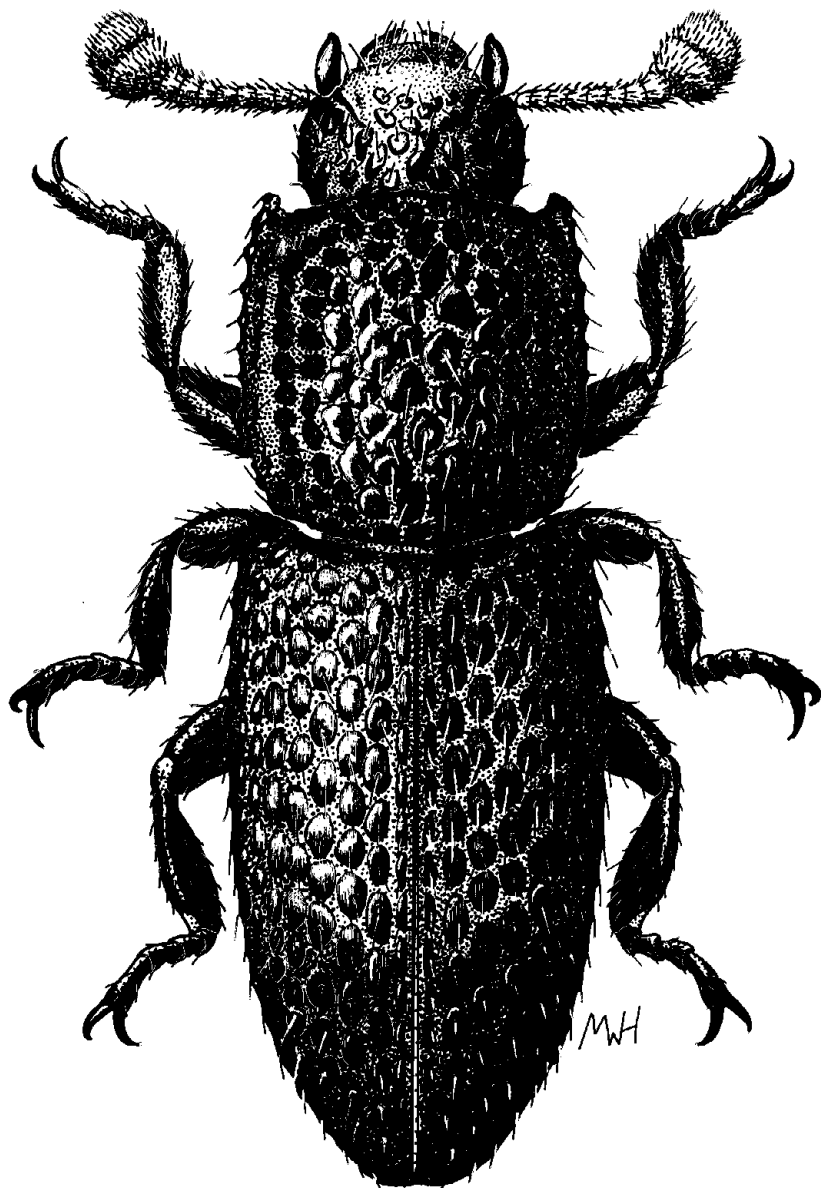


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Lyreus alleni Ivie and Ślipiński

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**DISTRIBUTION OF *LUCANUS ELAPHUS* LINNAEUS
(COLEOPTERA: LUCANIDAE) IN NORTH AMERICA**

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Abstract

Lucanus elaphus is reported from Alabama, Arkansas, Delaware, District of Columbia, Florida, Georgia, Illinois, Indiana, Iowa (New State Record), Kansas, Kentucky, Louisiana (New State Record), Maryland, Michigan, Minnesota (New State Record), Mississippi, Missouri, Nebraska (New State Record), North Carolina, Ohio, Oklahoma, Ontario, Pennsylvania (New State Record), South Carolina, Tennessee, Texas, Virginia, and West Virginia (New State Record).

The family Lucanidae (Coleoptera) has fascinated naturalists for years. There are 1,000–1,200 species of stag beetles in the world (Mizunuma and Nagai 1994) with ten genera and 30 species in the United States (Arnett 1965).

Lucanus elaphus L. is the largest North American species. The male of this species is 31–40 mm long (excluding the mandibles) and the female is about 28 mm long. *Lucanus elaphus* is uncommon in collections. Kirk (1969) mentions it as most rare in his listing from South Carolina. Blatchley (1910) and Brimley (1938) mention that the female is very rare.

There is little published information on *L. elaphus*; most references are part of regional or state checklists. Blatchley (1910) stated that *L. elaphus* is found in old oak stumps and sometimes in gardens. Ritcher (1966) could not distinguish between the larvae of *L. elaphus*, *Pseudolucanus capreolus* (L.), *P. mazama* (LeConte), and *P. placidus* (Say). Wickham (1903) and Staines (1994) reported on structural abnormalities in the species.

This project is an outgrowth of a survey for *L. elaphus* in southern Maryland (Staines 2000) where it is a species of concern on the Maryland Natural Heritage Program list (Anonymous 1994). While checking collections and literature for Maryland records and biological information, it became apparent that little is known about this species. The following information is presented as an effort to summarize the known information and encourage further work on the biology of the species so that future workers may have a better chance of finding specimens.

Distribution (see Acknowledgements for acronyms). **CANADA: Ontario:** listed in Benesh (1960) and McNamara (1991). **UNITED STATES: Alabama:** no further data (MCZC). Covington Co.: listed in Löding (1945). DeKalb Co.: 28 June 1951 (INHS). Lawrence Co.: listed in Löding (1945). Lee Co.: Auburn, 1 June 1924 (FMNH), 20 June 1925, 2 July 1927 (CASC). Madison Co.: Huntsville, July 1963 (FSCA); Monte Sano State Park (FSCA), 1915 (USNM), June 1935 (CASC), Fall 1976 (USNM), Fall 1977 (USNM). Marshall Co.: Albertville, July 1919 (BMNH). Mobile Co.: Mobile, July 1908 (UMRM). Monroe Co.: Haines Island Park, 26–31 May 1995, taken in black-light trap (MEMU). **Arkansas:??:** Merkel, 26 February 1909 (USNM). Arkansas Co.: 8 June 1970, taken at blacklight (UADE). Ashley Co.: Hamburg

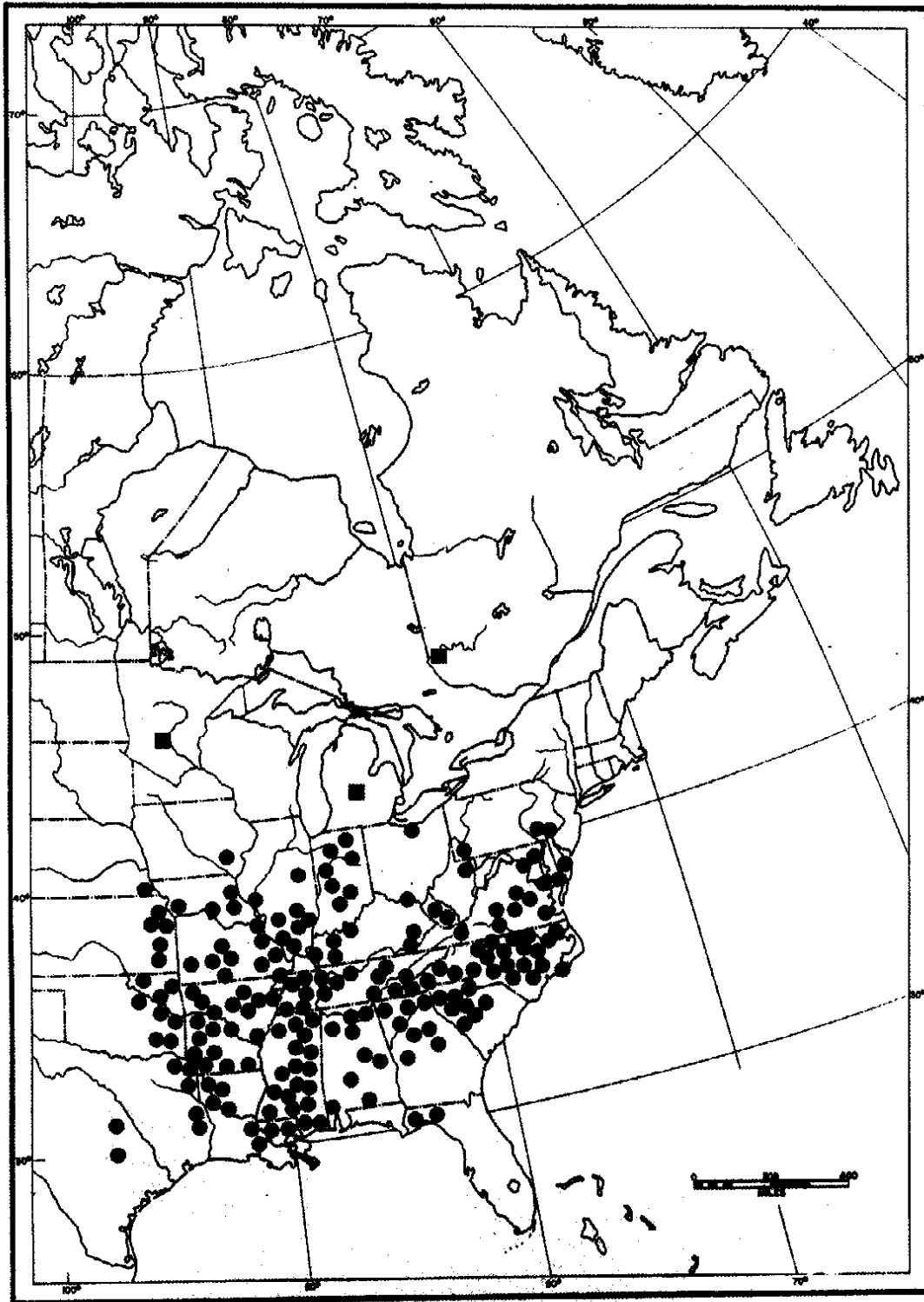


Fig. 1. Distribution of *Lucanus elaphus* in North America (squares—state label only).

(UADE). Benton Co.: Siloam Springs, 18 June 1907 (USNM). Columbia Co.: Magnolia, 1931 (SEMC). Garland Co.: Hot Springs (USNM). Hempstead Co.: Hope, 16 June 1935 (MCZC), 19 June 1931 (CUIC), July 1926 (MCZC), 31 July 1930 (CASC). Independence Co.: Newark, 23 June 1886 (USNM). John-

son Co.: 5 June 1975, 23 June 1977, taken at black light (UADE). Lafayette Co.: 2 June 1965, 3 June 1965 (UADE). Lawrence Co.: no further data (CASC); Imboden (CASC), 25 May 1929, 13 June 1931, 15 June 1925 (CASC), July 1926 (CASC, FMNH), 13 July 1925 (FMNH). Logan Co.: Magazine Mountain, Cameron Bluff Campground, 28 June 1990, 18 July 1990 (AMNH). Mississippi Co.: 6 June 1971 (UADE). Montgomery Co.: Upper Lake Ouachita (USNM), 6 August 1961 (USNM). Phillips Co.: Helena, 16 June 1920 (MEMU). Pulaski Co.: Little Rock, 26 June 1983 (FSCA). Sebastian Co.: Fort Smith, 13 July 1983, taken at light (FSCA), 1 July 1984 (FSCA). Sevier Co.: August 1972 (UADE). St. Francis Co.: Forrest City, June 1965 (USNM). Washington Co.: 1938, 3 June 1977, 20 June 1964, 30 July 1971, 8 October 1976, 4 December (UADE); Devil's Den State Park, 20 June 1975 (UADE); Fayetteville (UADE); Savoy, 20 July 1988 (UADE). **Delaware:** Sussex Co.: Milton, 6 June 1940 (UDCC). **District of Columbia:** listed in Ulke (1902). **Florida:** no further data (MCZC). Gadsden Co.: Chattahoochee, 31 May 1953, taken at light (UMMZ). Hamilton Co.: near Jasper, 15 June 1977 (FSCA). Liberty Co.: Torreya State Park, 11 July 1981, taken in river bottom forest (FSCA), 17 July 1982, taken at uv light. **Georgia:** Baldwin Co.: Milledgeville, 23 May 1938 (UGCA). Chattahoochee Co.: Fort Benning, July 1952 (UGCA). Clarke Co.: Athens, various dates (UGCA), October 1934 (USNM). Dade Co.: Trenton, 21 June 1937 (UGCA). Fulton Co.: 6 July 1960 (UGCA). Gordon Co.: 15 July 1975 (UGCA). Habersham Co.: 5 miles north of Batesville, 21 June 1987 (FSCA). Morgan Co.: Madison, 5 June 1939 (UGCA); Rutledge, 14 July 1940, 3 August 1952 (UGCA). Newton Co.: Covington, 30 June 1949 (UGCA). Spalding Co.: Griffin Experiment Station, 8 August 1996, taken on walk at trail garden (UGCA). Union Co.: Rocky Top Mountain, June 1960 (UGCA). **Illinois:** no further data (UMSP); Southern Illinois (USNM).??: Atlas, June 1931 (UMRM). Adams Co.: Quincy (INHS). Alexander Co.: Cairo (USNM); Villa Ridge, September 1892 (INHS). Calhoun Co.: Batchtown, 8 June 1899 (INHS). Clay Co.: Flora (USNM). Edwards Co.: 15 June 1944 (INHS). Hamilton Co.: Dahlgren, 4 June 1885 (INHS). Knox Co.: Galesburg (MCZC). Platt Co.: Allerton Estate, 26 June 1959 (INHS). Randolph Co.: 24 May 1896 (UMRM). Richland Co.: 3 June 1926 (INHS); Wabash Valley, May 1878 (MCZC). St. Clair Co.: 21 June 1902, 1 August 1902 (UMRM); Marissa, 30 May 1921 (INHS). Union Co.: Anna, 17 July 1883 (INHS); Pine Hills Recreation Area, 10 July 1968, taken at blacklight trap (FSCA). Washington Co.: Dubois, 1909 (INHS). **Indiana:** no further data (USNM). Clay Co.: Saline City, 6 June 1889 (USNM). Crawford Co.: listed in Blatchley (1910). Daviess Co.: Bicknell, 4 June 1937, 6 June 1938 (UADE). Dubois Co.: 13 August 1970 (TAMU). Elkhart Co.: Elkhart (CASC). Knox Co.: 27 May 1944, 10 June 1943 (UADE). Monroe Co.: Bloomington, June 1928 (CASC), 13 June 1931 (CASC). Orange Co.: Orleans, 3 July 1935 (UADE). Vigo Co.: listed in Blatchley (1910). Wabash Co.: Mt. Vernon, 23 May 1964 (FSCA). **Iowa:** Lee Co.: Keokuk (MCZC) **NEW STATE RECORD.** **Kansas:** no further data (FMNH, MCZC, USNM). Douglas Co.: no further data (SEMC). Labette Co.: Oswego, June (USNM). Leavenworth Co.: Leavenworth, 23 July 1943 (CASC), 30 July 1947 (SEMC). Wilson Co.: New Albany (BMNH). Wyandotte Co.: (FMNH). **Kentucky:** no further data (INHS).??: Cumberland Gap (MCZC); Oragus (MCZC). Bell Co.: Balkan, June 1915 (USNM). Henderson Co.: Henderson, 25 May 1921 (FMNH). Jefferson Co.: Louisville, 9 July 1938 (UKYC). Letcher Co.: Whitesburg, August 1915 (USNM). Meade Co.: Otter Creek Park, 19 June 1970 (USNM). Todd Co.: Elkton, 17 June 1961 (UKYC).

Warren Co.: Bowling Green, July 1892 (UKYC). **Louisiana:** no further data (USNM). Bossier Parish: Barksdale Air Force Base, 4 June 1996, 10 June 1996, 11 June 1996, 16 June 1996, all taken at blacklight trap (MEMU). Caddo Parish: Shreveport, 16 June 1990, on pine tree (LSAM). East Baton Rouge Parish: Baton Rouge, 20 June 1972 (LSAM). East Feliciana Parish: Clinton, 9 June 1971, on basket oak, 29 April to 2 May 1975 (LSAM). Natchitoches Parish: Kisatchie National Forest, 2 miles east Red Bluff Campground, 17–18 June 1988 (LSAM). Tangipahoa Parish: Loranger, 20 August 1931 (LSAM). Webster Parish: Lake Bistineau State Park, 21 May 1996 (TAMU). West Feliciana Parish: Tunica Hills WMA, 2 June 1995 (LSAM) **NEW STATE RECORDS.** **Maryland:** Baltimore (BMNH). St. Mary's Co.: Great Mills, 18 August 1947, taken at light (FSCA); Lexington Park, 4 July 1992, taken at light (FSCA); Patuxent River Naval Air Station, 7 August 1975 (Kean). Worcester Co.: Pocomoke City, taken in blacklight trap (FSCA), 1896 (UMCP). **Michigan:** no further data (OSUC). **Minnesota:** no further data (USNM) **NEW STATE RECORD.** **Mississippi** (91) [data summarized]:?? (2) [CMNH, MCZC], Amite Co. (1) [MEMU], Bolivar Co. (1) [UMIC], Calhoun Co. (1) [USNM], Carroll Co. (1) [MEMU], Chickasaw Co. (2) [MEMU], Clay Co. (1) [UMMZ], George Co. (1) [FMNH], Grenada Co. (2) [MEMU], Jasper Co. (1) [MEMU], Kemper Co. (1) [USNM], Lafayette Co. (29) [MEMU, UMIC, USNM], Lee Co. (7) [MEMU], Lincoln Co. (1) [MEMU], Lowndes Co. (1) [MEMU], Marion Co. (1) [MEMU], Oktibbeha Co. (23) [MEMU, CASC], Panola Co. (1) [MEMU], Perry Co. (1) [CMNH], Pontotoc Co. (2) [MEMU, OSUC], Rankin Co. (3) [MEMU, OSUC], Stone Co. (1) [MEMU], Tippah Co. (1) [UMSP], Union Co. (1) [UMIC], Warren Co. (4) [MEMU], Washington Co. (1) [FSCA], Wayne Co. (1) [LSAM]. February (1), April (2), May (5), June (42), July (25), August (2), September (3). 1910s (1), 1920s (8), 1930s (1), 1940s (2), 1960s (5), 1970s (28), 1980s (17), 1990s (20). Taken at black light (9), taken at mercury vapor light (1). **Missouri:** no further data (FMNH). Boone Co.: Columbia, June 1903 (FMNH), 21 June 1971, 14 July 1959, 2 August 1968, 4 September 1965 (UMRM). Butler Co.: 20 June 1897 (USNM); Poplar Bluff, July 1952 (UMRM). Girardeau Co.: Cape Girardeau, 25 July 1956 (USNM). Jasper Co.: no further data (IMRM). Jefferson Co.: Barnhart, 30 July 1960, 3 August 1935 (UMRM). New Madrid Co.: Morehouse, 6 May 1915 (MCZC). Pike Co.: July 1934 (UMRM); Louisiana, 6 June 1923 (UMRM). Platte Co.: 29 June 1992 (UMRM). Pulaski Co.: 17 July 1956 (FSCA). St. Charles Co.: O'Fallen, 4 June 1904 (UMRM). St. Louis Co.: Creve Coeur, 1 July 1908 (UMRM); Meramec Hinds, 3 June 1923 (USNM); St. Louis (CASC, CMNH), 20 June 1904 (FMNH), 23 June 1907 (UMMZ), 28 June 1972 (UMRM), 20 July 1897 (USNM). Stoddard Co.: Popular Bluff Forestry Camp, 23 June 1954, taken at light (FSCA). Stone Co.: 20 August 1915 (UMRM). Taney Co.: Forsyth, 14 July 1929 (FMNH). Texas Co.: Mountain Grove, 1916 (USNM). Washington Co.: Irondale, 29 July 1961 (UMRM). Wayne Co.: Williamsville, 20 March 1961 (UMRM). Wright Co.: Cedar Gap, 5 June 1911 (FMNH). **Nebraska:** Richardson Co.: Stella, 6 June 1999 (USNM) **NEW STATE RECORD.** **North Carolina** (125) [data summarized]: no further data (4) [CASC, FMNH, MCZC]. County unknown (2) [FSCA, MCZC, USNM], Bertie Co. (1) [NCSU], Cabarrus Co. (10) [CASC, FSCA, NCSU], Camden Co. (1) [NCSU], Carteret Co. (3) [FSCA], Catawba Co. (1) [NCSU], Chatham Co. (1) [NCSU], Cleveland Co. (1) [NCSU], Craven Co. (1) [FSCA], Davidson Co. (1) [NCSU], Duplin Co. (2) [NCSU], Durham Co. (6) [NCSU], Edgecomb Co. (1) [NCSU], Franklin Co. (1) [NCSU], Gaston

Co. (2) [MCZC, NCSU], Graham Co. (1) [CASC], Granville Co. (7) [NCSU, SEMC, UNSM], Halifax Co. (1) [USNM], Henderson Co. (1) [NCSU], Iredell Co. (1) [NCSU], Jackson Co. (2) [OSUC], Johnston Co. (8) [NCSU, FSCA], Macon Co. (1) [NCSU], Mecklenburg Co. (29) [BMNH, NCSU], Moore Co. (2) [NCSU, OSUC], Nash Co. (1) [USNM], Person Co. (2) [NCSU, UMSP], Pitt Co. (1) [SEMC], Randolph Co. (1) [CUIC], Scotland Co. (1) [USNM], Stanly Co. (1) [TAMU], Swain Co. (1) [CUIC], Union Co. (3) [CMNH, NCSU], Wake Co. (20) [FMNH, FSCA, NCSU, UMMZ] Washington Co. (1) [FSCA], Wayne Co. (1) [NCSU]. January (2), February (2), May (3), June (26), July (46), August (19), September (4), October (3), November (2), December (3). 1910s (4), 1920s (4), 1930s (5), 1940s (9), 1950s (28), 1960s (41), 1970s (4), 1980s (8), 1990s (4). Taken at light (1), taken under tree (2). **Ohio:** no further data (USNM).??: Bowlin, July 1937 (OSUC). Erie Co.: Sandusky (Cedar Point), 23 July 1904 (CASC). Hamilton Co.: Cincinnati (USNM). **Oklahoma:** Choctaw Co.: Boswell, 3 June 1925 (CASC). Craig Co.: Blue Jacket, 30 June 1931 (FMNH). Creek Co.: Dumright, 13 June 1925 (CASC). Latimer Co.: July 1982, July 1987 (FSCA); Red Oak, July 1981 (FSCA); 5 miles west of Red Oak, 16 July 1977, July 1979 (FSCA). Mays Co.: 12 July 1980 (TAMU). McCurtain Co.: 8 June 1934, 11 July 1932 (FMNH); 6.5 miles northeast of Idabel, 28–29 August 1937 (UMMZ). McIntosh Co.: listed in Arnold and Drew (1987). Okmulgee Co.: Haskell, July 1905 (USNM). Osage Co.: Bartlesville (USNM). Ottawa Co.: Commerce, August 1934 (SEMC); Wyandotte, 15 June 1931 (UKYC). Payne Co.: Stillwater, 18 July 1928 (CASC). **Pennsylvania:** no further data (FMNH). Delaware Co.: Lansdowne, 10 June 1935 (CASC). Greene Co.: Mapletown, 4 January 1961 (USNM). Montgomery Co.: (MCZC) **NEW STATE RECORDS.** **South Carolina:**??: Tarplay Gap, 4 July 1956 (FMNH). Anderson Co.: Pendleton, 3 June 1927 (MMUE). Bamberg Co.: mid-September 1927 (CUCC). Calhoun Co.: Congaree Swamp (CMNH). Fairfield Co.: Parr; Winnsboro (listed in Kirk 1970). Florence Co.: Florence (listed in Kirk 1969). Greenville Co.: Greer, 3 July 1931 (CUCC). Lancaster Co.: Richburg, 10 June 1939 (USNM). Laurens Co.: Enoree (CMNH). Lexington Co.: Lexington, 1 June 1982 (CUCC). McCormick Co.: Willington (listed in Kirk 1970). Oconee Co.: CCC Camp, July 1943 (USNM); Oconee State Park, 18 March 1974, reared- emerged 6 September 1974 (TAMU). Pickens Co.: Clemson, 6 June 1975, 15 June 1975, 10 July 1975 (TAMU), 15 June 1931 (USNM), 28 June 1974 (FSCA). Richland Co.: Columbia, 6 May 1916, 1914 (USNM). Spartanburg Co.: Spartanburg, 13 June 1929 (CUIC). Sumter Co.: Wedgefield (listed in Kirk 1969). York Co.: 27 July 1972 (SEMC). **Tennessee** (68) [data summarized]: no further data (2) [BMNH, CASC], Bedford Co. (1) [USNM], Benton Co. (3) [CMNH, FSCA, USNM], Carroll Co. (2) [FSCA, USNM], Coffee Co. (2) [ECUT], Davidson Co. (1) [USNM], Dickson Co. (1) [FSCA], Gibson Co. (1) [ECUT], Hamilton Co. (3) [FSCA, USNM], Hardeman Co. (1) [CMNH], Knox Co. (2) [ECUT, FMNH], Marion Co. (1) [CMNH], Morgan Co. (42) [CASC, CMNH, FMNH, FSCA, MCZC, MMUE, UKYC, USNM], Obion Co. (1) [INHS], Roane Co. (2) [CMNH, MCZC], Rutherford Co. (1) [UMMZ], Sevier Co. (1) [TAMU], Shelby Co. (1) [CMNH]. May (1), June (32), July (13), August (2), September (1), October (1). 1910s (2), 1920s (2), 1930s (19), 1940s (10), 1950s (8), 1970s (2), 1990s (3). Taken at black light (2). **Texas:** no further data (MCZC, USNM). Bowie Co.: Texarkana, May 1962 (TAMU). Caddo Co.: Caddo Lake State Park, 20 May 1998 (TAMU). Hunt Co.: Quinlan, 25 June 1940 (TAMU). Marion Co.: Lake O'the Pines, 12 June 1979 (TAMU). Sabine Co.: 9 miles

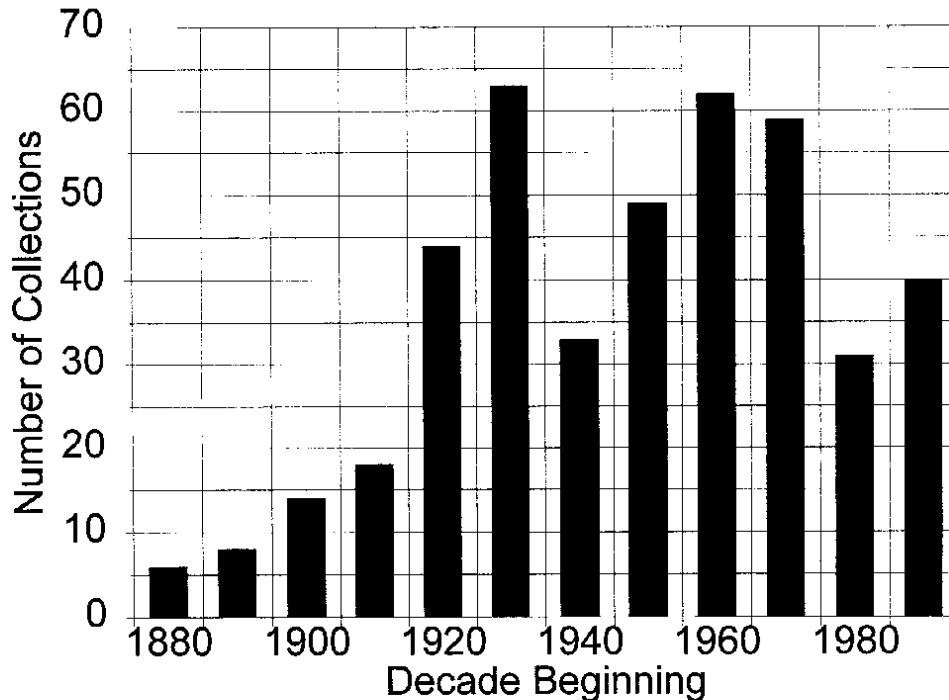


Fig. 2. Number of specimens of *Lucanus elaphus* collected each decade from 1880 to 1999.

east of Hemphill, 14 June 1990, taken in "beech bottom"; SFA Forest Camp, Milam, June 1965 (TAMU). Travis Co.: Austin (CASC). **Virginia:** Buckingham Co.: 27 May 1911 (USNM). Lunenburg Co.: Victoria (USNM). Montgomery Co.: Blacksburg, 5 May 1956 (VPIC). Nelson Co.: 9 July 1914, 5 August 1927 (USNM). Pittsylvania Co.: Chatham, 26 July 1939 (VPIC); Danville (FMNH). Prince Edward Co.: Farmville, 24 May 1923, 24 June 1924 (UGCA). Prince George Co.: Hopewell, 23 June 1930 (USNM); Petersburg-Fort Lee, 23 June 1962 (USNM); 10 miles south of Petersburg, 4 June 1970 (USNM). Richmond Co.: Warsaw, 16 June 1938 (USNM). Sussex Co.: Jarratt, 18 June (CUIC). **West Virginia:** Logan Co.: Fort Branch, 27 May 1911 (USNM). Marion Co.: Fairmont, 1926 (INHS). Mingo Co.: Laurel Creek Public Hunting and Fishing Area, 14 June 1979 (WVUC) **NEW STATE RECORDS.**

Analysis of the label data from these specimens shows that *L. elaphus* has been collected in every month of the year. However, most have been collected in June (41.3%) and July (35.0%). The date of collection does not appear to be affected by the geographical location, that is, specimens from the far south and the north of the range are collected at the same time of year.

Based on the number of specimens collected in each decade (Fig. 2) it appears that the population of *L. elaphus* is stable. There are several potential biases with the summarized information. First, much material from the 1930s and 1940s was collected by Bernard Benesh, a specialist on lucanids, who, considering the numerous specimens and dates of his collection, appeared to have insights into the biology of *L. elaphus* which were never published or at least to have access to a large known population. A second potential problem is the unincorporated backlog of specimens in many museums which is unavailable to researchers. This would tend to underrepresent the number of

specimens collected recently. Additionally, the current legal status of insects as "wildlife" with all the necessary permits and red tape involved has discouraged recent collecting and research. Finally, the information presented above is undoubtedly incomplete. One collection which provided label data on their holdings only submitted those from their state. When I visited the collection later, I obtained a number of interesting and widespread records.

The most common method of collecting *L. elaphus* is at light, with black-light, white light, and mercury vapor lamps being effective. There is little habitat information on the label data. Specimens were collected in river bottom forest, in short-leaf pine forest, in oak forest, in beech bottom, and near cotton fields.

Other species of lucanids breed in the decaying stumps or wood of a wide range of deciduous trees. For example, the European *Lucanus cervus* L. has confirmed breeding records in 12 genera representing 8 families in Suffolk, England alone (Hawes 1998). It is likely that *L. elaphus* fits this pattern, but this is merely conjecture until the life history of the species is worked out.

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**MARGARITABRUCHUS CHERYLAЕ, NEW GENUS AND NEW SPECIES OF
NEW WORLD BRUCHIDAE (COLEOPTERA)**

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Abstract

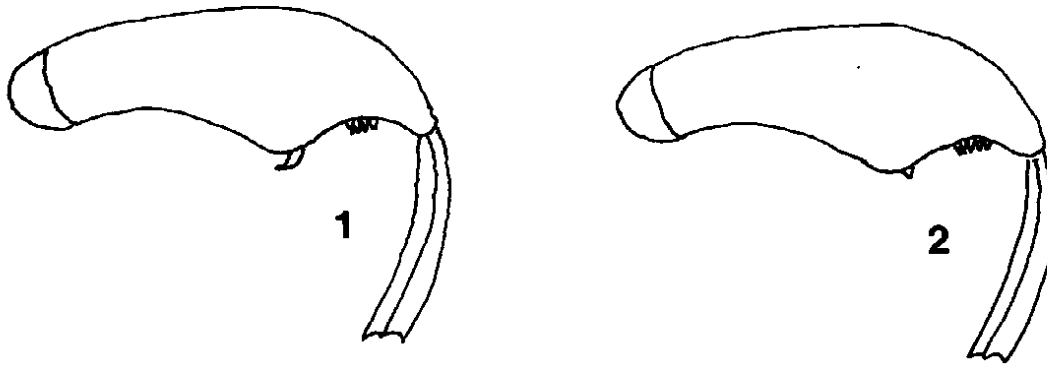
The new genus and species *Margaritabruchus cherylae* Romero and Johnson is described. It is distinct from other genera of bruchids because the ventral surface of the narrow hind femur is not in a gentle, convex curve. It is usually concave before and after an expansion near the middle that ends in a large, blunt, lateral spine about 0.66 from the base of the femur of both sexes. The hind femur of males has a hook-like spine on the lateral margin slightly beyond the blunt spine that is curved toward the base of the femur. The affinities of the genus are with other Acanthoscelidini and it is probably most closely related to *Meibomeus* and certainly to the very large New World genus, *Acanthoscelides* Schilsky. *Margaritabruchus cherylae* feeds in seeds of *Indigofera densiflora* M. Martens and Galeotti.

When this species was collected we noticed the unusual curvature of the hind femoral spine of males. We at first thought it to be a species of *Meibomeus* Bridwell because it had structures described by Bridwell (1946) as characters to distinguish *Meibomeus* from other genera. These structures were elytral stria 4 abbreviated at base starting from a small tubercle and "hind femur with inner edge beneath serrulate with a strong tooth beyond the serrulations and after a space with about four denticles." When Kingsolver and Whitehead (1976) revised *Meibomeus* they considered the above characters of Bridwell to define *Meibomeus* to be invalid and then used several other characters to define the genus.

Further study convinced us that *Margaritabruchus cherylae* Romero and Johnson is a new genus and a new species that is unlike any that we have seen. It is distinct from other genera of bruchids because of the shape of the hind femur of both sexes and the curvature of the spine on the hind femur of males of the species. The affinities of the genus are with other Acanthoscelidini and it is probably most closely related to *Meibomeus* and certainly to the very large New World genus, *Acanthoscelides* Schilsky.

Materials and Methods

We used the methods described by Kingsolver (1970) and Kingsolver and Whitehead (1974). For interpretation of genitalia we followed Romero and Johnson (1999).



Figs. 1–2. *Margaritabruchus cherylae*. 1) Hind leg of male; 2) hind leg of female.

Margaritabruchus Romero and Johnson, **new genus**

Type Species. *Margaritabruchus cherylae* Romero and Johnson.

Etymology. Margarita, named for the wife of the second author, Margaret Elkins Johnson (Gr. = *margarites* and L. = *margarita*, a pearl) and the genus *Bruchus* Linnaeus (Gr. = *brouchos* and L. = *Bruchus*, a genus of beetles). The name acknowledges the enormous unrecognized contributions that Margaret has made to the study of bruchid beetles.

Diagnosis. Male: Hind femur narrow, constricted basally and apically, ventral surface not in a gentle curve, expansion near middle ending in a large, blunt, lateral spine about 0.66 from base (Fig. 1); inner ventral surface without longitudinal carina; lateral margin of femur of some specimens with vague serrulations extending from base to a large, flattened area medially from blunt spine; hook-like spine on lateral margin slightly beyond blunt spine, hook-like spine curved toward base of femur, spine about 0.1 as long as femur at its widest (Fig. 1); lateral margin of femur before and after lateral spine concave to straight, not convex; femur armed on inner margin with about 4 small, subapical acuminate spines each about 0.3 as long as width of tibial base (Fig. 1).

Female: As in male but lateral margin of hind femur smooth, without serrulations; large, blunt area about 0.66 from base at widest portion of femur usually followed on lateral margin by a straight spine about 0.05 as long as width of femur at its widest (Fig. 2), when present, spine not curved toward base of femur (Fig. 2); femur armed on inner margin with 4 small, subapical acuminate spines each about 0.3 as long as width of tibial base.

Margaritabruchus cherylae Romero and Johnson, **new species**

The description of *Margaritabruchus cherylae* will serve as a description for both the new genus and the new species.

Description. Male: Length (pronotum-elytra) 2.0–2.5 mm. Width 1.2–1.5 mm. Maximum thoracic depth 0.9–1.2 mm. Integument black, not metallic; first three antennal segments dark brown; eyes dark red to shiny black. Vestiture moderately dense, grayish, not variegated; dense white hairs on small apical portion of mesepisternum and ocular sinus.

Head. Frons with medial longitudinal carina; eyes not sexually dimorphic, in some specimens facets coarse, about five rows of facets behind ocular sinus; interocular ratio about 0.42–0.54; antenna extended to about 0.80–0.83 length of elytron, pedicel about 0.60–0.75 of scape length and about 0.62–0.86 as long as segment 3, segment 11 slightly more elongate than 10, acuminate at apex.

Prothorax. Disk subcampanulate with many punctations in no apparent pattern, cervical sulcus deep, extending from near coxal cavity to 0.5 distance to pronotal midline; lateral prothoracic carina vague, extending from base to about 0.6 distance to coxal cavity; prosternum separating procoxae for about 0.5 their length; short median basal line on median basal lobe usually obscured by hairs.

Mesothorax and Metathorax. Scutellum small, quadrate, bifurcate at apex; elytron without basal gibbosity; stria 4 slightly abbreviated at base by a small spine; striae 3 and 5 sometimes slightly abbreviated; elytron slightly more than twice as long as broad; striae deep, punctate; stria intervals punctulate; metasternum deep, rounded in profile; metasternum without 2 strong medial spines at base on either side of midline projecting ventrally, but with a narrow, elongate medial sulcus separating metasternum; hind femur narrow, constricted basally and apically, ventral surface not in a gentle curve, expansion near middle ending in a large, blunt, lateral spine about 0.66 from base (Fig. 1); inner ventral surface without longitudinal carina; lateral margin of femur of some specimens with vague serrulations extending from base to a large, flattened area medially from blunt spine; hook-like spine on lateral margin slightly beyond blunt spine, hook-like spine curved toward base of femur, spine about 0.1 as long as femur at its widest (Fig. 1); lateral margin of femur before and after lateral spine concave to straight, not convex; femur armed on inner margin with about 4 small, subapical acuminate spines each about 0.3 as long as width of tibial base (Fig. 1); tibia with ventral, lateral and dorsomesal glabrous carinae, without lateroventral carina; dorsal surface of tibia without fossa but with 2 glabrous longitudinal carinae separated by shallow sulcus; tibial corona with one vague lateral spinule, mucro inconspicuous, about 0.07 as long as first tarsomere; tarsomere 1 with distinct ventral, lateral and mesal longitudinal carinae.

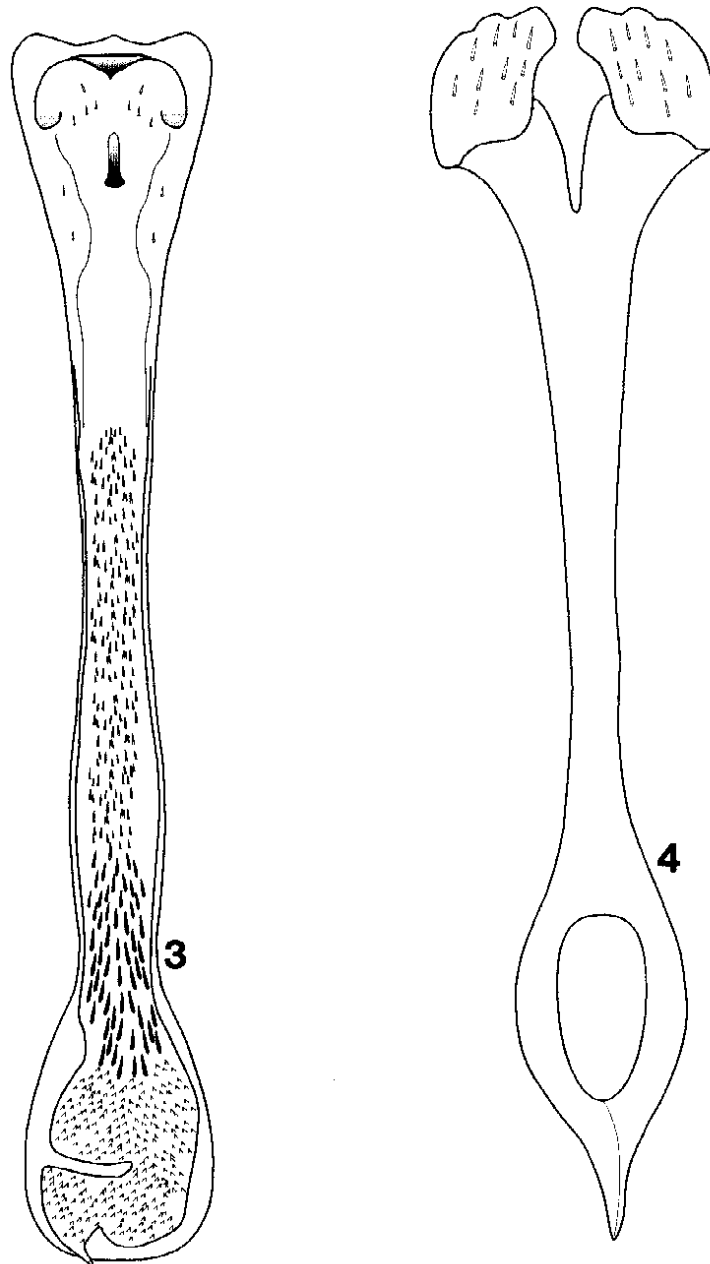
Abdomen. First abdominal sternum with polished lateral apical band; sterna 2–4 unmodified, fifth sternum 1.8–2.0 as long as fourth, blunt at apex, not emarginate, apex produced ventrally. Pygidium with many fine punctations, narrow, elongate, apex gently curved ventrad, convex in lateral view.

Genitalia. Median lobe elongate, slightly constricted on lateral margins; in ventral view ventral valve small, sclerotized, triangular, with apex bent ventrally; dorsal valve less sclerotized, rounded apically; apical third of armature of internal sac with sclerite blunt on one end and acuminate on the other and with many fine denticles, medial third of internal sac lined with minute spines intermixed with bifurcate spines, basal third with many fine spines then more apically with heavily sclerotized slightly elongate spines (Fig. 3). Lateral lobes elongate, cleft to 0.2 their length, apical portion of each lobe enlarged, covered with many fine setae (Fig. 4).

Female. Length (pronotum-elytra) 2.0–2.6 mm. Width 1.2–1.5 mm. Maximum thoracic depth 1.0–1.4 mm. Similar to male except interocular ratio about 0.52–0.65; lateral margin of hind femur smooth, without serrulations; large, blunt area about 0.66 from base at widest portion of femur usually followed on lateral margin by a straight spine about 0.05 as long as width of femur at its widest (Fig. 2), when present, spine not curved toward base of femur (Fig. 2); femur armed on inner margin with 4 small, subapical acuminate spines each about 0.3 as long as width of tibial base; sternum 5 shorter 1.5–1.7 as long as fourth, apex not produced ventrally.

Host Plants. *Indigofera densiflora* M. Martens and Galeotti: Mexico. Oaxaca: 17 km N Oaxaca, XII-20-78, C.D. Johnson collector (CDJ #278-78).

Type Series. Male holotype, allotype female and about 80 paratypes: Mexico. Oaxaca: 17 km N Oaxaca, XII-20-78, reared seeds no. 278-78, C. D. Johnson collector. Holotype, allotype, and several paratypes deposited in the U.S. National Museum of Natural History, Washington, D.C., U.S.A. All specimens used here are the property of the Clarence Dan Johnson collection that is now deposited in the Texas A and M University Insect Collection, Department of Entomology, College Station, Texas 77843, U.S.A. Paratypes were deposited in the following collections: CDJ collection, J. Romero Collection whose address is listed at the beginning of this paper; Florida State Collections



Figs. 3–4. *Margaritabruchus cherylae*. 3) Male genitalia, median lobe; 4) male genitalia, lateral lobes.

of Arthropods, Division of Plant Industry, P.O. Box 147100, Gainesville FL 32614–7100, U.S.A.; Arturo Terán, Fundación Miguel Lillo, Entomología, Miguel Lillo 251, (4000) San Miguel de Tucumán, Argentina; and C. S. Ribeiro-Costa, Departamento de Zoologia, Universidade Federal do Paraná, Caixa Postal 19020, 81531-990 Curitiba, PR, Brazil.

Distribution. Mexico (Oaxaca).

Discussion. *Margaritabruchus cherylae* is distinct from all other bruchids because males of the species have a hook-like spine on the hind femur that is curved toward the base of the femur, not toward the apex of the femur (Fig. 1). This spine is on the lateral margin of the femur about 0.66 from the base of the femur. The shape of the hind femur is different from most other bruchids

because it is narrow and the basal and apical portions are concave before and after a large, blunt area about 0.66 from the base at the widest portion of the femur and near the recurved spine. The hind femur of females is similar to males except the recurved spine is replaced with a straight spine (Fig. 2). This straight spine is sometimes absent in females. The male genitalia of *M. cherylae* are distinct from other Bruchidae (Figs. 3–4).

Margaritabruchus cherylae, *Acanthoscelides kingsolveri* Johnson and *A. ruficoxis* (Sharp) are bruchid species known to feed in seeds of *Indigofera densiflora*. About 14 bruchid species worldwide are known to feed in seeds of about 25 species of *Indigofera*. Most of what we consider to be verified records are from the New World and almost all of these verified records from the New World are species in the genus *Acanthoscelides*. In the Old World most species that are reported to feed in seeds of *Indigofera* are in the genus *Bruchidius* Schilsky.

Etymology. This species is named in honor of Cheryl Lyn Johnson Johnson, daughter of the second author, because she has assisted studies of bruchids many times in the field and lab. Also because she married a Johnson. Thus all of the second author's grandchildren carry the surname Johnson.

Acknowledgments

We are grateful to Northern Arizona University for providing space for Johnson and Romero to conduct part of this research and to the Colegio de Postgraduados for funds and space for Romero. We also thank Rick Conway, Margaret Johnson, and Rod Johnson for help in the field and lab. We are most appreciative to R. Liesner for identifying plants.

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SCIENTIFIC NOTE

Wallacea Baly, a Valid Name in the Hispinae (Coleoptera: Chrysomelidae)

Baly (1859:97) proposed the name *Wallacea* (type species, *Wallacea bowringii* Baly, by original designation) for three species of hispine chrysomelids from Indonesia. Almost concurrently, Doleschall (1859:82) proposed the same name for a stratiomyid fly (Diptera: Stratiomyidae; type species, *Wallacea argentea* Doleschall, by monotypy) also from Indonesia. Both publications were dated in the original as 1858, which is widely cited in association with these names.

Maulik (1928:159) proposed *Wallaceana* as a replacement name for *Wallacea* Baly, stating that although he could not date the publications involved precisely, "it seems that Doleschall's paper may have appeared a few month's earlier than Baly's book." Subsequent dating research now shows that the opposite is true. Sherborn (1934:310), working from records in the British Museum (Natural History), determined that Baly's work was published 12 February 1859. Thompson, Evenhuis, & Sabrosky (1999:402) dated Doleschall's paper as 14 April 1859, based on evidence in the minutes of the society's meetings.

The nomenclatural consequence of this dating research is that *Wallacea* Baly is the oldest genus group name, and is therefore valid in the Hispinae, with *Wallaceana* Maulik reduced to a synonym. Uhmann (1958) listed 30 valid species in this genus, all from the Oriental Region. *Wallacea* Doleschall is a junior homonym of Baly's name. *Gabaza* Walker (1858:80), previously thought to be a junior synonym of *Wallacea* Doleschall, is now the valid genus group name for the stratiomyid taxon.

