especie nueva; *A. bispineus*, especie nueva; *A. extensivus*, especie nueva; *A. primigenious*, especie nueva; *A. ciliaris*, especie nueva; *A. acuticolis*, especie nueva; *A. citimus*, especie nueva; *A. sturnus* Kirsh; *A. acanthus*, especie nueva; *A. inconstans* (Gorham); *A. cirritus*, especie nueva; *A. patulus*, especie nueva; *A. chiriqui*, especie nueva; *A. sculptilus*, especie nueva; *A. sabulosus*, especie nueva; *A. chondrus*, especie nueva; *A. cohibilis*, especie nueva; *A. irroratus*, especie nueva; *A. immarginatus* (Chevrolat); *A. acutus*, especie nueva; *A. torosus*, especie nueva; *A. olanchoensis*, especie nueva; *A. vietus*, especie nueva; *A. turnbowi*, especie nueva; *A. cornuatus*, especie nueva; *A. humerus*, especie nueva; *A. domus*, especie nueva; *A. capillus*, especie nueva; *A. coactus*, especie nueva; *A. scalenus*, especie nueva; *A. yungas*, especie nueva; *A. extensivus*, especie nueva; *A. lividus*, especie nueva; *A. nitidus*, especie nueva; *A. sagittarius*, especie nueva; *A. triangulus*, especie nueva; *A. batesi*, especie nueva; *A. ebenus*, especie nueva; *A. catie*, especie nueva; *A. monteverde*, especie nueva; *A. arenatus*, especie nueva; *A. bufustis*, especie nueva; *A. anticus*, especie nueva; *A. naevius*, especie nueva; *A. protenus*, especie nueva; *A. argus*, especie nueva; *A. panus*, especie nueva; *A. hespenheidei*, especie nueva; *A. collaris*, especie nueva; *A. dispilis*, especie nueva; *A. formicoides*, especie nueva; *A. akis*, especie nueva; *A. chelonus*, especie nueva; *A. cheliferosus*, especie nueva; *A. scutellaris* (Chevrolat); *A. improcerus*, especie nueva; *A. propinquus*, especie nueva; *A. calvus*, especie nueva; *A. myrmecoides*, especie nueva; *A. inbatus*, especie nueva; *A. eriodes*, especie nueva, y *A. discapillus*, especie nueva. Se designaron lectotipos para *A. inconstans*, *A. leucomelas*, *A. nitidus*, y *A. immarginatus*, y para el sinónimo junior *Clerus laevigatus* Spinola, *C. mollifascia* Chevrolat (nueva sinonimia), *C. subfasciatus* (Chevrolat), y *C. cyaneus* (Chevrolat) (nueva sinonimia, nueva combinación; transferido de *Enoclerus* Gahan).

Además de las categorías de asuntos convencionales de revisiones genéricas, esta obra también incluye una traducción sobre el resumen en Español, tratado de historia natural, una discusión sobre los grupos de especies, de dificultades en los pasos de clave sobre especies, y consideraciones sobre la evolución incluyendo aspectos de filogénicos y zoográficos. Esta obra incluye 28 ilustraciones de habitus, 239 ilustraciones de lénea, 29 mapas de distribución, 9 mapas representando las mayores zonas de distribución de la aphelocerofauna, 13 micrografías electrónicas, 5 fotografías, y árbol filogénico estableciendo con el Hennig 86 computer programa, una tabla sobre análisis de características, y una tabla representando las distribuciones de los grupos de especie de *Aphelocerus*.

Se piensa que los apheloceranos participan en un complejo mimetismo, que también incluye especie de hormigas, buprestidos, chrysomelidos, gorgojos, y arañas. Los apheloceranos se han visto corriendo sobre anchas hojas de plantas, y particularmente sobre los tallos de las hojas, muchas veces en compañía de hormigas negras y de aproximadamente el mismo tamaño que los escarabajos. Algunos de nuestro escarabajos fueron observados en flores de varios árboles, pero no se sabe si estos escarabajos están comiendo otros insectos metidos en las flores o si ellos están comiendo productos de las flores como néctar o polen.

Nuestros escarabajos se pueden coger durante todo el año, pero fueron cogidos más frecuente desde mayo hasta julio, sobre altitudes de escala 97–3000 metros. El mayor método para coger estos escarabajos se llama “beating sheet”, pero varios ejemplares también se capturaron con un aspirador mientras estos escarabajos estaban corriendo sobre hojas y corteza de árboles. Otros métodos de recolección con buen resultados son con una red, trampa de luz negra, trampa de Malaise. Algunos fueron succionados se encontraron con un aspirador en las flores de los árboles.

Se postula que la primera división del antepasado del *Aphelocerus*, ocurrió en el terreno históricamente establecido por la unión de los bloques Mexican/Mayan. La evolución del grupo probablemente ocurrió después de los que ocurrieron en el el Terciario. Las características estructurales del integumento de estos escarabajos de hoy indican que este grupo tiene una evolución muy reciente. En varios grupos de *Aphelocerus* no se encuentran muchas diferencias en el integumento.

La presente evidencia indica que tres mayores cursos evolucionarios se establecieron en el *Aphelocerus*. El primer curso establece una convexidad progresiva de los elytros y el cuerpo

en general. Esto pasó especialmente en los grupos del género que están metidos en mimetismo; puede decirse que estos *Apheloceranus* están, en apariencia, muy cerca de las hormigas, arañas, y *Myrmex* gorgojos. El segundo curso envuelve desarrollo del los 2° filamento de pelo que se encuentra en los elytros. La tercera tendencia del género establece la consolidación de los 2° filamentos de pelo en unas manchas sobre varios órganos del integumento.

La prominente presencia que los *Apheloceranus*, y cléridos en general, tienen en regiones templadas y tropicales sugiere que los *Apheloceranus* y otros cléridos se encuentran más abundantes en siete divisiones en el Nuevo Mundo. Estas divisiones son: América del Norte, América Medio, América del Sur, América Mexo, América Central, América Central Nuclear, y América Central Insular.

INTRODUCTION

My familiarity with these tropical beetles began during an expedition to Tabasco in southeastern Mexico during the summer of 1971. There, alongside a patch of deciduous forest, I noticed a small population of what I thought were black ants scurrying on leaves and twigs of a woody shrub locally known as "Jobo" (fig. 1a). Upon closer examination, I realized that I had come upon a bonanza of checkered beetles, a relatively rare collecting experience that I came to appreciate over the years compared to the usual frustration associated with the collecting of these beetles in increments of one.

Further, it was unfortunate that at the time of that collecting experience I did not realize that before me was an opportunity to investigate a question that still perplexes coleopterist colleagues, why are there so many little black insects and spiders that have silvery hair tufts along their flanks? Over time, it became apparent that *Apheloceranus* are components of a large mimetic complex that involves very distantly related insects and at least one species of spider. Accordingly, I began to collect insects with fascies approaching *Apheloceranus*. Also, I searched in prominent collections and found specimens of *A. myrmecoides*, n.sp., among *Myrmex* weevils and vice versa. In the process of beating oak branches, I gathered buprestids, chrysomelids, and cerambycids that belong to the aforementioned mimetic complex. Unfortunately, our state of knowledge about the biologic implications of these mimetic similarities is minimal and invites only tentative explanatory speculations. It is hoped that the comments in this contribution will encourage more extensive field observations and experimentation that will shed more light on this

fascinating aspect of checkered beetle biology.

This revision, therefore, had its conception more than 20 years ago. It comes to fruition now only because sufficient specimens have become available to make possible a detailed study of this fascinating group of clerids. I am very grateful to many curators and collectors who patiently provided the extended loan of many specimens towards the completion of this study.

LITERATURE REVIEW

Kirsch (1870: 369) established the genus *Aphelocerus* on the basis of *A. sturnus* (Kirsch, 1870: 370) which he placed in subfamily Tillinae, a practice followed by Lodhe (1900: 23), Schenkling (1903: 24, 1910: 26), Blackwelder (1945: 382), Corporaal (1950: 56), and Winkler (1961: 39). Before Kirsch, Chevrolat (1843: 25) described *nitidus* under the clerine genus *Clerus* and in 1874 he described *leucomelas*, to which he assigned the tilline genus *Tillus*. Additional species of *Aphelocerus* were described under *Clerus* by Chevrolat (1874: 296), Spinola (1844: 238), and Gorham (1882: 162).

After examining the type specimen of *A. sturnus* Kirsch, Barr (1976: 18) correctly re-assigned *Aphelocerus* to the subfamily Clerinae, where it became a senior synonym (Barr, 1976: 18) of Wolcott's *Adelphoclerus* (Wolcott, 1910: 356; 1927: 73; Ekis, 1975: 27). Rifkind (1995: 19) briefly discussed two members of this genus in his faunal work of Belize Cleridae.

MATERIALS AND METHODS

This study is based on more than 1000 adult specimens borrowed from museum and private collections, or collected by me during

fieldwork. I observed living aphelocerans in Mexico, Guatemala, Nicaragua, Costa Rica, and Panama. Live specimens of these checkered beetles were placed in killing jars with cyanide or ethyl acetate, then immersed in Pampel's to facilitate investigations of internal anatomy. Investigations of the digestive system organs and those of the internal reproductive system continue to produce variations useful particularly for studies of supraspecific systematics.

During the initial stages of the classificatory process, I first sorted specimens according to geographic origin, and then severed the abdomen from all male specimens to determine the extent of structural variation of the pygidium and aedeagus. Abdomens were easily separated from pinned beetles, but point-mounted specimens had to be relaxed in a warm soapy water solution, and then dissected under water. In time, I devised a more efficient method of gaining access to the genitalia of dry, point-mounted specimens as follows: Abdomens were severed from dry specimens by first removing the pin from the paper point, then the beetles, while still attached to the paper point, were placed upside down onto an inverted pinning tray matted with very soft tissue paper. Next, a number three pin was used to dislodge the abdomen from the thorax by piercing the abdomen behind/beneath each metacoxa. Some specimens were soaked and cleaned with a sonic cleaner, then dried and repinned. Severed abdomens were then subjected to a solution of warm KOH that facilitated the extraction of the aedeagus, ovipositor, and pygidium. The best results were obtained when the dry abdomens were immersed overnight in a 25% cold solution of KOH. Female abdomens were similarly treated when the pygidium and/or sixth visible abdominal sternum showed noteworthy variations.

Techniques of illustration and measurements were similar to those I described in my works of *Perilypus* (Ekis, 1977: 6) and *Plocamocera* (Opitz, 2004: 7). Within descriptions there are numbers in parentheses separated by a colon. These numbers represent measurements intended to provide dimensional ratios between structures that are being compared. Standard anatomical terminology used in this work originates from Nichols

(1989). I recognize that the plate that constitutes the visible venter of each abdominal segment in beetles represents a portion of the "real" segmental sternum. As Snodgrass (1935: 78) indicates, "... in the abdomen the sternal plates appear to contain, in most cases the entire basal parts of the otherwise suppressed limbs." However, I prefer to follow convention by using the term "sternum" to indicate that portion of sclerotization one sees in the checkered beetle adult abdominal segment. The figures of the reproductive organs show one of two ovaries, one of two testes, and one of two pairs of male accessory glands. The short transverse lines in the Character-Matrix Table (table 1) denote that a particular character state was not observed in a species group.

The excellent work of Rolland W. Brown (1966) was very helpful in the selection of specific epithets. The locality label information associated with each holotype specimen is presented in the species descriptions sequentially and precisely in the form that such information is written on the pinned specimen labels that are attached on the holotype specimen. In the "Paratypes" section of each new species description I have followed a sequence of recording locality information as follows: Country: State, Province, or Department: Specific locality. When more than one field collection was made from the same local locality, and the collections differ only in date, I separated the collection dates by a semicolon. Different localities within the same state, province, or departments were also separated by a semicolon. Different states, provinces, or departments, within the same country were separated by a colon. I examined the primary type of all nominal species included in this study.

The members of *Aphelocerus* and all New World genera with a well-developed basal denticle on the tarsal claws, such as *Caestron*, *Placopterus*, and *Enoclerus*, have a particularly long seta near the apex of the elytra. I have ascertained that this is a synapomorphic characteristic that links the aforementioned genera evolutionarily. I have named this extraordinarily long seta a "trich". As no bothrium was noted at the base of this seta, it cannot be termed a trichobothrium.

TABLE 1
Character Matrix of 38 Morphological Characters

Taxa	Characters																																											
	0	1	2	3	4	5	6	7	8	9	0	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3							
outgroup	0	0	1	0	0	-	0	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-					
<i>coalitus</i>	1	1	1	1	0	1	0	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1				
<i>echinatus</i>	1	0	1	1	0	1	0	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1			
<i>ciliaris</i>	1	0	1	1	0	1	1	5	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
<i>bispineus</i>	1	0	1	1	0	1	1	5	1	0	0	0	0	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
<i>acanthus</i>	1	0	1	1	0	1	1	6	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0		
<i>irroratus</i>	1	0	1	1	0	1	1	6	0	3	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	
<i>sculptillus</i>	1	0	1	1	0	1	1	6	0	3	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	
<i>youngas</i>	1	0	1	1	0	1	1	6	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	
<i>batesi</i>	1	0	1	1	0	1	1	6	0	3	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	
<i>immarginatus</i>	1	0	1	1	0	1	1	6	0	3	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	
<i>panus</i>	1	0	1	1	0	0	1	3	0	1	0	0	0	0	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	-	0
<i>cheliferous</i>	1	0	1	1	0	0	1	3	0	0	0	0	0	0	3	1	1	1	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	-	0
<i>scutellaris</i>	1	0	1	1	0	0	1	3	0	0	0	0	0	0	3	1	1	1	1	1	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	-	0	
<i>myrmecoides</i>	1	0	1	1	0	0	1	3	0	0	0	0	0	0	3	1	1	1	1	1	0	0	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	1	0	-	0		
<i>formicoides</i>	1	0	1	1	1	0	1	3	0	0	0	0	0	0	3	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	-	0	

ASSESSMENT OF SPECIES-LEVEL DISCONTINUITIES

The species concept applied in this contribution is based on fundamentals established by Ernst Mayr (1969). As behavioral or other biologic evidence of reproductive isolation was unavailable, I relied on anatomical differences and geographic parameters to infer species status. In the absence of evidence to the contrary, specimens from allopatric populations with similar genitalic characteristics were considered conspecific. Conversely, beetles from sympatric populations with varying genitalic characteristics were considered separate species. I found the presence or absence and distribution of secondary degree (2°) elytral setae valuable for predicting conspecificity or nonconspecificity in conjunction with variations of genitalia characteristics. Secondary degree setae are shorter and more decumbent than primary setae (see fig. 260). The secondary setae are organized into a midelytral tuft in most of the species. The shape of the tuft, whether it is comprised of one or two variously developed setal patches, and orientation of the setae in each patch are also useful for discriminating species. The setal tuft must be viewed at different angles (by tilting the specimen) to allow light re-

flections to bring out the true shape of the setal patches and the orientation of the setae in each patch. In some species the two, or three, setal patches are contiguous and as such may be interpreted as forming a single patch. However, in these cases, the direction of the setae in each patch will differ to establish whether a tuft is comprised of one, two, or three patches. Many species of the *youngas* species group are superficially similar such that preparation of the diagnostic key was very difficult. Interspecific differences of phylogenetic use were particularly scarce. Inconvenient characteristics, such as body size, had to be used on occasion to complete a diagnostic couplet. To facilitate the process of identifying species more, I provide illustrations of the elytral discal setal tuft of several species (for example, see figs. 165–183). The 66 nominal species presented in this work represent my assessment of the magnitude of anatomic and geographic divergence that represents reproductive isolation in the genus *Aphelocerus*.

In my systematic projects with checkered beetles, I have found it necessary to examine type specimens that date to the 1800s. At times, there was doubt as to the authenticity of a specimen being the primary type, mainly

due to discrepancies between pinned label information and information in published descriptions. Therefore, at the beginning of each species description I document the exact sequence of labels on the holotype or lectotype.

PHYLOGENETIC METHODS

The phylogenetic hypotheses presented herein are based on principles advocated by Willi Hennig (1966). Elsewhere, I have discussed these principles in detail (Eklis, 1977: 116; Opitz, 2004: 9). Character states were assessed as apomorphic or plesiomorphic on the basis of out-group comparisons, and the data matrix was analyzed with Hennig 86 version 1.5 (Farris, 1988).

REPOSITORIES OF SPECIMENS

The following abbreviations indicate collections from which specimens were borrowed, and were taken from Arnett, et al. (1993). My sincere thanks to the curators of these collections acknowledged in parentheses.

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|------|---|------|--|
| AMNH | American Museum of Natural History, Department of Entomology, Central Park West at 79th Street, New York, New York 10024-5192 (Lee Herman; herman@amnh.org) | CMNC | Canadian Museum of Nature, Insect Collection, Post Office Box 3443, Station D, Ottawa, Ontario, Canada K1P 6P4 (Robert S. Anderson; randerson@mus-natur-ca. Francois Genier; fgenier@mus-natur.ca) |
| BMNH | British Museum of Natural History, Department of Entomology, SW 5BD, London, England (Max Barkley; m.barclay@nhm.ac.uk) | CNCI | Agriculture-Food Canada, K.W. Neatby Building, 960 Carling Avenue, Ottawa, K1A 0C6, Canada (Donald E. Bright; brightd@em.agr.ca) |
| CASC | California Academy of Sciences, Department of Entomology, Golden Gate Park, San Francisco, California 94118 (David H. Kavanaugh; dkavanaugh@calacademy.org. Roberta Brett; rbrett@cas.calacademy.org) | DEIC | Deutsches Entomologisches Institute, 13 Eberswalde, Germany (Lothar Zerche; zerche@dei.eberswalde.de) |
| CDAE | California Department of Food and Agriculture, Plant Pest Diagnostic/Entomology Laboratory, Entomological Collection. 3294 Meadowview Road, Sacramento, California 95832-1448 (Chuck Bellamy; cbellamy@cdfa.ca.gov) | EMEC | Essig Museum of Entomology, University of California, College of Agriculture, Division of Entomology and Parasitology, California Insect Survey, Berkeley, California 94720 (Cheryl Barr; cbarr@nature.berkeley.edu) |
| CHAH | Henry A. Hespenheide Collection, University of California, Los Angeles, Department of Organismic Biology, Ecology and Evolution, 621 Charles E. Young South, Box 951606, Los Angeles, California 90095-1606 (henryh@biology.lifesci.ucla.edu) | EMUS | Utah State University, Department of Biology, Logan, Utah 84322-5305 (Wilford J. Hanson; biomail@cc.usu.edu) |
| | | FMNH | Field Museum of Natural History, Department of Entomology, Roosevelt Road at Lake Shore Drive, Chicago, Illinois 60605 (Alfred F. Newton; newton@fmnh.org) |
| | | FSCA | Florida State Collection of Arthropods, Division of Plant Industry, Florida Department of Agriculture, P.O. Box 147100, Gainesville, Florida 32614-7100 (Mike Thomas; thomasm@doacs.state.fl.us. Paul E. Skelley; afn07376@afn.org). |
| | | ICCM | Carnegie Museum of Natural History, Invertebrate Zoology, 4400 Forbes Ave., Pittsburgh, Pennsylvania 15213 (Robert Davidson; davidson@clpgh.org) |
| | | INBC | Instituto Nacional de Bioversidad, Apartado 22-3100, Santo Domingo, Heredia, Costa Rica (Angel Solis; asolis@inbio.ac.cr) |
| | | IZAV | Universidad Central de Venezuela, Facultad de Agronomia, Departamento e Instituto de Zoologia Agricola, Apartado postal 4579 Maracay 2101-A, Venezuela (Luis J. Joly; ljoly@cantu.net) |
| | | JEWC | Jim E. Wappes Collection, 171 Fall Creek, Bullverde, Texas 78163-2304 (Jim E. Wappes; beetle@wireweb.net) |
| | | JNRC | Jacques Rifkind Collection, 5105 Mortella Ave., Valley Village, California 91607-3219 (Jacques Rifkind; clerid@aol.com) |
| | | JPHC | Jeffrey P. Huether Collection, 443 Turk Road, Geneva, New York 14456 (Jeffrey P. Huether; jhmeloid@hotmail.com) |

- LACM Natural History Museum of Los Angeles County, Entomology Section, 900 Exposition Boulevard, Los Angeles, California 90007 (Brian P. Harris; bharris@nhm.org)
- LSUC Louisiana State University, Louisiana State Arthropod Museum, Department of Entomology, 402 Life Sciences Building, Baton Rouge, Louisiana 70803-1710 (Victoria L. Mosely; vmosele@unix1.lsu.edu)
- MCZC Museum of Comparative Zoology, Harvard University, Entomology, Cambridge, Massachusetts 02138 (Philip D. Perkins; perkins@oeb.harvard.edu)
- MIUP Museo de Invertebrados Graham B. Fairchild, Departamento de Zoología, Universidad de Panama, Facultad de Ciencias Naturales, Exacta Y Tecnología, Estafeta Universitaria, Panama (Roberto Cambra T.; quinterd@tivoli.si.edu)
- MLPA Universidad Nacional de La Plata, Facultad de Ciencias Naturales Y Museo, Departamento Científico de Entomología, Paseo Bosque s/n., 1900 La Plata, Argentina (L. De Santis, Juan A. Schnack; pstmaster@unplzo.edu.ar)
- MNHN Museum d'Histoire Naturelle, Entomologie, 45 bis, Rue de Buffon, Paris (Ve), France (Jean J. Menier; menier@cimrs1.mnh.fr)
- MRAC Royal Museum for Central Africa, Department of Entomology, Leuvensteeweg 13, 3980, Tervuren, Belgium (Marc De Meyer; demeyer@africanmuseum.be)
- MRSN Museo Regionale di Scienze Natrali, 10123 Torino, Via Giolitti, 36, Itali (O. Bortesi)
- MSUC Michigan State University, Department of Entomology, 243 Natural Science, East Lansing, Michigan 48824-1115 (Wayne Wheeling; wehling@pilot.msu.edu).
- MUCR Museo de Insectos, CIPROC, Escuela de Fitotecnica, Universidad de C. R. San Jose, Costa Rica (Humberto J. Lezama; hlezama@cariari.ver.ac.cr).
- MZSP Museu de Zoologia Universidade de Sao Paulo, Caixa Postal 42.694 01064-970, Sao Paulo, Brazil (Cleide Costa; cleico@usp.br)
- NINA Norwegian Institute for Nature Research, Division of Conservation Biology, Tungasletta 2, NO-7485, Trondheim, Norway (Frode Odegaard; frode.odegaard@ninatrd.ninianku.no)
- NMLN National Museum of Natural History, Department of Entomology, Darwinweg, Leiden, P.O. Box 9517, NL-2300 RA, Leiden, Nederland (J. van Tol; tol@naturalis.nl)
- PURC Purdue University, Department of Entomology, Entomology Hall, West Lafayette, Indiana 47907 (Arwin Provonsha; arwin-provonsha@entm.purdue.edu)
- QCAZ Pontifica Universidad Catolica del Ecuador, Departamento de Biología, Avenida 12 de Octubre, entre Patria y Beintilla, Apartado 17-01-2184, Quito, Ecuador (Gionanni Onore; onore@puceuo.puse.edu.ec)
- RFMC Roy F. Morris II Collection, 2635 Ewell Road, Lakeland, Florida 33811 (catchbugs@aol.com)
- RGCG Roland Gerstmeier Collection, Technische Universität München, Angewandte Zoologie, Alte Akademie 16, D-85350 Freising, Germany (Roland Gerstmeier; r.gerstmeier@lrz.tu-muenchen.de)
- RHTC Robert H. Turnbow, Jr. Collection, Directorate of Engineering and Logistics, Fort Rucker, Alabama 36362-5000 (turnbowr@rucker.army.mil)
- SEAN Museo Entomologico. S. E. A., A.P. 527, Leon, Nicaragua (Jean-Michel Maes; jmmaes@ibw.com.ni)
- SEMC The University of Kansas, Snow Entomological Division, The Natural History Museum of the University of Kansas, Lawrence, Kansas 66045-2454 (Zachary Falin; ksem@ku.edu)
- SMTD Staatliches Museum für Tierkunde, Dresden, Abt. Entomologie, Auguststr. 2 D-01067 Dresden, Germany (R. Krause; fax 0351/4952525)
- STRI Smithsonian Tropical Research Institute, Insect Collection—Tupper Center, P.O. Box 2072, Balboa, Panama (Annette Aiello; aielloa@tivoli.si.edu)
- TAMU Texas A & M University, College of Agriculture and Life Sciences, Department of Entomology, Minnie Belle Heep Building, College Station, Texas 77843-7029 (Edward G. Riley; egrchryso@tamu.edu)
- UCRC University of California, Department of Entomology, Riverside, California 92521 (John D. Pinto; john.pinto@ucr.edu)
- UMIC University of Mississippi Insect Collection, Department of Biology, University of Mississippi 38677 (Paul K. Lago; plago@olemiss.edu)

- UMRM Wilbur R. Enns Entomology Museum, Department of Entomology, 1-87 Agricultural Building, University of Missouri, Columbia, Missouri 65211 (Kristin B. Simpson; simpsonk@showme.missouri.edu)
- UMSP University of Minnesota, Department of Entomology, College of Agriculture, Food, and Environmental Sciences, 219 Hodson Hall, 1980 Folwell Ave., Saint Paul, Minnesota 55108-6125 (Philip J. Clausen; claus004umn.edu)
- UNSM University of Nebraska State Museum, Systematic Research Collections, W-436 Nebraska Hall, P.O. Box 880514, Lincoln, Nebraska, 68588-0514 (Brett C. Ratcliffe; bratcliffe1@unl.edu)
- USNM United States Department of Agriculture. Systematic Entomology Laboratory, c/o National Museum of Natural History MRC 168, Washington, D.C. 20560-0165 (Natalia J. Vandenberg; nvandenb@sel.barc.usda.gov)
- WFBC William F. Barr Collection, 1415 Borah Ave., Moscow, Idaho 83843 (William F. Barr; wlb-clerid@moscow.com)
- WFBM University of Idaho, Division of Entomology, William F. Barr Museum, Moscow, Idaho 83844 (Frank Merickel; fmerickel@uidaho.edu)
- WOPC Weston Opitz Collection, Kansas Wesleyan University, Department of Biology, 100 E. Claflin Ave., Salina, Kansas 67401-6196 (opitz@kww.edu)
- ZMAN Zoologische Museum der Universiteit van Amsterdam, Institute for Biodiversity and Ecosystem Dynamics, Department of Entomology, Plantage Middenlaan 64, 1018 DH Amsterdam, Netherlands (J. P. Duffels; duffels@bio.uval.nl)
- ZMHB Museum für Naturkunde on der Humboldt-Universität zu Berlin, 1040 Berlin, Invalidenstrasse 43, Germany (Manfred Uhlig; manfred=uhlig@rz.hu-berlin.de)

NATURAL HISTORY

MIMETIC ASSOCIATIONS

Any naturalist who has collected beetles extensively in the Neotropics will attest to the abundance of resemblances of color patterns and/or body shapes across familial lines. Such similarities among phylogenetically “unrelated” species are difficult to interpret as chance occurrences. They are often very fine tuned phenotypic similarities and

invite the speculation that they represent some kind of adaptive convergence. The concept of mimicry, although not easily proven, is often a logical explanation for such convergences among distantly related species. However, as acknowledged by Hespheide (1995: 146), “most cases of mimicry cannot be subjected to experimental verification because of the rarity of the putative mimics and the difficulty in designing an experimental protocol that would realistically test a given case”. . . *of mimicry*.

Integumental color, patterns of white setae on various parts of the integument, and body facies strongly suggest that species of *Aphelocerus* are involved in a mimetic complex. I do not believe that the basis of this mimicry is distastefulness, but rather that it is based on such factors as escape behavior or morphological resemblance to aggressive models such as ants. It is my contention that *Aphelocerus* species are involved in a mimetic complex, probably Mullerian, that includes species of Buprestidae, Cerambycidae, Chrysomelidae, Curculionidae, Formicidae, and spiders.

I observed live *A. myrmecoides*, n.sp., among *Myrmex* weevils moving on broadleaf herbaceous hedge growth. The similarity between these particular clerids and the weevils is very profound in general form (compare figs. 163, 164) and in such anatomical details as the presence of white setal tufts on the sides of the body. Their locomotory differences, however, betray their identity with the clerid having a rapid scurrying movement and the weevil a slow, more deliberate gait. At present, one can only speculate about the functional basis of this suspected Mullerian complex. However, the extraordinary development of the antenna and legs among some of these beetles suggests a Batesian mimicry involving ants or perhaps spiders.

Members of the *myrmecoides* species group have an oval, short hind body and highly convex elytra that could reflect an adaptation towards the cephalothorax and abdomen body plan of a spider. The locomotory behavior of jumping spiders (Salticidae), which often share a leafy habitat with these clerids, could serve as the selection factor towards an antipredatory mechanism evolved by a variety of photophilic beetles.

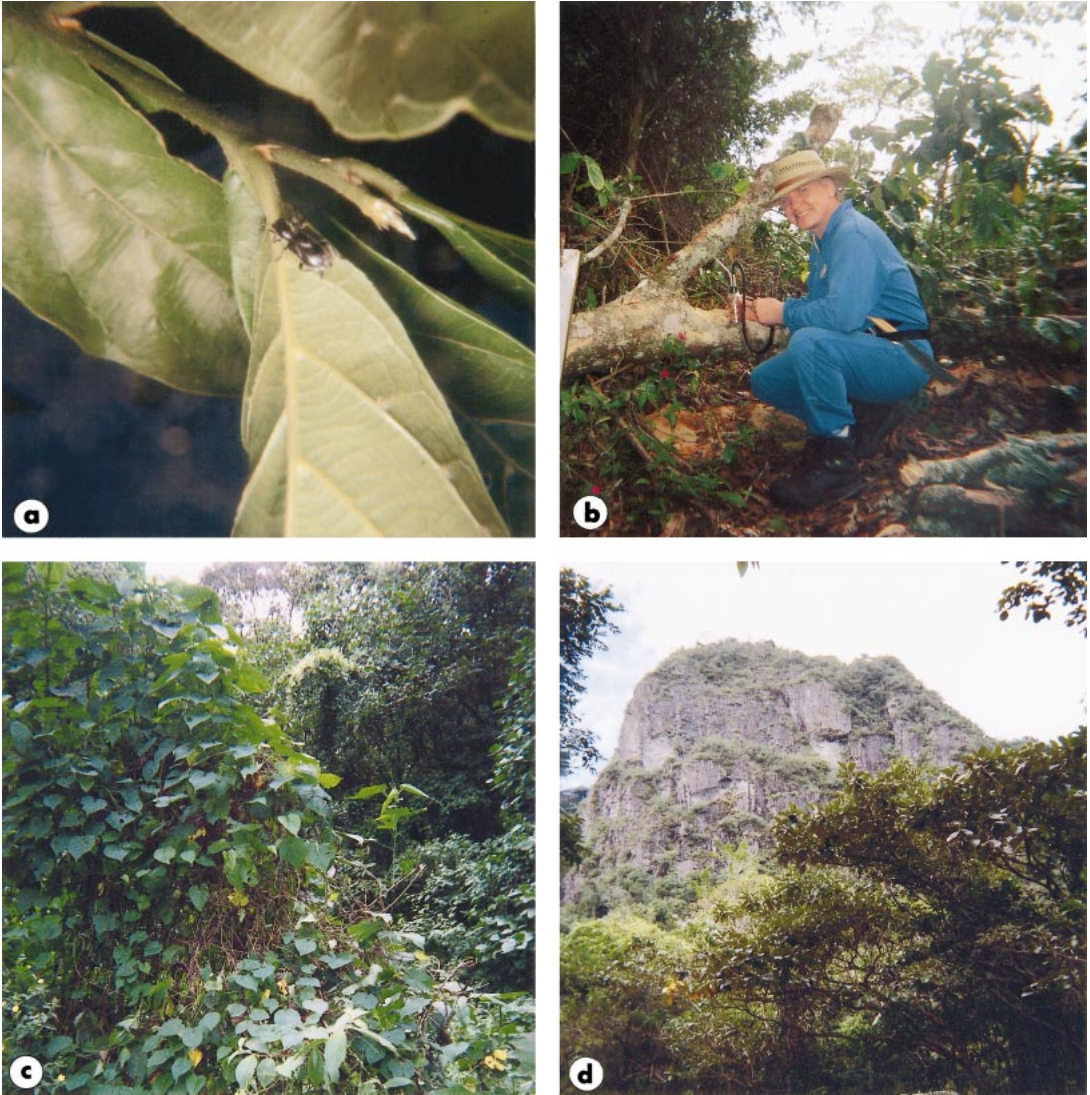


Fig. 1. Collecting habitats of *Aphelocerus* species. **a.** *A. coactus* under leaf. **b.** The author in Selva Negra, Nicaragua, December 2002. **c.** Viny verdure, Hacienda Las Lagunas del Volcan, Panama. **d.** Cerro Campana, Panama.

I (Opitz, 2004: 13) observed “jumping” behavior among plocamoceran clerids and suggested that such behavior was associated with fly-escape behavior as described by Hespeneide (1973: 52) for species of *Epi-phloeus* Spinola.

One may also speculate that this mimetic complex, which includes *Aphelocerus*, involves a mimetic relationship in which the similar color, smooth body, and very similar habitus of various species of beetles and spi-

ders may possibly be intertwined in a Mullerian association. Hespeneide (1973: 52) describes a similar mimetic complex in which beetles imitate the reddish forebody coloration and quick flight escape behavior of tachinid fly models. Moreover, Poinar (1999: 10) suggests that beetles with smooth bodies, characteristic of some of the above mentioned aphelocerans, are often characteristic of leaf beetles that escape predation by ants in that the beetles are difficult to grasp

because of the smooth contour of their bodies. Lastly, Hespeneide (1987: 53) commented on the color and habitus similarity between the zygotine weevil genus *Lissoderes* and the otidocephaline weevil genera *Myrmex* and *Ooterinus*, and he noted that species of *Aphelocerus* belong to this black, strongly shining assemblage of beetles.

FLORAL ASSOCIATIONS

Although checkered beetles are thought to be predominantly predaceous on lignicolous insects, they frequently occur within flowers. Checkered beetle anthophily has been reported by Foster (1976: 64), Mayer (1976: 2), Crowson (1964: 303), Hawkeswood (1981: 125, 1982: 31), and Opitz (2002: 241). To my knowledge there are no published reports of anthophily among the species of *Aphelocerus*. However, information from specimen labels suggests that the members of several *Aphelocerus* species do frequent blossoms, although their role in such a niche is unknown. According to information from specimen labels, anthophily among apheloceran species has been reported by James E. Wappes (*A. leucomelas* [Chevrolat] specimens feeding on blossoms of a woody plant), Jose A. Clavijo (*A. sturnus* Kirsch beetles within blossoms of *Inga marginata*), Frank T. Hovore (*A. cohibilis*, n.sp., individuals from a flowering tree species of *Croton*), and Frode Ødegaard (*A. catie*, n.sp., beetles on *Guatteria dumetorum*, *Jacaranda copala*, *Nectandra purpurascens*, and *Inga cocleensis*, and *A. myrmecoides*, n. sp., in flowers of *Forsteronia myriantha*).

Because apheloceran specimens have been captured on a variety of flower blossoms, one might presume that they feed on pollen. However, the construction of their mouthparts and development of the digestive system suggest that the flower visiting aphelocerans are predators of flower-visiting insects or soft-bodied arthropods. However, Frode Ødegaard reports (personal commun.) that specimens of *A. catie*, n.sp., did not feed on small anthophilic arthropods when the clerids and other small arthropods were placed together in small vials. Therefore, the possibility that these clerids feed on pollen and nectar cannot be discounted as both of these

flower products serve to nourish other checkered beetles of the subfamily Clerinae (Opitz, 2002). Moreover, Ødegaard observed abundant specimens of *A. catie*, n.sp., scurrying among inflorescences of *Inga cocleensis*, which is very reminiscent of the flower foraging behavior of *Eleale aspera* Newman (Opitz, 2002: 243).

Indeed, within the Cleridae there seems to be a positive correlation between an abundance of integumental pubescence and an anthophilic life style. For example, members of the Holarctic genus *Trichodes* (Foster, 1976: 65), Chilean *Calendyma* (Crowson, 1964: 303), and Australian *Eleale* and allies (Hawkeswood, 1982: 31; Opitz, 2002: 241) are among the outstanding examples of the degree of pubescence-anthophilic life style correlation. The functionality of the correlation, of course, is that a densely setose integument, particularly on the insects' dorsum, would facilitate a pollen harvest, much like the densely setose pollen baskets facilitate pollen collection of the honeybee.

Further, in *Aphelocerus* there exists an interesting transformation of elytral pubescence in the development of the elytral mid-discal setal tuft. Also, there seems to be a gradual reduction of the dense elytral pubescence from members of the more primitive *leucomelas* species group towards the less and less pubescent condition in the more advanced *scutellaris*–*myrmecoides*–*formicoides* line of species groups. Members of the *batesi* species group (for example, *A. catie*, n.sp.) and *ciliaris* species group (for example, *A. ciliaris*, n.sp.), which have highly setose elytra, have been reported on blossoms (Rifkind, personal commun.). Conversely, members of the more derived *scutellaris*–*myrmecoides*–*formicoides* line have an increasingly glabrous elytral disc (fig. 164). The latter species groups are clearly involved in mimetic life styles. In some of these mimetic species, such as *A. formicoides*, n.sp., where the body dorsum is relatively glabrous, elytral pubescence would detract from the deception to look like a more glabrous cuticular body model such as found in an ant. Conversely, members of *A. eriodes*, n.sp., with their clearly arachnoid body form, are densely setose on the dorsum, suggesting the trichose dorsum of a spider model. I have often

wondered whether an investigation into the relationship between the intricacies of integumental pubescence and form of life style might not lead to significant evolutionary hypotheses within Cleridae.

FIELD OBSERVATIONS

During an expedition to Los Altos de Panama, January 2, 2002, the last day of fieldwork, Lee Herman and I decided to make one more attempt to obtain specimens of apheloceran species known to occur on Cerro Campana (fig. 1d), and possibly obtain biological information about them. This was my third attempt to learn something about the biology of the apheloceran species known to occur in the Cerro Campana highlands (fig. 1d). I had worked the mountain several times before but was unsuccessful at observing apheloceran life habits, or determining the whereabouts of their immature stages. About one hour before the fieldwork was to end, I found what had eluded me for quite some time, checkered beetles flying into a recently felled tree trunk with a particularly strong fragrance emitted from exposed cuttings of wood and leaves.

According to Orlando Nuñez, an indigenous Panamanian living in the area, this particular tree had been down for seven days. Among the checkered beetles that this tree attracted were 12 specimens of *Enoclerus insidiosus* (Gorham), eight of another *Enoclerus* sp., two specimens of *Ichne*a, one of *Madoniella erythrocephalus* (Gorham), and most relevant to this study, two specimens of *A. myrmecoides*, n.sp., scurrying among some 11 specimens of *Myrmex* weevils. The tree in question did not show any evidence of flowers. In addition to these beetles, I observed and then collected two specimens of bostrichids that were in the process of boring into a debarked portion of the aforementioned tree trunk. It was an exciting moment to finally observe some evidence suggesting that aphelocerans are attracted, as are many other checkered beetles, to tree volatiles and at least potentially seem involved in predatory activity associated with lignicolous insects. As *A. myrmecoides*, n.sp., has also been observed to frequent blossoms of *Forsteronia myriantha* (loc. cit.) it seems likely

that at least some members of *Aphelocerus* are omnivorous since they may consume nectar and pollen from blossoms and prey on lignicolous insects when blossoms are not available; perhaps their diet comprises both plant and animal matter.

An interesting sidebar to the most recent field experience on Cerro Campana, Panama, was a legendary story by Orlando Nuñez about the felled tree on which I found many clerids. It seems that the indigenous peoples of Panama, possibly members of the tribe Gnobeg Bugle or “Guaymies”, made use of this species of tall tree as observation towers, and when a Spaniard asked a native about the name of this tree, the native replied in broken Spanish “espaber”, literally meaning “I climb to see”. Thus evolved the legendary vernacular name of this tree which ended a last hour of fieldwork on a culturally rich and scientifically rewarding note.

During three excursions to the charming village of Volcan, nested in a volcanic crater (1344 m) and surrounded by the highlands of Chiriqui, in Panama, I encountered many specimens of *Aphelocerus chiriqui*, n.sp., in two particular habitats. The first involved a natural reserve known as Hacienda Las Lagunas del Volcan, whose primary lakeside forests have trailside vegetation laden with woody shrubs densely intermixed with herbaceous vines (fig. 1c). Numerous *A. chiriqui* adults were taken at this site during May and August by beating. It was puzzling at first to realize that very few of these clerids could be seen scurrying on the surface of the broad vine leaves. Yet, beating this assemblage of vegetation consistently yielded specimens. Eventually, I realized that these clerids, along with a variety of other beetle predators, were foraging primarily on the underside of the leaves (as seen in fig. 1a) and along the stems of the herbaceous vines, possibly consuming immature/adult homopterans such as membracids, or feeding on the eggs of the multitude of chrysomelids ovipositing on the underside of leaves.

The second, “hot spot” for aphelocerans and other clerids (in the aforementioned highlands) was located on the northeastern slopes of a Chiriqui mountain (about 6 km north of Volcan, at about 1500 m) within an escarpment through which daily gusts of

wind sweep towards and up the mountain slopes. Specimens were collected along a narrow, roughly paved winding road with overhanging herbaceous plant assemblages. Beneath the overhanging verdure one would, almost invariably, find patches of flowering *Impatiens*, whose presence served as indicator plant species for the potential collecting of checkered beetles. Apheloceran checkered beetles, like impatiens plants, are found most often on sun-intensive moist slopes. After several days of fieldwork it became obvious that this particular portion of the mountain escarpment, with its wind thrusts, swept a variety of insects, including taxonomically diverse species of clerids, onto the slopes of the mountain, especially during midmorning periods of intensive sunlight (usually about 10:00 a.m.). Collecting efforts were poor along the same mountain road (leading to Rio Sereno from Volcan) on slopes that were shaded and where wind gusts were minimal or absent.

Most recently, during May 2002, Lee Herman and I spent a week collecting in Selva Negra, a private preserve of virgin cloud forest in the western highlands of Nicaragua. The Köhl family, a gracious people of German ancestry, is profoundly dedicated to the preservation of the Nicaraguan jungle habitats. Selva Negra (“Schwarzwald”), essentially a community of Nicaraguan citizens, maintain the mountain resort with a management style that emphasizes organically grown products within an uncompromising conservation framework.

Along the “Cody” trail, which is proximal to a large pond and adjacent to a narrow extension of a coffee grove that eventually coalesces with a dense virgin cloud forest known as “Monkey Territory”, I experienced outstanding results in the collection of generically diverse checkered beetles. Among the catch, there were two new species of *Aphelocerus* (*A. cirritus*, n.sp., and *A. capillus*, n.sp.) that were collected by beating overhanging tree branches, along the trail, intertwined with wild grape and other vines. Some of the nonliving vegetation, such as hardwood branches, was particularly rich in Cerambycidae.

NATURAL HISTORY INFORMATION FROM SPECIMEN LABELS

Many of the specimens on which this treatise is based were collected by beating tree foliage, particularly oak trees in tropical forests. Label data suggest that aphelocerans may be collected on foliage or woody branches of the following plants: *Nectandra purpurascens*, *Calophyllum longifolium*, *Inga cocleensis*, *Maranthes panamense*, *Lysiloma divaricata*, *Spondias mombin*, *Brosimum alicastrum*, *B. utile*, *Inga marginata*, *Forsteronia myriantha*, *Coumarouna oleifera*, and species of *Piper*, *Acacia*, *Quercus*, *Croton*, and *Arum* (an epiphytic vine).

Although specimens were collected throughout the year, most were captured from May through July, at elevations ranging from 97 m to 3000 m, most collected between 1500 and 2000 m. The “beating-sheet” method of collecting seems to be the most productive manner of obtaining these insects, although some specimens were also collected with sweep nets, light traps, and Malaise traps.

DIAGNOSIS OF APHELOCERUS

One of the most interesting, but difficult to find, generic characteristic of these beetles is the presence of an elytral trich, an extraordinarily elongated seta near the apex of each elytron (fig. 257). Superficially, however, most of these beetles are conveniently recognized by their shiny black integument and the presence of a streak of silvery setae at the base of the sutural margin and/or on the elytral disc. Only in specimens of *A. coalitus*, n.sp., *A. delicatulus* Barr, *A. affaniatis*, n.sp., and sometimes in specimens of *A. inconstans* Gorham, is the dorsum partially rufous or variously testaceous. Specimens of *Aphelocerus* have the pronotum consistently narrower than the width of the elytra across the humeri. Further, the members of most of the species show a tuft of silvery setae at the middle of the elytral disc that is usually divided into two variously developed setal patches (anterior patch and posterior patch) that in aggregate are usually proximal to the sutural margin (see frontispiece).

The integumental pubescence, particularly those found on the frons, pronotum, and el-

etra, are identified as primary (1°) or secondary (2°) setae. The primary setae (fig. 260) are usually more robust, more vertical, and not aggregated into groups whereas the secondary setae (fig. 258) are slender, shorter, more decumbent, and arranged into one, two, or three patches that combine to give the appearance of a single setal tuft.

The assignment of specimens to species is very difficult. Variations in aedeagal characteristics provide the most reliable criteria for species-level identifications. One particularly dramatic exception to interspecific aedeagal diversity is the virtually identical shape of the aedeagus in males of *A. echinatus*, n.sp. (fig. 144b), and *A. affaniatis*, n.sp. (fig. 144a). What makes this aedeagal similarity extraordinary is the extent to which the members of these species differ externally.

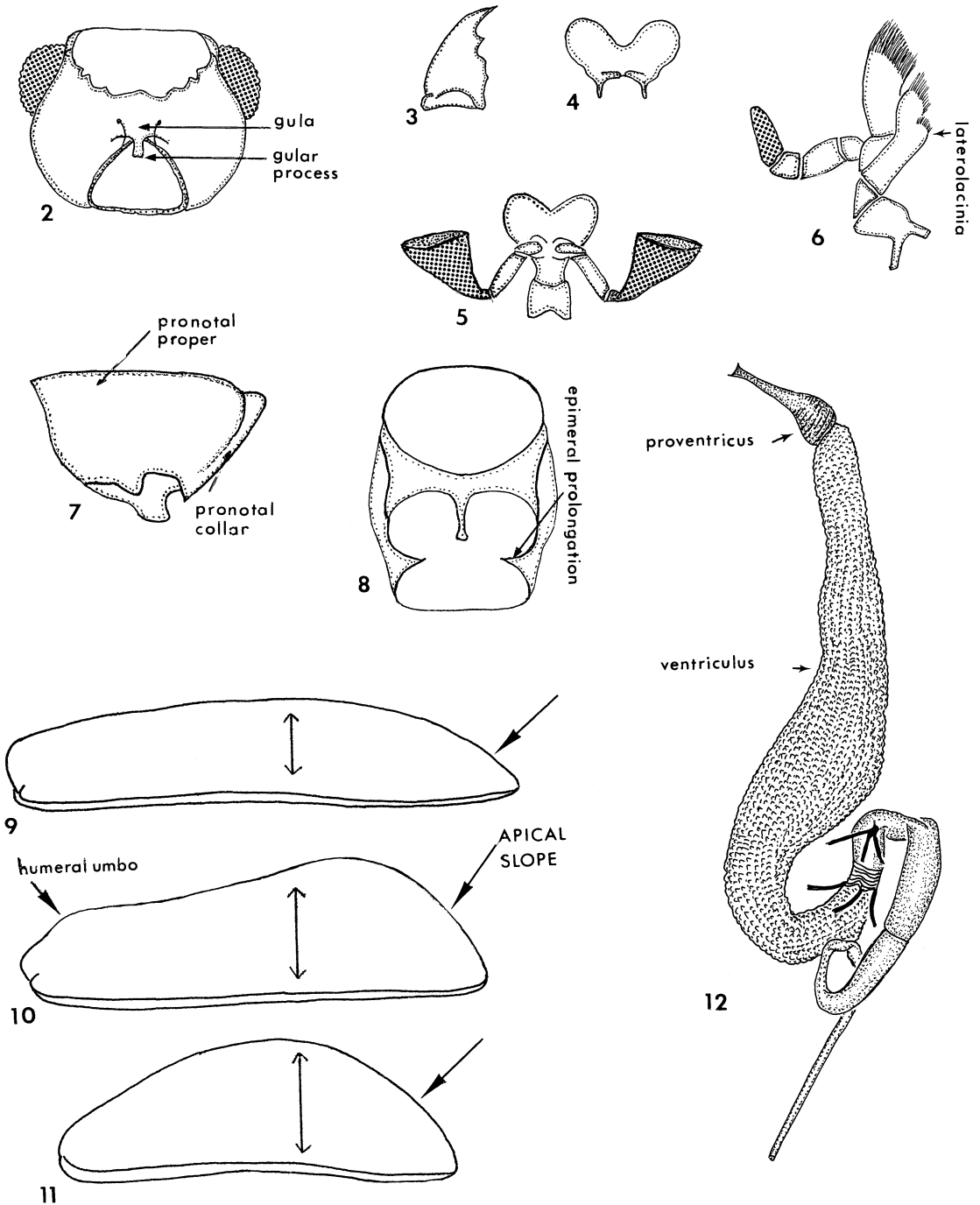
For identification of specimens of *Aphelocerus* to species level, the aedeagus of all available males should be examined. Other attributes used to discriminate the species are length of the antenna and the shape of its club, presence or absence of white setal tufts on the frons and lower side margins of the pronotum, size and shape and number of setal patches of the elytral middiscal setal tuft and the direction of their seta, pronotal shape, width of the pronotum in relation to the width of the elytra across the humeri, degree of angularity of the epipleural margin in the posterior fourth of the elytra, convexity of the posterior half of the elytra, length of the metatibia, and shape of the pygidium and sixth visible abdominal sternum. *Aphelocerus* specimens from whom elytral discal setae have been abraded may be difficult to identify, but the minute punctations from which the tuft setae arise give an indication of the presence and shape of the tuft. In a few cases geographic distribution was used as a convenient characteristic to assign externally similar specimens to species.

DESCRIPTION OF *APHELOCERUS*

Aphelocerus Kirsch, 1870: 369. Type species: *Aphelocerus sturnus* Kirsch, 1870: 370. By monotypy. Lohde, 1900: 23. Schenkling, 1903: 5, 24, 1910: 26. Blackwelder, 1945: 382. Corporaal, 1950: 56. Winkler, 1961: 39. Barr, 1976: 18. Rifkind, 1995: 17.

Adelphoclerus Wolcott, 1910: 356, 1927: 73. Type species: *Adelphoclerus nitidus* Wolcott, 1910: 357 (junior synonym). Corporaal, 1942: 137, 1950: 146.

Size: Length 3.2–8.6 mm; width 1.5–4.0 mm. *Form* (see frontispiece): Oblong; robust, commonly three times longer than broad; elytra plane in basal two-thirds and deflexed in apical third; members of the *formicoides*, *scutellaris*, and *myrmecoides* species groups variously convex in pronotal and elytral form; in some of these species groups the abdomen is proportionally shortened. *Integument*: Shiny black, rarely basal half of elytra reddish; cranium, pronotum, pterothorax, abdomen, legs sometimes cyanescent; elytra and legs rarely testaceous; cranium, pronotum, and elytra rarely castaneous. *Vestiture*: Integument densely setose; dense patch or patches of white setae (herein designated as “tufts”) may be present on frons (fig. 24), lateral aspects of pronotum (fig. 23), metepisternum-mesepimeron-mesepisternum (fig. 23), mesoscutellum and sutural margin (fig. 22), elytral disc (see frontispiece), and epipleural margin; elytral middiscal tuft may be comprised of one (fig. 35) or two (see frontispiece) patches; elytral disc near apex with one elongated seta (the elytral trich, fig. 257). *Head*: Cranium (fig. 2) finely punctate, rarely coarsely punctate, interocular depressions and frontal umbo feebly or boldly developed, genae and epicranium expanded in members of *formicoides*, *scutellaris*, and *myrmecoides* species groups, gula transverse, gular process narrowly projecting; labrum (fig. 4) transverse, strongly emarginate; mandible (fig. 3) subfalciform; maxilla (fig. 6) with lacinia divided into mediolacinia and laterolacinia, terminal segment of palpus digitiform; labium (fig. 5) with incised ligula, terminal segment of palpus securiform; eyes moderately or strongly convex, ommatidia fine, as wide as ocular suture; antenna (fig. 24) comprised of 11 antennomeres, terminal three antennomeres forming distinct club, shorter, equal in length, or longer than pronotum, funicular articles subcylindric. *Thorax*: Pronotum quadrate or elongate, plane (fig. 7) or convex (fig. 23), finely punctate, disc rarely wrinkled transversely, anterior transverse depression faintly or strongly impressed, side margins moderately (see frontispiece) or boldly (fig. 35) convex; coxal cavi-



Figs. 2–12. Various organs. 2–8. *Aphelocerus nitidus*. 2. Cranium (ventral view). 3. Mandible. 4. Labrum. 5. Labium. 6. Maxilla. 7–8. Pronotum (7, lateral view; 8, ventral view). 9. *A. coalitus*, elytral outline (lateral view). 10. *A. coactus*, elytral outline (lateral view). 11. *A. myrmecoides*, elytra (lateral view). 12. *A. coactus*, alimentary canal.

ties open (fig. 8); elytra nearly planar (fig. 9) or boldly (fig. 11) convex; rarely laterally compressed (fig. 41), disc very finely punctate or coarsely punctate or subrugose, rarely carinate, fine punctations sometimes arranged in longitudinal rows; metathoracic wing as in figure 15; legs particularly long in specimens of *formicoides*, *scutellaris*, and *myrmecoides* species groups, tibia with conspicuous carina on anterior and posterior facies, protibia with one spur, meso- and metatibia with two spurs, tarsal claws with conspicuous basal denticle (fig. 255); outer lateral margin of tibiae vested with stout dark setae, remainder of tibial setae pale. *Abdomen*: Shortened in members of *formicoides*, *scutellaris*, and *myrmecoides* species groups; pygidium trigonal (fig. 101) or subquadrate (fig. 93), with posterior margin evenly arcuate, or feebly sinuous; male sixth visible abdominal sternum always incised. *Male genitalia* (fig. 154): Moderately sclerotized; parameres usually short, with apical spine in some members of *ciliaris* species group; ventral sinus usually longer than dorsal sinus (fig. 13); phallus comprised of two phallic plates which are rarely denticulate; phallic plicae rarely prominent; spicular fork prominent (fig. 14), interspicular plate transverse. *Female genitalia* (fig. 17): Ovipositor predominately membranous; proctigeral bacculus (fig. 16) well developed; dorsal lamina trilobed; oblique bacculus and ventral bacculus (fig. 17) well developed; ventral lamina trilobed. *Male internal reproductive system* (figs. 18,19): Two pairs of accessory glands, medial gland biramous, lateral gland uniramous, coiled or loosely convoluted. *Female internal reproductive system* (fig. 20): Spermathecal capsule well sclerotized; spermathecal gland attached to base of spermathecal capsule. *Alimentary canal* (fig. 12): Proventriculus well developed; ventriculus broadened near middle, ventricular crypts well developed; six cryptonephridial malpighian tubules. *Nervous system*: As in figure 21.

DISTRIBUTION: This New World genus is widely distributed and particularly abundant in the tropics. In aggregate, the species range from Mexico to Argentina with the greatest concentration of species in Central America, between Mexico and Honduras. The highlands of Chiapas (Mexico), Puntarenas (Cos-

ta Rica), and Chiriqui (Panama) each possess a number of cryptic species.