I thank my colleague Chris Thompson for advice on nomenclature, and Charles Staines, Allen Norrbom, and Natalia Vandenberg for reviewing the manuscript.

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**DESCRIPTION AND PHYLOGENY OF *STAMINODEUS*,
A NEW GENUS OF DERELOMINI (COLEOPTERA: CURCULIONIDAE)
ASSOCIATED WITH CYCLANTHACEAE**

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Abstract

Staminodeus, **new genus**, is described for seven species: *S. inermis*, **new species**, from Panama; *S. curvitibialis*, **new species**, from Colombia and Venezuela; *S. denticulatus*, **new species**, from Costa Rica and Panama; *S. bispinosus*, **new species**, from Panama; *S. forcipis*, **new species**, from Costa Rica; *S. dilatatus*, **new species**, from Panama; and *S. vectoris*, **new species**, from Costa Rica and Panama. *Staminodeus* is placed in Derelomini, and is characterized by the putative synapomorphies: carinate rostrum, male with prothoracic leg ventrally denticulate (excepting *S. inermis*) as well as median lobe internally with complex structures, and female with frontal spine. All species are hypothesized to be associated with the staminodes of the inflorescences of Cyclanthaceae. Field observations on the reproductive behavior of *S. vectoris* at La Selva, Costa Rica, indicate that the protibia in males is used to displace competitors, whereas the spine in females was used as a point of support while transporting the detached staminodes to oviposition sites on the forest floor. A cladistic analysis with *Notolomus basalis* LeConte, *Perellesschus carludovicae* (Günther), and *Systenotelus costaricensis* Anderson & Gómez as out-group taxa hypothesizes the phylogenetic relationships (*S. inermis*, ((*S. curvitibialis*, *S. denticulatus*), ((*S. bispinosus*, *S. forcipis*), (*S. dilatatus*, *S. vectoris*)))).

Resumen

Staminodeus, **género nuevo**, se describe para siete especies: *S. inermis*, **especie nueva**, de Panamá; *S. curvitibialis*, **especie nueva**, de Colombia y Venezuela; *S. denticulatus*, **especie nueva**, de Costa Rica y Panamá; *S. bispinosus*, **especie nueva**, de Panamá; *S. forcipis*, **especie nueva**, de Costa Rica; *S. dilatatus*, **especie nueva**, de Panamá; y *S. vectoris*, **especie nueva**, de Costa Rica y Panamá. *Staminodeus* se coloca en Derelomini, y se caracteriza por las sinapomorfías putativas: rostro carinado, macho con pata protorácica ventralmente denticulada (exceptuando *S. inermis*) así como lóbulo mediano internamente con estructuras complejas, y hembra con espina frontal. Se hipotetiza que todas las especies están asociadas con los estaminoides de las inflorescencias de Cyclanthaceae. Observaciones de campo sobre el comportamiento reproductivo de *S. vectoris* en La Selva, Costa Rica, indican que la protibia en machos es usada para desplazar competidores, y que la espina en hembras es usada como un punto de apoyo durante el transporte de los estaminoides separados a los sitios de oviposición en el piso del bosque. Un análisis cladístico con *Notolomus basalis* LeConte, *Perellesschus carludovicae* (Günther), y *Systenotelus costaricensis* Anderson & Gómez como grupos externos hipotetiza las relaciones filogenéticas (*S. inermis*, ((*S. curvitibialis*, *S. denticulatus*), ((*S. bispinosus*, *S. forcipis*), (*S. dilatatus*, *S. vectoris*)))).

The Neotropical association between derelomine weevils (Curculionidae: Curculioninae *sensu* Kuschel 1995) and Cyclanthaceae presents many questions to be addressed in a phylogenetic context. Derelomini consist of approximately 40 genera with over 200 species in the literature (Alonso-Zarazaga

and Lyal 1999), among them *Celetes* Schönherr, *Derelomus* Schönherr, and *Phyllotrox* Schönherr. Although the tribe is cosmopolitan, the majority of species occur in tropical regions and are associated with palms, cyclanths, and arums. Some species, e.g., *Elaeidobius kamerunicus* (Faust), are considered to be important pollinators of cultivated palms (for review see Henderson 1986). The only genera that have been described with explicit reference to Cyclanthaceae are *Perellesschus* Wibmer & O'Brien and *Systenotelus* Anderson & Gómez, each with three species (Wibmer and O'Brien 1986; Anderson and Gómez 1997). Meanwhile, a large number of undescribed taxa have been observed to pollinate and reproduce in the reproductive organs of several genera of Cyclanthaceae (Gottsberger 1991; Eriksson 1994a; Seres and Ramírez 1995; Anderson and Gómez 1997; Franz 1999). At La Selva, Costa Rica, 13 species of Derelomini are associated with 11 species of Cyclanthaceae (Franz 1999). This monocot host family consists of 12 genera with 230 species which occur in wet forests throughout the Neotropical region (Harling *et al.* 1998); a generic phylogeny has been proposed by Eriksson (1994b). An extensive revision of Derelomini, including the description and phylogeny of its genera, is necessary before attempting to reconstruct the biological history of this association. In the present paper I begin by describing a new genus, *Staminodeus* Franz, with seven species from Colombia, Costa Rica, Panama, and Venezuela. I provide field observations on the reproductive behavior of *S. vectoris* Franz, as well as a cladistic analysis of *Staminodeus* using the following outgroups: *Notolomus basalis* LeConte, *Perellesschus carludovicae* (Günther), and *Systenotelus costaricensis* Anderson & Gómez.

Methods

Morphological Description. The entomological terminology follows Nichols (1989), as well as Ting (1936) for the mouthparts, Crowson (1944) for the metendosternite, Zherikhin and Gratshev (1995) for wing venation, and Burke (1959) for the genital complex in both sexes. Measurements were made using the ocular scale of a dissecting microscope (Wild M5A) at 50 × magnification or a compound microscope (Leitz Dialux 20) at 160 × magnification. Body length was measured from anterior margin of eye to posterior margin of elytron; rostrum length was measured from apex of rostrum to anterior margin of eye (number of measurements in parentheses, e.g., N = 15 for the preceding values). These abbreviations were used: l = length, w = width, r = rostrum, p = pronotum, t = tibia, and f = femur. Ventrites are numbered according to their homology within the curculionoid condition (e.g., see Thompson 1992), i.e., the first externally visible ventrite is ventrite III. Male descriptions are followed by those of females. Morphological descriptions are complementary, i.e., the shared features between genus and species, male and female, and serial homologs (e.g., legs) are not repeated after being mentioned for the first time. Illustrations were prepared using the drawing tube of either microscope, and SEM pictures of *S. vectoris* were produced with a Hitachi S-2360N. Type labels include the species name, e.g., "*Staminodeus vectoris*," the type status and gender, e.g., "Holotype, ♂," and "N. M. Franz, 2000." They are red, green, and yellow for holotypes, allotypes, and paratypes, respectively. Insect collections are coded as in Arnett *et al.* (1993).

Cladistic Analysis. The present lack of phylogenetic resolution and the large number of undescribed taxa within Derelomini are confining conditions for the choice of outgroups for *Staminodeus*, although these conditions are

acceptable as long as the character homologies are applicable to the ingroup taxa (e.g., see Nixon and Carpenter 1993). Using the key to the Petalochilinae by Kuschel (1952) as the best currently available reference, *Not. basalis* was chosen as a distinctive taxon which is associated with the cabbage palm *Sabal palmetto* (Walt.) Lodd. ex Schultes (Brown 1976), whereas *Per. carludovicae* and *Sys. costaricensis* were chosen because they are associated with Cyclanthaceae and would key out to the same couplet as *Staminodeus*, namely *Phyllotrox*. Described species of *Phyllotrox* were excluded because this genus is probably not monophyletic and in need of revision. All species of *Staminodeus* were included as ingroup taxa. The data matrix was operated in Winclada (Nixon 1999), and the tree search was performed with NONA (Goloboff 1993), using the following commands: "whennig" and "mswap+" which found all most parsimonious trees. Bremer branch support values (Bremer 1994) were calculated in NONA with "hold 5000," "suboptimal 20," and "bsupport 20." The resulting trees and character distributions were examined in Winclada. Autapomorphies for the species of *Staminodeus* (see descriptions) and for the outgroup genera were excluded from the matrix. The character arrangement follows the sequence of description.

Staminodeus, new genus

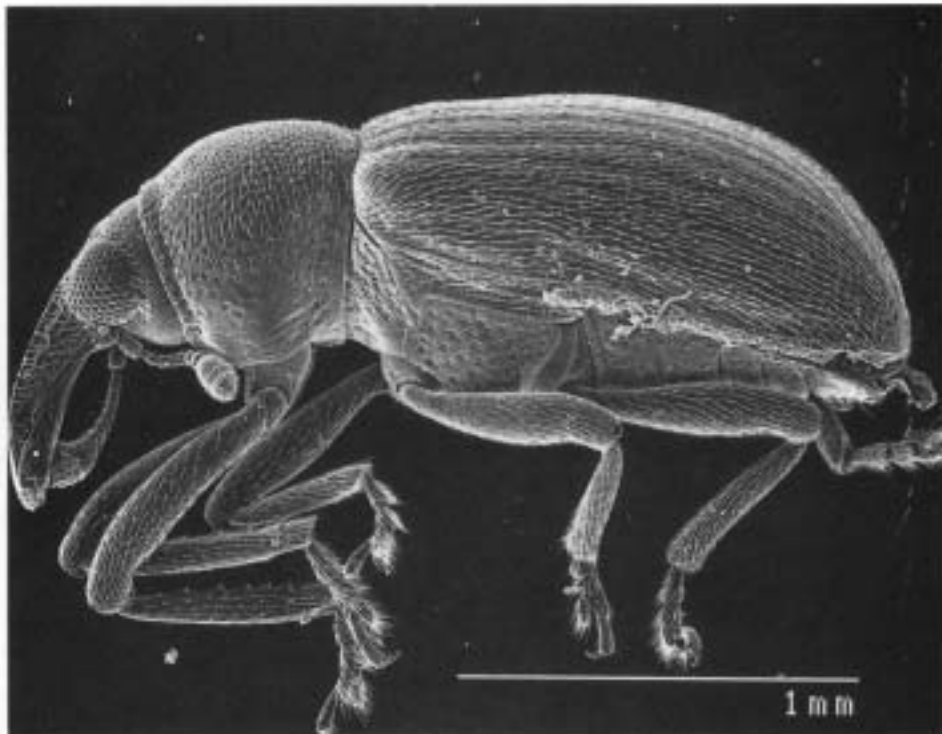
Diagnosis. Like *Perellesschus* and *Systemotelus*, *Staminodeus* keys out to *Phyllotrox* in Kuschel (1952). However, *Staminodeus* (Fig. 1a) is distinguished from these taxa and all other presently known Derelomini by the carinate rostrum in both sexes and the frontal spine in females (Fig. 1b). With the notable exception of *S. inermis* Franz, the prothoracic leg in all males is ventrally denticulate.

Male. Small, length 1.2–2.7 mm, width 0.6–1.2 mm, oval to elongate, l/w = 1.9–2.5, greatest width near anterior 2/5 of elytron, slightly compressed, dorsally convex, ventrally slightly convex, dark reddish-brown, sculpture punctate, vestiture short, fine, appressed, shiny.

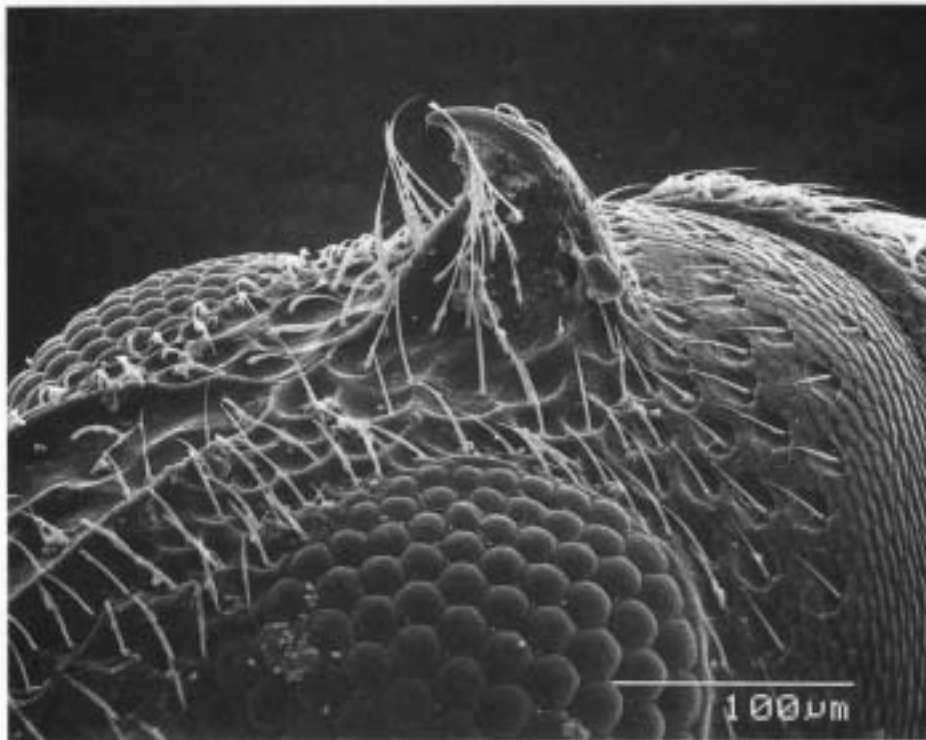
Head. *Mandible* (Fig. 2a). With 2 large dentes, inner dens with triangular emargination, outer dens slightly superposed. *Maxilla* (Fig. 2b). Cardo basally bilobed, apically broadened; stipes apically narrowed, outer margin with 1 large seta; galea+lacinia+palpiger fused, outer margin with 1 large seta, inner 1/3 setose, inner margin with 4–10 lacinial dentes (*sensu* Ting 1936); maxillary palps 3-segmented, extending beyond apex of palpiger; I longer than II, transverse; II shorter than III, transverse; III equilateral, apically papillate. *Labium* (Fig. 2c). Prementum with lateral margins apically diverging, apical margin with 2 triangular projections, median tendon triangular, dorsally and ventrally with 2 large setae; labial palps 2-segmented, extending beyond apex of prementum; I+II similar in length, equilateral; II apically papillate. Postmentum ventrally with 2 large setae.

Rostrum. In lateral view fairly short, 0.3–0.6 mm, slightly shorter than pronotum, r/p = 0.7–1.0, dorsally slightly arcuate, narrowed in apical 1/3, ventrally subrectate; in dorsal view fairly broad, breadth similar throughout; in cross-section subquadrate; dorsally with 2 marginal carinae, extending from frons to subapex of rostrum, slightly diverging, and 2 central carinulae, extending from basal 1/4 to apical 1/3 of rostrum, diverging; glabrate or carinulate in laterobasal 1/3; ventrally with 2 median sulci, extending from base to basal 2/5 of rostrum, subparallel; antennal insertion near apical 1/3; scrobe extending to eye, narrow, deep, subrectate, apically acuminate, shallow, basally vaguely defined.

Antenna. 11-segmented, extending to anterior 1/2 of pronotum, fairly slender; scape extending to eye, slightly shorter than funicle+club, slender, slightly arcuate, clavate in apical 1/4; funicle 7-segmented; I large, similar in length to II+III, elongate, clavate; II–VII small, similar in length, gradually progressing from elongate to transverse, clavate;



a



b

Fig. 1. *Staminodeus vectoris*, a) male, habitus; b) female, frons.

club 3-segmented, similar in length to III/IV–VII of funicle, oval, compact; I distinctly longer than II+III; II+III similar in length; funicle+club with short pubescence.

Eye. Fairly large, subcircular, slightly protruded, distant from anterior margin pronotum by $1/4$ – $1/2$ diameter of eye, separated by distance greater than breadth of antennal club, black.

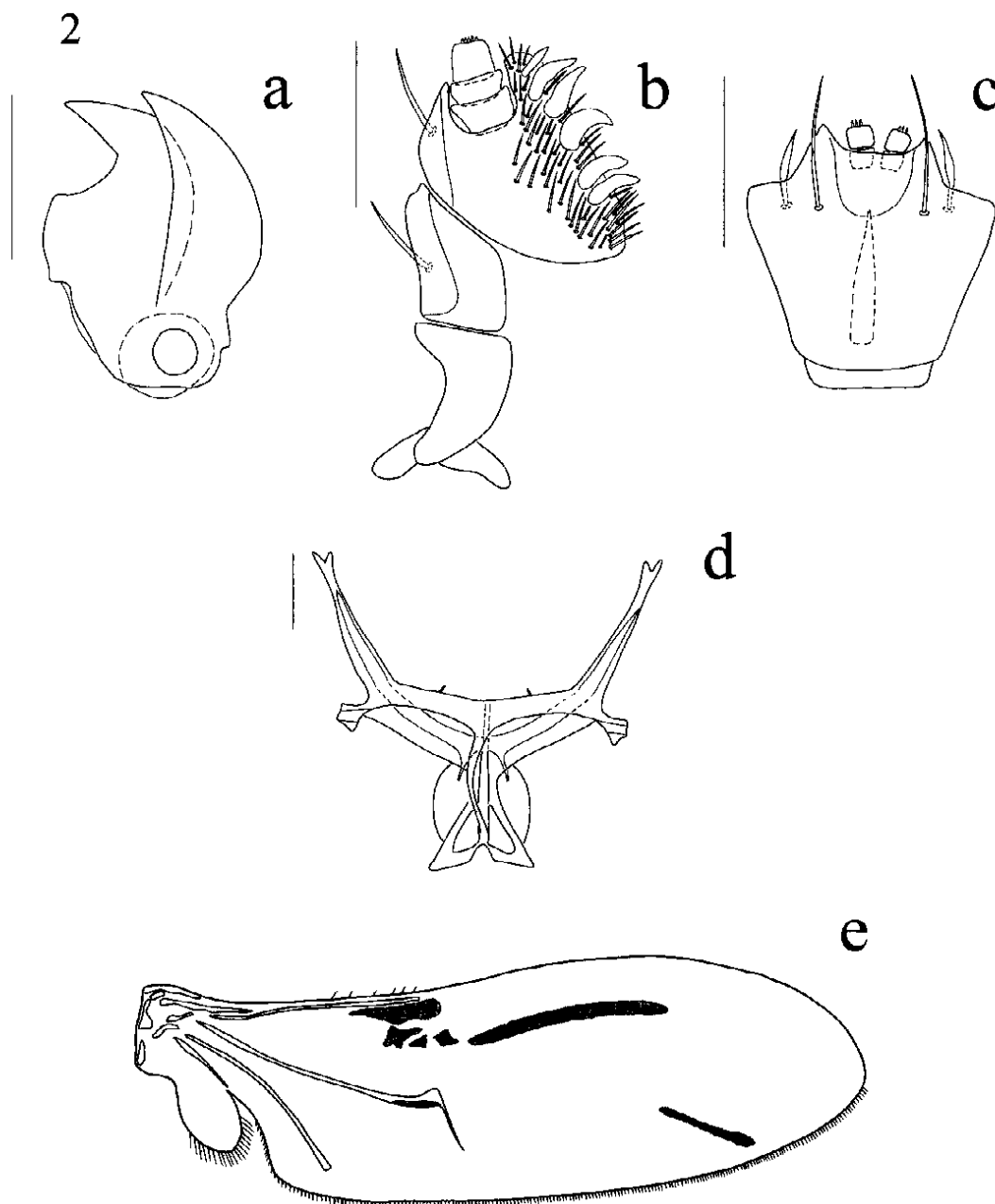


Fig. 2. *Staminodeus vectoris*, male, **a)** left mandible, ventral view; **b)** right maxilla, ventral view; **c)** labial prementum, ventral view; **d)** metendosternite, posterior view; **e)** right wing, dorsal view. Scale bar 0.05 mm for a), b), and c); 0.1 mm for d); and 0.5 mm for e).

Head. Fairly small, globular, transverse, frons glabrate or with 1 spinule.

Thorax. Pronotum. In dorsal view large, globular, l/w = 0.8–1.1, greatest width near central region, anteriorly narrowed, slightly to distinctly convex, anterior margin explanate, lateral margins rotundate, posterior margin bisinuate, sculpture densely punctate, vestiture medially converging; in lateral view conical, tumescent above procoxal cavities, narrowed in posterior 1/3, posterior margin lateroventrally explanate.

Epipleura. Mesepisternum triangular; mesepimeron pentagonal, dorsally broadened, projecting to pronotum+elytron; metepisternum tetragonal, extending beyond lateral

margin of metasternum, anteriorly broadened, posteriorly narrowed; metepimeron extending above posterior 1/4 of metepisternum.

Sterna. Prosternum fairly long, equilateral, convex, procoxal cavities inserted near central region, contiguous; mesosternum nearly 1/2 as long as metasternum, transverse, convex, retracted from ventral plane, mesocoxal cavities inserted at posterior margin, separated by distance nearly 1/5 as broad as mesocoxae; metasternum transverse, laterally convex, centrally plane, medially canaliculate, anterior margin with nodulate projection between mesocoxae, posterior margin with small, triangular projection near inner margin of each metacoxa, metacoxal cavities inserted at posterior margin, separated by distance similar to length of ventrite IV.

Metendosternite. (Fig. 2d). Stalk slightly shorter than furcal arms, ventrally broadened, emarginate, separated by median flange; ventral flange broader than stalk, laterally convex; lamina nearly 1/4 as long as central sclerotization; lateral projections apically expanded; anterior tendons inserted near lateral 1/3 of dorsal margin of lamina, slender, converging; furcal arms diverging, dorsally bifurcate.

Legs. Prothoracic leg distinctly longer than mesothoracic leg, slender; procoxa elongate, conical, apically obliquely truncate, inner margin with 1 subapical foveola; prothoraxer transverse, apically broadened, oblique; profemur similar in length to pronotum, $f/p = 0.9-1.3$, slender, in cross-section subcircular, ventrally inermous or denticulate; protibia similar in length to profemur, $t/f = 0.8-1.2$, slender, in cross-section subquadrate, width similar throughout, anteroventral margin inermous or denticulate/dentate, apically truncate, posteriorly narrowed, with row of setae ventrally ascending beyond condyle, inermous or mucronate; protarsus 5-segmented, nearly 3/5 as long as protibia; I longer than II, elongate, clavate; II shorter than III, equilateral, clavate; III bilobed, equilateral, lobes slender, diverging; IV nearly 1/4 as long as III, equilateral; V similar in length to II+III, elongate, clavate; protarsal claws nearly 2/5 as long as V, paired, simple; I-IV ventrally with long vestiture. Mesothoracic leg slightly shorter than metathoracic leg, fairly slender; mesocoxa equilateral, subcircular; mesofemur fairly slender, slightly sinuate, in cross-section subcircular, slightly compressed, greatest with near apical 2/5, ventrally inermous; mesotibia short, anteroventral margin inermous, apically slightly broadened, inermous or mucronate. Metacoxa transverse, elliptical, medially canaliculate; metatibia fairly long, apically inermous.

Scutellum. Exposed by elytron, intermediate in size, pentagonal.

Elytron. In dorsal view oval to elongate, $l/w = 1.3-1.6$, greatest width near anterior 2/5, broader than posterior margin of pronotum, humeri subquadrate, anterior margin bisinuate, lateral margins subparallel in anterior 1/2, gradually converging in posterior 1/2, posterior margin rotundate, subcontiguous; in lateral view convex, lateral margin slightly sinuate; 10-striate; striae similar in breadth to intervals, punctate, shallow, maculations dark brown, equilateral, subcontiguous; intervals light brown; III+VI merging before posterior margin, VII-IX ascending in anterior 1/3, X contiguous with lateral margin; vestiture parallel.

Wing. (Fig. 2e). Slightly longer than body, wing/body = 1.2-1.5, elliptical to elongate, $l/w = 2.6-3.7$, greatest width near apical 1/3, anterior margin sinuate, posterior margin slightly convex, anal lobe large; C, Sc, R, Cu, Cu1, 2A, and 4A present; with 1 small, triangular maculation in radial field and 2 large, elongate maculations in apical field; radial sclerites and 1 radiomedial sclerotization present; stigmal patch with 2 short macrosetae (see Zherikhin and Gratshev (1995:756); long macrosetae along apical margin of anal lobe; short macrosetae sparse along apical 1/2 of R, dense along posterior margin; microsetae throughout surface.

Abdomen. *Venter*. Nearly 2 × as long as lateral margin of metasternum, laterally convex, centrally plane, posteriorly gradually converging; III+IV fused, V-VII separated; III similar in length to IV, transverse, anterior margin with large, triangular, acuminate projection between metacoxae, anterior edges projected; IV longer than V, transverse; V+VI similar in length, transverse; VII similar in length to IV, transverse, posterior margin rotundate, cristulate; vestiture fairly long, semierect. *Pygidium*. Indistinct (covered by elytron), shorter than VII, transverse, slightly convex, narrow, parallel to orientation of tergum. *Tergum VIII*. Nearly 1/2 as long as spiculum gastrale, transverse,

convex, anterior margin subrectate, anterior edges projected, posterior margin subrectate, plicate, setose. *Sternum VIII*. Consisting of 2 elongate, plicate, posteriorly diverging sclerites, nearly $1/3-1/2$ as long as tergum VIII. *Spiculum gastrale*. Similar in length to median lobe, narrow, subrectate, medially flanged, basally with irregular expansion, apically bifurcate, with short, slender, perpendicular projections (T-shaped). *Tegmen*. Nearly $1/3$ as long as median lobe, fairly slender, Y-shaped; tegminal apodeme slightly shorter than lateral apodemes, subrectate; lateral apodemes arcuate, projecting to lateral region of median lobe. *Aedeagus*. Median lobe in dorsal view elongate, $l/w = 2.2-3.5$, basal margin irregular, lateral margins subrectate, subparallel, apical margin rotundate; in lateral view fairly broad, slightly sinuate, apically narrowed, slightly deflexed, porose; internally with 2 elongate, laterobasal sclerites, extending from basal region to central region of median lobe; with 1 elongate, median sclerite, extending along laterobasal sclerites; with 2 apical rami; and extended, denticulate regions; aedeagal apodemes shorter or longer than median lobe, narrow.

Variation. Color variation occurs in all species, *i.e.*, teneral individuals are pale yellow to light-reddish brown. Morphometrical variation occurs to a remarkable extent in male individuals of all species (excepting *S. inermis*). Apparently, larger males display positive allometry in the shape of the prothorax, *i.e.*, the pronotum is distinctly expanded, the prothoracic leg is very long, and anteroventral margin of the protibia bears more and larger dentes (Franz 1999).

Female. Length 1.1–2.4 mm, width 0.6–1.2 mm, $l/w = 1.8-2.4$. Rostrum 0.3–0.7 mm, subequal in length to pronotum, $r/p = 0.8-1.2$; antennal insertion near apical $2/5$. Frons with 1 basally triangular, apically acute, arcuate spine, nearly $1/4-3/4$ as long as diameter of eye, anteriorly with long, fine, erect setae. Pronotum fairly large, fairly globular, $l/w = 0.7-1.1$, slightly convex. Prothoracic leg longer than mesothoracic leg, fairly slender; procoxa anteriorly with long vestiture; $f/p = 0.9-1.3$, profemur fairly slender, slightly sinuate, in cross-section subcircular, slightly compressed, greatest width near apical $2/5$, ventrally inermous; $t/f = 0.7-1.1$, protibia fairly slender, anteroventral margin inermous, apically slightly broadened, inermous; mesotibia apically inermous. Elytron $l/w = 1.2-1.6$. Wing/body = 1.2–1.5, wing $l/w = 3.0-3.6$. Posterior margin of ventrite VII glabrate. *Tergum VIII* nearly $2/5$ as long as sternum VIII, transverse, convex, anterior margin subrectate, posterior margin rotundate, plicate, setose; *tergum IX* weakly sclerotized, similar in length to sternum VIII, elongate, anteriorly irregular, posteriorly narrowed; *sternum VIII* narrow, subrectate, medially flanged, apically bifurcate (Y-shaped); *coxites* nearly $1/2$ as long as sternum VIII, elongate, apically setulose, styli elongate, apically with 1 seta; *vagina+bursa copulatrix* large, elongate, longer than sternum VIII, with common oviduct; *spermathecal duct* apically papillate; *spermatheca* elongate, abruptly deflexed (C-shaped), basally rugose, apically narrowed; basally with large, elongate gland reservoir.

Variation. Apparently, the frontal spine displays negative allometry (Franz 1999, in prep.). The morphometrical variation of the prothorax is less remarkable than in males.

Type Species. *Staminodeus vectoris*, by present designation.

Etymology. Named for the association with the staminodes of the inflorescences of Cyclanthaceae (see below). Gender masculine.

Key to the Species of *Staminodeus*

1. Length 1.1–1.4 mm, light reddish-brown; male with eyes separated by distance similar to breadth of antennal club, frons glabrate, profemur ventrally inermous, anteroventral margin of protibia apically mucronate (Fig. 3a); female with eyes separated by distance slightly greater than breadth of antennal club, frontal spine nearly $1/3$ as long as diameter of eye, protibia apically mucronate *S. inermis* n. sp.

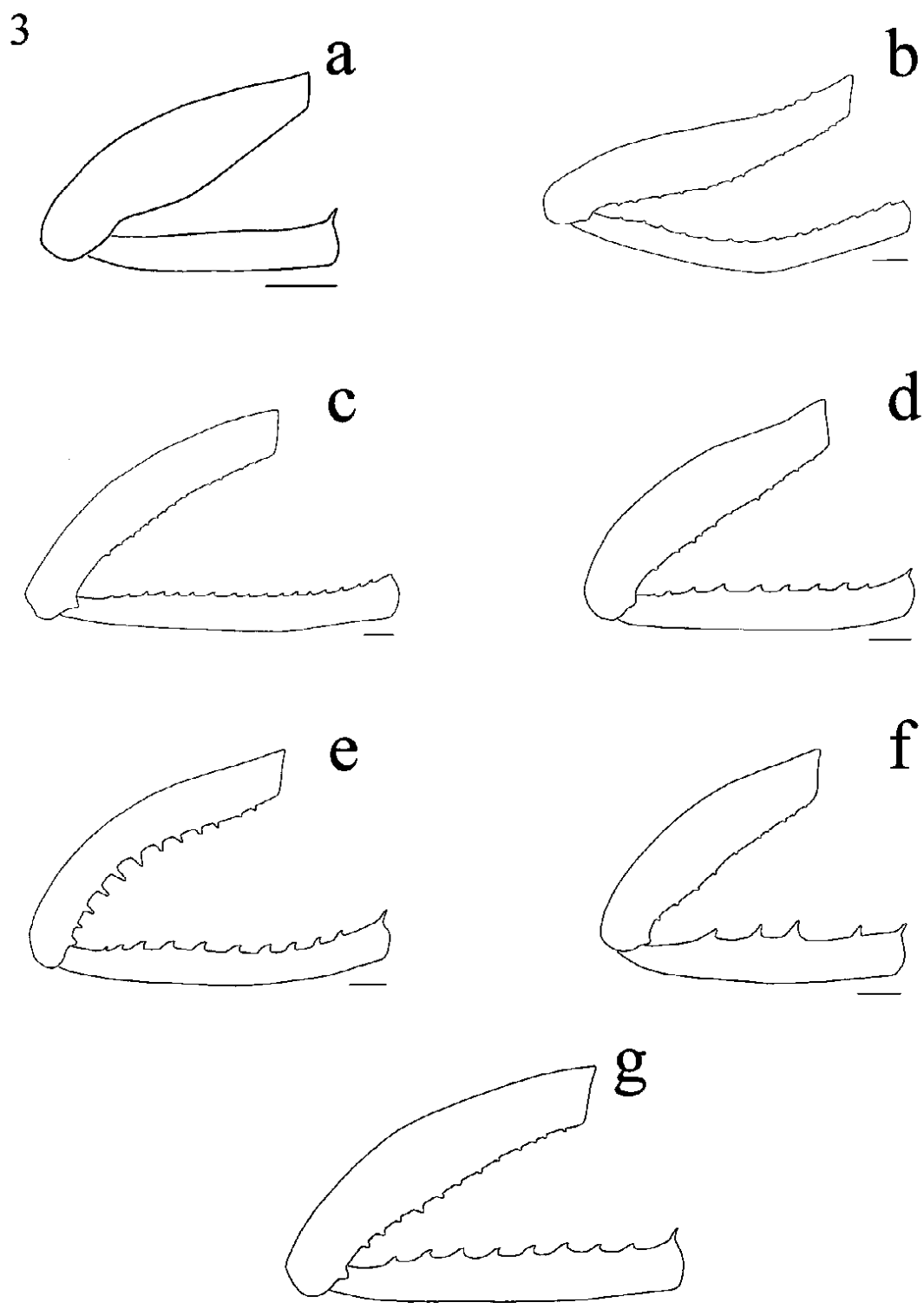


Fig. 3. *Staminodeus*, male, right profemur and protibia, anterior view, **a)** *S. inermis*; **b)** *S. curvitibialis*; **c)** *S. denticularis*; **d)** *S. bispinosus*; **e)** *S. forcipis*; **f)** *S. dilatatus*; **g)** *S. vectoris*. Scale bar 0.1 mm.

- 1'. Length 1.4–2.7 mm, dark reddish-brown; male with eyes separated by distance (slightly) greater than breadth of antennal club, frons glabrate or spinulose, profemur ventrally denticulate/dentate, anteroventral margin of protibia denticulate/dentate, protibia apically inermous or mucronate (Fig. 3b–g); female with eyes separated by distance greater than breadth of antennal club, frontal spine nearly $1/2$ – $3/4$ as long as diameter of eye, protibia apically inermous 2
- 2(1). Male with laterobasal $1/3$ of rostrum carinulate, anteroventral margin of protibia with 12–18 denticuli, protibia apically inermous (Fig. 3b–c) 3
- 2'. Male with laterobasal $1/3$ of rostrum glabrate, anteroventral margin of protibia with 3–10 dentes, apically mucronate (Fig. 3d–g) 4
- 3(2). Male with greatest width near humeri, rostrum slightly broadened in apical $1/3$, frons glabrate, procoxal cavities inserted near anterior $1/3$ of prosternum, profemur sinuate, posterolaterally denticulate, protibia distinctly arcuate (Fig. 3b); female with laterobasal $1/3$ of rostrum carinate, frontal spine nearly $1/2$ as long as diameter of eye *S. curvibialis* n. sp.
- 3'. Male with greatest width near anterior $2/5$ of elytron, breadth of rostrum similar throughout, frons spinulose, procoxal cavities inserted near central region of prosternum, profemur slightly arcuate, posterolaterally glabrate, protibia slightly arcuate (Fig. 3c); female with laterobasal $1/3$ of rostrum carinulate, frontal spine nearly $2/3$ – $3/4$ as long as diameter of eye *S. denticulatus* n. sp.
- 4(2). Male with frons spinulose 5
- 4'. Male with frons glabrate 6
- 5(4). Male with frontal spine nearly $1/5$ as long as diameter of eye, profemur slightly sinuate, ventrally denticulate, protibia subrectate, anteroventral margin of protibia with 6–10 dentes (Fig. 3d) *S. bispinosus* n. sp.
- 5'. Male with frontal spine nearly $2/5$ as long as diameter of eye, profemur (distinctly) arcuate, ventrally denticulate/dentate, protibia slightly arcuate, anteroventral margin of protibia with 8–10 dentes (Fig. 3e) *S. forcipis* n. sp.
- 6(4). Male with anteroventral margin of protibia with 3–6 subrectate dentes (Fig. 3f) *S. dilatatus* n. sp.
- 6'. Male with anteroventral margin of protibia with 6–10 arcuate dentes (Fig. 3g) *S. vectoris* n. sp.

Staminodeus inermis, new species

Diagnosis. *Staminodeus inermis* is distinguished from the other species of *Staminodeus* by the small size, the light reddish-brown color (but see section on variation in generic description); the short distance between the eyes, the ventrally inermous prothoracic leg in males; and the fairly short frontal spine in females.

Male. Very small, length 1.2–1.3 mm, width 0.6–0.7 mm, $l/w = 1.9$ – 2.0 , light reddish-brown. Rostrum 0.3 mm, $r/p = 0.9$ – 1.0 . Eyes separated by distance similar to breadth of antennal club. Frons glabrate, slightly protruded. Pronotum $l/w = 0.8$, slightly convex. Prosternum similar in length to mesosternum, slightly convex. Profemur (Fig. 3a) slightly sinuate, $f/p = 1.0$ – 1.3 , greatest width near apical $2/5$, ventrally inermous; protibia (Fig. 3a) subrectate, $t/f = 0.8$ – 0.9 , anteroventral margin inermous, apically mucronate, pro-

mucron nearly $2/3$ as long as protarsal claw; mesotibia apically mucronate, mesomucron nearly $1/4$ as long as mesotarsal claw. Elytron $l/w = 1.3-1.5$ ($N = 15$). Wing/body = $1.3-1.5$, wing $l/w = 2.9-3.7$. Median lobe (Fig. 4a) $l/w = 2.6-3.0$ ($N = 5$), laterobasal sclerites apically broadened, denticulate, median sclerite plicate, apical rami basally diverging, apically fused into triangular projection, basal $1/3$ of median lobe denticulate, aedeagal apodemes shorter than median lobe.

Female. Length 1.1–1.4 mm, width 0.6–0.7 mm, $l/w = 1.9-2.0$. Rostrum 0.3–0.4 mm, $r/p = 1.0-1.2$. Eyes separated by distance slightly greater than breadth of antennal club. Frontal spine nearly $1/3$ as long as diameter of eye. Pronotum $l/w = 0.7-0.8$. $F/p = 0.9-1.3$; $t/f = 0.7-1.0$, protibia apically mucronate, promucron nearly $1/4$ as long as protarsal claw. Elytron $l/w = 1.3-1.5$ ($N = 15$). Wing/body = $1.4-1.5$, wing $l/w = 3.1-3.6$ ($N = 5$). Spermatheca (Fig. 5a) deflexed nearly 135° , apex acute.

Type Information. Male holotype "PANAMA, Bocas del Toro, Corriente Grande, Rio Changuinola/ $9^\circ 17' 30''N$, $82^\circ 32' 41''W$, H. Wolda, Feb. 28, 1980" (CWOB); female allotype, same label as male holotype with different date "Feb. 12, 1980" (CWOB); male paratypes, same labels as male holotype with different dates "Jan. 22, 1980" (AMNH, 1), "Jan. 23, 1980" (AMNH, 2), "Jan. 25, 1980" (AMNH, 1), "Jan. 26, 1980" (AMNH, 1; BMNH, 1), "Jan. 29, 1980" (BMNH, 1), "Feb. 6, 1980" (BMNH, 1), "Feb. 8, 1980" (BMNH, 1), "Feb. 10, 1980" (BMNH, 1), "Feb. 11, 1980" (CMNC, 1), "Feb. 12, 1980" (CMNC, 1), "Apr. 3, 1980" (CMNC, 1), "Apr. 10, 1980" (CMNC, 1), "Apr. 12, 1980" (CMNC, 1), "Apr. 16, 1980" (CWOB, 1); "Panama, Bocas del Toro, Cor. Grande, Rio Changuinola, $9^\circ 17' 30''N$, $82^\circ 32' 41''W$, leg. H. Wolda, II-06-1980" (CWOB, 2), same labels as previous specimens with different dates "II-14-1980" (CWOB, 1), "II-15-1980" (CWOB, 1; INBC, 1), "II-17-1980" (INBC, 1), "II-26-1980" (INBC, 2), "III-25-1980" (INBC, 1), "III-27-1980" (MIUP, 2), "IV-04-1980" (MIUP, 1), "IV-19-1980" (MIUP, 1), "IV-24-1980" (MIUP, 1; MUCR, 3), "IV-25-1980" (MUCR, 1), "V-05-1980" (MUCR, 1); female paratypes, same labels as male holotype with different dates "Jan. 30, 1980" (AMNH, 1), "Feb. 2, 1980" (AMNH, 1), "Feb. 3, 1980" (AMNH, 1), "Feb. 4, 1980" (AMNH, 1), "Feb. 7, 1980" (AMNH, 1), "Feb. 12, 1980" (BMNH, 2), "Feb. 14, 1980" (BMNH, 1), "Feb. 25, 1980" (BMNH, 1), "March 7, 1980" (BMNH, 1), "Apr. 15, 1980" (CMNC, 1), "Apr. 27, 1980" (CMNC, 1), "Apr. 28, 1980" (CMNC, 1); "Panama, Bocas del Toro, Cor. Grande, Rio Changuinola, $9^\circ 17' 30''N$, $82^\circ 32' 41''W$, leg. H. Wolda, II-04-1980" (CMNC, 1), same labels as previous specimen with different dates "II-06-1980" (CMNC, 1), "II-07-1980" (CWOB, 2), "II-14-1980" (CWOB, 1), "II-15-1980" (CWOB, 2; INBC, 1), "II-21-1980" (INBC, 3), "II-26-1980" (INBC, 1), "III-27-1980" (MIUP, 1), "III-29-1980" (MIUP, 2), "IV-02-1980" (MIUP, 1), "IV-20-1980" (MIUP, 1; MUCR, 2), "IV-24-1980" (MUCR, 2), "IV-25-1980" (MUCR, 1).

Etymology. Named for the male plesiomorphy of lacking ventral denticulation on the prothoracic leg—*inermis* signifying "unarmed" (Nichols 1989).

Distribution. *Staminodeus inermis* has been collected on the Caribbean slope of Panama, Provincia Bocas del Toro, Río Changuinola (Fig. 6).

Natural History. Unknown.

Staminodeus curvitibialis, new species

Diagnosis. *Staminodeus curvitibialis* is distinguished from the other species of *Staminodeus* in general, and from *S. denticulatus* in particular, by the glabrate frons, the anterior insertion of the procoxal cavities, and the high number

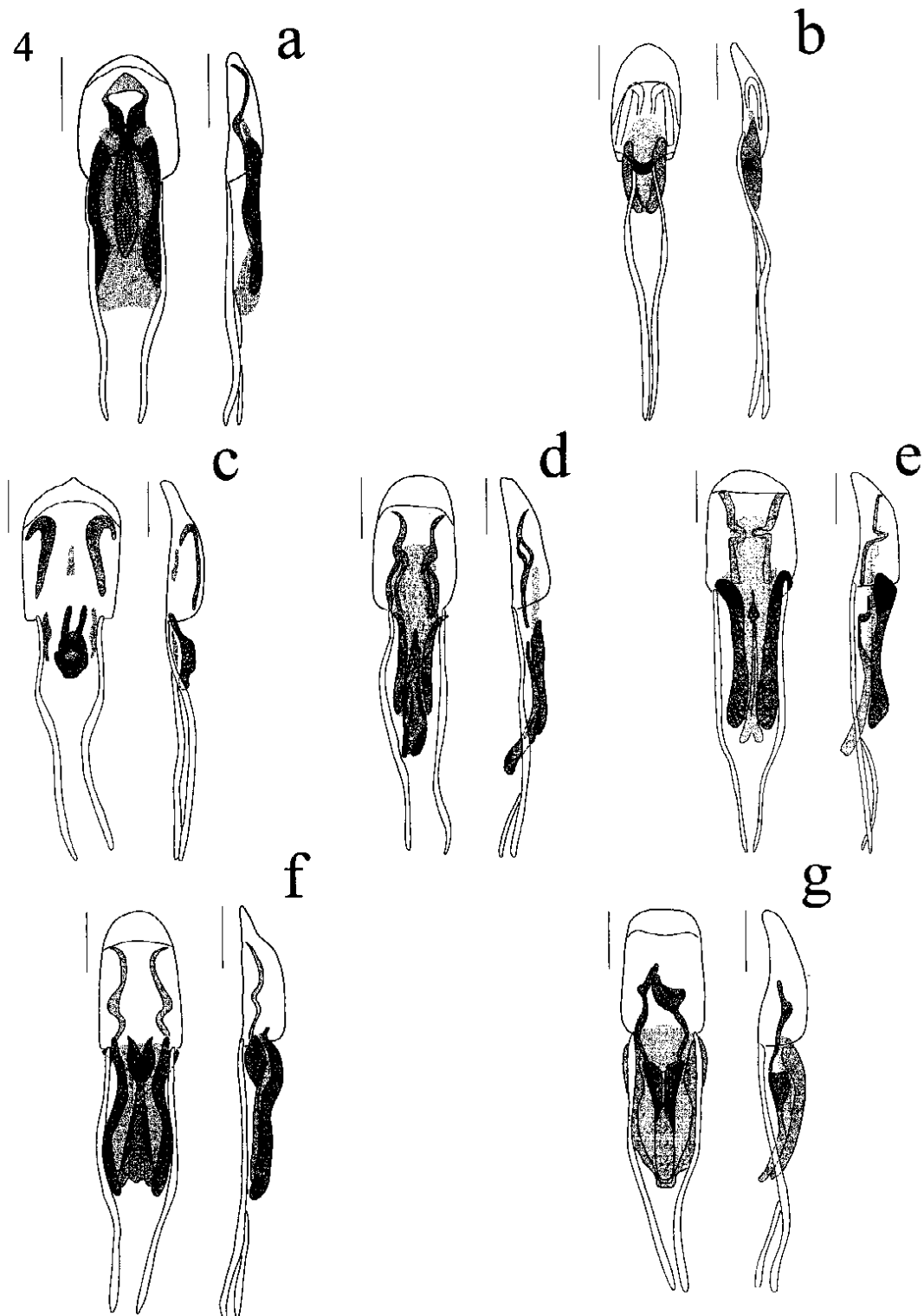


Fig. 4. *Staminodeus*, male, aedeagus, ventral and lateral view, **a)** *S. inermis*; **b)** *S. curvibtibialis*; **c)** *S. denticulatus*; **d)** *S. bispinosus*; **e)** *S. forcipis*; **f)** *S. dilatatus*; **g)** *S. vectoris*. Illustrations are interpretative: denticulation and setation are omitted. Scale bar 0.1 mm.