SPECIES GROUPS OF *APHELOCERUS*

The species of *Aphelocerus* can be separated into 15 species groups based on the presence or absence of elytral asetiferous punctations (fig. 259), distribution of secondary elytral setae (fig. 260), texture of the elytral surface, development of the elytral mid-discal setal tuft, extent of development of the genae and epicranium, pronotal microsculpture, microsculpture at the base of the elytra, length of the pronotum, macrosculpture on the pronotal disc, presence of the frontal setal tuft, prominence of the legs, degree of elytral convexity, and shape of the parameres.

coalitus group

The members of this species group are relatively large clerids (6.0–10.0 mm) whose pubescent pattern does not conform to the typical pattern as seen in the fronticepiece. In these beetles, there is an admixture of dark and pale setae on the elytral disc. The pale setae may or may not be organized in narrow lines or oblique patches. The presence of asetiferous punctations, particularly prominent in the posthumeral regions, is an apomorphic characteristic for this group of species. Further, the secondary elytral setae are not concentrated into transverse tufts at the middle of the elytra. The combined known range of this species group extends from the Oaxacan highlands of Mexico to the lower elevations of central Costa Rica.

echinatus group

The subapex of the parameres have an acute spine (fig. 125). The two species that comprise this species group inhabit southern Mexico, one from the Chiapan highlands, and one from the Yucatan Peninsula.

ciliaris group

The decumbent, 2° elytral setae begin to change direction at the middle of the elytral disc, obliquely directed towards the epipleural margin. Anterior to this "incipient" setal aggregation, the 2° setae are directed towards the front; towards the back behind the aggre-

gate. The members of this species group have been found only in southern Mexico.

bispineus group

This species group is comprised of four species whose male members show a very unique development of the posterior margins of the parameres. The parameres are predominantly truncate except at their most mesal margin where they narrowly flare out to form a small papillose protrusion (fig. 193). As in the members of the *ciliaris* species group in some of the specimens of the *bispineus* group, particularly those of *A. acuticolis*, n.sp., and *A. bispineus*, n.sp., the middiscal setal aggregate (fig. 235) suggests an evolutionary transition towards a distinct, elytral middiscal setal tuft as seen in the frontispiece. The members of this species group are known only from southern Mexico.

acanthus group

These beetles are characterized by the extensive development of the elytral middiscal setal tuft. The setal tuft reaches its highest development in the members of this group; it extends from the sutural margin to the epipleural margin (fig. 38). Collectively, the members of this group have a distribution that ranges from southern Mexico to Argentina.

sculptilus group

These small sized aphelocerans are easily distinguished from members of the other species groups by the fine microsculpture on the pronotal disc that is synapomorphic for the group. The range of this group extends from the western slopes of Costa Rica to the Chiriqui highlands of Panama.

irroratus group

This is a monotypic group whose member has a gritty microsculpture on the base of the elytral disc anterior to the elytral middiscal setal tuft (fig. 34). Also, the elytral epipleural and humeral margins are densely vested with short white setae. Specimens have been collected from Chiapas, Mexico, to the western highlands of Guatemala.

immarginatus group

This monotypic species group involves specimens whose humeral umbo is very prominent, the elytra are conspicuously depressed behind the umbo with the middiscal setal tuft set in the depression, and the posterior two-thirds of the elytral disc is strongly convex (fig. 40). *A. immarginatus* (Chevrolat) specimens are known only from the highlands of Colombia.

yungas group

The members of this group of species show a development of elytral middiscal setal tuft that is transitory towards its highest development as seen in specimens of the *acanthus* species group. The tuft is comprised of two patches of white 2° setae. In most cases the setae of the anterior patch are directed anteriorly while those of the posterior patch are directed laterally or posterolaterally (fig. 182). The geographic range of this species group extends from Mexico to Bolivia.

batesi group

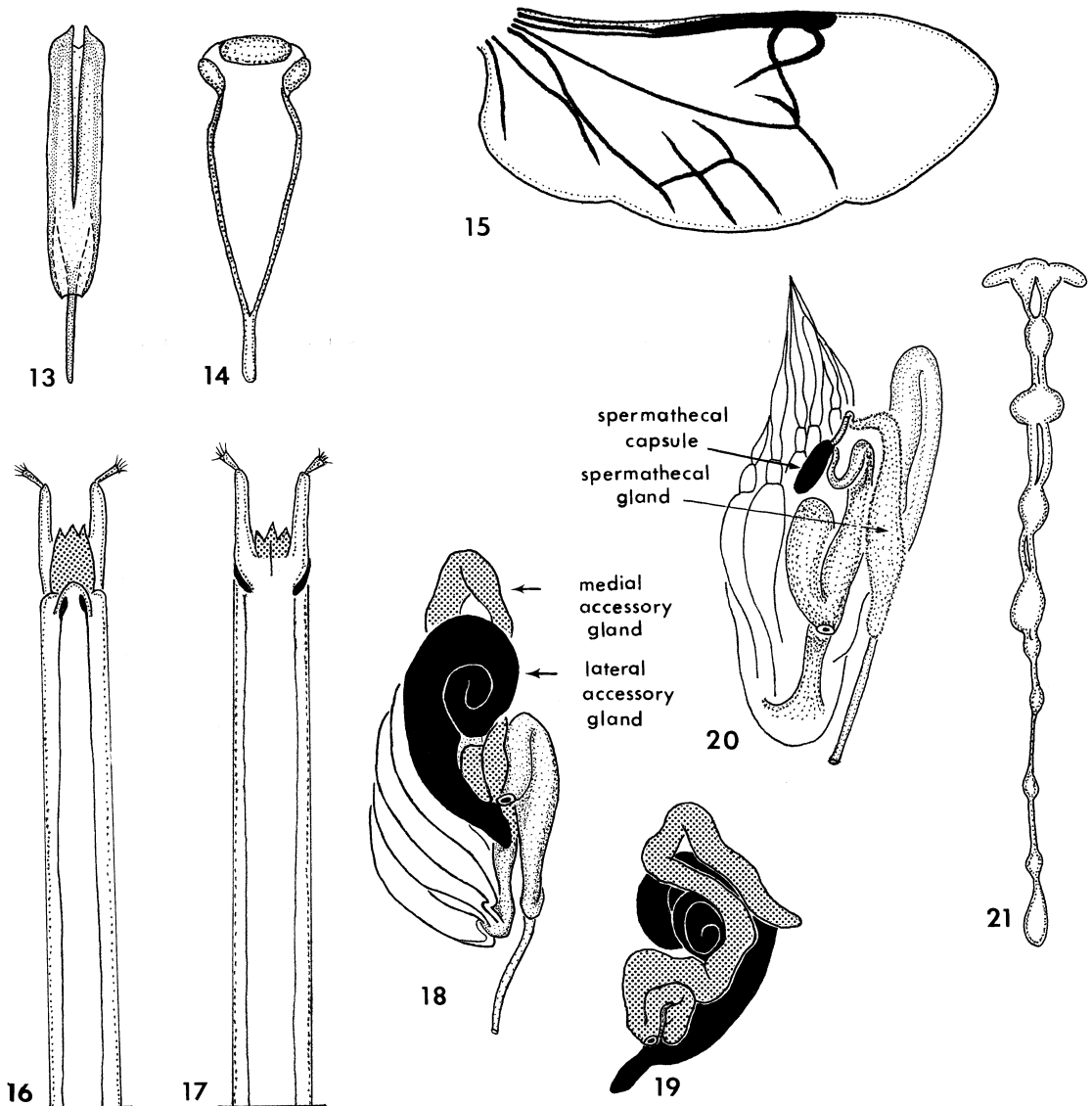
This is the most speciose group in the genus. In the members of this group the posterior patch is reduced to a few setae or is absent. When the posterior patch is absent, the setae of the anterior patch are all pointing in the same direction. In aggregate, the range of this species group extends from Mexico to Ecuador.

panus group

The campaniform pronotum and conspicuously slender antennae are apomorphic characteristics of the members of this species group. Their geographic range extends from Costa Rica to Brazil.

formicoides group

This group is comprised of two species whose members more than any other aphelocerans have the appearance of ants. Their pronotum proper is particularly globose, the elytra are short and very convex (fig. 45), and as in the case of the members of the *cheliferous* and *myrmecoides* groups, the elytral disc is faintly carinate longitudinally.



Figs. 13–21. Various organs. 13–14. *Aphelocerus coactus*. 13. Tegmen. 14. Spicular fork. 15. *A. nitidus* metathoracic wing. 16–19. *A. coactus*. 16–17. Ovipositor (16. dorsal view; 17. ventral view). 18. Male internal reproductive organs. 19. Accessory glands. 20. *A. inconstans*; female internal reproductive organs. 21. *A. coactus* brain and ventral nerve cord.

The species range from southern Mexico to western Panama.

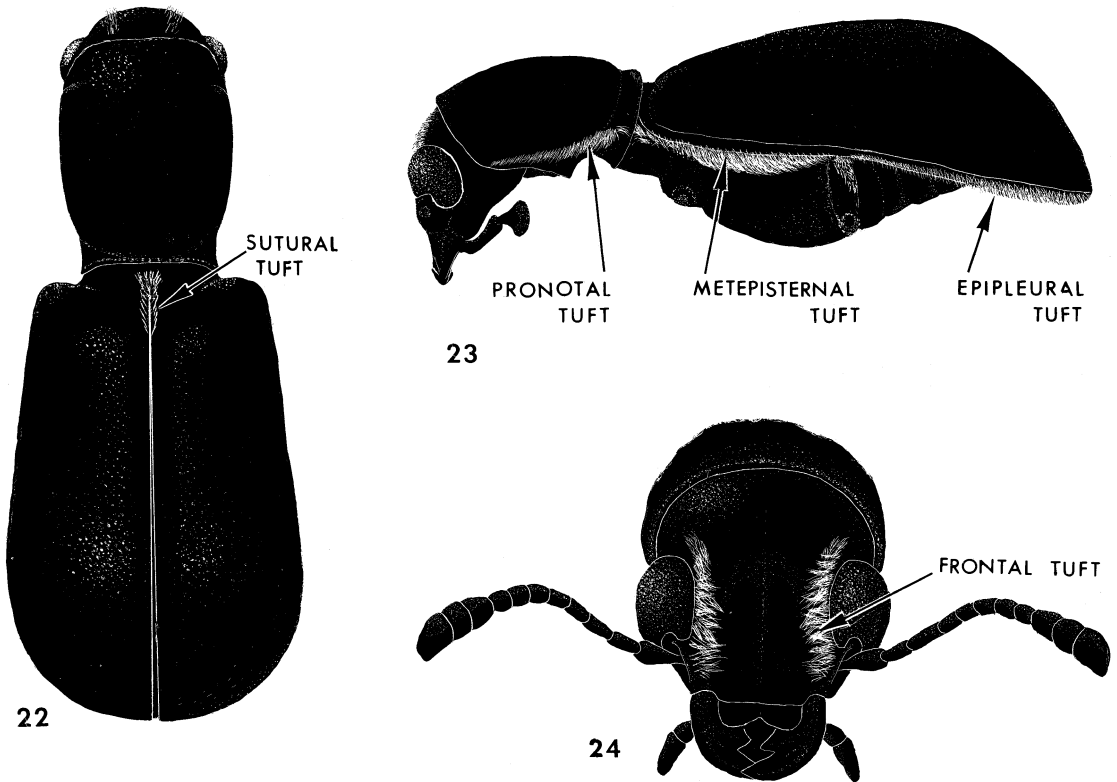
cheliferous group

These stout-bodied beetles have longitudinal ridges on the elytral disc. The testaceous color of the antennal apex is particularly notable in these beetles. They are dis-

tributed from southeastern Mexico to eastern Guatemala.

scutellaris group

In specimens of this group of species the posterior region of the pronotal disc is transversely wrinkled and the parameres are distinctly digitiform. The latter characteristic is



Figs. 22–24. Habitus views of *Aphelocerus myrmecoides*. 22. Dorsal view. 23. Lateral view. 24. Anterior view.

also present in the *myrmecoides* species group. These beetles are particularly robust, having a size range from about 5.0 to 8.0 mm. Geographically these beetles range in distribution from southeastern Mexico to Brazil.

myrmecoides group

Specimens of this species group have an abdomen that is proportionally very short. They share some characteristics with those of the *formicoides* and *cheliferous* group; for example, the elytral disc shows very shallow longitudinal swellings, the elytra are devoid of setal tufts and are exceptionally polished, and the legs are conspicuously lengthened with the femur extended well beyond the elytral apex. The pronotal tuft (on the lower sides of the pronotum) is highly developed in these beetles. Their geographic range extends from Costa Rica to Ecuador.

TROUBLESOME COUPLETS IN KEY TO SPECIES

Couplet 6(2): In this couplet it is imperative to distinguish between a midelytral setal tuft as pictured in the frontispiece and a “loose” rectangular aggregate of pale setae as pictured in figure 235.

Couplet 30(28’): The bluish luster on the pronotum varies somewhat in intensity. It is best to view the pronotum slightly tilted to the front.

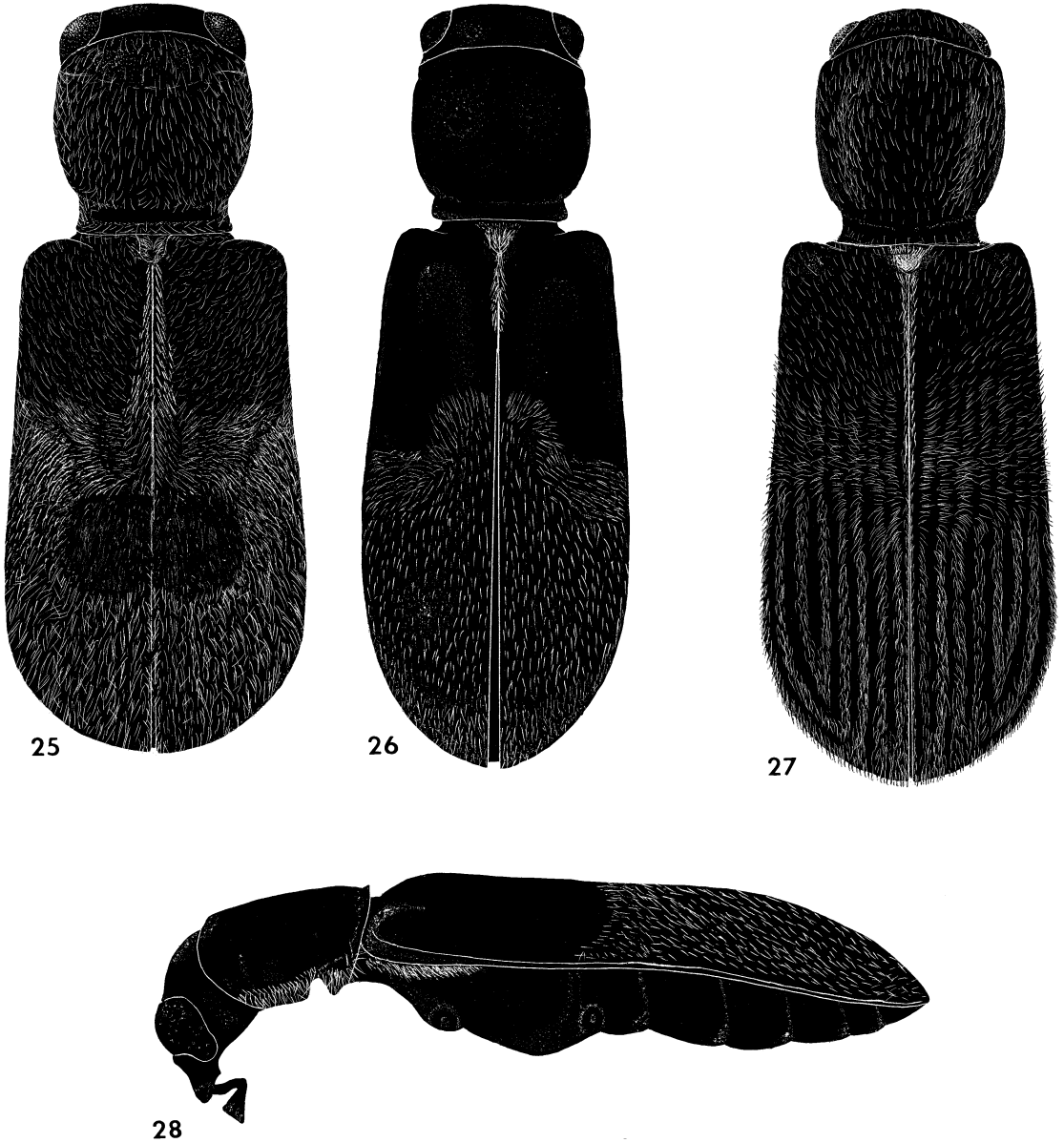
Couplet 38: A middiscal setal tuft is defined as having two patches when at least some of the posterior setae of the tuft are oriented towards the back.

KEY TO SPECIES GROUPS AND SPECIES

1. Elytra flat in basal two-thirds when viewed from side (fig. 28), elytral apical slope nearly always gradual (fig. 9), if somewhat acute

- then elytral middiscal setal tuft (as developed in the frontispiece) present; elytral disc while shining not particularly polished smooth between conspicuous setiferous punctuations setiferous punctuations never seriate 2
- 1'. Elytra boldly convex when viewed from side (fig. 11), elytral apical slope always acute (figs. 10, 11); elytral disc strongly shining and smooth between setiferous punctuations, setiferous punctuations minute and almost always seriate 51
- 2(1). Elytral disc with distinct asetiferous punctuations (fig. 259), particularly evident behind humeral angle; body length from about 6.0 mm to 10.0 mm 3
- 2'. Elytral disc without distinct asetiferous punctuations, rarely with some minute inconspicuous indentations; body length from about 4.0 mm to 8.0 mm, most about 5.0 mm 6
- 3(2). Elytral sutural margin with stout white setae; body length about 9 mm (*coalitus* group) 4
- 3'. Elytral sutural margin without stout white setae; body length about 6 mm (*echinatus* group) 5
- 4(3). Pronotal lower sides vested with white setal tuft (fig. 23), pronotal discal setae black; elytral disc with or without white linear setal streaks (fig. 29) (Mexico: San Luis Potosi; Sinaloa; Oaxaca; Colima; Jalisco; Chiapas; Quintana Roo. Guatemala: El Progreso; Baja Vera Paz; Zacapa; Belize. Honduras: Comayagua; Copan; La Paz; Cortes. Costa Rica: Cartago; Guanacaste) . . . *Aphelocerus leucomelas* (Chevrolat)
- 4'. Pronotal lower sides not vested with white setal tuft, pronotal disc setae mostly white; body dorsum vested profusely with white proclinate and reclinate setae (Mexico: Jalisco) *Aphelocerus coalitus*, n.sp.
- 5(3'). Elytral disc with longitudinal ridges; head, thorax, and elytra blue-black (Mexico: Chiapas. Guatemala: Huehuetenango) *Aphelocerus echinatus*, n.sp.
- 5'. Elytral disc without longitudinal ridges; head, thorax, and elytral basal half reddish (Mexico: Yucatan) *Aphelocerus affaniatis*, n.sp.
- 6(2). Elytral disc vested with mixture of dark and white 2° setae, 2° white setae not consolidated into midelytral setal tuft, there may be a few 2° pale setae at midelytral disc that are variously oriented, but most setae directed toward epipleural margin (fig. 27); elytral interpunctural spaces slightly roughened 7
- 6'. Elytral disc vested with mostly dark 2° setae, 2° white setae consolidated into midelytral setal tuft (see frontispiece), tuft comprised of one or two patches, sometimes posterior patch reduced (fig. 238) or absent (fig. 35); elytral interpunctural spaces not roughened 12
- 7(6). Body form robust (fig. 255b); body length about 6 mm; elytral disc always black (*ciliaris* group) 8
- 7'. Body form usually more slender (fig. 255a), rarely robust; body length about 4 mm; if larger in length and more robust in body form, then elytral disc partially reddish (*acuticollis* group) 9
- 8(7). Elytral basal half densely vested with 2° pale setae; elytral disc behind middle with oval patch of dark setae (fig. 25) (Mexico: Nayarit; Jalisco; Sinaloa; Guerrero; Colima; Chiapas) *Aphelocerus ciliaris*, n.sp.
- 8'. Elytral basal half with only a few 2° setae (Mexico: Veracruz) *Aphelocerus citimus*, n.sp.
- 9(7'). Elytra bicolored, humeral and posthumeral region proximal to epipleural margin testaceous (fig. 256), remainder black (Mexico: Durango; Oaxaca; Jalisco; Colima; Sinaloa; Guerrero; Nayarit; Morelos) *Aphelocerus delicatulus* Barr
- 9'. Elytra concolorous, black, or castaneous 10
- 10(9'). Elytral setae evenly distributed on disc; elytral color brassy (Mexico: Chiapas) *Aphelocerus aeneus*, n.sp.
- 10'. Elytral setae unevenly distributed on disc, middle of disc with loose aggregate of short setae most of which directed towards epipleural margin; elytral color black 11
- 11(10'). Elytral posterior third or fourth densely vested with pale setae; middiscal aggregate of 2° setae extends narrowly from sutural margin then widens to epipleural margin, setae of middiscal setal aggregation not particularly short (Mexico: Chiapas) *Aphelocerus bispineus*, n.sp.
- 11'. Elytral apical fourth with very few or no pale setae; setae of elytral middiscal aggregate very short (Mexico: Chiapas) *Aphelocerus acuticollis*, n.sp.
- 12(6'). Elytral disc anterior to elytral middiscal setal tuft minutely microsculptured (fig. 34); elytral disc vestiture comprised of 1° and 2° setae that are par-

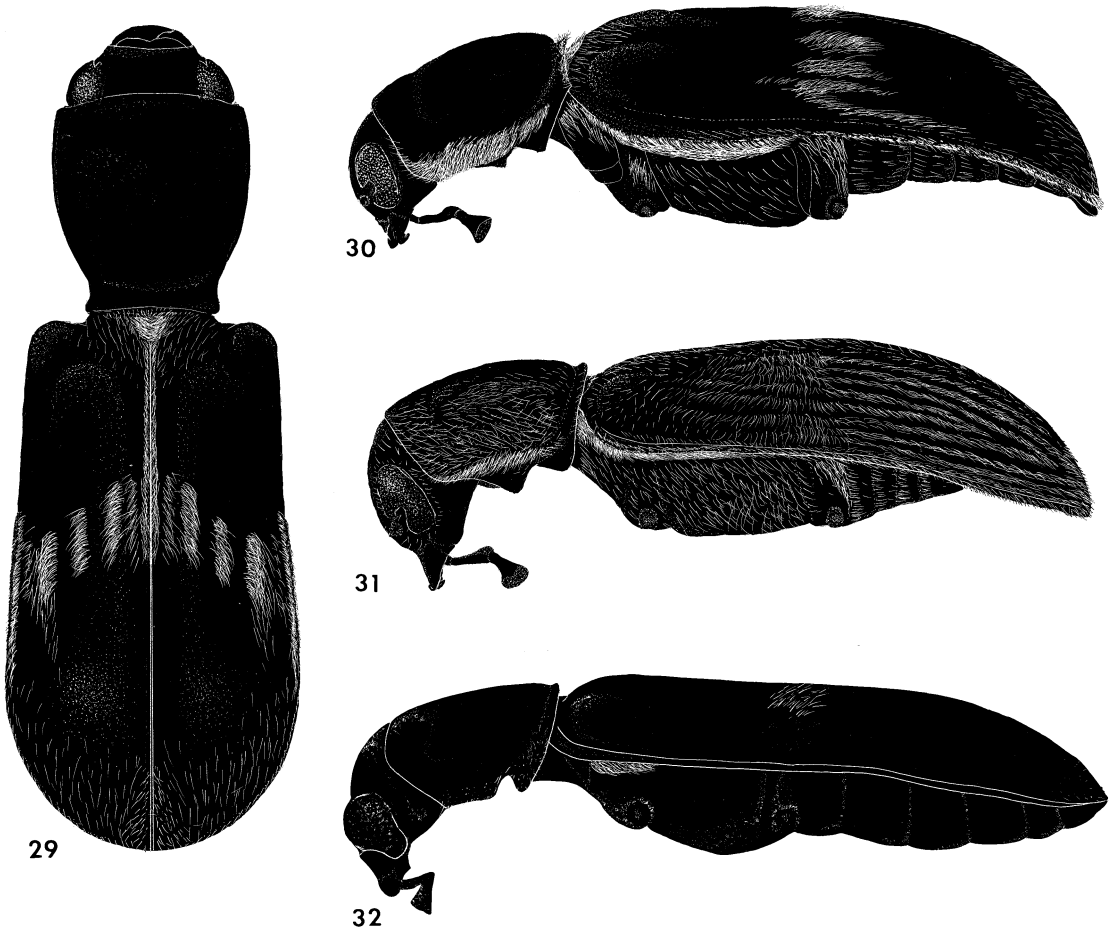
- ticularly densely distributed and are of equal length (Mexico: Chiapas. Guatemala: El Progreso; Sacatepequez; Baja Verapaz; Quezaltenango; Zacapa) (*irroratus* group) *Aphelocerus irroratus*, n.sp.
- 12'. Anterior region of elytral disc not minutely microsculptured; elytral disc moderately setose; 1° setae longer than 2° setae 13
- 13(12'). Pronotal disc very minutely finely microsculptured (*sculptilus* group) 14
- 13'. Pronotal disc not microsculptured, at most a few conspicuous punctations on or near the pronotal proper (fig. 7) 17
- 14(13). Elytral middiscal setal tuft comprised of one elongated posteriorly narrowed patch whose setae are directed to the front (fig. 240) (Panama: Cocle; Panama) *Aphelocerus sculptillus*, n.sp.
- 14'. Elytral middiscal setal tuft comprised of two patches, each patch consisting of 2° setae that as a group are orientated in various directions 15
- 15(14'). Posterior patch of elytral middiscal setal tuft densely setose (fig. 239) (Costa Rica: Puntarenas) *Aphelocerus sabulosus*, n.sp.
- 15'. Posterior patch of elytral middiscal setal tuft diminutive, comprised of only very few setae 16
- 16(15'). Elytra notably widened at middle (as in fig. 243); body length about 5.0 mm (Costa Rica: Cartago; San Jose; Limon; Heredia) *Aphelocerus cohibilis*, n.sp.
- 16'. Elytra not widened at middle, elytra outer margins subparallel (as in fig. 244); body length about 4.0 mm. (Panama; Chiriqui) *Aphelocerus chondrus*, n.sp.
- 17(13'). Elytral humeral umbo particularly prominent (fig. 10); elytral disc conspicuously depressed behind humeral umbo, middiscal setal tuft set in posthumeral depression; posterior two-thirds of the elytra highly convex (figs. 40, 242) (Colombia: Cundinamarca) (*immarginatus* group) *Aphelocerus immarginatus*, n.sp.
- 17'. Elytral humeral umbo not particularly prominent; elytral disc not particularly depressed behind humeral umbo; posterior two-thirds of elytra not highly convex (as in fig. 241) 18
- 18(17'). Anterior and posterior setal patches of elytral middiscal setal tuft very well developed (see frontispiece), if posterior patch is reduced then pronotal lower sides of pronotum always with dense line of white setae, setae of anterior patch directed towards the front, setae of posterior patch directed towards the back; elytral surface moderately smooth, somewhat shiny, and never roughly sculptured 19
- 18'. Anterior and/or posterior patch of elytral middiscal setal tuft greatly reduced (fig. 170); lower sides of pronotum never with dense line of white setae 38
- 19(18). Elytral middiscal setal tuft extended from sutural margin to epipleural margin, tuft extension to epipleural margin may involve only a few white setae (fig. 181) (*acanthus* group) 20
- 19'. Elytral middiscal setal tuft not extended from sutural margin to epipleural margin (see fig. 169) (*yungas* group) 26
- 20(19). Specimens from Central America (see fig. 283) 21
- 20'. Specimens from South America (see fig. 281) 25
- 21(20). Specimens from Nicaragua or northward 22
- 21'. Specimens from Costa Rica or southward 24
- 22(21). Lower sides of pronotum with dense line of white setae; body form narrow-rectangulate (fig. 244) 23
- 22'. Lower sides of pronotum without dense line of white setae; body form broad-rectangulate (fig. 243) (Guatemala: Huehuetenango) *Aphelocerus primigenius*, n.sp.
- 23(22). Sides of pronotum proper convex (fig. 269); body form narrow rectangulate (fig. 26) (Mexico: Chiapas; Zacapa. Guatemala: Baha Verapaz; Sacatepequez) *Aphelocerus inconstans* Gorham
- 23'. Sides of pronotum proper subparallel (fig. 270) (Nicaragua: Matagalpa) *Aphelocerus cirritus*, n.sp.
- 24(21'). Lower sides of pronotum vested with loose aggregate of white setae (Costa Rica: Puntarenas; San Jose) *Aphelocerus patulus*, n.sp.
- 24'. Lower sides of pronotum not vested with white setae (Costa Rica: Puntarenas. Panama: Chiriqui) *Aphelocerus chiriqui*, n.sp.



Figs. 25–28. Habitus views. 25. *Aphelocerus ciliaris*, dorsal. 26. *A. inconstans*, dorsal. 27. *A. coalitus*, dorsal. 28. *A. inconstans*.

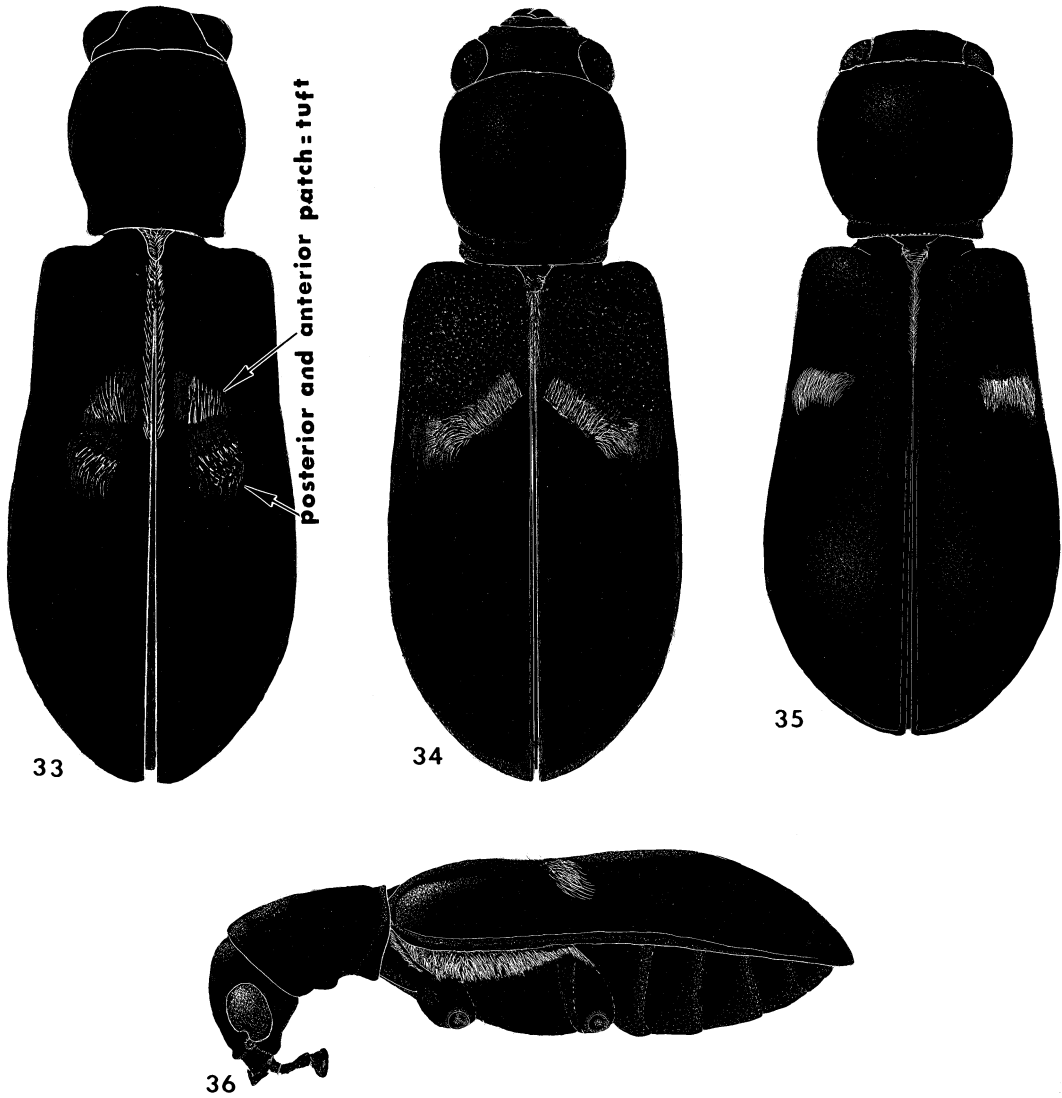
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| <p>25(20'). Specimens north of the Equator (Trinidad: Arura. Colombia: Risaralda. Venezuela: Aragua; Tachira; Falcon; Yaracuy; Trujillo. Ecuador: El Oro; Los Rios) <i>Aphelocerus sturnus</i> Kirsh</p> <p>25'. Specimens south of the Equator (Brazil: Santa Catarina; Sao Paulo; Matto Grosso. Paraguay: Itapua. Argentina:</p> | <p>Misiones)</p> <p>..... <i>Aphelocerus acanthus</i>, n.sp.</p> <p>26(19'). Specimens from Central America (Mexico to Panama) 27</p> <p>26'. Specimens from South America . . . 37</p> <p>27(26). Specimens from north of Costa Rica 28</p> <p>27'. Specimens from south of Nicaragua</p> |
|--|--|

- (Panama: Chiriqui)
 *Aphelocerus turnbowi*, n.sp.
 28(27). Posterior third of elytral disc copiously
 vested with white setae 29
 28'. Posterior third of elytral disc with no
 white setae or only a few white setae
 30
 29(28). Anterior patch of elytral middiscal setal
 tuft well developed (see frontispiece),
 posterior patch not particularly nar-
 rowed or extended posteriorly (Mexi-
 co: Tabasco; Veracruz; Oaxaca; Chia-
 pas; Yucatan. Honduras: Atlantida;
 Cortes Comayagua; Santa Barbara;
 Francisco Morazan; Copan)
 *Aphelocerus coactus*, n.sp.
 29'. Anterior patch of middiscal setal tuft
 modified to extent that setae directed
 toward epipleural margin, posterior
 patch narrowly extended posteriorly
 (Guatemala: Esquintla. El Salvador:
 San Salvador)
 *Aphelocerus extensivus*, n.sp.
 30(28'). Pronotum with bluish luster 31
 30'. Pronotum without bluish luster 33
 31(30). Curvature of posterior third of epipleural
 margin moderately arcuate (fig. 268)
 (Mexico: Chiapas; Oaxaca. Guatema-
 la: Huehuetenango)
 *Aphelocerus acutus*, n.sp.
 31'. Curvature of posterior third of epipleural
 margin strongly arcuate (fig. 267) ...
 32
 32(31'). Pronotal outer margins boldly convex
 (fig. 275) (Guatemala: Guatemala) ..
 *Aphelocerus torosus*, n.sp.
 32'. Pronotal outer margins slightly convex
 (fig. 276) (Honduras: Olancho) ...
 *Aphelocerus olanchoensis*, n.sp.
 33(30'). Pronotal disc with concentrically ar-
 ranged carina (Honduras: Francisco
 Morazan)
 *Aphelocerus vietus*, n.sp.
 33'. Pronotal disc without concentrically ar-
 ranged carina 34
 34(33'). Elytral disc notably concave behind hu-
 merus; humeral umbo prominent (as in
 fig. 10) (Honduras: Cortes)
 *Aphelocerus humerus*, n.sp.
 34'. Elytral disc not notably concave behind
 humerus; humeral umbo not particu-
 larly prominent 35
 35(34'). Specimens very small, not particularly ro-
 bust, about 4.0 mm (Mexico: Veracruz)
 *Aphelocerus cornuatus*, n.sp.
 35'. Specimen medium sized, robust, about
 5.0 mm 36
 36(35'). Specimens from southern Mexico (Mex-
 ico: Chiapas)
 *Aphelocerus domus*, n.sp.
 36'. Specimens from Nicaragua (Nicaragua:
 Matagalpa)
 *Aphelocerus capillus*, n.sp.
 37(26'). Body form slender, about 4.0 mm (Ve-
 nezuela: Amazonas)
 *Aphelocerus scalenus*, n.sp.
 37'. Body form robust, about 6.0 mm (Boliv-
 ia: Cochabamba)
 *Aphelocerus yungas*, n.sp.
 38(18'). Middiscal elytral setal tuft comprised of
 one well-developed anterior patch and
 one poorly developed posterior patch
 (fig. 166) (*batesi* group) 39
 38'. Middiscal elytral setal tuft comprised of
 one patch (fig. 171) 48
 39(38). Patches of middiscal elytral setal tuft
 widely separated (fig. 165) 40
 39'. Patches of middiscal elytral setal tuft
 contiguous 41
 40(39). Body length about 7.0 mm (Guatemala:
 state not known)
 *Aphelocerus triangulus*, n.sp.
 40'. Body length about 4.0 mm (Guatemala:
 state not known)
 *Aphelocerus saggitarius*, n.sp.
 41(39'). Specimens from Central America .. 42
 41'. Specimens from South America ... 47
 42(41). Elytral middiscal setal tuft dense, uni-
 formly narrow-oblique, together form-
 ing inverted V (Costa Rica: Cartago;
 Guanacaste. Panama: Panama; Cocle)
 *Aphelocerus catie*, n.sp.
 42'. Elytral middiscal setal tuft not dense or
 uniformly narrow, tuft often obscure
 and short 43
 43(42'). Specimens from north of Costa Rica ..
 44
 43'. Specimens from south of Nicaragua ...
 45
 44(43). Patches of elytral middiscal setal tuft
 distal from sutural margin (fig. 33),
 comprised of few setae, posterior
 patch often diminutive (Mexico: Ve-
 racruz; Puebla; Hidalgo; Tamaulipas;
 Querretaro; San Luis Potosi. Hondu-
 ras: Francisco Morazan)
 *Aphelocerus nitidus*, n.sp.
 44'. Patches of middiscal setal tuft proximal
 to sutural margin (fig. 170), anterior
 patch well developed, about twice
 length of posterior patch (Mexico:
 Chiapas. Guatemala: Sacatepequez;
 Zacapa; Baja Verapaz; Alta Vera Paz.
 Honduras: Olancho; Santa Barbara)
 *Aphelocerus lividus*, n.sp.
 45(43'). Elytral setiferous punctations seriate;



Figs. 29–32. Habitus views. 29–30. *Aphelocerus leucomelas* (29, dorsal view; 30, lateral view). 31. *A. coalitus*, lateral view. 32. *A. bufustis*, lateral view.

- posterior patch of elytral middiscal setal tuft well developed, narrowly expanded posteriorly (Panama; Panama) *Aphelocerus ebenus*, n.sp.
- 45'. Elytral setiferous punctations not seriate; posterior patch of middiscal setal tuft poorly developed 46
- 46(45'). Specimens from Province of Puntarenas, Costa Rica; body length about 5.0 mm; anterior patch of elytral middiscal setal tuft only slightly larger than sutural margins; tegmen as in figure 214 (Costa Rica: Puntarenas) *Aphelocerus monteverde*, n.sp.
- 46'. Specimens from Province of Cartago, Costa Rica; body length about 5.0 mm; anterior patch of elytral middiscal setal tuft at least twice length of posterior patch; tegmen as in figure 140 (Costa Rica: Puntarenas) *Aphelocerus arenatus*, n.sp.
- 47(41'). Hind body elongate (fig. 32); body length about 6.0 mm; pronotal lateral margins subparallel (fig. 273); elytral middiscal setal tuft poorly developed, anterior patch no longer than very short posterior patch (Venezuela: Distrito Federal) *Aphelocerus bufustis*, n.sp.
- 47'. Hind body squat; body length about 4.0 mm; pronotal lateral margins slightly rounded (fig. 272); elytral middiscal setal tuft well developed, anterior patch much longer than posterior patch (Brazil: Matto Grosso; Para; Goias; Ceara) *Aphelocerus batesi*, n.sp.



Figs. 33–36. Habitus views. 33. *Aphelocerus nitidus*, dorsal. 34. *A. irroratus*, dorsal. 35–36. *A. naevius* (35, dorsal; 36, lateral)

- | | |
|---|---|
| <p>48(38'). Elytral middiscal setal tuft far removed from sutural margin, comprised of many setae, setae directed to the back (fig. 35) (Honduras: Ocotepeque) . . . <i>Aphelocerus naevius</i>, n.sp.</p> <p>48'. Elytral middiscal setal tuft proximal to sutural margin, or comprised of only a few setae 49</p> <p>49(48'). Elytral middiscal setal tuft only slightly longer than wide, comprised of very few setae (fig. 172) (Costa Rica: Puntarenas; Cartago) <i>Aphelocerus argus</i>, n.sp.</p> | <p>49'. Elytral middiscal setal tuft transverse, much longer than wide (fig. 171) 50</p> <p>50(49'). Pronotal anterior transverse depression very faintly visible; elytral disc notably transversely depressed behind humeral umbo; curvature of epipleural margin at distal third of elytron acute (as in fig. 243) (Costa Rica: Cartago) <i>Aphelocerus protenus</i>, n.sp.</p> <p>50'. Pronotal anterior transverse depression conspicuous; curvature of epipleural margin at distal third of elytron obtuse</p> |
|---|---|

- (as in fig. 244) (Ecuador: Pichincha)
 *Aphelocerus anticus*, n.sp.
- 51(1'). Pronotal proper globose (fig. 44) (*formicoides* group) 52
- 51'. Pronotal proper elongate (fig. 43) 53
- 52(51). Elytral disc concave behind humeral umbo, with elevated longitudinal lines; lower sides of pronotum without tuft of white setae (Mexico: Chiapas. Belize. Honduras: Atlantida)
 *Aphelocerus formicoides*, n.sp.
- 52'. Elytral disc not concave behind humeral umbo, without longitudinal ridges; lower sides of pronotum with narrow tuft of white setae (Costa Rica: Limon; Cartago. Panama: Chiriqui; Cocle; Panama; Bocas del Toro)
 *Aphelocerus dispilis*, n.sp.
- 53(51'). Pronotum obcampaniform (fig. 245); antennal club notably slender (fig. 89) (*panus* group) 54
- 53'. Pronotum nearly rectangulate (fig. 246); antennal club compact (fig. 84) 56
- 54(53). Elytral disc with centrally located loose aggregate of white setae (Brazil: Goias) *Aphelocerus panus*, n.sp.
- 54'. Elytral disc without loose aggregate of white setae 55
- 55(54'). Pronotum broadly elongate (fig. 247) (Costa Rica: Heredia)
 *Aphelocerus hespenheidei*, n.sp.
- 55'. Pronotum narrowly elongate (fig. 246) (Bolivia: Santa Cruz)
 *Aphelocerus collaris*, n.sp.
- 56(53'). Posterior region of pronotal disc transversely wrinkled (*scutellaris* species group) 57
- 56'. Posterior region of pronotal disc not transversely wrinkled 60
- 57(56). Elytra compressed laterally; humerus very prominent (Mexico: Hidalgo; Veracruz; Chiapas)
 *Aphelocerus scutellaris*, n.sp.
- 57'. Elytra not compressed laterally; humerus not prominent 58
- 58(57'). Pronotum as long as wide (Mexico: Veracruz)
 *Aphelocerus improcerus*, n.sp.
- 58'. Pronotum considerably longer than wide 59
- 59(58'). Specimens large-sized (about 8 mm) (Mexico: Hidalgo)
 *Aphelocerus propinquus*, n.sp.
- 59'. Specimens medium-sized (about 5 mm) (Brazil: Amazonas)
 *Aphelocerus calvus*, n.sp.
- 60(56'). Frons with only a few pale setae (*cheliferosus* group) 61
- 60'. Frons with dense aggregation of white setae (*myrmecoides* group) 63
- 61(60). Epipleural margin curvature obtuse at elytral apical fourth (as in fig. 244) (Mexico: Veracruz)
 *Aphelocerus akis*, n.sp.
- 61'. Epipleural margin curvature acute (as in fig. 243) 62
- 62(61'). Specimens from southern Mexico (Mexico: Veracruz)
 *Aphelocerus cheliferosus*, n.sp.
- 62'. Specimens from northeastern Guatemala (Guatemala: Izabal)
 *Aphelocerus chelonus*, n.sp.
- 63(60'). Elytral disc very densely vested with dark reclinate setae (Ecuador: Pichincha) *Aphelocerus eriodes*, n.sp.
- 63'. Elytral disc vestiture comprised of moderate number of reclinate setae 64
- 64(63'). Elytral disc with strongly impressed longitudinal furrows (Costa Rica: Puntarenas) *Aphelocerus inbatus*, n.sp.
- 64'. Elytral disc without strongly impressed longitudinal furrows 65
- 65(64'). Lower sides of pronotum with well-developed tuft of white setae (as in fig. 23) (Costa Rica: Guanacaste; Puntarenas; Limon; Heredia; Alajuela; San Jose. Panama: Cocle; Panama; Bocas del Toro. Ecuador: Pichincha)
 *Aphelocerus myrmecoides*, n.sp.
- 65'. Lower sides of pronotum without setal tuft (Panama: Colon)
 *Aphelocerus discapillus*, n.sp.

DESCRIPTION OF APHELOCERUS SPECIES

COALITUS GROUP

Aphelocerus leucomelas (Chevrolat)

Figures 29, 30, 54, 126, 127, 190, 255, 257, 259; map 3

Tillus leucomelas Chevrolat, 1874: 281. Lectotype female. Here designated. "Mexico", herein type locality restricted to Orizaba, Veracruz, Mexico (MNHN). (Specimen point mounted; sex label affixed to paper point, white, machine printed; locality-species identification label, green mounted on white card, cursive; Paris Museum repository label, white with green marking; MNHN repository label, white, machine printed; lectotype label, red, machine printed; identification label, white, machine printed.) Gorham, 1882: 162. Corporaal, 1942: 137; 1950: 147.

DIAGNOSIS: These beetles are easily distinguished from other aphelocerans of the *coal-*

itus species group by their large size (about 10 mm) and by the often present short, longitudinal and obliquely arranged streaks of white setae on the elytral disc (figs. 29, 30). *A. leucomelas* (Chevrolat) specimens without white elytral setal streaks may be distinguished from superficially similar specimens of *A. coalitus*, n.sp. by the absence of decumbent white setae in individuals of *A. leucomelas* (Chevrolat) which are densely distributed throughout the elytral disc in specimens of *A. coalitus*, n.sp.

DESCRIPTION: *Size:* Length 8.9–10.1 mm; width 3.1–4.2 mm. *Integument:* Black, with streaks of white setae on elytral disc. *Vestiture:* With tuft of white setae on lower sides of pronotum, metepisternum, and elytral suture; cranium sparsely setose; pronotum densely vested with proclinate setae; mesoscutum and mesoscutellum densely matted with white setae; midelytron usually vested with five, variously developed, obliquely arranged streaks of white setae, setal streaks increase in length from those near suture to those near epipleuron, streak near epipleuron very long; elytral disc also vested with stout verical and short reclinate black setae; dense vestiture of setae on pterothorax, abdomen, and legs predominantly white. *Head:* Width across eyes equal to width across greatest width of pronotum; finely sparsely punctate; interocular depressions particularly deep; frontal umbo prominent; eyes oblong, moderately convex; antenna as in figure 54. *Thorax:* Pronotum elongate (47:51), narrower than width of elytra across humeri (47:63), densely finely punctate, side margins moderately arcuate, subapical depression very shallow; elytra with asetiferous and setiferous punctations and moderately convex in posterior half, depth of humerus 24, greatest depth in posterior half 30, humerus projecting. *Abdomen:* Male pygidium somewhat trigonal (as in fig. 101), female pygidium broad scutiform. *Male internal reproductive organs* (fig. 190): Two pairs of accessory glands; lateral gland uniramous, coiled distally and diverticulated basally; medial gland biramous, slender. *Male genitalia:* Aedeagus moderately sclerotized; parameres (fig. 126) well developed; ventral sinus half longer than dorsal sinus; phallic plicae (fig. 127) particularly

well developed. *Female genitalia:* Dorsal lamina trilobed, ventral lamina unilobed.

VARIATIONS: The antennal club is less robust in specimens from Costa Rica, the elytra are nearly brunneus in one specimen from Comayagua, Honduras, and the definition and number of white setal streaks on the elytral disc vary. The streaks are absent in some specimens from Guatemala, Honduras, and all available specimens from Costa Rica. The specimen from El Progreso, collected by J. E. Wappes, differed in that the lower sides of the pronotum lack a definitive white setal tuft. For the present, I ascribe this difference to represent intraspecific variation.

NATURAL HISTORY: From Mexico, specimens were collected during May, June, and July; from Guatemala during June and July (690–762 m); from Honduras during May and June, (609–850 m); and from Costa Rica during April, May, and June (70–600 m). J. Rifkind and P. Gum collected one specimen at 1067 m by beating burned vegetation in a pine and oak forest. They collected another specimen with light in Belize, during June at 290 m in a riparian habitat surrounded by hardwoods.

DISTRIBUTION (map 3): This Central American species ranges from Mexico to Costa Rica.

MATERIAL EXAMINED: I examined 22 specimens from: Mexico: Veracruz: 3.3 km SE San Andres Tuxtla, 9-VII-1963; 8 km E Veracruz, 12–25-VII-1964, E. Fisher, D. Verity; San Luis Potosi: El Salto, 9-VI-1966, J. B. Karren, at blacklight; Quintana Roo: 18–24 km S San Felipe Carr. Pte., 21-IV-1-I-1984, J. E. Wappes, feeding on blossoms of woody plant; Chiapas: 2 km W Chicoasen, 30-V-1987, thorn forest, B. Ratcliffe & M. Jameson; Hwy. 199, 10 km S Palenque, San Manuel Rd., 30-V-1987, D. A. Rider, E. G. Riley, collected at mercury vapor & blacklight; Parque Aguacero, 20–23-VI-1987, J. E. Wappes. *Guatemala:* El Progreso: 10–12 km N Estn. de la Virgen, 2000–2500 m, 3-VI-1991, J. E. Wappes; 8 km N La Estancia, 3-VI-1991, E. Giesbert; Baja Verapaz: 58.3 km S. Purulha, 690 m, F. Genier, hand collected; Zacapa: Rd. to San Lorenzo, 549 m, 30-IV-4-VI, E. Giesbert. *Belize.* Honduras: Francisco Morazan: Cortes: P. N. Agua Azul Meambar., mv + bl, 30-IV-1995, R. Turnbow; La

Paz: La Paz, 23-VI-1979, J. A. Chemsak, M. Michelbacher, W. W. Middlekauff; Comayagua: 29-IV-1979, E. Giesbert; Copan: Ruinas de Copan, 22–23-VI-1978, E. Giesbert, El Paraiso. Costa Rica: Cartago: Turrialba, Centro Agronómico Tropical de Investigación y Enseñanza (CATIE), 23-VI-1996, F. Hovore; 19–21-IV-1981, E. Giesbert; Guanacaste: Estacion Los Almendros, P. N. Guanacaste, 300 m, 3–30-IV-1994, E. Lopez; Est. Maritzas, oeste del Volcan Orosi, 600 m, VI-1990; R. Blanco: Limon. Specimens are deposited in: CASC, CDAE, CMNC, EMUS, FSCA, INBC, JEWG, JNRC, LSUC, NMNH, UNSM, RHTC, and WOPC.

REMARKS: There are several seemingly disjunct populations of this species ranging from southeastern Mexico to Guatemala, Honduras, and Costa Rica. The specimens from Costa Rica do not have white 2° setae on the elytral disc, a setal development also found on one specimen from Guatemala. All of the other northern specimens examined have longitudinal 2° setal streaks, albeit variable in size and form. The aedeagus is virtually identical in all males examined. The homogeneity of male genitalia and the variation of the 2° setal streaks in the northern specimens suggest that the somewhat disjunct populations of this species are conspecific.

Aphelocerus coalitus, new species

Figures 9, 27, 31, 55, 97–101, 128, 129, 155; map 4

HOLOTYPE: Male. Mexico: Nayarit: San Blas, 24-VI-1968, I. Bassols (MNHM). (Specimen pin mounted; support card with affixed sex label, white, machine printed; locality label, white, machine printed; MNHM repository label, white, machine printed; holotype label, red, machine printed; plastic vial with abdomen and aedeagus.)

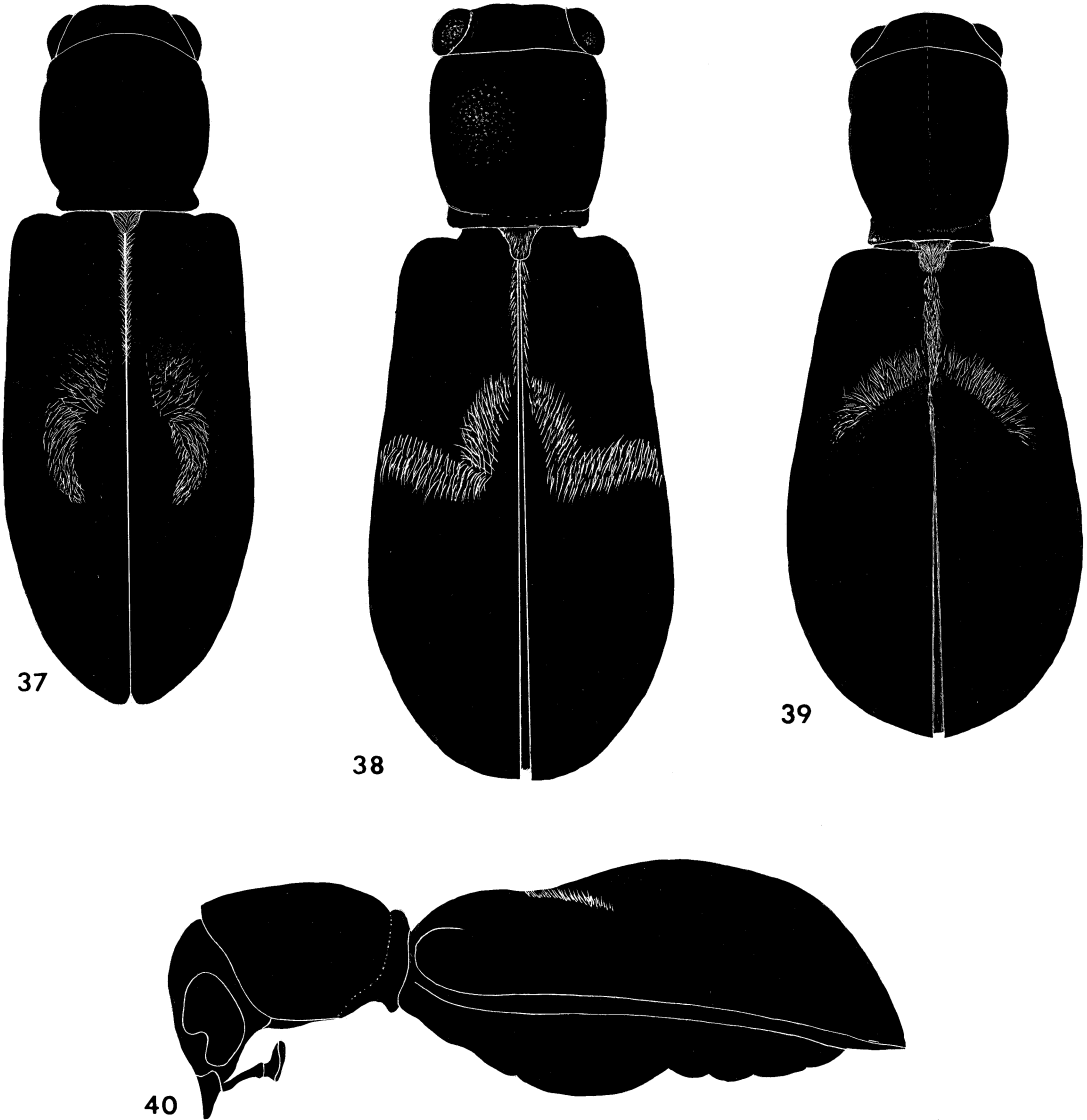
PARATYPES: Thirteen specimens. Mexico: Sinaloa: Mazatlan, 3.1 km N Sinaloa, 23-VII-1972, J. & M. A. Chemsak & A. & M. Michelbacher (EMEC, 1); Oaxaca: 13 km S Matias Romero, 2-VII-1964, C. D. Johnson (WOPC, 1); Colima: Lange, (MNHN, 1); Guerrero: Chilpancingo, J. Flohr G. (ZMHB, 1); Jalisco: Careyes, Hotel Costa Careyes, 7-VII-1991, J. Rifkin, P. Gum (JNRC, 1); 5–6-VII-1991,

tropical deciduous forest, beating, J. Rifkind, P. Gum (JNRC, 2); Est. Biol. Chamela, 2-VII-1995, R. L. Westcott (WOPC, 1); vic. Est. UNAM, 9–19-VII-1993, J. Heuther (JPHC, 1; JEWG, 1; WOPC, 1); Mexico, Playa Teopa, 6-VII-1991, beating vines (JNRC, 1); “Mexico”: Lange (MNHN, 1).

DIAGNOSIS: The dense vestiture of white decumbent 2° setae on the pronotum and elytra of these beetles will easily distinguish them from *A. leucomelas* (Chevrolat) of similar size. The elytral setal streaks (fig. 27) become confluent posteriorly (fig. 31).

DESCRIPTION: *Size*: Length 8.5–9.3 mm; width 3.4–4.0 mm. *Integument*: Picine. *Vestiture*: Body densely vested with white setae; with dense aggregate of white setae on pronotal lower sides, metepisternum, and elytral suture; mesoscutellum matted with white setae; elytral disc densely vested with short white decumbent setae that are proclinate in anterior half, reclinate in posterior half, and sometimes arranged into distally confluent longitudinal rows; posterior half of epipleuron densely lined with band of white setae. *Head*: Width across eyes slightly narrower than width across widest part of pronotum (48:53); finely punctated; interocular depressions and frontal umbo shallow; eyes oblong, convex; antenna as in figure 55. *Thorax*: Pronotum elongate (53:60), slightly narrower than width of elytra across humeri (53:63), coarsely punctate, tendency towards scabrous, side margins feebly arcuate, subapical depression faintly visible; elytra with asetiferous punctations, elytra feebly convex in posterior half, depth at humerus 35, greatest depth in posterior half 40, surface scabrous. *Abdomen*: Male pygidium as in figures 97 and 101, sixth visible sternum (fig. 98) deeply incised at distal margin; female pygidium as in figure 99, sixth visible sternum as in figure 100. *Male genitalia* (fig. 155): Aedeagus moderately sclerotized, tegmen as in fig. 128, ventral sinus twice length of dorsal sinus, phallic plicae (fig. 129) particularly well developed. *Male internal reproductive system*: Two pairs of accessory glands; medial gland undivided and coiled; lateral gland divided into two branches.

VARIATION: The elytra may be subcarinate and may reflect a brunneus cast. In some specimens the humerus is testaceous and the



Figs. 37–40. Habitus views. 37. *Aphelocerus extensivus*, dorsal. 38. *A. patulus*, dorsal. 39–40. *A. immarginatus* (39, dorsal; 40, lateral).

linear arrangement of white setae on the elytral disc is not clearly defined.

NATURAL HISTORY: Specimens were captured during June and July. One specimen was taken in a tropical deciduous forest, at light.

DISTRIBUTION (map 4): The distribution of this species seems to be restricted to Mexico, along the western slopes of the Sierra Madre

Occidental and the more southern Sierra Madre del Sur.

ETYMOLOGY: The trivial name *coalitus* is derived from the Latin adjective *coalesco* (unite). I refer to the posterior coalescence of the white setal lines near the elytral apex that is clearly visible in some specimens.

REMARKS: The specimens of *A. leucomelas* (Chevrolat) referred to by Corporaal in his

note 37 (1949: 343) actually refer to members of this species.

ECHINATUS GROUP

Aphelocerus echinatus, new species

Figures 51, 125, 144b; map 21

HOLOTYPE: Male. Mexico, Chiapas, Hwy. 190, 9 km NW Tuxtla Gutierrez, 800 m, UV light, June 15, 1991, E. Barchet (LACM). (Specimen pin mounted; support card with sex label, white, hand printed; locality label, white, machine printed; natural history label, white, machine printed; LACM repository label, white, machine printed; holotype label, red, machine printed; plastic vial with abdomen and aedeagus.)

PARATYPES: Twenty-three specimens. Five specimens from the same locality as the holotype (JNRC, 4; WOPC, 1). Mexico: Chiapas: 17 km W Tuxtla Gutierrez, 1006 m, 1-VIII-1998, J. E. Wappes (JEW, 4; USNM, 1; WFBC, 1; WOPC, 3); 17 km W Tuxtla Gutierrez, 1006 m, 21-25-VI-1987, E. Giesbert (FSCA, 3); 27-VI-8-VII-1986, E. Giesbert (WOPC, 1); 10 km W Tuxtla Gtz, 22-VI-1989, D. Thomas, H. Howden, J. Burne (JPHC, 1); Aguacero, 40 km W Tuxtla Gutierrez, 20-VI-1987, W. F. Chamberlain, (TAMU, 1); El Sumidero Parque, 23-24-VI-1990, J. Huether (JNRC, 1). Guatemala: Huehuetenango: 15 km N Nenton, 950 m, 5-VI-1997, E. Giesbert, J. Monzon (FSCA, 1; WOPC, 1).

DIAGNOSIS: The longitudinal carina on the shallowly scabrous elytral surface distinguishes the members of this species.

DESCRIPTION: *Size:* Length 6.2–7.5 mm; width 2.4–2.8 mm. *Integument:* Cranium, pronotum, and elytra cyanescent; thorax, legs, and abdomen piceous. *Vestiture:* Integument vested profusely with pale setae and few dark setae; tarsal setae mostly black; elytral setae proclinate in elytral anterior half and variously oriented in elytral posterior half. *Head:* Width across eyes only slightly narrower than width across pronotum (30:33); cranium finely punctate; interocular depressions and frontal umbo well developed, shallow; eyes subspherical, moderately convex; antenna as in figure 51. *Thorax:* Pronotum subequal in width and length (33:32), narrower than width of elytra across humeri

(33:44), densely, finely punctated; side margins moderately convex; anterior transverse depression faintly developed; elytra with many small asetiferous punctations, plane in anterior half, feebly convex in posterior half, depth at humerus 17, greatest depth in posterior half 20; surface shallowly, longitudinally carinate and scabrous. *Abdomen:* Posterior margin of pygidium evenly arcuate in both sexes. *Male genitalia* (fig. 125): Paramere with subapical spine on outer margin.