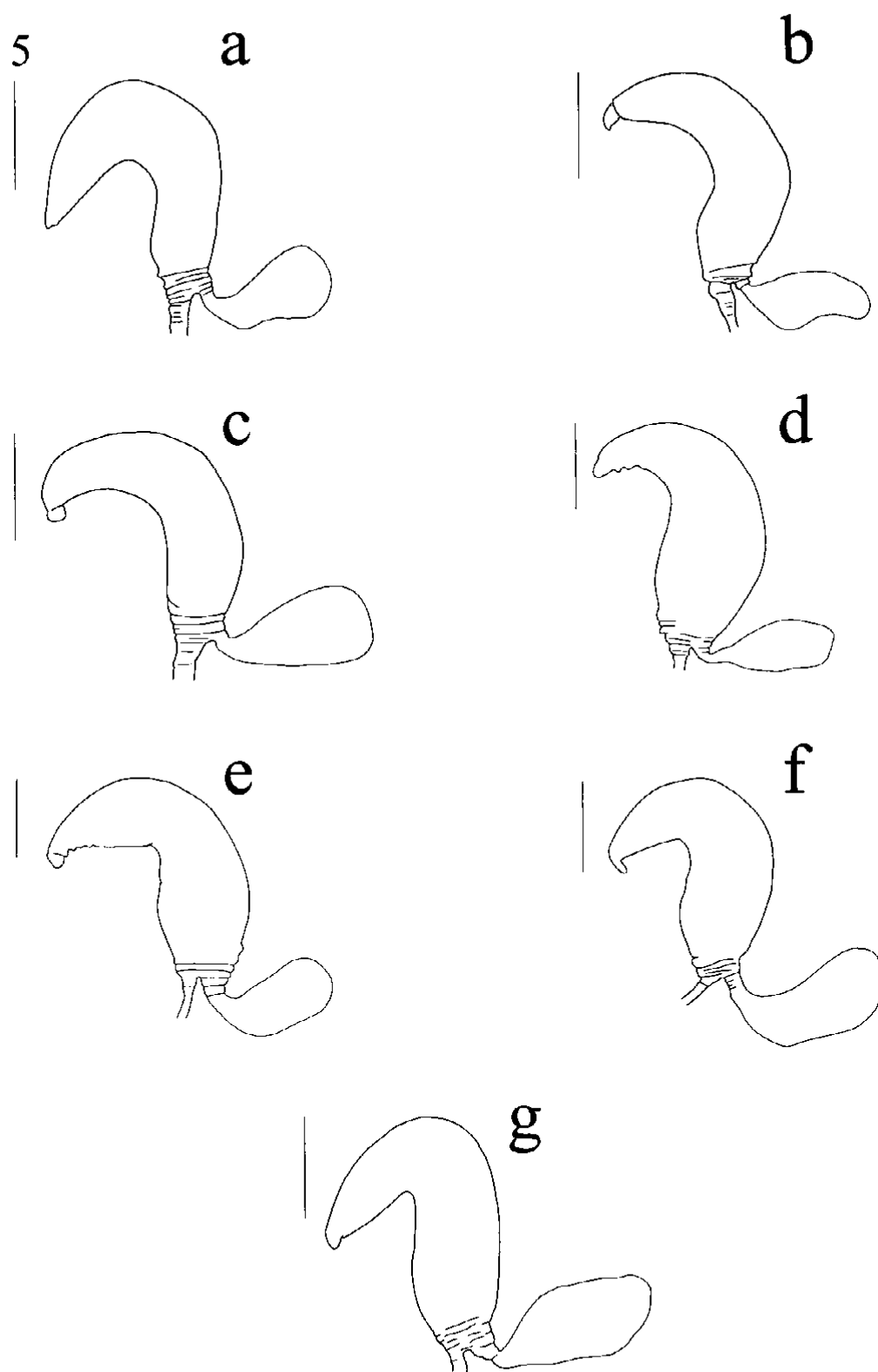


Fig. 5. *Staminodeus*, female, spermatheca and gland reservoir, a) *S. inermis*; b) *S. curvittibialis*; c) *S. denticulatus*; d) *S. bispinosus*; e) *S. forcipis*; f) *S. dilatatus*; g) *S. vectoris*. Scale bar 0.05 mm.



Fig. 6. Distribution of *Staminodeus* in Costa Rica, Panama, and Venezuela, ● *S. bispinosus*; ○ *S. curvitibialis* (distributional record for Colombia, Provincia Nariño, La Planada is omitted); ■ *S. denticulatus*; □ *S. dilatatus*; ▲ *S. forcipis*; △ *S. inermis*; ▽ *S. vectoris*.

of small denticuli along the distinctly arcuate protibia in males; as well as the laterobasal carina along the base of the rostrum in females.

Male. Length 1.9–2.7 mm, width 0.8–1.1 mm, l/w = 2.1–2.5, greatest width near humeri. Outer basal margin of mandible with rotundate projection. Rostrum 0.5–0.6 mm, r/p = 0.6–0.7, slightly broadened in apical 1/3, laterobasal 1/3 carinulate. Eyes separated by distance slightly greater than breadth of antennal club. Head small, frons glabrate. Pronotum l/w = 0.9–1.1, distinctly convex. Prosternum distinctly longer than mesosternum, elongate, distinctly convex, medially with duplicate carina, extending from procoxal cavities to posterior margin, procoxal cavities inserted near anterior 1/3. Profemur (Fig. 3b) very slender, sinuate, f/p = 1.0–1.2, slightly compressed, greatest width near apical 2/5, posterolaterally and ventrally denticulate; protibia (Fig. 3b) very slender, distinctly arcuate, t/f = 1.0–1.1, anteroventral margin with row of 12–18 denticuli, apically inermous; mesotibia apically inermous. Elytron l/w = 1.4–1.6 (N = 15), greatest width of elytron near humeri. Wing/body = 1.2–1.5, wing l/w = 2.6–3.4 (N = 5). Posterior margin of ventrite VII subrectate. Median lobe (Fig. 4b) l/w = 2.4–2.8 (N = 5), laterobasal sclerites denticulate, median sclerite heavily sclerotized, very short, rotundate, impressed, apically spinulose, apical rami weakly sclerotized, apically deflexed, basal 1/2 of median lobe denticulate, aedeagal apodemes longer than median lobe.

Female. Length 1.8–2.3 mm, width 0.8–1.0 mm, l/w = 1.9–2.2, greatest width near anterior 2/5 of elytron. Rostrum 0.5–0.7 mm, r/p = 1.0–1.1, laterobasal 1/3 carinate, laterobasal carina contiguous with dorsolateral carina. Head fairly small, frontal spine nearly 1/2 as long as diameter of eye. Pronotum l/w = 0.8–1.0, greatest width near anterior 1/3. Prosternum longer than mesosternum, equilateral, pleurosternal suture anteriorly with short projection, procoxal cavities inserted near central region. F/p = 1.0–1.1; t/f = 0.8–1.0. Elytron l/w = 1.3–1.6 (N = 15). Wing/body = 1.4–1.5, wing l/w = 3.1–3.6 (N = 5). Spermatheca (Fig. 5b) deflexed nearly 90°, apex separated, acute.

Type Information. Male holotype “Venezuela, Aragua, Rancho Grande, 1,400 m, on *Asplundia caput-medusae*, leg. H. Escalona, VI-06-1999” (IZAV); female allotype, same label as male holotype (IZAV); male paratypes, same labels as male holotype (AMNH, 5; BMNH, 5; CMNC, 5; CWOB, 5; IZAV, 5; MIUP, 5; MUCR, 5); female paratypes, same labels as male holotype (AMNH, 5; BMNH, 5; CMNC, 5; CWOB, 5; IZAV, 5; MIUP, 5; MUCR, 5).

Etymology. Named for the male apomorphy of having an arcuate protibia—*curvus* signifying “bent” and *tibialis* signifying “of the tibia” (Brown 1956).

Distribution. *Staminodeus curvitibialis* has been collected in Colombia, Provincia Nariño, La Planada: 01°05'N, 77°57'W; in Venezuela, Provincia Aragua, Portachuelo and Rancho Grande; in Venezuela, Provincia Carabobo, Morón; and in Venezuela, Provincia Falcón, Capadare (Fig. 6).

Natural History. *Staminodeus curvibtibialis* is associated with *Sphaeradenia hamata* Harling in Colombia, and with *Asplundia caput-medusae* (Hooker fil.) Harling in Venezuela (H. Escalona, pers. comm.).

Staminodeus denticulatus, new species

Diagnosis. *Staminodeus denticulatus* is distinguished from the other species of *Staminodeus* in general, and from *S. curvibtibialis* in particular, by the frontal spinule and the high number of small denticuli along the apically inermous protibia in males; as well as the fairly long and abruptly deflexed frontal spine in females.

Male. Length 1.8–2.4 mm, width 0.9–1.2 mm, l/w = 1.9–2.2. Rostrum 0.4–0.6 mm, r/p = 0.7–0.8, laterobasal 1/3 carinulate. Eyes separated by distance slightly greater than breadth of antennal club. Frons with 1 apically directed, arcuate spinule, nearly 1/4 as long as diameter of eye, anteriorly with long, fine, erect setae. Pronotum l/w = 0.8–0.9, anteriorly distinctly narrowed, distinctly convex. Prosternum distinctly longer than mesosternum, equilateral, distinctly convex. Profemur (Fig. 3c) slightly arcuate, f/p = 1.0/1.3, width similar throughout, ventrally denticulate; protibia (Fig. 3c) slightly arcuate, t/f = 1.0, anteroventral margin with row of 12–18 apically directed, arcuate, acute denticuli, apically inermous; mesotibia apically inermous. Elytron l/w = 1.3–1.5 (N = 4). Median lobe (Fig. 4c) l/w = 2.3–2.3 (N = 3), apical margin medially projected, laterobasal sclerites weakly sclerotized, short, spinulose, median sclerite heavily sclerotized, short, basally rotundate, impressed, apically spinulose, with 2 elongate, slightly diverging projections, apical rami broad, apically deflexed, with small, elongate, spinulose region between apical rami, aedeagal apodemes slightly longer than median lobe.

Female. Length 1.9–2.4 mm, width 1.0–1.2 mm, l/w = 1.8–2.0. Rostrum 0.5–0.7 mm, r/p = 0.9–1.0, laterobasal 1/3 carinulate. Frontal spine nearly 2/3–3/4 as long as diameter of eye, basally subrectate, perpendicular to frons, apically abruptly deflexed (not gradually arcuate). Pronotum l/w = 0.8–0.9, greatest width near anterior 1/3. Prosternum longer than mesosternum. F/p = 0.9–1.2; t/f = 0.9–1.1. Elytron l/w = 1.2–1.5 (N = 12). Spermatheca (Fig. 5c) deflexed nearly 90°, apex slightly separated, obtuse.

Type Information. Male holotype “Costa Rica, Puntarenas, Las Cruces, 1,100 m, on *Carludovica subpalmata*, leg. L. Gómez, XII-1994” (CMNC); female allotype, same label as male holotype (CMNC); male paratypes “PAN-AMA, Chiriqui, Fortuna, (8°44'N, 82°15'W), UV trap, Apr. 22, 1978/ H. Wolda, Collector” (CWOB, 2), same label as previous specimens with different date “Aug. 9, 1977” (MIUP, 1); same label as male holotype (MUCR, 1); “Costa Rica, Puntarenas, Las Cruces, 1,000 m, on *Evodianthus funifer*, leg. L. Gómez, XII-29-1994” (MUCR, 1); female paratypes, same label as male holotype (CMNC, 1); “Costa Rica, Puntarenas, Las Cruces, 1,000 m, on *Evodianthus funifer*, leg. L. Gómez, XII-29-1994” (CMNC, 1; MUCR, 3); “PAN-AMA, Chiriqui, Fortuna, (8°44'N, 82°15'W), UV trap, Apr. 22, 1978/ H. Wolda, Collector” (CWOB, 1), same labels as previous specimen with different dates “May 2, 1978” (CWOB, 1), “July 11, 1978” (CWOB, 1), “Aug. 2, 1978” (MIUP, 2).

Etymology. Named for the denticulate protibia in males—*denticulatus* signifying “with small teeth” (Brown 1956).

Distribution. *Staminodeus denticulatus* has been collected in the Cordillera de Talamanca of Costa Rica, Provincia de Puntarenas, San Vito: 08°47'N, 82°57'W; on the Caribbean slope of Panama, Provincia Bocas del Toro, Chiriquí Grande; and on the Pacific slope of Panama, Provincia Chiriquí, Fortuna (Fig. 6).

Natural History. *Staminodeus denticulatus* is associated with *Carludovica*

palmata Ruíz & Pavón and *Evodianthus junifer* (Poit.) Lindman in Costa Rica, and with *Asplundia* sp. in Panama, Provincia Bocas del Toro, Chiriquí Grande (label information by Windsor & Stockwell, X-13-1996).

Staminodeus bispinosus, new species

Diagnosis. *Staminodeus bispinosus* is distinguished from *S. forcipis* by the fairly short frontal spinule and the slightly sinuate profemur in males. It is problematic to separate the females from *S. forcipis*, *S. dilatatus*, and *S. vectoris* by the slight differences in spermathecal characters. The actual association of males and females of *S. bispinosus* has to be reconfirmed by field observations.

Male. Length 1.5–1.9 mm, width 0.7–1.0 mm, l/w = 2.0–2.3. Rostrum 0.4–0.5 mm, r/p = 0.8–1.0. Frons with 1 apically directed, arcuate spinule, nearly 1/5 as long as diameter of eye, anteriorly with long, fine, erect setae. Pronotum l/w = 0.8–0.9, convex. Prosternum longer than mesosternum. Profemur (Fig. 3d) slightly sinuate, f/p = 1.0–1.2, width similar throughout, ventrally denticulate; protibia (Fig. 3d) subrectate, t/f = 0.8–1.1, anteroventral margin with row of 6–10 apically directed, arcuate dentes, apically mucronate, promucron nearly 2/3 as long as protarsal claw; mesotibia apically inermous. Elytron l/w = 1.3–1.6 (N = 15). Median lobe (Fig. 4d) l/w = 2.8–3.1 (N = 10), laterobasal sclerites apically denticulate, median sclerite heavily sclerotized, basally projected, deflexed, apically acuminate, glabrate, apically rami basally divided, undulate, basal 3/4 of median lobe denticulate, aedeagal apodemes shorter than median lobe.

Female. Length 1.9 mm, width 0.7–1.0 mm, l/w = 1.9–2.1. Rostrum 0.5–0.6 mm, r/p = 1.0–1.2. Frontal spine nearly 3/5 as long as diameter of eye. Pronotum l/w = 0.8–0.9. F/p = 1.1–1.3; t/f = 0.8–0.9. Elytron l/w = 1.3–1.5 (N = 15). Spermatheca (Fig. 5d) deflexed nearly 90°, subapically undulate, apex rotundate.

Type Information. Male holotype "PANAMA, Chiriquí, Fortuna, (8°44'N, 82°15'W), UV trap, June 27, 1978/ H. Wolda, Collector" (CWOB); female allotype, same label as male holotype with different date "July 17, 1978" (CWOB); male paratypes, same labels as male holotype with different dates "Apr. 17, 1978" (CWOB, 1), "Apr. 24, 1978" (CWOB, 1); "PANAMA, Bocas del Toro, Corriente Grande, Río Changuinola/ 9°17'30"N, 82°32'41"W, H. Wolda, Jan. 20, 1980" (CWOB, 1), same labels as previous specimen with different dates "Jan. 23, 1980" (CWOB, 1), "Feb. 9, 1980" (CWOB, 1), "Feb. 13, 1980" (MIUP, 1), "Feb. 24, 1980" (MIUP, 1), "Apr. 8, 1980" (MIUP, 1); "Panama, Bocas del Toro, Cor. Grande, Río Changuinola, 9°17'30"N, 82°32'41"W, leg. H. Wolda, II-21-1980" (MIUP, 1), same label as previous specimen with different date "III-26-1980" (MIUP, 1); female paratypes, same labels as male holotype with different dates "Apr. 22, 1978" (CWOB, 1), "May 5, 1978" (CWOB, 2), "May 17, 1978" (CWOB, 1), "June 27, 1978" (CWOB, 1; MIUP, 1), "July 25, 1978" (MIUP, 3), "Aug. 22, 1978" (MIUP, 1).

Etymology. Named for the frontal spine which is present in both sexes—*bis* signifying "twice" and *spinosus* signifying "thorny" (Brown 1956).

Distribution. *Staminodeus bispinosus* has been collected on the Caribbean slope of Panama, Provincia Bocas del Toro, Río Changuinola; and on the Pacific slope of Panama, Provincia Chiriquí, Fortuna (Fig. 6).

Natural History. Unknown.

Staminodeus forcipis, new species

Diagnosis. *Staminodeus forcipis* is distinguished from *S. bispinosus* by the fairly large frontal spinule and the distinctly arcuate, apically dentate profemur in males. See diagnosis of *S. bispinosus* for females.

Male. Length 2.1 mm, width 1.0 mm, $l/w = 2.1$. Rostrum 0.5 mm, $r/p = 0.8$. Frons with 1 apically directed, arcuate spinule, nearly $2/5$ as long as diameter of eye, anteriorly with long, fine, erect setae. Pronotum $l/w = 0.9$, convex. Prosternum longer than mesosternum. Profemur (Fig. 3e) (distinctly) arcuate, $f/p = 1.2$, width similar throughout, each ventrolateral margin with row of denticuli/dentes, larger towards apex; protibia (Fig. 3e) slightly arcuate, $t/f = 1.0$, anteroventral margin with row of 8–10 apically directed, arcuate dentes, apically mucronate, promucron nearly $2/3$ as long as protarsal claw; mesotibia apically inermous. Elytron $l/w = 1.4$. Median lobe (Fig. 4e) $l/w = 2.9$ ($N = 1$), laterobasal sclerites apically heavily sclerotized, broadened, denticulate, median sclerite basally projected, apically acuminate, glabrate, apical rami distinctly undulate in central region, basal $3/4$ of median lobe denticulate, aedeagal apodemes shorter than median lobe.

Female. Length 1.9–2.0 mm, width 1.0 mm, $l/w = 1.9$ –2.0. Rostrum 0.5 mm, $r/p = 1.0$. Frontal spine nearly $3/5$ as long as diameter of eye. Pronotum $l/w = 0.8$ –0.9. $F/p = 1.1$ –1.2; $t/f = 0.9$ –1.0. Elytron $l/w = 1.4$ ($N = 2$). Spermatheca (Fig. 5e) deflexed nearly 90° , subapically undulate, apex slightly separated, rotundate.

Type Information. Male holotype “COSTA RICA, S. J., Zurqui de Moravia, 1,600 m, XI-1995, malaise trap, Hanson & Godoy” (CWOB); female allotype “COSTA RICA, S. Jose, Zurqui de Moravia, 1,600 m, malaise trap, III-1992, P. Hanson” (CWOB); female paratype “COSTA RICA, S. Jose, Zurqui de Moravia, 1,600 m, malaise trap, II-1993, P. Hanson” (MUCR, 1: teneral).

Etymology. Named for the dentate profemur and protibia in males which resemble a pair of tongs—*forceps* signifying “nippers, tongs” (Brown 1956).

Distribution. *Staminodeus forcipis* has been collected in the Cordillera de Tilarán of Costa Rica, Provincia Puntarenas, Monteverde; and in the Central Valley of Costa Rica, Provincia San José, Zurquí de Moravia (Fig. 6).

Natural History. Unknown.

Staminodeus dilatatus, new species

Diagnosis. *Staminodeus dilatatus* is distinguished from *S. vectoris* by the lower number of larger, subrectate dentes in males, in addition to differing from *S. bispinosus* and *S. forcipis* by the glabrate frons. See diagnosis of *S. bispinosus* for females.

Male. Length 1.4–1.9 mm, width 0.7–0.9 mm, $l/w = 1.9$ –2.2. Rostrum 0.4–0.5 mm, $r/p = 0.7$ –1.0. Frons glabrate. Pronotum $l/w = 0.8$ –0.9, convex. Prosternum longer than mesosternum. Profemur (Fig. 3f) slightly arcuate, $f/p = 0.9$ –1.1, width similar throughout, ventrally denticulate; protibia (Fig. 3f) subrectate, $t/f = 0.9$ –1.1, anteroventral margin with row of 3–6 apically directed, subrectate dentes, apically mucronate, promucron nearly $2/3$ as long as protarsal claw; mesotibia apically mucronate, mesomucron nearly $1/4$ as long as mesotarsal claw. Elytron $l/w = 1.3$ –1.4 ($N = 15$). Median lobe (Fig. 4f) $l/w = 3.0$ –3.5 ($N = 5$), laterobasal sclerites apically setose, median sclerite basally projected, apically bifurcate, setose, apical rami undulate, basal $2/3$ of median lobe denticulate, aedeagal apodemes shorter than median lobe.

Female. Length 1.5–1.9 mm, width 0.8–1.0 mm, $l/w = 1.9$ –2.0. Rostrum 0.4–0.6, $r/p = 1.0$ –1.1. Frontal spine nearly $3/5$ as long as diameter of eye. Pronotum $l/w = 0.8$. $F/p = 1.0$ –1.2; $t/f = 0.8$ –1.0. Elytron $l/w = 1.3$ –1.4 ($N = 3$). Spermatheca (Fig. 5f) deflexed nearly 120° , apex narrowly projected.

Type Information. Male holotype “PANAMA, Bocas del Toro, Corriente Grande, Rio Changuinola/ $9^\circ 17' 30''N$, $82^\circ 32' 41''W$, H. Wolda, Feb. 3, 1980” (CWOB); female allotype, same label as male holotype with different date “Feb. 9, 1980” (CWOB); male paratypes, same labels as male holotype with different dates “Jan. 20, 1980” (CWOB, 1), “Feb. 11, 1980” (CWOB, 1),

"Feb. 26, 1980" (CWOB, 1), "Mar. 13, 1980" (CWOB, 1), "Mar. 18, 1980" (CWOB, 1), "Mar. 28, 1980" (MIUP, 1); "Panama, Bocas del Toro, Cor. Grande, Rio Changuinola, 9°17'30"N, 82°32'41"W, leg. H. Wolda, III-15-1980" (MIUP, 1), same labels as previous specimen with different dates "III-26-1980" (MIUP, 2), "III-29-1980" (MIUP, 1); female paratypes, same label as male holotype with different date "March 4, 1980" (CWOB, 1); "Panama, Bocas del Toro, Cor. Grande, Rio Changuinola, 9°17'30"N, 82°32'41"W, leg. H. Wolda, IV-24-1980" (MIUP, 1).

Etymology. Named for the diagnostic character of the male protibia with respect to *S. vectoris*, i.e., less and larger dentes—*dilatatus* signifying "spread out, enlarged, extended" (Brown 1956).

Distribution. *Staminodeus dilatatus* has been collected on the Carribean slope of Panama, Provincia Bocas del Toro, Río Changuinola (Fig. 6).

Natural History. Unknown.

Staminodeus vectoris, new species

Diagnosis. *Staminodeus vectoris* is distinguished from *S. dilatatus* by the higher number of smaller, arcuate dentes in males, in addition to differing from *S. bispinosus* and *S. forcipis* by the glabrate frons. Males and females were associated by field observations (see below).

Male. Length 1.6–2.3 mm, width 0.7–1.0 mm, l/w = 2.1–2.4. Rostrum 0.4–0.5 mm, r/p = 0.7–0.9. Frons glabrate. Pronotum l/w = 0.8–1.0, convex. Prosternum longer than mesosternum. Profemur (Fig. 3g) slightly arcuate, f/p = 0.9–1.2, width similar throughout, ventrally denticulate; protibia (Fig. 3g) subrectate, t/f = 0.9–1.2, anteroventral margin with row of 6–10 apically directed, arcuate dentes, apically mucronate, promucron nearly 2/3 as long as protarsal claw; mesotibia apically mucronate, mesomucron nearly 1/4 as long as mesotarsal claw. Elytron l/w = 1.3–1.6 (N = 15). Wing/body = 1.2–1.3, wing l/w = 3.0–3.4 (N = 8). Median lobe (Fig. 4g) l/w = 2.5–3.3 (N = 15), laterobasal sclerites apically setose, median sclerite basally projected, apically bifurcate, setose, apical rami undulate, apically spatulate, basal 3/4 of median lobe denticulate, aedeagal apodemes shorter than median lobe.

Female. Length 1.8–2.2 mm, width 0.8–1.0 mm, l/w = 2.1–2.4. Rostrum 0.5 mm, r/p = 0.8–1.1, laterobasal 1/3 carinulate. Frontal spine nearly 3/5 as long as diameter of eye. Pronotum l/w = 0.8–1.1 (N = 15). F/p = 0.9–1.2; t/f = 0.8–1.0. Elytron l/w = 1.4–1.6 (N = 15). Wing/body = 1.2–1.3, wing l/w = 3.0–3.4 (N = 8). Spermatheca (Fig. 5g) deflexed nearly 135°, apex rotundate.

Type Information. Male holotype "Costa Rica, Heredia, La Selva, 40 m, on *Asplundia uncinata*, leg. N. Franz, VII-03-1997" (MUCR); female allotype, same label as male holotype (MUCR); male paratypes, same labels as male holotype (AMNH, 5; BMNH, 5; CMNC, 5; CWOB, 5; INBC, 5; MIUP, 5; MUCR, 5); female paratypes, same labels as male holotype (AMNH, 5; BMNH, 5; CMNC, 5; CWOB, 5; INBC, 5; MIUP, 5; MUCR, 5).

Etymology. Named for the female behavior of transporting the detached staminodes (see below)—*vectoris* signifying "carrier" (Brown 1956).

Distribution. *Staminodeus vectoris* has been collected at the Volcán Arenal in Costa Rica, Provincia Alajuela, Los Lagos: 10°29'N, 84°43'W; on the Carribean slope of Costa Rica, Provincia Heredia, Parque Nacional Braulio Carrillo, La Selva and Rara Avis; in the Central Valley of Costa Rica, Provincia San José, Zurquí de Moravia; and on the Carribean slope of Panama, Provincia Bocas del Toro, Río Changuinola (Fig. 6).

Natural History. *Staminodeus vectoris* is associated with the staminodes of the inflorescences of Cyclanthaceae. At La Selva, both sexes visit several spe-

Table 1. Character matrix for the cladistic analysis of *Staminodeus*.

Taxon/character	5	10	15	
<i>Not. basalis</i>	0000-	00000	-----	-00
<i>Per. carludovicae</i>	0000-	00100	-----	-00
<i>Sys. costaricensis</i>	0000-	00100	-----	-00
<i>S. inermis</i>	1000-	11011	000-0	-01
<i>S. curvibialis</i>	10110	00011	00101	011
<i>S. denticulatus</i>	11110	00011	00101	011
<i>S. bispinosus</i>	11111	10011	01011	101
<i>S. forcipis</i>	11111	10011	01011	101
<i>S. dilatatus</i>	10111	11011	11021	101
<i>S. vectoris</i>	10111	11011	11021	101

cies of *Asplundia* Harling, *Carludovica* Ruiz & Pavón, *Chorigyne* R. Eriksson, *Dicranopygium* Harling, and *Evodianthus* Oersted. The following observations were made for the most part on *Asplundia uncinata* Harling. The adult beetles arrive at dawn during the pistillate anthesis when the floral fragrances are volatilized. The females detach the staminodes and fall to the floor where they transport them with their legs—by turning upside down and using the frontal spine to support their position against the surface underneath. Meanwhile, the males associate with the moving staminodes. If several males occur on the same staminode, short fights are observed during which the prothoracic legs are used to displace competing males with fast blows. Presumably, the dentate protibiae interlock and translate the lifting power among them. Copulation and oviposition occur above the forest floor; the reproductive behavior is described with more detail in Franz (1999, in prep.). The ephemeral staminodes serve as an oviposition substrate. The larvae are detritivores in the leaf litter, and the pupae emerge from the forest floor after 10–20 days. The adult beetles are not pollinators because they do not touch the pistillate flowers of the host inflorescence and leave before the staminate anthesis. *Staminodeus vectoris* was coded (by C. W. O'Brien) as “gen. C2 sp. C1” in Franz (1999).

Cladistic Analysis

Characters. The following characters were used to construct the data matrix (Table 1).

1. Carinate rostrum: (0) absent; (1) present.
2. Male with spinulose frons: (0) absent; (1) present.
3. Male with denticulate profemur: (0) absent; (1) present.
4. Male with denticulate/dentate protibia: (0) absent; (1) present.
5. Male protibia with: (0) 12–18 denticuli; (1) 3–10 dentes. Inapplicable in *S. inermis* and in outgroup taxa.
6. Male with promucron: (0) absent; (1) present.
7. Male with mesomucron: (0) absent; (1) present.
8. Male with exposed, broad, perpendicular pygidium: (0) absent; (1) present.
9. Male with complex sclerites in median lobe: (0) absent; (1) present.
10. Male with denticulation in median lobe: (0) absent; (1) present.
11. Male with apical setation in laterobasal sclerites of median lobe: (0) absent; (1) present. Inapplicable in outgroup taxa.

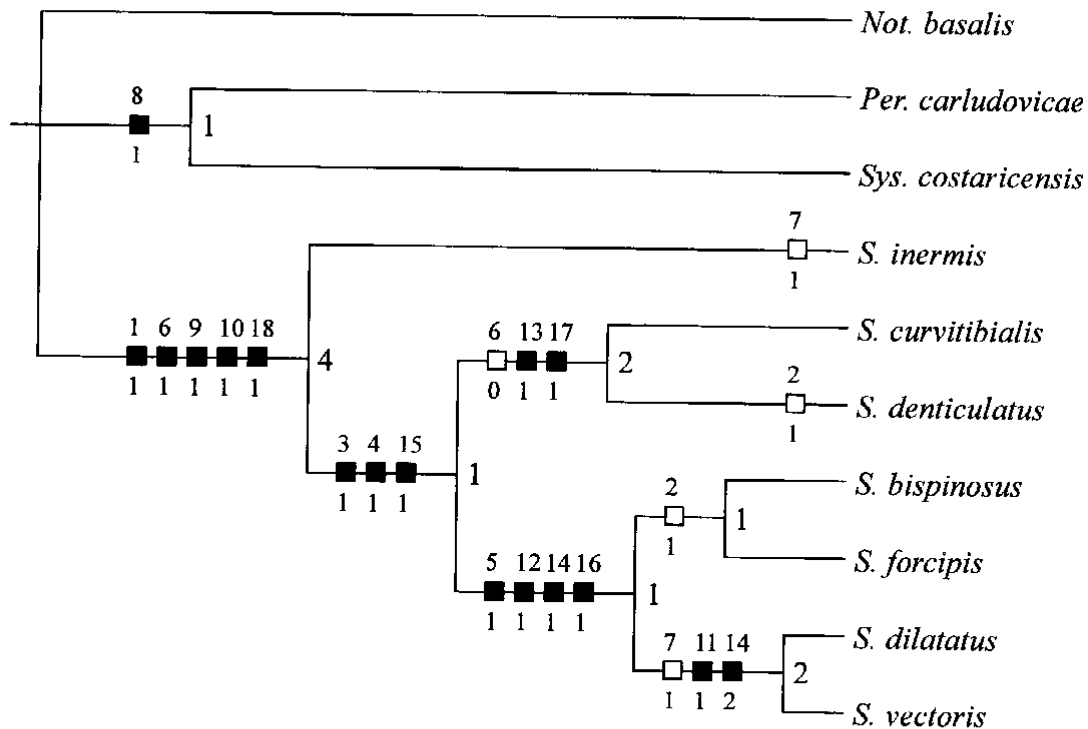


Fig. 7. Phylogenetic relationships among the seven species of *Staminodeus*, with *Not. basalis*, *Per. carludovicae*, and *Sys. costaricensis* as outgroup taxa. Character transformations are hypothesized according to ACCTRAN optimization. Homology is indicated by black rectangles, whereas homoplasy (for details see discussion) is indicated by white rectangles. Character numbers and character states (Table 1) are displayed above and below each rectangle, respectively, and Bremer support is indicated at the right end of each branch.

12. Male with basal projection of median sclerite of median lobe: (0) absent; (1) present. Inapplicable in outgroup taxa.
13. Male with median sclerite of median lobe: (0) longer than apical rami; (1) shorter than apical rami. Inapplicable in outgroup taxa.
14. Male with median sclerite of median lobe apically: (0) acuminate; (1) impressed; (2) bifurcate. Coded as non-additive. Inapplicable in *S. inermis* and in outgroup taxa.
15. Male with apical rami of median lobe: (0) fused; (1) separated. Inapplicable in outgroup taxa.
16. Male with apical rami of median lobe: (0) deflexed; (1) undulate. Inapplicable in outgroup taxa.
17. Male with aedeagal apodemes: (0) shorter than median lobe; (1) longer than median lobe.
18. Female with spinose frons: (0) absent; (1) present.

Analysis. The cladistic analysis for ten taxa and 18 characters yields a single most parsimonious cladogram with $L = 22$, $CI = 86$, and $RI = 90$ (Fig. 7). Bremer values indicate support by synapomorphies for the monophyly of *Staminodeus*, as well as that of (*S. curvithibialis*, *S. denticulatus*) and (*S. dilatatus*, *S. vectoris*). Homoplasy is hypothesized for character 2 (male with spinulose frons), character 6 (male with promucron), and character 7 (male with mesomucron). Fast optimization (ACCTRAN) proposes character 6 as a synapomorphy for *Staminodeus* and a reversal (secondary loss) for (*S. curvithibialis*,

S. denticulatus), whereas slow optimization (DELTRAN) proposes convergent transformations for *S. inermis* and ((*S. bispinosus*, *S. forcipis*), (*S. dilatatus*, *S. vectoris*)).

Discussion

The monophyly of *Staminodeus* within Derelomini is indicated by the carinate rostrum; the complex structures (sclerites, denticulation) of the median lobe in males; and the frontal spine in females. ACCTAN optimization preserves the primary homology of the male promucron for *Staminodeus* (cf. de Pinna 1991), and I prefer this optimization because the secondary loss of this character in *S. curvittibialis* and *S. denticulatus* corresponds to the general morphology of the male protibia in these species, *i.e.*, they have smaller denticuli which may not interlock among competing males as observed for *S. vectoris*. *Staminodeus inermis* is the sister taxon to the remaining species which share the ventrally denticulate/dentate prothoracic leg in males and the separated apical rami in the median lobe. The dark color and positive allometry of the male prothorax appear as further evidence for this divergence. *Staminodeus curvittibialis* and *S. denticulatus* are the sister taxon to the remaining species because of the shared characters of the male protibia (denticulate, inermous), the median sclerite of the median lobe (central position, short extension, apical impression with spinulose margin), and the fairly long aedeagal apodemes. The spinulose frons in *S. denticulatus* is interpreted as a single homoplasy. Conversely, the basal projection of the median sclerite and the distinctive undulation of the apical rami characterize the other clade with four species. The sister relationship of *S. bispinosus* and *S. forcipis* has weak support (spinulose frons in males, median sclerite of median lobe apically acuminate and glabrate), whereas I consider the apical setation of the laterobasal sclerites and the bifurcate apex of the median sclerite as stronger evidence for the sister relationship of *S. dilatatus* and *S. vectoris*.

Characters 5 and 11–16 are inapplicable to the outgroup taxa. Apparently, *Staminodeus* has evolved highly apomorphic male genitalia. However, the present hypotheses of genitalic homology may have to be reconsidered when closer relatives than the present outgroups are discovered; an undescribed species from Panama is a potential candidate. Cyclanthaceae occur throughout the Neotropical region, and field work in presently underrepresented geographic areas, *e.g.*, Colombia, is likely to yield additional species which will serve to refine previous assessments.

If the natural history of *S. vectoris* is—within reasonable limits—applicable to the remaining species, then *Staminodeus* is the first genus of Derelomini for which the association with the staminodes of the inflorescences of Cyclanthaceae has been reported. *Perelleschus* and *Systemotelus* have different biologies, since their larvae develop in the maturing infructescences rather than in the leaf litter (Anderson and Gómez 1997; Franz 1999, in prep.). A detailed account of the remarkable behavior of *S. vectoris* will be given elsewhere. *Staminodeus inermis* is an interesting candidate for field observations: its males lack the morphological synapomorphies for fighting, but may have similar behaviors to *S. vectoris*. This condition would refute the present hypothesis that fighting in males evolved *after* the specialized behavior of transporting staminodes in females.

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NEW SPECIES OF *HEMIPHILEURUS* KOI BE
(COLEOPTERA: SCARABAEIDAE: DYNASTINAE)
FROM MEXICO, GUATEMALA, COLOMBIA, AND BRAZIL

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Abstract

The following **new species** of *Hemiphileurus* are described: *H. bispinosus* Ratcliffe from Brazil, *H. deslislesi* Ratcliffe from Colombia, *H. quadridentatus* Ratcliffe from Guatemala, and *H. warneri* Ratcliffe from Mexico. The parameres of *H. rugulosus* Endrödi (Venezuela and Colombia) are illustrated to enable easier identification of this species, and *H. kahni* Dupuis and Dechambre is redescribed and recorded from Brazil for the first time. Diagnostic illustrations of the male parameres are provided for the above taxa. A checklist for all the species in the genus is given.

Resumen

Se describen las siguientes nuevas especies de *Hemiphileurus*: *H. bispinosus* Ratcliffe de Brasil, *H. deslislesi* Ratcliffe de Colombia, *H. quadridentatus* Ratcliffe de Guatemala, y *H. warneri* Ratcliffe de México. Se ilustraron los parámetros de *H. rugulosus* Endrödi (Venezuela y Colombia) para facilitar la identificación de esta especie. *Hemiphileurus kahni* Dupuis y Dechambre (Perú) es redescrita y registrada por primera vez en Brasil. Se proveen ilustraciones diagnóstico de los parámetros del macho para los taxa antes mencionados. Se incluye un listado de todas las especies del género.

*Where the telescope ends, the
microscope begins. Which of the two
has the grander view?*
—Victor Hugo

The genus *Hemiphileurus* contains the most species of any New World genus of Phileurini. Eighteen species are now found exclusively in South America, nine species occur in Mesoamerica (plus four additional in preparation by me), three species are found in both Central and South America, and 10 species inhabit the West Indies; one species is found in the Nearctic Region. Endrödi (1978, 1985) provided a synopsis of the genus, but additional species have been described since that time (Chalumeau 1988; Ratcliffe 1988; Ratcliffe and Ivie 1998; Dupuis and Dechambre 2000).

As a result of recent collecting by several colleagues, four new species are described below as well as comments to aid identification for two other species. Species of *Hemiphileurus* seem to be collected only intermittently at lights or from logs, and so additional new species will continue to be found. Well over half of the species in the genus have been described as new during the past decade.

Hemiphileurus kahni Dupuis and Dechambre
(Figs. 1–3)

Hemiphileurus kahni Dupuis and Dechambre 2000:26.

This species was described from a single male specimen from Genaro Herrera, Loreto, Peru. The specimens listed below represent a NEW COUNTRY RECORD:

BRAZIL: Amazonas; Rio Taruma Mirim—Igapo; J. Adis, 2.IX.1976 (2 specimens) and 10.XI.1976 (1 specimen). Specimens are deposited at the Instituto Nacional de Pesquisas da Amazonia (Manaus, Brazil) and in the B. C. Ratcliffe collection.

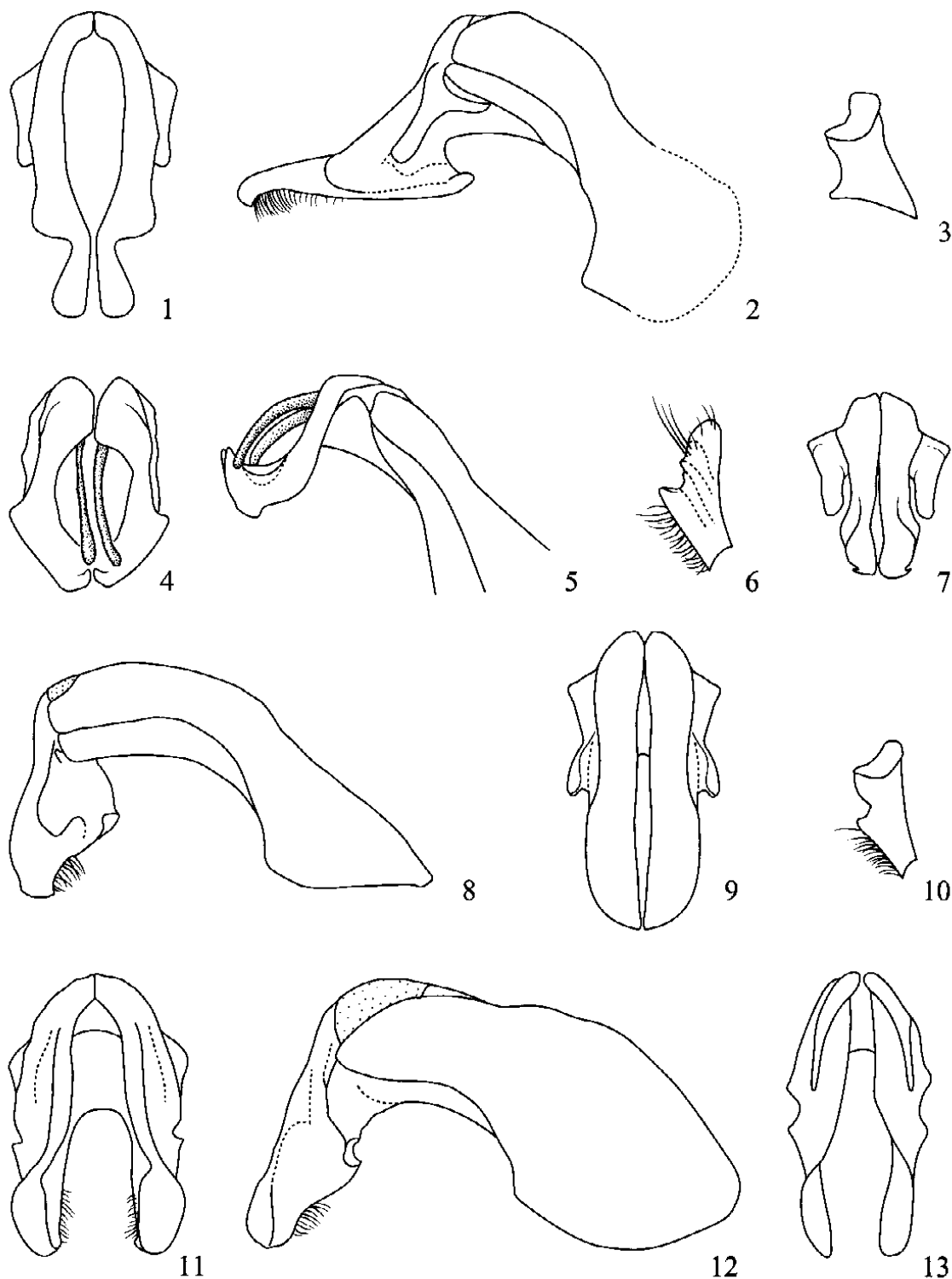
The Peruvian specimen was collected to the SSW of Iquitos where the El Capite river empties into the Ucayali which, in turn, almost immediately empties into the Amazon. The Brazilian specimens were taken near Manaus just above where the Rio Negro joins the Amazon. These two localities are approximately 1,540 km apart and are both characterized by lowland rainforest. The Brazil specimens represent a substantial range extension.

Inasmuch as the description by Dupuis and Dechambre did not include a female, is based on only one specimen, and is overly brief, I provide below a detailed re-description.

Male. Length 22.4 mm; width 10.7 mm. Color black. *Head*: Surface completely, transversely rugose. Frons with large, laterally compressed tubercle mesad of anterior border of each eye; surface between tubercles foveate, moderately rugose. Clypeus triangular, apex acute and strongly reflexed, a distinct carina extending from apex to base of each tubercle. Interocular width equals 4.5 transverse eye diameters. Antenna with 10 segments, club slightly longer than segments 2–7. Mandibles arcuate on lateral edge, apices acute. *Pronotum*: Surface finely shagreened, moderately punctate; punctures moderately large, each with a minute seta, punctures becoming slightly denser on sides. Median, longitudinal furrow shallow (nearly obsolete), becoming wider apically, not reaching base or apex. Base with complete marginal bead. *Elytra*: Surface with 5 distinct, punctate striae between suture and humeral umbone; punctures large, ocellate, separated from one another in each row by 1–2 puncture diameters. Intervals convex, with sparse micropunctures. *Pygidium*: Surface completely, densely punctate; punctures large, deep, setigerous; setae tawny in color, short, a few longer at center apex. In lateral view, surface strongly convex. *Legs*: Foretibia tridentate, teeth subequally separated. Median transverse carina on meso- and metatibiae ending in a long, acute spine on upper surface. Apex of posterior tibia with strong, acute spine on upper angle and with 8 short, broad spinules below spine. Apex of first tarsomere on posterior tarsus with strong, acute spine dorsally. *Venter*: Prosternal process broad, moderate in length, apex flattened into a concave, suboval plate (Fig. 3). Last sternite with small, dense punctures in lateral angles, elsewhere with small, sparse punctures. *Parameres*: Figures 1–2.

Female. Length 23.0–23.4 mm; width 11.2–11.3 mm. As male except in the following respects: *Pronotum*: Punctures slightly larger. *Elytra*: Intervals slightly wider. *Pygidium*: Setae shorter. *Venter*: Last sternite completely, moderately densely punctate, punctures moderate in size.

Remarks. *Hemiphileurus kahni* will key only to couplet 41 in Endrödi (1985) where the following two choices are for Mesoamerican species [*H. laevicauda* (Bates) and *H. punctatostriatus* (Bates)] that each have totally different parameres than *H. kahni*. The parameres (Figs. 1–2) of *H. kahni* are unique among species of *Hemiphileurus* and are diagnostic for the species. The distinct microsetae in the pronotal punctures are also unusual for a species of *Hemiphileurus*, but this may simply reflect a pristine specimen where the



Figs. 1–2. Parameres of *H. kahni* Dupuis and Dechambre.

Fig. 3. Prosternal process of *H. kahni* Dupuis and Dechambre.

Figs. 4–5. Parameres of holotype of *H. bispinosus* Ratcliffe, n. sp.

Fig. 6. Prosternal process, lateral oblique view, of *H. deslislesi* Ratcliffe, n. sp.

Figs. 7–8. Parameres of holotype of *H. deslislesi* Ratcliffe, n. sp.

Fig. 9. Parameres of *H. variolosus* (Burmeister).

Fig. 10. Prosternal process, lateral oblique view, of *H. variolosus* (Burmeister).

Figs. 11–13. Parameres of *H. rugulosus* Endrödi. 11–12) new drawing; 13) Endrödi drawing.

tiny setae have not been worn away; these setae are less noticeable in the two other specimens.

The biology of this species is unknown. The specimens reported here were collected in arboreal photoelectors mounted on tree trunks in an area of black-water inundation forest (igapo) near where the Tarumã Mirim river empties into the Rio Negro about 20 km upstream from Manaus (Adis 1981). The photoelector traps were modified to capture insects walking downward on the trunk of the trap tree.

Hemiphileurus bispinosus Ratcliffe, new species
(Figs. 4–5)

Type Material. Holotype labeled “BRAZIL: Minas Gerais, Belo Horizonte, UFMG, Estação Ecológica, IV-IV-1998, D. Yanega, ex blacklight.” Holotype deposited at the Museu de Zoologia of the Universidade de São Paulo, São Paulo, Brazil.

Holotype. Male. Length 16.0 mm; width 7.1 mm. Color black. *Head:* Frons in center with deep fovea, surface smooth; frons on sides with moderately-sized horns, horns erect and curving slightly posteriorly. Clypeus triangular, surface nearly smooth, with a few scattered, small, transverse punctures; apex acute and strongly reflexed, a weak carina extending from apex to base of each horn. Interocular width equals 4.0 transverse eye diameters. Antenna 10-segmented, club slightly longer than segments 2–7. Mandibles arcuate on lateral edge, apices acute. *Pronotum:* Surface weakly, finely shagreened, punctate; punctures in longitudinal furrow sparse, large, ocellate, punctures just either side of furrow sparse, small; punctures on disc moderate in density, large, ocellate, punctures becoming dense in anterior angles. Median longitudinal furrow deep, extending from base to anterior fifth of pronotum, furrow widest at middle. Base with complete marginal bead. *Elytra:* Surface with 5 punctate striae between suture and humeral umbone; punctures moderate to mostly large, umbilicate, separated from one another in each row by about 1 puncture diameter. Odd intervals slightly convex, becoming transversely wrinkled on sides of disc; even intervals with rows of punctures similar to those of striae. *Pygidium:* Surface moderately densely punctate; punctures moderate to moderately large, most setigerous either side of middle; setae short, tawny in color. In lateral view, surface regularly convex. *Legs:* Foretibia tridentate, teeth subequally separated. Median transverse carina on meso- and metatibiae crenulate. Apex of posterior tibia with strong, acute spine on upper angle and with several small serrations and a short, broad spinule between each serration (7 spinules on each side). Apex of first tarsomere of posterior tarsus extended into acute spine dorsally. *Venter:* Prosternal process short, subtriangular, flattened from front to back, and with small swelling on posterior face near base. Last sternite transversely rugopunctate to punctate in anterior half, apical half nearly smooth. *Parameres:* Figures 4–5.

Etymology. From the Latin *bi*, meaning two, and *spina*, meaning spine or thorn; this combination of words in reference to the two distinctive, curved spines between the parameres of the male genitalia (Figs. 4–5), hence the two-spined *Hemiphileurus*.