VARIATION: The femora and tibiae may be testaceous; the elytra vary from slightly violaceous to piceous.

NATURAL HISTORY: The available specimens were collected from Mexico during June (UV light at 800 m) and July (1006 m), and from Guatemala during early June at 950 m.

DISTRIBUTION (map 21): Known from southeastern Mexico and southwestern Guatemala.

ETYMOLOGY: From the Latin adjective *echinatus* (spiny). I refer to the spine on the parameres.

Aphelocerus affaniatis, new species

Figures 85, 144a; map 4b

HOLOTYPE: Male. Mexico: Yucatan: Cordelera Mayapan, June 29, 1952, J. & D. Palister (AMNH). (Specimen point mounted, sex label affixed to paper point, white, machine printed; support card, white; locality label, white, machine printed; expedition label; AMNH repository label; holotype label, red, machine printed; plastic vial with abdomen and aedeagus.)

PARATYPES: Four specimens. Mexico: Yucatan: Chichen Iza, 27-VI-1970, R. E. Beer and party (EMEC, 1); 2 km E Chichen Iza, 26-VI-1981, C. L. Bellamy (WOPC, 1); Quintana Roo: 18–24 km N San Felipe Cerr. Pte., 27-V-1-VI-1984, J. E. Wappes (JEW, 1); 3 km N X-Thobil, 17-VI-1990, R. Turnbow (WFBC, 1).

DIAGNOSIS: The reddish coloration on the basal half of the elytra will distinguish the members of this species from the closely related members of *A. echinatus*, n. sp. which differ by having the elytra totally blue-black.

DESCRIPTION: *Size:* Length 5.0–6.5 mm; width 1.9–2.2 mm. *Integument:* Cranium, prothorax, and basal half of elytra reddish,

mouthparts, antenna pterothoracic venter, legs, abdomen, and apical half of elytral disc piceous. *Vestiture*: Head, antenna, venter of thorax, pro-, meso-, and metathoracic femora and tibiae, discal portion of elytral apex, and abdomen with white setae, anterior margin of protibiae, all tarsi, pronotal, and elytral disc vested with dark setae; with a few variously oriented 2° setae at middle of elytral disc. *Head*: Width across eyes narrower than width across pronotum (45:52), finely punctate; interocular depression and fronal umbo shallow; eyes subspherical, moderately convex; antenna as in figure 85. *Thorax*: Pronotum about as wide as long (52:51), considerably narrower than width of elytra across humeri (52:60), finely sparsely punctated, side margins prominently arcuate, anterior transverse depression prominent; elytra moderately convex when viewed from side; depth at humerus 30, greatest depth in posterior half 38, humeral tumescence indistinct. *Abdomen*: Pygidium posterior margin evenly arcuate; aedeagus as in figure 144a.

VARIATION: The dark posterior portions of the elytral disc vary in intensity. The head and prothorax of the male from Yucatan is dark brown.

NATURAL HISTORY: Specimens were collected in May and June.

DISTRIBUTION (map 4b): Specimens have been collected from the Yucatan Peninsula.

ETYMOLOGY: The trivial name *affaniatis* is a Latin compound name derived from the adjectival *affania* (= chatter) and the suffix *-tis* (= action). The name refers to the frequent occasions during which I have discussed with colleagues the generic placement of this and other species akin to this species.

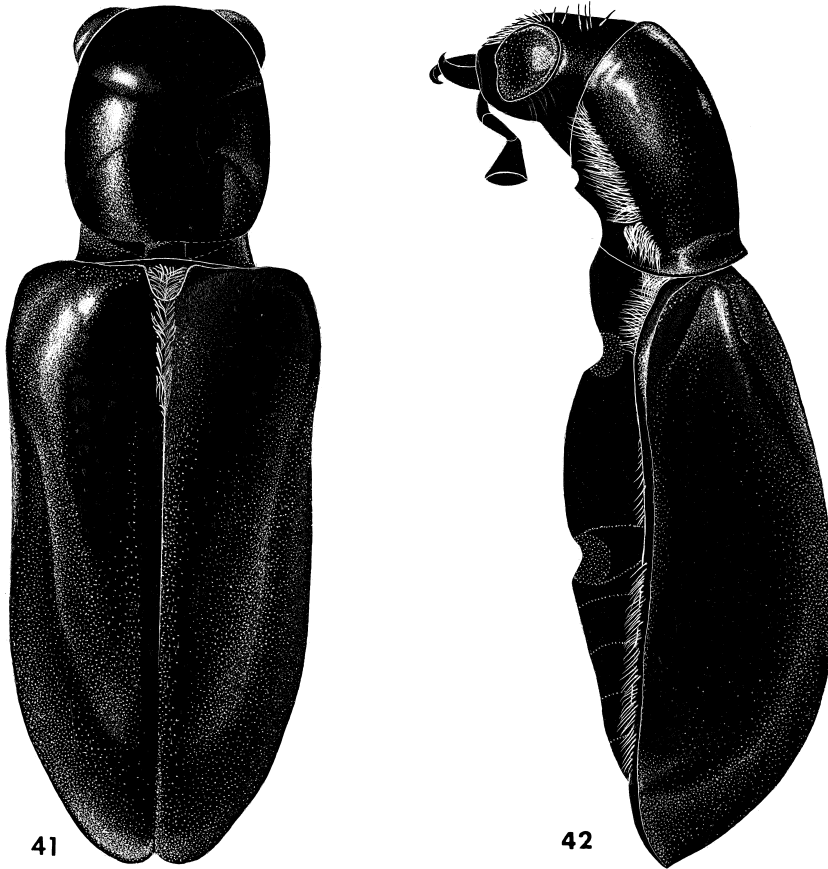
CILIARIS GROUP

Aphelocerus ciliaris, new species

Figures 25, 48, 91–94, 154, 207, 208, 255b, 260; map 1

HOLOTYPE: Male. Mexico, Nayarit, Pinchon, 7–5–56, R. & K. Driesbach (MSUC). (Specimen point mounted, sex label affixed to point, white, machine printed; paper point with antenna; support card; locality label, white machine printed; holotype label, red, machine and hand printed; plastic vial with aedeagus.)

PARATYPES: One hundred eight specimens from the same locality as the holotype (MSUC, 1; WOPC, 2). Mexico: Nayarit: Tepic, 7-V-1956, R. & K. Driesbach (MSUC, 1; WOPC, 1); 24-VI-1940, L. W. Saylor (USNM, 1); Sinaloa: 52 km E Villa Union, 9-VIII-1964, H. F. Howden (CMNC, 1; WOPC, 1); Concordia, 23-IV-1964, Howden & Martin (CMNC, 1); 35 km E Concordia, Hwy. 40, 4-VII-1987, C. L. Bellamy (WOPC, 1); Colima: (MNHN, 1): Jalisco: Hwy. 80, 3.7 km NE of Barra de Navidad, 152 m, 11-VIII-1982, C.W. O'Brien, L. O'Brien, & G. J. Wibmer (JNRC, 3); Rio Purification at Hwy. 200, 7-VII-1987, C. L. Bellamy (WFBC, 1); Chamela, 27-VI-1987, F. A. Noguera (WOPC, 1); Est. Biol. 7-VII-1987, at light, J. Chemsak, E. G. & J. M. Linsley (EMEC, 3); Estacion de Biologia Chamela, 3-VII-1986, "Atraido a la luz", Felipe A. Noguera M. (WOPC, 1); vic. UNAM, 9–19-VII-1993, J. E. Wappes (JEW, 7; WOPC, 3; USNM, 1); 6 km N El Tuito, 15–16-VII-1993, J. E. Wappes (JEW, 1; WFBM, 1); Hwy. 200, 10 km S El Tuito, 396 m, 8-VII-1991, beating *Acacia*, oak forest, J. Rifkind & P. Gum (WOPC, 1); Hwy. 200 at El Tuito, 650 m, 8-VII-1993, beating (WOPC, 1); 2 km W Hwy. 200, on rd. to Motel El Tucan, Jct 7 km S Emiliano Zapata, 243 m, beating, 7-VII-1991, tropical deciduous forest, J. Rifkind, P. Gum (JNRC, 3; WOPC, 1); Estacion de Biologia Chamela, UNAM, 9–14-VII-1993, Morris, Huether, Wappes, blacklight (RFMC, 4); Est. Biol. Chamela, 2-VII-1994, R. L. Wescott (WFBC, 3; WOPC, 2); 4-VII-1995, coll. w/ tropics net, R. L. Wescott (WFBC, 2); 5-VII-1994, R. L. Wescott (WFBC, 2; WOPC, 2); 30-VII-1994, R. L. Wescott (WFBC, 1; WOPC, 1); 30-VI-1994, tropics net, R. L. Wescott (WFBC, 1); "Eje Central", 2-VII-1995, R. L. Wescott (SEMC, 1; WFBM, 4; WOPC, 1); 15-23-VII-1987, F. T. Hovore (WOPC, 1); Estacion de la Biologica UNAM, bl + mv, 17-VII-1987, R. Turnbow, (RHTC, 7; WFBM, 1; WOPC, 2); Chamela, vic. Estacion UNAM, 9–19-VII-1993, J. Huether (JPHC, 4); Nayarit: Hwy. 200, 20 km E Las Piedras, 730 m, 7-VI-1991, W. B. Warner (JNRC, 4; WOPC, 1); 3 km SW Confradia de Suchitan, 1219 m, 21-VII-1995, J. Rifkind & A. Reifschneider (WOPC, 1); Colima:



Figs. 41–42. Habitus views of *Aphelocerus scutellaris* (41, dorsal; 42, lateral).

San Antonio, N of Comala, 1128 m, 21-VII-1995, J. Rifkind & A. Reifschneider (JNRC, 3; WOPC, 2); San Antonio, 1128–1158 m, 21-VII-1995, J. Rifkind (JNRC, 3); Oaxaca: 7 km NE San Pedro Mixtepec, 16-VI-1985, Jones, Schaffner (TAMU, 1); Guerrero: Hwy. 134, 36 km NE Jct. 200, 19-VII-1985, J. E. Wappes (WOPC, 1); 51 km NW Ixtapa, 18-VII-1985, R. Turnbow (RHTC, 1); Chiapas: El Sumidero, Mirador, La Coyota, 24-VI-1990, R. Turnbow (RHTC, 1; WOPC, 1); 9–12, 24-VI-1990, R. Turnbow (RHTC, 1); Parque Nacional, Canon del Sumidero, Mirador, 1100 m, 21-VI-1991, Trop. Decid. Forest, J. & E. Beierl (JNRC, 1); Parque Nacional, “El Sumidero”, 23-VI-1990 (JPHC, 1; WOPC, 1); Parque Nacional, El Sumidero, 27-VI-1990, M. C. Thomas (FSCA, 1); 2 km S Chicoasen, 18-VI-1989, S. Testa & E. Zuc-

caro (UMIC, 1); Parque Nacional Sumidero, 14-VI-1990, 1000 m, H. & A. Howden (CMNC, 5).

DIAGNOSIS: The dense vestiture of short white setae on the dorsum gives these beetles a silky appearance, especially on the elytral disc where the setae are directed posteriorly on the elytral posterior half and anteriorly and posteriorly on the elytral anterior half. The elytral surface is shallowly rugose. At midelytron, there is a narrow admixture of reclinate, proclinate, and laterally projecting setae that anteriorly interphase with mostly proclinate setae. Immediately behind the midelytron the predominance of white reclinate setae is interrupted by a centrally located diffuse patch of black setae (fig. 25). A midiscal elytral aggregate of white setae is not present. Specimens of the other species in

this species group, *A. citimus*, n.sp., have only a few pale setae on the anterior half of the elytral disc.

DESCRIPTION: *Size:* Length 4.8–5.5 mm, width 1.8–2.1 mm. *Integument:* Piceous, with or without cyanescent hue. *Vestiture:* Clypeus, frons, and epicranium vested with long subrecumbent white setae; setae proclinate on clypeus and lower sides of frons, directed laterally on interocular depression, and mesally on upper frons, frontal umbo, and epicranium; pronotum densely vested with long subrecumbent proclinate white setae intermixed with longer, more erect, black setae, setae on pronotal side margin conspicuously longer than discal setae; mesoscutellum matted with white setae; elytra vested with short white setae that are proclinate at elytral anterior half, setae oriented laterally at elytral middle and posteriorly in elytral posterior half; elytral sutural margin densely setose, but not producing a setal tuft; metepisternal tuft moderately prominent; antenna, pterothorax, legs, and abdomen densely setose. *Head:* Width across eyes slightly narrower than width across pronotum (28:29), coarsely punctated; interocular depressions and frontal umbo broad and shallow; eyes subspherical, moderately convex; antennae short, much shorter than length of pronotum, as in figure 48. *Thorax:* Pronotum feebly transverse (29:28), narrower than width of elytra across humeri (29:36), profusely finely punctated, side margins moderately arcuate, feebly incised by anterior transverse depression; elytra feebly convex in posterior half, depth at humerus 15, greatest depth in posterior half 20; surface arenose to feebly scabrous. *Abdomen:* Male pygidium (fig. 91) quadrate, sixth visible sternum (fig. 92) transverse and incised at distal margin; female pygidium (fig. 93) quadrate, sixth visible sternum (fig. 94) not incised at distal margin. *Male genitalia:* As in figures 154, 207, and 208 aedeagus short, broad, moderately sclerotized; parameres well developed, subcuminate, outer margin of parameres notched at base; dorsal surface broader than ventral surface; ventral sinus twice length of dorsal sinus, phallic plicae well developed. *Female genitalia:* Dorsal lamina trilobed, ventral lamina unilobed.

VARIATIONS: The legs and elytral coloration

vary from brunneus to cyanescent and in specimens from the southern portions of the distribution the apical region of the elytra is vested with more dark setae than light setae.

NATURAL HISTORY: Specimens have been collected from April through August. One specimen from Chamela is associated with *Lysiloma divaricata*. Two specimens were collected by beating deciduous trees at 243 m. Two other specimens were taken at 579 m and four at 1228 m. Several beetles were collected at light. Rifkind and Gum captured one specimen by beating *Acacia* at 396 m.

DISTRIBUTION (map 1): This species ranges from the western slopes of the Sierra Madre Occidental to western forests of the Transvolcanic Sierra to the more southern Chiapan highlands of the Sierra Madre of Mexico.

ETYMOLOGY: The trivial name *ciliaris* is derived from the Latin noun *cilium* (eyelid) and the suffix *-is* (having the nature of). I refer to the abundance of fine setae on the dorsum of the elytra.

Aphelocerus citimus, new species

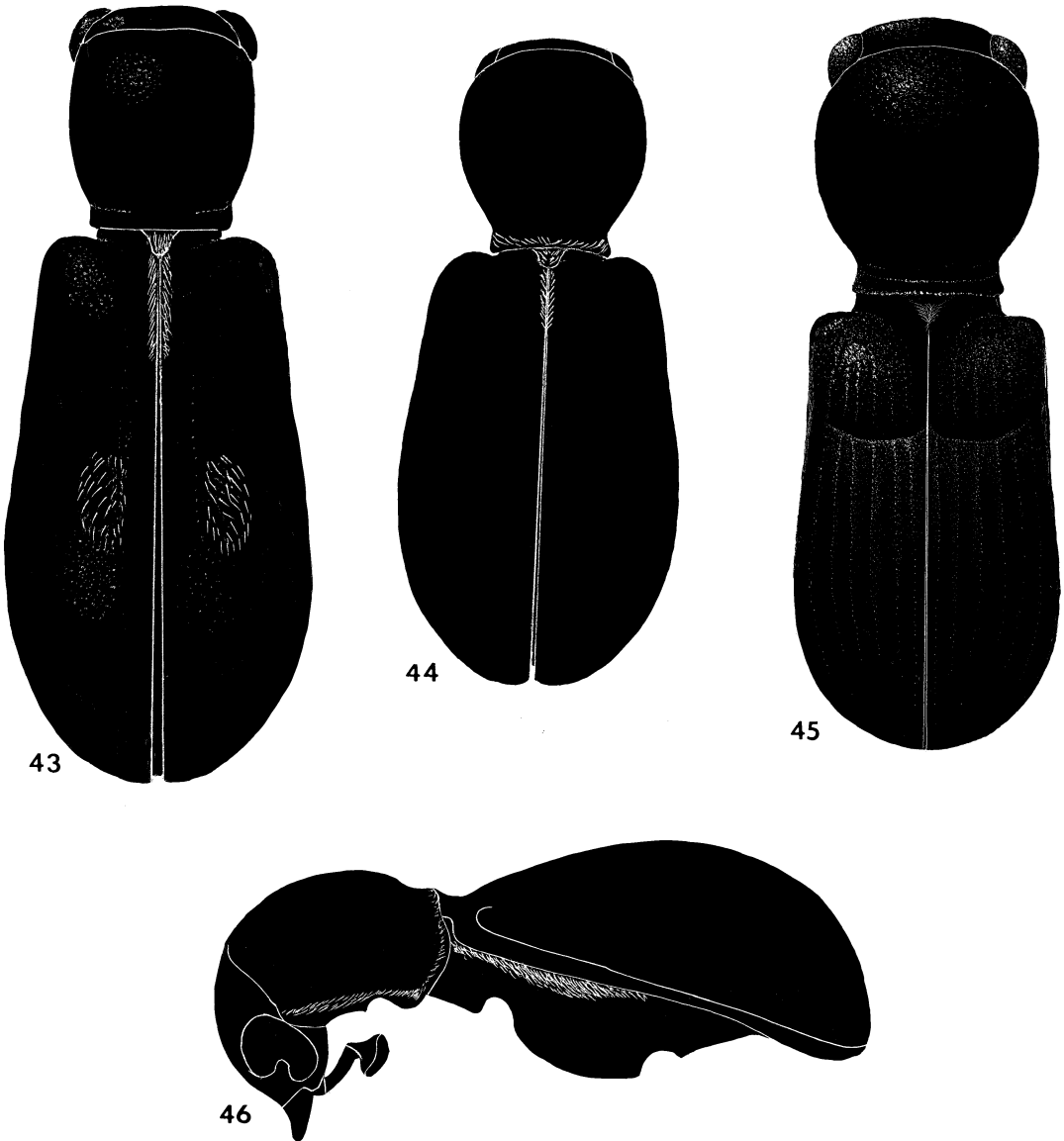
Figures 53, 123; map 21

HOLOTYPE: Male. Mexico, Ver., Jalapa, Botanical Gardens, 9 June 1983, 1320 m, C. & L. O'Brien & G. B. Marshall (LACM). (Specimen point mounted, sex label affixed to paper point, white, hand printed; support card, white, locality label, white, machine printed; LACM repository label, white, machine printed; holotype label, red, machine printed; plastic vial with abdomen and aedeagus.)

PARATYPES: None.

DIAGNOSIS: The available specimen superficially resembles the member of *A. inconstans* (Gorham), but in *citimus* beetles the lower aspects of the pronotum lack the dense aggregate of the white setae.

DESCRIPTION: *Size:* Length 6.2 mm; width 2.2 mm. *Integument:* Cranium, pronotum, pterothorax, and abdomen cyanescent; elytra and legs black. *Vestiture:* Apical half of elytra densely vested with patch of variously oriented setae; legs vested with white setae. *Head:* Interocular depressions and frontal umbo shallow; width across eyes equal to width across pronotum (40:40); antenna as in figure 53. *Thorax:* Pronotum longer than



Figs. 43–46. Habitus views. **43.** *Aphelocerus panus*, dorsal. **44.** *A. dispilis*, dorsal. **45.** *A. formicoides*, dorsal. **46.** *A. dispilis*, lateral.

wide (47:40), considerably narrower than width of elytra across humerus (40:50), anterior transverse depression well developed, side margins moderately arcuate; elytra shallow, depth at humerus 20, greatest depth in posterior half 25. *Abdomen*: Male pygidium with posterior margin evenly arcuate. *Male genitalia*: As in figure 123.

NATURAL HISTORY: The available specimen was collected in June, at 1320 m.

DISTRIBUTION (map 21): Southeastern Mexico.

ETYMOLOGY: From the Latin *citimus* (nearest). I refer to the superficial resemblance between specimens of *A. citimus* n.sp., and those of *A. inconstans* (Gorham).

BISPINEUS GROUP*Aphelocerus delicatulus* (Barr)

Figures 193, 256; map 24

Placopterus delicatulus Barr, 1976: 31. HOLOTYPE: Female. Mexico, 6.5 mi E Patrellos, Sinaloa, 21-VIII-1964, M. E. Irwin (CASC). (Specimen point mounted, sex label attached to paper point, white, machine printed; support card, white; locality label, white, machine printed; holotype label, red, hand printed; California Academy of Sciences repository label-type # 12, 697; plastic genitalia vial with aedeagus.) NEW COMBINATION.

PARATYPES: Three paratypes from the same locality as the holotype (UCRC, 1); 20-VIII-1964 (WFBC, 1). Mexico: Morelos: Tepotzlan, 26-IX-1957, R. & K. Driesbach, (MSUC, 1).

DIAGNOSIS: The testaceous coloration of the humeral region of the elytra (fig. 256) easily distinguishes the members of this species from all other aphelocerans.

DESCRIPTION: *Size*: Length 4.0–6.0 mm; width 1.2–2.5 mm. *Integument*: Lower half of frons, lower gena, clypeus, mouthparts, antenna, legs, sides of pronotum, prosternum, and lateral portion of basal half of elytra testaceous, remainder steel blue; covered with short pale and long dark setae; pale setae form rudimentary aggregate at mid elytron. *Head*: Width across eyes slightly narrower than width across pronotum (38:40); clypeus and frons coarsely punctated, vertex finely punctate; eyes subspherical, moderately convex; antenna as in figure 256. *Thorax*: Pronotum feebly transverse (40:35), considerably narrower than width of elytron across humerus (40:48), finely punctate, subapical depression feebly defined, side margins strongly arcuate; elytra shallow, depth at humerus 18, greatest depth in posterior half 18, surface finely punctate. *Abdomen*: Pygideal posterior margin evenly arcuate, aedeagus as in figure 193, medially acuminate.

VARIATION: The paratype specimen from Tepotzlan and the one from Ixcateopan have the cranium and pronotum purely steel blue.

NATURAL HISTORY: Specimens have been collected during August through October, at altitudes ranging from 609 to 1870 m.

DISTRIBUTION (map 24): This Mexican species is distributed along the western slopes

of the Sierra Madre Occidental and western regions of the Transvolcanic Sierra.

MATERIAL EXAMINED: I have examined 60 specimens from Mexico: Sinaloa: 14 km, NE La Cap. De Taxte, 1–5-X-1990, J. E. Wappes; Highway 40, 1870 m, 20-VIII-1974, M. E. Erwin: Morelos: Tepotzlan, 26-IX-1957, R. & K. Dreisbach: Oaxaca: 50 km NE Huaj de Leon, 11-X-1994, E. Giesbert: Colima: vic. El Terrero, E road, 609–1821 m 3-5-X-1992, J. Huether; 8-X-1992, R. Turnbow: Durango: 3 km W El Palmito, 2-III-1976, E. Giesbert: Guerrero: 6 km NW Ixcateopan, 20-IX-1989, R. Turnbow: Nayarit: Volcan Ceboruco, 12–16 km S Jala, 10-X-1992, R. Turnbow: Jalisco: 14 km SW Cocul, 28-IX-1991, E. Giesbert; 15 km SW Mazamitla, 6-X-1992, R. Turnbow. Specimens are deposited in BMNH, CASC, CMNC, DEIC, EMEC, FMNH, FSCA, JEWG, MSUC, NMLN, PURC, RFMC, RHTC, SEMC, TAMU, USNM, WFBC, WOPC, and ZMHB.

Aphelocerus aeneus, new species

Figure 196; map 27

HOLOTYPE: Male. Mexico. Chiapas, El Sumidero, 21 Oct. 1988, R. Turnbow. (AMNH). (Specimen point mounted, sex label affixed to paper point, white machine printed; support card, white; locality label, white, machine printed; AMNH repository label white, machine printed; holotype label, red, machine printed; plastic vial with abdomen and aedeagus.)

PARATYPES: None.

DIAGNOSIS: The brassy color of the body in combination with the testaceous mouthparts, clypeus, antenna, and legs testaceous easily distinguish the members of this species from congeners. Also, most of the short, pale elytral setae are directed posteriorly with no evidence of a middiscal elytral setal tuft.

DESCRIPTION: *Size*: Length 4.3 mm; width 1.8 mm. *Integument*: Mouthparts, antenna, clypeus, and legs testaceous, remainder metallic blue-green; elytral disc with pale decumbent setae; no indication of setal tuft. *Head*: Width across eyes about equal to width across pronotum (32:32); cranium rugose; eyes subspherical, moderately convex.



Figs. 47–61. Habitus view and antennae. 47. *Aphelocerus formicoides* (habitus, lateral view). 48–61. Antennae. 48. *A. ciliaris*. 49. *A. inconstans*. 50. *A. domus*. 51. *A. echinatus*. 52. *A. bispineus*. 53. *A. citimus*. 54. *A. leucomelas*. 55. *A. coalitus*. 56. *A. inbatus*. 57. *A. coactus*. 58. *A. nitidus*. 59. *A. lividus*. 60. *A. cornuatus*. 61. *A. acutus*.

Thorax: Pronotum as long as wide (32:32); narrower than width across humeri (32:38), finely punctate, subapical depression faintly indicated, side margins feebly arcuate; elytra shallow, plane depth at humerus 18, greatest

depth in posterior half 18, surface shallowly rugose. *Abdomen*: Pygidial posterior margin evenly arcuate, tegmen as in figure 196, parameres with medial acumination.

VARIATIONS: Not studied.

NATURAL HISTORY: The holotype specimen was captured during October.

DISTRIBUTION: Known only from Southern highlands of Chiapas, in Mexico.

ETYMOLOGY: The epithet is a Latin adjective that refers to the metallic blue-green color of this beetle.

Aphelocerus bispineus, new species
Figures 52, 194, 195, 255a; map 21

HOLOTYPE: Male. Mexico: Chiapas, Bochil, 10 km S., X.1. 1989, R. L. Penrose (CASC). (Specimen point mounted, sex label affixed to paper point, white, hand printed; support card; locality label, white, machine printed; holotype label, red, machine and hand printed; plastic vial with abdomen and aedeagus.)

PARATYPES: Eight specimens. Mexico: Chiapas: Sumidero Natl. Pk, 5-X-1990, P. Lago & E. Zucaro (UMIC, 1); 3–5 km S La Trinitaria, 19–20-X-1988, J. E. Wappes (JEW, 1); 3–5 km S La Triniaria, 19-X-1988, R. Turnbow (RHTC, 1; WOPC, 1); E. Giesbert (FSCA, 2; WOPC, 2).

DIAGNOSIS: Among the species that have a parameral acumination this species may be identified by the presence of a dense aggregate of pale setae on the lower sides of the pronotum. This characteristic also separates *A. bispineus*, n.sp., beetles from superficial similar Chiapan members of *A. ciliaris*, n.sp.

DESCRIPTION: *Size:* 3.5–5.0 mm; width 1.6–2.1 mm. *Integument:* Black, with violaceous tinge; pronotal lower sides vested with dense aggregate of pale setae; sutural tuft very reduced; midelytron with loose aggregate of setae whose orientation is towards epipleural margin. *Head:* Width across eyes equal to width across pronotum (30:30); cranium finely punctate; interocular depressions and frontal umbo shallow, eyes subspherical, moderately convex; antenna as in figure 52, as long as length of pronotum. *Thorax:* Pronotum as long as wide (30:30), considerably narrower than width of elytron across humeri (30:40), finely punctate, subapical depression faintly indicated, side margins moderately arcuate; elytra plane, depth at humeris 15, greatest depth in posterior half 15, surface shallowly rugose. *Abdomen:* Pygidial posterior margin evenly arcuate; aedeagus as in

figure 194; paramere with medial acumination; apical region of tegmen with paralateral bands of serrations; phallic plicae particularly broad (fig. 195).

VARIATION: The available specimens do not vary appreciably.

NATURAL HISTORY: Specimens were collected in October.

DISTRIBUTION (map 21): Known from the Chiapan highlands of southern Mexico.

ETYMOLOGY: From the Latin prefix *bi* (two) and the Latin *spineus* (of thorns). I refer to the parameral acuminations on the tegmen.

Aphelocerus acuticolis, new species
Figures 197, 215, 235; map 27

HOLOTYPE: Male. Mexico: Chiapas, 2.6 km S La Trinitaria, 19–Oct. 1988, R. Turnbow (AMNH). (Specimen point mounted, sex label affixed to paper point, white, machine printed; support card, white; locality label, white, machine printed; AMNH repository label, white, machine printed; holotype label, red, machine printed; plastic vial with abdomen and aedeagus.)

PARATYPES: Two specimens with the same locality data as the holotype (RHTC 1; WOPC, 1).

DIAGNOSIS: Distinguishable from the superficially similar specimens of *A. bispineus*, n.sp., by the more globose pronotum, lack of setal tuft on the lower sides of the pronotum, and castaneous mouthparts.

DESCRIPTION: *Size:* Length 4.5–5.1 mm, width 1.5–2.0 mm. *Integument:* Maxillae and labium castaneous, remainder black. *Vestiture:* Sutural tuft absent; midelytron with narrow band of white setae, setae oriented in various directions. *Head:* Width across eyes feebly narrower than width across pronotum (20:21); clypeus and frons coarsely punctate, vertex finely punctate; eyes subspherical, moderately convex; antenna as in figure 215. *Thorax:* Pronotum equal in width and length (21:21), considerably narrower than width across humeri (21:27), finely punctate, anterior transverse depression well developed, side margins strongly arcuate; elytra feebly convex in posterior half, depth at humerus 9, greatest depth in posterior half 12, surface shallowly rugose. *Abdomen:* Pygidial poste-

rior margin evenly arcuate; aedeagus as in figure 197; paramere with medial acumination.

NATURAL HISTORY: Specimens have been collected during October.

DISTRIBUTION (map 27): Known only from the type locality.

ETYMOLOGY: From the Latin adjective *acuti* (pointed) and the Latin noun *colis* (penis). I refer to the spinal development of the parameres of the tegmen.

ACANTHUS GROUP

Aphelocerus primigenius, new species

Figures 216, 243; map 27

HOLOTYPE: Female. Guatemala. Huehuet'go, 15 km N Nenion, 950 m, 5-VI-1999, E. Giesbert, J. Monzon (FSCA). (Specimen pin mounted, sex label affixed to support card, white, machine printed; support card, white; locality label, white, machine printed; FSCA repository label, white, machine printed; holotype label, red, machine printed; plastic vial with abdomen.)

PARATYPES: None.

DIAGNOSIS: Within the *acanthus* species group these beetles are readily distinguished by their profuse vestiture on the integument. From the superficially similar specimens of *A. inconstans* (Gorham) these beetle are distinguished by the more squat body form, more transverse pronotum, and by the more profuse distribution of setae on the sutural margin or the elytral. The extension of the middiscal elytral tuft to the epipleural margin will separate these beetles from those of *A. coactus*, n.sp.

DESCRIPTION: *Size*: Length 6.0 mm; width 3.5 mm. *Integument*: Black. *Vestiture*: Integument densely vested with prominent light and dark setae, white setae more prominent along margins and in elytral apical third. *Head*: Interocular depressions and frontal umbo shallow, epicranium, and gena coarsely punctate; eyes oblong, moderately convex; width across eyes equal to width across pronotum (45:50); antenna (figs. 82, 216) short, much shorter than length of pronotum. *Thorax*: Pronotum as long as wide (50:50), punctations most prominent on pronotal arch, anterior transverse depression poorly defined, side margins moderately arcuate, consider-

ably narrower than width across humeri (50:77); elytra moderately convex, disc densely, minutely, subrugosely punctate, apical slope acute, depth at humerus 25, greatest depth in posterior half 30; metafemora not extended beyond elytral apex. *Abdomen*: Posterior margin of female pygidium evenly arcuate.

VARIATION: Not studied.

NATURAL HISTORY: The available specimen was collected during early June at 950 m.

DISTRIBUTION (map 27): Known only from the type locality.

ETYMOLOGY: The specific epithet is taken from the scientific name of the woolly mammoth. I refer to the stout body and the densely pubescent characteristics of these beetles.

Aphelocerus sturnus Kirsch

Figures 82, 160, 183; map 16

Aphelocerus sturnus Kirsch, 1870: 370. LECTOTYPE. Male. Here selected. Colombia, Bogota (SMTD). (Specimen point mounted, antenna, pygidium, sixth visible abdominal sternum, and machine printed sex label affixed to paper point; support card, red type label glued to white card, machine printed; locality label, light green, machine printed; Staatl. Museum repository label, white, machine printed; lectotype label, red, machine and hand printed; plastic vial with abdomen and aedeagus.) Barr, 1976: 18.

Clerus subfasciatus Chevrolat, 1876: 14. LECTOTYPE. Female. Here selected. Colombia, Magdalena (MNHN). (Specimen point mounted, pygidium and sixth visible abdominal sternum affixed to paper point; support card, machine printed sex label affixed to support card; identification/locality label, green, mounted on white card; locality label, green, hand printed; Paris Museum repository label, margin with green mark; lectotype label, red, machine and hand printed.) Barr, 1976: 18.

Clerus cyaneus Chevrolat, 1876: 15. LECTOTYPE. Male. Here selected. Colombia, Medellon, E. Steinheil (MNHN). (Specimen point mounted, pygidium, sixth visible abdominal sternum, spicular fork, and machine printed sex label affixed to paper point; locality label, white cursive; E. Steinheil Museum label, white, machine printed; Museum Paris repository label, white, machine printed; identification label, white, cursive; lectotype label, red, machine and hand printed; plastic vial with abdomen and aedeagus.) Corporaal, 1950: 151 (*Enoclerus cyaneus* [Chevrolat]). NEW SYNONYMY. The name bearer of this nominal species does not vary

significantly from the holotype of *Aphelocerus sturnus* Kirsh.

DIAGNOSIS: The elytral discal tuft (fig. 183) is a broad patch of setae that extends from the sutural margin to the epipleural margin.

DESCRIPTION: *Size:* Length 5.0–5.5 mm; width 2.0–2.1 mm. *Integument:* Piceous. *Vestiture:* Head, prothorax, elytra, and protibia predominantly vested with dark setae, pterothorax, femora, meso-metathorax vested predominantly with pale setae; tarsi vested with dark setae; bipartite middiscal elytral setal tuft well developed, extends from sutural margin to epipleural margin. *Head:* Width across eyes feebly narrower than width across pronotum (23:24), finely punctate; interocular depression shallow; frontal umbo prominent; eyes subspherical, moderately convex; elytra shallow, depth at humerus 11, greatest depth in posterior half 16. *Abdomen:* Posterior margin of pygidium evenly arcuate in both sexes. *Male genitalia:* As in figure 160. *Male internal reproductive system:* Two pairs of accessory glands.

VARIATION: In some specimens the legs are testaceous.

NATURAL HISTORY: Specimens were collected throughout the year at altitudes ranging from 600 to 1800 m. S. and J. Peck collected one specimen by beating rain forest vegetation and J. A. Clavijo captured two specimens from flowers of *Inga marginata*.

DISTRIBUTION (map 16): This species appears to be concentrated in the Cordillera Occidental of Colombia and along the Northern Andes of Venezuela. One specimen was collected from Trinidad: Arura.

MATERIAL EXAMINED: I examined a variety of specimens, 40 of which were from: *Colombia:* Caldas: XII-1960, 1400 m, G. Frey. *Venezuela:* Aragua: Rancho Grande, 9-VII-1973, 1000 m, J. Salcedo & J. Clavijo; 1100 m, in flowers of *Inga marginata*, J. A. Clavijo; Cata, litoral, 8-VI-1983, C. Bordon; El Limon, 23-IX-1970, 850 m, J. & B. Bechyne; Tachira: 20 km E San Antonio, 23-IV-1974, 2000 m, H. & A. Howden; San Cristobal, 11-1960, G. Frey; Falcon: 4 km W Curimagua, 16-VIII-1975, M. Murtaugh; Curimagua, 30-XI-1971, 1200 m, J. & B. Bechyne; Cerro Galicia, 4-XII-1971, J. & B. Bechyne; 21-XI-1971, 1500 m, J. & B. Be-

chyne; Yaracuy: Parque Nacional Jaruby, Aroa, 1500 m, C. Bordon; Trujillo. Ecuador: El Oro: 1 km N Machala, 19-II-1981, 50 m, H. Howden; Los Rios: Quevedo, 6-VI-1971, J. & B. Bechyne. Specimens are deposited in: CMNC, IZAV, SMTD, and WOPC.

REMARKS: *A. cyaneus* (Chevrolat) is transferred from *Enoclerus*. It was transferred to that genus by Corporaal (1950: 151).

Aphelocerus acanthus, new species

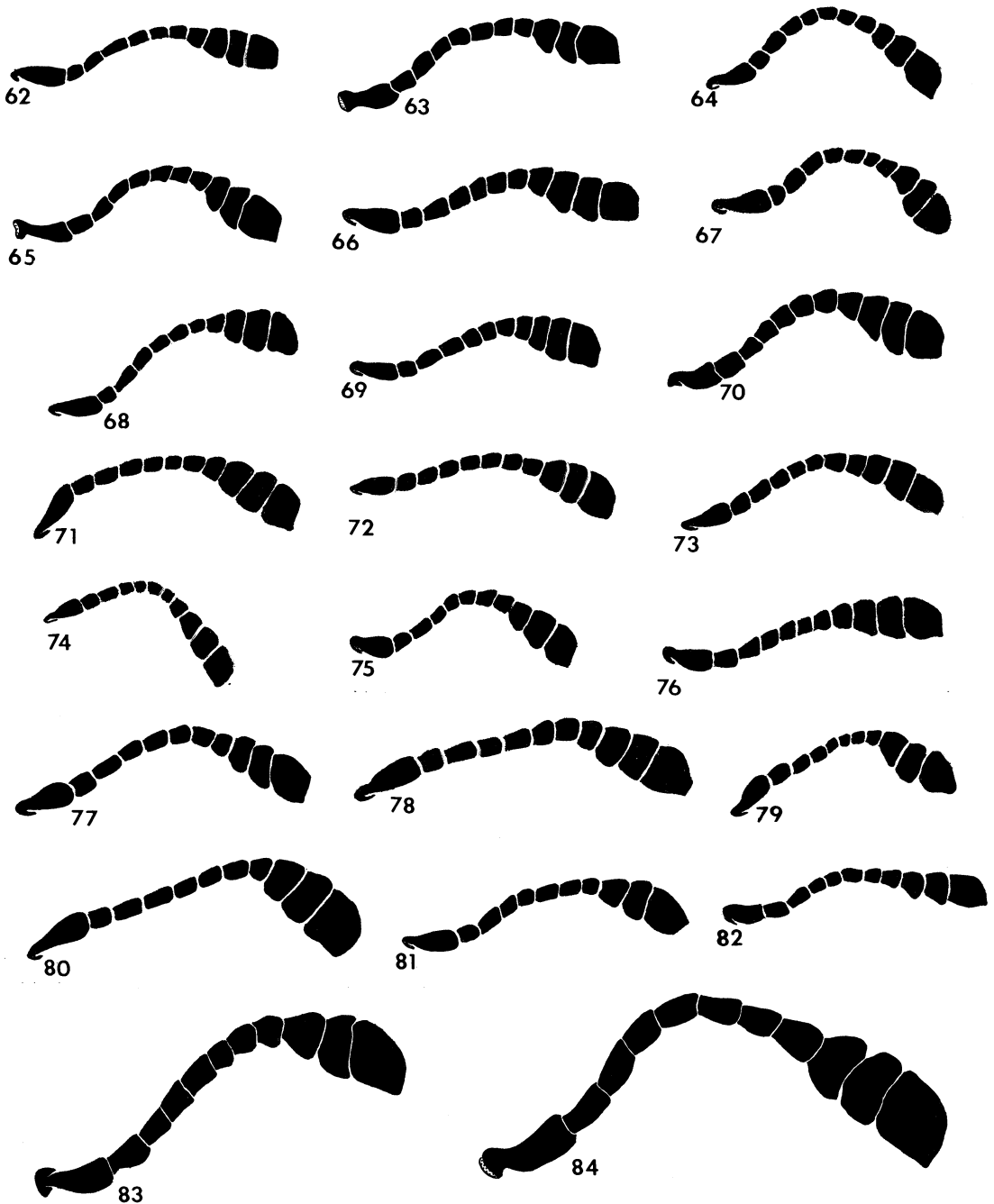
Figures 81, 150, 181; map 14

HOLOTYPE: Male. Argentina: Misiones: Dep. Concep. Sta. Maria, X-1946, M. J. Vianna (MLPA). (Specimen point mounted, pygidium, sixth visible abdominal sternum, spicular fork, and machine printed sex label affixed to paper point; support card; locality label, white, machine and hand printed; Museo La Plata repository label, white, machine printed; holotype label, red, machine and hand printed; plastic vial with aedeagus.)

PARATYPES: Twenty-five specimens. Nine specimens from the same locality as the holotype (MLPA, 5; WOPC, 4). Brazil: Rio Grande Do Sul: Itauba, 26-X-1999, Franceschini, Bonaldo, Silva (MCNZ, 1). Santo Augusto, IV-1966, O. Rappa: Santa Catarina: Hansa Humbolt, Ant. Maller, 1932 (MNHN, 3); Santa Catarina (JNRC, 1; WOPC, 1); Matra, XII-1941 (AMNH, 2); Corpua, XI-1948, Hansa Humbolt (AMNH, 1); Hansa, J. Clement (USNM, 1); Sao Paulo: Barneri, XI-1966, K. Lenko (MZSP, 1); Matto Grosso: Serra do Caraca, 27-XI-5-XII-1972 (MZSP, 1); "Brazil" (ZMHB, 1); Rive gauche du Parahyha, IX-1884, P. Germain (MNHN, 1). Paraguay: Itapua: Hoenu, Zone Sta. Maria, 19-X-1974 (ZMAN, 2). Argentina: Misiones: Puerto Iguazu, 25-XI-8-XII-1983, C. Bordon (IZAV, 1).

DIAGNOSIS: The integument is profusely vested with long setae; the elytral discal setal tuft (fig. 181) is dense and extensive, extending from the sutural margin to the epipleural margin.

DESCRIPTION: *Size:* Length 5.0–5.8 mm; width 1.8–2.4 mm. *Integument:* Piceous, with violaceous hue. *Vestiture:* Densely pilose; head, prothorax, elytra vested predominantly with dark setae, pterothorax, femora, meso-metathibiae vested predominantly with



Figs. 62–84. Antennae. 62. *Aphelocerus sagittarius*. 63. *A. irroratus*. 64. *A. naevius*. 65. *A. triangularis*. 66. *A. extensivus*. 67. *A. humerus*. 68. *A. argus*. 69. *A. protenus*. 70. *A. arenatus*. 71. *A. patulus*. 72. *A. monteverde*. 73. *A. chondrus*. 74. *A. catie*. 75. *A. chiriqui*. 76. *A. immarginatus*. 77. *A. anticus*. 78. *A. yungas*. 79. *A. batesi*. 80. *A. bufustis*. 81. *A. acanthus*. 82. *A. sturnus*. 83. *A. myrmecoides*. 84. *A. scutellaris*.

pale setae; tarsi vested with dark setae, elytral middiscal setal tuft bipartite, tuft extends to epipleural margin. *Head*: Width across eyes feebly narrower than width across pronotum (26:27), finely punctate, interocular depression and frontal umbo moderately prominent; antenna as in figure 81. *Thorax*: Pronotum equal in width and length (27:27), narrower than elytra across humeri (27:34), finely punctate, side margins moderately arcuate, subapical depression prominent, elytra shallow, depth at humerus 14, greatest depth in posterior half 16. *Abdomen*: Posterior margin of pygidium evenly arcuate in both sexes. *Male genitalia*: As in figure 150.

VARIATION: In some male specimens there is a distinct acumination in the outer margin of the parameral base (as seen in *A. inconstans* [Gorham], fig. 122). The expression of this acumination is somewhat variable; probably an artifact of KOH treatment of the aedeagus.

NATURAL HISTORY: Specimens were collected from September through December, and in April.

DISTRIBUTION (map 14): This species ranges from Southeastern Paraguay to Northeastern Argentina and Southeastern Brazil.

ETYMOLOGY: From the Latin *acanthus* (a prickly plant). I refer to the "thorny" appearance of the elytral middiscal setal tuft.

Aphelocerus inconstans (Gorham)

Figures 20, 26, 28, 49, 121, 122, 184–186, 244, 269; map 2

Clerus inconstans Gorham, 1882: 163. **LECTOTYPE**. Here selected. Guatemala, Duenas, G. C. Champion (BMNH). (Specimen point mounted, pygidium and machine printed sex label affixed to paper point; support card; type label, round with orange outline, machine printed; locality label, white, machine printed; identification label, white, cursive; B. C. A. collection-identification label, white, machine printed; lectotype label, red, machine and hand printed; plastic vial with abdomen and aedeagus. Wolcott, 1927: 73, 75; Barr, 1976: 18.

PARATYPES: Four specimens, two from the same location as the lectotype (BMNH, 1; USNM, 1). Guatemala: Sacatepequez: Capetillo, G. C. Champion (BMNH, 2).

DIAGNOSIS: These beetles may be distinguished from the superficially similar speci-

mens of *A. ciliaris*, n.sp., by the dense mat of white hairs on the lower side of the pronotum. Also, in *A. inconstans* (Gorham) specimens, white setae are distributed in the apical half of the elytra (fig. 26), not throughout the elytral surface, which is the case in most *A. ciliaris*, n.sp., specimens.

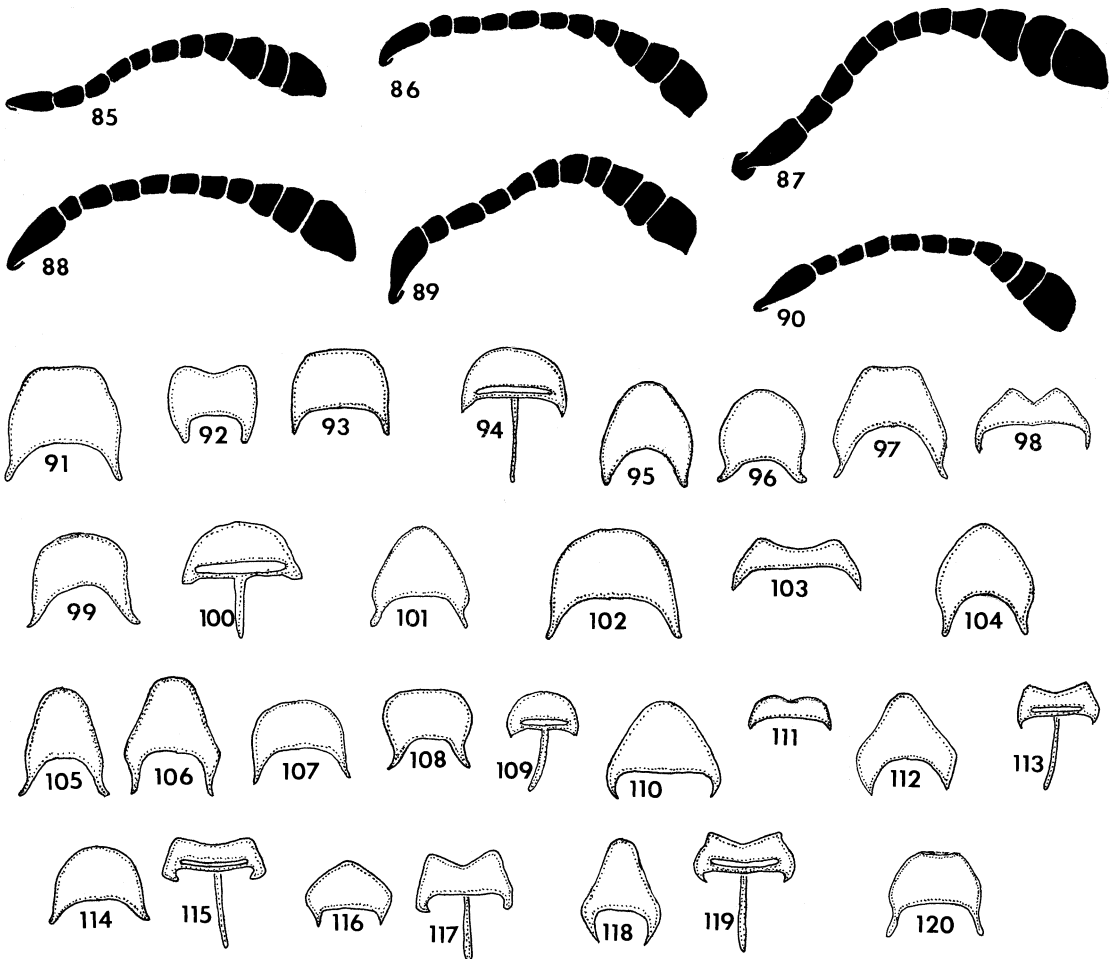
DESCRIPTION: *Size*: Length 5.4–7.4 mm; width 2.0–2.9 mm. *Integument*: Color highly variable, integument of most specimens black, of some black and castaneous. See below. *Vestiture*: Integument densely vested with setae, particularly on lateral aspects of pronotum (fig. 28) and apical half of the elytra (fig. 26). *Head*: Interocular depressions and frontal umbo prominent; width across eyes feebly narrower than width across pronotum (24:26); antenna as in figure 49. *Thorax*: Pronotum equal in width and length (26:26), slightly narrower than width of elytra across humeri (26:30), sides moderately convex and feebly incised by subapical depression, disc finely punctate; elytral depth at humerus 19, greatest depth at posterior half 22, surface shallowly scabrous. *Abdomen*: Pygidia with evenly convex posterior margins. *Male genitalia*: Tegmen as in figures 121 and 122; ventral sinus twice length of dorsal sinus. *Male internal reproductive organs*: As in figures 184–186; two pairs of accessory glands; lateral gland loosely coiled and diverticulated basally (fig. 184), medial gland biramous, dorsal branch very short (fig. 185), ventral branch very long. *Female internal reproductive organs*: As in figure 20.

VARIATION: The specimens examined from Guatemala vary extensively in integumental color and in distribution of white setae on the elytral surface. In some of these beetles the pronotum, legs, and elytra are stramineous, and there is considerable variation in the distribution of white setae on the posterior half of the elytra. Lastly, the outer basal margins of parameres may (fig. 121) or may not (fig. 122) be faintly acuminate.

NATURAL HISTORY: Specimens from Mexico were collected during June, those from Guatemala in May (1890 m), June, and July; those from El Salvador in May at 1800 m.

DISTRIBUTION (map 2): This species is known to range from southern Mexico to the highlands of Guatemala and El Salvador.

REMARKS: The varieties that Gorham



Figs. 85–120. Antennae, pygidia, and sixth visible abdominal sterna. 85–90. Antennae. 85. *Aphelocerus affaniatis*. 86. *A. dispilis*. 87. *A. formicoides*. 88. *A. cheliferosus*. 89. *A. panus*. 90. *A. calvus*. 91–120. Pygidium and/or sixth visible abdominal sternum. 91–92. *A. ciliaris*. 91–92. male (91, pygidium; 92, sixth visible abdominal sternum). 93–94. female (93, pygidium; 94, sixth visible abdominal sternum). 95. *A. coactus*, female pygidium. 96. *A. domus*, female pygidium. 97–100. *A. coalitus*, male (97, pygidium; 98, sixth visible abdominal sternum), 99–100. Female (99, pygidium; 100, sixth visible abdominal sternum). 101. *A. leucomelas*, male pygidium. 102–104. *A. coactus*. 102–103. male (102, pygidium; 103, sixth visible abdominal sternum). 104, female, pygidium. 105–106. *A. acutus*, pygidia (105, male; 106, female). 107–109. *A. lividus*. 107, male (pygidium). 108–109, female (108, pygidium; 109, sixth visible abdominal sternum). 110–113. *A. sagittarius*. 110–111, male (110, pygidium; 111, sixth visible abdominal sternum). 113, female, pygidium. 114–115. *A. humerus*, female (114, pygidium; 115, sixth visible abdominal sternum). 116–117. *A. naevius*, female (116, pygidium; 117, sixth visible abdominal sternum). 118–119. *A. triangulus*, female (118, pygidium; 119, sixth visible abdominal sternum). 120. *A. arenatus*, male, pygidium.

(1882: 163) lists and illustrates represent intraspecific color variants. Schenkling (1906: 274) lists “*var. inconstans* Gorh.—Cracas” as a variety of *Clerus*. I believe this listing is based on a misidentification. The specimen

is probably a member of *A. sturnus* Kirsch in which the arrangement of elytral setae are as described by Schenkling.

MATERIAL EXAMINED: I have examined a variety of specimens of which 64 were col-

lected from: Mexico: Chiapas: 30 km NM Comitán, 20-VI-1990, R. Turnbow; 16 km W San Cristobal de las Casas, 4-VI-1974, O'Brien & Marshall; Guatemala: Zacapa: Cerro de Mono, 2275 m, 25-28-V-1997, E. Giesbert. Guatemala: Baja Verapaz: 19-24 km N Salama, 1371 m, 25-31-V-1989, E. Giesbert; 24 km N Salama, Pantin Rd., 21-V-1995, Giesbert, Monzon; 9 km N Salama on Pantin Rd., 1600 m, 21-VI-1993, H. & A. Howden; 3 km S Coban Hwy, 1600 m, 6-VI-1993, H. & A. Howden; 19-24 km N Salama, 25-31-V-1989, 1371 m, J. E. Wappes; 7.8 km W Chilasco, 1700 m, 24-V-1991: Sacatepequez: Antigua, 2000 m, 20-VI-1973, Ginter Ekis; Antigua, 22-VI-1923, E. G. Smyth. Specimens are deposited in the collections of: BMNH, CMNC, FSCA, RHTC, and WOPC.

Aphelocerus cirritus, new species

Figures 262, 263, 270, 274; map 4a

HOLOTYPE: Male. Nicaragua: Matagalpa: 10 km NW Matagalpa, Selva Negra, 12°59'N, 85°54'W, 16-22-IV-2002 (AMNH). (Specimen point mounted, sex label affixed to paper point, white, machine printed; support card, white; locality label, white, machine and hand printed; AMNH repository label, white, machine printed; holotype label, red, machine printed; plastic vial with abdomen and aedeagus.)

PARATYPE: Four specimens from the same locality as the holotype (WOPC, 3; JNRC, 1).

DIAGNOSIS: Specimens of this species closely resemble members of *A. inconstans* (Gorham) and *A. patulus*, n.sp. From the former, *A. cirritus*, n.sp., specimens may be distinguished by their distinctly more elongated pronotum (compare figs. 269, 270) and by the abbreviated nature of the middiscal elytral setal tuft (compare figs. 26, 274). In *A. patulus*, n.sp., specimens, the pronotum lacks the dense aggregate of white setae on the lower margin of the pronotum which are clearly present in specimens of *A. cirritus*, n.sp.

DESCRIPTION: *Size:* Length 5.8-6.0 mm; width 2.1-2.2 mm. *Integument:* Mouthparts, cranium, antenna, thoracic venter, elytra, and legs black, abdomen dark brown. *Vestiture:* Head, antenna, venter of thorax, pro-, meso-

and metathoracic femora and meso-metathoracic tibiae, posterior margin of protibiae, discal portion of elytral apex, tarsi, and abdomen profusely vested with white setae; pronotal lower side margins with dense line of white setae; elytral disc with dark setae and middiscal setal tuft comprised of few 2° setae. *Head:* Width across eyes and across pronotum equal (40:40), finely punctate; interocular depression and fronal umbo moderately developed; eyes subspherical, moderately convex. *Thorax:* Pronotum longer than wide (50:42), considerably narrower than width of elytra across humeri (42:58), pronotal arch coarsely punctate, pronotal disc finely sparsely punctate, side margins nearly parallel, anterior transverse depression prominent; elytra very feebly convex when viewed from side; depth at humerus 27, greatest depth in posterior half 30, humeral tumescence indistinct. *Abdomen:* Pygidium posterior margin evenly arcuate; aedeagus as in figure 262. *Male internal reproductive organs* (fig. 263): Two pairs of accessory glands, lateral pair short, curvate apically, and diverticulated at base. Medial gland much longer and coiled/convoluted.

VARIATION: The dark posterior portion of the elytral disc varies in intensity.

NATURAL HISTORY: The available specimens are quite homogeneous.

DISTRIBUTION (map 4a): Known only from the type locality.

ETYMOLOGY: The specific epithet is a Latin adjectival meaning "having filaments". I refer to the setiferous lower margins of the pronotum.

Aphelocerus patulus, new species

Figures 38, 71, 141, 254; map 21

HOLOTYPE: Male. Costa Rica, Puntarenas, Monteverde, Feb. 21, 1987, E. Giesbert (LACM). (Specimen pin mounted; support card, white; locality label, hand printed, white; LACM repository label, white; holotype label, red, machine printed; plastic vial with abdomen and aedeagus.)

PARATYPES: Forty specimens. Eight specimens from the same locality as the holotype: 26-II-1987 (FSCA, 1; WOPC, 3); 27-II-87 (FSCA, 1); 11-14-IV-1981 (FSCA, 1; WOPC, 2). Costa Rica: Puntarenas: 4 km NE

San Luis de Guacimal, 1067 m, 26-II-1987, E. Giesbert (WOPC, 1); Monteverde, 18-V-1985, 1300 m, J. T. Doyen (EMEC, 1). Monteverde, 1400 m, 22-V-1979, H. & A. Howden (WOPC, 1); 11-13-V-1996, 1500 m, E. Giesbert (FSCA, 1; WOPC, 1); 23-II-1991, H. & A. Howden (CMNC, 2; WOPC, 1); 24-II-1991 (CMNC, 1); 25-II-1991 (CMNC, 1); 26-II-1991 (CMNC, 1; WOPC, 2); 26-II-1991, K. Mc Lachlan Hamilton (CMNC, 1); Monteverde Cloud Forest, 22-24-IV-1985 (WOPC, 1); 23-27-II-1991, B. Sinclair, Malaise (WOPC, 2); San Luis Monteverde, 1000-1350 m, I I-1994, Z. Fuentes (INBC, 6; WOPC, 4); 1 km W Santa Elena, 11-VI-1986, on dead wood, F. T. Hovore (WFBC, 1); Guanacaste: Estacion Cacao, SW side Volcan Cacao, 1000-1400 m, Malaise trap, 1988-1989 (INBC, 4); San Jose: Cerro Tacuotari, Santa Ana, 1900-2000 m, H. Vargas, F. G. Zumbado, M. A. Zumbado, 11-25-III 1992 (WOPC, 1).

DIAGNOSIS: Specimens of this species are very similar to geographically distant specimens of *A. inconstans* (Gorham) from which they may be distinguished by the absence of the dense vestiture of white setae on the lower margins of the pronotum. Also, in *A. patulus*, n.sp., females the pygidium is more trigonal than it is in females of *A. inconstans* (Gorham).