Remarks. *Hemiphileurus bispinosus* will key to couplet 31 in Endrödi (1985) where neither of the subsequent two choices fit the character states. The parameres of *H. bispinosus* (Figs. 4–5) are remarkable because of the two, long, slender spine-like processes arising from between the parameres. Among all the other species of *Hemiphileurus*, only *H. elongatus* Dupuis and Dechambre from Bolivia has parameres with internal processes, but these are very different from those of *H. bispinosus*. In addition, the form of the prosternal process is unusually short and “undeveloped” in this new species relative to most other species in the genus.

The biology of this species is unknown. The single specimen was taken at blacklights.

Hemiphileurus deslislesi Ratcliffe, **new species**
(Figs. 6–8)

Type Material. Holotype labeled "COLOMBIA, Calima Valley, 45 km. west of Buga. 29-III-1990." Holotype deposited at the Canadian Museum of Nature, Ottawa, Canada.

Holotype. Male. Length 24.0 mm; width 11.4 mm. Color black. *Head:* Entire surface smooth. Frons with 2 large, arcuate horns, horns erect and curving posteriorly. Clypeus triangular, apex acute and strongly reflexed, a distinct carina extending from apex to base of each horn. Interocular width equals 5.0 transverse eye diameters. Antenna with 10 segments, club slightly longer than segments 2–7. Mandibles arcuate on lateral edges, apices acute. *Pronotum:* Surface finely shagreened, with punctures mostly large in size; punctures moderately dense in median furrow and on disc anteriorly either side of furrow, moderate in density elsewhere. Median, longitudinal furrow shallow, extending from in front of base to just behind apex, becoming gradually wider anteriorly. Apical tubercles absent. Base with complete marginal bead. *Elytra:* Surface with 5 distinct rows of punctate striae between suture and humeral umbone; punctures large, umbilicate, separated from one another in each row by about 1 puncture diameter. Intervals slightly convex, finely shagreened. *Pygidium:* Surface densely punctate (more so than on elytral apices); punctures moderate to moderately large, less dense at apex, setigerous; setae minute, tawny in color. In lateral view, surface evenly convex. *Legs:* Foretibia tridentate, teeth subequally separated. Median transverse carina on meso- and metatibiae culminating with strong spine on upper surface. Apex of posterior tibia with strong, acute spine on upper angle and with several small serrations and a short, broad spinule between each serration (4 spinules on right side, 5 on left side). Apex of first tarsomere of posterior tarsus extended into long, acute spine dorsally. *Venter:* Prosternal process moderate in length with weakly expanded and suboval apex; shaft at middle on posterior face with obliquely transverse swelling and at base with strong, tooth-like swelling (Fig. 6). Last sternite densely punctate along anterior margin, moderately to sparsely punctate elsewhere. *Parameres:* Figures 7–8.

Etymology. At the request of Martin Hardy, who generously provided me with the specimen, I take pleasure in naming this species after its collector, Gilles Deslisles, who has been a dedicated amateur lepidopterist in Quebec, Canada, for more than 30 years.

Remarks. *Hemiphileurus deslislesi* will key only to couplet 36 in Endrödi (1985) where the following two choices are either *H. cylindroides* (Bates) or *H. simplex* Prell, both from Central America. The parameres of the males in each of these species are formed very differently from those of *H. deslislesi*. The parameres (Figs. 7–8) of *H. deslislesi* are similar to those of *H. variolosus* Burmeister (Fig. 9) as are the transverse carinae of the meso- and metatibiae. However, the prosternal process is tall, columnar, and with the apex broadly and triangularly flattened in *H. variolosus* (Fig. 10) whereas in *H. deslislesi* it is shorter, the shaft has transverse swellings, and the apex is not triangularly flattened (Fig. 6). In addition, the elytra in *H. variolosus* are strongly and densely punctate and lack the relatively smooth intervals of *H. deslislesi*.

Nothing is known of the biology of this species. Like other species of *Hemiphileurus*, the larvae probably live in rotting wood, and the adults may not be strongly attracted to lights (personal observation).

Hemiphileurus rugulosus Endrödi
(Figs. 11–13)

Hemiphileurus rugulosus Endrödi 1978:91.

Endrödi described this species based on 43 specimens, most of which were from Venezuela; two specimens were from Colombia. Endrödi's (1985) key to the species of *Hemiphileurus* generally works for identifying this species, but when one attempts to confirm the identification by comparing the parameres of the specimen with the illustration in the book, considerable doubt sets in because the two don't appear to be the same. The reason for this is the oversimplified illustration which, unfortunately, is typical for so many of the drawings by Endrödi. When compared with specimens identified by Endrödi, the illustration is simply not accurate.

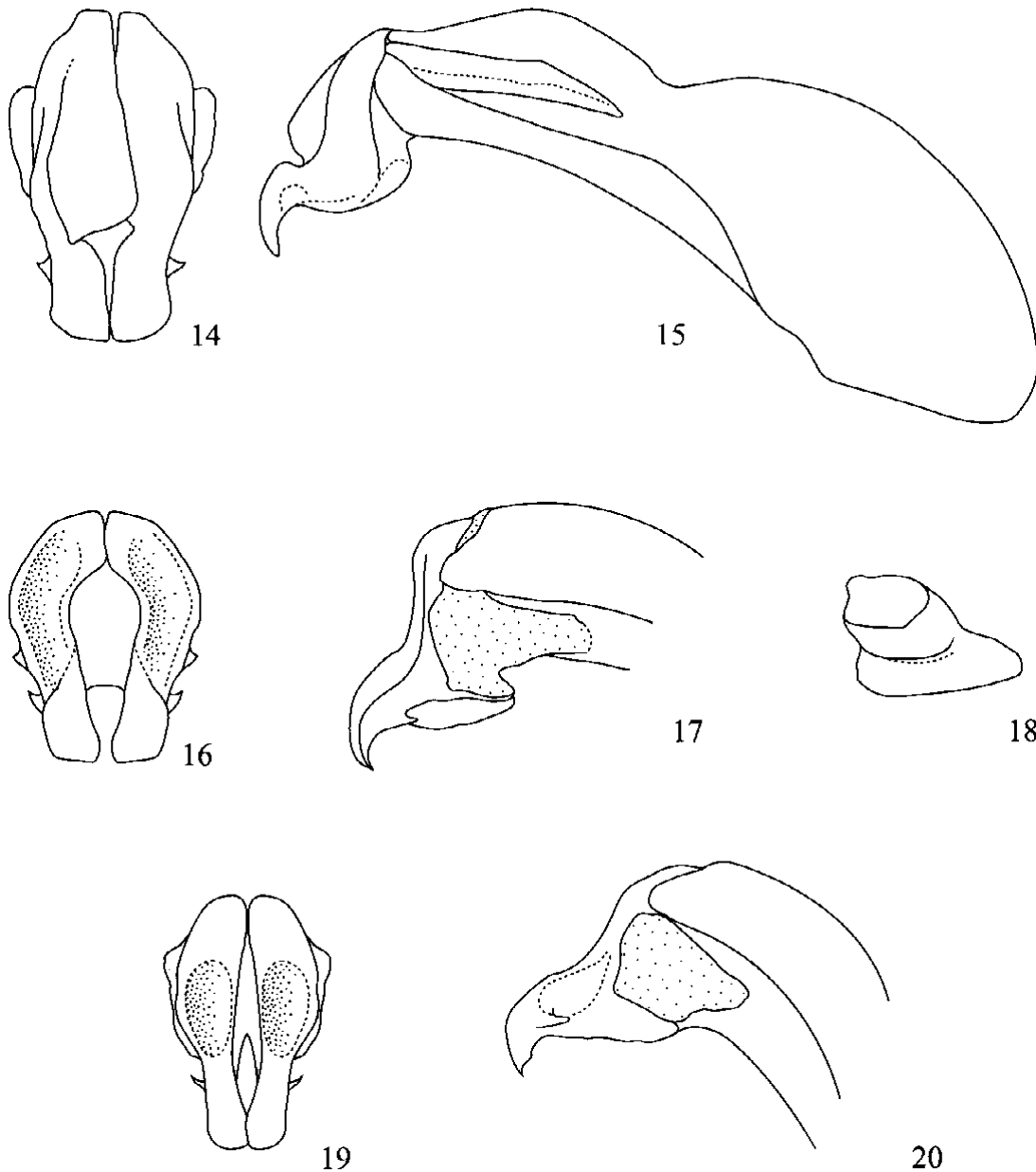
To help alleviate this confusion, I am providing new illustrations (Figs. 11–12) of the male genitalia of *H. rugulosus* specimens collected at Rancho Grande (near Maracay), Venezuela as well as Endrödi's original drawing (Fig. 13).

Hemiphileurus quadridentatus Ratcliffe, new species
(Figs. 14–15)

Type Material. Holotype labeled "GUATEMALA: Izabal, SE Morales nr. Negro Norte, IV-1997, ~1,000 m, 15°22'67"N 88°41'68"W, col. José Monzon." Allotype with same data. Six male and three female paratypes with same data. Holotype and allotype deposited at the University of Nebraska State Museum (Lincoln, NE). Paratypes deposited in the collections of the University of Nebraska State Museum, U.S. National Museum (Washington, D.C. but currently at the University of Nebraska for off-site enhancement), Universidad del Valle (Guatemala City, Guatemala), and the B.C. Ratcliffe collection.

Holotype. Male. Length 21.1 mm; width 9.7. Color black. *Head:* Surface of frons and base of clypeus coarsely rugose, apex of clypeus with sparse, moderately-sized punctures. Frons near its apex with 2 low, rounded tubercles; center of frons with large, moderately deep, oval fovea. Clypeus triangular, apex acute and strongly reflexed, carinae from apex to each tubercle absent. Interocular width equals 3.1 transverse eye diameters. Antenna with 10 segments, club subequal in length to segments 2–7. Mandibles arcuate on external edge, apices acute. *Pronotum:* Surface with disc either side of middle moderately punctate, punctures mostly large and weakly ocellate; punctures along anterior margin a little smaller, becoming rugopunctate, punctures on lateral margins moderate in size. Median, longitudinal furrow deep, with large and dense punctures, furrow extending from near base to near apex. A faint (nearly obsolete) tubercle present just behind apex either side of median furrow. All margins completely beaded. *Elytra:* Surface with 6 distinct, punctate striae between suture and humeral umbone; punctures moderate to large, oval to elongate, strongly ocellate, separated from one another in each row by about 1 puncture length. Intervals convex, impunctate. *Pygidium:* Surface moderately densely punctate; punctures moderate to mostly large, ocellate, setigerous; setae moderate to mostly long, reddish brown. In lateral view, surface regularly convex. *Legs:* Foretibia quadridentate, teeth subequally spaced from one another. Median transverse carina on meso- and metatibiae terminating with strong, acute spine. Apex of posterior tibia with strong, acute spine on upper angle and with 5 short spinules below spine. Apex of first tarsomere on posterior tarsus with strong, acute spine dorsally. *Venter:* Prosternal process broadly rounded, short, apex truncate and weakly concave. Last sternite rugopunctate in narrow band along base, elsewhere virtually impunctate. *Parameres:* Figures 14–15.

Allotype. Female. Length 21.9 mm; width 9.4 mm. As holotype except in the following respects: *Head:* Clypeus with a small, weak carina extending from apex to base of



Figs. 14–15. Parameres of *H. quadridentatus* Ratcliffe, n. sp.

Figs. 16–17. Parameres of *H. warneri* Ratcliffe, n. sp.

Fig. 18. Prosternal process, lateral oblique view, of *H. warneri* Ratcliffe, n. sp.

Figs. 19–20. Parameres of *H. illatus* (LcConte).

each frontal tubercle. *Elytra*: Punctures of striae mostly round to oval, only a few elongate. *Venter*: Last sternite with basal 1/3 rugopunctate, with sparse micropunctures elsewhere.

Variation. Males (5). Length 19.5–21.8 mm; width 8.6–9.3 mm. The male paratypes do not differ appreciably from the holotype. One specimen has fewer punctures on the pronotum and less setae on the pygidium.

Females (3). Length 18.5–23.3 mm; width 8.5–10.3 mm. The female paratypes do not differ from the allotype except for the presence of faint clypeal carinae, and the pygidium is weakly convex with smaller punctures in one specimen.

Etymology. This species is descriptively named for the four teeth present on the foretibia.

Remarks. *Hemiphileurus quadridentatus* will key only to couplets 45/46, the last in Endrödi's (1985) key. Here one finds the only other continental species with quadridentate foretibiae: *H. microps* (Burmeister) and *H. illatus* (LeConte), both from Mesoamerica. A third continental species with quadridentate foretibiae, *H. warneri*, is described in this paper. The diagnostic male parameres must be examined for reliable identification because of overlapping external character states between the four species.

The only other species with quadridentate foretibiae, out of 43 (currently) in the genus, are *H. dispar* (Kolbe) and *H. parvus* Dupuis and Dechambre, from Hispaniola and Cuba respectively.

The specimens of *H. quadridentatus* were taken at lights along with several specimens of *H. microps*; nothing is known of their biology. Although the type locality near Negro Norte is only 1,000 m in elevation, it is a cloud forest because of the high amount of moisture received from the Caribbean (>4,000 mm of rain/year). According to J. Monzon (pers. comm., September 2000), this forest is the northernmost limit for many Central and South American Cerambycidae as well as the metallic species of Central American *Plusiotis* (Scarabaeidae: Rutelinae) and other beetles. This is one of the most biologically rich forests in Guatemala and should be considered in any conservation programs there.

Hemiphileurus warneri Ratcliffe, **new species**
(Figs. 16–18)

Type Material. Holotype labeled "MEXICO: Nayarit, Hwy 200, 20 km E Los Piedras, VI-7-1991, 730 m, U.V. light, W.B. Warner." Holotype deposited at the University of Nebraska State Museum (Lincoln, NE).

Holotype. Male. Length 21.0 mm; width 9.7 mm. Color black. *Head:* Surface of frons completely, coarsely rugose, with median, deep fovea; a low, rounded tubercle present mesad of anterior border of each eye. Clypeus triangular, apex acute, reflexed; surface with sparse, moderately-sized punctures and with strong carina extending from clypeal apex to base of each tubercle. Interocular width equals 3.1 transverse eye diameters. Antenna 10-segmented, club slightly longer than segments 2–7. Mandibles with external edges arcuate, apices acute. *Pronotum:* Surface with moderately large punctures; punctures moderately dense, becoming denser in anterior fourth and in longitudinal furrow. Median, longitudinal furrow deep, narrow, extending from near base to near apex. Apex just behind marginal bead with small tubercle either side of midline. Base with complete marginal bead. *Elytra:* Surface with 5 distinct, punctate striae between suture and humeral umbone; punctures moderately large, ocellate, subcontiguous or separated from one another in each row by less than half a puncture length. Intervals convex, with sparse micropunctures. *Pygidium:* Surface with punctures moderately dense, moderately large, weakly ocellate, setigerous; setae minute, tawny. In lateral view, surface regularly convex. *Legs:* Foretibia with 4 subequally separated teeth. Median transverse carina on meso- and metatibiae ending with acute spine on upper surface. Apex of posterior tibia with strong, acute spine on upper angle and with 7 (left) and 4 (right) short, broad spinules below spine. Apex of first tarsomere of posterior tarsus with strong, acute spine dorsally. *Venter:* Prosternal process (Fig. 18) broad, moderate in length, apex flattened into transversely subrectangular, slightly concave plate, setae lacking. Last sternite with sparse, scattered punctures. *Parameres:* Figures 16–17.

Etymology. I take great pleasure in naming this species after Bill Warner

(Chandler, AZ) who collected the specimen and provided it to me for description.

Remarks. *Hemiphileurus warneri* is similar externally to *H. illatus* (LeConte) and will key to this species in Endrödi (1985). The parameres of *H. warneri* (Figs. 16–17) are different than those of *H. illatus* (Figs. 19–20). The most striking difference between the parameres, aside from the obvious length proportions, is the almost entirely concave surface of each paramere that abruptly becomes convex at the apices in *H. warneri* whereas in *H. illatus* there is only an oblong depression on the center of the paramere. In addition, the base of the last sternite in *H. illatus* is densely punctate to transversely rugulose in a narrow band while in *H. warneri* the entire surface of the last sternite is sparsely punctate and lacks any distinctive sculpturing across the base.

The holotype was taken at a U.V. light trap in lowland deciduous forest in a mesic canyon at the end of dry season.

Checklist of the Genus *Hemiphileurus* Kolbe, 1910

- H. beckeri* (Kolbe 1910) (as *Epiphileurus*)—Mexico
Epiphileurus beckeri ab. *parumstriatus* Kolbe 1910
H. bispinosus Ratcliffe, n. sp. 2001—Brazil
H. brasiliensis Endrödi 1978—Brazil, Peru
H. carinatipenis Dupuis and Dechambre 2000—Ecuador
H. costaricensis Endrödi 1978—Costa Rica, Panama
Hemiphileurus jamesonae Ratcliffe 1988
H. costatus Endrödi 1978—Paraguay
H. cribratus (Chevrolat 1844) (as *Phileurus*)—Cuba
H. cubaensis Chalumeau 1981—Cuba
H. curvicornis Dupuis and Dechambre 2000—Colombia
H. cylindroides (Bates 1888) (as *Phileurus*)—Guatemala, Belize, Costa Rica, Panama
H. dejeani (Bates 1888) (as *Phileurus*)—Mexico to Amazonian Brazil
H. depressus (Fabr. 1801) (as *Geotrupes*)—Colombia
Hemiphileurus deplanatus Endrödi 1978
H. deslislesi Ratcliffe, n. sp. 2000—Colombia
H. dispar (Kolbe 1910) (as *Epiphileurus*)—Hispaniola
H. elongatus Dupuis and Dechambre 2000—Peru, Bolivia
H. gibbosus Dupuis and Dechambre 2001—Colombia
H. hieki Chalumeau 1988—Colombia
H. howdeni Endrödi 1978—Peru
H. illatus (LeConte 1854) (as *Phileurus*)—United States, Mexico
H. illatus mexicanus Endrödi 1978—Mexico
Phileurus femoratus Burmeister 1847
Phileurus vitulus LeConte 1863
Phileuris phoenicus Casey 1915
Phileurus puncticollis Casey 1915
H. insularis Ratcliffe 1988—Brazil
H. jamaicensis (Howden 1970) (as *Epiphileurus*)—Jamaica
H. kahni Dupuis and Dechambre 2000—Peru, Brazil
H. laevicauda (Bates 1888) (as *Phileurus*)—Mexico, Guatemala, El Salvador, Costa Rica, Panama
H. laeviceps (Arrow 1947) (as *Epiphileurus*)—Dominica

- H. laminicornis* Dupuis and Dechambre 2000—Cuba
H. laticollis (Burmeister 1847) (as *Phileurus*)—Colombia
H. microps (Burmeister 1847) (as *Phileurus*)—Mexico, Guatemala
H. parvus Dupuis and Dechambre 2000—Cuba
H. phratrius Ratcliffe and Ivie 1998—Dominican Republic
H. puertoricensis (Chapin 1935) (as *Epiphileurus*)—Puerto Rico
H. punctatostriatus (Prell 1914) (as *Epiphileurus*)—Mexico, Belize, Panama
H. quadridentatus Ratcliffe, n. sp. 2001—Guatemala
H. rugulosus Endrödi 1978—Venezuela, Colombia
H. ryani Ratcliffe and Ivie 1998—Dominican Republic
H. scutellaris Howden and Endrödi 1978—Dominican Republic
H. similis Dupuis and Dechambre 2000—Ecuador
H. simplex Prell 1914—Guatemala, Costa Rica, Panama
 Phileurus cylindroides Bates 1888 (in part)
 Epiphileurus cylindroides Prell 1914
 Hemiphileurus fraternus Arrow 1937
H. unilobus Dupuis and Dechambre 2000—Venezuela
H. variolosus (Burmeister 1847) (as *Phileurus*)—Costa Rica, Panama, Colombia, Venezuela, French Guiana, Ecuador, Trinidad
 Epiphileurus irregularis Prell 1914
 Hemiphileurus variolosus ab.? *striatus* Endrödi 1978
H. vicarius Prell 1936—Costa Rica, Panama, Colombia, French Guiana, Ecuador, Brazil
H. vulgatus Dupuis and Dechambre 2000—Ecuador
H. warneri Ratcliffe, n. sp. 2001—Mexico.
H. n. sp. 1 Ratcliffe (in prep.)—Panama
H. n. sp. 2 Ratcliffe (in prep.)—Costa Rica, Panama
H. n. sp. 3 Ratcliffe (in prep.)—Costa Rica, Panama
H. n. sp. 4 Ratcliffe (in prep.)—Panama

Acknowledgments

I am grateful to Martin Hardy (Quebec, Canada) for providing me with the specimen of *H. deslislesi* for description. Dr. Doug Yanega (University of California, Riverside) generously provided me with the specimen of *H. bispinosus* that he collected while in Brazil. José Monzon (Guatemala City, Guatemala) donated the specimens of *H. quadridentatus* that he collected. William Warner (Chandler, AZ) once again provided me with new material for description with the specimen of *H. warneri*. I thank Dr. Lee Herman (American Museum of Natural History, New York) and Otto Merkl (Hungarian National Museum, Budapest) for loans of *Hemiphileurus* specimens. Dr. Joachim Adis (Max Planck Institute, Plön, Germany) is gratefully acknowledged for sending me the specimens of *H. kahni* that he collected during his ecological studies near Manaus. Angie Fox (Scientific Illustrator, University of Nebraska State Museum) prepared the illustrations, and Gail Littrell (University of Nebraska State Museum) made ready the manuscript.

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**A NEW *APHODIUS* ILLIGER FROM CHINA
(COLEOPTERA: SCARABAEIDAE)**

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Abstract

Aphodius (Bodilus) kaznakovi Frolov, **new species**, from central China (Qinghai Province) is described and illustrated. The new species is compared with closely related *A. (B.) sordescens* Harold.

P. K. Kozlov's expedition to Mongolia and Tibet during 1899–1901 yielded a rich natural history collection, including many Coleoptera. One *Aphodius* Illiger species from the subgenus *Bodilus* Mulsant collected in north-eastern Tibet has proved to be new.

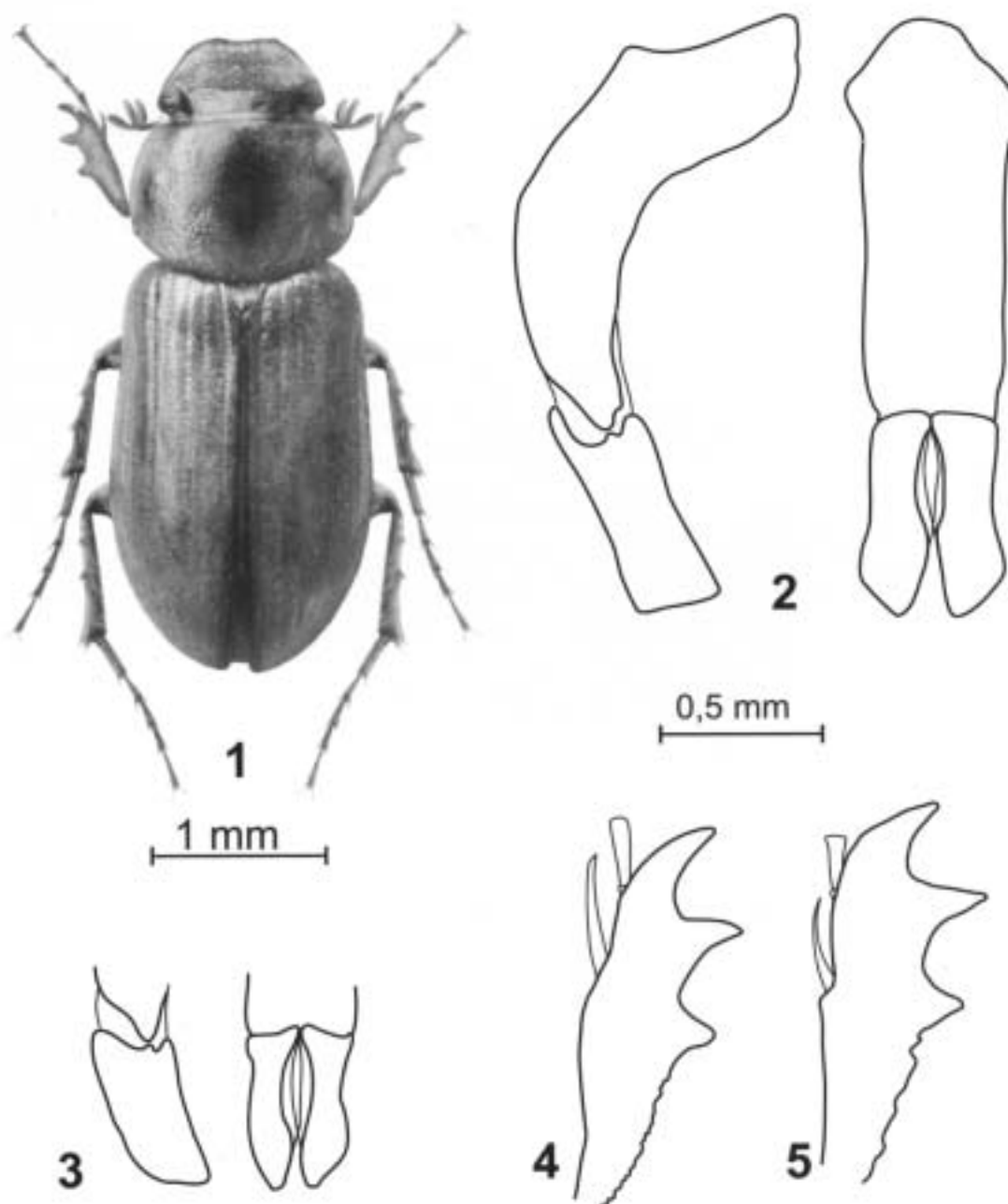
In order to define the type locality more exactly I compared the label data of the type series with the itinerary of the expedition (Kozlov 1906).

Aphodius (Bodilus) kaznakovi Frolov, **new species**
Figs. 1–2, 4

Type Locality. China: Qinghai Province, Burhan Budai Shan Mts.

Type Material. Holotype, male labeled "China: Qinghai, north slope of Burhan-Budda, canyon Khatu [ca. 20 km S from Barun (36°10'N, 97°20'E)], middle July 1901, Kozlov's expedition [in Russian]"; 11 male paratypes with the same data. Type material deposited in the collection of Zoological Institute (St. Petersburg).

Description. Holotype, Male (Fig. 1). Body yellowish-brown, shiny, pronotum and elytra semi-transparent. Head densely punctate (punctures separated by 0.5–2.0 times a puncture diameter). Frons not tuberculate; frontoclypeal suture distinct, appears as dark line. Clypeus feebly sinuate at middle, rounded at sides, lighter in color than remaining part of head. Genae rectangular, protruding past eyes. Dorsal surface of head pubescent with minute, barely visible setae. Width of eye in ventral view approximately 2 times as wide as minimum interval between eye and gula. Pronotum yellowish-brown with vague darker maculae on disc, surface coarsely punctate (punctures separated by 1 puncture diameter on disc), pubescent with yellowish barely visible setae. Anterior margin of pronotum not bordered, sides and base finely bordered; hind angles rounded. Lateral margins pubescent with sparse setae. Scutellum triangular, finely punctate, pubescent. Elytra yellowish-brown, shiny, without humeral teeth. Elytral interstices feebly convex, sparsely punctate. Striae fine, coarsely punctate (punctures of striae 2 times wider in diameter than width of striae, separated by 0.5–1.0 times a puncture diameter). Sides and apices of elytra pubescent with short and relatively sparse, but distinctly visible setae. Venter of body yellowish-brown. Disc of metasternum flat, sparsely and coarsely punctate, sparsely pubescent. Legs yellowish-brown. Apical spur of foretibia long and acute, slightly curved downward, located opposite interval between 1st and 2nd tibial teeth; spur reaches middle of 2nd tarsal segment (Fig. 4). Apical spurs of middle tibia slender and acute; lower spur longer than 2/3 length of upper spur. First segment of hind



Figs. 1–2, 4. *Aphodius kaznakovi*, male.

Figs. 3, 5. *A. sordescens*, male. 1) Habitus; 2) aedeagus, lateral and dorsal views; 3) parameres, lateral and dorsal views; 4, 5) foretibia.

tarsi slightly shorter than 2 following segments together. Adjoining apical setae of hind tibiae of unequal length. Shape of aedeagus typical for the subgenus *Bodilus* (Fig. 2).

Female. Unknown.

Variability. Body length 5.5–6.3 mm. Some paratypes have pronotum and head almost impubescent, but the absence of setae might be a result of abrasion.

Differential Diagnosis. The species is most similar to *A. sordescens* Harold but can be separated from it by the lighter coloration of the pronotum (*A. sordescens* has larger and more pronounced dark macula on the disc of the

pronotum), coarsely punctate and finely pubescent head and pronotum (pronotum and head of *A. sordescens* smooth, sparsely punctate, punctures separated by 2–4 times a puncture diameter), shape and location of foretibial spur in male (foretibial spur of *A. sordescens* more slender, located opposite 1st tibial tooth and reaching apex of 1st tarsal segment (Fig. 5), and the shape of the parameres (Figs. 2–3).

Etymology. The species is named in honor of A. N. Kaznakov, noted Russian researcher of central Asia and associate of P. K. Kozlov during his expedition to Mongolia and China in 1899–1901.

Acknowledgments

I would like to thank Dr. Brett Ratcliffe (University of Nebraska State Museum) for linguistic review of the manuscript.

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A NEW SPECIES OF *HARPALUS* LATREILLE (COLEOPTERA: CARABIDAE) FROM SOUTHEASTERN NORTH AMERICA

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Abstract

Harpalus (Pseudoophonus) poncei **new species** is described from Florida, USA, based on three specimens, all collected in 1963. This species may be a Florida endemic overlooked by collectors or an undescribed adventive species.

In the course of my review of the subgenus *Megapangus* Casey (Harpalini: *Harpalus* Latreille) (Will 1997), I found two specimens identified as *H. (Megapangus) caliginosus* (Fabricius) in the Cornell University Insect Collection, Ithaca, NY (CUIC), that by their relatively pale legs stood out as different from all other specimens I had examined (individuals of *Megapangus* have black legs [Fig. 1]). Upon closer inspection I found that these two individuals had the characteristics of the subgenus *Pseudoophonus* Motschulsky and not *Megapangus*. Comparison with *Harpalus* specimens in museums throughout North America resulted in only a single additional specimen from the United States National Museum, Washington, D.C. (USNM).

North American *Harpalus* species have been treated in several excellent works (Ball and Anderson 1962; Lindroth 1968; Noonan 1991). However, it not surprising that a species of *Pseudoophonus* from Florida would have remained unnoticed. Lindroth's faunal work focuses on the northern North American taxa, Ball and Anderson's monograph on *Pseudoophonus* predates the first collection record known for this species, and Noonan's publication excludes *Pseudoophonus* taxa since those taxa were covered previously.

Methods

General preparation and taxonomic methods and concepts used are the same as previously described by Will (1998) and Will and Liebherr (1997).

Taxonomy

For a general description of the genus *Harpalus* Latreille for North American species see Noonan's monograph (1991). For characteristics of subgenus *Pseudoophonus* see Ball and Anderson's treatment of the subgenus (Ball and Anderson 1962) and Ball's key to *Harpalus* subgenera (Ball 1960:84). Except for increasing the size range of *Pseudoophonus* species from 6.5–16.0 mm to 6.5–23.0 mm, characteristics of this species are consistent with descriptions presented in these works.

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Fig. 1. Comparison of habitus. **left)** *H. katieae* from MS; **middle)** holotype *H. poncei*; **right)** *H. pensylvanicus*, from FL.

Harpalus (Pseudoophonus) poncei new species

Recognition. Specimens of *H. poncei* can be distinguished from all other North American *Harpalus* species by their large size in combination with reddish legs, presence of mentum tooth, and pronotum relatively broad at the base with wide lateral margins (Fig. 2). Individuals are large relative to even larger specimens of *Pseudoophonus*, e.g., *Harpalus pensylvanicus* (DeGeer), but are smaller than individuals of the subgenus *Megapangus*, e.g., *H. katieae* Battoni (Fig. 1).

Type Material. HOLOTYPE ♂, "Naples, FLA., Dec 30 1963, J.B. Williams" (CUIC). ALLOTYPE ♀, Same data and deposition as holotype (reproductive tract and defensive glands dissected).

PARATYPE ♂, Port Charlotte, FLA. 1963, W. Rosenberg Collection (USNM).

Description. Size and form: 20–23 mm long; body robust and slightly depressed (Fig. 1).

Color: Upper body black; legs, antennae and palpi rufous; mandibles and labrum apically black, paler, nearly rufous basally; ventral surface medially dark rufo-piceous, more darkly infuscated laterally.

Head: In both sexes slightly transverse microsculpture scarcely visible on vertex, slightly more evident in female than male, generally shiny; mentum tooth simple, sagittiform.

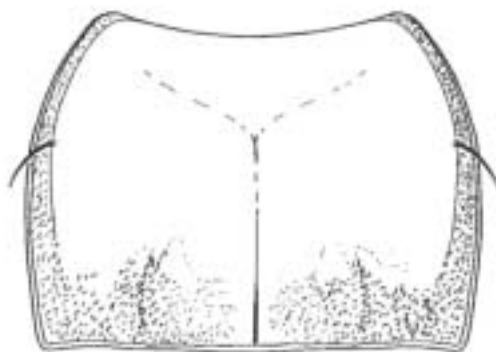


Fig. 2. Pronotum, *H. poncei*.

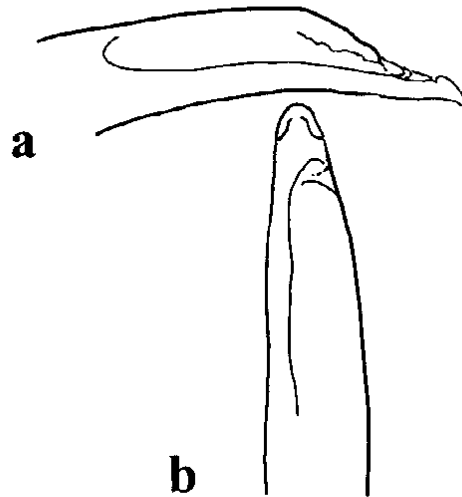


Fig. 3. Median lobe blade, *H. poncei*. **a)** left lateral view; **b)** dorsal view.

Pronotum: Outline quadrate, sides nearly straight from middle to posterior angles (Fig. 2); anterior angles moderately protruding; lateral marginal groove broad, widening posteriorly; groove and basolateral region punctulate-rugose with evident isodiametric or irregular mesh microsculpture; posterior bead broad and sharply delimited throughout, or slightly less defined laterally; posterior angles about right and slightly flexed ventrally; laterobasal fovea not separate from lateral groove; mediobasal fovea shallow and broadly impressed; disc convex with microsculpture in both sexes slightly transverse and scarcely visible; median longitudinal impression interrupted on disc, deeper near base and anterad near anterior transverse impression; anterior transverse impression very shallow, scarcely visible.

Legs: Protibial medioapical spur lanceolate or falcate, 5 lateroapical spines; metafemur with 4–6 setae on posterior margin; dorsal surface of all tarsi setose.

Elytra: Slightly depressed, parallel sided, subapical sinuation very slightly evident; humeral angle with small rounded tooth; elytral intervals slightly convex; striae impunctate or shallowly crenulate, sutural stria long; setose punctulae throughout intervals 7–9 and few small setae scattered along base of intervals 5–6; sloping base of elytra with few scattered setae; evident isodiametric or slightly irregular mesh microsculpture in both sexes; surface moderately shiny, female slightly duller from more evident microsculpture.

Abdomen: Sternites II–III with dense setae medially in addition to usual ambulatory setae.

Male genitalia: Blade straight in dorsal view, ostium slightly deflected left; tip scarcely flexed ventrally in lateral view (Fig. 3). The apical portion of the median lobe of the male holotype was exposed and so studied but not further dissected. The genitalia of the paratype male was not intact so was not dissected. The study of the endophallic structures could not be done on these specimens.

Female genitalia and reproductive tract: Bursa copulatrix elongate with large apicoventral lobe and an elongate dorsal sclerotized region terminating in a small lobe (Fig. 4); spermatheca simple, elongate, lightly constricted, inserted apically on bursa; spermathecal appended gland duct inserted basally, gland unknown, apparently lost during dissection; laterotergite broad, asetose; gonocoxite-1 elongate, asetose; gonocoxite-2 with two nematiform setae; median tergite IX with 20 apicomedial setae.

Defensive gland: Gland reservoir large; dorsal lobe well developed; collecting canal more than 2× length of reservoir.

Etymology of name: Genitive name based on Ponce de León, the Spanish explorer (1460–1521). In 1521 he lead an expedition intent on establishing a permanent settlement in the vicinity of Charlotte Harbor, FL. They were fierce-

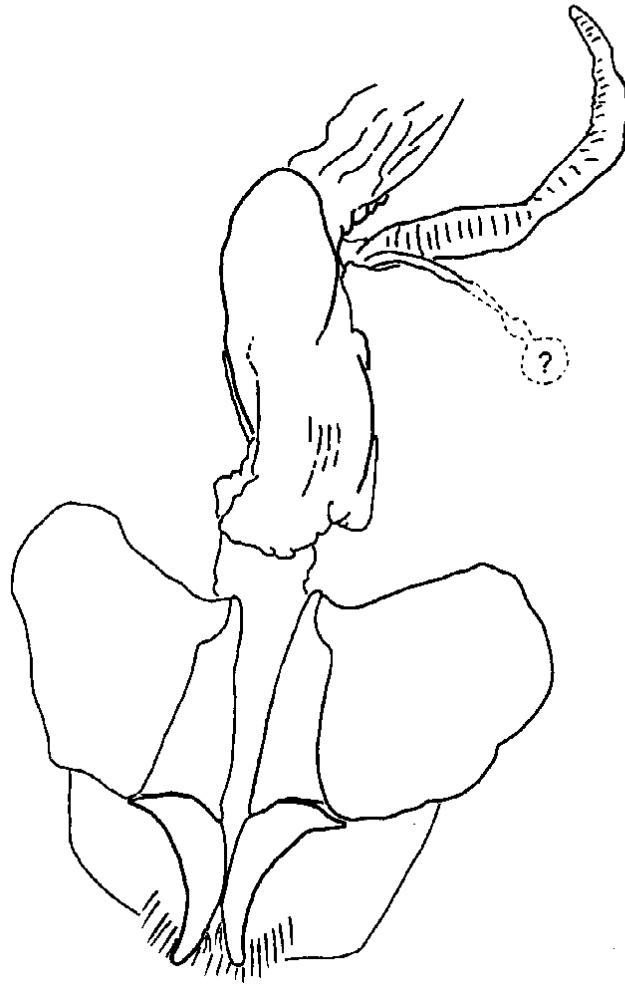


Fig. 4. *Harpalus poncei* Female reproductive tract ventral view.

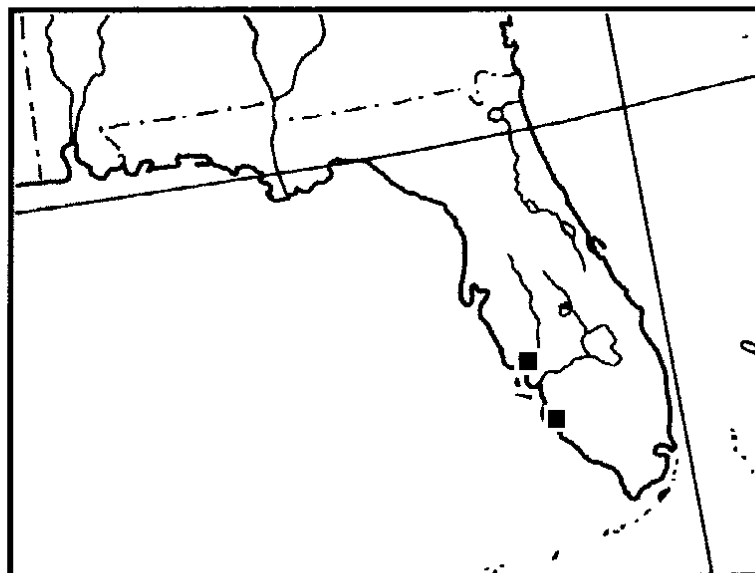


Fig. 5. Collection localities for *H. poncei*.

ly attacked by Native Americans and he was mortally wounded by an arrow during the battle.

Discussion. This species is only known from the type specimens from two sites on the west coast of Florida. The two collecting localities are separated by only 65 miles and the two collecting events occurred in the same year, 1963. This peculiar situation—one collecting season collection, in two, relatively close coastal sites—suggests that this may be adventive rather than a native species. I attempted to identify specimens using the various keys to North American *Harpalus* cited above but found no species to which I could attribute them. Considering the possibility that this is an adventive species, I subsequently attempted to identify specimens using various keys for Palaearctic, Asian, and African faunas (e.g., Basilewsky 1950, 1951; Habu 1973; Trautner and Geigenmüller 1987). After an extensive search through the literature, inspection of specimens in major collections and consultation with people with expertise in *Harpalus* taxonomy, I concluded that even if these specimens represent a nonnative species, it has remained undescribed.

These specimens may represent another vanishing part of Florida's unique fauna or, as is often the case, this species may be difficult to collect. Relatively few winter time collection records for *Harpalus* species are known (Noonan 1991). Perhaps this species has an unusual life cycle and has not been observed because little collecting has been done during its period of activity. I hope that this paper challenges collectors in Florida to look carefully at winter active *Harpalus* that might otherwise be disregarded as uninteresting.

Acknowledgments

I thank Terry Erwin (USNM; Department of Entomology, United States National Museum of Natural History, Smithsonian Institution) and Jim Liebherr (CUIC; Cornell University Insect Collection, Ithaca, NY) for access to the material for this paper.

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The Coleopterists Bulletin, 55(4):452. 2001.

BOOK REVIEW

VIVES, EDUARD. 2000. **Fauna Iberica. Volume 12. Coleoptera, Cerambycidae.** Museo Nacional de Ciencias Naturales. Consejo Superior de Investigaciones Científicas. Madrid. Ramos et (Eds.) 716 pp., 204 figs. (5 colored) ISBN 84-00-07887-X. Address for correspondence/purchase: Dpto. Publicaciones, c/ Vitrubio, 8, 28006—Madrid, Spain; email: publ@orgc.csic.es. Price: \$45.00.

This is one volume of the series of the Fauna Iberica published by the National Museum of Natural Sciences in Madrid, Spain. Although the book is printed in Spanish, the numerous illustrations make it relatively easy to use. The illustrations are excellent and the paper is of high quality. Each species is completely described, the geographic distribution is listed and biologies are recorded. Keys to genera and species are provided and an extensive bibliography is presented as well as an appendix listing synonymies and combinations. Another appendix lists host plants and their associated species. The book is very well done and is a valuable contribution for students of Cerambycidae. Although the Iberian Peninsula is not one of the faunistically richer areas, the Cerambycidae contain a number of very interesting species not commonly encountered. This work ranks high on the list of geographical faunal studies. It is a must for all interested in longhorns and provides easy determination of the Iberian fauna.

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(Received and accepted 13 September 2001)

NEW SPECIES OF *EUSCELUS* SCHOENHERR FROM CENTRAL AMERICA (COLEOPTERA: ATTELABIDAE)

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Abstract

Six new species of *Euscelus* Schoenherr from Central America are described, illustrated and mapped: *E. oaxacensis* **new species**, *E. stockwelli* **new species**, *E. similis* **new species**, *E. spinosus* **new species**, *E. bivittatus* **new species**, and *E. maculicollis* **new species**. These new species and **new records** for *E. submaculatus* Voss and *E. vittaticollis* Voss, previously known only from South America, brings the total number of euscelines in Central America to 22. Male genitalia, including unique endophallic structures, are illustrated for each new species. A key based on external characters is provided to separate the new species from all known Central American euscelines.

The characteristics of Euscelina and the taxonomic history of *Euscelus* Schoenherr were given in a previous paper (Hamilton 1997). O'Brien and Wibmer (1982) listed the following 13 species of *Euscelus* from Central America: *E. auratus* (Sharp), *E. binotatus* (Gyllenhal), *E. breviceps* (Sharp), *E. bullatus* (Sharp), *E. championi* (Sharp), *E. corallinus* (Gyllenhal), *E. cruralis* (Sharp), *E. elliptiguttatus* (Voss), *E. fenestratus* (Sharp), *E. inaequalis* (Sharp), *E. lissus* Voss, *E. mundanus* (Sharp), and *E. verticalis* Voss. Hamilton (1997) described *E. rufiventris* from Mexico. *Euscelus submaculatus* Voss and *E. vittaticollis* Voss in the collections of G. Vogt and H. Stockwell are new records for the Republic of Panama and Central America. This paper adds six new species from Central America: *E. oaxacensis* n. sp., *E. stockwelli* n. sp., *E. similis* n. sp., *E. spinosus* n. sp., *E. bivittatus* n. sp., and *E. maculicollis* n. sp. This brings the total number of euscelines now known from Central America to 22. O'Brien and Wibmer (1982) also list 36 species of *Euscelus* from South America including *E. elliptiguttatus* and *E. mundanus* that were originally described from Central America. The area concept of Central America in this paper is from Mexico to the Republic of Panama and excludes the West Indies.

The male genitalia, including the transfer apparatus (TA) and structures associated with the inner wall of the endophallic sac (e.g., TA guides), have been shown to be of importance in the taxonomy of attelabid and rhynchitid weevils (Hamilton 1979, 1992, 1994, 1998). This paper is the first to illustrate these important structures in species of the genus *Euscelus*. The male genitalia (i.e., aedeaguses) in the species described in this paper differ significantly in the tegminal cap-piece, apex of the median lobe's ventral plate, TA, TA guides, and other sclerotized structures on the inner wall of the endophallic sac (Figs. 8–14). Similarities are obvious only in the TA and TA guides of *E. stockwelli* and *E. breviceps* (Figs. 9 and 10). To date, I have published information on the TAs and accessory endophallic structures of 26 New World attelabine species representing five genera. This is only about 14% of the 184 total New World attelabine species placed in 15 genera. There is a need to accurately document the male genitalia, including the endophallic structures, of additional

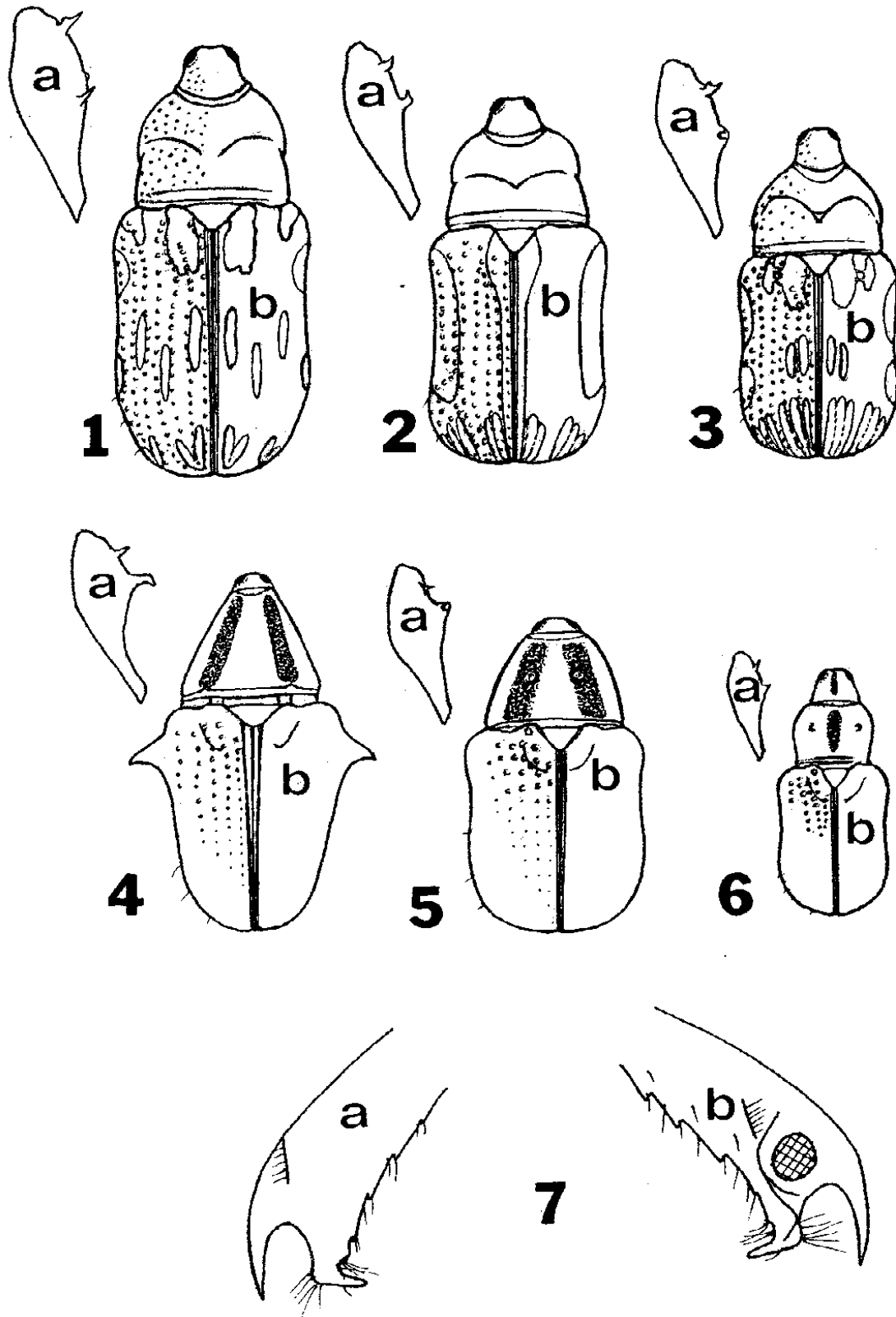
attelabine species in order to homologize and compare them in evolutionary context.

Sexual dimorphism is present in all attelabine weevils. Sexually dimorphic characters more or less applicable to all attelabine species are as follows: tibial apices are uni-uncinate in males and bi-uncinate in females; abdominal ventrals are more or less concave and distinctly setose in males but are more or less convex and with little or no setosity in females; protibiae are slightly longer, narrower and more arcuate in males; the eyes in most males are more protuberant than in conspecific females; and the antennal club is more elongate in males than in conspecific females. In eusceline weevils, the profemora are always armed in both sexes. The armature is sexually dimorphic and species specific and is useful in delimiting the species. In addition to the spinelike projections and denticles on the profemora, males often have a setose patch or pit near the base of the medio-ventral projection that is of taxonomic value. The functional significance of these setose sensilla is unknown. The profemoral sexual dimorphism is described in a separate section under each new species treatment.

Specimens used in this taxonomic study are associated with the following collections (acronyms are mainly from Heppner and Lamas 1982): American Museum of Natural History (AMNH); California Academy of Sciences (CASC); Canadian Museum of Nature Collection (CMNC); Texas Agricultural and Mechanical University Collection (TAMU); United States National Museum (USNM); Institute of Biodiversity, Costa Rica (INBio); Henry P. Stockwell collection (HPSC); Charles W. O'Brien collection (CWOB); Robert H. Turnbow collection (RHTC); Henry A. Hespenheide collection (CHAH); Robert W. Hamilton collection (RWHC).

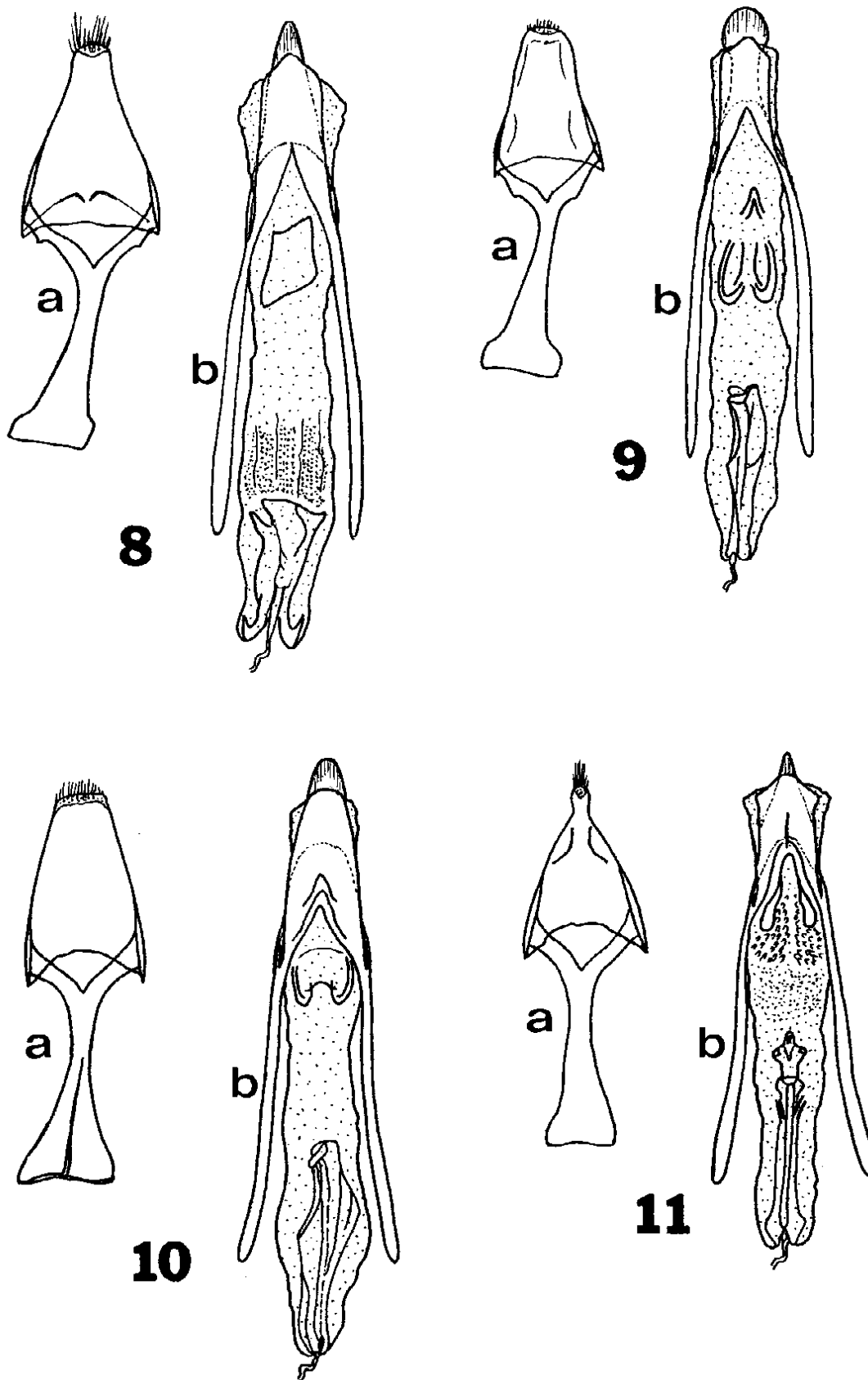
Key to *Euscelus* Species of Central America

- 1 Elytral striae distinct from base to apex of elytra, sometimes dense and deep throughout; intervals at elytral declivities more or less raised 2
- 1' Elytral striae not distinct throughout, more distinct at base, becoming smaller and more or less indistinct posteriorly; intervals at declivities not raised 13
- 2 Elytra with acute spine on each side near middle, dorsally between spines with pair of broadly rounded smooth tubercles *E. inaequalis* (Sharp)
- 2' Elytra without acute lateral spines and without pair of broadly rounded smooth tubercles between spines 3
- 3 Elytra with numerous yellowish marks, some barlike and confined to specific intervals 4
- 3' Elytra without numerous yellowish marks; either without marks or with only a pair of yellowish round or oval convex spots near middle 7
- 4 Interval markings at elytral declivities forming six parallel yellowish barlike marks (interval 4 and 8 not yellowish); elytra usually with small broadly acute lateral tubercles on both sides near middle
..... *E. breviceps* (Sharp)
- 4' Interval markings at elytral apices not exactly as above, lateral acute tubercles not present near middle of elytra 5
- 5 Interval markings at elytral declivities forming two V-shaped yellowish marks on each side (Fig. 1b); yellowish marks associated with intervals 1, 3, 5 and 7; sometimes apex of interval two also yellowish; body length (excluding rostrum) 5.8 mm or more *E. oaxacensis*, n. sp.



Figs. 1–6. New species of *Euscelus*, males, 16X; left profemur (a) and dorsal habitus (b). 1) *E. oaxacensis*; 2) *E. stockwelli*; 3) *E. similis*; 4) *E. spinosus*; 5) *E. bivittatus*; 6) *E. maculicollis*.

Fig. 7. *E. maculicollis*, male, protibial apex, 160X; outer face (a), inner face (b), basi-tarsal cavity crosshatched.



Figs. 8–11. Species of *Euscelus*, male genitalia, dorsal view, 64X; tegmen (a) and median lobe (b) with endophallic sac in repose. **8)** *E. oaxacensis*, n. sp.; **9)** *E. stockwelli*, n. sp.; **10)** *E. breviceps* (Sharp); **11)** *E. similis*, n. sp.

- 5' Interval markings at elytral apices not forming two V-shaped marks on each side; body length (excluding rostrum) less than 5.8 mm 6
- 6 First elytral interval with yellowish color extending throughout; dorso-lateral yellowish elytral mark large, elongate, widened posteriorly, extending from humerus to elytral declivity (Fig. 2b) *E. stockwelli*, n. sp.
- 6' First elytral interval without yellowish color extending throughout, broken before and after elytral midpoint; elytra without large, elongate, posteriorly widened dorso-lateral yellowish mark; with two separate dorso-lateral marks; marks separated near elytral midpoint (Fig. 3b) *E. similis*, n. sp.
- 7 Elytra with pair of yellowish convex spots near middle 8
- 7' Elytra without pair of yellowish convex spots near middle, coarsely punctured and reddish-brown throughout 12
- 8 Elytral spots oval or teardrop-shaped 11
- 8' Elytral spots round 9
- 9 Elytral spots small, weakly convex, spot diameter less than combined length of first two segments of antennal club 10
- 9' Elytral spots larger, strongly convex, spot diameter greater than combined length of first two segments of antennal club *E. championi* (Sharp)
- 10 Elytra, in dorsal view, distinctly widened posteriorly, apically more or less truncated; pronotal grooves nearly transverse, more or less meeting at middle of pronotum; body length (excluding rostrum) 6 mm or less *E. binotatus* (Gyllenhal)
- 10' Elytra, in dorsal view, not distinctly widened posteriorly, widening only slightly posteriorly not apically truncated; pronotal grooves not transverse, strongly oblique, not meeting at middle of pronotum; body length (excluding rostrum) 9 mm or more *E. cruralis* (Sharp)
- 11 Elytral intervals strongly raised at declivities; elytral spots with blurred edges, sometimes drawn out and blurred anteriorly; pronotum with line-like impressions not complete across middle; body length (excluding rostrum) 8 mm or more *E. elliptiguttatus* Voss
- 11' Elytral intervals not strongly raised at declivities; elytral spots with edges sharply defined; pronotum with linelike impression complete across middle; body length (excluding rostrum) less than 8 mm *E. fenestratus* (Sharp)
- 12 Pronotum densely punctured; elytral intervals distinct, wide, minutely and transversely strigate *E. submaculatus* Voss
- 12' Pronotum not densely punctured, without punctures, smooth and shiny; elytral intervals indistinct, reticulate *E. mundanus* (Sharp)
- 13 Elytra with distinctly raised oval yellowish areas surrounding scutellum; margins of raised areas narrow, reddish-brown, punctured; pronotum more or less with reddish-brown longitudinal mid-dorsal stripe 14
- 13' Elytra without raised oval yellowish areas surrounding scutellum; not margined as above; pronotum without longitudinal mid-dorsal reddish-brown stripe 15
- 14 Elytra, in dorsal view, distinctly narrowed from base to apex; with two transverse reddish-brown bands; one band just behind raised areas near scutellum and one near declivities; bands more or less join at elytral suture; oval yellowish areas near scutellum moderately raised *E. auratus* (Sharp)
- 14' Elytra, in dorsal view, not narrowed from base to apex, more or less parallel-sided, with two crooked reddish-brown linelike bands; one band

- just behind raised areas near scutellum and one near declivities; bands not joining at elytral suture; oval yellowish areas beside scutellum strongly raised *E. bullatus* (Sharp)
- 15 Elytra with posteriorly curved thornlike spines, one on each side just behind humeri (Fig. 4b) *E. spinosus*, n. sp.
- 15' Elytra without posteriorly curved thornlike spines 16
- 16 Pronotum with two small round dorso-lateral pitlike impressions on either side of middle; impressions sometimes indistinct in *E. corallinus* 20
- 16' Pronotum without dorso-lateral pitlike impressions 17
- 17 Pronotum with dorso-lateral oblique linelike grooves on each side of middle, body shiny blackish-brown with reddish abdomen *E. rufiventris* Hamilton
- 17' Pronotum without dorso-lateral oblique linelike grooves; body color not as above 18
- 18 Pronotum with two dorso-longitudinal reddish-brown stripes; stripes divergent basally (Fig. 5b) *E. bivittatus*, n. sp.
- 18' Pronotum without two dorso-longitudinal reddish-brown stripes 19
- 19 Pronotum with dark mid-dorsal longitudinal mark (Fig. 6b) *E. maculicollis*, n. sp.
- 19' Pronotum with dark brownish-black longitudinal stripes; one along each side and one mid-dorsal *E. vittaticollis* Voss
- 20 Elytra with black markings on humeri and along sides of scutellum. *E. verticalis* Voss
- 20' Elytra without black spots or markings; body reddish or reddish-brown throughout 21
- 21 Pronotal pitlike impressions weak or indistinct; males with profemur bidentate and first abdominal sternum with setal "brush" at middle between hind coxae; females with acute symmetrical peglike profemoral spine *E. corallinus* (Gyllenhal)
- 21' Pronotal pitlike impressions distinct, more or less deep; males with profemur tridentate and setae of abdominal sternum forming two widely separated rows; seta more or less forming tufts on sterna 2 and 5; females with subacute asymmetric profemoral spine *E. lissus* Voss

Euscelus oaxacensis, new species

Figs. 1, 8, 15

Type Locality. Mexico, Oaxaca, El Cameron-Tehuantepec.

Type Series. The type material consists of 21 specimens from Mexico. The holotype male and allotype female are labeled as follows: Mexico, Oaxaca, El Cameron-Tehuantepec, km 171, 25-vii-1981, *Terminalia*, G. Vogt (USNM). The sex and label data of the 19 paratypes are as follows: 2 females [same as primary types except, km 237–227]; 1 female, Mexico, Chis.[Chiapas], Sumidero, 4,000 ft, July 8, 1955, P. and C. Vaurie collectors (AMNH); 13 males and 2 females, Mexico, Chiapas, Chorreadero St. Pk., 26-v-1987, collected at mercury vapor and black light, DB Thomas, DA Rider, EG and TJ Riley (CWOB); 1 female, Mexico, Chiapas, El Chorreadero, east of Tuxtla Gtz., 13 June 1989, PK Lago, S Testa (CWOB).

Type Deposition. All types are located in their parent collections except the following: 1 female, same data as primary types (RWHC).

Color and Pubescence. Body reddish-brown; middle legs, hind legs and abdomen paler. Elytra with slightly raised yellowish markings. Pubescence absent above on head, pronotum and elytra; with some widely spaced pale erect setae on the elytra mainly near apical and apico-lateral margins. Rostral apex, antennae, pygidium, legs and mid-ventrals more or less sparsely set with fine pale reclinate setae.

Size Range. Male 5.8×2.4 mm to 7.2×3.0 mm; Female 5.5×2.3 mm to 6.4×2.6 mm.

Adult Descriptive Synopsis. *Head* more or less rectangular; vertex smooth, shiny, with scattered fine punctures; with postocular punctate band along margin of eye; genae moderately to densely punctured; frons with deep narrow median sulcus; eyes weakly protuberant. *Rostrum* short, about $\frac{1}{2}$ length of head; in lateral view weakly arcuate; in dorsal view distinctly widened from antennal insertions to apex; width at apex $\frac{1}{3}$ wider than width at base; base about four times wider than frons; dorsal apex moderately punctured. *Antenna* inserted dorso-laterally just behind basal $\frac{1}{3}$ of rostrum; club compact; basal and terminal segments subequal in length; middle segment slightly shorter; terminal segment acuminate. *Pronotum* wider than long; in dorsal view sides arched out in anterior half; dorsal anterior edge broadly emarginate; anterior and posterior width subequal; moderately punctured, more densely punctured postero-laterally; interspaces smooth, shiny; with two shallow oblique grooves; grooves not meeting in middle; anterior collar ringlike, weakly delimited, subequal in width throughout; subbasal constriction weak, linelike, indistinct laterally; width of basal piece at midline slightly more than midline width of anterior collar. *Elytra* about $\frac{2}{5}$ longer than wide; widest behind middle; weakly depressed in middle behind scutellum; weakly raised around scutellum; declivity abrupt; striae punctures distinct throughout; intervals smooth shiny, weakly convex, as wide or slightly wider than width of striae; each elytron with eleven yellowish marks; one large irregular mark near scutellum; two humeral marks, one at humeral apex and one posthumeral and lateral; four barlike interval marks staggered across middle; and four interval marks near apex forming two V-shaped groups on intervals 1 and 3 and 5 and 7. *Thorax* with pleura and lateral edges of sterna coarsely punctured; metathoracic sternum smooth, bulbous each side of middle. *Legs* with front pair greatly enlarged; profemora swollen, stalked, armed. *Abdomen* with sterna 1–4 more or less subequal; smooth, shiny, minutely crenulate; laterally with scattered punctures; sutures weakly delimited; sternum 5 narrow, ringlike, moderately to densely punctured; suture between 4 and 5 distinct; pygidium and tergum between elytral apices densely punctured.

Profemoral Sexual Dimorphism. The profemur in males is armed with a disti-ventral thornlike projection, a straight medio-ventral peglike projection and a blunt projection on the rim of a small round seta bearing pit (Fig. 1a) near the base of the medio-ventral projection. The profemur in females is armed with a disti-ventral thornlike projection and a medio-ventral peglike projection.

Distribution (Fig. 15). *Euscelus oaxacensis* is known only from three sites in southern Mexico; the type locality in Oaxaca and two sites in Chiapas near Tuxtla Gutierrez.

Comments. *Euscelus oaxacensis* is easily distinguished from other New World euscelines by the elytral markings and the profemoral armature (Fig. 1). This is *Euscelus* sp #6 of Vogt (1992). Vogt reported it from *Terminalia* sp. (Combretaceae) and did not associate it with a pterocoline thief weevil. He states that the host trees grow in dry washes, canadas and barrancas across the pacific slopes of Oaxaca. The species is related to *E. breviceps*, *E. similis*, and *E. stockwelli* based on color pattern, elytral markings and the shape and sculpture of the pronotum. It is distinctly larger than these three and obviously differs from them in the arrangement of the yellowish elytral marks and the profe-

moral armature. Also, the aedeagus (Fig. 8) in *E. oaxacensis* is easily distinguished by the large wide TA bearing a fingerlike process and the irregularly rectangular TA guide. The specific name is derived from the Mexican state of Oaxaca.

Euscelus similis, new species

Figs. 3, 11, 15

Type Locality. Belize, Belmopan

Type Series. The type series consists of 12 specimens. The holotype male and allotype female are labeled as follows: Belize, 39 mi n. e. of Belmopan, 17-viii-1981, *Terminalia*, G. Vogt (USNM). The sex and label data of the 10 paratypes are as follows: 3 males and 2 females, label data same as primary types; 2 males and 2 females, Belize, Corozal, viii-1980, *Terminalia*, G. Vogt (USNM); 1 female, Guatemala, Livingston, v-5 [no year], Barber & Schwarz coll. (USNM).

Type Deposition. All types are located in the USNM except the following: 1 male and 1 female, same data as primary types (RWHC).

Color and Pubescence. Body reddish-brown; sides of head, pronotum, metasternum, femora and all pleura darker; middle and hind legs paler. Elytra with slightly raised yellowish markings. Pubescence absent above on head, pronotum and elytra; elytra with only a few small widely spaced erect pale setae mainly near apical and apico-lateral margins. Rostral apex, antennae, pygidium, legs and mid-ventrals more or less sparsely set with fine pale reclinate setae.

Size Range. Male 4.0×1.7 mm to 4.7×2.0 mm; Female 3.9×1.6 mm to 4.7×2.0 mm.

Adult Descriptive Synopsis. *Head* more or less rectangular, weakly constricted across middle; vertex moderately punctured, interspaces smooth, shiny; with narrow postocular punctate band along margin of eye; genae more or less densely punctured; frons with weak median sulcus; eyes moderately protuberant. *Rostrum* short, about $\frac{1}{2}$ length of head; in lateral view weakly arcuate; in dorsal view distinctly widened from antennal insertions to apex; width at apex $1\frac{1}{2}$ times as wide as base; base about $2\frac{1}{2}$ times wider than frons; dorsal apex moderately punctured. *Antennae* inserted dorso-laterally just behind basal $\frac{1}{3}$ of rostrum; club compact; basal and middle segment subequal in length; middle segment slightly shorter; terminal segment acuminate. *Pronotum* wider than long; in dorsal view sides arched out in anterior half; dorsal anterior edge weakly emarginate through middle; anterior and posterior width subequal; with widely spaced fine punctures; moderately punctured postero-laterally; interspaces smooth, shiny; with two deep oblique grooves near middle; grooves meet at middle forming wide V-shape and median depression; anterior collar distinct, widest through middle; subbasal constriction linelike, indistinct laterally; width of basal piece at midline slightly less than midline width of anterior collar. *Elytra* about $\frac{1}{4}$ longer than wide; widest behind middle; weakly depressed in middle behind scutellum; weakly raised around scutellum; declivity abrupt; striae punctures distinct throughout; intervals smooth, shiny, weakly convex, about as wide as striae; each elytron with twelve yellowish marks; two at base, larger one adjacent to scutellum on intervals 1 and 2, smaller one at base of interval 4, more or less connected by narrow yellowish interspaces; one postero-lateral to humerus; two in middle near elytral suture on intervals 1 and 2; one dorso-lateral beyond middle; and six barlike interval marks from declivity to apex, covering intervals 1, 2, 3, 5, 6 and 7. *Thorax* with pleura and lateral edges of sterna coarsely punctured; metasternum smooth, bulbous each side of middle. *Legs* with front pair greatly enlarged; profemora swollen, stalked, armed. *Abdomen* with sterna 1-3 subequal, smooth, shiny, minutely crenulate; sutures distinct through middle, weak laterally; with scattered lateral punctures; sterna 4 and 5 subequal, slightly shorter along midline than sterna 1-3; suture between sternum 4 and 5 complete;

sternum 5 distinctly punctured; pygidium and tergum between elytral apices densely punctured.

Profemoral Sexual Dimorphism. The profemur in males is armed with a disti-ventral thornlike projection, a medio-ventral acuminate projection that is strongly angled (bent over) and an oval setose pit near the base of the medio-ventral projection (Fig. 3a). The profemur in females is armed only with an disti-ventral thornlike projection and a small straight medio-ventral denticulate projection.

Distribution (Fig. 15). Eleven of the 12 specimens in the type series are from Belize (Belmopan and Corozal) and a single female specimen is recorded from Livingston, Guatemala.

Comments. *Euscelus similis* is easily distinguished from the other Central American euscelines by the profemoral armature and the elytral markings (Fig. 3). It is very similar to *E. breviceps* but lacks the toothlike projection on the postero-lateral portion of the elytra and differs in profemoral armature. The medio-ventral profemoral projection in males of *E. breviceps* is smaller and not angled and the medio-ventral profemoral projection in females of *E. breviceps* is much smaller and denticulate. The aedeaguses are very different in *E. breviceps* and *E. similis* (compare Figs. 10 and 11). The apex of the tegminal cap-piece in *E. similis* is narrow and fingerlike, the apex of the ventral plate of the median lobe is narrowly pointed, the TA is narrow and elongate and the TA guide is surrounded numerous bluntly tipped denticles. The yellowish elytral marks on the pinned specimens of *E. similis*, *E. breviceps* and *E. stockwelli* take on a greenish luster when the specimens are hydrated. These marks may actually be bright green in living specimens. Buchanan (1935, unpublished note on USNM specimen label) noted that similar elytral marks on *Euscelus sexmaculatus* (Chevrolat) from Haiti were bright green when the specimen was collected. This species has been associated with *Terminalia* spp. by G. Vogt but has not been associated with a pterocoline egg predator. It is probably associated with *Pterocolus torreyae* Hamilton which is known to attack *E. breviceps* (Vogt 1982). The species name is in reference to the external similarity of this species to *E. breviceps*.

Euscelus stockwelli, new species

Figs. 2, 9, 15

Type Locality. Panama, Canal Zone, Cerro Galera.

Type Series. The type series consists of 30 specimens from the Republic of Panama. The holotype male and allotype female are labeled as follows: Canal Zone, Cerro Galera, 5. Jan. 1976, Col. HP Stockwell (HPSC). The sex and label data of the 28 paratypes are as follows: 1 female, same as primary types; 1 female, Panama province, El Llano Carti rd., km 9, el. 350 m, 7,8-v-1991, beating foliage, *Terminalia amazonica* [amazonia?], Windsor-Stockwell (HPSC); 1 female, same as previous except 8-v-1991, Stockwell; 1 male, Panama pr. Cerro Jefe, 30-vi-1971, 700 m, *Terminalia*, HA Hespeneide (CHAH); 1 male and 1 female, same as previous except 22-vi-1971, 9°14'N–79°23'W (CHAH); 1 male, Panama pr. [Province], Cerro Campana, 17-vii-1977, 850 m, 8°40'N–79°56'W, *Terminalia*, HA Hespeneide (CHAH); 1 female, Panama prov., Pozo Azul, Finca Vega nr. Las Nubes, 671 m, 26-i-1975, D.C. Rentz (CASC); 1 female, pipeline rd., 1971, *Terminalia*, G Vogt (USNM); 4 males and 2 females, Serra [sic] Campana, 1971, *Terminalia*, G Vogt (USNM); 3 females, same as previous except 1970 (USNM); 1 male and 1

female, PAN., km 7.5–9, Llano Carti Road, viii-3-1995, CW and LB O'Brien (CWOB); 1 female, [same as previous except, vii-28-1995] (CWOB); 1 female, Panama C. Z., Ft. Sherman, 8-viii-82, col. D Engleman (CWOB); 1 male, Canal Zone, Fort Gulick, Qts. 40, March 1979, at light, HJ Harlan (CWOB); 1 male, Canal Zone, Barro Colorado Is., UV trap 1 (3 m high), 9 Apr. 1997, H Wolda (CWOB); 1 male, Panama, Cerro Jefe, June 9, 1985, E Riley and D Rider (CWOB); 1 male and 1 female, Panama Pr., El Llano-Carti road, km 7–9, 400 m, 6-vi-1995-06, RS Anderson (CMNC); 1 female, Pma. Pr. [Panama Province], Llano-Carti rd., km 8, El 350 m, 25 Aug. 1984, Stockwell (CMNC). **Not included in type series:** 2 males and 1 female, [Panama?], 1978, G Vogt (USNM).

Type Deposition. The holotype and allotype are located in the USNM. All paratypes are located in their parent collections except the following: 1 male and 1 female, Serra [sic] Campana, 1971, *Terminalia*, G. Vogt (RWHC); 1 male and 1 female, same as previous (CMNC); 1 male and 1 female, same as previous except female, 1970 (CASC); 1 male, [Panama], 1978, G Vogt (AMNH).

Color and Pubescence. Body reddish-brown with pronotum, middle legs, hind legs, abdominal ventrals and pygidium distinctly paler. Elytra with slightly raised yellowish markings. Pubescence absent above on head, pronotum and elytra; elytra with only a few small widely spaced erect pale setae near the apical and apico-lateral margins. Rostral apex, antennae, pygidium, legs and mid-ventrals more or less sparsely set with fine pale reclinate setae.

Size Range. Male 4.6×1.8 mm to 5.2×2.1 mm; Female 4.8×1.9 mm to 5.3 to 2.2 mm.

Adult Descriptive Synopsis. *Head* more or less rectangular, weakly constricted across middle; vertex smooth, shiny, without punctures; with narrow postocular punctate band along margin of eye; genae moderately punctured; frons with deep median channel; eyes strongly protuberant. *Rostrum* short, $\frac{1}{2}$ as long as head; in lateral view weakly arcuate; in dorsal view widening from antennal insertions to apex; width at apex about $\frac{1}{2}$ wider than width at base; base three times wider than frons; dorsal apex sparsely punctured. *Antenna* inserted dorso-laterally at basal $\frac{1}{3}$ of rostrum; club compact; basal and terminal segments subequal in length; middle segment slightly shorter; terminal segment acuminate. *Pronotum* wider than long; in dorsal view sides arched out in anterior half; dorsal anterior edge weakly emarginate through middle; anterior and posterior width subequal; dorsally without punctures, smooth, shiny; laterally and postero-laterally with some punctures; with two deep oblique grooves; grooves meeting at middle forming wide V-shaped depression; anterior collar distinct, wide through middle; subbasal constriction linelike, distinct throughout; width of basal piece at midline subequal to midline width of anterior collar. *Elytra* about $\frac{1}{4}$ longer than wide; widest behind middle; moderately depressed in middle behind scutellum; moderately raised around scutellum; declivity abrupt; stria punctures distinct throughout; intervals smooth, shiny, weakly convex, as wide as width of striae; each elytron with seven yellow marks; one along entire first interval from scutellum to apex, curving around apex; one dorso-lateral, large, elongate, wide, covering intervals 5–8, distinctly widened posteriorly, extending from humerus to near elytral declivity; and five marks from declivity to apex on intervals 2, 3, 5, 6 and 7. *Thorax* with pleura and lateral edges of sterna coarsely punctured; metathoracic sternum smooth, bulbous each side of middle. *Legs* with front pair greatly enlarged; profemur swollen, stalked, armed. *Abdomen* with sterna 1–3, subequal, smooth, shiny, minutely crenulate, with small scattered lateral punctures; sterna 4 and 5 subequal, moderately punctured, slightly shorter at midline than sterna 1–3; all sutures distinct, somewhat weaker laterally; pygidium and tergum between elytral apices densely punctured.

Profemoral Sexual Dimorphism. The profemur in males has a disti-ventral

thornlike projection, a medio-ventral angled and apically acute spine and a round setose pit near the base of the medio-ventral spine (Fig. 2a). The pro-femur in females is armed with an disti-ventral thornlike spine and a small straight medio-ventral denticulate projection.

Distribution (Fig. 15). All available specimens are from the Republic of Panama near or in the canal zone.

Comments. *Euscelus stockwelli* can easily be distinguished from other euscelines by the elytral markings (Fig. 2b). Similar markings also occur in *E. breviceps* and *E. similis* but the first intervals are yellowish from scutellum to apex and the large dorso-lateral yellowish marks are unique to *E. stockwelli*. This species is closely related to *E. breviceps* and has very similar aedeagal structure but the rounded knoblike apex of the ventral plate of the median lobe in *E. stockwelli* is distinct (compare Figs. 9 and 10). Vogt (1992) listed this species as *Euscelus* sp. nr. *breviceps* Sharp and associated it with *Terminalia amazonica* (sic) in the Combreteceae. He gave its range as lowlands to 1,000 m in Honduras and the Republic of Panama. No specimens from Honduras were found in the Vogt material. Vogt also listed a bicolored pterocoline egg predator, *Pterocolus auricollis* Sharp, associated with this species. Stockwell collected this species on *Terminalia amazonia* (Gmel.) in Panama. The species is named in honor of Henry P. Stockwell whose collections have made a significant contribution to weevil taxonomy.

Euscelus spinosus, new species

Figs. 4, 14, 16

Type Locality. Panama, Trinidad Rio.

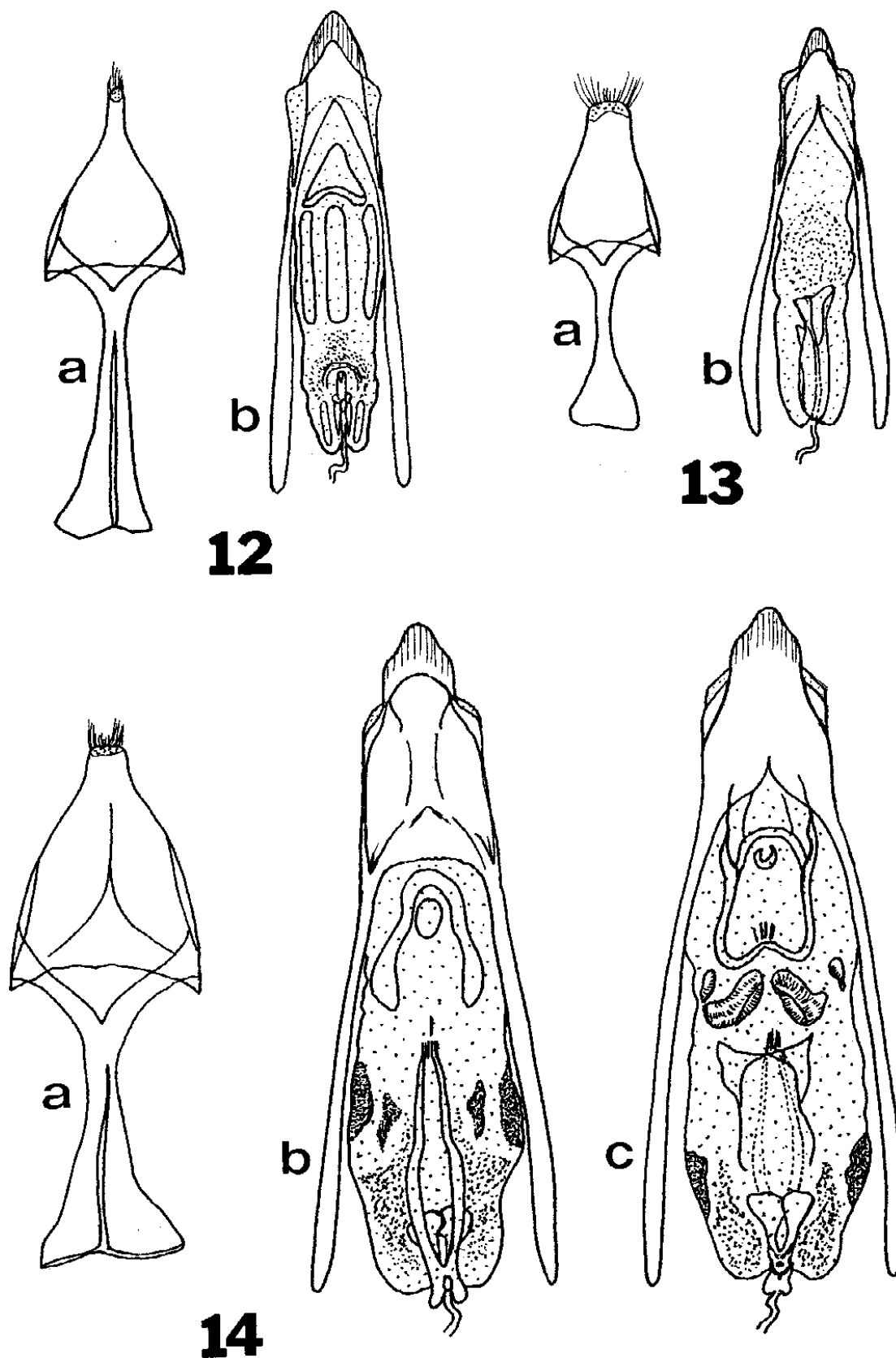
Type Series. The type series consists of 5 specimens from the Republic of Panama. The male holotype is labeled as follows: Trinidad Rio, Pan. 19.3.12 [19-iii-1912], A. Busck (USNM). The allotype is labeled the same as the holotype except 20.3.12. The holotype has only the two basal segments present on the right antenna while the allotype has only the two basal segments present on the left antenna. The sex and label data of the 3 paratypes are as follows: 1 male, Panama: Pma. Pr., Llano-Carti rd., km 9, el. 350 m, 15 Feb. 93, Stockwell (HPSC); 1 male, same as previous except 5 Jan. 91; 1 female, Panama: Zona del Canal, Barro Colorado Island, 13 Nov. 1984, M Wong (HPSC).

Type Deposition. All types are located in the USNM except: 1 male, Panama, Llano-Carti rd., Km 9, el. 350 m, 5 Jan. 91 (RWHC).

Color and Pubescence. Body reddish-brown and shiny throughout. Pronotum with two reddish brown basally divergent longitudinal stripes. Head behind eyes, apices of elytral spines, and front legs (except femoral stalk and coxae) darker. Pubescence absent above on head, pronotum and elytra; elytra with only a few widely spaced erect pale setae along lateral margins. Antennae, pygidium, legs and mid-ventrals sparsely set with fine pale reclinate setae.

Size Range. Male 5.3×2.3 mm to 6.2×2.6 mm; Female 5.6×2.4 mm to 6.1×2.6 mm.

Adult Descriptive Synopsis. Head elongate, weakly conical, widest at base, smooth, shiny, with postocular row of very small punctures along margin of eye, otherwise without punctures; frons smooth, shiny, without sculpture; eyes moderately protuberant. Rostrum slightly more than $\frac{1}{2}$ length of head; in lateral view weakly arcuate; in dorsal view widened from middle to apex; width at apex $\frac{1}{2}$ wider than width at base; about $2\frac{1}{2}$ times wider at base than width of frons; dorsal apex with fine punctures; interspaces smooth, shiny. Antenna inserted dorso-laterally at basal $\frac{1}{3}$ of rostrum; club compact-



Figs. 12–14. Species of *Euscelus*, male genitalia, dorsal view except 14c ventral, 64X; tegmen (a) and median lobe (b and c) with endophallic sac in repose. 12) *E. bivittatus*, n. sp.; 13) *E. maculicollis*, n. sp.; 14) *E. spinosus*, n. sp.

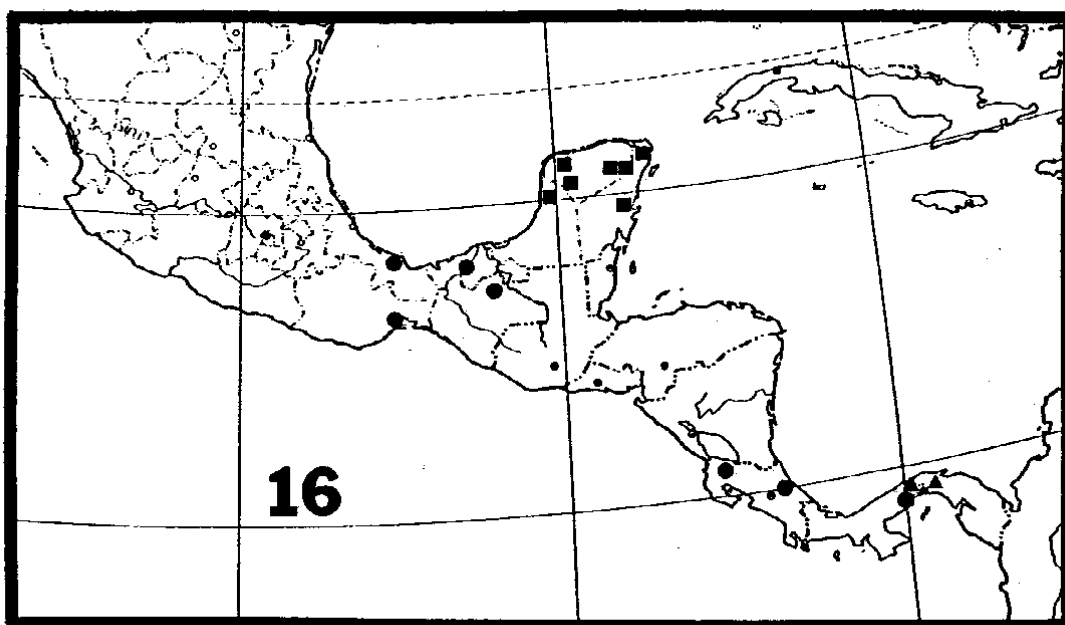
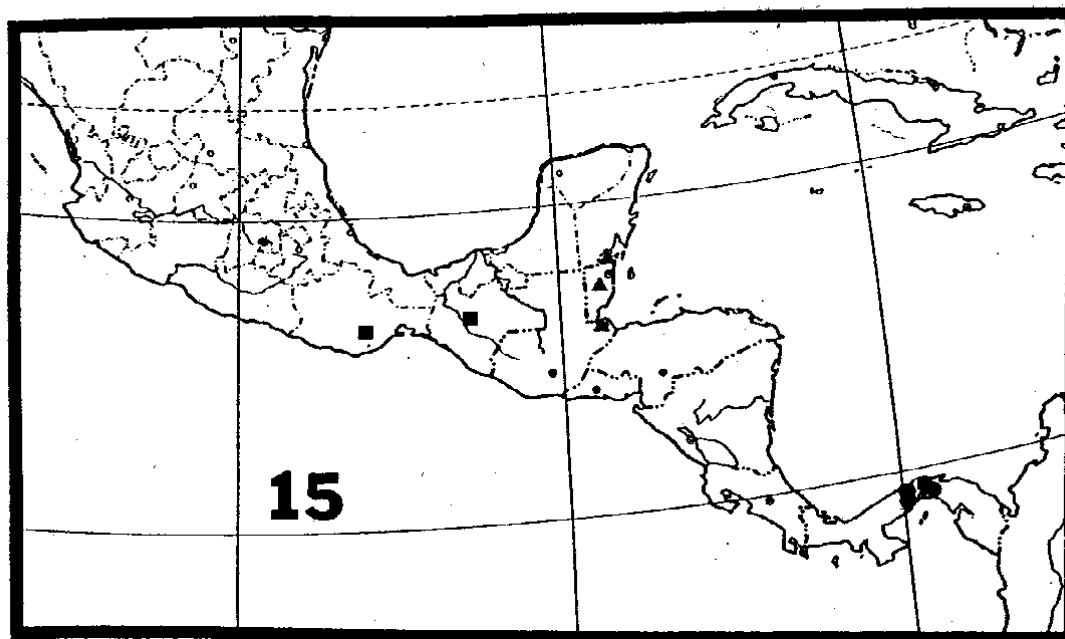


Fig. 15. Distribution of *Euscelus* n. spp. *E. oaxacensis* [black squares], *E. stockwelli* [black circles], *E. similis* [black triangles].

Fig. 16. Distribution of *Euscelus* n. spp. *E. maculicollis* [black squares], *E. bivittatus* [black circles], *E. spinosus* [black triangles].

elongate, slightly shorter than funicle; basal segment longer than middle and terminal segment; middle and terminal segment subequal in length; terminal segment acuminate. *Pronotum* wider than long, widest at base, strongly narrowed from base to apex; in dorsal view sides nearly straight; smooth, shiny, without punctures; with two basally divergent longitudinal stripes; dorsal anterior edge straight; with weak depression on either side near middle; anterior collar weakly delimited, widest at middle, subbasal constriction linelike, distinct throughout; width of basal piece at midline subequal to midline width of anterior collar. *Elytra* about 1/3 longer than wide; widest across humeri; weakly depressed behind scutellum; in dorsal view distinctly narrowed posteriorly; with large

thornlike posthumeral spines, outer apical margin curved posteriorly; elytral midbase with irregular large stria punctures; striae becoming much smaller posteriorly beyond base, indistinct apically; intervals flat, wide, smooth, shiny, becoming indistinct apically. *Thorax* with pleura smooth, shiny, sparsely punctured. *Legs* with front pair greatly enlarged; profemora swollen, stalked, armed. *Abdomen* with sterna 1–5 more or less subequal, smooth, shiny; sutures distinct medially, indistinct laterally; pygidium moderately punctured.

Profemoral Sexual Dimorphism. The profemur in males (Fig. 4a) is armed with two close set spinelike projections. The disti-ventral projection is straight, peglike and apically acuminate while the medio-ventral projection is wider, strongly angled and apically blunt. A small setose patch is present at the base of the medio-ventral projection. The profemur in females is armed with a single straight disti-ventral, peglike, apically acuminate projection.

Distribution (Fig.16). All known specimens are from the Republic of Panama.

Comments. *Euscelus spinosus* is easily recognized by the two stripes on the pronotum and the thornlike posthumeral spines of the elytra (Fig. 4b). *Euscelus bivittatus* also has two pronotal stripes but the elytral humeri are simple. Elytral spines or spinelike projections occur in other New World euscelines. None are distinctly thornlike as in this species except in *E. spiniger* Voss from South America. However, in *E. spiniger* the thornlike spines are larger and more posthumeral in location. The spines are straight, acute and located midlaterally in *E. inaequalis* Sharp and *E. armatus* (Gyllenhal). Some West Indian euscelines, *E. dentipes* (Fabricius), *E. cancellatus* Voss and *E. scrobiculatus* Voss, have smaller elytral projections near the humeri that are either bluntly tipped or denticulate. The aedeagal median lobe in *E. spinosus* (Fig. 14b and c) has a distinct TA and TA guides and the endophallic sac has more sclerotized accessory structures than in the other new species. No host plant or pterocoline association has been recorded for this species. It is named for the large thornlike spines on the elytra.

Euscelus bivittatus, new species

Figs. 5, 12, 16

Type Locality. Mexico, Chiapas.

Type Series. The type series consists of 19 specimens. The holotype male and allotype female are labeled as follows: Mexico, Chiapas, Finca Agua Clara, viii-25-1981, *Coccoloba*, G. Vogt (USNM). The male holotype has the right antenna missing and the endophallus protruded. The sex and label data of the 17 paratypes are as follows: **MEXICO:** 1 female, same as primary types; 2 males and 3 females, Tabasco, Jalapa, viii-14-1982, *Escobo*, G. Vogt (USNM); 1 female, Veracruz, Lake Catemaco, iv.30-v.1, 1969, HF Howden (CMNC); 1 male and 1 female, Ver. [Veracruz], Balzapote (nr. Montepio), 20', 20 May, 1983, CW and L O'Brien and GB Marshall (CWOB); 1 male, Oax. [Oaxaca], Istmo de Tehuantepec, SARH, Coleccion Sanidad Vegetal (CWOB); 1 female, Veracruz, Mex., La Playa Escondida, Las Tuxtlas, 23 March 1980, S. Kaiser, LG Bezark Collection (CWOB). **COSTA RICA:** 1 male, Guan. Prov., Guanacasta, Est. Cacao, 1,000–1,400 m, Lado SO Vol. Cacao P. N., 21 a May 1992, L-N 323300, 375700, R Vargas (INBio); 1 female, Guanac. Pr., Estac. Cacao, 1,000–1,400 m SW side Volcan Cacao, Apr. 1988, 323300-375700, M. Espinoza (INBio); 1 female, 28-iv-36, an Gebusch, Hamburg Farm, Reventazon Ebene Limon, F. Nevermann (USNM); 1 male, Waldeck, July 22, 1936, CR

4857, Sofia and CH Ballou (USNM). **PANAMA:** 1 female, Canal area, Barro Colorado Natl. Mon., Gigante Peninsula, 4 Jun '92, Fog #8, coll. John E. Tobin (HPSC); 1 male, C. Z. [Canal Zone], Fort Sherman, 1 June '78, A Thurman (HPSC). **Not included in type series:** 1 male, [Panama?], G. Vogt (USNM).