DESCRIPTION: *Size:* Length 5.0-6.0 mm; width 2.0-2.5 mm. *Integument:* Piceous. *Vestiture:* Elytral middiscal setal tuft highly developed (fig. 38), extended from elytral suture to epipleural margin. *Head:* Width across eyes equal to width of pronotum (25:25), finely punctate; interocular depression and frontal umbo shallow; eyes moderately convex; antenna as in figure 71. *Thorax:* Pronotum equal in width and length (25:25); narrower than width of elytron across humeri (25:35), finely punctate, side margins feebly arcuate, feebly incised by anterior transverse depressions; elytral depth at humerus 17, greater depth in posterior half 20. *Abdomen:* Pygidium posterior margin evenly arcuate in male, trigonal in female (fig. 254); sixth visible abdominal sternum not incised. *Male genitalia:* As in figure 141.

VARIATION: Except for size, I did not observe any noteworthy variation among the specimens examined.

NATURAL HISTORY: Specimens were collected in February, April, May, and June at altitudes ranging from 1067 to 2000 m. One specimen was collected on dead wood and several in a Malaise trap.

DISTRIBUTION (map 21): Known only from the Costa Rican forests of Guanacaste, San Jose, and Puntarenas.

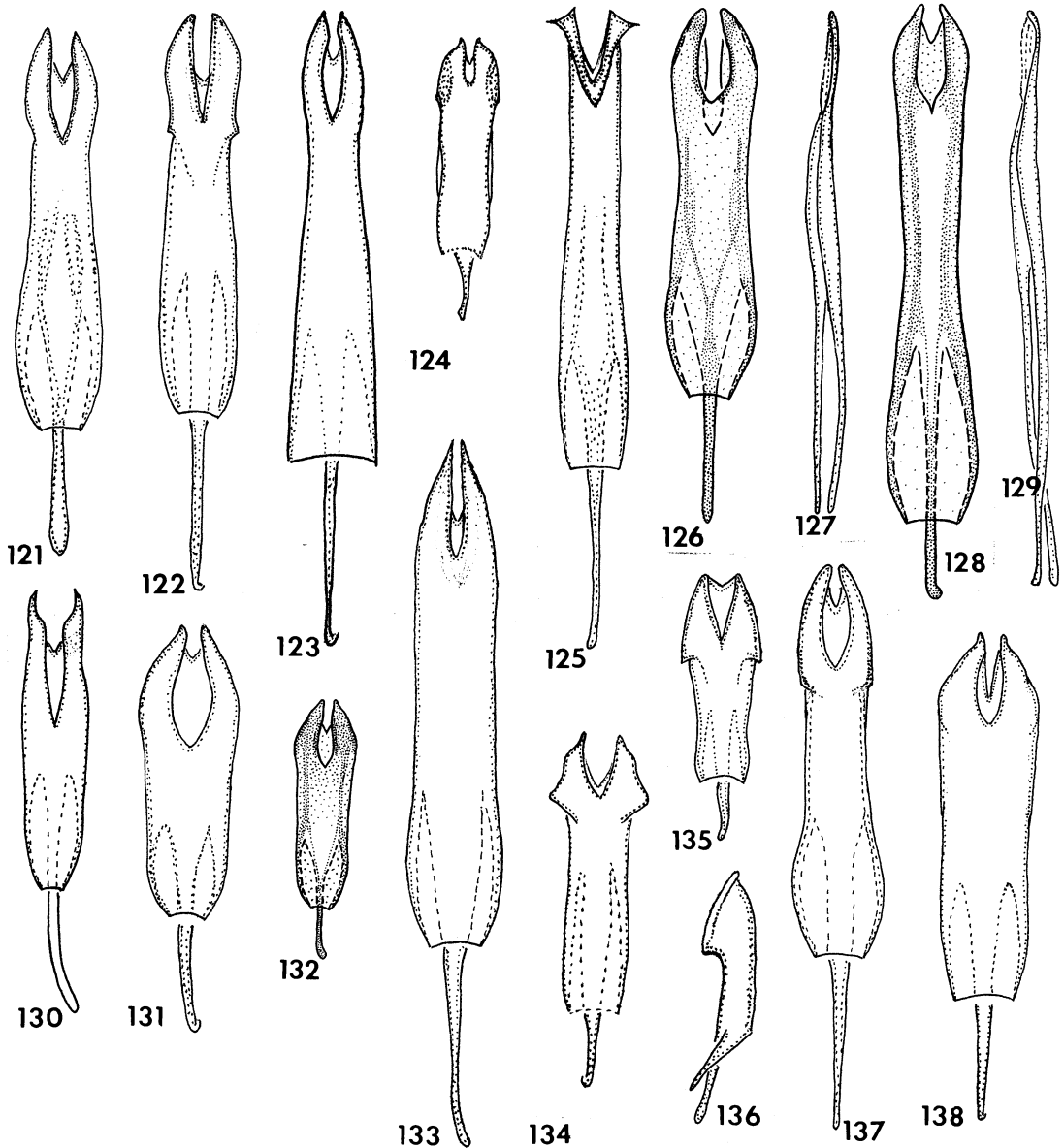
ETYMOLOGY: The specific epithet *patulus* (spread out) is a Latin adjective. It is used here to indicate the extended setal patches of the elytral middiscal setal tuft.

Aphelocerus chiriqui, new species

Figures 75, 159, 175, 258; map 21

HOLOTYPE: Male. Panama. V. de Chiriqui, 25-4000', Champion (BMNH). (Specimen point mounted; sex label affixed to paper point, white, machine printed; support card; collection label, white, machine printed; repository label, white, machine printed; holotype label, red, machine and hand printed; plastic vial with aedeagus.)

PARATYPES: Two hundred and eight specimens. Twenty-seven specimens from the same locality as the holotype; 762-1219 m (BMNH, 5; MNHN, 6); 914-1219 m (AMNH, 1; BMNH, 3; DEIC, 2; MCZC, 1; MNHN, 1); 609-914 m (BMNH, 3; MNHN, 2; USNM, 1; FMNH, 2). Costa Rica: Puntarenas: Est. Pittier, Send. Ario Canasta, 1.4 km NNO de la Estacion, 1750-1800 m, 2-8-I-1996, M. Moranga, Sombrereta (INBC, 1); Las Cruces, 7-II-1998, F. Hovore (JNRC, 3; WOPC, 2); Las Alturas, 6-7-I-1998, F. Hovore (JNRC, 1). Panama: Chiriqui: W Volcan, Hacienda Lagunas del Volcan, 8°46'N, 82°40'W, 1360 m, 24-XII-2001, beating viny bushes, W. Opitz (WOPC, 9); Las Lagunas, 1360 m, 4 km W Hato del Volcan, 1360 m, 17-IV-1985, H. Stockwell (WOPC, 1); Hacienda Lagunas del Volcan, 7-VIII-2000, 1400 m, beating lakeside forest, vinery verdure, W. Opitz (WOPC, 5); 8-VIII-2000, W. Opitz (WOPC, 6); 14-VIII-2000, W. Opitz (WOPC, 2); 15-VIII-2000, W. Opitz (WOPC, 6); 18-V-2001, beating intermixture of vines and herbaceous verdure, W. Opitz (WOPC, 2); Hwy 13, rd. to Finca Tizingal, 1350 m, 8°49'N, 82°41'W, 25-XII-2001, beating overhanging vegetation, W. Opitz (MRAC, 2; RGCG, 1; WOPC, 8); Finca Ti-



Figs. 121–138. Tegmina or phalli. **121.** *Aphelocerus inconstans*, tegmen. **122.** *A. inconstans*, tegmen. **123.** *A. citimus*, tegmen. **124.** *A. argus*, tegmen. **125.** *A. echinatus*, tegmen. **126–127.** *A. leucomelas* (**126**, tegmen; **127**, phallus). **128–129.** *A. coalitus* (**128**, tegmen; **129**, phallus). **130.** *A. acutus*, tegmen. **131.** *A. lividus*, tegmen. **132.** *A. irroratus*, tegmen. **133.** *A. acutus*, tegmen. **134.** *A. arenatus*, tegmen. **135–136.** *A. sagittarius* tegmina (**135**, ventral view; **136**, lateral view). **137.** *A. sculptillus*, tegmen. **138.** *A. protenus*, tegmen.

zingal, 1380 m, 17-V-2001, beating woody shrubs intertwined with vines and herbaceous verdure (WOPC, 22); Hato del Volcan, 13-VIII-2000, beating roadside vegetation, intermixture of lianas and herbaceous verdure,

W. Opitz (MIUP, 2; WOPC, 2); 14-VIII-2000, W. Opitz (WOPC, 4); 5 km N Hato del Volcan, mountain slope, 7-VIII-2000, beating roadside vegetation, W. Opitz (WOPC, 6); Hwy 13, 6 km NW Volcan, 24-XII-2001,

1565 m, 8°49'N, 82°41'W, beating overhanging roadside veg. W. Opitz (WOPC, 7); same locality except 26-XII-2001 (WOPC, 14), 27-XII-2001 (UMRM, 2; MRSN, 2; RCGC, 1; WOPC, 11), 25-XII-2001 (WOPC, 21); 10 km N Hato del Volcan, 10-VIII-2000, beating roadside vegetation, intermixture of lianas and herbaceous verdure, W. Opitz (WOPC, 2); Mountain road from Rio Sereno to Volcan, 8-VIII-2000, beating tree branches in roadside forest, W. Opitz (WOPC, 3); slopes of mountain, 10 km, N Volcan, 1475 m, 17-V-2001, beating overhanging branches of shrubs intertwined with herbaceous verdure, W. Opitz (WOPC, 16); Cerro Pando, 24-IV-1973, 1535 m, G. Ekis (WOPC, 4); 1.5 km S Volcan de Chiriqui, 29-IX-1970, 1219 m, H. P. Stockwell (WOPC, 2); north of Santa Clara, 8°51'N, 82°46'W, 4-VII-1976, H. Stockwell (STRI, 1); 10-IV-1976 (WOPC, 1); 2 km N Santa Clara, 1300 m, Hartman's Finca, 8°51'N, 82°36'W, 24-25-V-1977 (CMNC, 1); 4 km E. Santa Clara, 5-VII-1996, 1125, Gillogly & Schaffner (TAMU, 2); 30 km NW Volcan, 23-VII-1976, W. E. Clark (WOPC, 3); Las Lagunas, 1400 m, 22-IV-1973, G. Ekis (WOPC, 1); El Volcan, Las Lagunas, 9-VII-1974, C. W. O'Brien (WOPC, 1); Finca La Suiza, 16-IV-1996, R. Turnbow (WOPC, 1); Boquete, 22-V-2001, beating hedgerow bush intertwined with herbaceous vines, W. Opitz (WOPC, 2); Boquete, 25-VI-1974, O'Briens & Marshall (WOPC, 1); Bugaba, Champion (BMNH, 1).

DIAGNOSIS: The posterior patch of the bipartite elytral discal setal tuft is greatly expanded (fig. 175).

DESCRIPTION: *Size:* Length 3.8–4.3 mm; width 1.5–2.0 mm. *Integument:* Piceous. *Vestiture:* Head, pterothorax, elytron, and protibia vested predominantly with dark setae, femora, and meso-metatarsia vested predominantly with pale setae; tarsi vested with dark setae; elytral discal setal tuft bipartite, with posterior patch well developed. *Head:* Width across eyes slightly narrower than width across pronotum (22:23), finely punctate; interocular depression and frontal umbo shallow; eyes subspherical, moderately convex; antenna as in figure 75. *Thorax:* Pronotum equal in width and length (24:24), narrower than width across humeri (24:29), finely punctate, side margins boldly arcuate,

subapical depression indistinct; elytra depth at humerus 12, greatest depth in posterior half 15; elytral middiscal setal patch as in figure 258. *Abdomen:* Posterior margin of pygidium evenly rounded in both sexes. *Male genitalia:* As in figure 159.

VARIATION: The known Costa Rican specimens of this species have the posterior patch of the elytral setal tuft reduced near the epipleural margin. Further, the parameres of the Costa Rican males are slightly shorter. I attribute this difference to geographical variation.

NATURAL HISTORY: Specimens were collected from May to September, at altitudes ranging from 762 to 1800 m.

DISTRIBUTION (map 21): The known distribution of this species extends from southern Costa Rica to the highlands of western Panama.

ETYMOLOGY: The trivial name, *chiriqui*, constitutes a noun in apposition and refers to the type locality.

SCULPTILLUS GROUP

Aphelocerus sculptillus, new species
Figures 137, 198, 217, 240; map 27

HOLOTYPE: Female. Panama: Panama, Cerro Campana, 645 m, 1-I-2002, W. Opitz (MIUP). (Specimen point mounted, sex label affixed to paper point, white, machine printed; support card, white; locality label, white, machine printed; MIUP repository label, white, machine printed; holotype label, red, machine printed.)

PARATYPES: Ten specimens. Panama: Cocle: Altos de Campana, 26-IV-1996, R. Turnbow (RHTC, 1; WOPC, 1); El Valle, 29-IV-1992, E. Giesbert (FSCA, 1; WOPC, 2); 10-13-VI-1985, E. Riley & D. Rider (LSUC, 1); Cerro Campana, 7-I-1994 (JEW, 1); 17-V-1999 (RFMC, 1); 625 m, 25-VI-1995, H. Stockwell (STRI, 1); 820 m, 10-VII-1982, H. Stockwell (WOPC, 1).

DIAGNOSIS: The elytral middiscal setal tuft is comprised of one large patch whose setae are directed anteriorly (fig. 240). This feature will distinguish *A. sculptillus*, n.sp., specimens from all other aphelocerans with a microsculptured pronotal disc.

DESCRIPTION: *Size:* Length 4.2–5.0 mm; 2.0–2.2 mm. *Integument:* Black. *Vestiture:*

Integument densely vested with prominent light and dark setae; elytral sutural tuft well developed, extended to elytral basal third; elytral middiscal tuft comprised of one large transverse patch whose setae are directed anteriorly. *Head*: Finely punctate; interocular depressions and frontal umbo shallow; eyes, oval moderately convex; width across eyes about equal to width across pronotum (31:34); antenna (fig. 217) much shorter than length of pronotum (28:35). *Thorax*: Pronotum about as long as wide (35:34), disc finely punctated and very finely microsculptured, subapical depression poorly defined, side margins moderately arcuate; elytra moderately convex, depth at humerus 35, greatest depth in posterior half 50. *Abdomen*: Posterior margin of pygidium evenly arcuate in female; feebly sinuous in male. *Male genitalia*: As in figure 198; parameral apices less acuminate than in *A. sabulosus*, n.sp. specimens.

VARIATION: There is some variation in the development of the basal acumination of the parameres.

NATURAL HISTORY: Specimens have been collected during January, April, May, and June, from 625 to 820 m; one by beating roadside vegetation.

DISTRIBUTION (map 27): Known only from Central Panama.

ETYMOLOGY: The specific epithet is a Latin compound name derived from *sculpto* (carve) and the diminutive suffix *-illus*. I refer to the minute microsculpture on the pronotal disc.

***Aphelocerus sabulosus*, new species**

Figures 199, 239; map 27

HOLOTYPE: Female. Costa Rica. Punt. Prov., 6 km SE Santa Elena, 7–8 June 1987, F. T. Hovore, coll on *Croton* blossoms (AMNH). (Specimen point mounted, sex label affixed to paper point, white machine printed; support card, white; locality label, white machine printed; AMNH repository label, white, machine printed; holotype label, red, machine printed.)

PARATYPES: Eight specimens, two from the same locality as the holotype (WOPC, 2). Costa Rica: Cartago: Cartago, 11-VI-1987, F. Hovore (WFBC, 1); Puntarenas: 10 NE

Ciudad Neilly, 28-VI-1994, F. T. Hovore (JNRC, 1; WOPC, 2); vic. Las Alturas, 23–24-I-1996, F. T. Hovore (WOPC, 1); Est. Agujas. Send. Leyba. 300–350 m, 29-VIII–12-IX-1998, M. Labo, Tp., Malaise Seca (INBC, 1).

DIAGNOSIS: Distinguishable from other species of *Aphelocerus* that have the pronotal disc microsculptured by the extent of development of the posterior patch of the elytral middiscal tuft (fig. 239).

DESCRIPTION: *Size*: Length 3.5–4.8 mm; width 1.3–2.2 mm. *Integument*: Black. *Vestiture*: Integument densely vested with prominent light and dark setae; elytral middiscal setal tuft comprised of two patches, posterior patch much wider than anterior patch. *Head*: Finely punctate; interocular depression and frontal umbo moderately developed; eyes oval, moderately convex; width across eyes slightly narrower than width across pronotum (33:38); antenna shorter than length of pronotum (30:38). *Thorax*: Pronotum as long as wide (38:38), disc finely punctate and very finely microsculptured, anterior transverse depression poorly defined, side margins moderately arcuate; elytra moderately convex, depth at humerus 22, greatest depth in posterior half 25. *Abdomen*: Posterior margin of pygidium evenly arcuate in female, truncate in male. *Male genitalia*: As in figure 199; parameral apices acuminate.

VARIATION: The specimens examined were quite homogeneous.

NATURAL HISTORY: Frank T. Hovore collected all the available specimens during June, on blossoms of *Croton*. One specimen was collected with a Malaise trap located at 300–350 m.

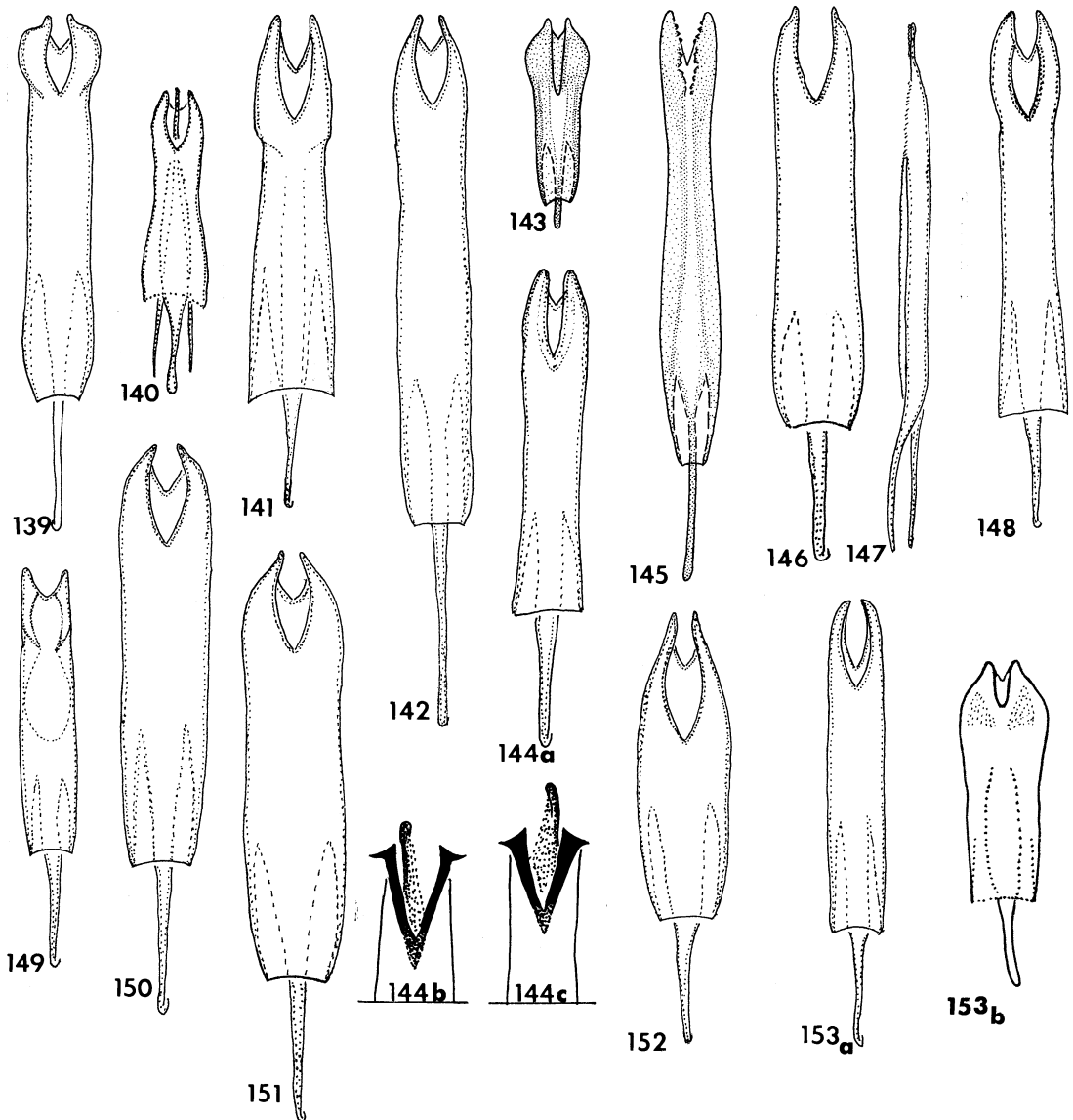
DISTRIBUTION (map 27): Known only from southernmost province of Costa Rica.

ETYMOLOGY: The specific epithet is a Latin adjective that stems from *sabulo* (gravel). I refer to the gravel-like microsculpture on the pronotal disc.

***Aphelocerus chondrus*, new species**

Figures 73, 213, 249; map 27

HOLOTYPE: Male. Panama, Bugaba, Chaminion (BMNH). (Specimen point mounted, sex label affixed to paper point, white, machine printed; support card, white; locality



Figs. 139–153. Tegmina or phallus. 139. *Aphelocerus immarginatus*, tegmen. 140. *A. vietus*, tegmen. 141. *A. patulus*, tegmen. 142. *A. yungas*, tegmen. 143. *A. naevius*, tegmen. 144a. *A. catie*, tegmen. 144b. *A. affaniatis*, tegmen. 144c. *A. echinatus*, tegmen. 145. *A. scutellaris*. 146–147. *A. cheliferosus* (146, tegmen; 147, phallus). 148. *A. panus*, tegmen. 149. *A. formicoides*, tegmen. 150. *A. acanthus*, tegmen. 151. *A. bufustis*, tegmen. 152. *A. batesi*, tegmen. 153a. *A. calvus*, tegmen. 153b. *A. capillus*, tegmen.

label, white, machine printed; BMNH repository label, white, machine printed; holotype label, red, machine printed; plastic vial with abdomen and aedeagus.)

PARATYPES: One specimen from the same locality as the holotype (WOPC, 1).

DIAGNOSIS: The outer margins of the elytra are subparallel. This along with the small size of these beetles (4 mm) will distinguish these beetles from the other aphelocerans with the pronotal disc microsculptured. From superficially similar *A. chondrus*, n.sp., spec-

imens, specimens of *A. cohibilis*, n.sp., may be distinguished by their more subquadrate pronotum (compare figs. 248, 249).

DESCRIPTION: *Size:* Length 4.0 mm; width 1.2 mm. *Integument:* Black. *Vestiture:* Integument densely vested with prominent light and dark setae; elytral middiscal setal tuft comprised of two patches; posterior patch much shorter than anterior patch. *Head:* Finely punctate; interocular depressions and frontal umbo moderately developed; eyes oval, moderately convex; width across eyes slightly narrower than width across pronotum (26:29); antenna (fig. 73) shorter than length of pronotum (28:30). *Thorax:* Pronotum slightly longer than broad (30:29), disc finely punctate and very finely microsculptured, anterior transverse depression conspicuous, side margins feebly arcuate; elytra feebly convex, depth at humerus 15, greatest depth in posterior half 20. *Abdomen:* Posterior margin of male pygidium feebly incised. *Male genitalia:* Tegmen as in figure 213.

VARIATION: The specimens examined were homogeneous.

NATURAL HISTORY: The two available specimens were collected from Bugaba, Panama whose altitude is about 300 m.

DISTRIBUTION (map 27): Known only from western Panama.

ETYMOLOGY: The trivial *chondrus* (granular) refers to the granular appearance of the pronotal disc.

***Aphelocerus cohibilis*, new species**

Figures 218, 239, 248; map 27

HOLOTYPE: Female. Costa Rica: Prov. Cartago, Turrialba, CATIE, 30-VI-1-VII-1996, beating foliage and flowering trees, J. Rifkind, H. Lezama (LACM). (Specimen pin mounted, sex label affixed to support card; white, machine printed; locality label, white, bordered in black, machine printed; AMNH repository label, white, machine printed; holotype label, red, machine printed.)

PARATYPES: Seven specimens. Costa Rica: Cartago: Cartago, 11-VI-1987, on *Croton*, F. Hovore (WFBC, 1; WOPC, 1); CATIE, 3 km SE Turrialba, 600 m, 14-V-1985, J. Chemsak (WOPC, 1); San Jose: Estac. Bijagual, I-1990, R. Zuniga (INBC, 1); Limon: Est. Hitoy Cerere, R. Cerere, Res. Biologica Hitoy

Cerere, 100 m, Malaise, 1992 (INBC, 1; WOPC, 1); Heredia: 10 km W Puerto Viejo, 170 m, 1-III-1991, H. & A. Howden (CMNC, 1).

DIAGNOSIS: Distinguishable from the superficially similar specimens of *A. chondrus*, n.sp., by the expansion of the elytra at the middle, and from *A. sabulosus*, n.sp., by the more convex condition of the pronotal side margins.

DESCRIPTION: *Size:* Length 4.0–6.0 mm; width 1.7–2.5 mm. *Integument:* Black. *Vestiture:* Integument densely vested with prominent light and dark setae; elytral middiscal setal tuft comprised of two patches, posterior patch much shorter than anterior patch. *Head:* Finely punctate; interocular depressions and frontal umbo moderately developed; eyes oval, moderately convex; width across eyes slightly narrower than width across pronotum (40:43); antenna (fig. 218) shorter than length of pronotum (30:38). *Thorax:* Pronotum slightly longer than broad (43:48), disc finely punctate and very finely microsculptured, subapical depression poorly defined, side margins moderately arcuate; elytra moderately convex, depth at humerus 25, greatest depth in posterior half 30. *Abdomen:* Posterior margin of female pygidium evenly arcuate.

VARIATION: The specimens examined were quite homogeneous.

NATURAL HISTORY: Specimens have been collected in January, March, June, and July; from 100 to 500 m in altitude. Two specimens were collected on *Croton*, another by beating foliage from a flowering tree.

DISTRIBUTION (map 27): Known only from central Costa Rica.

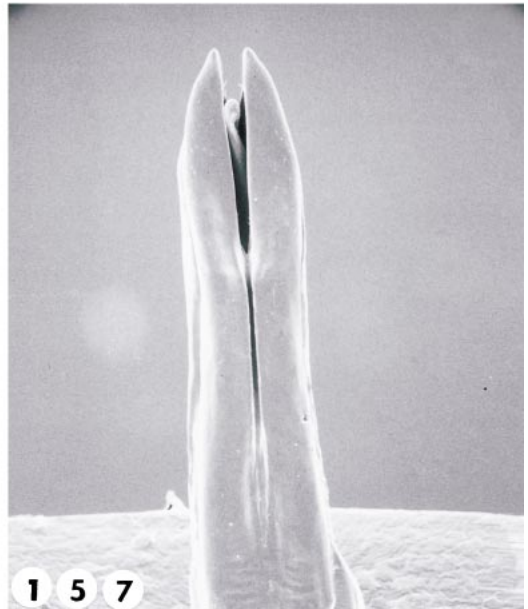
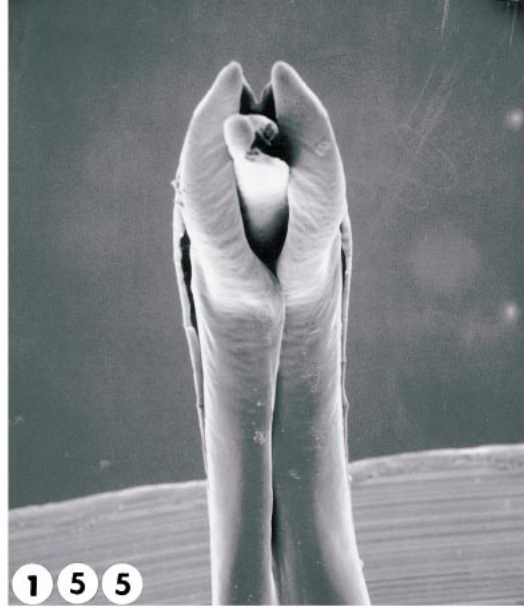
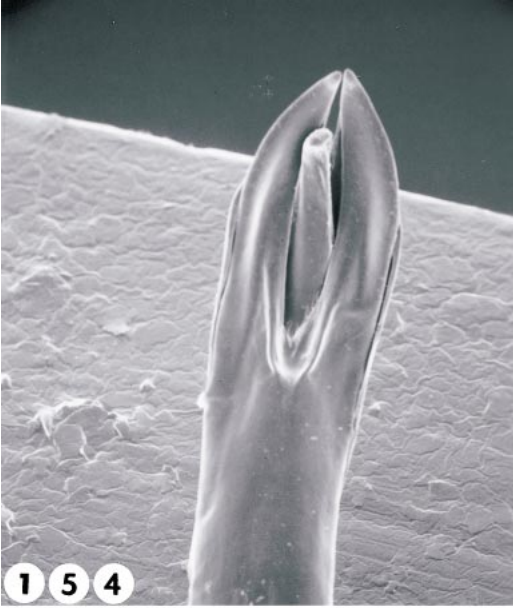
ETYMOLOGY: The specific epithet *cohibilis* is a Latin adjectival that translates as terse. I refer to the abbreviated condition of the posterior patch of the elytral middiscal setal tuft.

IRRORATUS GROUP

***Aphelocerus irroratus*, new species**

Figures 34, 63, 132; map 9

HOLOTYPE: Female. Guatemala, Guat., Antigua, 2000 m, 20-VI-1973, Ginter Ekis (AMNH). (Specimen point mounted, sex label affixed to paper point, white, machine printed; support card; locality label, white,



Figs. 154–157. Aedeagi. 154. *Aphelocerus ciliaris*. 155. *A. coalitus*. 156. *A. coactus*. 157. *A. nitidus*.

machine printed; AMNH repository label, red, machine printed, holotype label, red, machine printed.)

PARATYPES: Twenty-seven specimens. Four from the same locality as the holotype (USNM, 1; JNRC, 1; WOPC, 2). Mexico: Chiapas: 6.4 km N Bochil, 4-V-1969, H. F.

Howden (CMNC, 1). Guatemala: 4 km W Sta. Catarina Pinula, 1800 m, 13-VI-1991, H. Howden (CMNC, 1); El Progreso: above Los Albores, 2439 m, 7–8-IV-1991, E. Giesbert (WOPC, 1); Sacatepequez: Capetillo (BMNH, 4); Finca San Rafael, 27-VI-1948, 2103 m, R. D. Mitchell (FMNH, 1); 19–24

km N. Salama, 25–31-IV-1989, 1371 m, J. E. Wappes (JEW, 1); Baja Verapaz: 7.8 km W Chilasco, 1700 m, 24-V-1991, H. & A. Howden (CMNC, 1); 24 km N Salama, Pantin, 21-IV-1995, E. Giesbert, J. Monzon (WOPC, 1); 19–24 km N Salama, 1371 m, 25–31-IV-1989, E. Giesbert (FSCA, 1), San Jeronimo (BMNH, 1); 9 km S San Jeronimo, BVP, 25-VI-1966, 1371 m, J. M. Campbell (CNCI, 1); Zacapa: Rd. to San Lorenzo, 1288 m, 4-IV-1991, E. Giesbert (FSCA, 1; WOPC, 1); 15°04'N, 89°56'W, Las Nubes near La Trinidad, 1900 m, 27-IV-1997, M. E. Erwin (WOPC, 1); Guatemala City (MNHN, 1); Quetzaltenango: 3.0 km SE Zunil, NW slope Vol. Zunil, 14°46'N, 91°28'W, 18-VIII-1974 (USNM, 1), 8 km SW Zunil, 1585 m, 18-VI-1993; F. Genier, hand collected (WOPC, 1); 1288 m, 20–21-IV-1996, E. Giesbert & J. Monzon (FSCA, 1); Guatemala: Nebaj, 1829 m, 9-VII-1947, C. & P. Vaurie (AMNH, 2).

DIAGNOSIS: The fine punctiform microsculpture (fig. 34) on the elytral disc anterior to the middiscal setal tuft will separate the members of this species from congeners.

DESCRIPTION: *Size:* Length 4.3–5.6 mm, width 1.7–2.1 mm *Integument:* Cyanescent, except elytra piceous. *Vestiture:* Basal third of elytral disc densely vested with short, very fine white setae conspicuous along epipleural margin; generally integument vested predominantly with dark setae; metepisternal, sutural, and elytral discal tuft well developed, latter bipartite, setae of anterior patch directed anteriorly, setae of posterior patch directed towards epipleural margin. *Head:* Width across eyes narrower than width across pronotum (23:27); finely punctate; interocular depression and frontal umbo shallow; antenna as in figure 63. *Thorax:* Pronotum subequal in width and length, narrower than width of elytra across humeri (27:31); elytral depth at humerus 15, greatest depth in posterior half 20. *Male genitalia:* Aedeagus (fig. 132) short; ventral sinus twice length of dorsal sinus.

NATURAL HISTORY: In June, in Antigua, Guatemala, I collected four specimens at 2000 m by beating a stand of roadside hedge-row adjacent to an extensive pine forest. Other specimens were taken from June to August, by “sweeping herbs in cleared fields”

and by “beating dead leaves”, at altitudes ranging from 518 to 2439 m.

DISTRIBUTION (map 9): This species ranges from the highlands of Chiapas, Mexico, to the southern extension of the Sierra Madre of Guatemala.

ETYMOLOGY: The specific epithet *irroratus* is a Latin adjective denoting “covered with granules” and it is used in reference to the granular condition on the surface of the basal third of the elytra.

IMMARGINATUS GROUP

Aphelocerus immarginatus (Chevrolat)

Figures 39, 40, 76, 139, 242; map 13

Clerus immarginatus Chevrolat, 1874: 297. **LECTOTYPE.** Female. Here selected. Nova Granada (= Colombia), Magdalena (MNHN). (Specimen point mounted; sex label affixed to paper point, white, machine printed; support card, white; identification-locality label, light green, cursive; Paris Museum-Chevrolat collection label, white, with green mark on margin, machine printed; MNHN repository label, white, machine printed; lectotype label, red, machine and hand printed.) **NEW COMBINATION.** Chevrolat (1876: 14). Barr (1976: 18).

DIAGNOSIS: The pronotum is distinctly elongate (fig. 39), the elytron is particularly convex in posterior half (fig. 40), and the humeral umbo of the elytra is particularly well developed (as in *A. coactus*, n.sp., fig. 10).

DESCRIPTION: *Size:* Length 4.5–6.0 mm; width 1.5–2.3 mm. *Integument:* Black. *Vestiture:* Head, prothorax, elytron, and protibia vested predominantly with dark setae, prothorax, femur, and meso-metathorax vested predominantly with pale setae; tarsi vested with dark setae, elytral discal tuft comprised of one diagonal elongate patch whose setae are decumbent towards the anterior. *Head:* Width across eyes slightly narrower than width across pronotum (30:32), finely and sparsely punctate; interocular depression and frontal umbo prominent, eyes subspherical, moderately convex; antenna as in figure 76. *Thorax:* Pronotum distinctly elongate (32:37), considerably narrower than width across humeri (32:37), finely punctate, sides feebly convex, subapical depression faintly indicated; elytra (fig. 242) strongly convex in posterior half, depth at humerus 15, greatest depth in posterior half 18, humeral tumes-

cence particularly prominent. *Abdomen*: Posterior margin of pygidium evenly arcuate in both sexes. *Male genitalia* (fig. 139): Parameres explanate.

VARIATION: The specimens examined did not vary appreciably.

NATURAL HISTORY: The specimen examined from Peru was collected in May.

DISTRIBUTION (map 13): Known only from the highlands of Colombia and Peru.

MATERIAL EXAMINED: I examined various specimens, four were from Colombia: Magdalena: Cundinamarca: Bogota. Specimens are deposited in MNHN and WOPC.

YUNGAS GROUP

Aphelocerus acutus, new species

Figures 61, 105, 106, 130, 133, 169, 268; map 7

HOLOTYPE: Male. Mexico, Chis., 9 mi SE Tapilula, Hwy. 195, 24 V 1983, 5100 ft, C. & L. O'Brien & G. B. Marshall (LACM). (Specimen point mounted; sex label affixed to paper point, white, hand printed; support card, white; locality label, white, machine printed; LACM repository label; holotype label, machine printed; plastic vial with abdomen and aedeagus.)

PARATYPES: Thirty-seven specimens. Five specimens from the same locality as the holotype (JNRC, 3; WOPC, 2). Mexico: Chiapas: Hwy. 190, 14 km E Jct. W. Hwy 195, 169 m, 20-VI-1991, J. & E. Beierl (JNRC, 2; WOPC, 1); Montebello Nat. Pk., 17-V-1969, H. J. Teskey (CNCI, 1); 32 km N. Bochil, Yerba Buena, 1737 m, 8-VI-1969, Mal. trap (CNCI, 1); Colonia (ZMHB, 2; WOPC, 1); A. Heyne, (WOPC, 1); 6.4 km NW of Pueblo Nuevo, River Bajada, 15-VII-1965, G. H. & K. L. Nelson (WOPC, 2); Lagunas, Montebello, 5-VI-1974, C. W. O'Brien (WOPC, 3); 2.8 km W entrance Pargue de Laguna Montebello, 21-VI-1990, R. Turnbow (RHTC, 1); Sumidero Cyn., 1219 m, 14-26-VI-1987, J. E. Wappes (JEW, 1; WOPC, 1); Sumidero Cyn., 1219 m, 14-VI-1987 (FSCA, 5; WOPC, 3); Ruinas de Chinkultik, 16-VI-1987, E. Giesbert (FSCA, 1); Oaxaca: Tepamacalco (MNHN, 1). Guatemala: Huehuetenago: 15 km N Nenton, 950 m 5-VI-1997, E. Giesbert, J. Monzon (FSCA, 2; WOPC, 2).

DIAGNOSIS: The members of this species differ from the superficially similar specimens of *A. cornuatus*, n.sp., by the cyanescent hue of the pronotum and trigonal shape of the male and female pygidia (figs. 105, 106). The shape of the elytral middiscal setal tuft is as in figure 169.

DESCRIPTION: *Size*: Length 4.3–4.8 mm; width 1.6–1.8 mm. *Integument*: Head, pronotum, femora, pterothorax, and abdomen cyanscent; tibiae, tarsi, and elytra piceous. *Vestiture*: Integument vested mostly by dark setae, few pale setae; metepisterial, sutural, and elytral discal tufts well developed; latter bipartite, setae of anterior patch directed anteriorly, setae of posterior patch directed towards sutural margin. *Head*: Width across eyes feebly narrower than width across pronotum (20:21); frontal umbo and interocular depressions shallow; eyes subspherical, moderately convex; antenna as in figure 61. *Pronotum*: Equal in width and length (22:22), considerably narrower than width of elytra across humeri (22:20), finely punctate, side margins moderately arcuate, feebly indented by subapical depression; elytra feebly convex in posterior half, depth at humerus 12, greatest depth in posterior half 15, surface finely punctated and shiny. *Abdomen*: Male and female pygidia as in figures 105 and 106, respectively. *Male genitalia*: As in figure 133; parameres acuminate; ventral sinus twice length of dorsal sinus.

VARIATION: The elytra vary from piceous to brunneus.

NATURAL HISTORY: Specimens have been collected during May (1554 m), June (1220 m, malaise trap at 1730 m), and July (sweeping).

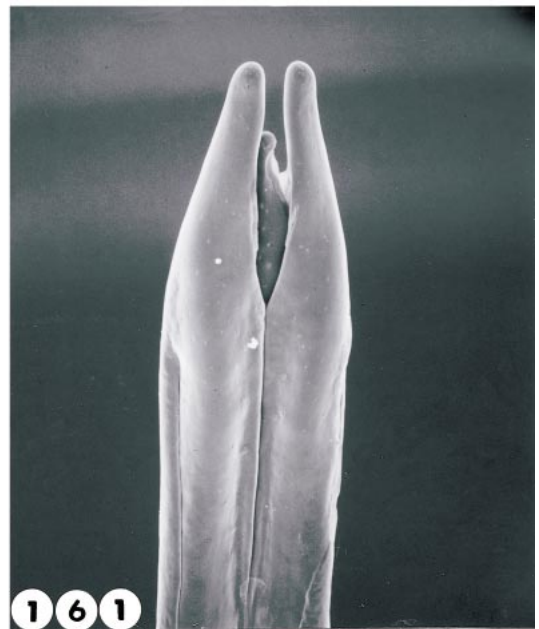
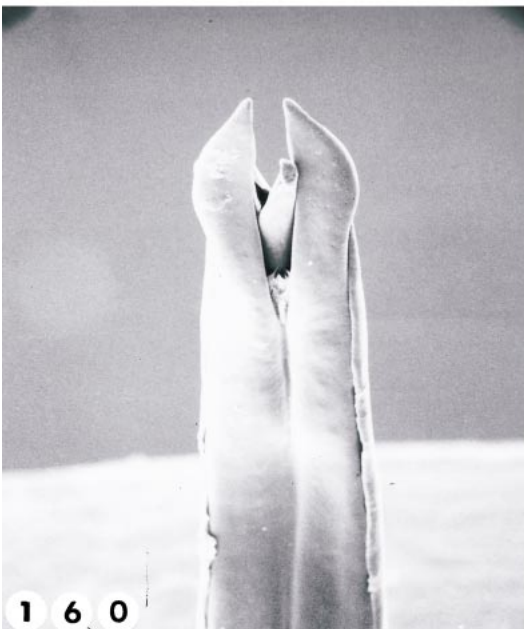
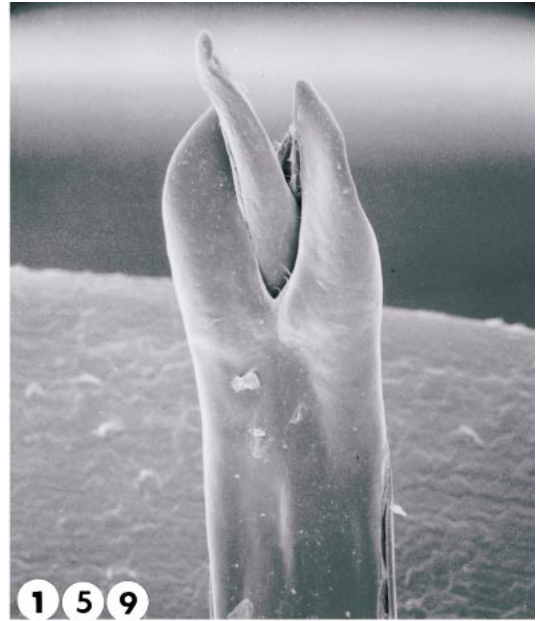
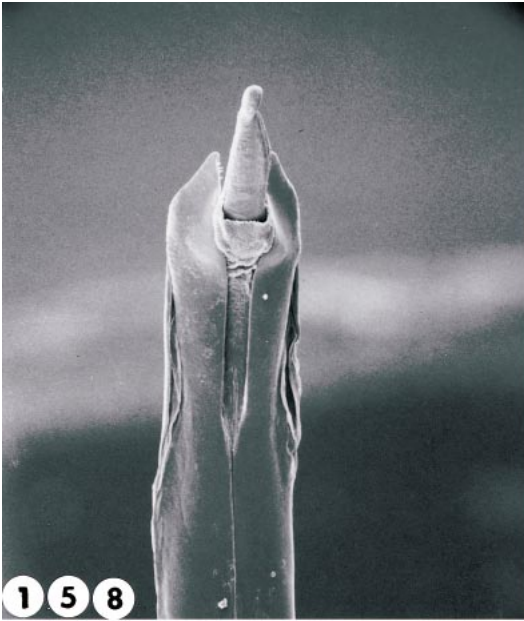
DISTRIBUTION (map 7): Known only from southeastern Mexico and western Guatemala.

ETYMOLOGY: From the Latin *acutus* (pointed). I refer to the acuminate shape of the parameres.

Aphelocerus torosus, new species

Figures 265, 267, 275; map 27

HOLOTYPE: Male. GUAT., Guatemala, 4 km W Sta. Catarina Pinula, 1800 m, 13.VI.1991, H. Howden (CMNC). (Specimen point mounted, sex label affixed to paper point, white, machine printed; support



Figs. 158–161. Aedeagi. 158. *Aphelocerus extensivus*. 159. *A. chiriqui*. 160. *A. sturnus*. 161. *A. myrmecoides*.

card, white; locality label, white, machine printed; CMNC repository label, white, machine printed; holotype label, red, machine printed; plastic vial with abdomen and aedeagus.)

PARATYPE: One specimen from Guatemala: Zacapa: 5–8 km N San Lorenzo, 10-VI-1993, 1800–2000 m, H. & A. Howden (WOPC, 1).

DIAGNOSIS: Specimens of this species are superficially very similar to specimens of *A.*

acutus, n.sp., from which they differ by the degree of convexity of the epipleural margin at elytral apical third (compare figs. 267, 268). The aedeagus is proportionally much longer and the parameral apices more acuminate in specimens of *A. acutus*, n. sp. (compare figs. 133, 265).

DESCRIPTION: *Size:* Length 4.0 mm; width 1.5 mm. *Integument:* Forebody black, with bluish tinge; remainder of integument piceous. *Vestiture:* Predominantly dark; elytral setae dark, except disc with two small patches of 2° white setae. *Head:* Width across eyes slightly narrower than width across pronotum (28:30), finely punctate; interocular depression and fronal umbo moderately developed; eyes subspherical, moderately convex. *Thorax:* Pronotum as wide as long (30:30), considerably narrower than width of elytra across humeri (30:37), pronotal arch coarsely punctated, pronotal disc finely sparsely punctate, side margins considerably convex, anterior transverse depression prominent; elytra moderately convex when viewed from side; depth at humerus 20, greatest depth in posterior half 27, humeral tumescence moderately developed. *Abdomen:* Pygidium posterior margin evenly arcuate; aedeagus as in figure 265.

VARIATION: The specimens did not vary appreciably.

NATURAL HISTORY: The available specimens were collected in June, one at an elevation between 1800 and 2000 m.

DISTRIBUTION (map 27): Known only from central Guatemala.

ETYMOLOGY: The trivial name *torosus* is a Latin adjective meaning bulging. I refer to the robustness of the body conformation of this small beetle.

Apheloceris olanchoensis, new species

Figures 276, 277; map 27

HOLOTYPE: Male. Honduras: Olancho, Parq. Nac. La Muralla, III-13 & 14-1997, B. Ratcliffe & M. Jameson (UNSM). (Specimen pin mounted, sex label affixed to support card, white, machine printed; support card, white; locality label, white, machine printed; -UNSM repository label, white, machine printed; holotype label, red, machine printed; plastic vial with abdomen and aedeagus.)

PARATYPE: One specimen. Honduras: Olancho: P. N. La Muralla, 25-IV-1995, R. Turnbow (RHTC, 1).

DIAGNOSIS: Among the aphelocerans that show a bluish tinge on the pronotum *A. olanchoensis*, n.sp., specimens are most similar to specimens of *A. torosus*, n.sp., from which they may be distinguished by the less convex, nearly subparallel outer margins of the pronotum (compare figs. 275, 276).

DESCRIPTION: *Size:* Length 4.8–5.0 mm; width 2.0 mm. *Integument:* Forebody black, with bluish tinge; remainder of integument piceous. *Vestiture:* Predominantly black: elytral setae dark, except elytral disc with two small patches of 2° white setae. *Head:* Width across eyes about equal to width across pronotum (30:30), finely punctate; interocular depression and fronal umbo moderately developed; eyes subspherical, moderately convex. *Thorax:* Pronotum slightly longer than wide (40:38), considerably narrower than width of elytra across humeri (38:47), pronotal arch finely punctate, pronotal disc finely sparsely punctate, side margins feebly convex, anterior transverse depression not particularly prominent; elytra moderately convex when viewed from side; depth at humerus 20, greatest depth in posterior half 25, humeral tumescence moderately developed. *Abdomen:* Pygidium posterior margin evenly arcuate; aedeagus as in figure 277.

VARIATION: The two specimens examined did not vary appreciably

NATURAL HISTORY: The holotype was collected in March, the paratype in May.

DISTRIBUTION (map 27): Known only from north-central Honduras.

ETYMOLOGY: The name *olanchoensis* is a geographical patronym. It stems from Olancho, a department of Honduras, and the Latin suffix *-ensis*.

Apheloceris vietus, new species

Figures 140, 252, 253; map 27

HOLOTYPE: Male. Honduras: Tegucigalpa vic., El Sitio, 3100', May 24, 1993, J. Rifkind, P. Gum (LACM). (Specimen point mounted, sex label affixed to support card, white, machine printed; locality label, white, machine printed; natural history label, white, machine printed; LACM repository label,

white, machine printed; holotype label, red, machine printed; plastic vial with aedeagus and abdomen.)

PARATYPES: None.

DIAGNOSIS: The centrally directed carinae on the pronotal disc distinguish the members of this species from other *Aphelocerus* specimens.

DESCRIPTION: *Size*: Length 5.0 mm; width 2.0 mm. *Integument*: Black; antenna, mouthparts, and tarsi brunneus. *Vestiture*: Integument copiously vested with prominent light and dark setae; setal tufts prominent on mesoscutelum, basal third of sutural margin, and elytral disc; elytral discal tufts bipartite, setae of anterior patch directed anteriorly, posteriorly in distal setal patch; elytral apical region predominantly vested with white setae. *Head*: Interocular depressions and frontal umbo only faintly visible; frons, epicranium, and gena finely punctated; eyes oblong, moderately convex; width across eyes equal to width across pronotum (70:70); antenna shorter than length of pronotum (70:78). *Thorax*: Pronotum longer than wide (70:78), disc with carinae directed to center of disc, subapical depression poorly defined, side margins feebly arcuate, considerably narrower than width across humeri (70:90); elytra moderately convex, apical slope gradual, depth at humerus 30, greatest depth in posterior half 40; metafemora not extended beyond elytral apex. *Abdomen*: Pygidium and fifth visible sternum notably slender, truncate (figs. 252, 253). *Male genitalia*: As in figure 140.

VARIATIONS: Not studied.

NATURAL HISTORY: The holotype was collected in May, at 945 m, in a tropical deciduous forest.

DISTRIBUTION (map 27): Known only from the type locality.

ETYMOLOGY: The specific epithet *vietus* (shriveled) is a Latin adjectival. I refer to the scabrous surface of the pronotum.

Aphelocerus turnbowi, new species

Figures 209, 220, 233; map 25

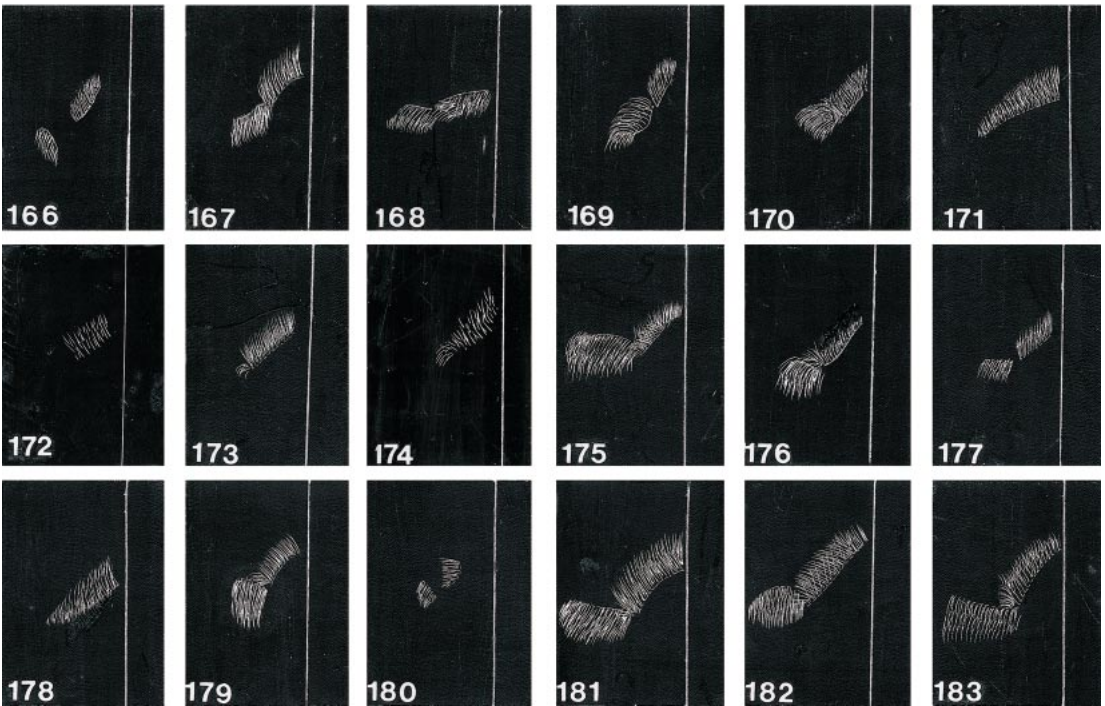
HOLOTYPE: Male. Panama: Chiriqui, 5 km N Hornito, 17 May 1996, R. Turnbow (MIUP). (Specimen point mounted, sex label affixed to paper point, white machine print-

ed; support card, white; locality label, white; MIUP repository label, white, machine printed; holotype label, red, machine printed.)

PARATYPES: Sixty-two specimens, twenty seven specimens from the same locality as the holotype (RHTC, 2; WOPC, 2); 15-IV-1996 (RHTC, 1; WOPC, 1); 16-IV-1996 (JNRC, 2; RHTC, 9; WOPC, 3); 17-IV-1996 (WOPC, 1). Panama: Chiriqui: Finca La Suiza, 16-IV-1996 (RHTC, 3); 6-VII-1996 (WOPC, 1); 1 km SE Hornito, 28-V-2-VI-1994, F. Andrews and A. Gilbert, Malaise trap (CDAE, 4; WOPC, 2); 2 km N Hornito, 16-VI-1994, 1200 m, A. R. Gillogly (STRI, 1); vic. Hornito, 1371 m, 24-26-IV-1995, E. Giesbert (FSCA, 1; WOPC, 1); vic. Hornito, 1371 m, 14-18-IV-1996, Wappes, Huether, and Morris (JEWS, 1; RFMC, 1); Hartmann's Finca, 4-7-VII-1997, Wappes and Morris (JEWS, 1); 18-IV-1993, E. Giesbert (FSCA, 1); 6 km SE Fortuna Dam, 16-17-IV-1992 (FSCA, 1); 20-I-1992, 1100 m, H. P. Stockwell (WOPC, 1); 7 km SE Fortuna Dam, 8-V-1993, Gillogly and Stockwell (STRI, 4; WOPC, 2); 13-VII-1995, 1100 m, A. R. Gillogly (STRI, 1; WOPC, 1); 12-V-1991, 1100 m, Windsor and Stockwell (STRI, 1; WOPC, 2); 13-VII-1995, A. R. Gillogly (WOPC, 1); 30-IV-1993, 1200 m (STRI, 2); nr. Mina Cerro Colorado, 6-VIII-1993, 1800 m, Gillogly and Stockwell (STRI, 1; WOPC, 1); vic. Chiriquicito, 365 m, 25-IV-1995, E. Giesbert (WOPC, 1); Reserva Fortuna, Rio Hornito trail, 28-V-1993, F. Andrews and A. Gilbert (CDAE, 1; WOPC, 1); Veraguas: Alto de Piedra, above Santa Fe, 850 m, 10-IV-1993, H. Stockwell (STRI, 2; WOPC, 1).

DIAGNOSIS: Specimens from the Panamanian Province of Chiriqui are considered to belong to this species if they have the posterior patch of the elytral middiscal setal tuft quadrate, about half the size of the anterior patch (fig. 233). Also, the posterior patch may be substantially reduced.

DESCRIPTION: *Size*: Length 3.6-5.0 mm; width 1.1-2.1 mm. *Integument*: Black. *Vestiture*: Integument densely vested with prominent light and dark setae; elytral middiscal setal tuft comprised of two patches, posterior patch half the size of anterior patch. *Head*: Finely punctate; interocular depressions and frontal umbo moderately developed; eyes



Figs. 162–183. Aedeagus, habitus, elytral discal setal tufts. **162.** *Aphelocerus dispilis*, aedeagus. **163.** Weevil, *Myrmex* sp. **164.** *Aphelocerus myrmecoides*, **165–183.** Elytral discal setal tufts. **165.** *A. sagittarius*. **166.** *A. triangulus*. **167.** *A. cornuatus*. **168.** *A. humerus*. **169.** *A. acutus*. **170.** *A. lividus*. **171.** *A. protenus*. **172.** *A. argus*. **173.** *A. arenatus*. **174.** *A. catie*. **175.** *A. chiriqui*. **176.** *A. yungas*. **177.** *A. monteverde*. **178.** *A. anticus*. **179.** *A. batesi*. **180.** *A. bufustis*. **181.** *A. acanthus*. **182.** *A. yungas*. **183.** *A. sturnus*.

oval, moderately convex; width across slightly narrower than width across pronotum (33:43); antenna (fig. 220) shorter than length of pronotum (30:35). *Thorax*: Pronotum about equal in length and width (35:35), disc finely punctate, anterior transverse depression faintly visible, side margins moderately arcuate; elytra notably convex in posterior half, depth at humerus 17, greatest depth in posterior half 25. *Abdomen*: Posterior margin of male pygidium narrowly truncate, evenly arcuate in females. *Male genitalia*: Aedeagus short, tegmen as in figure 209.

VARIATION: The posterior patch of the elytral middiscal tuft varies in size, most often being rather small as shown in figure 233.

NATURAL HISTORY: The specimens examined were collected during May, June, and July, from altitudes ranging from 365 to 1371 m.

DISTRIBUTION (map 25): Known only from the highlands of Chiriqui and Varaguas, in Panama.

ETYMOLOGY: It gives me great pleasure to name this species to give credit to an outstanding beetle collector and friend of the insect systematic profession. On several occasions Dr. Turnbow took the initiative to contact me and make available his fine assortment of clerids.

Aphelocerus cornuatus, new species

Figures 60, 167; map 21

HOLOTYPE: Male. Mexico, Atoyac, May, H. H. S. (BMNH). (Specimen point mounted, pygidium, sixth visible abdominal sternum and machine printed sex label affixed to paper point; support card, white, locality label, white, machine printed; year label "1907-156", white, machine printed; BMNH repository label, white, machine printed; holotype label, red, machine and hand printed; plastic vial with aedeagus.)

PARATYPES: Three specimens with the same locality information as the holotype (BMNH, 1; ZMHB, 1; WOPC, 1).

DIAGNOSIS: The combination of small size (4 mm), Mexican distribution, and presence of a bipartite elytral discal setal tuft (fig. 167) will identify the members of this species. The acuminate-curved shape of the parameres easily identifies the males.