Type Deposition.. The holotype and allotype are located in the USNM. All paratypes are located in their parent collections except the following: 1 male and 1 female, Mexico, Tabasco, Jalapa, 14-viii-1982, *Escobo*, G Vogt (RWHC); 1 male and 1 female, same as previous (CASC).

Color and Pubescence. Body reddish-brown throughout. Head, rostrum, antennae, front legs (except coxae) and pronotal stripes darker. Pubescence absent above except for a few small widely spaced erect pale setae on the elytra. Rostral apex, antennae, pygidium, legs and mid-ventrals more or less sparsely set with fine pale reclinate setae.

Size Range. Male 3.6×1.6 mm to 5.3×2.2 mm; Female 4.1×1.8 mm to 5.5×2.3 mm.

Adult Descriptive Synopsis. *Head* weakly conical, widest at base, smooth, shiny; genae with small scattered punctures; with postocular row of small punctures along margin of eye; frons smooth, shiny, without sculpture; eyes moderately protuberant. *Rostrum* $1/2$ length of head; in lateral view weakly arcuate; in dorsal view widened from antennal insertions to apex; width at apex $1/2$ wider than width at base; width at base about twice as wide as frons; dorsal apex sparsely punctured, interspaces smooth, shiny; densely punctured laterally. *Antenna* inserted dorso-laterally at basal $1/3$ of rostrum; club compact; basal and terminal segments subequal in length; middle segment slightly shorter; terminal segment acuminate. *Pronotum* wider than long, widest at base, narrowing slightly from base to apex; in dorsal view sides weakly arched out; dorsal anterior edge straight; smooth, shiny, without punctures; with two small depressions, one each side near middle; with two posteriorly divergent longitudinal stripes; anterior collar weakly delimited, ringlike, subequal in width throughout; subbasal constriction linelike, complete throughout; width of basal piece at midline greater than midline width of anterior collar. *Elytra* $1/4$ longer than wide, weakly depressed behind scutellum; in dorsal view sides more or less parallel; striae distinct at base, large, becoming abruptly smaller from behind depression to apex; intervals smooth, shiny, flat, wider than striae, more or less indistinct apically. *Thorax* with pleura smooth, shiny, with scattered punctures; metathoracic sternum smooth, shiny, weakly bulbous each side of middle. *Legs* with front pair greatly enlarged; profemora swollen, stalked armed. *Abdomen* with sterna 1–5 more or less subequal, laterally smooth, shiny; sutures weak between sterna 1–4; suture between 4 and 5 distinct; pygidium moderately punctured.

Profemoral Sexual Dimorphism. The profemur in males (Fig. 5a) is bidentate. The disti-ventral denticle is small and acute and the medio-ventral denticle is somewhat larger, bluntly tipped and angled. In some small males the medio-ventral projection is represented only by a small blunt denticle. The profemur in females is armed with a small disti-ventral acute denticle.

Distribution (Fig. 16). This species ranges from southern Mexico to the Republic of Panama.

Comments. *Euscelus bivittatus* is distinguished by the two stripes on the pronotum (Fig. 5b) and the reddish-brown smooth and shiny body. *Euscelus bivittatus* is similar in size and body coloration to *E. corallinus* (Gyllenhal) and *E. lissus* Voss. However, the two pronotal stripes will easily distinguish it from these two species. Also, the males of both *E. corallinus* and *E. lissus* have distinct setal tuft patterns on the abdominal sterna that are not present in males of *E. bivittatus*. The aedeagal median lobe of this species (Fig. 12b) has a unique TA and wide bandlike TA guides marked by a basal triangular plate. This is most likely G. Vogt's species #2 that he associated with *Coccoloba* sp.

in the Polygonaceae family (Vogt 1992). Vogt did not associate *E. corallinus*, *E. lissus* or this species with a pterocoline thief weevil. The specific name refers to the two stripes on the pronotum.

Euscelus maculicollis, **new species**

Figs. 6, 7, 13, 16

Type Locality. Mexico, Yucatan, nr. Chichen Itza.

Type Series. The type series consists of 77 specimens from the Mexican states of Campeche, Quintana Roo, and Yucatan. The holotype male and allotype female are labeled as follows: Mexico, Yuc. [Yucatan], 2 km E. Chichen Itza, 20 m, 20.vii.1983, M. Kaulbars (CMNC). The sex and label data of the 75 paratypes are as follows: **CAMPECHE:** 4 males and 1 female, [1 leaf roll on separate pin with same data], 89 km NE Campeche, vii-31-90, CW and LB O'Brien (CWOB). **YUCATAN:** 4 females, 2 mi. E. Chichen Itza, 100', 19-20, vii-83, dry trop. seas. forest, R Anderson, W Maddsison (CMNC); 1 female, same as previous except, Anderson (CMNC); 1 male, 14 mi. e. Chichen Itza, July 30-31, 1980, Schaffner, Weaver, MM Friedlander (TAMU); 1 male, 3 mi. w. Chichen Itza, Aug. 6, 1974, on *Neomillspaughia emarginata*, CW and L O'Brien and Marshall (USNM); 1 female, Uxmal Ruins, 150', 21.vi.83, R Anderson, roadside sweep (CMNC); 1 male, [same as previous except, 50 m, RS Anderson] (CMNC); 1 female, 3 km E Chichen Itza, 23 Oct. 1991, R. Turnbow (RHTC); 1 male, 2 km E Chichen Itza, 16 June 1990, R Turnbow (RHTC); 4 males and 1 female, Yuc., 3mi E. Chichen Itza, Aug. 7, 1974, CW and LB O'Brien and Marshall (CWOB); 6 males and 10 females, 1 female pinned with associated leaf roll, [same as previous except Aug. 6, 1974] (CWOB); 5 males and 5 females, 1 male and 1 female pinned with associated leaf roll, 3 mi. W Chichen Itza, Aug. 6, 1974, on *Neomillspaughia emarginata*, CW and L O'Brien and Marshall (CWOB); 1 male and 3 females, [2 females pinned with associated leaf rolls], 13 mi. E Valladolid, Aug. 7, 1974, CW and L O'Brien and Marshall (CWOB); 1 female, Yuc., 9 km N. Merida, viii-31-1990, CW and LB O'Brien (CWOB); 1 male, Yuc. 51 km E. Merida, viii-1-1990, CW and LB O'Brien (CWOB); 2 males and 4 females, Yuc., 22 km S. Valladolid, viii-2-1990, CW and LB O'Brien (CWOB); 2 females, [same as previous except vii-28-1990] (CWOB); 1 female, [same as previous except 2 km S. Valladolid] (CWOB); 2 males, YUC., 6 km W. Valladolid, vii-2-1990, CW and LB O'Brien (CWOB); 2 males, Yuc., 26 km SW Merida, vii-30-1990, CW and LB O'Brien (CWOB); 1 male, Yuc., 36 km W. Chichen Itza, viii-1-1990, CW and LB O'Brien (CWOB); 1 female, [1 leaf roll on separate pin with same data], Yuc., 37 km SW Uman, vii-31-90, CW and LB O'Brien (CWOB). **QUINTANA ROO:** 1 male, Mpio: Lazaro Cardenas, 25 km NNE Leona Vicario, Reserva El Eden, 16-20/vii/95, R. Jones (RWHC); 1 male, 17 km NW Carillo Puerto [Felipe Carillo Puerto], 18 June 1990, R. Turnbow (RHTC); 1 male and 1 female, 12 km N Carillo Puerto, 19 Oct. 1991, R. Turnbow (RHTC); 1 male, Quint. Roo, Felipe Carillo, Pto., 10-14 Oct. '86, sweeping (CWOB); 1 male and 1 female, 32 km N. Felipe Carillo P. [Puerto], 30 m, 17-vii-1983, M Kaulbars (CMNC).

Type Deposition. All types are located in their parent collections except the following: 1 female, 2 km E Chichen Itza, 23 Oct. 1991 (AMNH); 1 male, 2 km E Chichen Itza, June 1990 (AMNH); 1 female, 2 mi. e. Chichen Itza, 100', 19-20, vii-83 (RWHC); 1 male and 1 female, 12 km N Carillo Puerto, 19 Oct. 1991 (USNM).

Color and Pubescence. Body reddish-brown and shiny throughout with the head, pronotum, and front legs somewhat darker. Pronotum, and usually head, with a variably darkened mid-dorsal mark. Pubescence absent above except for a few very small erect pale apical and apico-lateral elytral setae. Rostral apex, antennae, pygidium, legs and mid-ventrals more or less sparsely set with fine pale reclinate setae.

Size Range. Male 3.0×1.3 mm to 3.8×1.6 mm; Female 3.2×1.4 mm to 3.8×1.7 mm.

Adult Descriptive Synopsis. *Head* more or less rectangular, slightly wider at base, smooth, shiny, with very small scattered punctures; with postocular row of small punctures along margin of eye; frons smooth, shiny, without sculpture; eyes moderately protuberant. *Rostrum* short, slightly more than 1/3 length of head; in lateral view weakly arcuate; in dorsal view distinctly widened from antennal insertions to apex; width at apex about 1/3 wider than width at base; width at base twice as wide as frons; densely punctured throughout. *Antennae* inserted dorso-laterally near rostral base; club compact; first and terminal segment subequal in length; middle segment shorter; terminal segment acuminate. *Pronotum* wider than long; in dorsal view sides arched out; dorsal anterior edge weakly emarginate; widest near middle; smooth, shiny; with very small scattered punctures; with two small shallow depressions near middle; anterior collar weakly delimited, widest at middle; subbasal constriction linelike, punctate, incomplete laterally; width of basal piece at midline subequal to midline width of anterior collar. *Elytra* about 1/5 longer than wide; with weak transverse depression behind scutellum; in dorsal view widest just behind middle; stria punctures distinct in basal 1/3 of elytra, becoming smaller and indistinct posteriorly; intervals smooth, shiny, flat, wider than striae. *Thorax* with pleura and lateral edges of sterna sparsely punctured; metathoracic sternum weakly bulbous each side of middle. *Legs* with front pair greatly enlarged; profemora swollen, armed. *Abdomen* with sterna 1–4 subequal, smooth, shiny; sutures more or less indistinct; sternum 5 narrow; suture between 4 and 5 distinct; pygidium and last abdominal tergum moderately to densely punctate.

Profemoral Sexual Dimorphism. The profemur in males (Fig. 6a) is armed with a disti-ventral narrow thornlike spine and a medio-ventral, angled, anteriorly projecting, apically rounded denticle. The profemur in females is armed with a single more or less straight, acuminate disti-ventral spine and the tibial apices are bi-uncinate.

Distribution (Fig. 16). Specimens representing this species are from the Mexican States of Campeche, Yucatan and Quintana Roo.

Comments. *Euscelus maculicollis* is distinguished by the small size, shiny reddish-brown body, and the dark mid-dorsal mark on the pronotum and head (Fig. 6b). The mid-dorsal pronotal mark is weakly formed in some specimens and the head mark in some specimens is indistinct. Males have a unique hoe-like projection at the inner protibial apex (Fig. 7a and b). This characteristic does not occur in any other known eucelines although the inner apical margin of the protibia in *E. lissus* has a small, broadly rounded non-angled projection. The protibial apex of *E. corallinus* has a curved uncuslike projection on the inner apical margin which can easily be confused with the bi-uncinate tibial apices of females. This species is similar to *E. corallinus* and *E. lissus* but it is smaller in overall size and usually has the mid-dorsal mark on the pronotum. Males and females from the Mexican state of Yucatan are nearly as small as the smallest known eusceline, *E. rufiventris* Hamilton. It also differs from *E. lissus* in that it lacks the deep pronotal pits of that species. When males of *E. maculicollis* and *E. lissus* are compared, the males of *E. maculicollis* have a patch of setosity on the first abdominal sternum while males of *E. lissus* have two widely separated longitudinal rows of setosity accented with tufts. *Eus-*

celus maculicollis is closely related to *E. corallinus*. The setosity of the male sterna and the armature of the profemora is similar in *E. maculicollis* and *E. corallinus* but they can be separated by the dark mid-dorsal mark on the pronotum and the hoelike projection on the male protibial apex in *E. maculicollis*. The aedeagal TA of this species (Fig. 13b) is somewhat similar to that of *E. stockwelli* and *E. breviceps* but TA guides are absent. O'Brien and Marshall collected this species and it's leaf rolls from *Neomillspaughia emarginata* (Gross) of the Polygonaceae family. Pterocoline association is unknown for this species. The specific epithet is in reference to the pronotal mark.

Acknowledgments

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**DESCRIPTION OF THE LARVA OF *BABALIMNICHUS MASAMII* M. SATÔ
(COLEOPTERA: LIMNICHIDAE, THAUMASTODINAE)**

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Abstract

The larva of *Babalimnichus masamii* M. Satô is described. This larva is the first record of the genus and subfamily Thaumastodinae, and is quite easily distinguished from the previously known limnichid larvae in having the mandibular basal process setose.

About 200 species belonging to 30 genera of the family Limnichidae are known from all over the world; however, only a few larvae have hitherto been recorded (Paulus 1970; Britton 1971, 1977; Brown 1991).

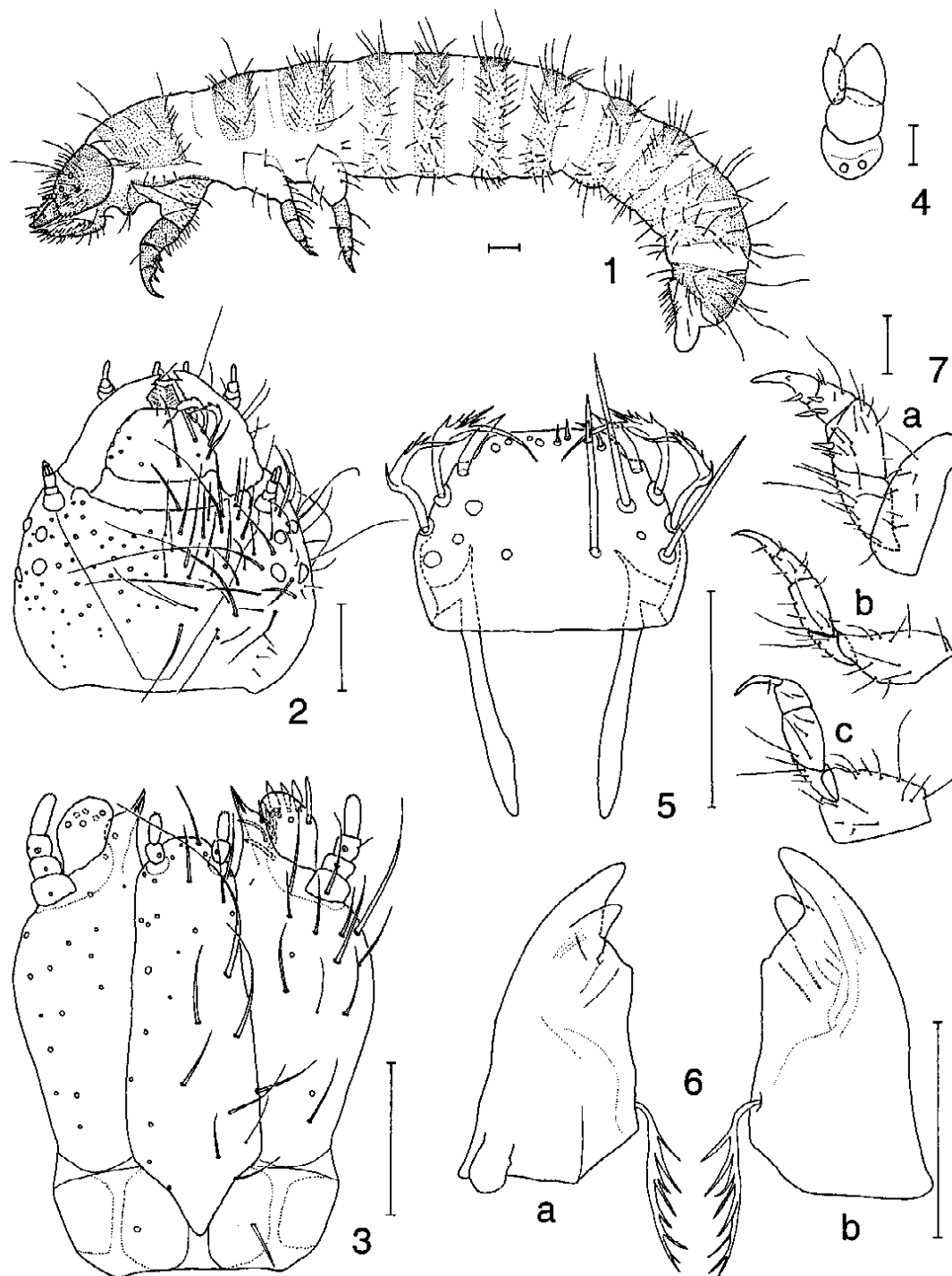
Recently, we collected many adults and some larvae of *Babalimnichus masamii* M. Satô, 1994 in Honshu, Japan. The genus *Babalimnichus* M. Satô (1994) has been represented by adults of two species recorded from Taiwan and Japan (the Ryukyu Is.), and belongs to the subfamily Thaumastodinae (Spangler 1995). In the Ryukyu Is., the adult of *B. masamii* is commonly obtained from the surface of local rocks which are situated on the coral reef, although the larvae were not found immediately thereon.

In this paper, we describe the larva of *B. masamii*. This is the first record of the larva of the genus and the subfamily Thaumastodinae.

Material

After we scraped up surface material from the wet rocks on which the adults of *B. masamii* were obtained, we examined it in our laboratory. We broke the rock by hand and tried to find larvae, but were unsuccessful. We then put the broken pieces in water. A few minutes later, we obtained larvae floating on the surface of the water. The larvae were held at room temperature in an attempt to obtain pupae and adults. Unfortunately, all died in a few days. Judging from the habitats, the features of the larvae, and association with adults, we believe that the larvae are those of *B. masamii*.

Specimens Examined (Larvae). 10 exs. Chita Peninsula, Aichi Pref., Honshu, Japan, January 15, 1996; 2 exs., ditto, January 28, 1996; 2 exs. ditto, February 4, 1996, H. Yoshitomi leg. Two specimens were dissected and mounted on slides No. HY 266–268. The other specimens are preserved in 70% ethyl alcohol.



Figs. 1–7. Larva of *Babalimnichus masamii* M. Satô. 1) Habitus in lateral aspect; 2) head in dorsal aspect; 3) labium and maxillae; 4) right antenna in dorsal aspect; 5) labrum in dorsal aspect; 6) mandible in ventral aspect (a) and dorsal aspect (b); 7) front (a), middle (b) and hind legs (c). Scale bar = 100 μ m.

Babalimnichus masamii M. Satô (1994:175)

Mature Larva. Body length about 2.0 mm; body width about 0.4 mm (at prothorax); head length about 0.2 mm; head width about 0.3 mm. Head and mouth parts brown, but mandible somewhat dusky; dorsal surface of thorax and abdomen pale brown; ventral

surface of thorax and abdomen cream colored; front leg yellowish brown, but claw somewhat dusky; middle and hind legs cream colored, except for brown claws.

Head (Fig. 2) wider than long, covered with long and short setae; gular sutures absent. Antenna (Fig. 4) short; scape with two large punctures; flagellum with an apical spine; sensorium large, almost same size of pedicel. Four stemmata forming quadrangle on each antero-lateral side of head; one of them situated just behind antennal base; another one just below it, behind base of mandible; other two stemmata behind each anterior ones. Labrum (Fig. 5) a little wider than long; front margin provided with eight short setae; lateral margin with unique type of three setae on each side, anterior one strong, two remaining posterior setae long and pectinate; three dorsal setae on each side long; a pair of long apodemes protruding from near antero-lateral corners. Mandible (Fig. 6) rather strong, with two apical teeth; a pectinate and articulated basal setose process connecting at about the basal 1/4 of inner margin of mandible. Maxilla (Fig. 3) with four segmented palpi; galea articulated, with six strong setae; lacinia fixed, with a unique type apical seta. Mentum with a pair of long setae slightly lateral to and beside the middle. Gula present. Thorax wider than head, covered with long and short setae; prothorax widest segment of the body. Legs long; front leg (Fig. 7a) stouter than the other legs, covered with several strong setae on ventral surface of tibia and tarsus, with a strong seta and a small process on pretarsus; middle (Fig. 7b) and hind legs (Fig. 7c) slender, with a normal seta on pretarsus. Abdomen cylindrical, covered with long and short setae; 9th tergite without distinct urogomphus, with some setae longer than setae on abdominal segments.

Comparisons to Other Limnichid Larvae. This larva is distinguished from other limnichid larvae which have been described in the following points: 1) front leg is stouter than the other legs; 2) two setae on lateral margin of labrum are long and pectinate; 3) labrum has a pair of apodemes; 4) each mandible has a pectinate and articulated basal setose process. The last characteristic in this species is very interesting and important, because the other described limnichid larvae have a setose basal mandibular process. At the present time, we cannot determine whether the preceding characteristics are peculiar to this species or to the genus and the subfamily. The presence of a setose basal mandibular process is not unusual in larvae of the superfamily Dryopoidea. For example, Ptilodactylidae and Elmidac have a mandibular basal setose process (Brown 1991; Lawrence 1991).

Biological Notes. The habitat (Fig. 8) is along a seashore at the base of a sandstone cliff where the waves beat only during high tide. Adults were not observed on dried rocks but were present on wet rocks during low tide along with a small staphylinid beetle and *Ligia* sp. (Isopoda). The larvae presumably live in cracks and small holes of the rock, because their movements are slow and they could not be found on the surface of rocks in the field. Surfaces of the rocks were covered with pale green vegetation (Bacillariophyceae?), and we believe that the larvae live and feed on this substrate.

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Fig. 8. Habitat of *Babalimnichus masamii* M. Satô in Aichi Pref.

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**REDISCOVERY OF *ANOMALA EXIGUA* (SCHWARZ) (SCARABAEIDAE:
RUTELINAE), WITH NOTES ON ITS NATURAL HISTORY**

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Abstract

Presumed to be extinct by some authors, *Anomala exigua* (Schwarz) was rediscovered in central Florida. A diagnosis of males and females is presented, including a note on the brachypterous female. Comments are made on attempts to find the type locality. Observations on habitat preferences and behavior are discussed.

Anomala exigua (Schwarz) (Scarabaeidae: Rutelinae) is the smallest member of the genus in the eastern US. It is a rare species with few specimens known in collections. Potts (1977a) stated the species is "probably extinct" adding that after its description "has never been collected again." However, one specimen with the label data "Florida: Polk County, 28-IV-1955, H. Denmark" is in the Florida State Collection of Arthropods Museum (Woodruff 1982). This specimen was confirmed as *A. exigua* by comparison with the type of *A. exigua* by O. Cartwright (pers. comm. R. E. Woodruff). Another specimen with label data "10 mi S. Leesburg, Lake Co. Florida, March 29-1957, Forster and Gersch" is present in the Canadian Museum of Nature (H. Howden Collection).

Recent workers have disagreed about whether *A. exigua* is rare or extinct. Woodruff (1982) stated that the species is "Rare or Status Undetermined," indicating it is rare in collections and little is known about it. Woodruff and Deyrup (1994) stated that it is "Rare" and that it was "premature to consider it as extinct." Peck and Thomas (1998) followed Potts' original note and cited it as "extinct?", including the question mark to indicate their doubt.

A recent collection of *A. exigua* during the spring of 1998 prompted another look at its status. Observations on the natural history of this species were made during subsequent collecting trips. Specimens are deposited in various collections, including: R. F. Morris (Lakeland FL); P. E. Skelley (Gainesville, FL); W. B. Warner (Chandler, AZ); H. F. Howden (Ottawa, Canada); Archbold Biological Station; Florida State Collection of Arthropods Museum; University of Georgia; University of Nebraska State Museum; United States National Museum of Natural History.

Anomala exigua (Schwarz)

Strigoderma exigua Schwarz 1878:362–363. Type depository: Casey Collection, United States National Museum of Natural History. Type label data (pers. comm., N. Adams) “Sumter Co., Florida, 1.5 Hubbard and Schwarz, Type # 455, *Oliganomala exigua*.” The generic name “*Oliganomala*” was apparently changed before publication.

Male Diagnosis (Fig. 1). Based on 75 specimens. Length: 4.0–5.0 mm, width: 1.9–2.5 mm. Body elongate oval, dorsally glabrous, ventrally with sparse, long hairs. Head smooth between punctures, castaneous to black; antennal club length equal to 2X eye length. Pronotum smooth between punctures, castaneous to black, laterally pale; lateral margin with fringe of long setae. Elytral striae deep, coarsely punctured; alternating narrow intervals testaceous (white in life), typically contrasting with wider castaneous intervals, giving a striped appearance; intervals punctate or wrinkled; epipleuron with fringe of long setae. Pygidium with few, sparse, long hairs. Mesocoxae narrowly separated by depressed mesosternum. Protibial apex triangular, slightly curved outward, external teeth lacking; protibial spur located at apical 1/3; 5th protarsomere enlarged; major claw cleft and 2.5X longer than minor claw (Fig. 2). Meso- and metatarsal major claw simple. Metatibia same length or slightly longer than metafemur; metatarsus same length or slightly longer than metatibia; metatarsal claw as long as apical tarsomere. Wing 1.5X length of elytron, capable of flight.

Female Diagnosis. Based on one specimen from Lake County, P. Skelley collection to be deposited in the Florida State Collection of Arthropods. Length 4.3 mm, width: 2.0 mm. Similar to the male except as noted: body slightly stouter than male. Antennal club equal in length to 1X eye length. Protibia (Fig. 3) nearly parallel sided, narrow; protibial spur located at middle; 5th protarsomere not enlarged; major tarsal claw reduced, weakly cleft, shorter than minor claw. Metatibia slightly shorter than metafemur; metatarsus 3/4 length of metatibia; metatarsal claw 1/2 length of apical tarsomere. Wing truncate, 2/3 length of elytron, presumed incapable of flight.

Remarks. Males vary tremendously in elytral color pattern, ranging from distinctly striped to pale with dark striae punctures. Intermediates show varying amounts of black, but generally have alternating dark intervals with a faint V-shaped central band. The testaceous intervals are bright white on living specimens and fade after preservation.

Protibia that lack external teeth is an unusual character in North American *Anomala* species, shared only with another Florida species, *A. eximia* Potts (Potts 1976). *Anomala eximia* can be distinguished by its larger size (6.5–7.5 mm length), solid black pronotum, and obscure elytral striation lacking stripes. Potts' (1977b) key to *Anomala* species north of Mexico can be used to distinguish these from all other U.S. *Anomala*.

Type Locality. In his description of the species, Schwarz (1878:362) stated the type locality as the “sand hills east of Lake Altapopka.” In his “Checklist of Species” from Florida (Schwarz 1878:451) and on the type's label data, Schwarz stated that Sumter County was the type locality. Potts (1977b), Woodruff (1982), and Woodruff and Deyrup (1994) all cited Sumter County, while Potts (1977a) and Peck and Thomas (1998) cited “Lake Altapopka” as the type locality.

We have noted several discrepancies regarding the locality and collecting

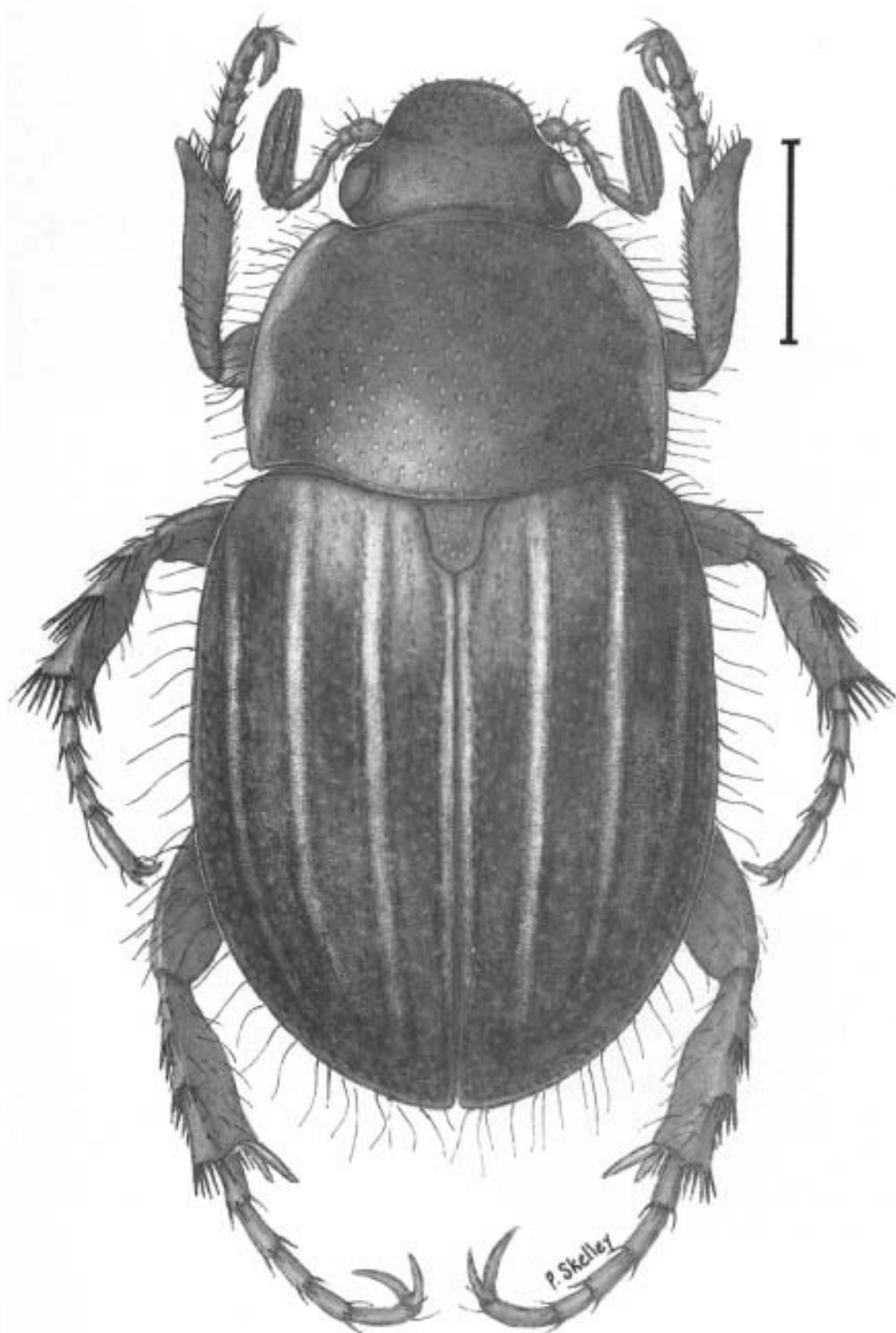
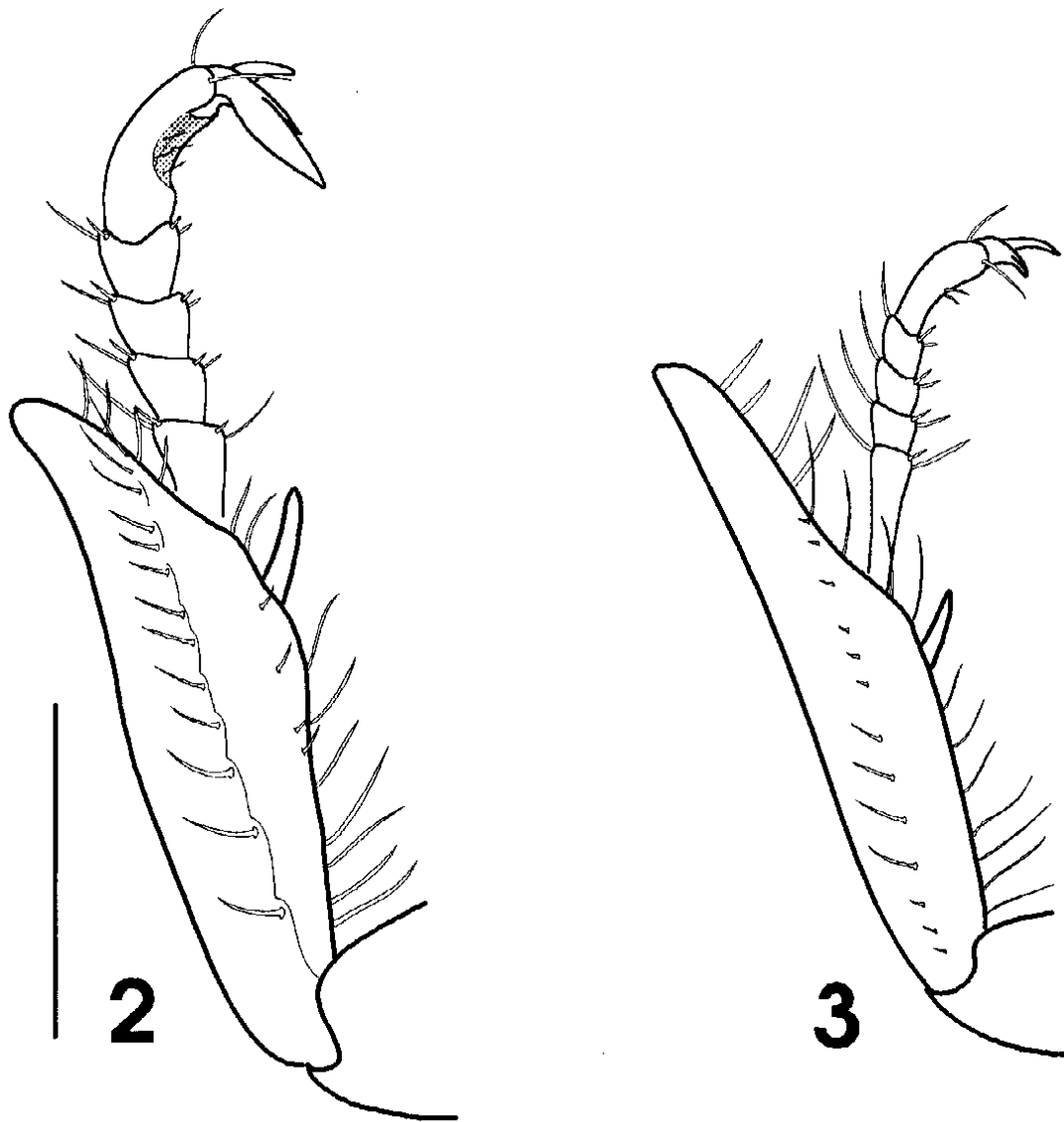


Fig. 1. Male *Anomala exigua* (Schwarz) from Polk County, Florida. Line = 1.0 mm.



Figs. 2–3. Protibiae and tarsi. **2)** Male; **3)** female. Line = 0.5 mm.

data of the type specimen. The locality “Lake Altapopka” is a mystery. According to the Florida Atlas for Colton’s 1836 Map of the United States of America, “Altapopka” is an alternate spelling for “Apopka” (pers. comm. J. Cusick). The derivation of Apopka is from the Creek Indian words “aha papka” meaning “potato-eating place” (Morris 1995). The history of the alternate spelling is unknown. Therefore, the type locality seems to be the sandhills east of present day Lake Apopka, Orange Co., Florida.

During the middle 1800s, the political boundaries within Florida were frequently changing. Well before Schwarz’s trip, Lake Apopka was divided: the eastern half was in the Mosquito Territory (later to become Orange County) and the western half in Sumter County. By 1871, Sumter County was divided with its eastern half becoming the present day Lake County, enclosing the western half of Lake Apopka, as it is today (pers. comm., M. Willis). At the time Schwarz went through the area (1876), Lake Apopka was not in Sumter County. Plus, the sandhills east of Lake Apopka were never in Sumter County.

The route was probably not well marked with "County Line" signs. Schwarz could easily have made a labeling error.

Schwarz (1878:353) comments on collecting "A number of interesting species . . . on the journey across the peninsula from Tampa to Enterprise during the first half of May" in 1876. On the label data of the type specimen the date is recorded as 1.5 (interpreted as 1 May, pers. comm., N. Adams). Schwarz's field notebooks are present in the Smithsonian Archives. According to these notebooks, on the first of May, Schwarz was still in Tampa waiting for someone to arrive before beginning the trip down the Ocala Road with Hubbard on an ox-drawn cart. This makes the day of collection questionable.

Based on these findings we believe the sandhills east of Lake Apopka (Orange County) is the type locality and that the specimen was collected in May. This is substantiated by the fact that recently collected specimens from Lake County (listed below) were collected less than 10 miles from the suspected type locality and were mostly collected in May.

Recent Collection Localities. Locality data on the 1955 specimen of *A. exigua* is only "Polk County." The 1957 Lake County specimen was collected 10 mi S. of Leesburg. To date, we have located populations at four sites in two Florida counties: Lake County, 1 mile northeast of Clermont and 2.3 miles east of Clermont; Polk County, Lake Marion Estates (east of Lake Marion) and 4.5 miles east of Lake Hamilton (southwest of Lake Marion).

All known localities are on an ancient sand ridge that extends from Lake Placid (Highlands County) north to the Ocala National Forest (Marion County). Because of the sandy soils, rolling hills, and multitude of sandhill lakes, most of this region is currently used for agriculture or for residential communities. Remnants of natural habitats in this area tend to be small, widely spaced, and threatened because of continuing development.

Sandhill communities are xeric, and the dominant plants adapted to frequent burns. Some of the following plants are indicators of sandhill habitats: turkey oak (*Quercus laevis* Walter), longleaf pine (*Pinus palustris* Miller), Florida wiregrass (*Aristida beyrichiana* Trinius & Ruprecht), and gopher apple (*Licania michauxii* Prance). Sandhills are open woodlands, frequently with open patches of sand. One collection site was being invaded by mesic adapted plants, but was still open with many of the characteristic ground plants.

Biological Observations. Most specimens of *A. exigua* were collected by sweeping low plants in small openings of the sandhills. If an opening was too large or densely vegetated, no beetles were found. Most specimens were collected from mid-morning to noon and only while the sun was shining. None were collected on cloudy days, at lights, or sweeping low vegetation at night. Males were strong fliers and difficult to catch. Several males escaped even after being netted. Two males were observed sitting on the tips of low plants waving their antennae. Attempts to observe feeding were not successful.

Flight intercept traps in a nearby scrub habitat (another xeric adapted plant community) at the Lake Marion site produced *A. eximia*, which also appears to be a diurnal species (pers. comm. M. Deyrup). Sweeping nearby mesic woods produced the related *Strigoderma pygmaea* (Fabricius), another diurnal ruteline.

Based on collection data, males appear to be active from late March to early June. Schwarz commented on his trip to central Florida as occurring between April 30 and May 15, 1876. The 1955 Polk County specimen was collected on April 28, and the 1957 Lake County specimen on March 27. The dates of collection at the Lake Marion sites (Polk County) range from April 22 to early

June 1998. The recent Lake County specimens were collected in late May and early June 1998. The brachypterous female was dead when sifted from the sand on June 8th. More survey work is needed to accurately define peaks of activity, and the total range of this species.

Acknowledgments

We thank M. Deyrup (Archbold Biological Station, Lake Placid, FL) for providing data from his material and comments on the unique nature of the central ridge systems of Florida; R. E. Woodruff (Florida State Collection of Arthropods, Gainesville, FL) for helping to gather biological information and for helpful comments on the genus *Anomala*; H. J. Armstrong and M. Willis (University of Florida, Map Library, Gainesville, FL) for assistance locating "Lake Altapopka" and historical information on Florida; J. Cusick (University of Florida, Special Collections Library, Gainesville, FL) for consulting Colton's map atlas; N. Adams (Smithsonian Institution, Washington, D. C.) for checking Schwarz's type specimen; and W. Cox (Smithsonian Institution Archives, Washington, D. C.) for consulting Schwarz's notebooks.

We thank the following for their reviews: M. L. Jameson (University of Nebraska State Museum, Lincoln, NE), W. B. Warner (Chandler, AZ), J. M. Kingsolver (Florida State Collection of Arthropods, Gainesville, FL), M. C. Thomas and W. N. Dixon (Florida Department of Agriculture and Consumer Services, Gainesville, FL), and the anonymous reviewers. This is Florida Department of Agriculture and Consumer Services, Division of Plant Industry, Entomology Contribution No. 881.

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**A NEW LONG-LIPPED BEETLE FROM TEXAS AND A REVIEW OF THE
GENUS *TELEGEUSIS* HORN (COLEOPTERA: TELEGEUSIDAE)**

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Abstract

The long-lipped beetle family Telegeusidae is reported for the first time from Texas and is represented in that state by the **new species** *Telegeusis texensis* Fleenor and Taber. The biology and literature of this rare genus are reviewed.

The beetle family Telegeusidae consists of two rare New World genera (*Telegeusis* Horn and *Pseudotelegeusis* Wittmer), with a combined total of eight currently recognized species. These small coleopterans range in size from 3.5 mm to 8.0 mm in length and received their common name of “long-lipped beetles” from the remarkably long terminal segment of the labial and maxillary palps (Fig. 1). All known individuals are adult males and, with the exception of one specimen described here, were collected at lights. No female or larva has been reported and the biology of the long-lipped beetles remains unknown.

Telegeusis consists of six currently recognized species ranging from the southwestern United States to the Panama Canal Zone (Horn 1895; Martin 1931; Barber 1952; Allen and Hutton 1969; Zaragosa 1975, 1990). To this total we add a seventh, *Telegeusis texensis* new species, collected in the Lost Pines forest of central Texas (Bastrop County, 30°06'30" N latitude, 97°15' W longitude, 157 m elevation). No member of this beetle family has been previously reported from Texas.

At dusk on 22 April 2000, between 7 and 8 PM, a tiny beetle resembling a staphylinid alighted on the senior author's leg while a blacklight trap was being prepared for a night of collecting near a pond in the forest. We had been alerted that telegeusids might occur in this habitat by a fellow entomologist (Jeffrey Back, communicated by Alan Gillogly). Upon inspection with a hand lens the near-diagnostic mouthparts became evident and it was clear that a long-lipped beetle was at hand. At this point the junior author recalled seeing an apparently identical specimen landing briefly on a milkweed plant only one half hour before though at some distance from the site of this encounter. High hopes were entertained for the capture of additional specimens at our blacklight traps but none were secured on this or any other date. An exhaustive study of the literature revealed that our specimen represented a new species and greatly extended the known range of the family. The holotype with label data as indicated above (“Tx. Bastrop County/ Bastrop State Park/ 22 Apr. 2000. S.B. Fleenor”), initially in alcohol, will ultimately be critical point dried, pointed

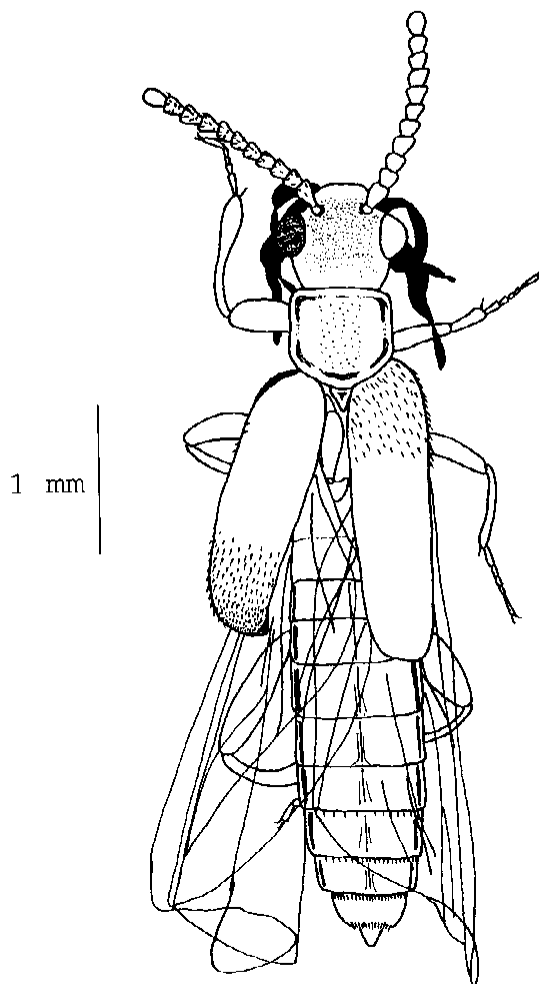


Fig. 1. *Telegeusis texensis* sp. nov., dorsal habitus.

and deposited in the insect collection at Texas A & M University for permanent preservation and reference. The description of that specimen follows.

Telegeusis texensis, new species
(Fig. 1)

Description. Male holotype. Length 4.5 mm; width 1.0 mm. Staphyliniform habitus with short elytra. Color black with orange-brown occiput, orange postgena, gula, labrum and pronotum. Body covered with short, depressed black and yellow hairs.

Head about as long as wide (0.8 mm), broadly rounded but abruptly narrowed in front of eyes and produced into a short, broad muzzle. Vertex wide, convex, and punctate with short black, depressed hairs. Antennae dark brown, eleven-segmented, moniliform, and inserted above angles of muzzle in front of eyes. Segments conic-cylindric except for the terminal segment which is ellipsoid. Eyes medio-lateral, round and bulging, dark and finely faceted. Mandibles dark brown, falcate. Maxillary palpi 4-segmented, labial palpi 3-segmented, black with basal segments greatly contracted and terminal segment elongate, twisted, ribbon-like, 1 mm or more in length.

Pronotum quadrangular, about as long as broad (0.7 mm), with dimensions slightly smaller than head. Edges margined and grooved, especially at the corners. Anterior margin straight, posterior margin convex, lateral margins subparallel to slightly sinuate. Disc strongly convex anteriorly, more flattened posteriorly. Clothed above with short, depressed yellow hairs.

Elytra punctate with short, depressed, black hairs, about three times as long (1.5 mm) as their basal width (0.5 mm), hardly tapering to a broad, rounded apex, and extending at rest just beyond the apices of the hind coxae.

Wings transparent, membranous, infuscated smoky grey or black, about 3.0 mm long and loosely pleated longitudinally when folded, with weak longitudinal veins and short black hairs on veins and wing margins.

Thoracic pro-, meso-, metasternites and pleurites clouded smoky grey at surface but internally yellow-orange. Metasternum large, trapezoidal in shape, broadening posteriorly and with prominent median and posterior sutures. Legs yellow-brown but darkening distally. Tarsi 5-segmented.

Abdomen dorsally flattened, laterally costate. Sides subparallel except for last three segments which become successively narrowed distally. Eight segments visible with terminalia slightly protruding. Surface clothed with short, appressed, black hairs.

In addition to the holotype, three specimens, agreeing in all respects with the above description were located in the Texas A & M collection and are here designated as paratypes. Their label data follows; "Kerrville, Texas/ VI-8-90, At Light/ W. F. Chamberlain" (one specimen) and "Texas; Bastrop Co./ Bastrop State Park/ IV-7-2000 U. V. light/Coll. E. G. Riley-928" (two specimens). The latter two specimens were taken at dusk (Edward Riley, personal communication) as was our holotype specimen in the same general locality. Inquiry revealed no *Telegeusis* specimens in the insect collection housed at the University of Texas at Austin (Christopher Durden, personal communication).

Telegeusis texensis may be distinguished from all other long-lipped beetles by the combination of concolorous black elytra and orange-yellow pronotum.

The six previously recognized *Telegeusis* species are *T. debilis* Horn (Baja California, Mexico) (Horn 1895), *T. nubifer* Martin (Arizona, U.S.A.) (Martin 1931), *T. schwarzi* Barber (Arizona, U.S.A.) (Barber 1952), *T. panamaensis* Allen and Hutton (Panama) (Allen and Hutton 1969), *T. chamelensis* Zaragosa (Jalisco, Mexico) (Zaragosa 1975), and *T. orientalis* Zaragosa (Nuevo Leon, Mexico) (Zaragosa 1990).

The rarity of these beetles is underscored by the small number of specimens available at the time of their original descriptions. For example, the first described *Telegeusis* species was *T. debilis*, recognized on the basis of a single individual, as was *T. chamelensis*. A mere two specimens were available for the description of *T. nubifer* and *T. orientalis*. *T. texensis* is proposed here on the basis of the four specimens cited above. Only *T. panamaensis* was described from as many as ten specimens. All captures prior to our own were at lights with the possible exception of Horn's species because the means of capture were not explained in that case. The Texas long-lipped beetle is unique in being described from individuals collected during late daylight or dusk. Nothing else is known about the biology of these beetles.

The combination of color and elytral length will serve to distinguish *Telegeusis* species from one another. Those species with entirely black or dark elytra are *T. panamaensis*, *T. orientalis*, and *T. texensis*. The latter species is immediately known by its orange pronotum because the pronotum of the other two is black. *Telegeusis panamaensis* is separated from *T. orientalis* by the former's much smaller size (≤ 3.70 mm vs. 5.60 mm).

Elytral length serves to distinguish those species with light-colored (yellowish) elytra. The elytra of *T. debilis* are longer than those of the other light-colored species. They extend one-third to one-half of their total length beyond the hind coxae. Those of *T. chamelensis* extend no more than one fourth of their total length beyond the hind coxae. *Telegeusis nubifer* and *T. schwarzi* are easier to diagnose, for the former's elytra extend to the posterior part of the coxae whereas those of the latter extend no farther than the base or anterior part of the coxae. Genitalia have been found useful only in the diagnosis of *T. panamaensis*. The lateral lobes of its genitalia are indented whereas those of the five other previously recognized species are straight (Allen and Hutton 1969). Of course, the disjunct distributions of all but *T. schwarzi* and *T. nubifer* (Arizona) are a great aid in identification as the ranges are currently understood.

We are continuing our work in the Lost Pines forest of central Texas in hopes of

discovering additional specimens of *T. texensis* and perhaps the unknown females and larvae of the long-lipped beetles.

We thank David Riskind of the Texas Parks and Wildlife Department and Edward Riley of Texas A & M University for permission to collect the holotype and to examine the paratypes, respectively.

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**NEW SPECIES OF *PHYLLOPHAGA* HARRIS
(COLEOPTERA: MELOLONTHIDAE, MELOLONTHINAE) FROM
BIOSPHERE RESERVE OF MANANTLÁN, JALISCO-COLIMA, MÉXICO**

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Abstract

New species of *Phyllophaga* Harris in the subgenera *Phyllophaga* (*s.str.*) and *Phytalus* Erichson are described from the montane cloud forests located at 1,900–2,300 m of altitude in the Biosphere Reserve Sierra de Manantlán, Jalisco-Colima, México. *Phyllophaga* (*s.str.*) *sayloriana* **new species** and *P.* (*s.str.*) *manantleca* **new species** are included in the “*pubicauda*” species group; *P.* (*s.str.*) *joyana* **new species** is included in the “*xanthe*” species group; *P.* (*Phytalus*) *dugesiana* **new species** and *P.* (*Phytalus*) *jalisciensis* **new species** are included in the “*bucephala*” species group. Drawings of male genital capsules, tarsal claws, and female genital plates of the new species are provided.

Resumen

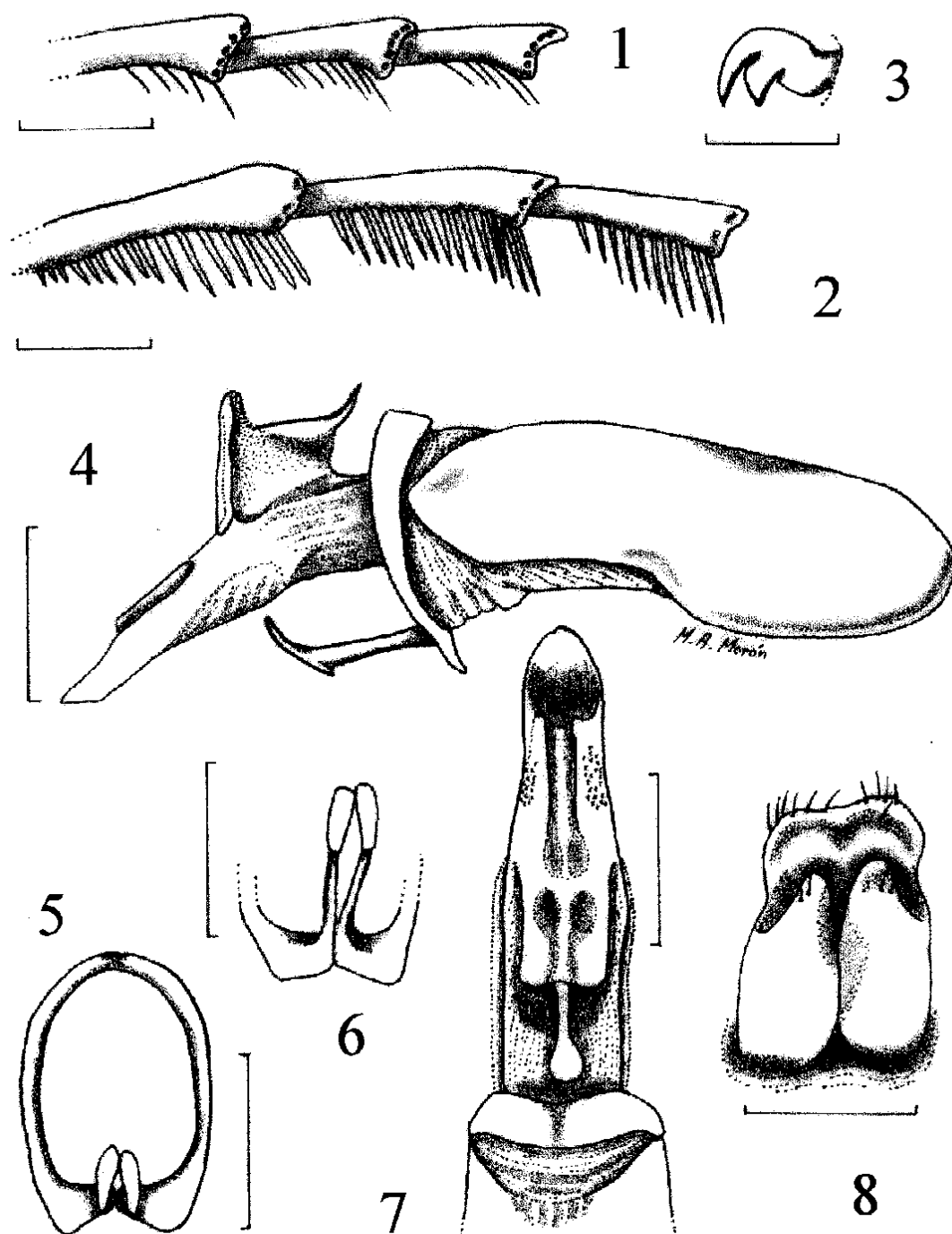
Se describen cinco especies nuevas de *Phyllophaga* Harris, subgéneros *Phyllophaga* (*s.str.*) y *Phytalus* Erichson, representadas por 1,023 ejemplares recolectados en los bosques mesófilos de montaña establecidos entre los 1,900 y 2,300 m de altitud en la Reserva de la Biosfera Sierra de Manantlán, Jalisco-Colima, México. *Phyllophaga* (*s.str.*) *sayloriana* **especie nueva** y *P.* (*s.str.*) *manantleca* **especie nueva** se incorporan al grupo de especies “*pubicauda*,” y *P.* (*s.str.*) *joyana* **especie nueva** se incorpora en el grupo de especies “*xanthe*”; *P.* (*Phytalus*) *dugesiana* **especie nueva** y *P.* (*Phytalus*) *jalisciensis* **especie nueva** se incorporan en el grupo de especies “*bucephala*.” Se incluyen dibujos de las cápsulas genitales masculinas, de las placas genitales femeninas y de las uñas tarsales de las cinco especies nuevas.

Biosphere Reserve Sierra de Manantlán (BRSM) is located near the junction of two main mountain chains of Mexico: Sierra Madre del Sur, that represent an old southeastern extension of Sierra Madre Occidental and Appalachian mountains; and the more recent volcanic chain named Neovolcanic Transverse Axis. Near BRSM volcanic activity at Nevado de Colima is frequent and intense, so that the surrounding forests are often affected by lava flows and ash or sand rains. These volcanic phenomena may temporarily isolate populations of animals and plants, favoring morphological differentiation and, eventually, speciation. More than 2,700 species of plants have been registered from BRSM (Vázquez *et al.* 1995) but the insect fauna living in forests located above 1,500 m of altitude is poorly known. Montane cloud forests in BRSM are located from 700 to 2,600 m altitude. They have a mean temperature of from 8–25°C and have 1,000–1,700 mm annual rainfall. Some of dominant

tree species are *Magnolia iltisana* Vázquez (Magnoliaceae), *Ilex brandegeana* Loes (Aquifoliaceae), *Cornus disciflora* S & M ex DC (Cornaceae), *Dendropanax arboreus* (L.) Decne. & Planch. (Araliaceae), *Carpinus tropicalis* Furlow (Betulaceae), *Fraxinus uhdei* (Wenzig) Lingelsh (Oleaceae), *Symplocarpon purpusii* (Brandegee) Kobuski (Theaceae), *Quercus salicifolia* Née (Fagaceae) (Vázquez *et al.*, 1995:54). During January to December 1986 and April 1997 to July 1999, L. E. Rivera-Cervantes, M. López-Vieyra and J. C. García-Montiel collected nearly 2,000 specimens of the genus *Phyllophaga* in the montane cloud forests around the biological station of Las Joyas, BRSM, Jalisco, and in El Terrero, BRSM, Colima. These samples included 11 species of the subgenera *Phyllophaga* and *Phytalus*. Ten were determined as new taxa. Three of these have been described to date: *P. (s.str.) chamacayoca* Morón, *P. (Phytalus) mesophylla* Morón & Rivera-Cervantes, and *P. (Phytalus) teosinteophaga* Morón & Rivera-Cervantes (Morón 1991; Morón & Rivera-Cervantes 1992). This paper describes males and females of the other five new species collected in BRSM. The characters and terms used in the descriptions are those of Morón (1986). Drawings were made with the aid of a stereomicroscope provided with camera lucida as well as scanner and video-printer system. Measurements were obtained with an ocular micrometer or caliper. Study specimens are deposited in: American Museum of Natural History, New York (AMNH), California Academy of Sciences, San Francisco (CASC); Canadian National Collection, Ottawa (CNC); Field Museum of Natural History, Chicago (FMNH); Instituto de Biología, UNAM, Mexico City (IBUNAM); Instituto de Ecología, Xalapa, Veracruz (IEXA); Instituto Manantlán de Ecología, Autlán, Jalisco (IMEJ); Museum Nationale d'Histoire Naturelle, Paris (MNHN); Natural History Museum, London (NHMC); University of Nebraska State Museum, Lincoln, Nebraska (UNSM); Zoologisches Museum der Humboldt Universität, Berlin (ZMHU); A. & H. Howden collection c/o Canadian Museum of Nature, Ottawa (AHHC); G. Nogueira, Guadalajara, Jalisco (GNPC); and M.A. Morón, Xalapa, Veracruz, México (MXAL).

Phyllophaga (Phyllophaga) sayloriana Morón, Rivera y López, **new species**
Figs. 1–8

Description. Holotype. Male. Head, pronotum, elytra and pygidium shiny reddish dark brown, sterna, and legs shiny reddish light brown. Clypeus bilobed, wider than long (4:1), anterior border widely sinuated with margins moderately elevated, surface slightly convex, densely rugo-punctate, with erect, very long, slender setae. Fronto-clypeal suture slightly sinuated and vaguely impressed, obscured by dense punctuation. Frons wider than long (2.1:1) convex, coarsely rugo-punctate, with erect, very long, slender setae. Antenna 10 segmented, with 3 segmented club; lamellae slightly longer than length of five preceeding segments combined (1.2:1), segment 4° as long as segment 3, segment 5° with rounded anterior tubercle, segments 6° and 7° wider than long, each one with conical or acute process directed forward. Frons 6.5× wider than each eye dorsal diameter. Canthus curved and rounded, with 7–9 setae. Labrum deeply bilobed, with curved slender setae on the borders. Mentum widely concave, polished, with lateral slender setae, anterior border widely cleft. Pronotum wider than long (1.8:1) and 1.9× wider than frons. Pronotal disk densely rugo-punctate, with many erect, very long, slender setae; lateral borders widely angulated, marginal bead widely crenulate, with long, slender setae; anterior angles slightly obtuse, rounded, scarcely prominent; posterior angles obtuse, scarcely prominent. Scutellum 1.5× wider than long, with more than 15 deep and shallow, small, setiferous punctures. Elytron 2.3× longer than wide, densely rugo-punctate, with many erect, long, slender setae uniformly distributed; epipleural border narrowed, extended along the complete margin, provided with a fringe of long setae;



Figs. 1–8. *Phyllophaga sayloriana*. 1) male mesotarsomeres, latero-ventral view; 2) male metatarsomeres, latero-ventral view; 3) tarsal claw, male; 4) genital capsule, lateral view; 5) paramera, distal view; 6) apex of paramera, distal-ventral view; 7) distal half of genital capsule, dorsal view; 8) ventral genital plates, female. Scale lines: Figs. 1–3 = 0.5 mm; Figs. 4–8 = 1 mm.

humeral calla rounded, prominent; apical calla rounded. Metathoracic wings completely developed. Propygidium shiny, finely punctate with scattered, short setae. Pygidium convex, shiny, markedly rugose, with erect, long, slender setae, mainly toward the basal border; apical margin with 20 slender setae; basal margin effaced at the middle. Pterosternon with long, dense, yellowish vestiture. Visible abdominal sternites 2° to 4° with wide and deep mesial sulcus; sternite 5° convex, with scattered setiferous punctures and

anterior border slightly furrowed; anal plate widely concave, finely granulose-punctate, anterior and posterior borders thickened, with scattered erect, long setae. Protibiae as long as protarsi, with two large teeth and one small tooth on external border, preapical spur long, straight, acute, slightly longer than 2° protarsomerus (1.2:1). Mesotibiae with very long, slender setae, and one oblique, short, setiferous, transverse carina; upper apical spur straight, narrow, as long as lower spur. Metatibiae shorter than metatarsi (1:1.2), with very long, slender setae, and one oblique, short setiferous transverse carina; apical spurs articulated with the border, upper spur lanceolate, slightly curved, with nearly rounded apex, nearly as long as 2° metatarsomerus, and 1.5 longer than lower spur. Tarsomeres semicylindrical, elongated, with enlarged apex, and many setae around the apex; mesotarsomeres 2° to 5° ventrally present one line of slender setae (Fig. 1); metatarsomeres 2° to 4° ventrally present one line of stout setae, nearly comb-like structure (Fig. 2). Tarsal claws symmetrical, similar on all legs, with median acute-angled tooth located near basal dilatation, but also near apical tooth (Fig. 3). Genital capsule with long, narrowed, angled paramera, fused dorsally at their basis, apex angled, with preapical long projections ended in flattened, blade-like structures (Figs. 4–7). Tectum convex with widely sinuated distal border. Aedeagus long, wide, with sclerotized tube-like support and preapical, dorsal, sclerotized plates and blades (Figs. 4–7). Length of genital capsule from the apex of parameres to the border of basal piece: 3.3 mm. Total body length: 13.2 mm. Humeral width: 5.3 mm.

Allotype. Female. Similar to the male except as follows: antennal club 0.8 shorter than the five preceeding segments combined; pygidium with apical fifth concave, polished, without punctures or setae, apex slightly upturned; visible abdominal sternites 2° to 4° with mesial narrow, shallow sulcus; sternite 5° coarsely rugo-punctate, with scattered short setae; anal plate convex, rugo-punctate, with basal border slightly uplift, and lines of 10–20 slender setae along basal and apical borders. Protibia with external border clearly tridentate. Apical spurs of metatibiae wide, slightly curved with rounded apices. Ventral genital plates ovate, strongly sclerotized, nearly symmetrical, convex, with some short setae; dorsal genital plates ovate, with borders scarcely setose (Fig. 8). Total body length: 13.9 mm. Humeral width: 6.0 mm.

Paratype Variation. Males. Similar to the holotype except as follows: body color dark reddish brown to light reddish brown; abdominal sternites with mesial furrow less deep; total body length: 11.6–13.7 mm, humeral width: 4.8–5.6 mm. Female paratypes are similar to the allotype except as follows: body color dark reddish brown to dark yellowish brown; pygidial preapical fifth more or less concave; total body length: 13.5–14.9 mm; humeral width: 5.9–6.2 mm.

Type Series. (Described from 50 males and 92 females). Holotype ♂ ; MEXICO: *Jalisco*, Autlán, Est. Las Joyas, bosque mesófilo, Alt. 1,900 m, 7-VIII-1997, trampa luz, M. López (MXAL). Allotype ♀ ; same data as holotype, except A. Vázquez (MXAL). Paratypes: same data as holotype except A. Vázquez (2 ♂♂); same data except 3-VII-1997, J. García, (1 ♂ 2 ♀♀); M. López (3 ♂♂ 5 ♀♀); 4-VII-1997, J. García (3 ♂♂ 1 ♀); 5-VIII-1997, A. Vázquez (2 ♀♀); 6-VIII-1997 (♂); M. López (4 ♀♀); J. García (2 ♀♀); 7-VIII-1997, S. Núñez (2 ♂♂); A. Vázquez (2 ♀♀); M. López (11 ♀♀); A. Partida (1 ♂ 2 ♀♀); J. García (♀); 5-IX-1997, A. Guerra (♀); M. López (♀); 1-X-1997 (♂/♀); 30-VII-1999, V. González (2 ♂♂); G. Mesa (♂); 31-VII-1999, M. López (♂/♀); J. García (♀); V. González (♀); same data except 21-XI-1985, G. Parada, veg. secundaria (♂); 17-VI-1986, L. Rivera, veg. secundaria (♀); 19-VI-1986, (2 ♂♂); VII-1985, bosque pinos, (♀); 10-IX-1987, (♂). *Colima*, Minatitlán, El Terrero, bosque mesófilo, Alt. 2,300 m, 25-VI-1998, trampa luz, J. García (3 ♂♂); same data except C. Hernández, trampa uv (♀); 26-VI-1998,

luz fluor. (♂); 27-VI-1998, M. López, trampa uv (♀); 23-VII-1998, luz fluor. (9 ♂♂ 7 ♀♀); 24-VII-1998, M. López (♀); 25-VII-1998, J. García (8 ♂♂ 3 ♀♀); M. López (2 ♂♂); 20-VIII-1998, M. López, trampa uv (♂); 21-VIII-1998, J. García (3 ♀♀); luz fluor. (1 ♂ 5 ♀♀); 22-VIII-1998 (1 ♂ 16 ♀♀); trampa uv (6 ♀♀); 25-VIII-1998, M. López (♂/♀); J. García (♂); 27-VIII-1998, M. López (♀); 24-IX-1998, J. García, luz fluor. (4 ♀♀); 25-IX-1998 (♀); 24-X-1998, trampa uv (♀); 24-XI-1998, luz fluor. (♂). Paratypes are deposited at AAHC, AMNH, CASC, CNC, FMNH, IBUNAM, IEXA, IMEJ, GNPC, MNHN, MXAL, NHMC, UNSM and ZMHU.

Type Locality. Las Joyas, Biosphere Reserve Sierra de Manantlán, Autlán municipality, state of Jalisco, México (approx. 19°35'13"N; 104°16' 48"W).

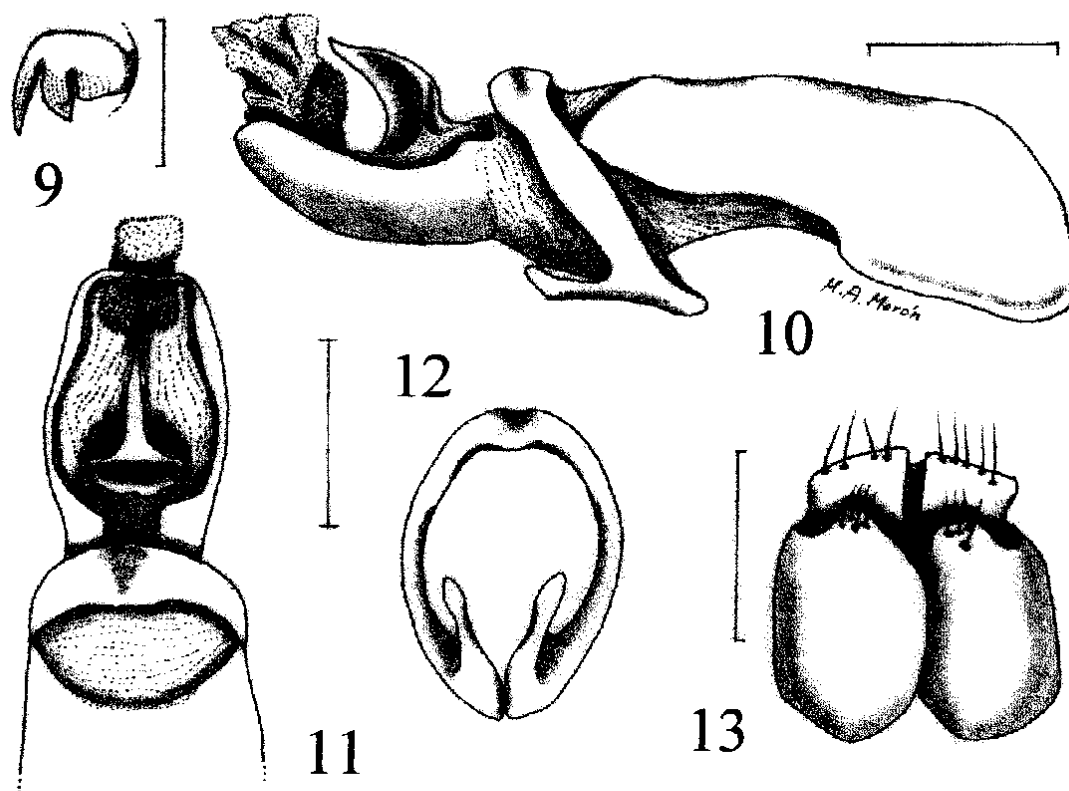
Biological Data. Specimens of *P. sayloriana* n.sp. were collected at white fluorescent and UV lights in montane cloud forest, pine forest and secondary vegetation located at 1,900–2,300 m altitude. Phenology: June (9), July (53), August (67), September (8), October (3), November (2). Other species of *Phyllophaga* flying at the same time and place were *P. (Phytalus) dugesiana* n.sp., *P. (Phytalus) jalisciensis* n.sp., *P. (s.str.) manantleca* n.sp. and *P. (s.str.) chamacayoca* Morón.

Remarks. *Phyllophaga sayloriana* n.sp. belong to the species group “*blanchardi*,” complex “*pubicauda*” (*sensu* Morón 1986). The diagnostic combination of characters for both sexes include: anterior border of clypeus deep and widely sinuated; frons, pronotum and elytra with dense vestiture of erect, very long setae; abdominal sternites 2° to 4° with deep mesial sulcus; pygidium noticeably rugose; and metatarsal segments 2° to 4° with comb-like line of setae in ventral sides. Shape of paramera is similar to *P. pubicauda* Bates, *P. blanchardi* Arrow, *P. microcerus* Arrow, *P. rufithorax* Moser, *P. moei* Saylor and *P. hidalgoana* Saylor, but the proportions of each part of the paramera are different, and in all of these species the pygidium is not rugose and the sternites are not deeply sulcated. The dorsal vestiture and punctuation, body color and mesial sulcus on sternites, suggests some relation with *P. hirticollis* Moser, known only from “Buena Vista, Mexico,” but the details and proportions of male genital capsule, pygidial sculpture, and metatarsi vestiture, as well as body size, are different. Dorsal aspect of *P. sayloriana* also resembles some species in the group “*heteronycha*,” but the shape of abdominal segments, tarsal claws and male genital capsule are much different.

Etymology. This new species is dedicated to Lawrence W. Saylor, whose numerous descriptions of species of the genus *Phyllophaga* provided an important step for the study of these beetles in Mexico and Latin America.

Phyllophaga (Phyllophaga) manantleca Morón, Rivera y López, **new species**
Figs. 9–13

Holotype Male. Head, pronotum and elytra shiny reddish dark brown; pygidium, sternum, and legs shiny reddish light brown. Clypeus moderately bilobed, wider than long (4:1), anterior border shallow and widely sinuated, with margins scarcely elevated, surface convex, with large, round punctures, nearly confluent, with erect, long, slender setae. Fronto-clypeal suture nearly straight and scarcely impressed. Frons wider than long (2.1:1) convex, with large, round punctures and erect, long, slender setae. Antenna 10 segmented, with 3 segmented club; lamellae slightly longer than length of five preceeding segments combined (1.2:1), segment 4° nearly as long as segment 3, segment 5° without anterior projections, segments 6° and 7° wider than long, each one with conical or acute process directed forward. Frons 6.2× wider than each eye dorsal diameter. Canthus curved and rounded, with 9 setae. Labrum deeply bilobed, with curved, slender setae on



Figs. 9–13. *Phyllophaga manantleca*. 9) tarsal claw, male; 10) genital capsule, lateral view; 11) paramera, distal view; 12) distal half of genital capsule, dorsal view; 13) ventral genital plates, female. Scale lines = 1 mm, except Fig. 9 = 0.5 mm.

all surface. Mentum widely concave, polished, with lateral slender setae, anterior border deeply cleft. Pronotum wider than long (1.8:1) and $2\times$ wider than frons. Pronotal disk rugo-punctate, punctures separated by one diameter or less, with many erect, long, slender setae; lateral borders widely angulated, marginal bead vaguely crenulate, with long, slender setae; anterior angles slightly obtuse, rounded, scarcely prominent; posterior angles widely obtuse, not prominent. Scutellum $1.6\times$ wider than long, without punctures. Elytron $2.6\times$ longer than wide, densely rugo-punctate, with some, scattered, short setae at basal third; epipleural border narrowed, extended along the complete margin, provided with a fringe of medium size setae; humeral calla rounded, prominent; apical calla rounded. Metathoracic wings completely developed. Propygidium shiny, finely punctate with abundant short setae. Pygidium convex, shiny, moderately punctate, with erect, medium size, slender setae near center of disk and short setae toward basal border; preapical area without setae; apical margin with 20 slender setae; basal margin effaced at middle. Pterosternon with long, dense, yellowish vestiture. Visible abdominal sternites 2° to 4° with narrow and deep mesial sulcus; sternite 5° convex, with patch of setiferous granules and posterior border slightly excavated transversally; anal plate wide and shallowly concave, finely granulose-setose, anterior and posterior borders thickened, with scattered erect, long setae on posterior border. Protibiae slightly shorter than protarsi (0.84:1), with two large teeth and one small tooth on external border, preapical spur long, straight, acute, shorter than 2° protarsomerus (1.6:2). Mesotibiae with long, slender setae, and one oblique, short, setiferous, transverse carina; upper apical spur straight, narrow, nearly as long as lower spur. Metatibiae shorter than metatarsi (1:1.2), with long, slender setae, and one oblique, short setiferous transverse carina; apical spurs articulated with border, upper spur lanceolate, slightly curved, with rounded apex, nearly as long as 2° metatarsomerus, and $1.2\times$ longer than lower spur. Tarsomeres semicylindrical, elongated, with enlarged apex, and many setae around the apex; mesotarsomeres 2° to 5° ventrally present one line of scattered, slender setae; metatarsomeres 2° to 4° ventrally present two lines

of setae. Tarsal claws symmetrical, similar on all legs, with median acute-angled tooth located near basal dilatation, but also near apical tooth (Fig. 9). Genital capsule with long, narrowed, angled paramera, fused dorsally at their basis, apex angled, with preapical short projections ended in slightly elbowed, ovate structure (Figs. 10–12). Tectum convex with widely sinuated distal border. Aedeagus long, wide, with sclerotized tube-like support and preapical, dorsal, curved, sharply pointed, sclerotized plate (Figs. 10–12). Length of genital capsule from apex of parameres to border of basal piece: 2.6 mm. Total body length: 13.1 mm. Humeral width: 5.6 mm.

Allotype. Female. Similar to the male except as follows: antennal club 0.9 shorter than the five preceeding segments combined; punctuation of frons and pronotum slightly more coarse; apex of pygidium slightly prominent; visible abdominal sternites 2° to 4° with mesial sulcus vaguely indicated; sternite 5° convex, punctate, with scattered short setae; anal plate convex, punctate, with scattered, short and medium size setae. Protibia with external border clearly tridentate. Apical spurs of metatibiae wide, slightly curved with rounded apices. Ventral genital plates ovate, moderately sclerotized, nearly symmetrical, convex, with some short setae near acute, apical border; dorsal genital plates ovate, with borders scarcely setose (Fig. 13). Total body length: 14.1 mm. Humeral width: 6.1 mm.

Paratype Variation. Males are similar to the holotype except in total body length: 11.8–13.5 mm, humeral width: 5.1–5.8 mm. Female paratypes are similar to the allotype except as follows: body color dark reddish brown to dark yellowish brown; pygidium more or less setiferous; total body length: 13.2–15.1 mm; humeral width: 6.0–6.5 mm

Type Series. (Described from 189 males and 243 females). Holotype ♂; MEXICO: Jalisco, Autlán, Est. Las Joyas, bosque mesófilo, Alt. 1,900 m, 2-X-1997, trampa luz, D. Pelayo (MXAL). Allotype ♀; same data as holotype (MXAL). Paratypes: same data as holotype (4 ♂♂ 3 ♀♀); same data except 5-VIII-1997, S. Núñez, (♂); A. Vázquez (♂); J. García (♂/♀); 6-VIII-1997 (♂/♀); A. Partida (3 ♂♂); 7-VIII-1997, S. Núñez (♀); A. Partida (♂); J. García (♂); A. Vázquez (♂); M. López (8 ♂♂); 4-IX-1997, A. Guerra (♂); M. López (2 ♂ 1 ♀); 5-IX-1997, A. Guerra (♂/♀); M. López (1 ♂ 2 ♀♀); M. López, (3 ♂♂ 2 ♀♀); 1-X-1997 (8 ♂♂ 2 ♀♀); D. Pelayo (♀); 4-XI-1997 (♂); M. López (♂); 6-XI-1997, D. Pelayo (♂/♀); M. López (♂); 4-XII-1997 (2 ♂♂); 29-VII-1999, J. García (♂); 30-VII-1999, V. González (♂); J. García (♂); G. Mesa (♀); M. López (♀); 31-VII-1999 (♀); V. González (♂); same data except 18-VI-1986, L. Rivera, (1 ♂ 2 ♀); VIII-1987, (♀); 17-XI-1985, bosque pinos, (♂/♀); Jalisco, Sierra de Manantlán, Alt. 1,650 m, 12-IX-1994, G. Nogueira (3 ♂♂ 2 ♀♀); same data except 17-VII-1993, 1,500 m (3 ♂♂ 2 ♀♀); 2-VIII-1994, 1,470 m (1 ♂ 3 ♀♀); 15-VI-1996 (18 ♂♂ 10 ♀♀). Colima, Minatitlán, El Terrero, bosque mesófilo, Alt. 2,200 m, 23-VII-1998, trampa luz, J. García (2 ♀♀); same data except 24-VII-1998 (12 ♂♂ 7 ♀♀); M. López, trampa uv (♂); 25-VII-1998 (♂); J. García (3 ♂♂ 6 ♀♀); 20-VIII-1998 (11 ♂♂ 9 ♀♀); M. López, trampa uv (♂/♀); 21-VIII-1998 (3 ♀♀); J. García (15 ♀♀); luz fluor. (37 ♂♂ 28 ♀♀); 22-VIII-1998, trampa uv (1 ♂ 36 ♀♀); luz fluor. (42 ♂♂ 66 ♀♀); 24-IX-1998, M. López (♀); J. García (1 ♂ 3 ♀♀); 25-IX-1998 (6 ♀♀); M. López (♀); trampa uv (3 ♀♀); 22-X-1998 (♂); 23-X-1998 (6 ♀♀); 24-X-1998 (♀); luz fluor. (2 ♂♂ 6 ♀♀); 24-XI-1998, trampa uv (2 ♀♀). Paratypes are deposited at AAHC, AMNH, CASC, CNC, FMNH, IBUNAM, IEXA, IMEJ, GNPC, MNHN, MXAL, NHMC, UNSM and ZMHU.

Type Locality. Las Joyas, Biosphere Reserve Sierra de Manantlán, Autlán municipality, state of Jalisco, México (approx. 19°35'13"N; 104°16' 48"W).

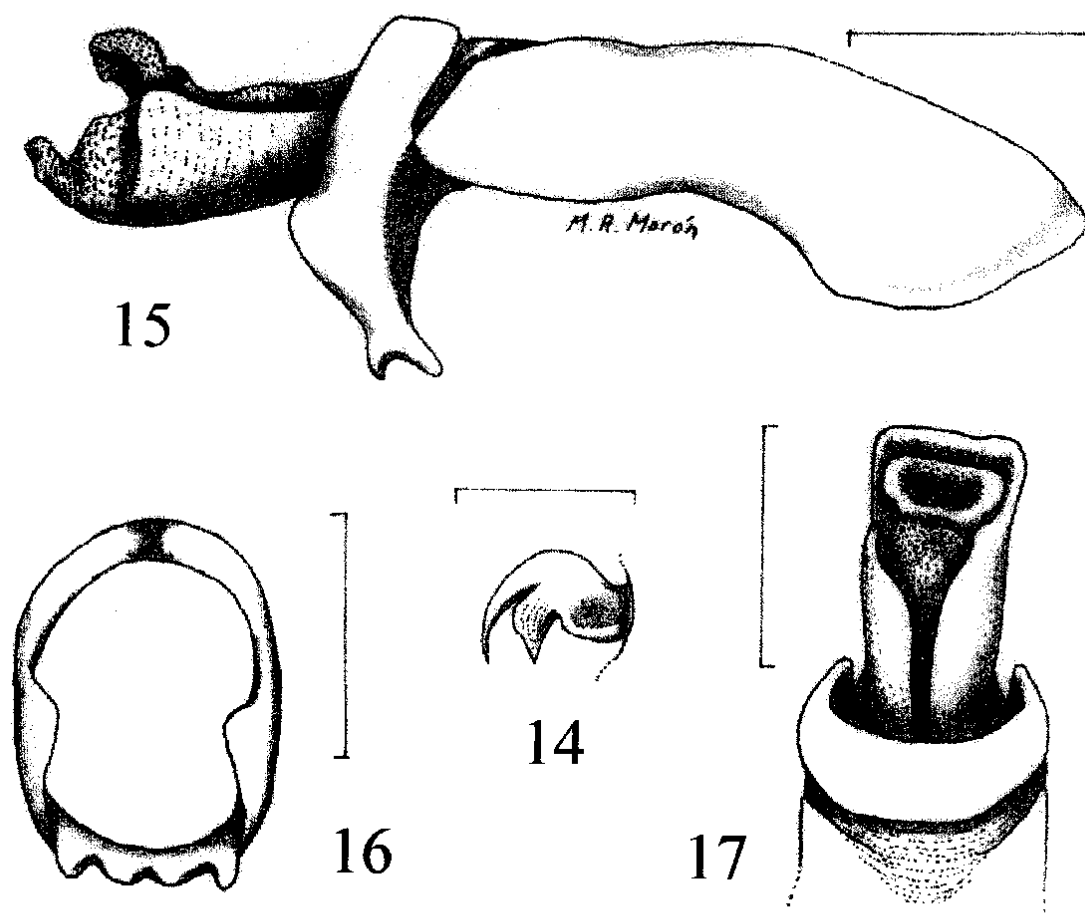
Biological Data. Specimens of *P. manantleca* n.sp. were collected at white fluorescent and UV lights in montane cloud forest and pine forest located at 1,900–2,200 m altitude. They were also collected at Hg vapor lamps in oak forest located at 1,470–1,650 m altitude, where the dominant tree species is *Quercus rugosa* Née. Phenology: June (33), July (43), August (276), September (34), October (35), November (9), December (2). Other species of *Phyllophaga* flying at the same time and place were *P. (Phytalus) dugesiana* n.sp., *P. (Phytalus) jalisciensis* n.sp., *P. (s.str.) sayloriana* n. sp., *P. (s.str.) joyana* n.sp. and *P. (s.str.) chamacayoca* Morón.

Remarks. *Phyllophaga manantleca* n. sp. belong to the species group “*blanchardi*,” complex “*pubicauda*” (*sensu* Morón 1986). The diagnostic combination of characters for both sexes include: anterior border of clypeus widely sinuated; frons and pronotum with dense vestiture of erect, long setae; abdominal sternites 2° to 4° with deep mesial sulcus; abdominal sternite 5° with granulose-setiferous patch; and pygidium finely punctate and moderately setiferous. Shape of paramera is similar to *P. inflativentris* Moser and *P. hintonella* Saylor, but the proportions of each part are different.

Etymology. Derived from Sierra de Manantlán, old Aztec name “*Manauanltlan*” meaning, “near the site where defence is developed” or “near defended site,” “near fortification” (*Manauia* = defended, *ana* = growth, development, *ltlan* = near) Simeón (1988).

Phyllophaga (Phyllophaga) joyana Morón, Rivera y López, **new species**
Figs. 14–17

Holotype Male. Head, pronotum and elytra shiny yellowish dark brown; pygidium, sterna, and legs shiny yellowish testaceous. Clypeus clearly bilobed, wider than long (4.8:1), anterior border deeply sinuated, with margins scarcely elevated, surface convex, with large, round punctures, nearly confluent, with long, slender setae. Fronto-clypeal suture slightly sinuose, finely impressed. Frons wider than long (2.2:1) convex, irregularly rugo-punctate, with long, slender setae. Antenna 10 segmented, with 3 segmented club; lamellae as long as the length of five preceeding segments combined (1:1), segment 4° nearly as long as segment 3, segment 5° with small anterior, rounded projection, segments 6° and 7° wider than long, each one with acute process directed forward. Frons 6.2× wider than each eye dorsal diameter. Canthus curved and rounded, with 5–7 setae. Labrum deeply bilobed, with curved, slender setae near borders. Mentum widely concave, polished, with slender setae at center and near lateral borders, anterior border clearly sinuated. Pronotum wider than long (1.9:1) and 1.9× wider than frons. Pronotal disk with heterogeneous, deep, round punctures separated by 1–3 diameters, with many erect, very long, slender setae; lateral borders widely angled, marginal bead vaguely crenulate, with long, slender setae; anterior angles obtuse, scarcely prominent; posterior angles widely obtuse, not prominent. Scutellum 1.4× wider than long, with 9 shallow, small punctures. Elytron 2.6× longer than wide, densely rugo-punctate, without setae; epipleural border narrowed, extended along complete margin, provided with a fringe of setae progressively shorter toward the apex of elytra; humeral calla rounded, prominent; apical calla rounded. Metathoracic wings completely developed. Propygidium shiny, fine and shallowly punctate, without setae. Pygidium convex, slightly prominent toward base, shiny, with scattered, shallow punctures, without setae on disk; apical margin with 14 slender setae; basal margin effaced at middle. Pterosternon with long, dense, yellowish vestiture. Visible abdominal sternites 2° to 4° with shallow, wide, longitudinal depression; sternite 5° convex, scattered punctures and some slender setae; posterior border slightly excavated toward sides; anal plate wide and shallowly concave, with vague punctures, without setae; posterior border thickened, scarcely notched at middle, with 10 erect, long setae. Protibiae slightly shorter than protarsi (0.9:1), with two large teeth and one acute, small tooth on external border, preapical spur long, straight, acute, slightly shorter than



Figs. 14–17. *Phyllophaga joyana*. **14)** tarsal claw, male; **15)** genital capsule, lateral view; **16)** paramera, distal view; **17)** distal half of genital capsule, dorsal view. Scale lines = 1 mm, except Fig. 14 = 0.5 mm.

2° protarsomeres (0.8:1). Mesotibiae with some long, slender setae, and one oblique, short, setiferous, transverse carina; upper apical spur straight, narrow, slightly shorter than lower spur (0.8:1). Metatibiae shorter than metatarsi (0.9:1), with some long, slender setae, and one oblique, short setiferous transverse carina; apical spurs articulated with the border, upper spur lanceolate, slightly curved, with rounded apex, nearly as long as 2° metatarsomeres, and 1.2× longer than lower spur. Tarsomeres semicylindrical, elongated, with enlarged apex, and many setae around apex; mesotarsomeres 2° to 5° ventrally present two lines of scattered, slender setae; metatarsomeres 2° to 4° ventrally present two lines of setae. Tarsal claws symmetrical, similar on all legs, with median acute-angled tooth located near basal dilatation, but also near apical tooth (Fig. 14). Genital capsule with long, narrowed, curved paramera, fused dorsally at their basis, and ventrally at their apex, with lateral, rounded laminar projections and preapical short, tooth-like, curved projections (Figs. 15–17). Tectum convex with widely sinuated distal border. Aedeagus long, wide, with sclerotized tube-like support and preapical, dorsal, bilobed, excavated, sclerotized plate (Figs. 15–17). Length of genital capsule from apex of parameres to border of basal piece: 3.4 mm. Total body length: 13.0 mm. Humeral width: 5.5 mm.

Allotype. Female. Similar to the male except as follows: antennal club as long as the four preceeding segments combined; pygidium transversally concave at middle with preapical prominence briefly bilobed; visible abdominal sternites 2° to 4° with mesial sulcus vaguely indicated; sternite 5° convex,

punctate, with scattered short setae; anal plate convex, punctate, with scattered, short and medium size setae. Protibia with external border clearly tridentate. Apical spurs of metatibiae wide, slightly curved with rounded apices. Ventral genital plates widely ovate, moderately sclerotized, nearly symmetrical, poorly convex, without setae; dorsal genital plates nearly rectangular, fused mesially, with scarce setae on distal borders. Total body length: 13.0 mm. Humeral width: 5.6 mm.

Paratype Variation. Males. Specimens from Minatitlán, Colima have pronotal punctures closely approximated, wider and denser than specimens from Las Joyas. Total body length: 13.0–13.2 mm, humeral width: 5.5–5.6 mm.

Type Series. (Described from 4 males and 1 female). Holotype ♂; MEXICO: Jalisco, Autlán, Est. Las Joyas, bosque mesófilo, Alt. 1,900 m, 5-VIII-1997, trampa luz, M. López (MXAL). Allotype ♀: Colima, Minatitlán, El Terrero, bosque mesófilo, Alt. 2,200 m, 25-VII-1998, trampa luz UV, J.García (MXAL). Paratypes: same data as holotype (♂) (IMEJ); same data as allotype (2 ♂♂) (IEXA, MXAL).

Type Locality. Las Joyas, Biosphere Reserve Sierra de Manantlán, Autlán municipality, state of Jalisco, México (approx. 19°35'13"N; 104°16'48"W).

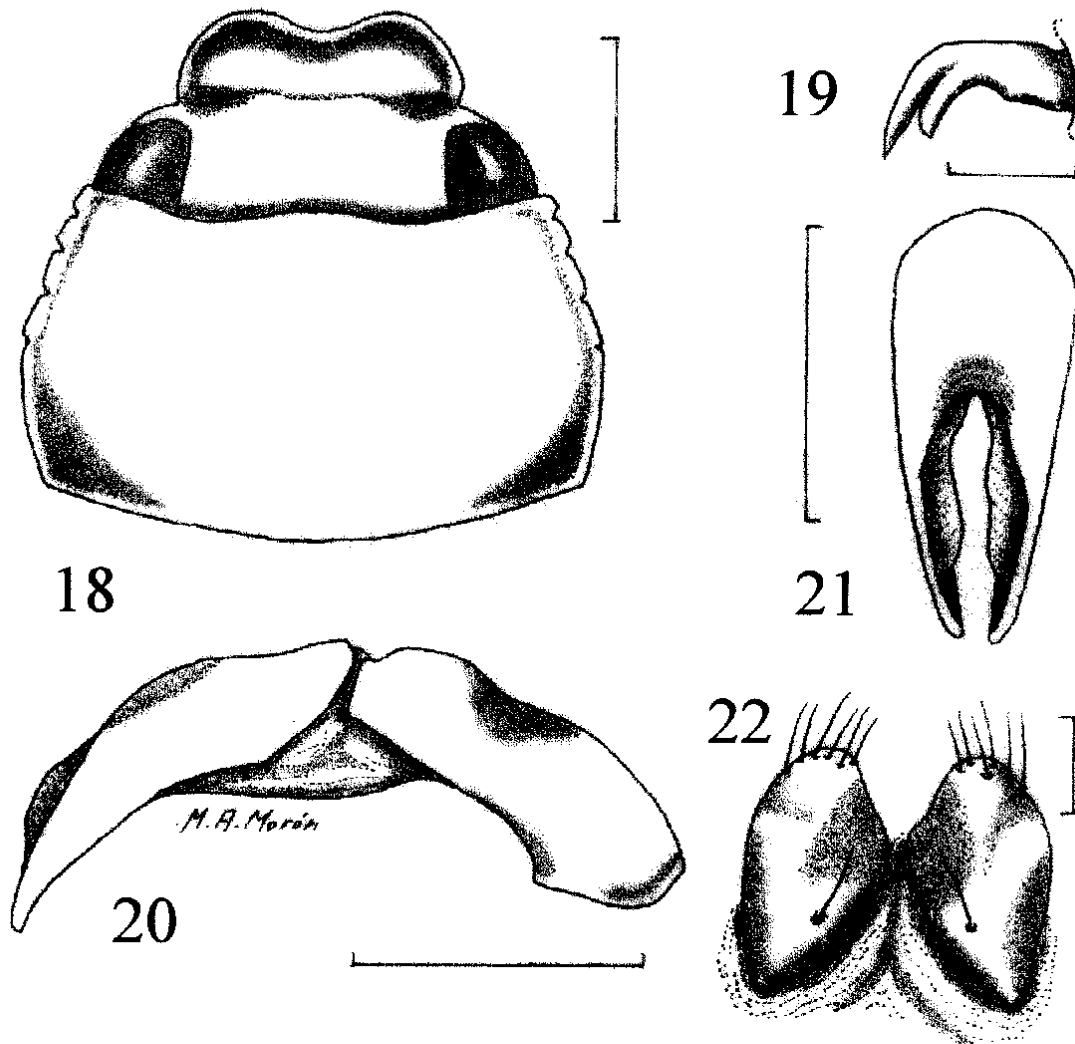
Biological Data. Specimens of *P. joyana* n.sp. were collected at fluorescent white lights or UV lights in montane cloud forest located at 1,900–2,200 m altitude, between 20:00 and 20:30 h. Phenology: July (3), August (2). Other species of *Phyllophaga* flying at the same time and place were *P. (Phytalus) jalisciensis* n.sp. and *P. (s.str.) manantleca* n.sp.

Remarks. *Phyllophaga joyana* n.sp. belongs to the species group “*blanchardi*,” complex “*xanthe*” (*sensu* Morón 1986). The diagnostic combination of characters for male include: anterior border of clypeus deeply sinuated; frons and pronotum with dense vestiture of erect, long setae; abdominal sternites 2° to 4° with shallow mesial concavity; abdominal sternite 5° with scarce punctuation or vestiture; and pygidium vaguely punctate, without setae on disk. The shape of the paramera and aedeagus have some similarities with *P. xanthe* Bates, *P. verruciventrifera* Moser and *P. collaris* Moser, but the proportions or positions of each part are much different.