DESCRIPTION: *Size*: Length 4.0–4.2 mm; width 1.5–1.8 mm. *Integument*: Cranium black, remainder of body piceous. *Vestiture*: Integument vested with mostly dark setae, few pale setae; metepisternal, sutural, and elytral middiscal tufts prominent; latter tuft bipartite, setae of anterior patch directed anteriorly, setae of posterior patch directed posteriorly. *Head*: Width across eyes as wide as greatest width across pronotum (18:18); interocular depressions and frontal umbo broad and shallow; eyes moderately convex; antenna as in figure 60. *Thorax*: Pronotum subequal in width and length (17:18), considerably narrower than width across humeri (17:24), with very few fine punctations, lateral margins feebly arcuate, subapical depression feebly impressed; elytra feebly convex in posterior half, depth at humerus 10, greatest depth in posterior half 15, surface finely punctate. *Abdomen*: Male pygidium evenly arcuate in distal margin; female pygidium subconic. *Male genitalia*: As in *A. acutus* fig. 130; parameres acuminate and concave along median margin near apex; ventral sinus twice length of dorsal sinus.

VARIATION: The available specimens did not vary appreciably.

NATURAL HISTORY: The material examined was collected in May from Atoyac, Mexico, which is at an altitude of about 400 m.

DISTRIBUTION (map 21): Known only from the type locality.

ETYMOLOGY: From the Latin *cornu* (horn) and the Latin suffix *-atus* (having the nature of). I refer to the horn like configuration of the parameres.

REMARKS: The locality label of the type specimen indicates that Atoyac is in "Estado Veracruz"; however the only Atoyac locality known to me is located in "Estado Guerrero".

Aphelocerus humerus, new species

Figures 67, 114, 115, 168; map 21

HOLOTYPE: Female. Honduras: Cortes, 20 km N Cofradia, 4-VII-1977, C. W. O'Brien (AMNH). (Specimen point mounted; pygidium, sixth visible abdominal sternum, and machine printed sex label affixed to paper pointed; support card; locality label; AMNH repository label, white, machine printed; ho-

lotype label, red, machine printed; plastic vial with abdomen.)

PARATYPES: None.

DIAGNOSIS: The available specimen is superficially similar to specimens of *A. naevius*, n.sp. In *A. humerus*, n.sp., specimens, however, the elytral setal tuft is bipartite (fig. 168) and there is a more pronounced swollen humeral umbo and deeper concavity behind the humerus.

DESCRIPTION: *Size*: Length 5.0 mm; width 2.0 mm. *Integument*: Brown. *Vestiture*: Integument vested predominantly with pale setae, few dark setae; metepisternal, sutural, and elytral tufts well developed; latter bipartite, anterior patch with setae directed towards epipleuron, setae of posterior patch directed posteriorly. *Head*: Width across eyes feebly narrower than width across pronotum (24:28), very finely punctate; interocular depression and frontal umbo moderately defined; eyes subspherical, moderately convex; antenna as in figure 67. *Thorax*: Pronotum subequal in width and length (28:29), narrower than width of elytral across humeri (28:34); pronotal disc finely punctate; elytral humeral umbo very prominent; elytra concave behind humeral umbo, depth at humerus 15, greatest depth in posterior half 22. *Abdomen*: Female pygidium (fig. 114) evenly convex in posterior margin; sixth visible sternum (fig. 115) strongly incised.

NATURAL HISTORY: The only available specimen was collected from the type locality in July.

DISTRIBUTION (map 21): Known only from western Honduras.

ETYMOLOGY: The trivial name *humerus* (shoulder) is a Latin noun used here to accentuate the prominence of the swollen umbo behind the humeral angle.

Aphelocerus domus, new species
50, 96, 223, 232; map 25

HOLOTYPE: Female. Mexico. Chiapas, 4 km N. Ocozocoautla, 900 m, June 20, 1991, beating trop. decid. forest, J. & E. Beird (LACM). (Specimen point mounted, sex label affixed to paper point; white, machine printed; support card, white; locality label, white, bordered in black; collector/natural history label, white, bordered in black, ma-

chine printed; LACM repository label, white, machine printed; holotype label, red, machine printed; plastic vial with abdomen and ovipositor.)

PARATYPES: None.

DIAGNOSIS: This specimen is superficially very similar to those of *A. coactus*, n.sp., from which they may be separated by the lack of densely distributed white setae on the distal third of the elytra. Also, in *A. domus*, n.sp., specimens the female pygidium is not trigonal, which is the case in *A. coactus*, n.sp., specimens (compare figs. 95, 96).

DESCRIPTION: *Size*: Length 5.0 mm; width 2.1 mm. *Integument*: Black. *Vestiture*: Integument densely vested with prominent light and dark setae; elytral middiscal setal tuft comprised of two patches, anterior and posterior patches approximately equal in size. *Head*: Finely punctate; interocular depressions and frontal umbo moderately developed; eyes oval, moderately convex; width across eyes slightly narrower than width across pronotum (33:38); antenna (fig. 223) shorter than length of pronotum (30:40). *Thorax*: Pronotum slightly longer than broad (40:38); disc finely punctate, subapical depression faintly visible, side margins moderately arcuate; elytra moderately convex, depth at humerus 20, greatest depth in posterior half 30; elytral middiscal setal patch as in figure 232. *Abdomen*: Posterior margin of female pygidium evenly arcuate.

VARIATION: Not studied.

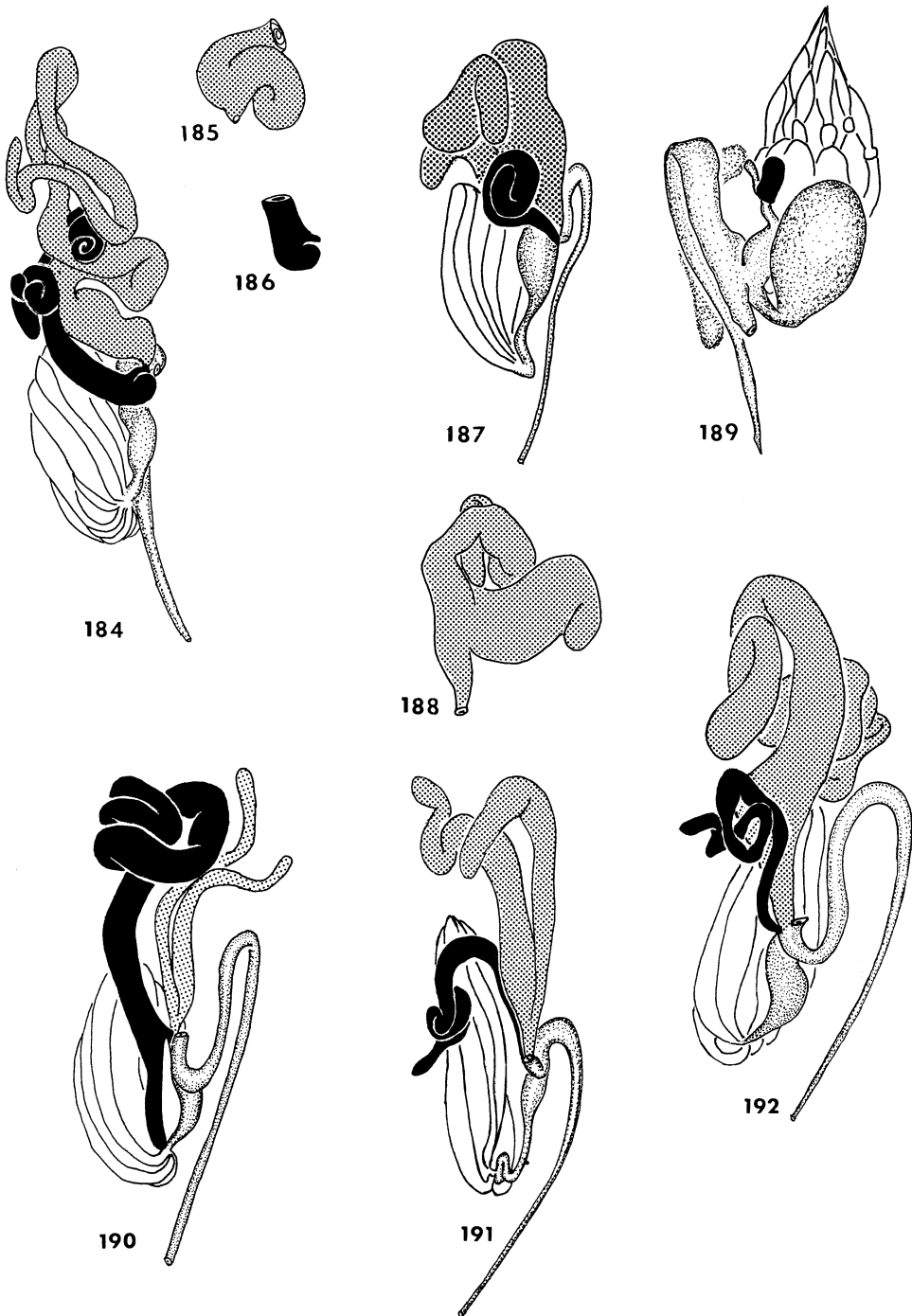
NATURAL HISTORY: The available specimen was collected in June, by beating within a deciduous forest located at an altitude of 900 m.

DISTRIBUTION (map 25): Known only from the type locality.

ETYMOLOGY: The trivial name is a Latin noun meaning roof. I refer to the moderate convexity of the elytra.

Aphelocerus capillus, new species
Figures 153a, 266; map 10

HOLOTYPE: Male. Nicaragua: Matagalpa: 10 km NW Matagalpa, Selva Negra, 16-V-22-IV-2002, 1280 m, 12°59'N, 85°54'W, W. Opitz (AMNH). (Specimen point mounted, sex label affixed to paper point, white, machine printed; support card, white; locality



Figs. 184–192. Internal reproductive organs. **184–186.** *Aphelocerus inconstans*. **184–185**, male (**184**, accessory glands, testis, and ejaculatory duct; **185**, base of medial accessory gland; **186**, base of lateral accessory gland). **187–189.** *A. myrmecoides*. **187–188**, male (**187**, accessory glands, testis, and ejaculatory duct; **188**, medial accessory gland). **189.** Female. **190.** *A. leucomelas*, male. **191.** *A. discapillus*, male. **192.** *A. cheliferosus* male.

label, white, machine and hand printed; AMNH repository label, white, machine printed; holotype label, red, machine printed; plastic vial with abdomen and aedeagus.)

PARATYPES: Six specimens from the same locality as the holotype (WOPC, 4; JNRC, 1) and Montana Selva Negra, 1300 m, 7.5 km N Matagalpa, 13°00'1"N, 85°54'32"W, 15-16-VI-2001, B. Ratcliffe, M. L. Jameson, R. Cave (UNSM. 1).

DIAGNOSIS: Specimens of this species closely resemble members of the southern Mexican *A. domus*, n.sp., specimens from which they can be distinguished by geographic distribution. *A. capillus*, n.sp., specimens are known only from western Nicaragua.

DESCRIPTION: *Size*: Length 5.0–5.2 mm; width 1.8–2.0 mm. *Integument*: Black. *Vestiture*: Integument vested mostly with dark setae, upper region of thorax lined with dense patch of white setae; elytral disc with distinct, bipartite patch of 2° white decumbent setae. *Head*: Width across eyes subequal to width across pronotum equal (37:40), finely punctate; interocular depression and fronal umbo moderately developed; eyes subspherical, moderately convex. *Thorax*: Pronotum as long as wide (40:40), narrower than width of elytra across humeri (40:50), pronotal disc finely, sparsely punctate, side margins moderately convex, anterior transverse depression prominent; elytra flat in basal two-thirds when viewed from side; depth at humerus 20, greatest depth in posterior half 20; humeral tumescence prominent. *Abdomen*: Pygidium posterior margin evenly arcuate in both sexes; aedeagus as in figure 153a. *Male internal reproductive organs* (fig. 266): Two pairs of accessory glands, lateral pair shorter than medial pair. Both sets of glands highly convoluted and diverticulated at base.

VARIATION: The available specimens are quite homogeneous with the exception of the posterior patch of the elytral middiscal tuft with is slightly reduced in some specimens.

NATURAL HISTORY: The specimens were collected by beating overhanging trail vegetation rich in dead branches and broad leaf vines. Some were captured from a tangle of dense vines draped over short bushes.

DISTRIBUTION (map 10): Known only from the vicinity of the type locality.

ETYMOLOGY: The specific epithet is a Latin noun meaning "hair". I refer to the extensive development of the elytral middiscal setal tuft.

Aphelocerus coactus, new species

Fronticepiece, figs. 1a, 10, 12–14, 16, 17–19, 21, 57, 95, 102–104; 156, 241; map 5

HOLOTYPE: Male. Mexico, Tabasco, La Chontalpa, VII. 4.1971, G. Ekis (AMNH). (Specimen point mounted, sex label affixed to point, white, machine printed; support card; locality label, white, machine printed; AMNH repository label, white, machine printed; holotype label, red, machine printed.)

PARATYPES: One hundred and five specimens. Thirty-three from the same locality as the holotype (AMNH, 1; BMNH, 1; CASC, 1; ICCM, 1; DEIC, 1; MCZC, 1; MNHN, 1; SEAN, 2; WFBC, 1; WOPC, 22; ZMAN, 1). Mexico: Tabasco: 48 km W Cardenas, 4-VII-1971, Clark, Murray, Hart, Schaeffner (SMTD, 2; TAMU, 15; WOPC, 6); Veracruz: 11 km SW Manatitlan, 2-VIII-1974, 45 m, C. W. O'Brien (WOPC, 1); Cordorba, 19-V-1957 (USNM, 1); Dr. A. Fenyés (CASC, 2); Coyame, Lake Catemaco, 1–15-VII-1963, D. R. Whitehead (USNM, 1); 2.1 km N of Hotel Playa Azul, L. Catemaco (CMNC, 1; WOPC, 1; FSCA, 3); Estacion Biologia los Tuxtlas, 26-IV–6-V-1989, E. Giesbert (FSCA, 4); Catemaco, 6-IX-1974, W. Hanson, G. Bohart (EMUS, 1), 18-VII-1966, J. S. Buckett, M. R. & R. C. Gardiner (EMEC, 1); Minatitlan, 8–26-IX-1961, R. & K. Driesback (MSUC, 2); Orizaba, 1-V-1921, L. R. Reynold (FMNH, 3), 28-VII-1941, Tierra Blanca, H. S. Dybas (FMNH, 1); Yucatan: Old 180 km # 265, 12-V-1997, R. Morris (RFMC, 1); Oaxaca: 6 km N Matias Romero, 12-VIII-1980, E. Giesbert (FSCA, 1); Chiapas: Tapachula, Hoge (ZMHB, 1); 6 km Simojovel, 5-VIII-1969, Campbell & Bright (CNCI, 1); Colima: (ZMHB, 1); Guerrero: Atoyac, April, H. H. S. (USNM, 1); Mexico: Kolze, (FMNH, 1). Honduras: Atlantida: 10 km W. La Ceiba, 5-VIII-1977, C. W. O'Brien (WOPC, 3); 12 km W Olanchito, V-1949, E. C. Becker (CNCI, 1); Cortes: El Agua Azul, 30-IV-1993, R. Turnbow (RHTC, 1); Comayagua: SW corner Lago de Yojoa, 1.2 km. W Pito

Solo, 30-IV-1993, 609 km, J. Rifkind, P. Gum (JNRC, 3; WOPC, 1); Lago de Yojoa, SE corner, 26-IV-1993, on *Piper* sp., J. Rifkind, P. Gum (JNRC, 2; WOPC, 1); Santa Barbara: SE end Lake Yojoa, 29-V-1996, F. G. Andrews & A. J. Gilbert (JNRC, 1); Francisco Morazan: Talanga, 14°17.92'N, 87°14.17'W, 27-V-1996, F. G. Andrews & A. J. Gilbert (CDAE, 2); nr. LaVentana, 30-VI-1995 (JNRC, 1); vicinity of Tegucigalpa, road to La Tigra, vic. of Jutiapa, 23-IV-1993, sweeping shrub, J. Rifkind, P. Gum (JNRC, 1); vic. El Sitio, 945 m, 2-IV-1993, J. Rifkind, P. Gum, sweeping, beating tropical deciduous forest (WOPC, 1); Copan: 6 km E El Jaral, 14°52.23', N 89°03.89'W, 2 VI-1996, F. Andrews & A. Gilbert (CDAE, 2; WOPC, 1).

DIAGNOSIS: Specimens of this species are most conveniently identified by the arrangement and configuration of the elytral setal tuft as seen in the frontispiece. The elytral distal tuft is percurrent and acuminate posteriorly. The cluster of setae in the anterior portion of the tuft are directed anteriorly whereas those forming the posterior portions of the tuft are directed to the epipleural margins and/or towards the posterior portion of the elytral apical third, which is profusely vested with white setae.

DESCRIPTION: *Size:* Length 4.0–6.0 mm; width 1.8–2.4 mm. *Integument:* Piceous. *Vestiture:* Head, prothorax, elytra, and protibiae vested predominately with dark setae, pterothorax, femora, and meso-metathorax vested predominantly with pale setae, tarsi vested with dark setae; mesocutellum matted with white setae; elytra with distinct, discally located, bipartite setal tuft (fig. 1), setae near epipleural margin pale to white, discal non-tuft setae black in anterior two-thirds and pale to white in posterior third; anterior third of elytral sutural margin vested with white setal tuft; metepisternal tuft prominent. *Head:* Width across eyes narrower than width across pronotum (27:31), finely punctate; interocular depressions and frontal umbo broad and shallow; eyes subspherical, moderately convex; antenna as in figure 57. *Thorax:* Pronotum equal in width and length, narrower than width of elytra across humeri (32:39), finely punctate, disc sparsely punctate, side margin moderately arcuate and fee-

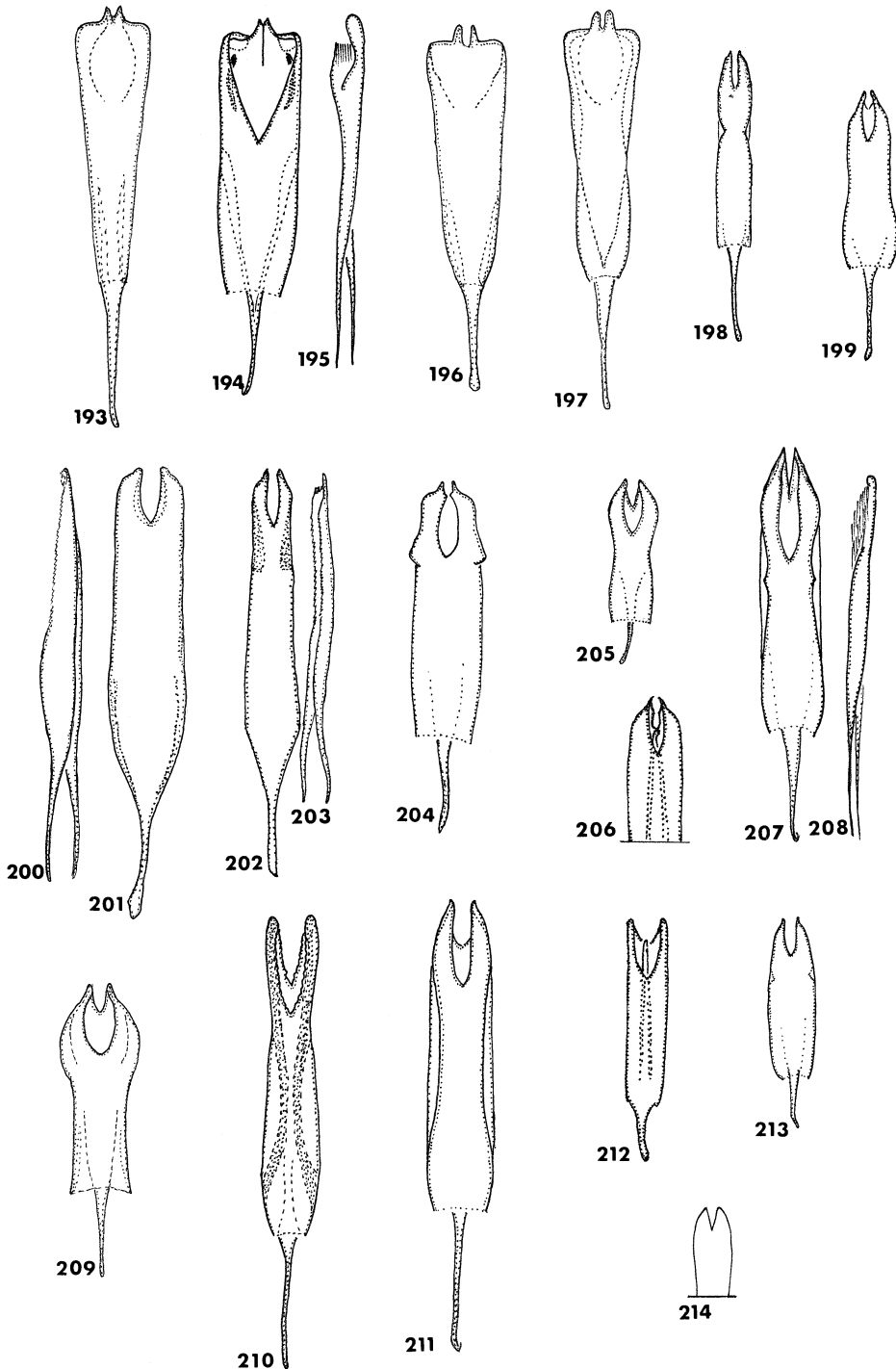
bly incised by anterior transverse depression; elytra moderately convex in posterior half, depth at humerus 19, greatest depth in posterior half 25, surface finely punctate and shiny. *Abdomen:* Male pygidium (fig. 102) evenly arcuate in distal margin; sixth visible sternum (fig. 103) transverse and incised at distal margin; female pygidium (fig. 104) conic. *Male genitalia* (figs. 13, 14, 156): Aedeagus short and moderately sclerotized; parameres feebly developed; ventral sinus five times longer than dorsal sinus; phallic plicae well developed. *Female genitalia:* As in figures 16 and 17; dorsal lamina trilobed; ventral lamina unilobed. *Male internal reproductive organs* (figs. 18, 19): Two pairs of accessory glands; lateral gland uniramous, coiled, and basally diverticulated (fig. 18); medial gland biramous, linear; testis composed of 12 follicles. *Female internal reproductive system:* Spermathecal capsule cylindrical, elongate, and notably sclerotized; spermathecal gland attached to base of spermathecal capsule; bursa copulatrix well developed; ovary comprised of 12 ovarioles. *Alimentary canal:* As in figure 12; proventriculus well developed; ventricular crypts well developed; six cryptonephridial malpighian tubules present. *Nervous system:* As in figure 21.

VARIATION: Except for the brunneus elytra on some specimens and slight differences in the conic form of the female pygidium, the members of this species do not vary appreciably.

NATURAL HISTORY: Specimens have been collected in April, May, June, July, August, and September; at altitudes ranging from 8 to 1148 m. In July, in a forest clearing in Tabasco, Mexico, at about 8 m in altitude, I observed and collected 43 specimens scurrying on foliage of *Spondias mombin*, a woody shrub known locally as “Jobo”. J. Rifkind and P. Gum collected one specimen on flowers in a hardwood broadleaf forest.

DISTRIBUTION (map 5): The known range of this Central American species extends from southern Mexico and northern Honduras.

ETYMOLOGY: The trivial name *coactus* is a Latin adjective meaning “thick”. I refer to the robust body of these beetles.



Figs. 193–214. Tegmina and phalli. 193. *Aphelocerus delicatulus*, tegmen. 194–195. *A. bispineus* (194, tegmen; 195, phallus). 196. *A. aeneus*, tegmen. 197. *A. acuticolis*, tegmen. 198. *A. sculptillus*, tegmen. 199. *A. sabulosus*, tegmen. 200–201. *A. akis* (200, phallus; 201, tegmen). 202–203. *A. chelonus* (202, tegmen; 203, phallus). 204. *A. scalenus*, tegmen. 205. *A. ebenus*, tegmen. 206. *A. hespenheidei*, tegmen. 207–208. *A. ciliaris* (207, tegmen; 208, phallus). 209. *A. turnbowi*, tegmen. 210. *A. improcerus*. 211. *A. anticus*, tegmen. 212. *A. inbatus*, tegmen. 213. *A. chondrus*, tegmen. 214. *A. monteverde*, tegmen.

Aphelocerus scalenus, new species

Figures 204, 219, 221, 236; map 26

HOLOTYPE: Male. Venezuela, T. F. Amazonas, 13-XI-1982, P. Guanches (IZAV). (Specimen point mounted, sex label affixed to paper point, white, machine printed; support card, white; locality label, white, machine and hand printed; IZAV repository label; holotype label, red, machine printed; plastic vial with abdomen and aedeagus.)

PARATYPES: None.

DIAGNOSIS: Posterior patch of midelytral setal tuft comprised of only a few setae that are contiguous with a loose aggregate of decumbent pale setae.

DESCRIPTION: *Size:* Length 5.0 mm; width 1.8 mm. *Integument:* Black. *Vestiture:* Integument copiously vested with prominent light and dark setae; elytral middiscal setal tuft comprised of two patches, anterior patch not prominent, posterior patch comprised of few setae contiguous with loose aggregate of decumbent setae (fig. 236). *Head:* Finely punctate; interocular depressions and frontal umbo moderately developed; eyes oval, moderately convex; width across eyes equal to width across pronotum (36:36); antenna as long as length of pronotum (35:35), with elongate club (figs. 219, 221). *Thorax:* Pronotum as long as wide (35:35), disc finely punctate, subapical depression faintly visible, side margins moderately arcuate; elytra only feebly convex in posterior half, depth at humerus 18, greatest depth in posterior half 25. *Abdomen:* Posterior margin of male broadly narrowed, truncated. *Male genitalia:* Aedeagus as in figure 204.

VARIATION: Not studied.

NATURAL HISTORY: The available specimen was collected during November.

DISTRIBUTION (map 26): Known only from the type locality.

ETYMOLOGY: The specific epithet, *scalenus*, is a Latin adjectival meaning uneven. I refer to the disparity between the development of the setal patches of the elytral middiscal tuft.

Aphelocerus yungas, new species

Figures 78, 142, 176, 182, 222, 230;
map 22

HOLOTYPE: Male. Bolivia, Chaco, Yungas, 3000, G. Garleep (MNHN). (Specimen point

mounted; sex label affixed to paper point; support card, lined; locality label, beige, machine printed; Paris Museum repository label, beige, machine printed; holotype label, red, machine and hand printed; plastic vial with aedeagus.)

PARATYPES: Nineteen specimens. Three specimens from the same locality as the holotype (WOPC, 3). Bolivia: Cochabamba: Yungas del Palmar, 15-X-1949, 1000 m, R. Zischka (FMNH, 1); Yungas (MHNP, 1); Cochabamba, Germain (WOPC, 1); Bolivia, Chaco (MNHN, 3; WOPC, 2). "Bolivia" (BMNH, 2; DEIC, 1; ZMHB, 2; MNHN, 3).

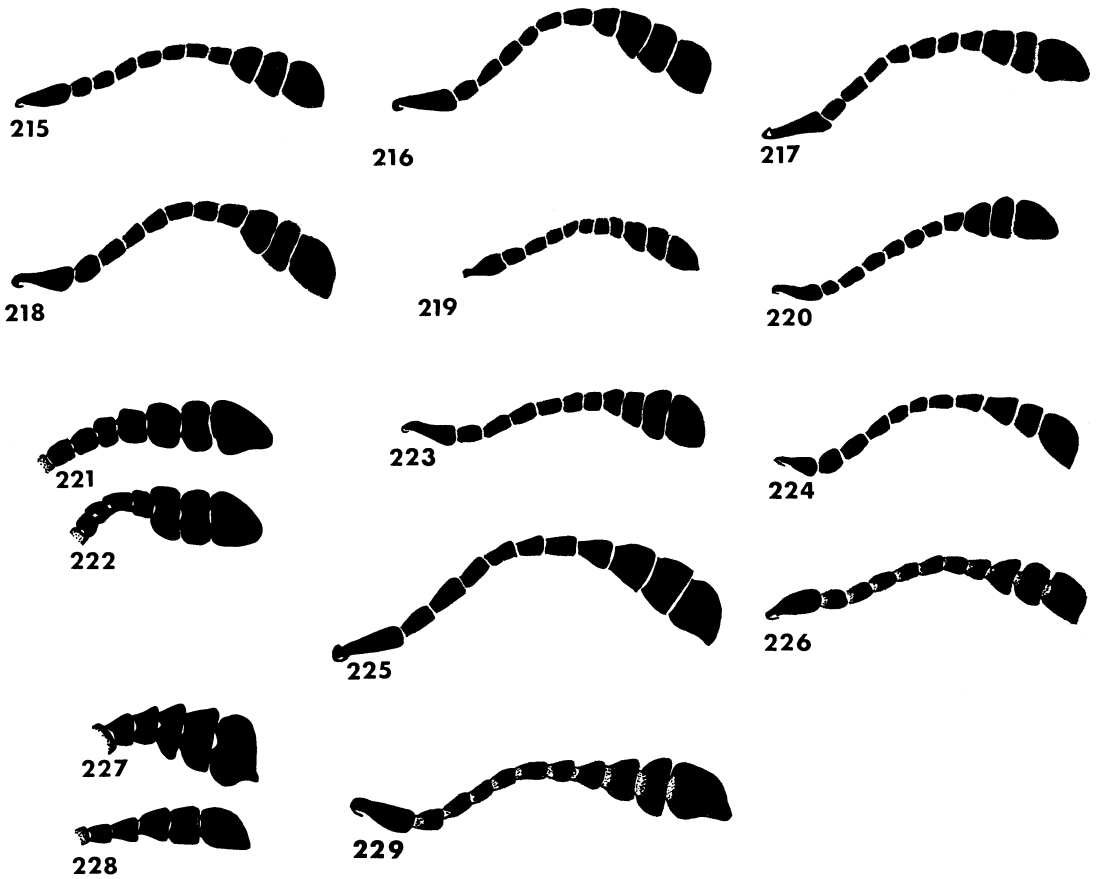
DIAGNOSIS: These are shallow-bodied beetles that superficially resemble the members of *A. bufustis*, n. sp., from which they differ by having the elytral discal tuft (fig. 182) particularly well developed.

DESCRIPTION: *Size:* Length 6.0–7.4 mm; width 2.0–2.2 mm. *Integument:* Head, prothorax, abdomen piceous, pterothorax, piceous, remainder castaneous. *Vestiture:* Head, prothorax, elytra, and protibia vested predominantly with dark setae, pterothorax, femora, meso-metathorax vested predominantly with pale setae; anterior patch of middiscal setal tuft well developed, posterior patch short and wide; tarsi vested with dark setae. *Head:* Width across eyes same as width across pronotum (27:27), finely punctate, interocular depressions and frontal umbo shallow; eyes subspherical, moderately convex; antenna as in figures 78 and 222. *Thorax:* Pronotum subequal width and length (26:27), narrower than width of elytron across humeri (26:36), finely punctated, side margin feebly arcuate, anterior transverse depression prominent; elytra shallow, depth at humerus 13, greatest depth in posterior half 17; humeral tumescence not prominent. *Abdomen:* Pygidium of both sexes with posterior margin evenly arcuate. *Male genitalia* (fig. 142): Aedeagus proportionally longer than in other species.

VARIATION: The elongations of the elytral middiscal patches, particularly the anterior patch, is variable in length (see figs. 176, 230)

NATURAL HISTORY: Specimens were collected from 1000 to 3000 m, one in October.

DISTRIBUTION (map 22): Known only from the highlands of Bolivia.



Figs. 215–229. Antennae. 215. *Aphelocerus acuticollis*. 216. *A. primigenius*. 217. *A. sculptillus*. 218. *A. cohibilis*. 219. *A. scalenus*. 220. *A. turnbowi*. 221. *A. scalenus*. 222. *A. yungas*. 223. *A. domus*. 224. *A. propinquus*. 225. *A. improcerus*. 226. *A. akis*. 227. *A. chelonus*. 228. *A. cheliferosus*. 229. *A. inbatus*.

ETYMOLOGY: The trivial name, *yungas*, constitutes a noun in apposition and refers to the type locality.

Aphelocerus extensivus, new species

Figures 37, 66, 158; map 27

HOLOTYPE: Female. Guatemala, Zapote (El Zapote) G. C. Champion (BMNH). (Specimen point mounted; sex label affixed to paper point, white, machine printed; support card; locality label, white machine printed; holotype label, red, machine and hand printed.)

PARATYPES: Five specimens. Two from the same locality as the holotype (BMNH, 1; WOPC, 1). El Salvador: San Salvador: Quetzaltepeque, 500 m, 19-VI-1963, D. Q.

Cavagnaro & M. E. Irwin (WOPC, 2); 8-VII-1960, J. & B. Bechyne (IZAV, 1).

DIAGNOSIS: The posterior patch of the elytral setal tuft is narrowly extended posteriorly (fig. 37), and the sutural tuft is elongated. These characteristics will distinguish the members of this species from other members of the *yungas* species group.

DESCRIPTION: *Size*: Length 4.9–6.0 mm; width 1.8–2.2 mm. *Integument*: Piceous. *Vestiture*: Integument vested with predominately pale setae, few dark setae; metepisternal, sutural, and elytral middiscal tufts well developed; sutural tuft particularly elongated; elytral discal tuft bipartite; setae of anterior patch directed toward epipleuron, setae of posterior patch directed posteriorly, middiscal elytral setal tuft notably extended pos-

teriorly. *Head*: Width across eyes feebly narrower than width across pronotum (30:33), coarsely, densely punctated; interocular depression and frontal umbo shallow; eyes subspherical, moderately convex; antenna as in figure 66. *Thorax*: Pronotum near equal in width and length (33:34); narrower than width of elytra across humeri (26:33); finely punctate, side margins boldly arcuate, feebly incised by subapical depression, elytral depth at humerus 18, greatest depth in posterior half 21. *Abdomen*: Pygidium with posterior margin evenly convex. *Male genitalia*: As in figure 158.

VARIATION: Except for the body size, these beetles did not vary appreciably.

NATURAL HISTORY: The El Salvador specimens were collected in June (500 m) and July.

DISTRIBUTION (map 10): From southern Guatemala to central El Salvador.

ETYMOLOGY: The specific epithet is a Latin adjective meaning "stretch out". I refer to the extended condition of the posterior patch of the elytral middiscal setal tuft.

BATESI GROUP

Aphelocerus lividus, new species

Figures 59, 107–109, 131, 170; map 8

HOLOTYPE: Male. Mexico: Chiapas: Junct. Rts. 190 & 195, 11-VI-1969, J. M. Campbell (CNCI). (Specimen pin mounted; support card; locality label, white, machine printed, machine printed sex label attached to locality label; holotype label, red, machine and hand printed; plastic vial with aedeagus.)

PARATYPES: Seventy-six paratypes. Three specimens from the same locality as the holotype (CNCI, 1; WOPC, 2). Mexico: Chiapas, 1964–1965, D. E. Breedlove (CASC, 1); 27 km Simojovel, 17-VII-1962, J. M. Campbell (CNCI, 1); 3.2 km NE Bochil, 3-VII-1969, D. Bright & J. M. Campbell (CNCI, 1); 6.4 km N Bochil, 4-V-1969, H. F. Howden (CMNC, 1); 4.8 km NW Rincon, Chamula, 2103 m, Hwy. 195, 24-IV-1983, C. & L. O'Brien & G. B. Marshall (JNRC, 12; WOPC, 1); 14 km SE Tapulila, Hwy. 195, 24-IV-1983, 1554 m, C. L. O'Brien & G. B. Marshall (FSCA, 3; JNRC, 5; WOPC, 4); Hwy. 195, Mirador, El Cam., 27-VI-1960, J. Huether (JNRC, 1);

Mirador, El Caminero, Hwy. 195, 11 km S Ranyon, 1900 m, 27-VII–1990, M.C. Thomas (FSCA, 3; USNM, 1; WOPC, 3); Mirador, El Caminero, on Hwy. 195, 27 VI-1990, R. Turnbow (RHTC, 2; WOPC, 2); Hwy. 195, 1900 m, 27-VI-1992, J. Huether (JPHC, 6; WOPC, 3); Hwy. 195, Mirador, El Cam., 1900 m, 27-VI-1960, J. Huether (JNRC, 1); 5.7 km S Rayon, 1900 m, 27-VI-1990, R. Turnbow (RHTC, 2; WOPC, 1); M. C. Thomas (FSCA, 1); (ZMAN, 1). Guatemala: Sacatepequez: 10 km W San Miquel Duenas, Jct. Rts. 6 & 10, 2439 m, 29-V-1966, J. M. Cambell (WOPC, 1); Capetillo, G. C. Champion (BMNH, 1; DEIC, 1; MNHP 1; WOPC, 1); Zacapa: Jabali S slope of Sierra de las Minas, N of Cabanas, 28-VIII-1948, 1676 m, R. D. Mitchel (FMNH, 1); rd. to San Lorenzo, 1288 m, 20–21-IV-1966, E. Giesbert, J. Monzon (WOPC, 1); vicinity San Lorenzo, 1463 m, 4-IV-1991, E. Giesbert (WOPC, 1); vic. San Lorenzo, 1463 m, 4-IV-1991, E. Giesbert (WOPC, 1); rd. to San Lorenzo, 1340 m, 22-IV-1995 (FSDA, 1); Baja Verapaz: 19–24 km N Salama, 25–31-IV-1989, 1371 m, J.E. Wappes (JEW, 2); 24 km N Salama, 21-IV-1995, Giesbert & Monzon (WOPC, 1); Purulha, 5 km S San Geronimo, 1585 m, 6–14-IV-1991, E. Giesbert (FSCA, 2; WOPC, 1). Alta Verapaz: Coban, 1219 m, 8-VII-1947, C. & P. Vaurie (AMNH, 2). Guatemala: without additional information, L. Conradt (MNH, 1). Honduras: Olancho: P.N. La Marulla, 24-V-1995, R. Turnbow (RHTC, 1); La Marulla, Pq. Nac. 24–27-V-1995, J. E. Wappes (WOPC, 1); 25-V-1996, F. G. Andrews and A.J. Gilbert, blacklight (CDAE, 3; WOPC, 1); Santa Barbara: nr. Lago Yojoa, above El Mochito, El Cidral, 9-IX-1984, C. W. O'Brien (JNRC, 1).

DIAGNOSIS: Cranium, pronotum, legs, and abdomen cyanescent; elytral umbo prominent; aedeagus short; male and female pygidium transverse (figs. 107–108). Elytral discal setal tuft as in figure 170.

DESCRIPTION: *Size*: Length 4.1–5.8 mm; width 1.5–2.2 mm. *Integument*: Cranium, pronotum, legs, and abdomen cyanescent; elytra piceous. *Vestiture*: Integument vested predominantly with dark setae, few pale setae; metaepisternal, sutural, and elytral discal tufts well developed, latter bipartite, posterior patch abbreviated, setae of anterior patch

directed anteriorly, setae of posterior patch directed posteriorly. *Head*: Width across eyes feebly narrower than width across pronotum (25:27), finely, sparsely punctate; interocular depressions very feebly developed; eyes subspherical, moderately convex, antenna as in figure 59. *Thorax*: Pronotum subequal in width and length (24:25); substantially narrower than width across humeri (24:32), finely punctate; side margins feebly arcuate, anterior transverse depression indistinct, elytra moderately convex in posterior half, depth at humerus 19, greatest depth in posterior half 25. *Abdomen*: Pygidia as in figure 107 and 108, female sixth visible abdominal sternum as in figure 109. *Male genitalia*: As in figure 131; aedeagus short.

VARIATION: The posterior patch of the elytral middiscal setal tuft becomes progressively larger, more widened towards the epipleural margin, in specimens from southern Mexico, through Guatemala, and into Honduras.

NATURAL HISTORY: Specimens were collected during May, June, and July at altitudes ranging from 1219 to 2439 m. A Honduran specimen was captured in September.

DISTRIBUTION (map 8): Specimens have been found from the highlands of southern Mexico, central Guatemala, and eastern Honduras.

ETYMOLOGY: From the Latin *lividus* (bluish). I refer to the cyanescent luster on the cranium, pronotum, legs, and abdomen.

Aphelocerus nitidus (Chevrolat)

Figures 2–8, 15, 33, 58, 157, 234, 237, 261, 271; map 6

Clerus nitidus Chevrolat, 1843: 25. **LECTOTYPE**. Female. Here selected. Mexico, Veracruz, Tuxpan (= Tuxpan) (D. Salle) (MNHN). (Specimen point mounted, antenna, pygidium, sixth abdominal sternum, and sex label affixed to paper point, white, machine printed; support card, white; identification-locality label, green, mounted on white support card, cursive and hand printed; MNHN repository label, white with green marking, machine printed; MNHN repository label, white, machine printed; lectotype label, red, machine printed; identification label, white, machine printed). Gorham, 1882: 162. Wolcott, 1927: 73. Corporaal, 1950: 147. Ekis, 1975: 27, 61. Barr, 1976: 18.

Clerus laevigatus Spinola, 1844: 238. **LECTOTYPE**. Mexico (MRSN). (Specimen point mounted;

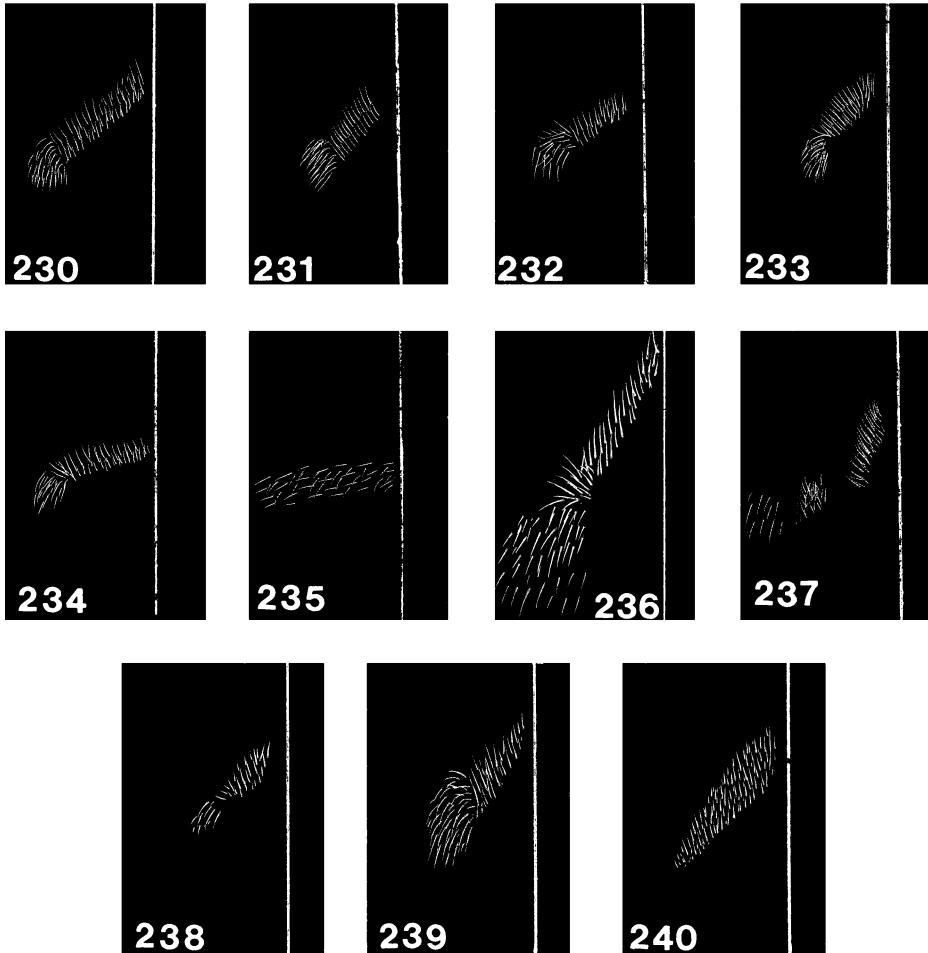
support card with green type label and sex label; small square of yellow ribbon; MRSN repository label, white, hand printed; lectotype label, red, machine and hand printed; plastic vial with aedeagus.) Corporaal, 1950: 147.

Clerus nebulosus Spinola, 1844: 238. There is some uncertainty as to the identity of this nominal species. The availability of the name stems from its listing in synonymy by Spinola (1844: 238), and representation by a habitus illustration. Unfortunately, the type specimen appears to be lost; thus I accept this synonymy as established by Spinola. Gorham, 1882: 163 (*Clerus*). Corporaal, 1950: 147 (*Adelphoclerus*). Ekis, 1975: 60 (*Adelphoclerus*).

Clerus mollifascia Chevrolat, 1874: 297. **LECTOTYPE**. Female. Here selected. Mexico, Yucatan (MHNH). (Specimen point mounted, pygidium and machine printed sex label affixed to paper point; support card; identification-locality label, green, mounted on white card, cursive and hand printed; Paris Museum repository label, white machine printed, and with green marking; lectotype label, red, machine and hand printed; specimen identification label, white, hand printed.). *New Synonymy*. Wickham and Wolcott, 1912: 55; Wolcott, 1927: 73; Corporaal, 1950: 147; Barr, 1976: 18. The name bearer of this nominal species is not significantly different from the holotype of *Aphelocerus nitidus* (Chevrolat).

DIAGNOSIS: *A. nitidus* (Chevrolat) specimens are characterized by having the midelytral setal tuft variable, but usually separated into two small but distinct setal patches (fig. 33). Setae project anteriorly in anterior patch and posteriorly in posterior patch.

DESCRIPTION: *Size*: Length 4.9–5.6 mm; width 2.1–2.6 mm. *Integument*: Black. *Vestiture*: Cranium, pronotal sides, pterothorax, legs, and abdomen densely vested with pale setae; pronotal disc with dark setae; mesocutellum matted with white setae; elytral disc with bipartite setal tuft, remainder of discal setae dark; anterior third of elytral sutural margin vested with white setal tuft; metepisternal tuft prominent. *Head*: Width across eyes slightly narrower than width across pronotum (28:30), finely punctate; interocular depression broad and shallow; eyes subspherical, moderately convex; antenna as in figure 58. *Thorax*: Pronotum subequal in width and length (30:31), narrower than width across humeri (30:42), disc finely sparsely punctate, side margins moderately



Figs. 230–240. Elytral middiscal setal tufts. **230.** *Aphelocerus yungas*. **231.** *A. improcerus*. **232.** *A. domus*. **233.** *A. turnbowi*. **234.** *A. nitidus*. **235.** *A. acuticolis*. **236.** *A. scalenus*. **237.** *A. nitidus*. **238.** *A. cohibilis*. **239.** *A. sabulosus*. **240.** *A. sculptillus*.

arcuate and feebly incised by subapical depression; elytra moderately convex in posterior half, depth at humerus 18, greatest depth at posterior half 20, surface finely punctate and shiny; elytral middiscal setal tuft with patches joined or not (see figs. 234, 237, 271). *Abdomen:* Male pygidium evenly arcuate in posterior margin; female pygidium with posterior margin broadly arcuate; sixth visible sternum of male and female transverse, males' incised at distal margin. *Male genitalia:* As in figures 157 and 261. *Male internal reproductive organs:* Two pairs of accessory glands; lateral gland uniramous, coiled, and diverticulated basally; medial gland bi-

ramous, linear, dorsal branch of medial gland very short; testis comprised of 12 follicles.

VARIATION: This is a highly variable species in such salient characteristics as integumental color (black to stramineous), development of midelytral setal tuft (sometimes faintly indicated or extended posteriorly into acute extensions; see figs. 33, 234, 237, 271), length of setal tuft on the sutural margin, degree of pygideal truncation, and in the ventral surface of the parameres (sometimes flanged or explanate in distal half [fig. 261] or with their outer margins slightly inflexed giving a subsagittate appearance [fig. 157]; the latter condition appears commonly

among specimens from the more northern latitudes).

NATURAL HISTORY: Specimens were collected throughout the year, most often during the summer. Beating oak foliage at altitudes 402–1859 m produced several specimens.

DISTRIBUTION (map 6): This species seems to be concentrated in the north highlands of the Sierra Madre Oriental and within the Isthmus of Tehuantepec in Mexico. Substantial collections are recorded from the highlands of Cordoba and Orizaba.

SPECIMENS EXAMINED: Ninety-eight specimens were examined from: Mexico: Veracruz: Tuxpan; Jalapa, Botanical Gardens, 1320 m, 9-VI-1983, C. & L. O'Brien & G. B. Marshall; 11.2 km SE Orizaba, 19–20-VI-1983, B. K. Dozier; Presidio, 25-VII-1965, A. B. Lau; Acultzingo, 9-VI-1959, 1524 m, H. E. Evans; Cordoba, 29-VI-1966, J. S. Buckett, M. R. & R. C. Gardner; 3.7 km SE Rinconada, 21-VI-1962, D. H. Jansen; 0.6 km W Fortin de las Flores, 2-VII-1962, D. H. Janzen; 8 km E Las Vigas, 29-VI-1962, J. M. Campbell; Fortin de las Flores, Sumidero; Planta de la Cervceria, Ing. Daniel Rubago Res, 762–914 m, 12-VII-1968; H. V. Weems, III; 4.3 km SE Orizaba, 19–20-VI-1983, B. K. Dozier; San Rafael Jicaltepec, 3-IV-1986: Puebla: 4.3 N Zacapoxtla, 1524 m, 12-VI-1983, C. W. & L. O'Brien & G. B. Marshall: Hidalgo: 18 km NE Jalapa, 1676 m, 27-V-1974, O'Brien; 14 km NE Jacala, 1890 m, 27-V-1974, C. W. O'Brien; 1.8 km SW Jacala, 1859 m, 27-V-1974, O'Brien; 15.6 km NE Jacala, 1859 m, 27-V-1974, O'Brien; Acatempa, 15 km N Tlanchinol, 21-VI-1988, R. Turnbow; 46 km SW Tamaunchale, 1493 m, 4-VI-1987, R. Turnbow; La Quebradora, 10.8 km N Tlanchinol, 20-VII-1988, R. Turnbow: Tamaulipas: Rd. to Rancho del Cielo nr. Gomez Farias, 14-VI-1982, R. Turnbow; rd. from Alta Cimas to Est. Biol. Canindo, 900–1400 m, 28-VII-1993, E. G. Riley & M. A. Quinn: Queretaro: 24.9 km SW Xilitla, 1420 m 3-VI-1987, R. Turnbow: San Luis Potosi: 11 km SW Xilitla, 26-V-1974, C. W. O'Brien; 24.9 km SW Xilitla, 26-V-1974, C. W. O'Brien; San Luis Potosi, 1829–1981 m, 27-V-1965, H. V. Weems, Jr.; Microondas Tortugas at km 82 on rte. 70, 19-VII-1988, R. Turnbow; Puerto Verde, 64 km W Ciudad Valles, 15-VII-1982, R. Turnbow. Honduras: Francisco Morazán:

Parque Nacional La Tigra, 1-VI-1993, R. Turnbow; 15 km N. Jesus de Otoro, 15-VIII-1977, C. W. O'Brien; Tegucigalpa vic. El Sitio, 945 m, 24-IV-1993, J. Rifkind, P. Gunn, sweeping, beating tropical deciduous forest. Specimens are deposited in: AMNH, BMNH, CASC, CNCI, EMEC, FMNH, FSCA, RFMC, SEMC, TAMU, WFBC, and WOPC.

Aphelocerus sagittarius, new species
 Figures 62, 110–113, 135, 136, 165;
 map 21

HOLOTYPE: Male. "Guatemala", L. Conrard (MNHN). (Specimen mounted on a card, machine printed sex label affixed to specimen card; locality label, white, machine printed; Paris Museum repository label; holotype label, red, machine and hand printed.)

PARATYPES: Twelve specimens from Guatemala, L. Conrard (DEIC, 3; MNHN, 6; WOPC, 3).

DIAGNOSIS: Uniformly small beetles (4 mm); the cranium, pronotum, legs, and abdomen are cyanescent; the pygidia are trigonal; aedeagus distinctly sagittate; elytral discal setal tuft as in figure 165. Tegmen as in figures 135 and 136.

DESCRIPTION: *Size:* Length 4.1–4.5 mm; width 1.7–2.0 mm. *Integument:* Cranium, pronotum, legs, and abdomen cyanescent; elytra piceous. *Vestiture:* Integument vested predominantly with dark setae, few pale setae; metepisternal, sutural tuft moderately developed, elytral discal tuft bipartite, anterior and posterior patches widely separated, setae of anterior patch directed anteriorly, setae of posterior patch directed posteriorly. *Head:* Width across eyes same as width across pronotum (22:22) finely punctate; interocular depressions and frontal umbo shallow; eyes subspherical, moderately convex, antenna as in figure 62. *Thorax:* Pronotum subequal in width and length (22:24), narrower than width of elytron across humeri (22:27); finely punctate, side margins subparallel, feebly incised by anterior transverse depression; elytral depth at humerus 14, greatest depth in posterior half 20; humeral umbo prominent. *Abdomen:* Pygidia (figs. 110, 112) trigonal; sixth visible abdominal sternum deeply incised in female (fig. 113), moderately incised in male (fig. 111). *Male genitalia:* As in figures 135 and 136.

VARIATION: In some specimens the elytra tend to be more brunneus than piceous (which may reflect a teneral condition of the specimens). The extent of development of the posterolateral outer angles of the parameres are variously expressed.

NATURAL HISTORY: No information available.

DISTRIBUTION (map 21): Known only from Guatemala.

ETYMOLOGY: The trivial name is taken from the Latin feminine *sagitta* (arrow). I refer to the arrow-shaped apex of the aedeagus.

Aphelocerus triangulus, new species

Figures 65, 118, 119, 166; map 21

HOLOTYPE: Female. Guatemala. L. Conradt (MNHN). (Specimen point mounted; pygidium, sixth visible abdominal sternum, and machine printed sex label affixed to paper point; support card, white; locality label, white, machine printed; Paris Museum repository label, white, machine printed; holotype label, red, machine and hand printed; plastic vial with abdomen and ovipositor.)

PARATYPE: None.

DIAGNOSIS: Within the *batesi* group these beetles are distinguished by their large size and by the trigonal shape of the pygidium (fig. 118) in combination with the development of the elytral discal setal tuft (fig. 166).

DESCRIPTION: *Size*: Length 6.5 mm; width 2.8 mm. *Integument*: Cranium, thorax, legs, and abdomen cyanescent; elytra piceous. *Vestiture*: Integument vested predominantly with dark setae, few pale setae; metepisternal, sutural, and elytral setal tufts moderately developed; patches of middiscal elytral setal small. *Head*: Width across eyes narrower than width across pronotum (29:34); finely punctate; eyes subspherical, moderately convex, antenna as in figure 65. *Thorax*: Pronotum subequal in width and length, narrower than elytra across humeri (34:39); side margin strongly arcuate; elytral depth at humerus 18, greatest depth in posterior half 20; humeral umbo particularly well developed. *Abdomen*: Female pygidium and sixth visible sternum as in figures 118 and 119; pygidium notably trigonal.

VARIATION: No information available.

NATURAL HISTORY: No information available.

DISTRIBUTION (map 21): Known only from Guatemala.

ETYMOLOGY: The specific epithet is from the Latin *triangulus* (having three angles). I refer to the trigonal shape of the pygidium.

Aphelocerus batesi, new species

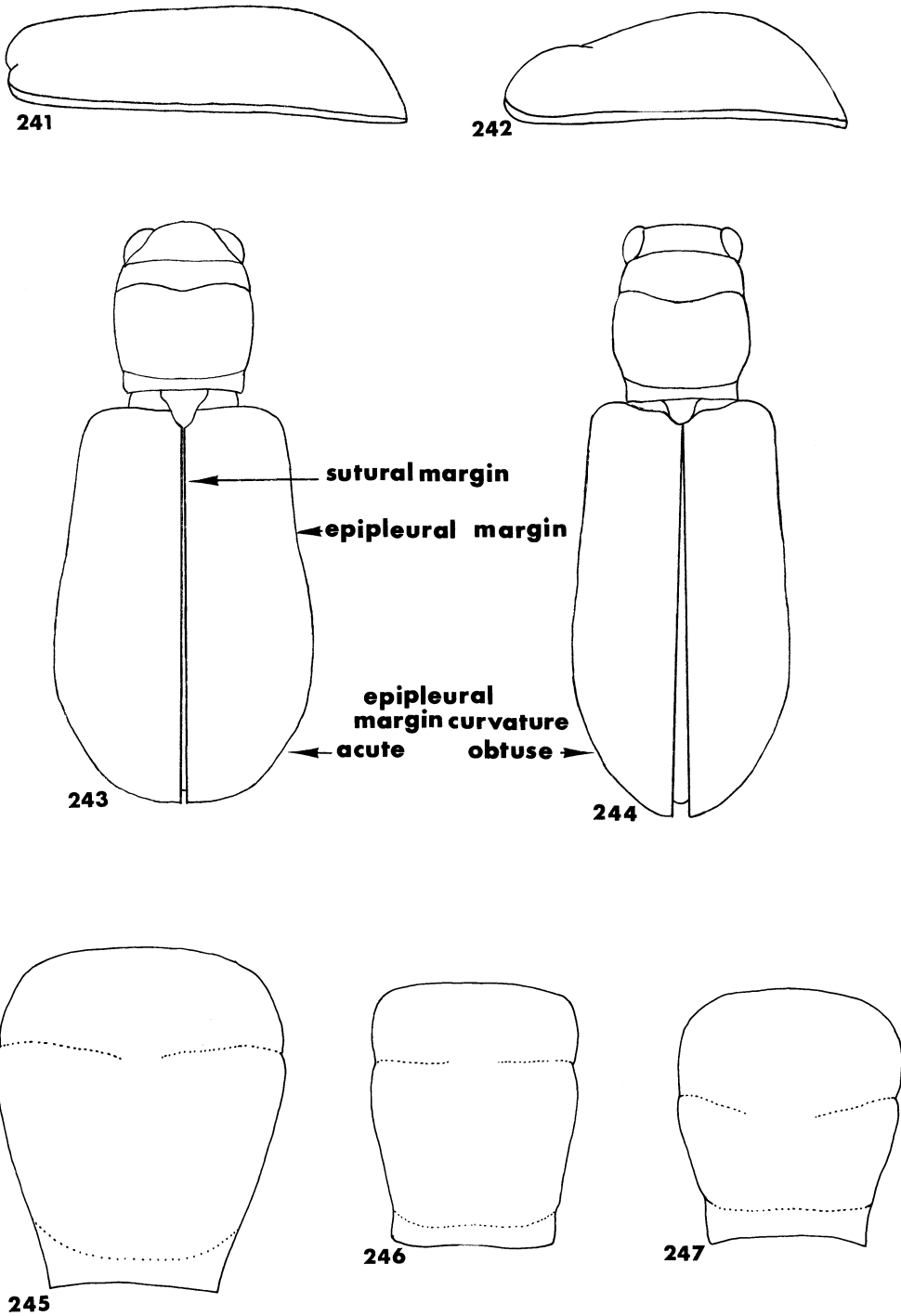
Figures 79, 152, 179, 272; map 15

HOLOTYPE: Male. Brazil, Amazon, Ege (Tefe), Bates (BMNH). (Specimen point mounted, pygidium, sixth visible sternum, spicular fork, and machine printed sex label affixed to paper point; support card; locality label, white, machine and hand printed; Fry Collection label, white, machine printed; holotype label, red, machine and hand printed; plastic vial with aedeagus.)

PARATYPES: Twenty-eight specimens. Nine specimens with the same locality information as the holotype (BMNH, 5; WOPC, 4). Brazil: Matto Grosso: Diamantino, Fazenda Rio Arinos, X-1983, Eurides Furtado (CMNH, 5; WOPC, 4); Para: (BMNH, 1; WOPC, 1); Santarem (ICCM, 1); Goias: Jatai, XI-1972, F. M. Oliveria (WOPC, 1); Taperinha (1, ICCM); Amazonas: Itaituba (MNHN, 1; DEIC, 1); Ceara: Serra de Baturite (MNHN, 1); 4-16-XI, 1997, J. E. Eger, black light trap (FSCA, 1); 5-17-X-1993, J. E. Eger, MV & black lights (WOPC, 1).

DIAGNOSIS: Specimens of this species superficially resemble those of *A. immarginatus* (Chevrolat). In specimens of *batesi*, however, the elytral middiscal setal tuft (fig. 179) is more developed and the tegmen of the male genitalia is not sagittate as is the case in specimens of *A. immarginatus* (Chevrolat).

DESCRIPTION: *Size*: Length 4.8–5.3 mm; width 2.0–2.2 mm. *Integument*: Black. *Vestiture*: Head, prothorax, elytron, and protibia vested with predominantly dark setae, pterothorax, femora, meso-metabibiae vested with predominantly pale setae; tarsi vested with dark setae, elytral posterior patch of elytral discal setal tuft extended posteriorly. *Head*: Width across eyes slightly narrower than width of pronotum (22:24), finely punctate, interocular depressions and frontal umbo shallow, eyes subspherical, moderately convex; antenna as in figure 79. *Thorax*: Pronotum (fig. 272) feebly elongate (24:28), narrower than width of elytra across humeri



Figs. 241–247. Elytra, habitus, pronota. **241.** *Aphelocerus coactus*, elytra (lateral view). **242.** *A. immarginatus*, elytra (lateral view). **243.** *A. primigenius*, habitus. **244.** *A. inconstans*, habitus. **245.** *A. panus*, pronotum (dorsal view). **246.** *A. collaris*, pronotum (dorsal view). **247.** *A. hespenheidei*, pronotum (dorsal view).

(24:33), finely punctated, side margins moderately arcuate, subapical depression faintly indirected; elytra boldly convex in posterior half, depth at humerus 12, greatest depth in posterior half 18; humeral umbo prominent. *Abdomen*: Posterior margin of pygidium evenly arcuate to both sexes. *Male genitalia*: As in figure 152; ventral sinus particularly elongate.

VARIATIONS: The specimens examined did not vary appreciably.

NATURAL HISTORY: Specimens were collected in October and November (Brazil); two with a black light trap.

DISTRIBUTION (map 15): Found most frequently in the environs of the Amazon Basin of Brazil.

ETYMOLOGY: The trivial name is a dedicated epithet in honor of the collector of the holotype, H. W. Bates.

Aphelocerus ebenus, new species
Figure 205; map 25

HOLOTYPE: Male. Panama: Pma. Pr., Llano-Carti Rd., Km.-10, El. 350 m, 31 May '83, Stockwell (STRI). (Specimen point mounted, sex label affixed to paper point, white, hand printed; support card, white, locality label, white, machine printed; STRI repository label, white, machine printed; holotype label, red, machine printed.)

PARATYPES: Two specimens from the same locality as the holotype, except one specimen collected in the vicinity of km 9 on Llano-Carti Rd, 4-IX-1982 (WOPC, 2).

DIAGNOSIS: The more convex outer margins of the pronotum will separate the members of this species from the very similar specimens of *A. turnbowi*, n.sp. Further, the parameres are significantly narrower in *A. ebenus*, n.sp., than they are in *A. turnbowi*, n.sp.

DESCRIPTION: *Size*: Length 4.0–4.5 mm; width 1.5–2.0 mm. *Integument*: Black. *Vestiture*: Middiscal elytral setal tuft comprised of two patches, anterior patch elongate, oblique, posterior patch reduced. *Head*: Interocular depressions and frontal umbo prominent; width across eyes subequal to width across pronotum (30:35); antenna as in figure 74 for *A. catie*, n.sp. *Thorax*: Pronotum as long as wide (35:35), considerably narrower than width of elytra across humerus

(35:47), anterior transverse depression, moderately impressed, side margins moderately arcuate; elytra moderately convex, depth at humerus 15, greatest depth in posterior half 20. *Abdomen*: Male pygidium subtrigonal, posterior margin short. *Male genitalia*: As in figure 205.

NATURAL HISTORY: The available specimens were collected in May or September, at 350 m.

DISTRIBUTION (map 25): Known only from the type locality.

ETYMOLOGY: The specific epithet *ebenus* (of ebony, black) is a Latin adjectival. I refer to the integumentary color of these beetles.

Aphelocerus catie, new species
Figures 74, 144, 174; map 12

HOLOTYPE: Male: Costa Rica: CATIE, 3 km SE Turrialba, 600 m, Cartago Prov., V-14-85 (J. Chemsak) (EMEC). (Specimen point mounted; support card; sex label affixed to paper point, white, hand printed; locality label, white, machine printed; holotype label, red, machine printed; plastic vial with abdomen and aedeagus.)

PARATYPES: Seventy specimens. Nine specimens from the same locality as the holotype (EMEC, 2; WOPC, 1; WFBC, 3); 16-V-1985 (WOPC, 1). Costa Rica: Alajuela: 20 km S Upala, 8-IX-1990, F. D. Parker (EMUS, 1); 13-XII-1990-9-I-1991 (WOPC, 1); 29-I-1991 (EMUS, 1); 30-XII-1990 (WOPC, 1); 29-I-1991 (EMUS, 1); 30-XII-1990 (WOPC, 1); 6-I-1991 (EMUS, 1); 1-10-IV-1991 (WOPC, 1); 1-15-VII-1991 (EMUS, 1): Guanacaste: Estacion Pitilla, 9 km S de Santa Cecilia, 700 m, XII-1994, P. Ross, P. Rios (INBC, 1): Cartago: Turrialba, *Catie*, 1-XII-1995, beating fallen tree, *Brosimum alicastrum*, J. Rifkind, H. Lezama (JNRC, 1); 23-VI-1996, F. Hovore, (JNRC, 3; WOPC, 2); 9-14-VI-1988, E. Giesbert (FSCA, 1; WOPC, 1); grounds of IICA, 1-VI-1976 (EMEC, 1). Panama: Colon: Fort Sherman, 9°17'N, 79°59'W, 8-IX-2001 (NINA, 1; WOPC, 6); 16-IX-2001 (NINA, 6; WOPC, 2), in flowers of *Inga cocleensis*, F. Ødegaard (NINA, 4; WOPC, 2); 11-XII-2001 (NINA, 1), 11-I-2202 (NINA, 1) on *Guatteria dumetorum*; 11-IV-2002 (WOPC, 1); 2-VI-2002 (NINA, 1), on *Nectandra purpurascens*; in flowers of *Jacaranda copaia*,

12-IV-2002 (NINA, 1); Panama: 10–13 km. N El Llano, 29–31-V-1983, E. Giesbert (FSCA, 4; WOPC, 4); 8.5 km N El Llano, 3–4-I-1983, E. Giesbert (FSCA, 2); 8–11 km N El Llano, 24-I-1993, F. Hovore (WFBC, 1); 13–18 km N El Llano, 24-I-1993, F. Hovore (WFBC, 1); 13–18 km N El Llano, 29-IV–3-VI-1983, J. E. Wappes (WOPC, 1; JWEC, 1); Cerro Campana, 7-I-1994, J. E. Wappes (JWEC, 1; WOPC, 1); 853 m, 25–26-IV-1996, Wappes, Huether, and Morris (JPHC, 1). Panama: Coclé: El Valle, 18-V-1994, F. T. Hovore (WOPC, 1).

DIAGNOSIS: The elytral discal setal tuft is comprised of one oblique cluster of setae (fig. 174).

DESCRIPTION: *Size:* Length 3.2–4.7 mm; width 1.5–2.0 mm. *Integument:* Head and pronotum cyanescent, legs, pterothorax, elytra, and abdomen piceous. *Vestiture:* Head, prothorax, elytra and protibia vested predominantly with dark setae, pterothorax, femora, and meso-metantibiae vested predominantly with pale setae; tarsi vested with dark setae; elytral setal tuft comprised of one oblique cluster of setae. *Head:* Width across eyes slightly narrower than width of pronotum (21:23), finely punctate, interocular and frontal umbo shallow; eyes subspherical, moderately convex; antenna as in figure 74. *Thorax:* Pronotum equal in width and length (23:23); narrower than width of elytra across humeri (23:31) finely punctate, side margins feebly arcuate, anterior transverse depression faintly indicated; elytral depth at humerus 12, greatest depth in posterior half 18. *Abdomen:* Posterior margin of pygidium evenly arcuate in both sexes. *Male genitalia:* As in figure 144; parameres conspicuously broad, digitiform.

VARIATIONS: There is some variation in the width of the elytral middiscal setal tuft; in one female specimen, the posterior elytral setal patch is very broad.

NATURAL HISTORY: The available specimens were collected from the type locality in May, at 600 m. Other specimens were collected in April, May, July, November, December, and January. J. Rifkind and H. Lezama captured one specimen by beating a fallen tree of *Brosimum alicastrum*.

DISTRIBUTION (map 12): Known from central Costa Rica to central Panama.

ETYMOLOGY: The trivial name, *catie*, is a noun in apposition and refers to the type locality. CATIE is an acronym for “Centro Agronómico Tropical de Investigación y Enseñanza”.

Aphelocerus monteverde, new species

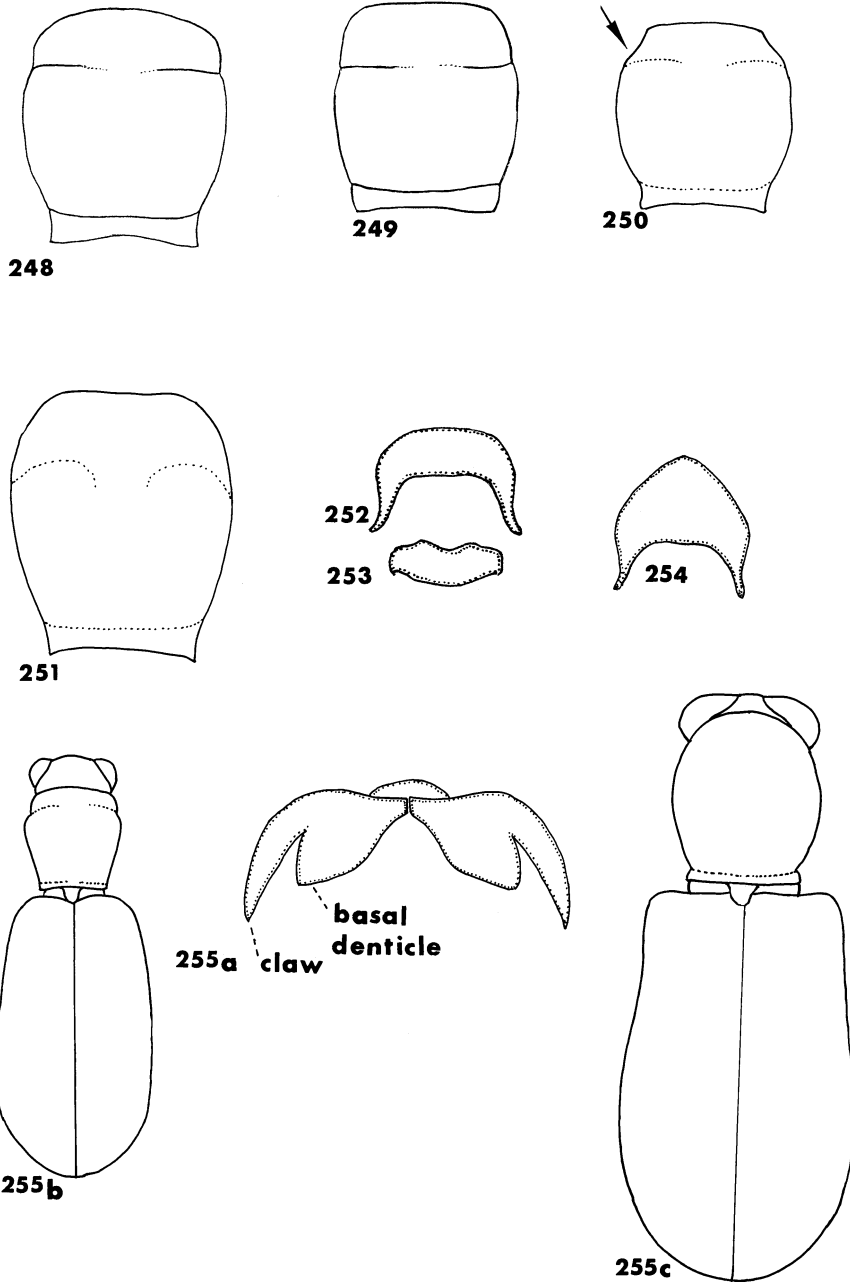
Figures 72, 177, 214; map 21

HOLOTYPE: Female. Costa Rica, Punt., Monteverde, 20–24 Jun 1986, W. Hansen, G. Bohart (AMNH). (Specimen point mounted, sex label affixed to paper point, white, machine printed; support card, white; locality label, white, machine printed; AMNH repository label, white, machine printed; holotype label, red, machine and hand printed.)

PARATYPES: Nineteen specimens. Costa Rica: Puntarenas: Monteverde, Cloud forest, 9–12-VI-1986, F. T. Hovore (WFBC, 1); San Luis, 2–8-VIII-1996, L. M. La Pierre (JNRC, 6; WOPC, 3); 26-VII–1-VIII-1996, L. La Pierre (JNRC, 2); San Luis valley, 1-VII-1989, F. Hovore (WFBC, 1); San Luis, 1040 m, 24-VIII–15-IX-1992, F. A. Quesada (INBC, 1); Monteverde, Pension Quetzal, 22–24-IV-1985, F. T. Hovore (WOPC, 1); 26-V–3-VI-1984, E. Riley, D. Rider, and D. Le Doux (LSUC, 1; WOPC, 1); 1500 m, 11–13-IV-1996, E. Giesbert (WOPC, 1); 21–26-V-1979, J. M. and B. A. Campbell (WOPC, 1).

DIAGNOSIS: Specimens of this species closely resemble those of *A. arenatus*, n. sp., from which they may be distinguished by having the anterior patch of the middiscal setal tuft only slightly larger than the posterior patch. In *A. arenatus*, n.sp., specimens the anterior patch is twice as large as the posterior patch.

DESCRIPTION: *Size:* Length 4.0–5.2 mm; width 1.8–2.3 mm. *Integument:* Cranium, pronotum, pterothorax, abdomen cyanescent, elytra piceous. *Vestiture:* Head, prothorax, elytra, and protibia vested predominantly with dark setae, pterothorax, femora, and meso-metantibiae vested predominantly with pale setae; tarsi vested with dark setae; setal tuft of elytral disc as in figure 177. *Head:* Width across eyes feebly narrower than width across pronotum (35:37), finely punctate; interocular depression and frontal umbo shallow; eyes subspherical, moderately convex; antenna as in figure 72. *Thorax:* Pro-



Figs. 248–255. Pronota, pygidium, sixth visible abdominal sternum, tarsal claws. 248. *Aphelocerus cohibilis*, pronotum (dorsal view). 249. *A. chondrus* (dorsal view). 250. *A. improcerus*, pronotum (dorsal view). 251. *A. protenus*, pronotum (dorsal view). 252–253. *A. vietus*, male (252, pygidium; 253, sixth visible abdominal sternum). 254. *A. patulus*, female pygidium. 255a. *A. leucomelas*, tarsal claws. 255b. *A. bispineus* habitus. 255c. *A. ciliaris* habitus.

notum slightly longer than wide (40:37), disc finely punctate, subapical depression faintly indicated, considerably narrower than width of elytra across humeri (24:32), side margin moderately arcuate, feebly incised by subapical depression; elytral depth at humerus 22, greatest depth in posterior half 30, humeral tumescence prominent. *Abdomen*: Male pygidium posterior margin evenly narrowed, evenly arcuate in females. *Male genitalia*: Aedeagus short, parameres as in figure 214.

VARIATION: The available specimens did not vary appreciably.

NATURAL HISTORY: Specimens were collected during May, June, July, and August at altitudes ranging from 1040 to 1500 m.

DISTRIBUTION (map 21): Known only from northwestern Costa Rica.

ETYMOLOGY: The trivial name *monteverde* is a noun in apposition and refers to type locality.

Aphelocerus arenatus, new species

Figures 70, 120, 134, 173; map 21

HOLOTYPE: Female. Rio Sn. Lorenzo, Tieras Morenas, Tenorio, A. C. A., Prov. Guana. COSTA RICA, 1050 m, Mar. 1994. G. Rodriguez, L N 287800-427600 # 2761 (INBC). (Specimen point mounted, sex label affixed to paper point; locality label, white, machine printed; electronic label, plastic, machine printed; INBC repository label, white, machine printed; holotype label, red, machine printed.)

PARATYPES: Five specimens. Three from the same locality as the holotype (JNRC, 2; WOPC, 1). Costa Rica: San Jose: 5 km SW Escazu, 1200 m, 24-V-1995, beating, J. Rifkind, H. Lezama (WOPC, 1); Alajuela: Volcan Poas, 9-10-VII-1963, C. L. Hogue (WOPC, 1).

DIAGNOSIS: These beetles may be distinguished from other specimens that have the cranium and pronotum cyanescent by having the pronotal disc coarsely punctate anterior to a feebly impressed anterior transverse depression, and the elytral discal setal tuft (fig. 173) is comprised of a large anterior patch whose setae are directed anteriorly and a very small posterior patch comprised of only a few posteriorly directed setae.

DESCRIPTION: *Size*: Length 5.0 mm; width 2.0 mm. *Integument*: Cranium, pronotum, pterothorax, legs, and abdomen cyanescent; elytra piceous. *Vestiture*: Head, prothorax, elytra, and protibia vested with predominantly dark setae, pterothorax, femora, and meso-metathorax vested profusely with pale setae; tarsi vested with dark setae; epipleural margin vested densely with pale setae; elytral setal tuft bipartite, with large anterior patch and small posterior patch. *Head*: Width across eyes feebly narrower than width across pronotum (35:38), finely punctate; interocular depressions and frontal umbo shallow; eyes subspherical, moderately convex; antenna as in figure 70. *Thorax*: Pronotum equal in width and length (38:38), considerably narrower than elytra across humeri (38:50), disc in front of anterior transverse depression coarsely punctate, side margin moderately arcuate, feebly incised by anterior transverse depression; elytra moderately convex; depth at humerus 22, greatest depth in posterior half 28, humeral umbo prominent. *Abdomen*: Distal margin of male pygidium (fig. 120) feebly incised. *Male genitalia* (fig. 134): Parameres explanate at base.

VARIATION: The available specimens did not vary appreciably.

NATURAL HISTORY: Specimens were collected by beating, in May; one on a flowering tree; one at 1200 m. One additional specimen was collected in July.

DISTRIBUTION (map 21): Known only from central Costa Rica.

ETYMOLOGY: The trivial name is comprised of the Latin *arena* (a place for games) and the Latin suffix *-tus* (pertaining to). I refer to the athletic fields at the University of Costa Rica from which some of these specimens were collected.

Aphelocerus bufustis, new species

Figures 32, 80, 151, 180, 273; map 22

HOLOTYPE: Male. Venezuela, Caracas, Valley, 11-VI-1992, L. R. Reynolds (FMNH). (Specimen point mounted; pygidium, sixth visible sternum, and hand printed sex label affixed to paper point; support card, white; locality label, white, machine and hand printed; collector label, white, machine printed; FMNH repository label, white, machine

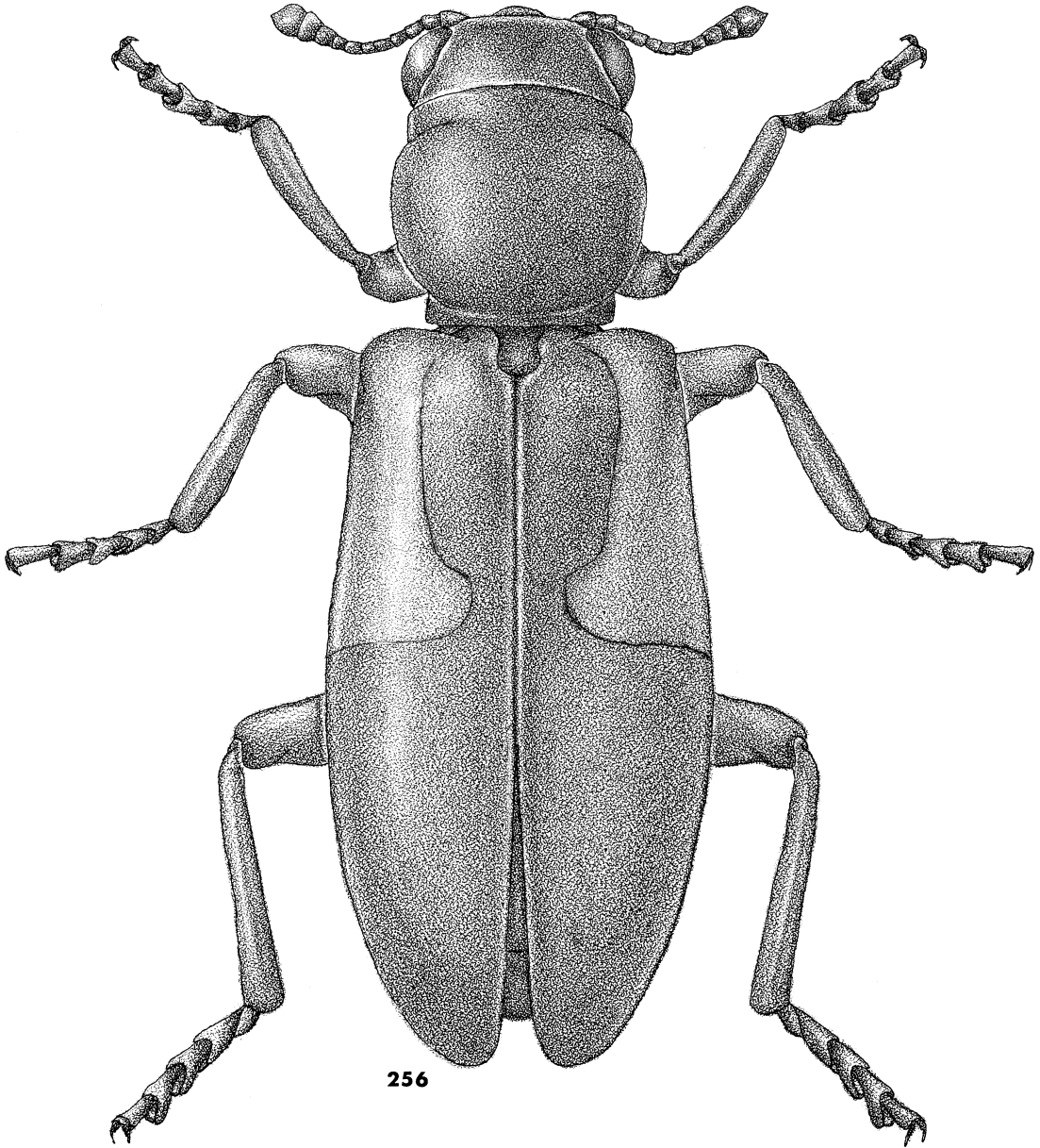


Fig. 256. *Aphelocerus delicatulus* habitus.

printed; holotype label, red, machine printed; holotype label, red, machine printed; plastic vial with aedeagus.)

PARATYPES: None.

DIAGNOSIS: In comparison to other members of the *batesi* group, the elytra of this beetle are atypically shallow (fig. 32), the

elytral middiscal setal tuft (fig. 180) is comprised of two very small patches, and the antennal club is unusually large.

DESCRIPTION: *Size*: Length 6 mm; width 2 mm. *Integument*: Cranium and pronotum piceous, with a cyanescent hue, remainder castaneous. *Vestiture*: Head, prothorax, elytron,

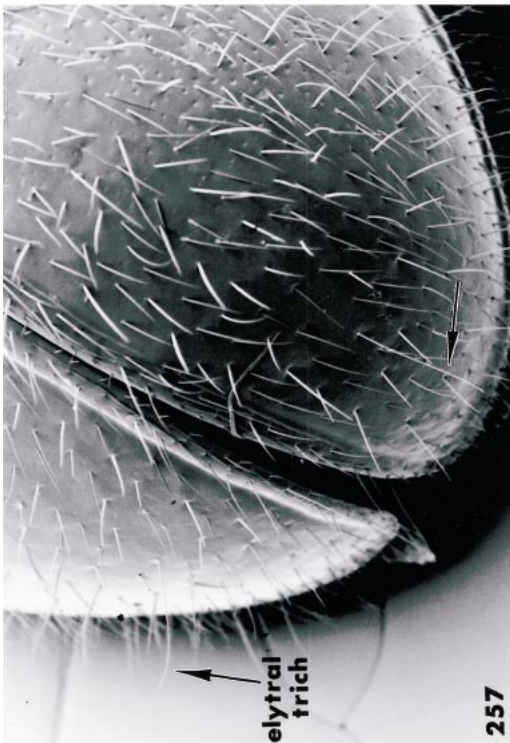
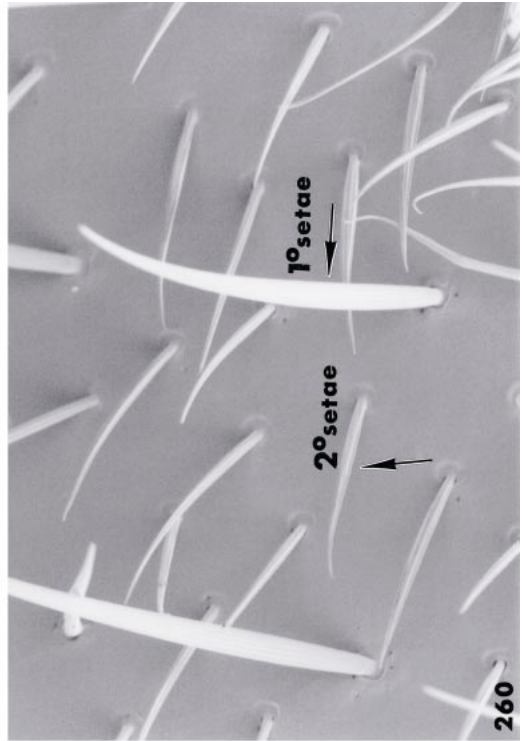
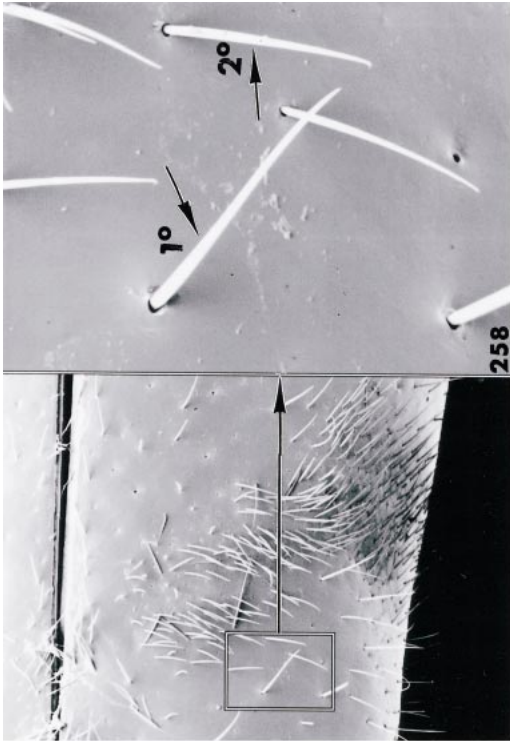


Fig. 257-260. Elytral vestiture. 257. *Aphelocerus leucomelas*. 258. *A. chiriqui*. 259. *A. leucomelas*. 260. *A. ciliaris*.

and protibia vested predominantly with dark setae, pterothorax, femora, and meso-metathorax vested predominantly with pale setae; tarsi vested with dark setae; elytral discal setal tuft, bipartite, setal patches particularly small. *Head*: Width across eyes about equal to width across pronotum (36:37), finely punctated, interocular depression and frontal umbo shallow; eyes subspherical, moderately convex; antenna as in figure 80. *Thorax*: Pronotum (fig. 273) subequal in width and length (37:40), coarsely punctate, subapical depression faintly indented, side margins feebly arcuate; elytra conspicuously shallow, depth at humerus 18, greatest depth in posterior half 18. *Abdomen*: Pygidium with posterior margin evenly arcuate. *Male genitalia*: As in figure 151.

NATURAL HISTORY: The only available specimen was collected in June.

DISTRIBUTION (map 22): Known only from the type locality.

ETYMOLOGY: The trivial name is a compound name from the Latin prefix *bu-* (large) and the Latin masculine *fustis* (club). I refer to the extraordinarily large antennal club characteristic of this species.

***Aphelocerus anticus*, new species**

Figures 77, 178, 211; map 22

HOLOTYPE: Female. Ecuador, Pich. Prov., 16 km SE Sto. Domingo, Tinalandia, 680 m, 15–30-VI-1975, S. & J. Peck (CNCI). (Specimen point mounted; sex label affixed to paper point, white, machine printed; support card, white locality label, hand printed; holotype label, red machine and hand printed.)

PARATYPES: Seven specimens, one collected from the same locality as the holotype, 15–30-V-1975 (CMNC, 1). Ecuador: Pichincha: Tinalandia, 500 m, 16 km SE Sto. Domingo, 4–14-VI-1976, S. & J. Peck (CNCI, 1; WOPC, 1); 12 km E Santa Domingo de los Colorados, 17-XI-1986, G. B. Edwards, forest, field, 670–762 m (FSCA, 1); 12 km E Sto. Domingo de los Colorados, 762 m, 11–17-V-1986, J. E. Eger (TAMU, 1); 17 km E Santa Domingo, 23–28-XII-1989, E. Giesbert (FSCA, 1), “Ecuador”, 6-I-1985 (QCAZ, 1).

DIAGNOSIS: In specimens of this species the elytral discal setal tuft (fig. 178) is com-

prised of one patch whose setae are directed anteriorly.

DESCRIPTION: *Size*: Length 4.5–5.2 mm; width 2.0–2.6 mm. *Integument*: Black, except legs, elytra piceous and apex of antenna testaceous. *Vestiture*: Head, prothorax, elytra, and protibia vested predominantly with dark setae, pterothorax, femora, and meso-metathorax vested predominantly with pale setae; tarsi vested with dark setae, elytral middiscal setal tuft comprised of one patch whose setae are directed anteriorly. *Head*: Width across eyes feebly narrower than width across pronotum (32:35) finely punctate; interocular depressions and frontal umbo shallow; eyes subspherical, moderately convex; antenna as in figure 77. *Thorax*: Pronotum as long as wide (35:35), narrower than width of elytra across humeri (35:40), anterior transverse depression moderately indicated; elytral depth at humerus 10, greatest depth in posterior half 20, humeral umbo prominent. *Abdomen*: Male pygidium with posterior margin narrowed, feebly truncate, tegmen as in figure 211.

VARIATION: The available specimens did not vary appreciably.

NATURAL HISTORY: Specimens were collected during May, June, and December at 680 m; another specimen was taken (670–762 m) in a forest field.

DISTRIBUTION (map 22): Known only from central Ecuador.

ETYMOLOGY: The trivial name *anticus* (in front) is a Latin adjective used here to refer to the anterior orientation of the setae of the elytral middiscal tuft.

***Aphelocerus naevius*, new species**

Figures 35, 36, 64, 116, 117, 143; map 21

HOLOTYPE: Male. Honduras, Oco., 14 mi. NE Nueva Ocotepeque, 6900', 25-VII-1974, O'Briens & Marshall (AMNH). (Specimen point mounted, sex label affixed to paper point, white, machine printed; paper point with antenna; support card; locality label, white, machine printed; AMNH repository label, white, machine printed; holotype label, red, machine printed; plastic vial with aedeagus.)

PARATYPES: Two specimens from the same locality as the holotype (WOPC, 2).

DIAGNOSIS: The flecklike appearance of the setal tuft on the elytral disc (figs. 35, 36) will conveniently distinguish the members of this species. Also, the pronotal side margins (fig. 36) are boldly arcuate giving the pronotal disc a subspherical dorsal profile, a unique configuration of the pronotum in the *batesi* group.

DESCRIPTION: *Size:* Length 4.2–5.0 mm; width 1.7–1.8 mm. *Integument:* Cyanescent, except elytra piceous. *Vestiture:* Integument vested predominantly with dark setae; metepisternal, sutural, and elytral discal tufts well developed; latter consists of one cluster of posteriorly directed setae (fig. 35). *Head:* Width across eyes equal to width across pronotum (35:35), finely densely punctate; interocular depression and frontal umbo shallow; eyes subspherical, moderately convex; antenna as in figure 64. *Thorax:* Pronotum slightly longer than wide (37:35), narrower than width of elytra across humeri (35:47), disc finely punctate; elytral humeral umbo prominent; elytra feebly convex in posterior half, depth at humerus 15, greatest depth in posterior half 20. *Abdomen:* Female pygidium (fig. 116) trigonal, sixth visible abdominal sternum deeply incised (fig. 117); aedeagus (fig. 143) short, parameres feebly developed, ventral sinus three times longer than dorsal sinus.

VARIATION: The available specimens did not vary appreciably.

NATURAL HISTORY: The available specimens were collected by beating at 2103 m.

DISTRIBUTION: Known only from Honduras.

ETYMOLOGY: The specific epithet is a Latin adjective that means “with a mole or birthmark”. I refer to the flecklike appearance of the elytral middiscal setal tuft.

Aphelocerus protenus, new species

Figures 69, 138, 171, 251; map 21

HOLOTYPE: Male. Costa Rica, Cartago Prov., Catie, Turrialba, 26–27-XII-1989, F. Hovore (AMNH). (Specimen point mounted; support card, white, sex label affixed to support card, white, hand printed; locality label, white, machine printed; collectors label, white, machine printed; AMNH repository label, white, machine printed; holotype label,

red, machine printed; plastic vial with abdomen and aedeagus.)

PARATYPES: Eight specimens. Costa Rica: Cartago: La Suiza de Turrialba, 1923, Pablo Schild (CMNC, 2; WOPC, 1); Turrialba, CATIE, 9–14-VI-1988, E. Giesbert (FSCA, 1); vic. Atirro, Hotel Casa Turiro, 579 m, beating, 30-VI–1-VII-1996, J. Rifkind, H. Lezama (JNRC, 1); Turrialba, CATIE, 23-VI-1996, F. Hovore (WOPC, 1). Tres Equis, Turrialba, 1-IV-1990, 580 m, in weeds, H. J. Lezama (MUCR, 1); Monumento Nacional Guayabo, A.C.A.C., Amistad, VII-1994, 1100 m, G. Fonseca, L. N. 217400_570000 # 3126 (INBC, 1).

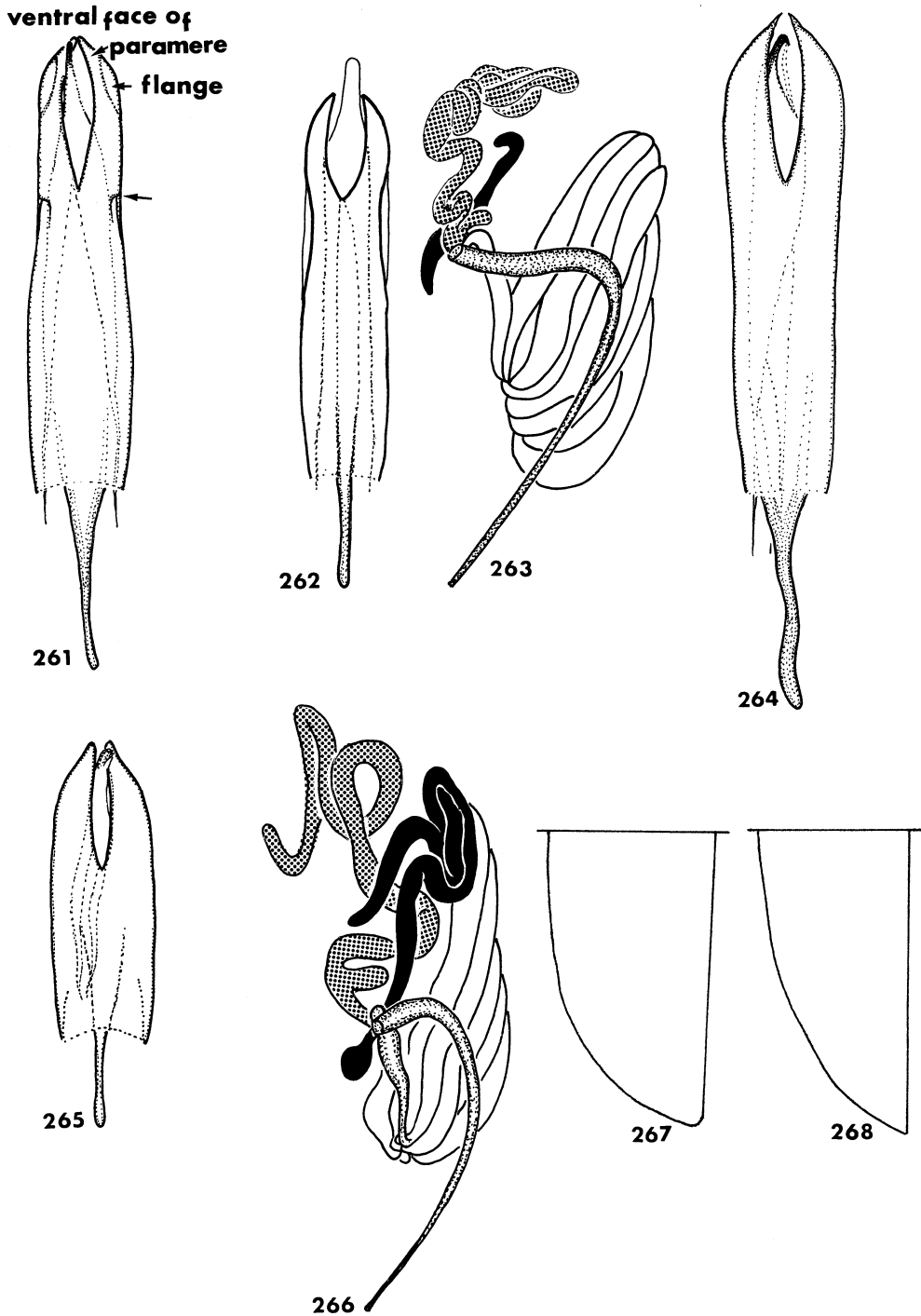
DIAGNOSIS: In specimens of this species the elytral humeral umbo is very prominent and the elytral discal setal tuft is a single diagonal patch (fig. 171); the setae of the tuft are all decumbent and directed anteriorly.

DESCRIPTION: *Size:* Length 4.5 mm; width 2.1 mm. *Integument:* Black. *Vestiture:* Head, prothorax, elytra, and protibia vested predominantly with dark setae, pterothorax, femora, and meso-metatarsia vested predominantly with pale setae; tarsi vested with dark setae; epipleural margin vested profusely with pale setae; elytral setal tuft comprised of one elongate diagonal patch whose setae project anteriorly. *Head:* Width across eyes narrower than width across pronotum (30:35); finely punctate, interocular depression and frontal umbo indistinct; eyes subspherical, moderately convex; antenna (fig. 69) shorter than pronotum (30:35). *Thorax:* Pronotum as figure 251, as long as wide (35:35), finely sparsely punctate, side margins moderately arcuate, anterior transverse depression indistinct, considerably narrower than width of elytra across humerus (35:45); elytra strongly convex in posterior half, depth at humerus 15, greatest depth in posterior half 23. *Abdomen:* Pygidium with posterior margin evenly arcuate; tegmen as in figure 138; parameres broad at base.

NATURAL HISTORY: Specimens were collected in May, June, July, and December.

DISTRIBUTION (map 21): Known only from central Costa Rica.

ETYMOLOGY: The Latin *protenus* (forward) is used to refer to the forward-directed setae of the elytral setal tuft.



Figs. 261–268. Aedeagi, male internal reproductive organs and elytra. **261.** *Aphelocerus nitidus*, aedeagus. **262–263.** *A. cirritus* (**262**, aedeagus; **263**, internal reproductive organs). **264.** *A. dispilis*, aedeagus. **265.** *A. torosus*, aedeagus. **266.** *A. capillus*, internal reproductive organs. **267.** *A. torosus*, elytron. **268.** *A. acutus*, elytron.

Aphelocerus argus, new species

Figures 68, 124, 172; map 25

HOLOTYPE: Male. Rio Sn Lorenzo, Tierras Morenas, Tenorio, A. C. A., Prov. Guana, Costa Rica, 1050 m, Mar. 1994, G. Rodriguez, L N 287800–427600 # 276 (INBC). (Specimen point mounted, sex label affixed to paper point, white, hand printed; support card; locality label, white, machine printed; plastic electronic label, white, machine printed; INBC repository label, white, machine printed; holotype label, red, machine printed.)

PARATYPES: Eight specimens. Costa Rica: Puntarenas: Santa Elena, 6-V-1985, A. J. Gilbert (CDAE, 1; WOPC, 1); Monteverde, 1400 m, 28-IV-1979, H. & A. Howden (CMNC, 1); 20–24-VI-1986, N. Youssef (WOPC, 1); 16–19-VI-1995, F. Hovore (JNRC, 1); Buen Amigo, San Luis Monteverde, 1000–1350 m; XI-1994, Z. Fuentes (WOPC, 1); Cartago: 5 km NE Pacayas, 1310 m, 25-V-1995, beating roadside vegetation, J. Rifkind, H. Lezama (JNRC, 1; WOPC, 1).

DIAGNOSIS: Specimens from Costa Rica that have the elytral middiscal setal tuft reduced to very few setae belong to this species.

DESCRIPTION: *Size:* Length 5.0–5.5 mm; width 2.2–2.8 mm. *Integument:* Head, pronotum, pterothorax, and abdomen cyanescent; elytral and legs piceous. *Vestiture:* Integument vested predominantly with dark setae, few pale setae; elytra middiscal setal tuft comprised of one small compact patch (fig. 172). *Head:* Width across eyes narrower than width across pronotum (33:37), coarsely punctate; interocular depression and frontal umbo indistinct; eyes subspherical, moderately convex; antenna shorter than pronotum (30:40), as in figure 68. *Thorax:* Pronotum subequal in width and length (37:40), narrower than width of elytra across humeri (37:42); coarsely punctated in region anterior to faintly indicated anterior transverse depression, side margins moderately arcuate; depth at humerus 15, greatest depth in posterior half 18. *Abdomen:* Pygidial posterior margin evenly arcuate; aedeagus as in figure 124.

VARIATION: No noteworthy variation was observed among the specimens examined.

NATURAL HISTORY: Specimens were collected in January, May, June, and July, at altitudes ranging from 1000 to 1400 m. Two specimens were captured by beating roadside vegetation.

DISTRIBUTION (map 25): Known only from the Costa Rica Provinces of Guanacaste, Puntarenas and Cartago; some from Monteverde.

ETYMOLOGY: The trivial name is a Greek adjective meaning shining. I refer to the shiny surface of the pronotal and elytral discs.

*PANUS GROUP**Aphelocerus panus*, new species

Figures 43, 89, 148, 245; map 18

HOLOTYPE: Female. Brazil, Goyaz, Rio Verde, 1908, G. A. Baer (MNHN). (Specimen point mounted, sex label affixed to paper point, white, machine printed; support card, lined; locality label, green, machine printed; locality label, beige, cursive; holotype label, red, machine and hand printed.)

PARATYPES: Five specimens. One specimen from the same locality as the holotype (WOPC, 1). Brazil: Goias: Jatahi, (MNHN, 1; WOPC, 1); Don Maier (DEIC, 1); XI-1972, F. M. Oliveira (WOPC, 1).

DIAGNOSIS: Within the panus group only specimens of this species have a loose aggregate of white setae on the elytral disc (fig. 43).

DESCRIPTION: *Size:* Length 5.1–6.8 mm; width 1.8–2.8 mm. *Integument:* Black. *Vestiture:* Frontal and epipleural setal tufts moderately developed, sutural and metepisternal tufts well developed; elytral disc vested with loose aggregate of white setae (fig. 43); anterior fascies of protibia and apex of profemur vested with long black setae, tarsi vested with dark setae, profemora and remainder of legs, pterothorax, and abdomen vested with pale setae. *Head:* Genae and epicranium expanded, gena behind eyes wrinkled; interocular depression and frontal umbo well developed, epicranium and gena finely punctate; eyes subspherical, moderately convex, width across eyes slightly greater than width across pronotum (38:36); antenna (fig. 89) elongate, as long as length of pronotum (40:40). *Thorax:* Pronotum elongate (40:36), nar-

rower than width of elytra across humeri (36:45); pronotal anterior transverse depression faintly developed; elytra boldly convex, depth at humerus 15, greatest depth in posterior half 20; legs prominent, metafemur extended to apex of elytra. *Abdomen*: Posterior margin of pygidium evenly convex in both sexes, tegmen as in figure 148.

VARIATION: The specimens examined did not vary appreciably.

NATURAL HISTORY: One specimen was collected in November.

DISTRIBUTION (map 18): Known only from southern Brazil.

ETYMOLOGY: The specific epithet *panus* (patch) is a Latin noun which refers to the loose aggregate of white setae on the elytral disc.

Aphelocerus hespenheidei, new species
Figures 206, 247; map 25

HOLOTYPE: Male. COSTA RICA, Heredia: Est. Biol. La Selva, 50–150 m, 10°26'N, 84°01'W, Oct. 1994, INBio-OET (INBC). (Specimen point mounted, sex label affixed to paper point, white, machine printed; support card, white; locality label, white, machine printed; collection date label [22 Octubre 1994 FPM/28/29, *Pentaclethra macrolobia*], white machine and hand printed; INBC repository label, white, machine printed; electronic label (INBIO CR 1002287830); holotype label, red, machine printed.)

PARATYPES: One specimen from the same locality as the holotype (WOPC, 1).

DIAGNOSIS: This species may be readily distinguished from the other two species of the *panus* group by the dense line of decumbent white setae on the sides of the frons.

DESCRIPTION: *Size*: Length 4.0–4.5 mm; width 1.8 mm. *Integument*: Black. *Vestiture*: Side margins of frons with narrow line of dense white setae; dorsum prominently vested with dark setae, body sides and legs with abundance of white setae. *Head*: Frontal umbo and interocular depressions prominent; eyes subspherical, moderately convex; width across eyes equal to width across pronotum (35:35). *Thorax*: Pronotum as long as wide (37:37), narrower than width of elytra across humeri (37:80), finely punctate, anterior

transverse depression well developed; elytra short, boldly convex, depth at humerus 40, greatest depth in posterior half 70; metafemur expanded, extended beyond elytral apex. *Abdomen*: Pygidium posterior margin evenly arcuate in both sexes; aedeagus as in figure 206.

VARIATION: No noteworthy variation was noted in the two available specimens.

NATURAL HISTORY: The available beetles were collected during October on *Pentaclethra macroloba*.

DISTRIBUTION (map 25): Known only from the type locality.

ETYMOLOGY: I take pleasure in naming this species to recognize the outstanding contribution that Henry Hespeneide has made to our understanding of beetle mimicry.

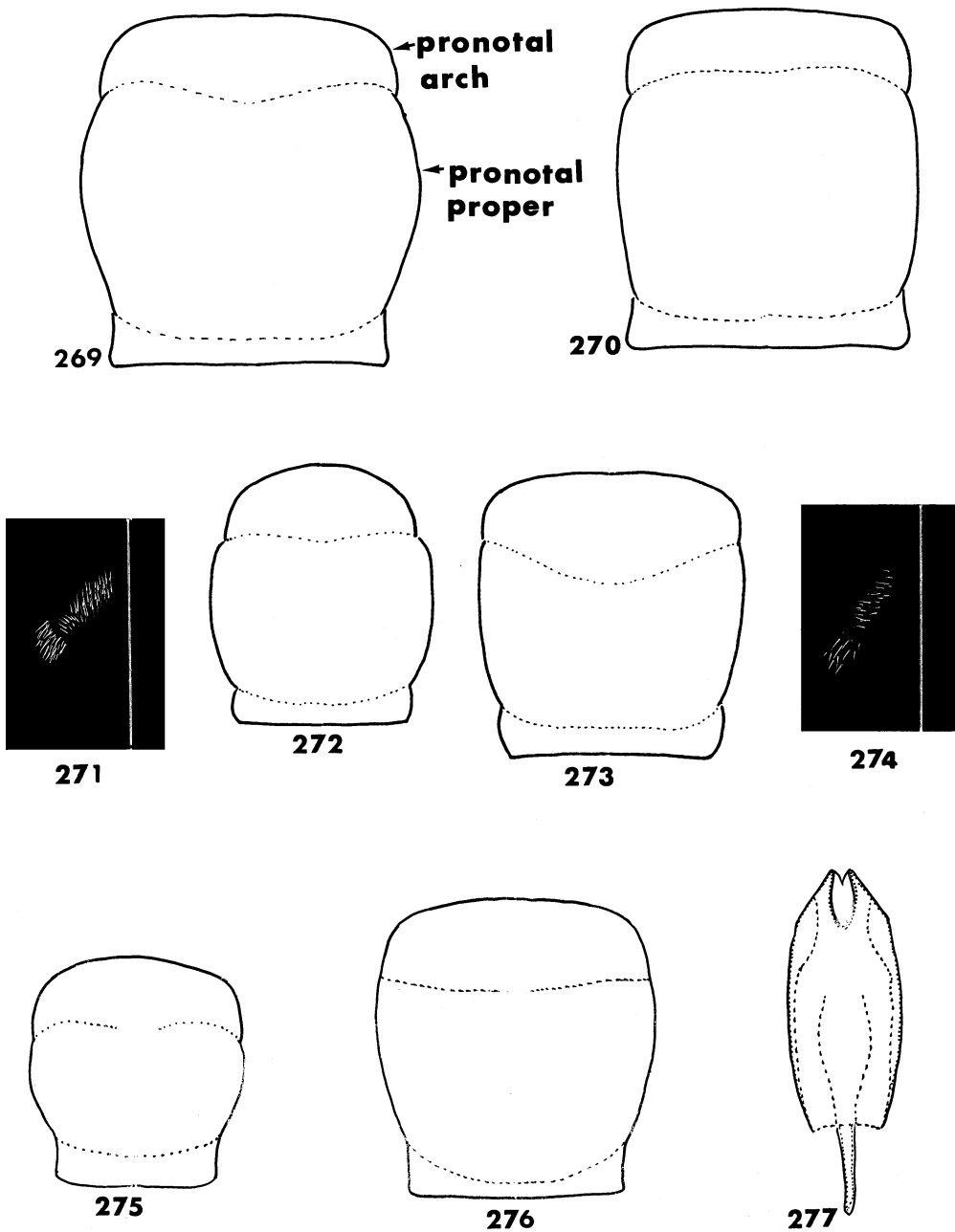
Aphelocerus collaris, new species
Figure 246; map 26

HOLOTYPE: Male. Bolivia, Sta. Cruz, Buena Vista, Oct. 18–25–1992, E. Giesbert (FSCA). (Specimen point mounted, support card, white sex label affixed to support card, white, machine printed; locality label, white, machine printed; FSCA repository label, white, machine printed; holotype label, red, machine printed; plastic vial with abdomen.)

PARATYPES: None.

DIAGNOSIS: Distinguished from specimens of *A. panus*, n.sp., by the lack of white setae on the elytral disc. Also, *A. collaris*, n.sp., specimens lack the dense line of white setae on the outer sides of the frons which distinguishes them from specimens of *A. hespenheidei*, n.sp.

DESCRIPTION: *Size*: Length 5.0 mm; width 2.0 mm. *Integument*: Piceous. *Vestiture*: Integument densely vested with prominent light and dark setae; sutural tuft well developed. *Head*: Genae and epicranium expanded; interocular depressions and frontal umbo prominent; frons, epicranium, and gena very finely punctate; eyes subspherical, moderately convex; width across eyes greater than width across pronotum (38:35); antenna elongate, as long as length of pronotum (40:40). *Thorax*: Pronotum longer than wide (35:40), very finely punctate, anterior transverse depression poorly defined, side margins feebly arcuate, considerably narrower than



Figs. 269–277. Pronota, elytral setal patches, tegmen. 269. *Aphelocerus inconstans*, pronotum. 270. *A. cirritus*, pronotum. 271. *A. nitidus*, elytral setal patches. 272. *A. batesi*, pronotum. 273. *A. bufustis*, pronotum. 274. *A. cirritus* elytral setal patch. 275. *A. torosus*, pronotum. 276–277. *A. olanchoensis* (276, pronotum; 277, tegmen).

width across humeri (35:43); elytra boldly convex, depth at humerus 15, greatest depth in posterior half 25; metafemora not extended beyond elytral apex. *Abdomen*: Posterior margin of male pygidium truncate, of female evenly arcuate; aedeagus not available.

VARIATION: Not studied.

NATURAL HISTORY: The holotype specimen was collected in October.

DISTRIBUTION (map 26): Known only from the type locality.

ETYMOLOGY: The specific epithet is a compound name derived from *collum* (neck) and the suffix *-is* (having the nature of). I refer to the elongated form of the forebody.

FORMICOIDES GROUP

Aphelocerus dispilis, new species

Figures 44, 46, 86, 162, 264; map 20

HOLOTYPE: Male. Costa Rica, Cartago, 18 km, NE Turrialba, Feb. 4–10 1978, E. Giesbert (LACM). (Specimen point mounted, support card, sex label affixed to support card, white machine printed; locality label, white, hand printed; LACM repository label; holotype label, red, machine and hand printed; plastic vial with abdomen and aedeagus.)

PARATYPES: Sixteen specimens. Costa Rica: Limon: Vicinity Puerto Viejo, I-1986, E. Giesbert (FSCA, 1); Revantazon, Ebene Limon, "an welken Laub" F. Nevermann (WOPC, 1); 16 km SW Guapiles, 28-V-1985, on dead wood, F. T. Hovore (WFBC, 1); Cartago: 11–18 km N Pavones, 14-I-1989, F. Hovore (WFBC, 2; WOPC, 1); 10 km N Pavones, 18-VI-1988, F. Hovore (WOPC, 1); Turrialba: CATIE, 13–14-I-1989, F. Hovore (WFBC, 1). Panama: Cocle: El Valle, 29-IV-1992, E. Giesbert (FSCA, 1); El Valle, 6-II-1992, F. Hovore, (WOPC, 1). Panama: Cerro Campana, 16–17-IV-1999, Wappes & Morris (JEW, 1); 6-VII-1974, L. & C. W. O'Brien and Marshall (WOPC, 1); 750 m, 8°40', N 79°, 56'W, 30-VII-1970, H. A. Hespenheide (CHAH, 1). Chiriqui: Bugaba, 243–457 m, Champion (BMNH, 1); Bocas del Toro: 24 km S Punta Pena, 21-II-1999, R. Turnbow (WOPC, 1).

DIAGNOSIS: Within the *formicoides* group these beetles may be distinguished by their small size (4 mm), globose pronotal disc (fig. 44), and the presence of the pronotal and

metepisternal setal tufts. The pronotal collar is vested with white setae and the sutural tuft is short (fig. 44).

DESCRIPTION: *Size*: Length 4.3–5.0 mm; width 1.8–2.1 mm. *Integument*: Black. *Vestiture*: Clypeus with few setae, frons and epicranium vested with dark setae; pronotal setal tuft extended posteriorly to across pronotal collar; sutural tuft short; disc of pronotum and elytra vested with dark erect setae; anterior fascies and apex of profemur vested with long black setae, tarsi vested with dark setae, remainder of legs and venter vested with pale setae. *Head*: Interocular depression, frontal umbo shallow; frons, epicranium and gena very finely punctate, gena behind eyes wrinkled; eyes subspherical, moderately convex; width across eyes equal to pronotal width (35:35); antenna (fig. 86) elongate, nearly as long as length of pronotum (43:45). *Thorax*: Pronotal disc globose, very finely punctate, pronotum elongate (43:35) and only slightly narrower than width of elytra across humeri (35:37), anterior transverse depression only faintly indicated at side; elytra short, boldly convex (fig. 46), depth at humerus 12, greatest depth in posterior half 28; legs very prominent, metafemur extended beyond elytral apex. *Abdomen*: Posterior margin of pygidium evenly arcuate in both sexes; tegmen as in figure 162.

VARIATION: The specimen from Bugaba, Panama, is brunneus.

NATURAL HISTORY: Specimens have been collected in January, February, April, May, June, and July at altitudes ranging from 243 to 750 m; one specimen in May on dead wood.

DISTRIBUTION (map 20): Known from central Costa Rica and central Panama.

ETYMOLOGY: The trivial name is from the Latin *dis* (without) and the Latin *pilus* (hair). I refer to the lack of a setal tuft on the elytral disc.

Aphelocerus formicoides, new species

Figures 45, 47, 87, 149; map 23

HOLOTYPE: Male. Honduras. Dept. Yoro, 45 km S Tela, 800 m, May 25–27, 1978, E. Giesbert (LACM). (Specimen pin mounted; support card; machine printed, sex label affixed to support card; locality label, white,

hand printed; LACM repository label, white, hand printed; holotype label, red, machine and hand printed.)

PARATYPES: Twelve specimens. Six specimens from the same locality as the holotype (FSCA, 2; WOPC, 3); 600 m (FSCA, 1). Honduras: Atlantida: 12 km SW La Ceiba, 21-IV-1979, E. Giesbert (FSCA, 2; WOPC, 1). Mexico: Chiapas: 16 km S Malpaso 24-V-1969, J. M. Campbell (CNCI, 1). Belize: Cayo: Mtn. Pine Ridge, 525 m, 26-VI-1992, Pine Ridge, Chito Line at Little Vaqueros Creek, Broadleaved Hardwood Forest, beating/sweeping in slash area, J. Rifkind, P. Gum (JNRI, 1; WOPC, 1).

DIAGNOSIS: These small beetles (4 mm) have a distinct transverse concavity behind the well-developed humeral umbo of the elytra (figs. 45, 47). Also, the elytral disc has seven shallow, longitudinal carinae behind the humeral umbo.

DESCRIPTION: *Size:* Length 3.6–5.0 mm; width 1.7–2.0 mm. *Integument:* Black. *Vestiture:* The pronotal setal tuft consists of a single row of pale setae; except for metepisternal tuft, no other indication of a tuft is present; integument of dorsum vested with admixture of dark and pale setae; anterior fascies of protibia vested with long dark setae; tarsi vested with dark and pale setae, remainder of legs, pterothorax, and abdomen vested with pale setae. *Head:* Genae and epicranium expanded, gena wrinkled behind eyes; interocular depressions and frontal umbo shallow; frons, epicranium, and gena finely punctated, eyes subspherical, moderately convex; width across eyes narrower than width across pronotum (29:30); antenna elongate (fig. 87), nearly as long as length of pronotum (33:36). *Thorax:* Pronotal disc globose, very finely punctate; pronotum elongate (30:36), narrower than width of elytra across humeri (30:34); elytra short and boldly convex (fig. 47), with seven shallow, longitudinal carinae behind humeral umbo, depth at humerus 10, greatest depth in posterior half 17; legs very prominent, metafemur extended beyond elytral apex. *Abdomen:* Posterior margin of pygidium evenly arcuate in both sexes. *Male genitalia:* As in figure 149.

VARIATION: The longitudinal carinae on the elytral disc vary in their strength.

NATURAL HISTORY: The available specimens were captured in May and June. Ed Giesbert collected six specimens at 800 m and one at 600 m near La Ceiba, Honduras. J. Rifkind and P. Gum collected two specimens by beating broadleaved hardwoods at 525 m.

DISTRIBUTION (map 23): This Central American species has been collected from southern Mexico, Honduras, and Belize.

ETYMOLOGY: The trivial name *formicoides* is a compound Latin adjective from the feminine *formica* (ant) and the suffix *-oides* (likeness). I refer to the ant like appearance of these beetles.

CHELIFEROUS GROUP

Aphelocerus akis, new species

Figures 200, 201, 226; map 25

HOLOTYPE: Male: Mexico, Veracruz, E slope Vol. San Martin Tuxla, 2200', July 5, 1994, E. Giesbert (FSCA). (Specimen point mounted, sex label affixed to paper point, white, machine printed; support card, white; locality label, white, machine printed; FSCA repository label, white, machine printed; holotype label, red, machine printed; plastic vial with aedeagus and abdomen).

PARATYPES: Three specimens. Mexico. Veracruz, 914 m, N slope Volcan San Martin, IV-6 (year unknown) E. Giesbert (WOPC, 2); Est. Biol. De Los Tuxtlas, 18°35', 95°05', 28-IV-1991 (WFBC, 1).

DIAGNOSIS: Distinguishable from very similar specimens of *A. apiculus*, n.sp., by the trigonal shape of the last antennomere and by the more gradual slope of the elytra.

DESCRIPTION: *Size:* 6.0–6.5 mm; width 2.1 mm. *Integument:* Black. *Vestiture:* Integument densely vested with prominent light and dark setae, light setae particularly prominent along lower edge of pronotum and along epipleuron. *Head:* Genae and epicranium expanded; interocular depressions and frontal umbo prominent; frons, epicranium, and gena very finely punctate; eyes spherical, moderately convex; width across eyes subequal to width across pronotum (45:50); antenna (fig. 226) elongate, longer than length of pronotum (65:55). *Thorax:* Pronotum longer than wide (55:50), very finely punctated, anterior transverse depression poorly defined,

lateral margins feebly arcuate, considerably narrower than wide across humeri (49:60); elytra boldly convex, shallow longitudinal carina only faintly visible throughout elytral disc, apical slope acute, depth at humerus 25, greatest depth in posterior half 38; metafemora not extended beyond elytral apex. *Abdomen*: Posterior margin of male pygidium truncate, of female evenly arcuate. *Male genitalia*: As in figure 201; phallic plate with denticular margin (fig. 200).

VARIATION: The four specimens examined did not vary appreciably.

NATURAL HISTORY: The holotype specimen was collected during early July, whereas two paratype specimens were captured during early May, at 670 m and 945 m. One additional paratype was captured during April at the Biological Station of Los Tuxtlas.

DISTRIBUTION (map 25): Known from the northern and eastern slopes of Volcan San Martin and from the Los Tuxtlas Biological Station in southeastern Mexico.

ETYMOLOGY: The specific epithet *akis* (point) is a Greek noun. I wish to accentuate the testaceous coloration of the antennal apex.

***Aphelocerus chelonus*, new species**

Figures 202, 203, 227; map 25

HOLOTYPE: Male. Guatemala: Izabal: 25 km SE Morales, 2800'; May 21–24, 1996, E. Giesbert, J. Monzon (FSCA). (Specimen point mounted, sex label affixed to paper point, white, machine printed; support card, white; locality label, white machine printed; FSCA repository label, white machine printed; holotype label, red, machine printed; plastic vial with aedeagus and abdomen.)

PARATYPES: Four specimens from the same locality as the holotype (FSCA, 1; WOPC, 1); 31-IV–2-VI-1997, E. Giesbert, J. Monzon (FSCA, 1); Montanas del Mico, Cerro San Gil, at microwave station, 9-VI-1993, mv & uv light, W. B. Warner, J. Monzon, J. Ryan (WOPC, 1).

DIAGNOSIS: The members of this species have the elytra polished, devoid of shallow longitudinal ridges, the pronotal tuft is absent, and the elytral apical angle is acute. These features will distinguish *A. chelonus*,

n.sp., members from those of other species with the antennal apex testaceous.

DESCRIPTION: *Size*: Length 5.5–6.5 mm; width 2.0–2.5 mm. *Integument*: Black, antennal apex testaceous. *Vestiture*: Integument densely vested with prominent light and dark setae, light setae prominent along lower edge of pronotum and along epipleuron. *Head*: Genae and epicranium expanded; interocular depressions and frontal umbo prominent; frons, epicranium, and gena very finely punctate; eyes spherical, moderately convex; width across eyes equal to width across pronotum (50:50); antenna (fig. 227) elongate, nearly as long as length of pronotum (40:50). *Thorax*: Pronotum as long as wide (50:50), very finely punctate, anterior transverse depression well defined, side margins boldly arcuate, considerably narrower than wide across humeri (50:65); elytra moderately convex, disc polished, very finely punctate, erect and decumbent setae serially arranged, apical slope acute, depth at humerus 30, greatest depth in posterior half 35; metafemora not extended beyond elytral apex. *Abdomen*: Posterior margin of pygidium evenly arcuate in male, feebly sinuous in female. *Male genitalia*: As in figure 202; phallic plate with denticular margin (fig. 203).

VARIATION: No appreciable variation was noted among the available specimens.

NATURAL HISTORY: The available specimens were collected in late May at 853 m.

DISTRIBUTION (map 25): Known only from the type locality.

ETYMOLOGY: The specific epithet *chelonus* (turtle) is a Greek noun. I refer to the convex shell-like configuration of the elytra.

***Aphelocerus cheliferosus*, new species**

Figures 88, 146, 147, 192, 228; map 19

HOLOTYPE: Male. Mexico. Ver. 250', Los Tuxtlas, Biol. Sta. UNAM, 20-V-1983, C. & L. O'Brien & Marshall (LACM). (Specimen point mounted, sex label affixed to paper point, white, hand printed; support card, white; locality label, white, machine printed; LACM repository label, white, machine printed; holotype label, red, machine printed; plastic vial with abdomen and aedeagus.)

PARATYPES: Fifteen specimens from the same locality as the holotype: (JNRC, 4;

WOPC, 1); 21-V-1983 (JNRC, 5; WOPC, 2); 19-V-1983 (JNRC, 1; WOPC, 2).

DIAGNOSIS: The antennal apex of these beetles is testaceous, which is also a characteristic of some other species across species-group lines. Among the members of this species complex, *cheliferous* specimens may be identified by having the elytral surface polished, the outer margin of the elytral apex obtuse, and the side margins of the pronotum feebly convex.

DESCRIPTION: *Size:* Length 5.0–5.0 mm; width 2.0–2.5 mm. *Integument:* Cranium, pronotum, venter, and legs cyanescent; elytra piceous. *Vestiture:* Integument densely vested with prominent light and dark setae, light setae particularly prominent along lower edge of pronotum and along the epipleuron. *Head:* Genae and epicranium expanded; interocular depression and frontal umbo well developed; frons, epicranium, and gena finely punctate; eyes subspherical, boldly convex; width across eyes feebly narrower than width of pronotum (31:33); antenna (figs. 88, 228) elongate, nearly as long as length of pronotum (35:37). *Thorax:* Pronotum elongate (33:37), considerably narrower than width of elytra across humeri (33:40); lateral margins feebly arcuate; anterior transverse depression faintly indicated; elytra strongly convex, disc with nine longitudinal rows of fine punctations, and shallow longitudinal ridges, depth at humerus 18, greatest depth in posterior half 28; legs prominent, meta-femur extended to elytral apex. *Abdomen:* Posterior margin of pygidium evenly arcuate in both sexes. *Male internal reproductive organs* (fig. 192): Lateral accessory gland narrow and convoluted, coiled; medial gland longer and vastly more robust than lateral gland. *Male genitalia* (fig. 146): Parameres well developed; ventral and dorsal sinuses equal in length; phallic plate (fig. 147) set with row of marginal denticles.

VARIATION: The shallow longitudinal elytral ridges vary in expression as does the extent of testaceousness of the antennal apex.

NATURAL HISTORY: Specimens were collected in May at 76 m.

DISTRIBUTION (map 19): This species is known from the slopes of Volvan San Andres Tuxtla, in Mexico.

ETYMOLOGY: The trivial name *cheliferous*

comes from the Latin noun *chela* (claw) and *-ferous* (carry). I refer to the presence of marginal denticles on the phallic plates.

SCUTELLARIS GROUP

Aphelocerus scutellaris (Chevrolat)

Figures 41, 42, 84, 145; map 21

Clerus scutellaris Chevrolat, 1874: 296. Lectotype: Male. Here selected. Mexico, Orizaba (MNHN). (Specimen point mounted, sex label affixed to paper point, white, machine printed; support card, white, with lines; identification-locality label, green, mounted on white card, cursive; identification label, beige, cursive; Paris Museum repository label, white with green mark, machine printed; identification label, white, machine printed; the lectotype is marked by an elytral puncture resulting from the original pinning). Chevrolat, 1876: 15; Gorham, 1882: 162; Corporaal, 1950: 147; Barr, 1976: 18.

Adelphoclerus nitidus Wolcott, 1910: 357.

Adelphoclerus fulgidus Wolcott, 1927: 73 (new name for *Adelphoclerus nitidus* Wolcott).

HOLOTYPE: Mexico, Jalapa, Smith (FMNH). (Specimen point mounted; locality label, beige, machine printed; H. F. Wickham Collection label; type label, red, machine and hand printed; identification label, beige, cursive; type label, white and bordered by two red lines, hand printed; identification label, white, machine printed.) **NEW SYNONYMY.** One paratype with the same data as holotype (USNM).

DIAGNOSIS: In *A. scutellaris* (Chevrolat) specimens, the largest specimens in this species group (8 mm), the elytra are conspicuously compressed laterally. There is an acute posthumeral lateral deflection that sharpens the humeral angle and gives the dorsal fascies of the elytra a subtrigonal appearance (figs. 41, 42).

DESCRIPTION: *Size:* Length 7.4–8.6 mm; width 2.4–4.4 mm. *Integument:* Black, antennal apex testaceous, tarsi piceous. *Vestiture:* Frontal, pronotal, metepisternal tufts well developed, epipleural tuft moderately developed, sutural tuft short but prominent; mesocutellum matted with white setae, elytral apical region in pale setae, remainder of dorsum sparsely vested with erect black setae; anterior fascies and apex of profemur vested with long, black setae, tarsi vested

with black setae, pterothorax and abdomen vested with pale setae. *Head*: Gena and epicranium expanded; interocular depression and frontal umbo indistinct; frons, epicranium, and gena finely and sparsely punctate; eye subspherical, moderately convex; width across eyes slightly narrower than width across pronotum (60:63); antenna (fig. 84) elongate, nearly as long as length of pronotum (70:75). *Thorax*: Pronotum elongate (75:63), disc finely wrinkled transversely in posterior region, finely punctate in remainder, side margins feebly arcuate, anterior transverse depression faintly indicated at sides, considerably narrower than width of elytra across humeri (63:85); elytra boldly convex and conspicuously compressed laterally especially behind the humerus, humeral angle pronounced, with 10 rows of very fine setiferous punctations, rows of punctations seem to coincide in position with faintly indicated longitudinal carinae, depth at humerus 30, greatest depth at posterior half 50; legs very prominently elongate, metafemur extended beyond elytral apex. *Abdomen*: Posterior margin of pygidium evenly arcuate in both sexes, tegmen as in figure 145; inner margins of parameres denticulate.

VARIATION: Elytral coloration varies from black to piceous and the basal half of the pronotal disc varies in the number and structural development of the transverse wrinkles. The antenna apex is less testaceous in some specimens. Also, there is some variation in the prominence of the transverse subapical depression of the pronotum, humerus, post-humeral margin, lateral coompression of the elytra, and longitudinal elevations of the elytral disc.

NATURAL HISTORY: Specimens were captured in June, July, and in September, at altitudes ranging from 914 to 1493 m.

DISTRIBUTION (map 21): These specimens have been most abundantly collected from the Atlantic slopes of the Sierra Madre Oriental, but it is also known from the isthmus of Tehuamtepec.

MATERIAL EXAMINED: I examined 18 specimens from Mexico: Veracruz: 10 km N Fortin, 21–29-VII-1976, E. Giesbert; Fortin de Las Flores, 6-VII-1963, J. Doyen; Jalapa, Smith: Hidalgo: Chiapas. Specimens are de-

posited in EMEC, FSCA, JEW, RHTC, WOPC, and ZMAN.

REMARKS: In 1910, A. B. Wolcott published the name *Adelphoclerus nitidus* (Wolcott, 1910: 357) which he later rejected as a secondary homonym of *Clerus nitidus* (Chevrolat, 1843: 25), and replaced it with the *Adelphoclerus fulgidus* (Wolcott, 1927: 73).

***Aphelocerus improcerus*, new species**
Figures 210, 225, 231, 250; map 25

HOLOTYPE: Male. Mexico. Veracruz, Las Minas, 7-V-1994, J. E. Wappes (AMNH). (Specimen point mounted, sex label affixed to the paper point, white, machine printed; AMNH repository label, white, machine printed; holotype label, red, machine printed; plastic vial with abdomen and aedeagus.)

PARATYPES: None.

DIAGNOSIS: The holotype superficially resembles members of *A. cheliferosus*, n.sp., and *A. scutellaris* (Chevrolat). However, in *A. improcerus*, n. sp., beetles the epipleural tuft does not span the entire length of the epipleuron as it does in *A. cheliferosus*, n.sp., specimens and the pronotum is not conspicuously oblong as is the case with *A. scutellaris* (Chevrolat) beetles.

DESCRIPTION: *Size*: Length 6.0 mm; width 2.7 mm. *Integument*: Black, antennal apex and tarsi piceous. *Vestiture*: Lateral margins of frons vested with long white setae, pronotal and metepisternal tuft well developed, epipleural tuft moderately developed, sutural tuft short but prominent; mesocutellum matted with white setae, elytral region with white setae, remainder of dorsum sparsely vested with dark erect setae, protibiae with few dark setae, rest of legs vested with long white setae, pterothorax vested with white setae. *Head*: Gena and epicranium only slightly expanded, postocular portion of gena wrinkled; interocular depressions and frontal umbo not prominent, frons scabrous, eyes subspherical, moderately convex; width across eyes about equal to width of pronotum (52:53); antenna (fig. 225) elongate, nearly as long as length of pronotum (52:55). *Thorax*: Pronotum feebly elongate (55:53), disc finely wrinkled transversely in posterior region, coarsely punctuate in remainder; side margins mod-

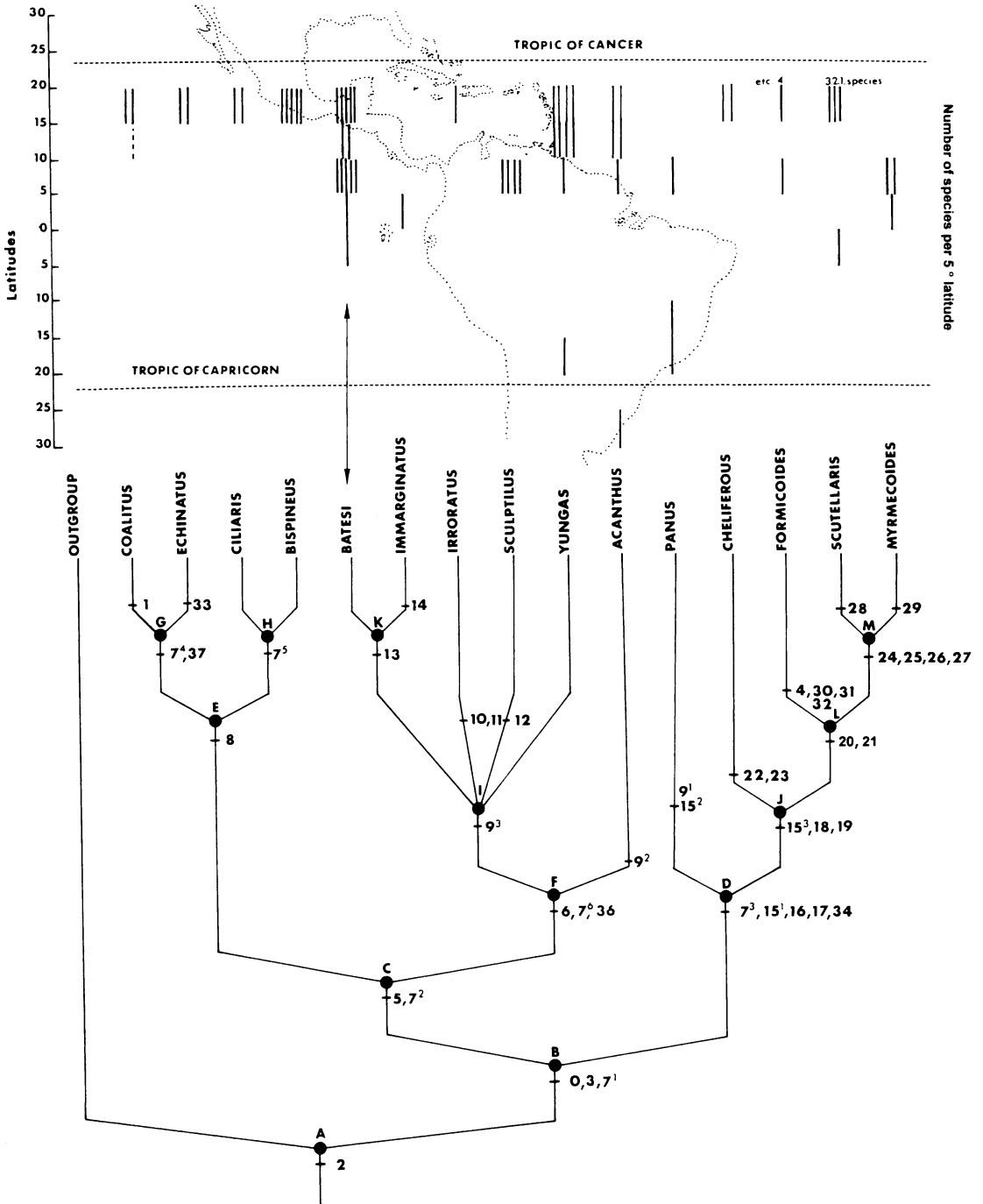


Fig. 278. Phylogenetic tree of the *Aphelocerus* species groups.

erately arcuate, faintly indented along anterior angles (fig. 250) anterior transverse depression faintly indicated, pronotum considerably narrower than width of elytra across humeri (53:65); elytral middiscal setal patch small (fig. 231), elytra moderately convex in posterior half, humeral angle pronounced, finely punctate, punctations serially arranged near sutural margin, depth at humerus 20, greatest depth at posterior half 32; legs prominently elongate, metafemur extends beyond elytra apex. *Abdomen*: Posterior margin of male pygidium feebly truncated. *Male genitalia*: Tegmen as in figure 210; inner margin of parameres denticulated, phallobasic apodeme very narrow.

VARIATION: No available information.

NATURAL HISTORY: The holotype was captured during May.

DISTRIBUTION (map 25): Known only from the type locality.

ETYMOLOGY: The Latin specific epithet *improcerus* means undersized. I selected the name because my initial impression of this specimen was that it was a small individual of *A. scutellaris* (Chevrolat).

Aphelocerus propinquus, new species
Figure 224; map 25

HOLOTYPE: Male. Mexico. Hidalgo # 1, 38.5 mi. NE Jacala, 11 June 1966, J. B. Karen. (AMNH). (Specimen pin mounted, sex label affixed to support card, white, machine printed; support card, white; locality label, white, machine printed; AMNH repository label, white, machine printed; holotype label, red, machine printed; plastic vial with aedeagus and abdomen.)

PARATYPES: None.

DIAGNOSIS: The members of this species are readily distinguishable from *A. scutellaris* (Chevrolat) by the evenly arcuate slope of the elytral deflection at elytral basal third. In *A. scutellaris* specimens the lateral elytral deflection is acute.

DESCRIPTION: *Size*: Length 8.0 mm; width 3.0 mm. *Integument*: Black. *Vestiture*: Integument density vested with prominent light and dark setae, frontal, and pronotal, metepisternal tufts prominent. *Head*: Genae and epicranium expanded; interocular depressions and frontal umbo very conspicuous;

frons, epicranium, and gena very coarsely punctate; eyes spherical, moderately convex; width across eyes subequal to width across pronotum (60:65); antenna (fig. 224) elongate, about as long as length of pronotum (75:78). *Thorax*: Pronotum longer than wide (78:65), coarsely punctate, lower disc faintly transversely wrinkled, anterior transverse depression faintly indicated, side margins moderately arcuate, pronotum considerably narrower than width across humeri (65:84); elytra boldly convex, disc polished, with serial rows of small punctations whose size progressively diminishes to elytral apex, erect and decumbent setae serially arranged, apical slope acute, depth at humerus 30, greatest depth in posterior half 40; metafemora extended beyond elytral apex. *Abdomen*: Posterior margin of male pygidium evenly, narrowly arcuate. *Male genitalia*: Very similar to that *A. scutellaris* (Chevrolat) (fig. 145), except with fewer renulations along the mid-dorsal margins of the parameres.

VARIATIONS: Not studied.

NATURAL HISTORY: The only available specimen was collected in June.

DISTRIBUTION (map 25): Known only from the type locality.

ETYMOLOGY: The specific epithet *propinquus* (near) is a Latin name that I use here to indicate the close relationship between the members of this species and those of *A. scutellaris* (Chevrolat).

Aphelocerus calvus, new species
Figures 90, 153; map 22

HOLOTYPE: Male. Brazil, Sto. Paulo 'd Olivenca, Amazonas, M. de Mathan (MNHP). (Specimen point mounted, pygidium, sixth visible abdominal sternum, and machine printed sex label affixed to paper point; support card, white; locality label, white, machine printed; Paris Museum collection label, white, machine printed; holotype label, red, machine and hand printed.)

PARATYPES: None.

DIAGNOSIS: The extraordinary, elongate pronotum (23:30) distinguishes the members of this species; the width across the eyes is greater than the width of the pronotum (23:24); the frontal setal tuft and the metepisternal tuft are present.



Fig. 279. North America clerofauna (in black).

DESCRIPTION: *Size:* Length 5.0 mm; width 7.0 mm. *Integument:* Piceous. *Vestiture:* Frontal tuft moderately developed, metepisternal tuft well developed; anterior fascies of protibia vested with dark setae, tarsi vested with dark setae, profemora and remainder of legs, pterthorax, and abdomen vested with pale setae; dorsum vested with dark setae. *Head:* Genae and epicranium expanded, gena behind eyes wrinkled; interocular depression and frontal umbo indistinct; frons, epicranium, and gena very finely punctate; eyes subspherical, moderately convex; width across eyes feebly broader than width across pronotum (24:23); antenna (fig. 90) nearly as long as length of pronotum (28:30). *Thorax:* Pronotum conspicuously elongate (23:30); pronotum considerably narrower than width of elytra across humeri (23:27), side margins feebly arcuate, anterior transverse depression faintly indicated, elytra moderately convex, depth at humerus 10, greatest depth in posterior half 15; legs prominent, metafemur extended beyond elytral apex. *Abdomen:* Posterior margin of pygidium evenly arcuate. *Male genitalia:* Parameres acuminate (fig. 153).

DISTRIBUTION (map 22): Known only from the Amazonian region of Brazil.

ETYMOLOGY: The trivial name *calvus* (bald) is a Latin adjective used here to emphasize the lack of a setal tuft on the elytral disc.

MYRMECOIDES GROUP

Aphelocerus myrmecoides, new species

Figures 11, 22–24, 83, 161, 164, 187–189; map 17

HOLOTYPE: Male. Costa Rica, Puntarenas, 4 km NE San Luis Guacimal, 3500 ft, Feb. 26, 1987, E. Giesbert (LACM). (Specimen point mounted; support card, antenna and machine printed sex label affixed to support card; locality label, white, machine printed; lectotype label, red, machine and hand printed; plastic vial with abdomen and aedeagus.)

PARATYPES: One hundred and twenty-four specimens. Five specimens from the same locality as the holotype (FSCA, 3; WOPC, 2). Costa Rica: Guanacaste: Guanacaste Cons. Area, 5 km N Quebrada Grande, 750 m, 12-II-1996, dry tropical forest, R. Anderson

(CMNC, 1); Puntarenas: San Luis, 21–25-VII-1996, L. M. La Pierre (JNRC, 1); Las Cruces ridge 27-VI-1996, F. T. Hovore (WOPC, 1); Buen Amigo, San Luis Monteverde A. C. Arenal, 1000–1350 m, IV-1994, Grace Fuentes (INBC, 1); Monteverde, 26-II-1987, E. Giesbert (FSCA, 1; WOPC, 1); Monteverde, 15-VII–24-VIII-1992, F. A. Cluesada (INBC, 1); Sirena, Corcovado N. P. 0–100 m., R. Blanco & G. Fonseca, IV-1989 (INBC, 1); San Luis, 1040 m, R. B. A., 18–22-VII-1990, F. Hovore (WFBC, 1); 22–25-VII-1992, F. Hovore, (WFBC, 1); 6 km S San Vito, 5000 m (CASC, 1); Limon: 17 km Guapiles, 16-VI-1986, on dead wood, F. T. Hovore (WOPC, 1); vic. Bribri, 1-I-1986, E. Giesbert (WOPC, 1); Guanacaste: Estac. Mengo, 1100 m, SW side Volcan Cacao, II-1989, GNP Biodiversity Survey (INBC, 1; WOPC, 1); Est. Cacao, 1000–1400 m, Lado SO Vol. Cacao, P.N. Guan, Z. Fuentes, 21–29-IV-1992 (INBC, 1), 3 km SE R. Narango, 2-VI-1993, F. D. Parker (EMUS, 1); Hereida: Finca La Selva, 3 km S. Pto. Viejo, 10°26'N, 84°01'W, 26-VII-1976, Malaise trap, D. Perry (WFBC, 1); 18-VIII-1994, H. A. Hespeneheide (CHAH, 1); nr. Puerto Viejo, 18–19-VI-1975, D. R. Perry (CHAH, 1; WOPC, 1); Est. Biol. La Selva, 50–150 m, 10°26'N 84°01'W, Proy ALAS. INBIO-DET, MI / 17/ 675, 29-VI-1997, Bosque primaria, INBIO CR 1002 731925 (INBC, 1); Cartago: CATIE, 25–29-V-1985, F. T. Hovore (WFBC, 1; WOPC, 1); Catie, 600 m 16–20-V-1979, J. M. & B. A. Campbell (WOPC, 1); Turrialba, CATIE, 26–29-VI-1986, W. Hanson, G. Bohart (EMUS, 1); 23-VI-1996, F. Hovore (JNRC, 1); 27-II-1987 (WOPC, 1), 28–31-V-1987 (FSCA, 2), 9–14-IV-1988, E. Giesbert (WOPC, 1); 10 km N Pavones, 18-VI-1988, F. Hovore (WFBC, 1); 11–18 km N Pavones, 14-I-1989, F. Hovore (WOPC, 1); 26–27-XII-1989 (WFBC, 1; WOPC, 1); 1-XII-1995 (JNRC, 4; WOPC, 1); Turrialba, 610 m, IICA, 11-VII-1971, Ginter Ekiš (WOPC, 2; AMNH, 1; BMNH, 1); 3-VI-1973 (WOPC, 5; CASC, 1; SMTD, 1; USNM, 1); 6-VI-1986, Chemsak, Katsura, A. & M. Michelbacher (WFBC, 1; WOPC, 1); 800 m, F. Nevermann (USNM, 1); 2-VI-1951, D. L. Cartwright (USNM, 1); Alajuela: Sect. San Ramon de Dos Rios, 620 m, 20-II–3-III-1995, C. Lano (INBC, 2; WOPC, 1); Limon:

Revantazon, Hamburg Farm, 1-V-1929, "an wellem Laub", F. Nevermann (FMNH, 1; MCZC, 1); 15-I-36 (ZMHB, 1); San Jose University de Costa Rica, Athletic Fields, 4-XII-1995, beating dead branches, J. Rifkind (JNRC, 1); F. Nevermann (ZMAN, 1); 10-VI-23, F. Nevermann (USNM, 1); CATIE, 1-XII-1995 (JNRC, 4; WOPC, 1); CATIE, 1-XII-1995 (JNRC, 4; WOPC, 1); "Costa Rica", 1926, Paul Serre (MNHN, 1). Panama: Cocle: 5 km N El Cope Cont. Divide, 850 m, 17-VI-1991, Windsor & Stockwell (STRI, 1); El Velle, 800 m, 19-V-1991, R. Turnbow (RHTC, 1); 29-IV-1992, E. Giesbert (FSCA, 1; WOPC, 1); Colon: Fort Sherman, 9°17'N, 79°59'W, 16-IX-2001, on *Brosimum utile*, F. Ødegaard (NINA, 1); same locality except 14-IX-2001, on *Brosimum utile*, F. Ødegaard (WOPC, 1); same locality except 10-XII-2001, on *Brosimum utile*, F. Ødegaard (NINA, 1; MIUP, 1); same locality except 24-I-2002, on *Brosimum*, from dead branches in canopy (WOPC, 2); same locality except 17-IV-2002, in flowers of *Forsteronia myriantha* (NINA, 1); Panama: Cerro Campana, 645 m, 2-I-2002, beating roadside branches & bushes, W. Opitz (WOPC, 2); Cerro Campana, 850 m, 8°40'N 79°56'W, 31-VII-1974, Stockwell (WOPC, 2); 850 m, 10-VII-1982, H. P. Stockwell (STRI, 1); 1850 m, 8°40'N, 79°56'W; 1-VIII-1970, H. A. Heppenheide (CHAH, 1); 23-II-1975, D. Englemann (WOPC, 1); 820 m, 18-IV-1999, H. P. Stockwell, (STRI, 1); 625 m, 25-VI-1995, H. P. Stockwell (WOPC, 1); 20-I-1996, 609 m, F. T. Hovore (JNRC, 4); 823 m, 24-27-IV-1995, E. Giesbert (FSCA, 1); 31-VI-1987, on dead wood, F. T. Hovore (WFBC, 1); Altos de Cerro Campana, 17-18-V-1994, F. T. Hovore (WFBC, 1); 17-V-1999, Morris & Wappes (RFMC, 1); Cerro Azul/Jefe, 14-25-I-1993, F. Hovore (WFBC, 1); CerroAzul, Altus De Pacoras, 4-10-I-1994, J. E. Wappes (WOPC, 1); 8-14 km N El Llano, 11-13-V-1994, F. T. Hovore (WOPC, 1); Cocle: El Valle, 7-I-1994, J. E. Wappes (JEW, 1); Cerro Jefe, 6-I-1994 Korefs, J. E. Wappes (JEW, 1); Bocas del Toro: 11.7 km S Punta Pena, 21-II-1999, R. Turnbow (JPHC, 2); 40 km W Chiriqui Grande, 10-V-1999, Morris & Wappes (RFMC, 1). Ecuador: Pinchincha: Tinalandia, 16 km SE Sto. Domingo, 4-14-VI-1976, 500 m, S. & J. Peck (CMNC, 2;

CNCI, 1; WOPC, 1); 15 km E Sto. Domingo, Tinalandia, 23-26-II-1981, 700 m, H. F. Howden (CMNC, 1); Hotel Tinalandia, 12 km E of Santo Domingo de los Colorados, 15-IV-1985, Causen & Cervenka (UMSP, 1); 17 km E Sto. Domingo, 23-28-XII-1989 (FSCA, 2); vic. Tinalandia, 925 m, 12-VI-1997, E. Geisbert, F. Hovore (FSCA, 1).

DIAGNOSIS: The following combination of characteristics will distinguish the members of this species: Frontal, pronotal, epipleural, and metepisternal tufts (figs. 22-24) well developed; sutural tuft rudimentary.

DESCRIPTION: *Size:* Length 4.8-7.0 mm; width 2.0-2.8 mm. *Integument:* Black, antennal apex and tarsi piceous. *Vestiture:* Frontal tuft (fig. 24), pronotal tuft (fig. 23), epipleural (fig. 23), and metepisternal tuft (fig. 23) well developed; mesoscutellum vested with dense mat of white setae, sutural margin with few white setae; remainder of dorsum sparsely vested with erect dark setae; profemora and remainder of legs vested predominantly with white setae, anterior facies of protibia and apex of profemur vested with long black setae, tarsi vested with white setae, pterothorax and abdomen vested with white setae. *Head:* Genae and epicranium expanded, gena behind eyes wrinkled; interocular depressions and frontal umbo indistinct, region subrugose; frons, epicranium, and gena very finely and sparsely punctate; eyes subspherical, moderately convex; width across eyes nearly equal to width across pronotum (32:33); antenna (fig. 83) elongate, as long as pronotal length (42:42). *Thorax:* Pronotum elongate (33:42), disc coarsely punctate on anterior third, finely punctate in remainder, anterior transverse depression only faintly indicated at pronotal lateral margins, lateral margins feebly arcuate, elytra across humeri (33:42); elytra short and boldly convex (fig. 11), very finely punctated, with 10 rows of punctations, depth at humerus 14, greatest depth in posterior half 26; legs particularly prominent and elongated, metafemur extended beyond elytral apex. *Abdomen:* Posterior margin of pygidium evenly arcuate in both sexes. *Male genitalia:* As in figure 161. *Male internal reproductive organs* (figs. 187, 188): Two pairs of accessory glands, lateral pair short and coiled; medial gland broad, biramous (fig. 188). *Female*



Fig. 280. Middle America clerofauna (in black).

internal reproductive organs (fig. 189); spermathecal capsule cylindrical, truncate basally; spermathecal gland attached to base of spermathecal capsule.

NATURAL HISTORY: Specimens were collected in January–March, May–July, November, and December at altitudes ranging from 152 to 1800 m. Most of the beetles were taken in June and July. I collected 13 specimens by sweeping herbaceous hedge growth on a ravine summit adjacent to Rio Renvantazon, in Turrialba, Costa Rica. In association with these specimens, I collected 14 weevils of a *Myrmex* species that share a striking structural similarity with the clerids. The similarity is so profound that they are almost indistinguishable in dorsal view (compare figs. 163, 164). When observed alive, the two groups of beetles are readily set apart by differences in locomotion. The weevil's gait being sluggish when compared to the scurrying

movement of the clerids. Nevermann captured one specimen in flight in January near Limon, Costa Rica, and D. Englemann found one specimen by beating epiphytic vines of an *Arum* species. J. Rifkind and H. Lezama collected two specimens by beating fallen trees (*Brosium alicastrum*). One of these beetles was collected by Malaise trap and one on dead wood. D. R. Perry collected two specimens in a Malaise trap, "off ground in tree #1 *Coumarouna oleifera*". Frode Ødegaard collected two specimens by beating canopy vegetation of *Brosimum utile*. He captured an additional specimen on canopy flowers of *Forsteronia myriantha*.

VARIATION: The integument is towards piceous in some specimens. A specimen from Pincincha and one from Emeraldas, in Ecuador, are unusual in that all setae on the elytral disc are white.

DISTRIBUTION (map 17): The known range

extends from the highlands of Costa Rica southward to mountain regions of Panama and Ecuador.

ETYMOLOGY: The trivial name *myrmecoides* is a Latin compound adjective formed from *Myrmex* (a weevil genus name) and the suffix *-oides* (likeness). I refer to the similarity in body form between *Myrmex* weevils and members of this species.

Aphelocerus inbatus, new species

Figures 56, 212, 229, map 25

HOLOTYPE: Male. Costa Rica, Puntren., San Vito, Las Alturas, 1500 m, XII. 1991, Hanson & Godoy (MUCR). (Specimen point mounted, sex label affixed to paper point, white, machine printed; support card, white; locality label, white, machine printed; MUCR repository label; holotype label, red, machine printed; plastic vial with abdomen and aedeagus.)

PARATYPES: One specimen from the same locality as the holotype (WOPC, 1).

DIAGNOSIS: The absence of a distinct pair of setal tufts on the frons easily distinguishes these beetles from others of the *myrmecoides* species group.

DESCRIPTION: *Size*: Length 5.0–5.5 mm; width 3.3–3.6 mm. *Integument*: Black. *Vestiture*: Pronotal, metepisternal, and sutural tufts well developed; dorsum predominantly vested with dark setae; legs predominantly vested with pale setae. *Head*: Genae and epicranium expanded, gena behind eyes wrinkled; interocular depression and frontal umbo shallow; frons, epicranium, and gena very finely punctate; eyes subspherical, moderately convex; width across eyes equal to width across pronotum (41:41); antenna as in figs. 56, 229. *Thorax*: Pronotum elongate (41:45), considerably narrower than width of elytra across humeri (41:54), finely, sparsely punctate, side margin feebly arcuate, anterior transverse depression indistinct; elytra short, notably convex; elytral depth at humerus 20, greatest depth in posterior half 30; legs notably elongate, metafemur extended beyond elytral apex. *Abdomen*: Pygidium posterior margin evenly arcuate in both sexes. *Male genitalia*: As in figure 212.

VARIATION: The 11th antennomere varies in shape (compare figs. 56, 229).

NATURAL HISTORY: Specimens were collected during December at 1500 m.

DISTRIBUTION (map 25): Known only from the type locality.

ETYMOLOGY: The trivial name *inbatus* is a Latin compound adjective that stems from the prefix *-in* (without) and *batus* (bush). I refer to the absence of a well-defined setal tuft on the frons present in specimens of closely related species.

Aphelocerus eriodes, new species

Map 26

HOLOTYPE: Female. Ecuador, Pichincha, 17 km E Sto. Domingo, Dec. 23–28, 1989, E. Giesbert (FSCA). (Specimen pin mounted, sex label affixed to support card, white, machine printed; locality label, white, hand printed; FSCA repository label; holotype label, red, machine printed; plastic vial with abdomen and aedeagus.)

PARATYPES: None.

DIAGNOSIS: The dense distribution of dark decumbent 2° setae on the pronotal and elytral disc will distinguish the members of this species from other specimens of the *myrmecoides* species group.

DESCRIPTION: *Size*: Length 6.0 mm; width 2.3 mm. *Integument*: Black. *Vestiture*: Frontal, pronotal, epipleural, and metepisternal tufts well developed; pronotum and elytra, densely vested with decumbent dark setae, legs vested predominantly with white setae. *Head*: Genae and epicranium expanded; gena behind eyes distinctly wrinkled; interocular depression and frontal umbo shallow; frons, epicranium, and gena very finely and sparsely punctate; eyes subspherical, moderately convex; width across eyes feebly wider than width across pronotum (47:45). *Thorax*: Pronotum considerably narrower than width of elytra across humeri (45:60), finely, sparsely punctate, lateral margin subparallel, anterior transverse depression indistinct; elytra short and boldly convex, with very shallow longitudinal swellings; depth at humerus 25, greatest depth in posterior half 50; legs very prominent and elongate, metafemur extended beyond elytral apex. *Abdomen*: Pygidial posterior margin evenly arcuate.

VARIATION: One specimen examined.



Fig. 281. South America clerofauna (in black).

NATURAL HISTORY: The only available specimen was collected in December.

DISTRIBUTION (map 26): Known only from the type locality.

ETYMOLOGY: The specific epithet *eriodes* (like wool) is a Greek adjective used to call attention to the dense vestiture on the pronotum and elytral disc.

Aphelocerus discapillus, new species

Figures 191, 264; map 25

HOLOTYPE: Male. PANAMA, Colon Pr. Fort Sherman, 9°17'N, 79°59'W, 11 May 2002, leg. F. Ødegaard, on *Nectandra purpurascens* (NINA). (Specimen point mounted, sex label affixed to paper point, white, machine printed; support card, white; locality label, white, machine printed; NINA repository label, white, machine printed; holotype label, red, machine printed; plastic vial with aedeagus and abdomen.)

PARATYPES: Eleven paratypes from the same locality as the holotype; 1-VI-2001, *Brosimum utile*, F. Ødegaard (WOPC, 1); 25-IX-2001, on *Maranthes panamense*, F. Ødegaard (NINA, 1); 11-XII-2001, *Calophyllum longifolium*, F. Ødegaard (NINA, 1); 28-XII-2001, on *Maranthes panamense*, F. Ødegaard (NINA, 1; WOPC, 4); 3-I-2002, *Maranthes panamense*, F. Ødegaard (NINA, 1; WOPC, 1); 12-I-2002, on *Inga coccleensis*, F. Ødegaard (WOPC, 1).

DIAGNOSIS: These beetles are easily distinguished from those of *A. myrmecoides*, n.sp., the most probable sister species, by the absence of a white setal tuft on the lower sides of their pronotum. Further, the frontal setal tuft is clearly well developed in *A. myrmecoides*, n.sp. (fig. 24), but only faintly indicated in specimens of *A. discapillus*, n.sp.

DESCRIPTION: *Size*: Length 5.5–6.0 mm; width 1.8–2.0 mm. *Integument*: Black. *Vestiture*: Lateral aspects of frons vested with white setal tuft (as in fig. 24); leg vestiture predominantly black, but longer black setae sparsely distributed along anterior margin of tibiae; metepisternal tuft (as in *A. myrmecoides*, n.sp., fig. 23); sutural tuft well developed (as in *A. myrmecoides*, n.sp., fig. 22); elytral humeral region, epipleural margin, and side region of elytral disc moderately vested with white setae, remainder of elytral

disc vested with 1° and 2° dark setae (see fig. 259 for *A. leucomelas* [Chevrolat]). *Head*: Genae and epicranium expanded; interocular depression and frontal umbo prominent; frons, epicranium, and gena very finely punctated; eyes spherical, moderately convex; width across eyes slightly narrower than width across pronotum (38:36); antenna elongated, nearly as long as length of pronotum (48:50). *Thorax*: Pronotum longer than wide (40:47), very finely punctated, anterior transverse depression poorly defined, side margins feebly arcuate, considerably narrower than width across humeri (38:45); elytra boldly convex, disc polished, with nine serial rows of punctations, erect and decumbent setae serially arranged, apical slope acute, depth at humerus 15, greatest depth in posterior half 26; metafemora not extended beyond elytral apex. *Abdomen*: Posterior margin of male and female pygidium evenly arcuate. *Male genitalia*: As in figure 264; parameral apices somewhat unciform.

VARIATION: The available specimens are quite homogeneous.

NATURAL HISTORY: Frode Ødegaard collected the type series as part of his research involving canopy insects. The holotype was collected on flowers of *Nectandra purpurascens*. Other specimens were captured by beating canopy vegetation of *Maranthes panamense*, *Calophyllum longifolium*, *Brosimum utile*, *Inga coccleensis*, and *Nectandra purpurascens*.

DISTRIBUTION (map 25): Known only from the type locality.

ETYMOLOGY: The specific epithet is a compound name that stems from the Latin prefix *-dis* (without) and the Latin *capillus* (hair). I refer to the absence of the pronotal tuft in the members of this species.

EVOLUTIONARY CONSIDERATIONS

For most of this study, I could not postulate with confidence the monophyly of *Aphelocerus* nor could I identify the genus with any particular sister lineage. No synapomorphic characteristic among the species had been found during the descriptive phase of the work. I did have some suspicion that the black coloration of the integument, in combination with an assortment of arrange-

ments of short silvery setae, might be of some assistance in this regard. Near the end of the revision, however, and while filling a few moments with identification work, to my great delight and quite by accident, I discovered a very obscure trich (fig. 257) near the elytral apex of these beetles. I had found what eluded me for more than 10 years of research, a suprageneric-level synapomorphy, involving *Aphelocerus* and several New World clerine genera. I think most cleridologists would agree that I had found the proverbial phylogenetic needle in the checkered beetle haystack. It is just that difficult to find suprageneric synapomorphies within the Cleridae.

A sister taxon of *Aphelocerus* had also been very elusive. This, despite an extensive outgroups survey of taxa of the subfamily Clerinae and particularly those of the members of the New World *Enoclerus*. It has always been my impression that systematists carry a "perfectionistic gene" and very reluctantly publish systematic papers with overly loose ends in statements of kinships. I felt that way after completing the character matrix for the phylogenetic analysis. The lack of "rooting" to a relative, after more than a decade of work, made the whole work seem incomplete. Then, in the final preparation of the manuscript, my good friend and colleague Lee Herman suggested that I might check once more for a sister group, which if found, would facilitate his assistance with operation of the Hennig 86 program. Having done this sort of tedious search several times before I hesitated at the suggestion, but did so and within five minutes found the elusive sister group. I found an elytral trich among most members of the New World clerine genera with well-developed tarsal denticles; for example, such genera as *Placopterus*, *Caestron*, and *Enoclerus*.

CHARACTERS SELECTED FOR PHYLOGENETIC ANALYSIS

Thirty-eight adult characters of *Aphelocerus* Kirsch and the outgroup genera *Placopterus*, *Caestron*, *Perilypus*, *Colyphus*, *Sallea*, *Blaxima*, *Phonius*, and *Systemoderes* were used in the species-group analysis. All of the outgroup genera involve New World clerine

genera that I consider to be the most closely related taxa of *Aphelocerus*. Character states designated as "0" are considered plesiomorphic whereas those given a value from "1" to "6" (in the case of transformation series) are judged apomorphic.

- Character 0. Integumental color: (0) not black; (1) black.
- Character 1. Body size: (0) about 4.0 mm; (1) about 10 mm.
- Character 2. Elytral trich (fig. 257): (0) absent; (1) present.
- Character 3. Elytral sutural tuft (fig. 22): (0) absent; (1) present.
- Character 4. Elytral 2° setae (fig. 259): (0) present; (1) absent.
- Character 5. Color of elytral 2° setae: (0) black; (1) white.
- Character 6. Asetiferous punctations (fig. 259): (0) present; (1) absent.
- Character 7. Elytral 2° degree setae: (0) uniformly distributed on elytral disc; (1) not uniformly distributed on elytral disc; (2) some form of consolidation; (3) lost; (4) consolidated into longitudinal streak (fig. 27); (5) consolidated into incipient midelytral tuft (fig. 235); (6) consolidated into distinct midelytral setal tuft (fig. 1).
- Character 8. Elytral surface texture: (0) not scabrous; (1) scabrous.
- Character 9. Consolidation of 2°: (0) not into tuft; (1) into long tufts; (2) into two short tufts.
- Character 10. Elytral base: (0) not microsculptured; (1) microsculptured.
- Character 11. Length of 1° setae: (0) normal length; (1) very short.
- Character 12. Pronotal microsculpture: (0) absent; (1) present.
- Character 13. Size of posterior patch of elytral setal tuft: (0) not reduced; (1) reduced.
- Character 14. Length of tegmen: (0) moderate length; (1) very long.
- Character 15. Shape of pronotum: (0) subquadrate; (1) not subquadrate; (2) campaniform; (3) notably elongate.
- Character 16. Elytral depth: (0) moderate; (1) deep.
- Character 17. Color of antennal apex: (0) piceous; (1) testaceous.
- Character 18. Distribution of 1° setae: (0) not seriate; (1) seriate.
- Character 19. Elytral disc: (0) not shallowly carinate; (1) shallowly carinate.
- Character 20. Antennal length: (0) moderate; (1) notably long.
- Character 21. Length of legs: (0) moderate; (1) notably long.



Fig. 282. Mexo-America clerofauna (in black).

Fig. 283. Central America clerofauna (in black).

- Character 22. Phallic plates: (0) not denticulate; (1) denticulate.
- Character 23. Epipleural margin: (0) moderately setose; (1) densely setose.
- Character 24. Parameral shape: (0) not digitiform; (1) digitiform.
- Character 25. Pronotal tuft: (0) absent; (1) present.
- Character 26. Frontal tuft: (0) absent; (1) present.
- Character 27. Mimetic associations: (0) not with *Myrmex* weevils; (1) with *Myrmex* weevils.
- Character 28. Pronotal surface texture: (0) not transversely wrinkled; (1) transversely wrinkled.
- Character 29. Length of abdomen: (0) moderate length; (1) notably shortened.
- Character 30. Sclerotization of tegmen: (0) complete; (1) incomplete.
- Character 31. Profemur: (0) moderately swollen; (1) strongly swollen.
- Character 32. Shape of pronotal proper: (0) not globose; (1) globose.
- Character 33. Parameral spine: (0) absent; (1) present.
- Character 34. Second degree setae: (0) abundant; (1) sparse.
- Character 35. Second degree setae: (0) not consolidated into rows; (1) consolidated into rows.
- Character 36. Second degree setal tuft: (0) not comprised of middiscal transverse tuft; (1) comprised of middiscal transverse tuft.
- Character 37. First degree setae: (0) robust and moderate in numbers; (1) robust and extraordinarily high in numbers.

PHYLOGENETIC ANALYSIS

A character matrix was coded for the 15 species-group taxa (the outgroup involves representative species of more than eight generic taxa) listed in table 1 and encoded into Hennig 86. The analysis yielded one phylogenetic tree (fig. 278) with a length index of 32, consistency index of 84, and retention index of 85.

PHYLOGENETIC SCENARIO FOR THE EVOLUTION OF APHELOCERUS AND ITS SPECIES GROUPS

It is hypothesized that ancestral *Aphelocerus* diverged on the land mass comprised of the ancient Mexican/Mayan blocks, that is, somewhere after the major Tertiary tectonic events. An earlier evolution of the genus is not supported by features of the external or internal morphology, or by any other line of evidence, in that an earlier Tertiary origin for *Aphelocerus* would likely have

generated substantially more structural divergence than is presently known. Moreover, had aphelocerans been part of the great Tertiary tectonic events, the vicariant divisions and geographic shifts of the ancestral apheloceran populations would have provided tremendous evolutionary inertia, as has been demonstrated for other forms of life that "went along for the ride" during ancient Caribbean plate tectonics (Rosen, 1974, 1976; Pregill, 1981; Hallam, 1981).

The extent of generic memberships of the outgroup (fig. 278), based on the presence of the elytral trich, has not been fully established. However, it is clear that during the evolutionary ascension from ancestral species A towards ancestral *Aphelocerus* (ancestral species B), the elytral trich was retained. During this ascent, the ancestors of extant aphelocerans also evolved such novel characteristics as development of a clearly defined sutural tuft, and among most species, the consolidation of 2° setae into some sort of elytral tuft most prominently visible in the *acanthus* species group.

During the early evolution of apheloceran ancestor B, two major assemblages diverged. One of these ultimately evolved descendants characterized by aggregates of white 2° seta on the elytra. In the second lineage of this initial divergence of the apheloceran progenitor, and beginning with ancestor D, the elytra were transformed towards a more rotund configuration. It is suggested that this evolution, featured by a more compact, shorter, and more convex body form, represents a progression towards a mimetic life style involving spiders, ants, and *Myrmex* weevils. A gradual transition of convexity may be seen when one compares members of the *panus* species group with members of the *scutellaris-myrmecoides* lineages. Among these extant species groups one can clearly see the anatomical perfection towards ants as exhibited by members of the *formicoides* species group that is hypothesized to be an offshoot of ancestral species L.

Ancestral species L also generated a line whose body morphology became more compact and whose general fascies proceeded towards a resemblance to leaf-inhabiting jumping spiders and weevils. The sister group relationship between the *scutellaris* species

group and the *myrmecoides* species group is strongly supported by such conspicuous synapomorphies as digitiform parameres, presence of frontal and pronotal setal tufts, and a very strong evolution towards mimicry. In time, ancestral species M diverged to produce the *scutellaris*-*myrmecoides* species groups, any member of which converged towards the body plan of jumping spiders and/or *Myrmex* weevils (compare figs. 163 and 164).

From the progenitor of *Aphelocerus* (ancestral species B) there apparently evolved a stem species (ancestral species C) that retained the plesiomorphic, more flattened elytral structural plan characteristic of the majority of the species in the genus. The divergence of ancestral species C evolved into a line in which the elytral surface became scabrous. It is hypothesized that eventually this line evolved into ancestral species E that, in turn, diverged to produce ancestral species G and H.

Ancestral species G generated the sister species groups *coalitus* and *echinatus*, both characterized by their retention of asetiferous punctations. Ancestral species H produced the *ciliaris*-*bispineus* lineage in which the 2° elytral setae demonstrate a trend towards consolidation. White 2° setal aggregates towards development of an elytral patch becomes progressively more prominent as one proceeds towards the *irroratus*-*yungas* species-group members.

In summary, there are three major evolutionary trends among the extant species of *Aphelocerus*. The first, and most conspicuous, involves the progressive increase of elytral convexity as we proceed from the *panus* species group and end with the *scutellaris* species group. The second trend involves the development of 2° setae on the elytra as is seen from the *coalitus* species group to the *bispineus* species group. Lastly, there is a progressive consolidation of 2° setae into setal patches on the elytra, which reaches its most complex development among the *acanthus* species-group specimens. Then, there is a curious characteristic reversal; one hypothesizes a reduction of the posterior patch of the 2° elytral setal tuft. This reversal is most clearly evidenced in the *batesi* species group.

ZOOGEOGRAPHIC CONSIDERATIONS

Many outstanding advances have been made in biogeography from the pioneering Darwinian concept of center of origin and dispersal. The panbiographer Croizat (1964) advanced the idea that contemporary macrobiotic distributions may be placed into historical context by the establishment of faunal tracks, tracks that faunistically unite intercontinentally and thus potentially foretell, or suggest, patterns of historical distributions of species ancestral to the extant species under study. Faunal tracks are established by plotting corroborative distributional linearities of distantly related faunas and floras.

Rosen (1978: 160) refined Croizat's concepts into a methodology called vicariance biogeography whereby tectonic events are acknowledged to fragment ancestral biotas into geographical separation. Subsequently, these now separated biotal fragments may or may not respond evolutionarily following the vicariant event. If evolutionary inertia does take place, that is, if through natural selection, or through any other process involved with speciation, the biota fragmentation evolves novelties, and possibly obscure ancient synapomorphies, then the kinship relationship may well be inferred with usage of the vicariance biogeographical model. In essence, the vicariance concept involves the fragmentation of ancestral faunas towards an insular existence of the resultant vicariants.

With a focus on Mexico and Central America, Halffter (1987) suggested that the extant insect distributions of the Mexico-America (as defined by fig. 282) and Nuclear Central American (as defined by fig. 284) faunas are explainable via transitional zoning. Halffter's biographic concept considers temperate and tropical montane habitats the primary basis for northern and southern encroachments of insect biotas into the aforementioned landmasses. More recently, Lieberr (1991a) applied cladistic biographical methods to derive general area cladograms for the montane areas of Mexico on the basis of cladistic analyses of the carabid genera *Elipiptoleus* and *Calathus*.

Despite these important advances in biogeography, I am compelled to reiterate an earlier thought about the use of biogeograph-

ic methods: "Irrespective of biotic or taxonomic level, it is the nature of the available data that usually determines the approach to historical zoogeography" (Egis, 1977: 126), particularly among systematic entomologists who often struggle with a paucity of distributional records.

Lastly, cladistic biogeography suggests that distributions of extant taxa reflect results of physiogeographically based historical vicariances. This concept of biogeography is more likely to be supported by ancestral or more primitive extant taxa simply because there has been more time to evolve phylogenetically useful characteristics that can support or refute biogeographical hypotheses. In many instances, however, the cladistic biogeographical model is difficult to apply when one deals with species-level faunas that have undergone, or are undergoing, rapid evolution in relatively recent geologic history. In such cases, there has not been sufficient time for establishment of synapomorphic diversity upon which to base hypotheses of evolution or historical biogeography.

GEOPHYSICAL ORISMOMOLOGY

In biogeographical analyses it is important to define geophysical parameters. How one partitions the research terrain is often dependent on the vagility of the organism under consideration, the extent of ecological specialization of the species, the geographical extent to which the research animal has been collected, and the extent of the motivation of the investigator to provide extant/historical explanations of current distributional patterns. In the recent decades, there has been a flurry of important discussions relevant to the geophysical properties of Middle America (Malfait and Dinkman, 1972; Keigwin, 1982; Coney, 1982; Burke, et al., 1984; Weyl, 1966; and Donnelly, 1988). Moreover, in *Systematic Entomology*, the works of George Ball (e.g., 1978) and his students (Erwin, 1970; Whitehead, 1972; and Noonan, 1973), and Liebherr (1988, 1991, 1991a, 1992, and 1994) have greatly advanced our thinking about Middle American insect biogeography.

The above mentioned works, and others, have been important resources for my

thoughts about Middle American checkered beetle biogeography. Checkered beetles are a particularly difficult group to analyse biogeographically because of the difficulties associated with their collection. They are rarely collected in great numbers, as a group are comprehensively involved in mimicry (Mawdsley, 1994), and are few in numbers per locality, and are sometimes associated with floral periodicity (Opitz, 2002: 241). However, I can state with confidence that most of the Middle American checkered beetle fauna is found most abundantly in mid-altitude highlands, usually at about 1000 m. The prominent association of checkered beetles with temperate and tropical montane regions, in combination with some recent information about Middle American tectonics and historical orogeny, suggests, at least for checkered beetle biogeography, a subdivision of the New World into seven major divisions. These divisions although generally aligned with political boundaries are established to focus more on the major mountain ranges from which checkered beetles have been collected in abundance.

North America (fig. 279): The northern continental landmass south to the political boundary with Mexico and corresponding roughly with the diminution of the more southern ridges of the Rocky Mountains.

Middle America (fig. 280): The landmass extending southeast from the United States to the southeastern highlands of the Cordillera de San Blas of Panama.

South America (fig. 281): The southern continental landmass extending east and south from Panama and more or less in its westernmost region, corresponding to the distribution of the Colombian–Venezuelan Andes to the southern foothills of the Chilean Andes.

Mexo-America (fig. 282): The terrain south of the United States and approximately compatible with three great mountain chains, the Sierra Madre Occidental, the western component of the Transvolcanic Sierra, and to the southern foothills of the Sierra Madre del Sur. This subdivision ends at the southernmost limit of the isthmus of Tehuantepec and geologically consists of the Mesozoic Mexican Block (Donnelly, 1988: 17).

Central America (fig. 283): The landmass

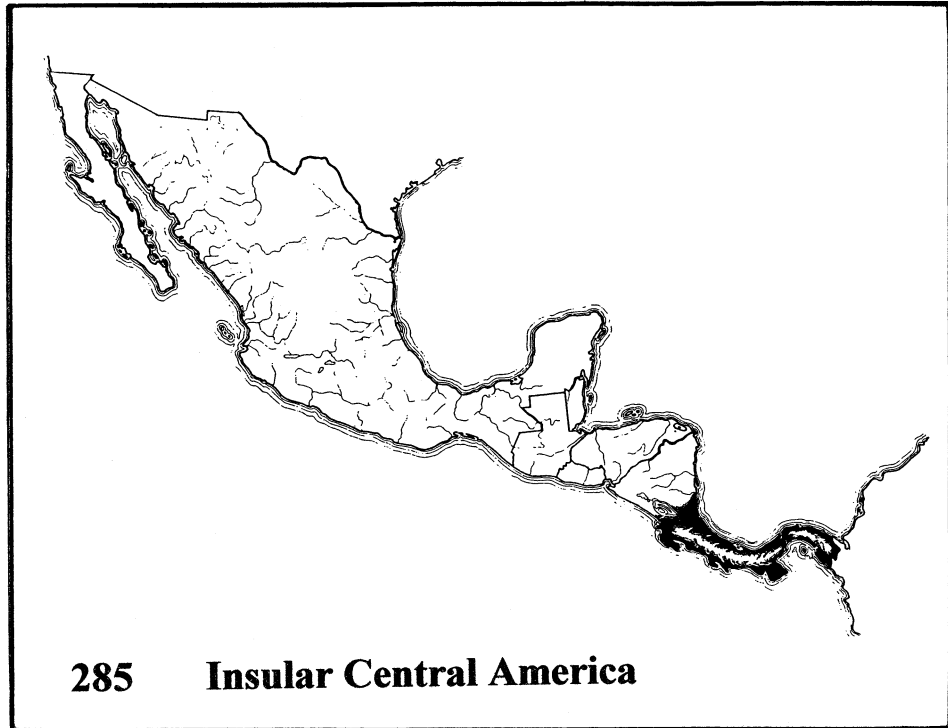
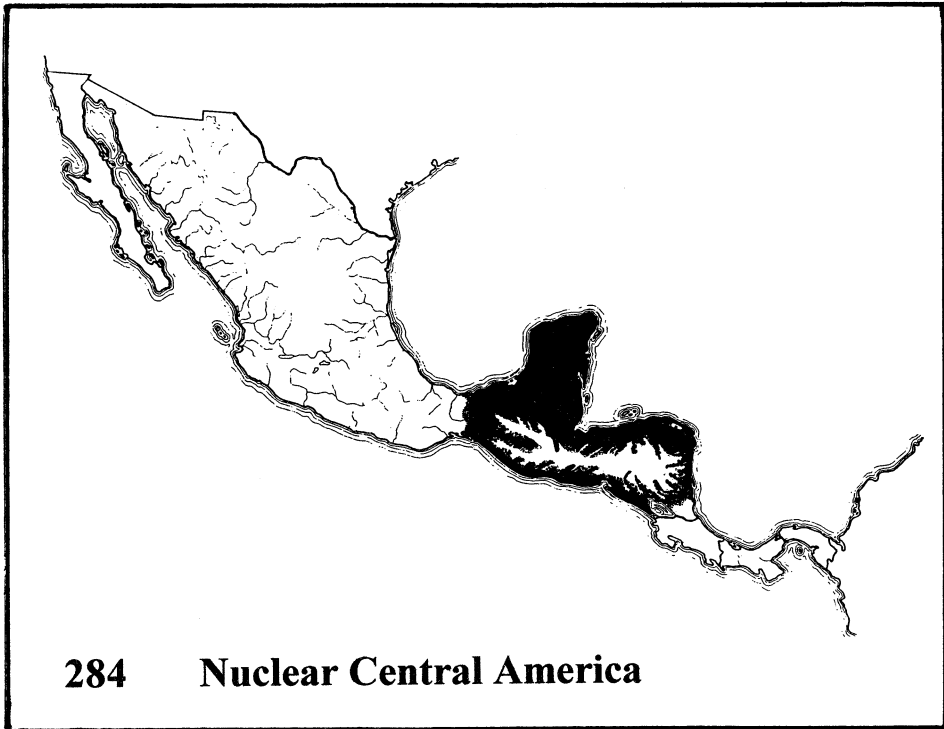


Fig. 284. Nuclear Central America clerofauna (in black).

Fig. 285. Insular Central America clerofauna (in black).

east of the Isthmus of Tehuantepec, then extending eastward and southward to the border of Colombia. The terrain includes the Talamancan range of Costa Rica and Panama and the Cordillera of San Blas in eastern Panama. The northern half of this landmass remained above sea level throughout the Cenozoic, whereas the southern half was submerged throughout the majority of the Tertiary (Savage: 1982: 465).

Nuclear Central America (fig. 284): The portion of Central America extending from the Isthmus of Tehuantepec southeastward to the highlands of eastern Nicaragua. In essence, this terrain roughly corresponds to what has been called the Chiapas Complex (Ball and Shpeley, 2000), and involves the pre-Mezozoic Mayan and Choris Blocks. Although there was considerable tectonic rearrangement of these crustal areas during the development of the Caribbean portal, convention has it that they were connected to the Mexican Block and consistently above sea level during the Tertiary. It is believed that the Choris Block connected to the Mayan Block at the end of the Cretaceous and tectonically acquired its present position at about 30 million years ago (Donnelly, 1988: 21).

Insular Central America (fig. 285): The southern portion of Central America located between southern Nicaragua and Colombia and involving the Costa Rican- Panamanian highlands of Sierra Talamanca and the Panamanian Cordillera San Blas. It is widely known that this terrain was submerged during the greater part of the Tertiary and formed the Pacific and Atlantic portal. The closure of this portal began some 25 million years ago (Keigwin, 1982; Donnelly, 1988), and allowed interchanges of flora and fauna between North America, Mexo-America, Nuclear Central America, and South America.

As a group, the aphelocerofauna is in a rapid state of evolution, as the general anatomical coherence within the group suggests. The species members of the *batesi* and *yungas* species groups are particularly similar in general anatomy. It is unlikely that their present distributions can be linked to Tertiary orogenic and/or tectonic events. In the genus, there are an outstanding number of cryptic

species. In particular, there are a variety of cryptic species within the *batesi* species group whose members exhibit the most extensive geographic distribution within the genus. Cryptic species are common in other apheloceran species groups as well. Therefore, it is unlikely that the present distributions of the more recent apheloceran species groups can be linked to tertiary orogenic and/or tectonic events. Moreover, of the 66 species presently recognized, fully 54 are confined to single mountain complexes (see figs. 286, 287). When one deals with such recent faunas, area cladograms based on historical geologic events must give way to models implementing biographical methods of dispersal and transitional zoning.

The limited range of many of the species suggests that *Aphelocerus* is undergoing rapid evolution, principally in isolation, in montane Middle American (fig. 286) and montane northern South America (fig. 287) highland complexes. In my view, this suggests that the ancestral apheloceran divergences occurred after the principal Tertiary tectonic events. Therefore, in an attempt to present some beginnings of a biogeographical analysis of this genus, I will implement the "transitional zone" method as defined by Marshall and Lieberr (2000) and proposed by Halffter (1987).

However, when dealing with the ancestors of *Aphelocerus*, in connection with the distribution of extant taxa closely related to that genus, some preliminary historical biogeographical comments might be worthy of discussion. Distributional evidence suggests that ancestral *Aphelocerus* evolved on an ancient Middle American terrain, probably on what is commonly referred to as the Mexican and Mayan Blocks. These were prehistoric crustal areas that fused tectonically to the northern continent as far back as Albanian time, some 100 million years ago (Donnelly, 1988: 19). These blocks must have been exceptionally fertile grounds for some clerine lineages as today regions that correspond to these ancient land masses harbor a variety of monotypic taxa that undoubtedly represent survivors of a much more diverse Tertiary fauna.

Perhaps, many of these ancestral kindreds of *Aphelocera*, which led to such older groups as *Blaxina* and *Sallea*, succumbed to

the Yucatanian Bolide impact thought to have occurred at the end of the Cretaceous (Alvarez and Asaro, 1990). Having survived the Bolide impact, ancestral aphelocerans, and those of the lesser speciose cousins, apparently proved more adaptable to the incipient habitats that persisted following the Bolide impact. Aphelocerans probably flourished during the post Bolide impact periods, as did such genera as *Colyphus*, *Perilypus*, and *Placopterus*. These genera, along with the very speciose *Enoclerus*, proceeded to proliferate into available niches on the more favorable southern habitats. Such habitats would have been provided by tectonic events such as the addition of the Chortin Block to the Mayan Block thereby increasing the area of more tropical environs and completing the development of what has come to be known as Nuclear Central America.

In time, there would have been the closing of the Panamanian portal, allowing a southern apheloceran dispersal that proliferated a number of species across species group lines, and generated such derived groups as the autochthonous *sculptillus* and *myrmecoides* species groups. It is difficult to add credible biological comments about the South American aphelocerofauna. On the basis of what is known, it seems that this fauna stems from multiple southern extensions of Middle American elements. What can be stated with confidence, however, is that these tentative statements about *Aphelocerus* biogeography will have to be reevaluated when the South American aphelocerofauna is more thoroughly known. I believe that there are vastly greater number of apheloceran species in South America than have heretofore been discovered.

GRUPOS DE ESPECIES DE *APHELOCERUS*

Las especies de *Aphelocerus* pueden separarse en 15 grupos basados en presencia o ausencia de puntuaciones asetíferas elitrales (fig. 259), distribución de setas elitrales secundarias (fig. 260), textura de la superficie elitral, desarrollo del mechón setal mesodiscal elitral, la magnitud de desarrollo de la gena y epicráneo, la micro escultura del pronoto, la micro escultura de la base de los

élitros, la longitud del pronoto, la macro escultura del disco pronotal, la presencia de un mechón de setas frontal, la prominencia de las patas, el grado de convexidad del élitro, y la forma de los parámetros.

grupo *coalitus*

Los miembros de este grupo de especies son Cléridos relativamente grandes (6.0–10.0 mm) con patrón de pubescencia diferente del modelo típico como visto en el “frontis-piece”. En estos coleópteros, hay una mezcla de setas pálidas y oscuras en el disco elitral. Las setas pálidas pueden o no organizarse en líneas estrechas o en parches oblicuos. La presencia de puntuaciones asetíferas, particularmente prominente en las regiones post-humerales, es una característica apomórfica para este grupo de especies. Más allá, las setas elitrales secundarias no se concentran en los mechones transversos a la mitad del élitro. La distribución conocida de este grupo se extiende de las regiones montañosas de Oaxaca en México a las elevaciones bajas del centro de Costa Rica.

grupo *echinatus*

Los subápices de los parámetros presentan una espina aguda (fig. 125). Las dos especies de este grupo habitan el sur de México, una en las regiones montañosas de Chiapas, y la otra en la península de Yucatán.

grupo *ciliaris*

La declinación de las setas elitrales secundarias empiezan a cambiar de dirección a la mitad del disco elitral, dirigidas oblicuamente hacia el margen epipleural. Anterior a esto la agregación “incipiente” de setas, las setas secundarias se dirigen hacia el frente; hacia atrás, detrás del agregado. Los miembros de este grupo de especie sólo se han encontrado en el sur de México.

grupo *bispineus*

Este grupo comprende cuatro especies cuyos genitalia masculinos muestran un desarrollo muy único de los márgenes posteriores de los parámetros. Los parámetros son predominantemente truncados con excepción de su margen más mesal dónde sobresalen estrecha-

mente para formar una protrusión papilosa pequeña (fig. 193). Como en los miembros del grupo de especies ciliaris, algunos especímenes del grupo bispineus, particularmente los de *A. acuticollis*, especie nueva, y *A. bispineus*, especie nueva., la agregación de setas mediodiscales (fig. 235) sugiere una transición evolutiva hacia un distinto mechón de setas mediodiscal elitral como visto en el “*frontispiece*”. Los miembros de este grupo de especie sólo se conocen del sur de México.

grupo *acanthus*

Estos coleópteros se caracterizan por el desarrollo extenso del mechón de setas mediodiscal de los élitros. El mechón de setas alcanza su desarrollo más grande en los miembros de este grupo; se extiende del margen sutural al margen epipleural (fig. 38). Colectivamente, los miembros de este grupo tienen una distribución que va del sur de México hasta Argentina.

grupo *sculptilus*

Estos Cléridos de pequeño tamaño son fácilmente distinguidos de los miembros de los otros grupos de especie por la micro escultura fina en el disco pronotal, carácter que es synapomórfico para el grupo. El rango de este grupo se extiende de la vertiente occidental de Costa Rica a las regiones montañosas de Chiriquí en Panamá.

grupo *irroratus*

Éste es un grupo monotípico cuyo miembro tiene una micro escultura areniscosa en la base del disco, anterior al mechón de setas mediodiscal (fig. 34). También, los márgenes epipleurales y humerales del élitro son densamente cubiertos de setas blancas cortas. Los especímenes han sido colectados de Chiapas, México hasta las regiones montañosas occidentales de Guatemala.

grupo *immarginatus*

Este grupo de especie monotípico incluye especímenes cuyo “umbo” humeral es muy prominente, los élitros están visiblemente deprimidos detrás del “umbo” con el mechón de setas mediodiscal puesto en la depresión, y los dos tercios posteriores del disco elitral

fuertemente convexo (fig. 40). Los especímenes de *A. immarginatus* (Chevrolat) sólo se conocen de las regiones montañosas de Colombia.

grupo *yungas*

Los miembros de este grupo de especies muestran un desarrollo del mechón de setas mediodiscal elitral transitorio hacia su desarrollo más alto visto en los especímenes del grupo de especies *acanthus*. El mechón comprende dos parches de setas secundarias blancas. En la mayoría de los casos las setas del parche anterior se dirigen anteriormente mientras aquéllas del parche posterior se dirigen lateralmente o posterolateralmente (fig. 182). La distribución geográfica de este grupo de especies se extiende de México a Bolivia.

grupo *batesi*

Esto es el grupo más numero del género. En los miembros de este grupo el parche posterior se reduce a unas setas o está ausente. Cuando el parche posterior está ausente, las setas del parche anterior están dirigidas todas en la misma dirección. La distribución conjunta de las especies de este grupo se extiende de México a Ecuador.

grupo *panus*

El pronoto campaniforme y las antenas evidentemente delgadas son características apomórficas de los miembros de este grupo de especies. Su distribución geográfica se extiende de Costa Rica a Brasil.

grupo *formicoides*

Este grupo comprende dos especies cuyos miembros, más que cualquier otro apheloceranos, tienen la apariencia de hormigas. Su pronoto es particularmente globoso, los élitros son cortos y muy convexos (fig. 45), y como en el caso de los miembros de los grupos *cheliferous* y *myrmecoides*, el disco elitral es levemente carinado longitudinalmente. Las especies tiene distribución desde el sur de México a Panamá occidental.

grupo *cheliferous*

Éstos coleópteros de cuerpo robusto tienen carinas longitudinales elevadas en el disco

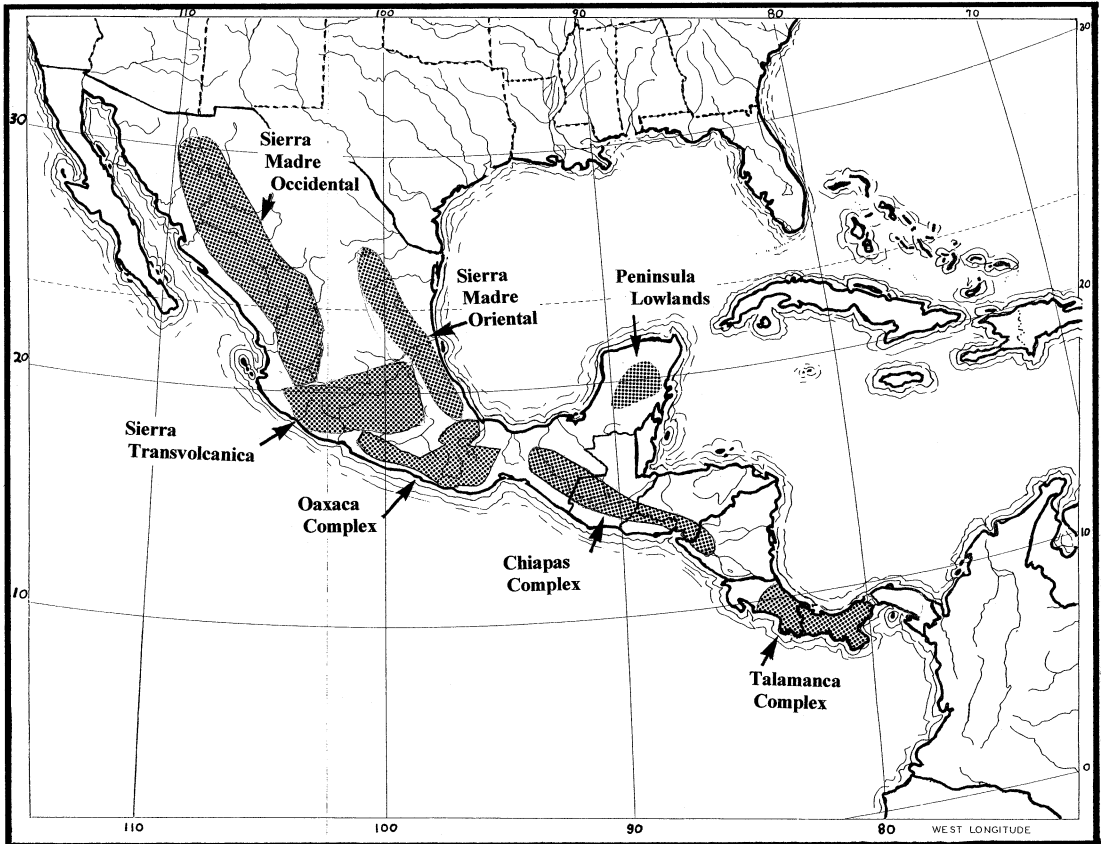


Fig. 286. Major aphelocerofauna regions in Middle America.

elital. El color testáceo del ápice de la antena es particularmente notable en estos coleópteros. Su distribución va desde el sureste de México al este de Guatemala.

grupo *scutellaris*

En los especímenes de este grupo de especies la región posterior del disco pronotal está transversalmente arrugada y los parámetros son distintamente digitiformes. La última característica también está presente en el grupo de especies *myrmecoides*. Estos coleópteros son particularmente robustos, teniendo un tamaño de aproximadamente 5.0 a 8.0 mm. Estos Cléridos tienen distribución del sureste de México hasta Brasil.

grupo *myrmecoides*

Los especímenes de este grupo de especies tienen un abdomen que es proporcionalmente

muy corto. Ellos comparten algunas características con las especies de los grupos *formicoides* y *cheliferous*; por ejemplo, el disco elital muestra las hinchazones longitudinales muy poco profundas, los élitros están desprovistos de mechones de setas y están excepcionalmente pulidos, y las piernas son visiblemente alargadas con el fémur extendiéndose más allá del ápice elital. El mechón pronotal (en los lados más bajos del pronoto) es muy desarrollado en estos Cléridos. Su distribución geográfica se extiende de Costa Rica a Ecuador.

PASOS PROBLEMATICOS EN LA CLAVE DE ESPECIES

Paso 6(2): En esta paso es indispensable distinguir entre un mechón de setas meso-elital como se figura en el "frontispiece" y un agregado rectangular suelto de setas pálidas como se encuentra en figura 235.

Paso 30(28'): El lustre azulado en el pronoto varía un poco en la intensidad. Es mejor ver el pronoto inclinado ligeramente al frente.

Paso 38: Un mechón de setas mesodiscal se define como teniendo dos parches cuando por lo menos algunas de las setas posteriores del mechón se orientan hacia atrás.

CLAVE DE LOS GRUPOS DE ESPECIE Y DE LAS ESPECIES

1. Elitro aplanado en los dos-tercios basales cuando se ve de lado (fig. 28), inclinación apical del élitro casi siempre gradual (fig. 9), si es un poco aguda entonces existe un mechón de setas mediodiscal (como presentado en el "frontispiece"); el disco elitral a pesar de ser brillante, no es particularmente liso o pulido entre las puntuaciones setíferas muy visibles; la puntuación setífera nunca seriada 2
- 1'. Elitro levemente convexo cuando se ve de lado (fig. 11), inclinación apical del élitro siempre aguda (figs. 10, 11); disco elitral muy brillante y liso entre las puntuaciones setíferas, puntuación setífera diminuta y casi siempre seriada 51
- 2(1). Disco elitral con puntuaciones asetíferas distintas (fig. 259), particularmente evidente detrás los ángulos humerales; la longitud del cuerpo de aproximadamente 6.0 mm a 10.0 mm 3
- 2'. Disco elitral sin puntuaciones asetíferas distintas, raramente con algunas indentaciones diminutas discretas; la longitud del cuerpo de aproximadamente 4.0 mm a 8.0 mm, generalmente alrededor de 5 mm 6
- 3(2). Margen sutural del élitro con setas blancas robustas; la longitud del cuerpo es de aproximadamente 9 mm (grupo *coalitus*) 4
- 3'. Margen sutural del élitro sin setas blancas robustas; la longitud del cuerpo es de aproximadamente 6 mm (grupo *echinatus*) 5
- 4(3). Lados bajos del pronoto vestidos con mechón de setas blancas (fig. 23), setas del disco pronotal negras; disco elitral con o sin rayas lineales de setas blancas (fig. 29) (México: San Luis Potosí; Sinaloa; Oaxaca; Colima; Jalisco; Chiapas; Quintana Roo. Guatemala: El Progreso; Baja Vera Paz; Zacapa; Belice. Honduras: Comayagua; Copan; La Paz; Cortés. Costa Rica: Cartago; Guanacaste)
 . . . *Aphelocerus leucomelas* (Chevrolat)
- 4'. Lados bajos del pronoto no vestidos con mechón de setas blancas, setas del disco pronotal principalmente blancas; dorso del cuerpo vestido profusamente con setas blancas proclinadas y reclinadas (México: Jalisco)
 . . . *Aphelocerus coalitus*, especie nueva
- 5(3'). Disco elitral con crestas longitudinales; cabeza, tórax, y élitro azul-negro (México: Chiapas. Guatemala: Huehuetenango)
 . . . *Aphelocerus echinatus*, especie nueva
- 5'. Disco elitral sin crestas longitudinales; cabeza, tórax, y mitad basal del élitro rojiza (México: Yucatán)
 . . *Aphelocerus affaniatis*, especie nueva
- 6(2) Disco elitral vestido con una mezcla de setas secundarias oscuras y blancas, setas secundarias blancas no consolidadas en un mechón de setas medioelitral, puede haber unas setas secundarias pálidas orientadas diversamente en el disco medioelitral, pero la mayoría de las setas están dirigidas hacia el margen epipleural (fig. 27); el espacio entre puntuaciones del élitro ligeramente áspero 7
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 . . . *Aphelocerus ciliaris*, especie nueva
- 8'. Mitad basal del élitro con sólo unas setas secundarias (México: Veracruz)
 . . . *Aphelocerus citimus*, especie nueva
- 9(7'). Elitro bicolor, las regiones humerales y

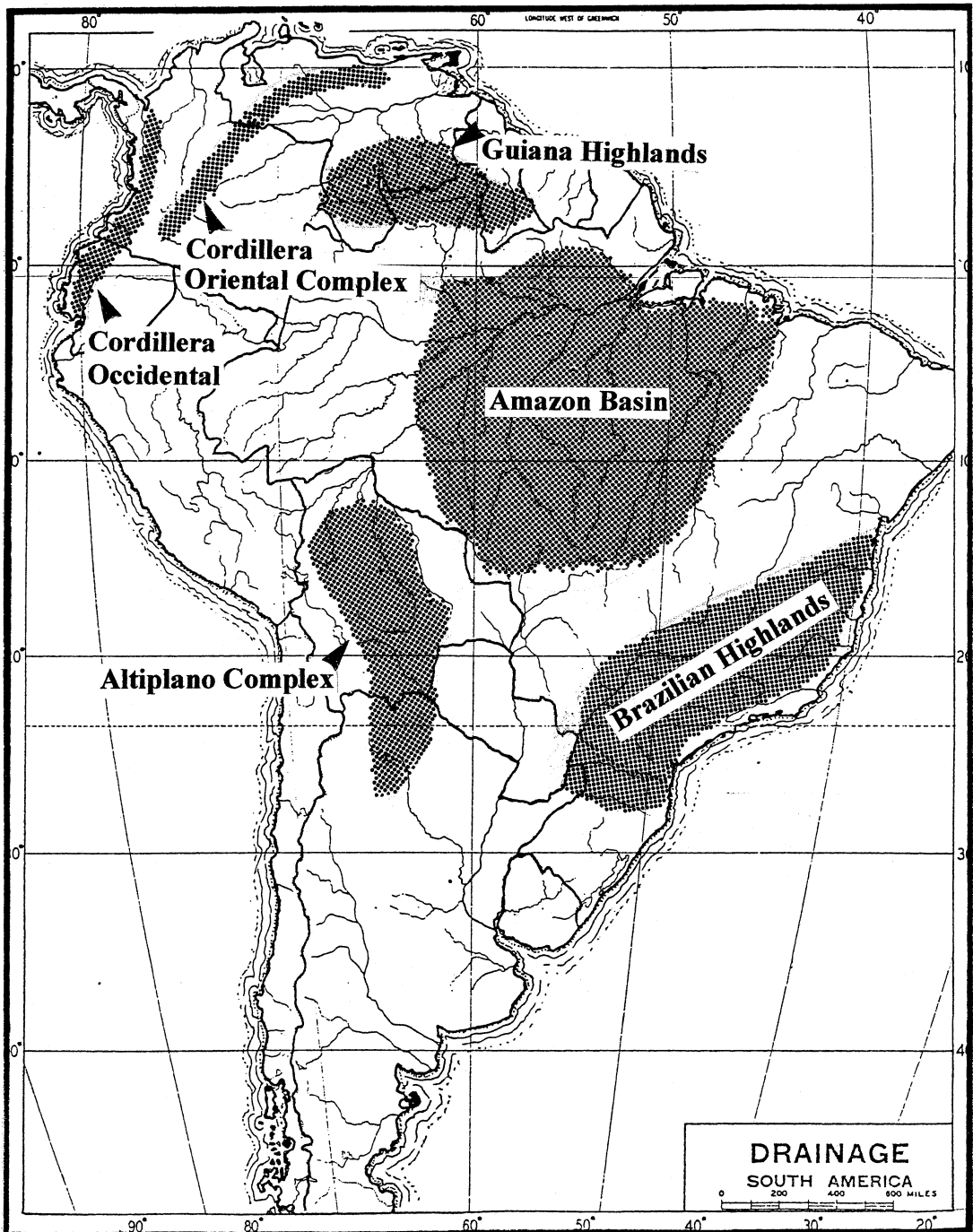


Fig. 287. Major aphelocerofauna regions in South America.

- posthumerales cercanas al margen epipleural testáceas (fig. 256), el resto negro (México: Durango; Oaxaca; Jalisco; Colima; Sinaloa; Guerrero; Nayarit; Morelos) *Aphelocerus delicatulus* Barr
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Aphelocerus bispineus, especie nueva
- 11'. Cuarto apical del élitro con algunas o ninguna setas pálidas; setas del agregado mediodiscal del élitro muy cortas (México: Chiapas)
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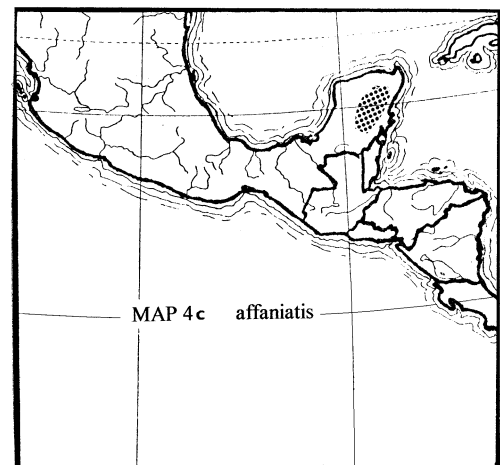
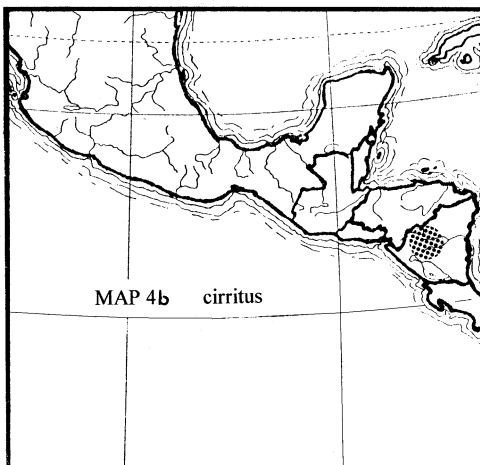
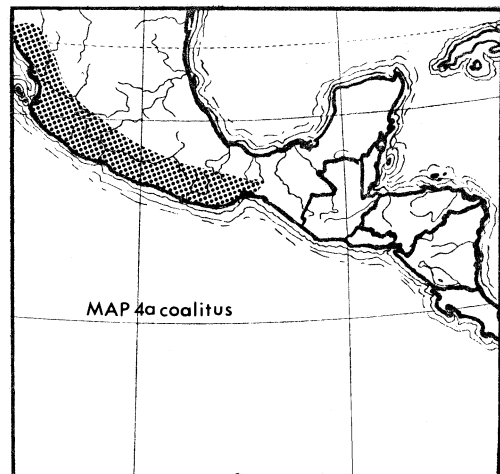
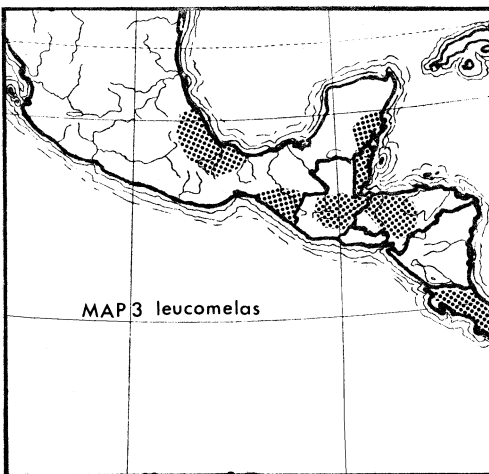
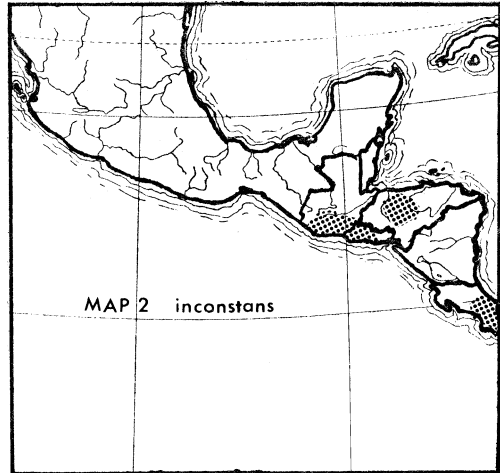
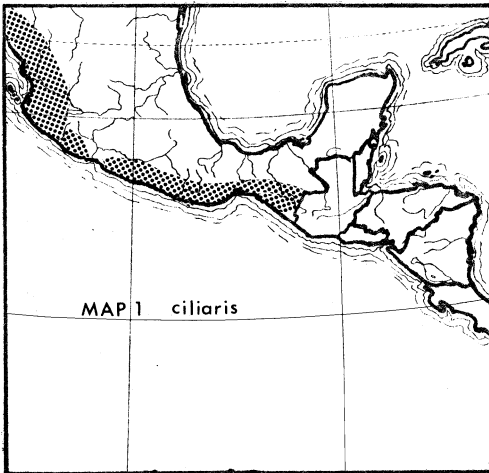
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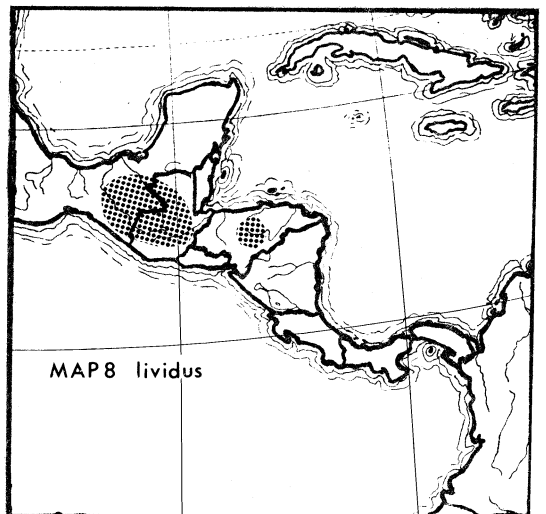
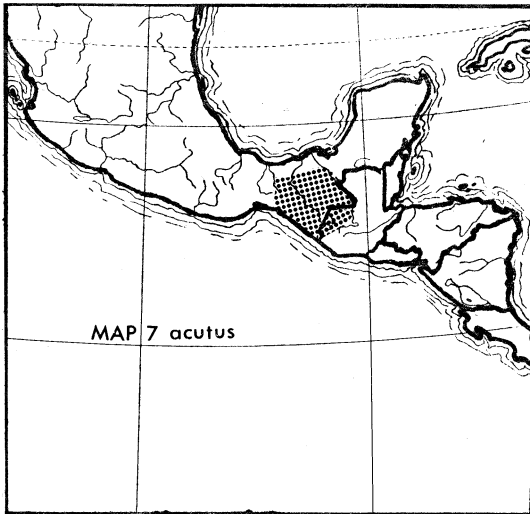
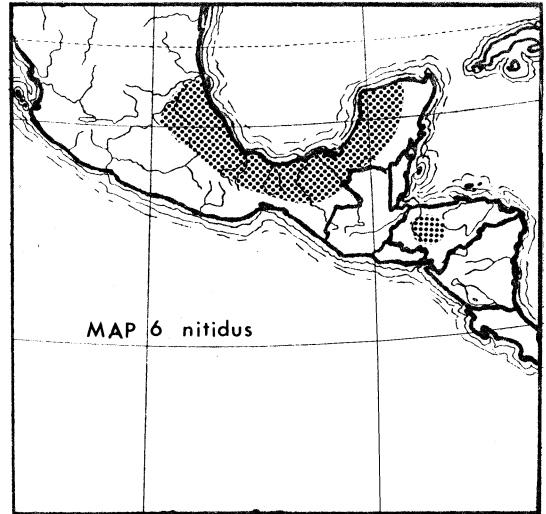
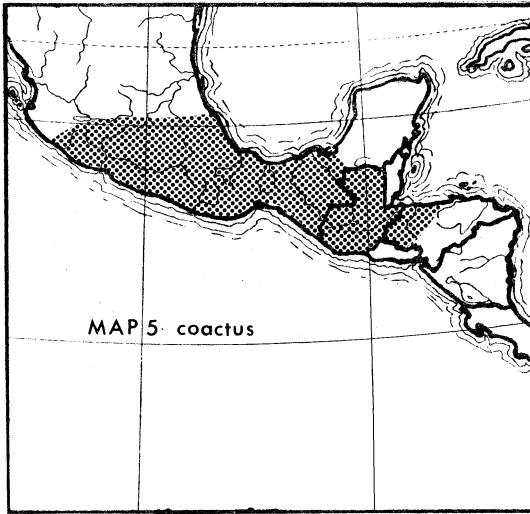
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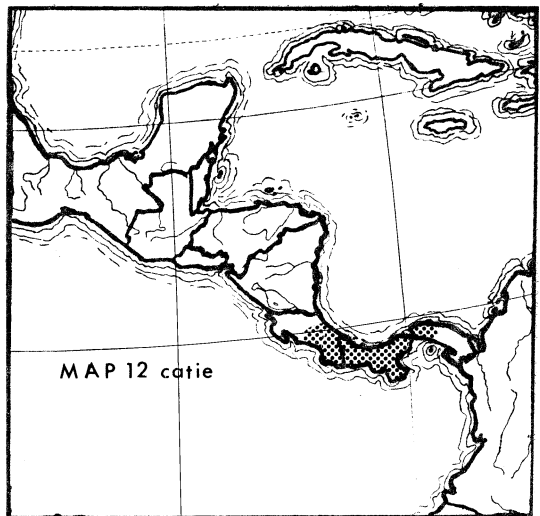
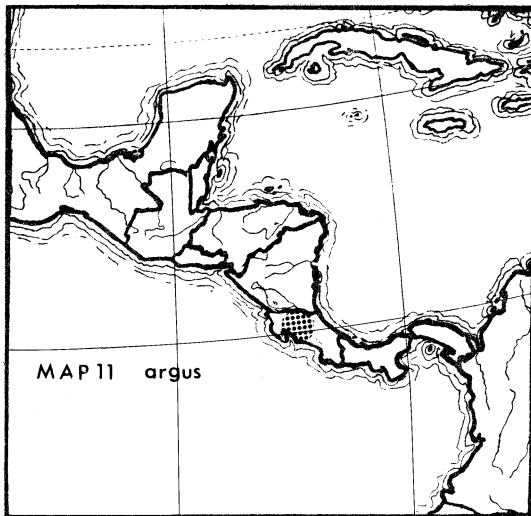
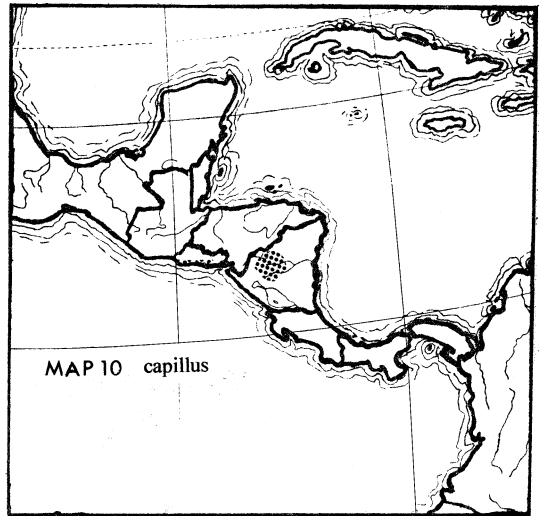
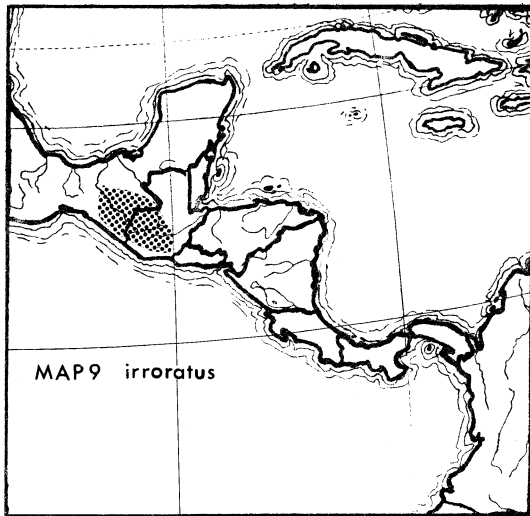
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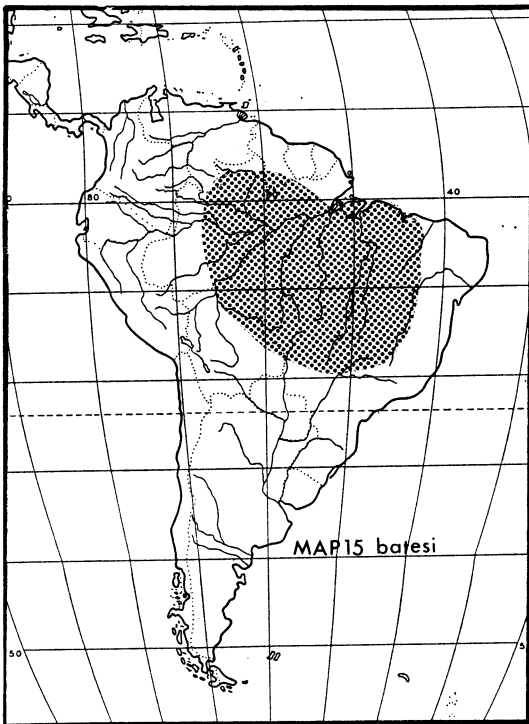
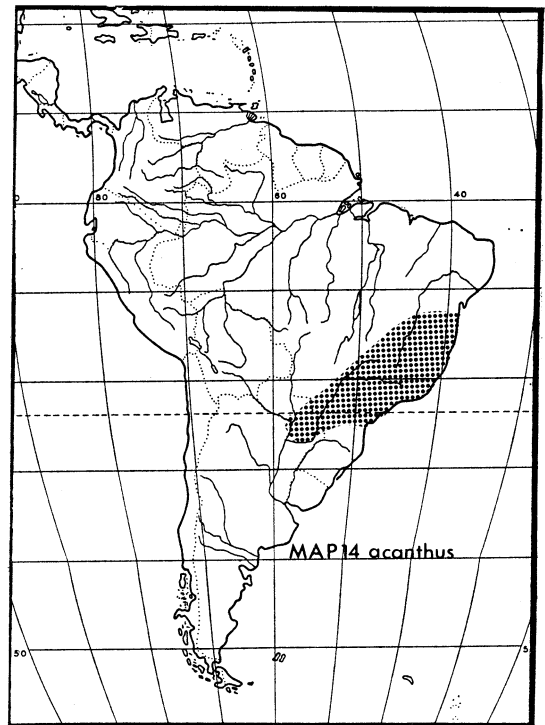
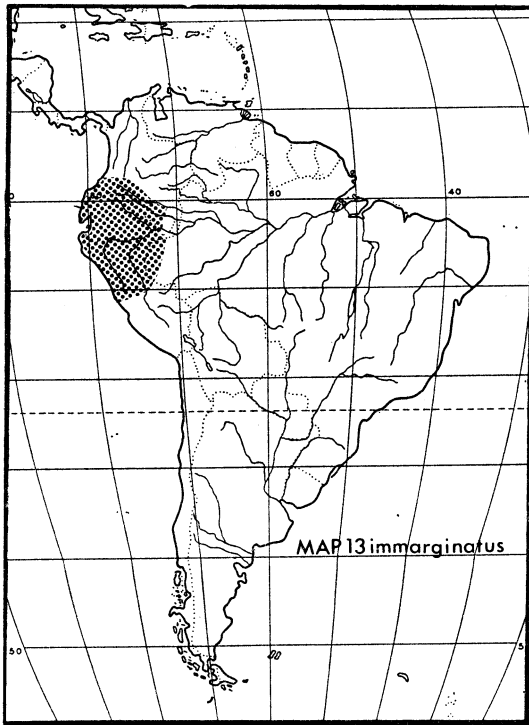
Maps 1-4. Geographic distributions of species as indicated.



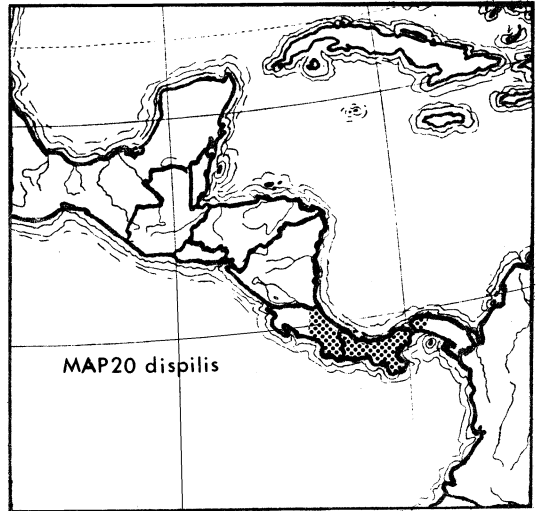
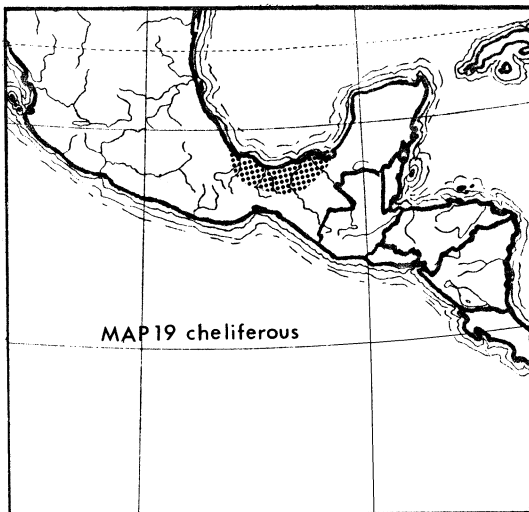
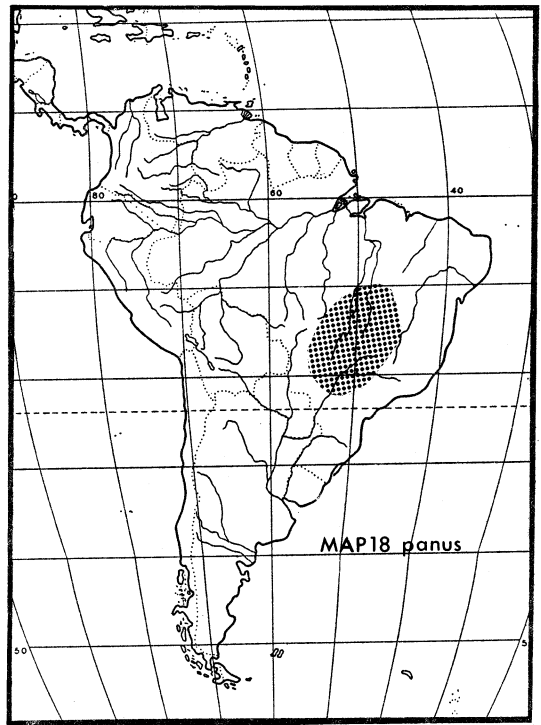
Maps 5–8. Geographic distributions of species as indicated.



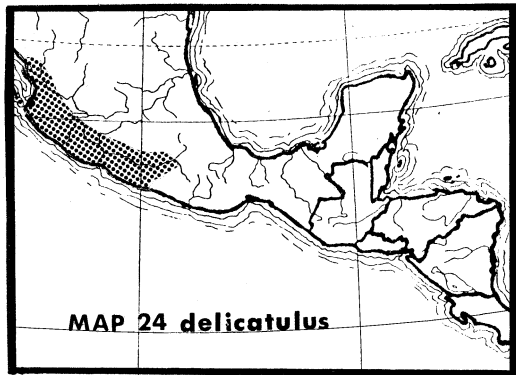
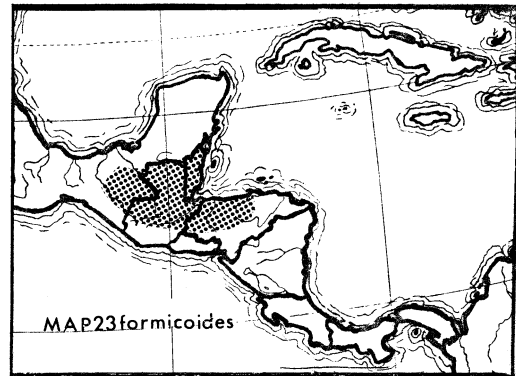
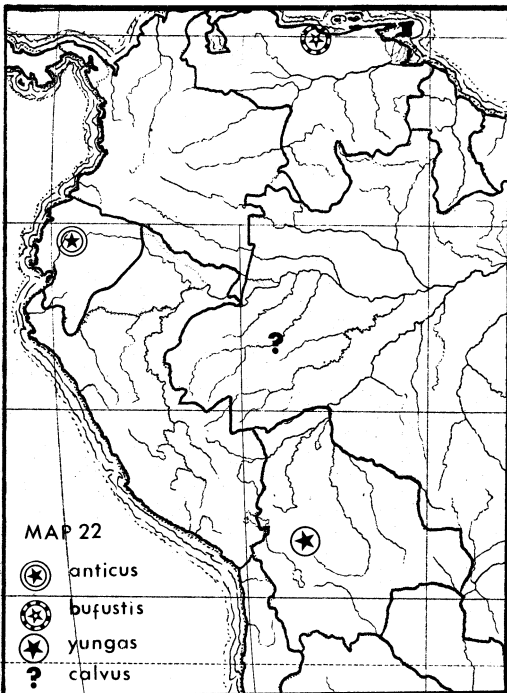
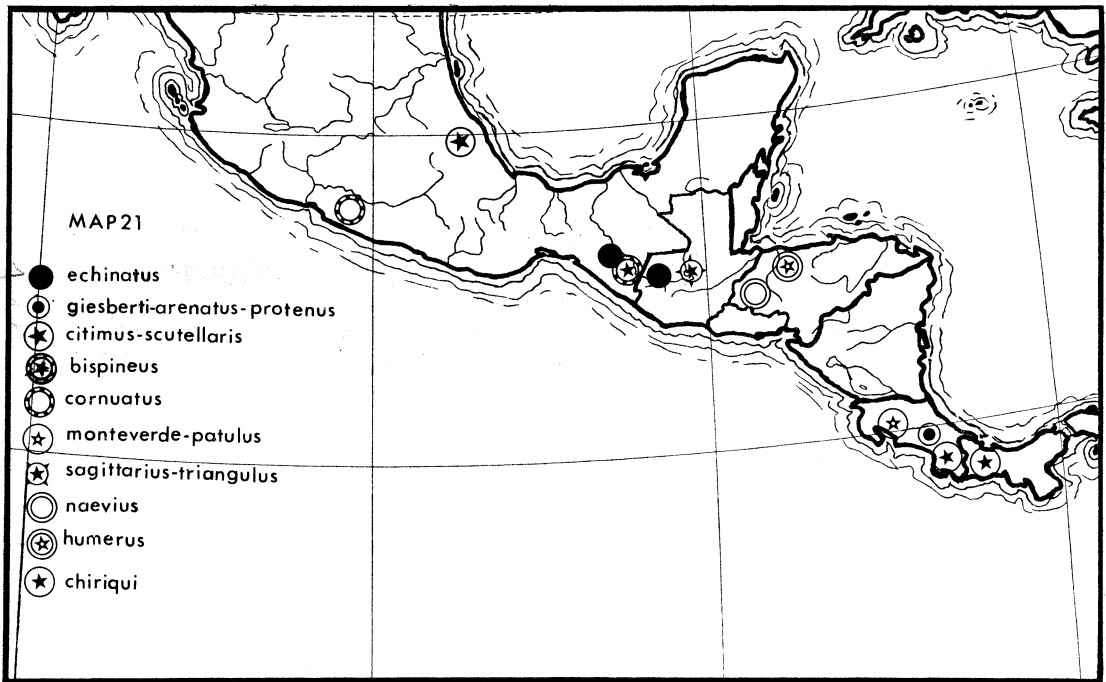
Maps 9–12. Geographic distributions of species as indicated.



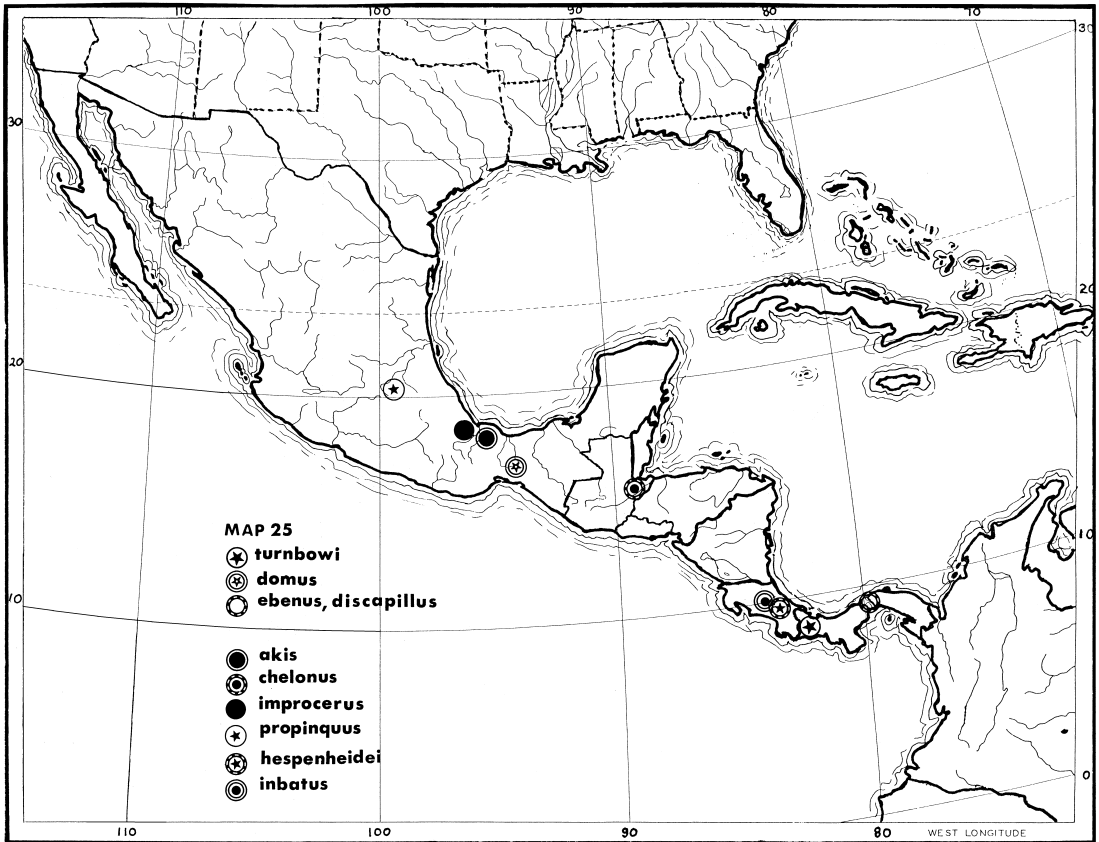
Maps 13–16. Geographic distribution of species as indicated.



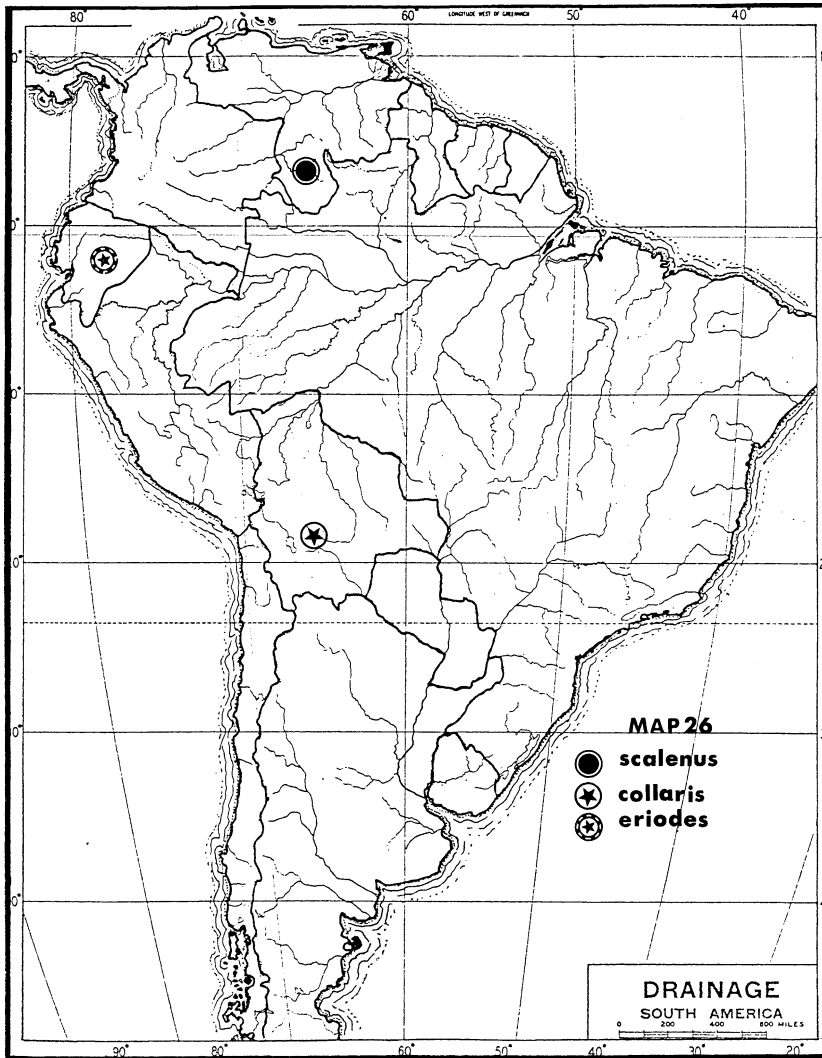
Maps 17-20. Geographic distribution of species as indicated.



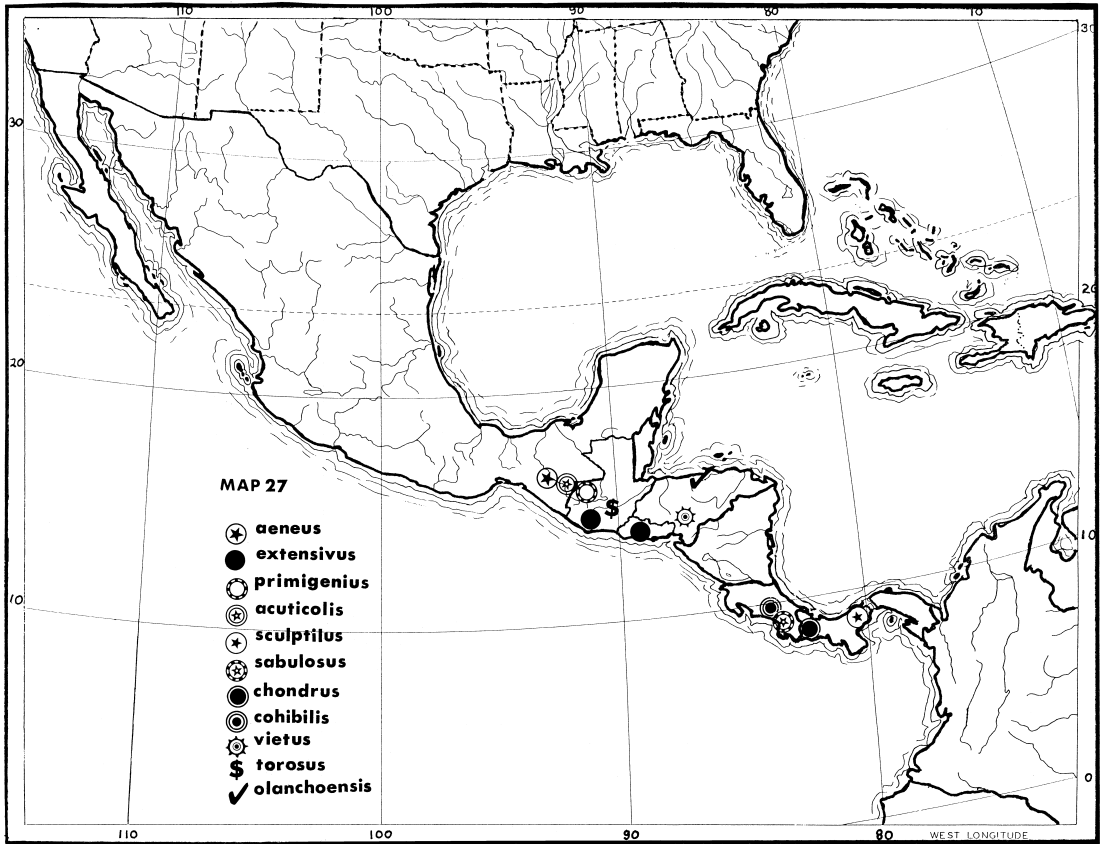
Maps 21–24. Geographic distribution of species as indicated.



Map 25. Geographic distribution of species as indicated.



Map 26. Geographic distribution of species as indicated.



Map 27. Geographic distribution of species as indicated.