Etymology. Derived from the name of Las Joyas creek, that flow near the middle of the Biological Station Las Joyas, Sierra de Manantlán.

Phyllophaga (Phytalus) dugesiana Morón, Rivera and López, **new species**
Figs. 18–22

Holotype Male. Head shiny reddish brown; pronotum, clytra, pygidium, sternites and legs shiny yellowish testaceous. Clypeus short (Fig. 18), wider than long (3:1), anterior border widely sinuated with margins strongly elevated, disk surface nearly flat, with deep, round punctures, without setae. Fronto-clypeal suture slightly sinuated, finely impressed. Frons wider than long (1.8:1) convex, with round, deep punctures and without setae. Antenna 9 segmented, with 3 segmented club; lamellae longer than the preceding four segments combined (1.8:1), segment 5° longer than segment 4°, segment 6° very short, all without anterior projections. Frons 2.8× wider than each eye dorsal diameter. Canthus short and narrowed, with 5 setae. Labrum widely bilobed, deeply sinuated, with slender setae at the borders. Mentum concave, with lateral bulks and slender setae, anterior border widely sinuated. Pronotum wider than long (1.7:1) and 2.2× wider than frons. Pronotal disk glabrous, slightly convex, but with shallow depressions toward the posterior angles and lateral margins, irregularly punctate, round punctures separated by less of width of puncture to 1–3 punctures; anterior margin without setae; lateral borders widely rounded, marginal bead (Fig. 18) clear and widely crenulate, with scattered, short setae; anterior angles nearly straight, prominent; posterior angles obtuse, prominent. Scu-



Figs. 18–22. *Phyllophaga dugesiana*. 18) head and pronotum, dorsal view; 19) tarsal claw, male; 20) genital capsule, lateral view; 21) paramera, distal view; 22) ventral genital plates, female. Scale lines: Figs. 19, 22 = 0.25 mm; Figs. 18, 20–21 = 1 mm.

tellum 1.2× wider than long, with 30 shallow, small, irregular punctures. Each elytron 3.2× longer than wide, finely rugo-punctate, glabrous; epipleural border with the color of disk surface, narrowed, extended along the complete margin, without setae; humeral calla rounded, prominent; apical calla rounded. Metathoracic wings completely developed. Propygidium shiny, with fine, shallow punctures, glabrous. Pygidium slightly uniformly convex, shiny, shallow and finely punctate, glabrous, apical margin rounded, with 12 slender, short setae; basal margin widely interrupted at the middle. Pterosternon with medium size, moderately dense, yellowish vestiture. Visible abdominal sternites 2 to 4 slightly convex, with some minute setae at the midline; sternite 5 slightly convex with group of medium size, erect setae at the middle; anal plate convex, with scattered shallow punctures and some slender setae. Protibiae shorter than protarsi (1:1.3), with external border nearly tridentate, preapical spur straight, acute, shorter than 2° protarsomeres (1:1.6). Mesotibiae with one oblique, strong, setiferous, transverse carina, preceeding by vague carina with 2 setae on external side; lower apical spur straight, narrow, slightly shorter than upper spur (1:1.2). Metatibiae nearly as long as metatarsi (1:1.2), with one oblique, poorly marked setiferous, transverse carina, and 3–5 setae on the external side; apical spurs articulated with the border, straight and narrowed with acute apex, upper spur shorter than 2° metatarsomere (1:1.3), and 1.2× longer than lower spur. Tarsomeres

semicylindrical, elongated, with enlarged apex, some setae around the apex and two lines of setae ventrally. Tarsal claws symmetrical, deep and narrowly cleft, with lower tooth clearly shorter and separated from the upper tooth (Fig. 19). Genital capsule elongated, basal piece slightly shorter than paramera (1:1.1), tectum with transverse prominence near distal border, paramera elongate, fused at dorsal base, with apex narrowed, slightly curved downward, trema ojival (Figs. 20–21). Aedeagus moderately long, with sclerotized, support structure, without outstanding dorsal or preapical sclerites. Length of genital capsule from apex of parameres to border of basal piece: 1.9 mm. Total body length: 9.1 mm. Humeral width: 3.3 mm.

Allotype. Female. Similar to male except as follows: antennal club slightly longer than preceeding four segments (1.2:1); pronotal punctures more deep; anal plate more convex, deep punctate; protibial external border with three acute teeth. Ventral genital plates slightly sclerotized, symmetrical, with apical border rounded without setae; dorsal genital plates rounded, thin, with some setae at apical border (Fig. 22). Total body length: 9.2 mm. Humeral width: 3.5 mm.

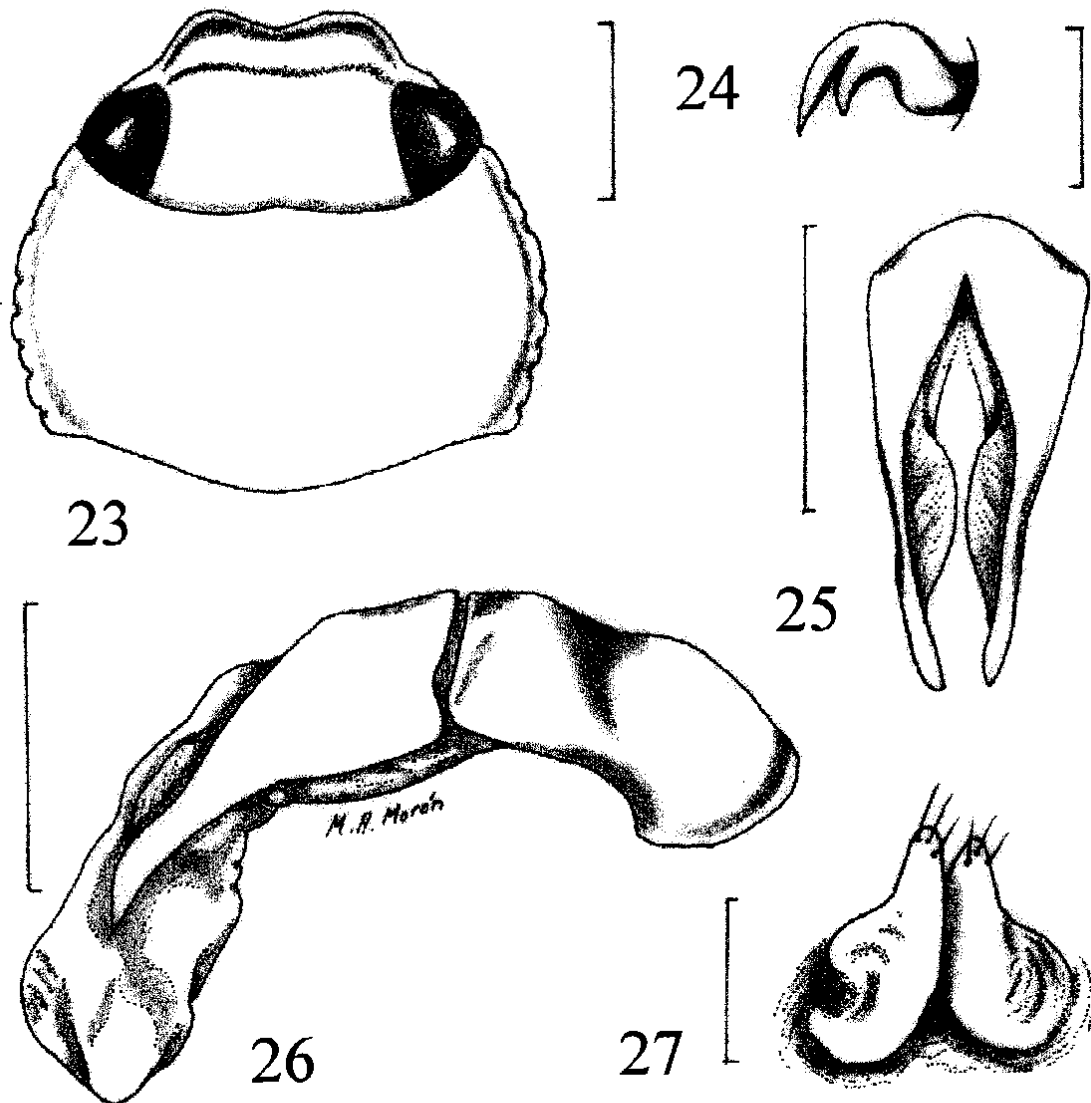
Paratype Variation. Paratypes of both sexes are similar to types except that some female specimens present darkened pronotum and elytra, or males are yellowish brown and females are reddish brown. Total body length: 7.2–10.5 mm. Humeral width: 3.0–3.9 mm.

Type Series. (Described from 202 males and 179 females). Holotype, ♂; MEXICO: Jalisco, Autlán, Estación Las Joyas, 6-VI-1997, 1,900 m, trampa luz, bosque mesófilo, M. López (MXAL). Allotype ♀ same data as holotype, except 6-V-1997 (MXAL). Paratypes: same data as holotype, (64 ♂♂ 26 ♀♀); same data except C. Ibarra, (4 ♂♂ 2 ♀♀); D. Hernández (3 ♂♂ 1 ♀); 4-VI-1997, M. López (7 ♂♂ 6 ♀♀); C. Ibarra (2 ♂♂ 3 ♀♀); D. Hernández (2 ♂♂ 1 ♀); 5-VI-1997, (2 ♂♂ 2 ♀♀); M. López (2 ♂♂ 1 ♀); C. Ibarra (1 ♂ 2 ♀♀); 3-VII-1997, J. García (3 ♀♀); M. López (95 ♂♂ 54 ♀♀); 4-VII-1997, J. García (3 ♂♂ 1 ♀); M. López (1 ♂ 3 ♀♀); 5-VIII-1997, S. Núñez (2 ♂♂ 1 ♀); A. Vázquez (2 ♀♀); 6-VIII-1997, M. López (1 ♂ 20 ♀♀); S. Núñez (♀); 7-VIII-1997, M. López (4 ♂♂ 12 ♀♀); A. Partida (♀); 4-IX-1997, A. Guerra (♂); 5-IX-1997, M. López (♀); A. Guerra (♀); 30-IX-1997, M. López (♀); D. Pelayo (♀); 21-XI-1985, G. Parada, (3 ♀♀); 13-VII-1986, L. Riviera, (♀); 15-VI-1986, (2 ♂♂ 8 ♀♀); 18-VI-1986, (♂); 19-VI-1986, (1 ♂ 9 ♀♀); 11-VII-1986, (2 ♂♂). Colima, Minatitlán, El Terrero, bosque mesófilo, 2,200 m, 27-VI-1998, luz, J. García (3 ♀♀); 23-VII-1998 (♀); 24-VII-1998 (♀); M. López (♀); 25-VII-1998, J. García (♂/♀). Paratypes are deposited at AAHC, AMNH, CASC, CNC, FMNH, IBUNAM, IEXA, IMEJ, GNPC, MNHN, MXAL, NHMC, UNSM and ZMHU.

Type Locality. Las Joyas, Biosphere Reserve Sierra de Manantlán, Autlán municipality, state of Jalisco, México (approx. 19°35'13"N; 104°16'48"W).

Biological Data. Specimens of *P. dugesiana* n.sp. were collected at lights in cloud forest located at 1,900 m of altitude. Phenology: June (158), July (167), August (45), September (5), November (3). This species represents nearly 50% of the samples of *Phyllophaga* specimens in Las Joyas. Other species flying at the same time and place were *P. (Phytalus) mesophylla* Morón & Rivera, *P. (Phytalus) jalisciensis* n. sp., *P.(s.str.) chamacayoca* Morón, *P.(s.str.) sayloriana* n.sp., *P.(s.str.) manantleca* n.sp. and two other undescribed species.

Remarks. *Phyllophaga dugesiana* n.sp. presents the diagnostic characters of the species group "*bucephala*" but are clearly not related with any other species. The very elongated elytra (more than 3 times longer than wide), 9-



Figs. 23–27. *Phyllophaga jalisciensis*. 23) Head and pronotum, dorsal view; 24) tarsal claw, male; 25) paramera, distal view; 26) genital capsule, lateral view; 27) ventral genital plates, female. Scale lines: Figs. 24, 27 = 0.25 mm; Figs. 23, 25–26 = 1 mm.

segmented antenna with elongated club, bilobed shape of clypeus, pronotum, elytra and pygidium glabrous, punctate pronotum, elytra moderately rugose, and shape of male genital capsule will aid in the recognition of this species.

Etymology. This new species is dedicated to the memory of the Mexican-French coleopterist Eugenio D. Dugés (1833–1895), whose pioneering works with Mexican species of Coleoptera have been recognized in recent years.

Phyllophaga (Phytalus) jalisciensis Morón, Rivera and López, **new species**
Figs. 23–25

Holotype Male. Frons, disk of pronotum and elytra, shiny dark brown; clypeus, lateral borders of pronotum, pygidium, sternites and legs shiny yellowish testaceous. Clypeus short (Fig. 23), wider than long (4.2:1), anterior border widely sinuated with margins strongly elevated, disk surface slightly concave, with wide, shallow, round punctures, without setae. Fronto-clypeal suture vaguely sinuated, finely impressed. Frons wider than long (2.5:1) convex, with sparse, round, shallow punctures and scarce, erect, slender

setae. Antenna 9 segmented, with 3 segmented club; lamellae longer than the preceding four segments combined (1.6:1), segment 5° as long as segment 4°, both without anterior projections; segment 6° short, with acute projection directed forward. Frons 4.3× wider than each eye dorsal diameter. Canthus much short and narrowed, with 4 setae. Labrum widely bilobed, deeply sinuated, with slender setae at the borders. Mentum concave, with lateral bulks and slender setae, anterior border wide and deeply sinuated. Pronotum wider than long (2:1) and 2× wider than frons. Pronotal disk glabrous, slightly convex, irregularly punctate, round punctures separated by width of 1–2 punctures; anterior margin without setae; lateral borders wide and slightly rounded, marginal bead widely crenulate (Fig. 23), with scattered, short setae; anterior angles nearly straight, not prominent, rounded; posterior angles obtuse, not prominent, rounded. Scutellum 1.1× wider than long, with 18 shallow, small, irregular punctures. Each elytron 2.8× longer than wide, densely rugo-punctate, glabrous; epipleural border with color of disk surface, narrowed, extended along the complete margin, with scattered, short setae; humeral calla rounded, prominent; apical calla rounded. Metathoracic wings completely developed. Propygidium shiny, with fine, sparse punctures and 5 oblique striae, glabrous. Pygidium uniformly convex, shiny, regularly covered with round punctures, glabrous, apical margin rounded, with 13 slender, short setae; basal margin widely interrupted at the middle. Pterosternon with medium size, moderately dense to scarce, yellowish vestiture. Visible abdominal sternites 2 to 4 slightly convex, with short setae at the midline and toward sides; sternite 5 slightly convex, with medium size, erect setae at middle; anal plate convex, with scattered shallow punctures and some slender, erect setae. Protibiae shorter than protarsi (1:1.2), with external border nearly tridentate, because basal tooth is vaguely indicated; preapical spur straight, acute, much shorter than 2° protarsomerus (1:2.8). Mesotibiae with one oblique, strong, setiferous, transverse carina, preceding by vague carina with 3 setae on external side; lower apical spur straight, narrow, shorter than upper spur (1:1.4). Metatibiae nearly as long as metatarsi (1:1.1), with one oblique, vague, setiferous, transverse carina, and 5 setae on external side; apical spurs articulated with border, straight and narrowed with rounded apex, upper spur much shorter than 2° metatarsomere (1:2.3), and 1.2× longer than lower spur. Tarsomeres semicylindrical, elongated, with enlarged apex, some setae around the apex and many setae on ventrally slightly flattened side. Tarsal claws symmetrical, deep and narrowly cleft, with lower tooth clearly shorter and separated from the upper tooth (Fig. 24). Genital capsule elongated, basal piece slightly shorter than paramera (1:1.1), tectum with 2 wide, lateral prominences near distal border, paramera elongate, fused at dorsal base, with distal half narrowed, slightly curved downward, apex nearly rounded, trema ovoid (Figs. 25–26). Aedeagus moderately long, with poorly sclerotized support structure, without outstanding dorsal or preapical sclerites. Length of genital capsule from apex of parameres to border of basal piece: 2.4 mm. Total body length: 8.1 mm. Humeral width: 3.3 mm.

Allotype. Female. Similar to male except as follows: antennal club as long as preceding four segments (1:1); frontal and pronotal punctures more deep; anal plate deep punctate; protibial external border with 3 teeth clearly marked. Ventral genital plates slightly sclerotized, symmetrical, with apical border widely rounded, without setae; dorsal genital plates rounded, slightly narrowed, with some erect setae at apical border (Fig. 27). Total body length: 8.9 mm. Humeral width: 3.5 mm.

Paratype Variation. Paratypes of both sexes are similar to types except that some specimens present pronotum completely darkened. Total body length: 7.9–9.5 mm. Humeral width: 3.0–3.6 mm.

Type Series. (described from 42 males and 21 females). Holotype, ♂; MEXICO: Jalisco, Autlán, Estación Las Joyas, 4-VII-1997, 1,900 m, trampa luz, bosque mesófilo, M. López (MXAL). Allotype, ♀ same data as holotype, except 5-VIII-1997, A. Vázquez (MXAL). Paratypes: same data as holotype (♂); same data as allotype, except S. Nuñez (♀); 3-VII-1997, J. García (2 ♂♂ 1 ♀); M. López (♂/♀); 5-VIII-1997, J. García (♂); 6-VIII-1997 (3 ♂♂ 1 ♀);

A. Partida (6 ♂♂); M. López (♀); 7-VIII-1997, J. García (7 ♂♂ 1 ♀); A. Partida (3 ♂♂ 3 ♀♀); S. Núñez (♂); M. López (♀); 4-IX-1997, A. Guerra, (2 ♂♂); M. López, (2 ♂♂ 1 ♀); 5-IX-1997, M. López (♂); 30-IX-1997, M. López (2 ♂♂); 1-X-1997 (♂/♀); D. Pelayo (♂); 2-X-1997 (♀); M. López (♂); 30-VII-1999, G. Mesa (♂/♀); J. García (♂/♀); V. González (♂); M. López (♀); 31-VII-1999, V. González (♂); 19-VI-1986, L. Rivera, (♂/♀); 12-VII-1986, barbechos, L. Rivera, (♂). Paratypes are deposited at AAHC, AMNH, CASC, CNC, FMNH, IBUNAM, IEXA, IMEJ, GNPC, MNHN, MXAL, NHMC, UNSM and ZMHU.

Type Locality. Las Joyas, Biosphere Reserve Sierra de Manantlán, Autlán municipality, state of Jalisco, México (approx. 19°35'13"N; 104°16'48"W).

Biological Data. Specimens of *P. jalisciensis* n.sp. were collected at lights in cloud forest located at 1,900 m of altitude. Phenology: June (2), July (15), August (32), September (9), October (5). Other species flying at the same time and place were *P. (Phytalus) mesophylla* Morón & Rivera, *P. (Phytalus) dugesiana* n. sp., *P.(s.str.) sayloriana* n.sp., *P.(s.str.) manantleca*, *P. (s.str.) joyana* n.sp. and one undescribed species.

Remarks. *Phyllophaga jalisciensis* n.sp. presents the diagnostic characters of the species group "*bucephala*," with some similarity with *P. omitemia* Bates and *P. teosinteophaga* Morón & Cervantes. The dense, ventral vestiture of the tarsal segments and male genital capsule are very different from the *P. omitemia*. The bicolored pronotum and shape of parameres are different from *P. teosinteophaga*.

Etymology. Derived from the name of state of Jalisco or Xallisco, old Nahuatl language name meaning *Xalli*, "sand," *co* "in," "in sandy land" (Simeón 1988) and Latin suffix *-ensis*, "belonging" (Jaeger 1978); *jalisciensis* "belonging to sandy land."

Acknowledgments

We are indebted to the authorities, professors, technicians and students of the Universidad de Guadalajara related to the biological station in Las Joyas because of their help and cooperation in obtaining the samples now described. This paper is a contribution to the project "Sistemática y Biología del género *Phyllophaga* en México y América Central" (225260-5-25723-N), supported by CONACYT, México.

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SCIENTIFIC NOTE

New Mexican State Records for *Oniticellus rhinocerus* Bates and *Euoniticellus intermedius* (Reiche) (Scarabaeidae: Scarabaeinae)

The Tribe Oniticellini (Scarabaeidae: Scarabaeinae) is represented in México by three species: *Oniticellus rhinocerus* Bates, *Liatongus monstrosus* (Bates) and, *Euoniticellus intermedius* (Reiche).

The native fungus, dung and, carrion feeding *O. rhinocerus* has been recorded from the Mexican states of Durango, Guerrero, Jalisco, Estado de México, Michoacán, Morelos, Oaxaca and Sinaloa (Delgado 1999).

New record: Eight males and six females of this species were recorded from México, Sonora, Yécora, bosque de encino-pino, 1,400 m, 28°22'N, 108°54'W, 10–17.VIII.2000, necrotrampa cebada con langostino, G.A. Quiroz, L.A. y J.L. Navarrete. This is the most northern record for this species and, increase their distribution in 720 km approximately in straight line and, is the lowest altitudinal record.

The introduced dung feeding *Euoniticellus intermedius* has been collected in the states of Baja California, Baja California Sur, Chihuahua, Durango, Guanajuato, Hidalgo, Jalisco, Michoacán, Puebla, Sonora, Tamaulipas and Veracruz (Montes de Oca and Halfpter 1998; Morón *et al.* 2000).

New record: A single male was recorded from México, Nuevo León, Santiago, Cascada Cola de Caballo, 600 m, 24°21'N, 100°09'W, 5.IX.2000, *ex* excremento vacuno, G.A. Quiroz, L.A. y J.L. Navarrete.

Specimens are deposited in the Entomological Collection of the Centro de Estudios en Zoología, Universidad de Guadalajara (CZUG).

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**A NEW SPECIES OF *LYREUS* AUBÉ FROM ALABAMA, FIRST REPORT OF
THE GENUS FROM THE NEW WORLD
(ZOPHERIDAE: COLYDIINAE: SYNCHITINI)**

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Abstract

Lyreus alleni Ivie and Ślipiński, **new species**, is described from a limestone sinkhole in Alabama. This is the first record of the genus from the New World. Illustrations of the new species and the European *L. subterraneus* Aubé are provided to aid in identification.

The genus *Lyreus* Aubé was described from Europe, and until now has included the type species, *L. subterraneus* Aubé from France (Dajoz 1977), and *L. septemstriatus* Fancello & Leo (1991) from Sardinia. It was included in the Colydiidae/Sychitinae (Ivie and Ślipiński 1990) until those groups were placed as a subfamily/tribe of the Zopheridae by Ślipiński and Lawrence (1999). An Alabaman species of this genus came to us through the courtesy of Albert Allen of Boise, Idaho, and we are describing the species here so that *Lyreus* can be included among the North American genera in the second volume of American Beetles (Arnett and Thomas 2001). The habitat of this species, a limestone sinkhole in Alabama at the southern terminus of the Appalachian Mountains, is consistent with the known habits of the European species, which are known only from soil habitats in Departments of Aude, Var and Alpes-Maritimes in the south of France, and from calcareous soils at Domusnovas, Sardinia (Dajoz 1977; Fancello and Leo 1991). The existence of this group from the southern Appalachians and Mediterranean region will undoubtedly be of interest to zoogeographers of the trans-Atlantic pattern seen in such groups as Trechini (Carabidae), Pselaphinae (Staphylinidae), and others discussed by Noonan (1988) and Carlton and Cox (1990).

Lyreus alleni Ivie and Ślipiński **new species**

Figs. 1–4

Type Material. HOLOTYPE male. ALABAMA: Jefferson Co.; Clay, Crystal Cave; 02 July 1978, 1,000 ft; T. King, from limestone sink. Deposited in the National Museum of Natural History, Washington [NMNH]. PARATYPES. 10—same data as holotype, in the collections of Albert Allen, Karl Stephan, Montana State University, Bozeman, Muzeum i Instytut Zoologii, Warsaw, and NMNH.

Diagnosis. *Lyreus alleni* is easily recognized among North American colydiines (=Colydiidae of authors) by the characteristic sculpture (Fig. 1), complete absence of eyes (Fig. 2), and small size. The narrower form, distinctly shaped pronotum (Fig. 2) and the more parallel-sided prosternal process (Fig. 3) will distinguish it from the European *L. subterraneus*, with its distinctly broader form, more laterally arcuate pronotum (Fig. 5) and more triangular prosternal process (Fig. 6). The Sardinian *L. septemstriatus* differs obviously in having only 7 punctured striae, but also in the greatly bisinuate posterior margin of the pronotum, which results in a posterior directed median lobe that is received in an excavation in the anterior edge of the elytra (Figs. 1 and 3 in Fancello and Leo 1991). The male genitalia will readily distinguish the species, the parameres of *L. alleni* (Fig. 4) being blunt and relatively short (in relation to the basal piece and median lobe), while those of *L. subterraneus* (Fig. 7) are relatively longer and narrowly acute. The genitalia of *L. septemstriatus*, as illustrated by Figure 2 of Fancello and Leo (1991) are very distinct, with reduced parameres that end in acuminate points.

Description. Length 2.2–2.7 mm. Color uniform dark reddish brown. Dorsally covered in large flattened, subcontiguous tubercles (Fig. 1), each bearing a single subdecumbent seta; cuticle smooth and shining on tubercles, dull between, obscured with dirt-encrusted secretions. *Head* somewhat pentagonal (Fig. 2), covered with large flattened tubercles, the largest starting in a broad median band on the occiput, and diverging in arms towards the frontal angles; frontal margin transverse, smooth immediately behind; eyes completely absent; a wide antennal groove present, extending to rear of head; mentum coarsely punctate. Antenna (Fig. 2) 11-segmented, with a clearly 2-segmented club; basal segments sparsely and club densely setose. *Thorax*: Pronotum (Fig. 2) nearly parallel-sided in anterior half, indistinctly narrowed posteriorly; anterior angles directed forward; dorsally covered with large irregularly-placed tubercles, somewhat larger medially; lateral margin serrate, double when viewed laterally. Prothorax below with hypomeron slightly concave, entire ventral surface covered in slightly transverse coarse tubercles; procoxal process (Fig. 3) slightly expanded behind coxae, the cavities very narrowly open behind. Elytra with distinct humeral angles; tubercles arranged in 9 indistinct rows, offset so as to give the impression of diagonal rows extending forward from the suture at *ca.* 45° angle on disc, becoming confused apically. Scutellum very small, transverse. Metathoracic wings absent. *Venter*: Mesosternum, metasternum and ventrites covered with unique scrollwork consisting of shining individual flat-topped tubercles and intricate interconnected sinuate lines surrounded by and surrounding flat-bottomed dull channels, the latter filled with encrusted secretions; a single seta arising from each tubercle. Metasternum short, one-half the length of mesofemur; metacoxae oval, not reaching elytral margin, separated by half their width by truncate process of first ventrite. All ventrites free, with deep grooves at sutures. *Legs* sparsely covered with setae, the tarsi 4-4-4 and unmodified, tarsomeres 1–3 subequal, and together considerably shorter than 4. *Male genitalia* as in Figure 4.

Etymology. Named in honor of Albert Allen, seeker and collector extraordinary of rare and phylogenetically significant beetles. This generous colleague

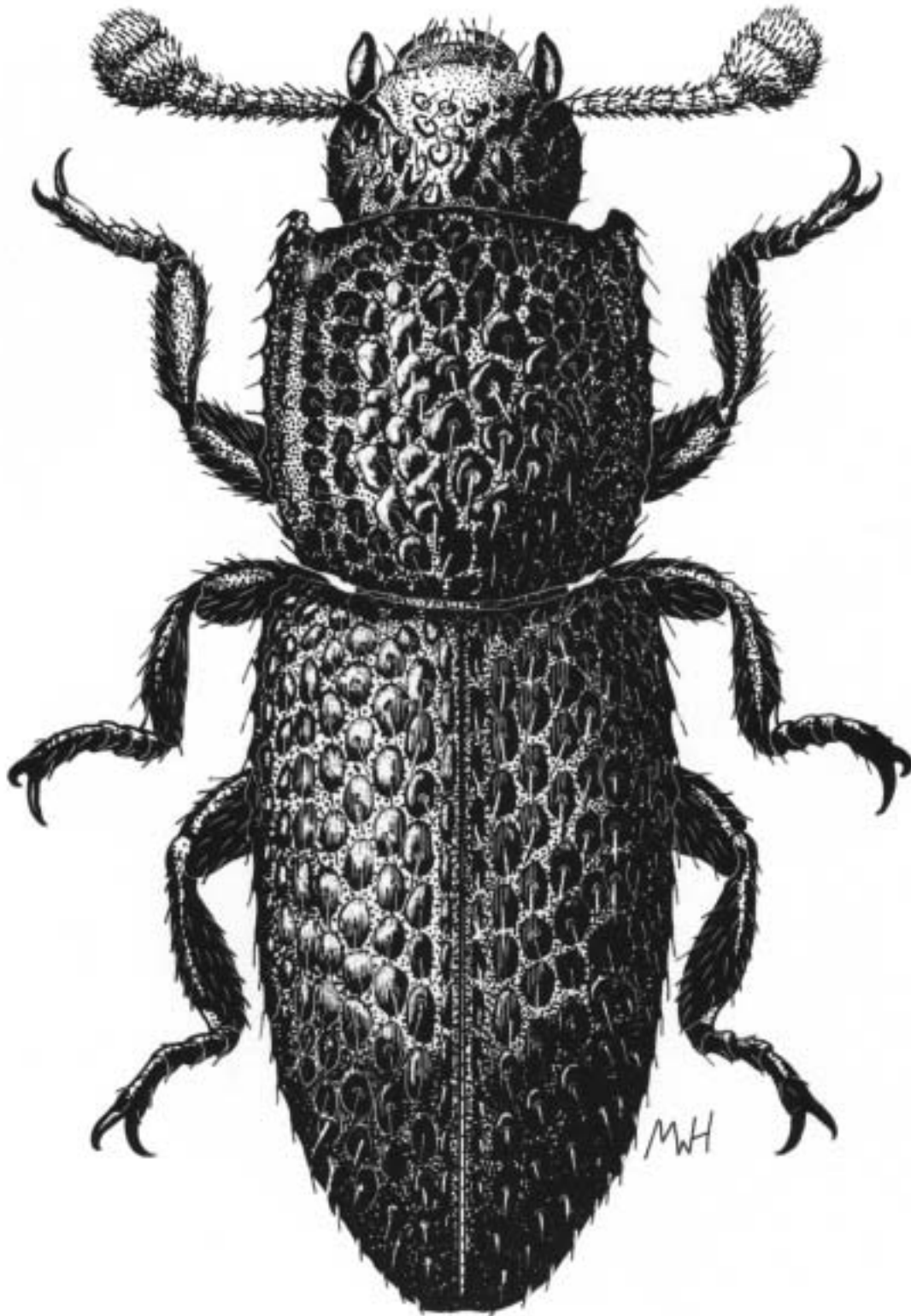
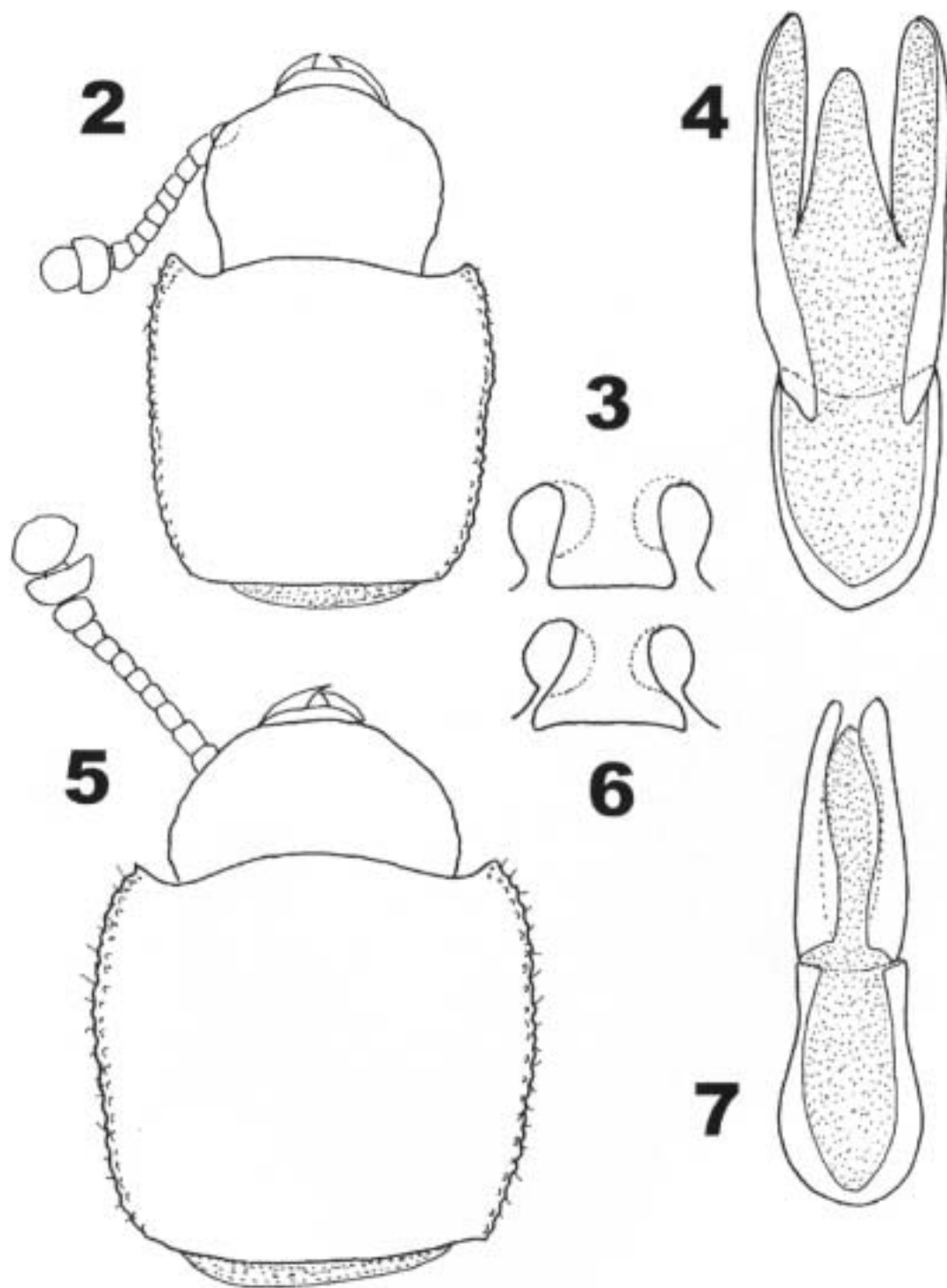


Fig. 1. *Lyreus alleni* Ivie and Šlipiński. habitus.



Figs. 2-4. *Lyreus alleni* Ivie and Šlipiński. 2) head and pronotum; 3) prosternal process; 4) male genitalia.

Figs. 5-7. *Lyreus subteranneus* Aubé. 5) head and pronotum; 6) prosternal process; 7) male genitalia.

first recognized this species as unique, and provided both the specimens and illustration (Fig. 1) for our use.

Acknowledgments

We would like to thank Albert Allen for providing the specimens of this species, and for allowing us to use the habitus illustration by Marvin Hanks. Richard S. Miller, J. Joseph Giersch and Marni G. Rolston reviewed the manuscript. Our collaboration was supported by our respective institutions. This is contribution J-2001-16 of the Montana Agricultural Experiment Station.

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SCIENTIFIC NOTE

New State Records for *Microsternus ulkei* (Crotch) (Coleoptera: Erotylidae)

The pleasing fungus beetle *Microsternus ulkei* (Crotch) is a wide-ranging yet rarely collected species inhabiting old-growth or mature forests in the eastern United States. Reliable records include Ohio, Massachusetts, West Virginia, Illinois, Indiana, Kentucky, Maryland, and North Carolina (Boyle 1956; Goodrich 1994). Congeners are found in the Orient and the Austral-oriental regions, suggesting a relict distribution (Boyle 1956; Chujo 1969; Chujo and Chujo 1988). Bracket fungi and old dead trees are recorded as hosts (Goodrich 1994; Skelley *et al.* 1991).

This note documents a series of collections that represent the first known occurrence of this species in Tennessee and Mississippi: Tennessee: Hamblen Co., 3 km W. Morristown, 1930 Bluebird Cir., VI-30-1991, Bobby Brown, on log (1 specimen); same data only VIII-7-1991 (3 specimens. B. Brown collector); same data only VII-25-1991, B. Brown, on log (1 specimen.); Cannon Co. Short Mountains, V-12-1992, E. J. Ford, *Phellinus gilvus* on fallen *Fagus americanus* in shaded ravine (22 specimens). Mississippi: Warren Co., Vicksburg, U.S. Watersways Experimental Station, near Brown Lake, about 1.5 miles S. I-20 on Halls Ferry Road, III-23-1998, C. O'Brien collector, in a ravine with remnant beech woods.

There may be a close association between this beetle and old stumps and dead logs of beech trees (*F. americanus*) based on the last two records reported here and from other known localities (Goodrich 1994). Specimens are deposited in the United States National Museum, Washington, D.C., the Paul E. Skelley Collection, Gainesville, FL, the E. J. Ford Collection, Woodbury, TN, Kansas State University Museum of Entomological and Prairie Arthropod Research, Manhattan, KS, and the B. Brown collection, St. George, KS.

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Bobby Brown, Department of Entomology, Kansas State University, Manhattan, KS 66506-4004, U.S.A. and Paul E. Skelley, Florida State Collection of Arthropods, Gainesville, FL 32614-7100, U.S.A. Florida Department of Agriculture and Consumer Services, Division of Plant Industry, Entomology Contribution No. 885 and Kansas Agricultural Experimental Station Contribution Number 01-463-J.

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ON THE GENUS *ONTHOPHILUS* Leach (Coleoptera: Histeridae) from China

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Abstract

In this paper, *Onthophilus lijiangensis*, **new species**, is described based on specimens from Yunnan Province, China. *Onthophilus silvae* Lewis and *O. ordinarius* Lewis are newly recorded from China. Thus, the Chinese species of *Onthophilus* are increased to seven. A key to species is given. Type specimens are deposited in the Institute of Zoology, Academia Sinica.

Onthophilus Leach is a small genus of the beetle family Histeridae. A total of 37 species and three subspecies have been described all over the world (Mazur 1984, 1997), of which 15 species are from the Nearctic region, four species from Oriental region, and 17 species and three subspecies from the Palearctic region. The only Australian species is *O. australis* Helava and Howden (1997). When Leach erected the genus *Onthophilus* in 1817, only two species, *O. striatus* Forster and *O. sulcatus* Moll, were included. Since then, many species have been described. A remarkable change of the genus concept occurred when Lewis (1891) erected the genus *Epiechinus* to accommodate seven species of *Onthophilus*. Thereafter, the genus concept of *Onthophilus* excluding the species of *Epiechinus* was followed by Reichardt (1933), Helava (1978), Mazur (1984, 1997), Ohara and Nakane (1986) and many other authors. This genus concept is now commonly accepted and is followed here.

At present, there is not a revision of the worldwide species of *Onthophilus*. Helava (1978) revised the 14 Nearctic species of *Onthophilus*. Only one species, *O. reyesi* Kryzhanovskij, was described subsequently from the Nearctic region (Kryzhanovskij 1992). For the Palearctic species of *Onthophilus*, Reichardt (1933) included 13 species and two subspecies. This included *O. ostreatus* Lewis from Southeast China (Fujian, Hongkong, Taiwan) and Japan (Honshu, Shikoku, Kyushu) (Ohara and Nakane 1986). Since then, four species and one subspecies have been discovered and described.

Lewis (1879) described *O. ostreatus* from Hongkong, the first *Onthophilus* species from China. Ten years later, Reitter (1889) recorded *O. foveipennis* Lewis from north China (Gansu), the first species of *Onthophilus* from Mainland China (see Reichardt 1933). After many decades of silence, Reichardt and Kryzhanovskij (1964) recorded *O. ostreatus* from Fujian, based on the specimens collected by Dr. J. Klapperich in Southeast China during 1937–1938. Jingke Li (1993) described a new species, *O. heilongjiangensis* Li, based on a single female specimen from Northeast China. One year later, Mazur (1994) published a description of another new species, *O. smetanai*, from Taiwan. In total, four species have been recorded from China before this study. In this paper, *O. silvae* Lewis and *O. ordinarius* Lewis are newly recorded from China, and *O. lijiangensis* Zhou and Luo, **new species**, is described based

on specimens from Yunnan Province, China. Thus, the Chinese species of *Onthophilus* are increased to seven.

For the terminology of the striae and other surface features, we follow Helava (1978) and Ohara and Nakane (1986). Eight striae on each elytron are named, from outside to inside, as external subhumeral stria, internal subhumeral stria, stria one to five, and sutural stria. The striae give their names to the major elytral costae that lie immediately mesad of them. The following abbreviations are used in the text: SC (sutural costa between the sutural stria and the suture), EC5 (elytral costa five, lies mesad of stria five), EC4 (elytral costa four, lies mesad of stria four), EC3 (elytral costa three, lies mesad of stria three), EC2 (elytral costa two, lies mesad of stria two), EC1 (elytral costa one, lies mesad of stria one), ISC (internal subhumeral costa, lies mesad of internal subhumeral stria), and ESC (external subhumeral costa, lies mesad of external subhumeral stria).

This study was based on the specimens in the collection of Institute of Zoology, Academia Sinica, and a few from the collection of Dr. M. Ohara and Dr. S. Mazur. type specimens are deposited in Institute of Zoology, Academia Sinica.

Onthophilus Leach

Onthophilus Leach 1817:76; Reichardt 1933:137–144; Helava 1978:7–8; Mazur 1997:7–9 (catalogued).

Type Species. *Hister sulcatus* Moll 1784:172 (Designated by Westwood 1840:22).

Synonym. *Scolytus* Müller 1776:22 (nec. Geoffroy 1762:309); Jakobson 1911:641.

Orthophilus Westwood 1840:22 (error).

Hypsenor Villa and Villa 1833; Alonso-Zarazaga and Yelamos 1994 (1995): 178.

Key to the Chinese Species of *Onthophilus* Leach

- 1 Pronotal costae indistinct, almost absent *O. smetanai* Mazur
- 1' Pronotum with distinct costae 2
- 2 Pronotum with 8 costae *O. silvae* Lewis
- 2' Pronotum with 6 costae 3
- 3 Elytral costae interrupted, forming elongate tubercles *O. lijiangensis*, new species
- 3' Elytral costae not interrupted to form elongate tubercles 4
- 4 Elytral fossa between EC2 and EC4 reduced, elytral costae narrow *O. ordinarius* Lewis
- 4' Elytral fossa between EC2 and EC4 deep, well-developed 5
- 5 Elytral fossa transverse and much deeper, the basal part of EC2 and EC4 prominent, costae on pronotum developed and higher *O. ostreatus* Lewis
- 5' Elytral costae narrower, not so prominent, pronotal costae reduced *O. foveipennis* Lewis

1. *Onthophilus foveipennis* Lewis 1885

Onthophilus foveipennis Lewis 1885:472 (Amurskiy Kray); Reitter 1889: 566 (Gansu); Reichardt 1933:141; Mazur 1997:8 (catalogued).

Synonym. *Scolytus foveipennis*: Jakobson 1911:652.

Distribution. China (Gansu, Beijing); Russia (Amurskiy Kray).

Specimens Examined. 54 ♀♀, 50 ♂♂ and 62 exs., 22–25. September 1998; 3 ♀♀, 3 ♂♂, 28. April–1. May 1999; 4 ♀♀, 6 ♂♂ and 25 exs., 22–23. May 1999; 1 ex., 25–28. June 1999; 17 exs., 27–30. August 1999; 24 ♀♀, 30 ♂♂ and 54 exs., 21–24. September 1999; 1 ex., 27–30. October 1998; collected at Xiaolongmen Research Station (39°58'N, 115°25'E; 1,225 m), about 140 km west of Beijing, by Xiao-dong Yu.

Remarks. In a forest habitat of mixed deciduous trees many specimens were collected using pitfall traps. In the area studied, adults of this species occur from April to October, and exhibit highest abundance during September. Morphological variation occurs in pronotal costae. Some specimens have a much reduced costae on the pronotum, making it difficult to observe costal patterns and distinguish them from the species lacking these costae.

2. *Onthophilus ordinarius* Lewis 1879, **new record from China**

Onthophilus ordinarius Lewis 1879:78 (Irkustsk); Reichardt 1933:142; Ohara and Nakane 1986:9 (Japan); Mazur 1997:8 (catalogued).

Synonym. *Scolytus ostreatus*: Jakobson 1911:652.

Distribution. China (Northeast China), Russia (Irkustsk, Central and East Siberia), Japan.

Specimens Examined. 5 exs. Northeast China (Manchuria), Ta Yngtse. Linsien, collected by E. Bourgaut.

Remarks. The Chinese specimens were compared with the Japanese specimen collected and identified by M. Ohara (with label "Japan: Nopporo Hokkaido. 5-VI-1987, M. Ohara leg.").

3. *Onthophilus ostreatus* Lewis 1879

Onthophilus ostreatus Lewis 1879:78 (Hong Kong), Lewis 1884:139 (Japan); Miwa 1931 (Taiwan); Reichardt 1933:143; Reichardt and Kryzhanovskij 1964:171 (Kuatun); Mazur 1997:8 (catalogued).

Synonym. *Scolytus ostreatus*: Jakobson 1911:652.

Distribution. China (Fujian, Hongkong, Taiwan), Japan.

Specimens Examined. We examined two Chinese specimens, one determined by Y. Miwa and the other by T. Shiraki, which have no date or specific locality data.

Remarks. The Chinese specimens were compared with a Japanese specimen collected and identified by M. Ohara (with label "Japan: Meinoo-bokujou, Kanoya Kyushu. 7-VII-1984, M. Ohara leg.").

4. *Onthophilus silvae* Lewis 1884, **new record from China**

Onthophilus silvae Lewis 1884:139 (Japan); Reichardt 1933:143; Mazur 1997:8 (catalogued).

Synonym. *Scolytus silvae*: Jakobson 1911:652.

Distributions. China (Beijing), Japan.

Specimens Examined. 1 ex., **Beijing**: Xiaolongmen Research Station (39°58'N, 115°25'E), 1,225 m, 19–21. VII. 1999, collected by Tian-hong Luo.

Remarks. Before this study, *O. silvae* was recorded from Japan and Russia (Far East). This is the first time it is reported from China. In a forest habitat of mixed deciduous trees, about 140 km west to Beijing, we collected this species using decaying meat as baits. This method was used with pitfall traps in 16 different forest habitats in this area, but we found only one *O. silvae* among several hundred specimens of *O. foveipennis*. Thus, *O. silvae* may be

a rare species with the same habitat preference as *O. foveipennis*. One specimen, determined by Y. Miwa, was compared with the Chinese specimen.

5. *Onthophilus smetanai* Mazur 1994

Onthophilus smetanai Mazur 1994:43–44 (Taiwan); Mazur 1997:8 (catalogued).

Distribution. China (Taiwan).

Specimens Examined. Taiwan: Hualien, Hsien, Taroko N.P. Duodyatunshan, 2650 m, 8–13. V. 1990, collected by A. Smetana.

6. *Onthophilus lijiangensis* Zhou and Lou, **new species**

(Figs. 1 and 2)

Diagnosis. This species is relatively larger and strongly punctured. It differs from most of its congeneric species by the most prominent but interrupted elytral costae, which form elongate tubercles in appearance. From those species that have interrupted elytral costae, it can be distinguished by having a deep transverse fossa on the base of elytron, much lower and reduced ESC, EC1, EC3, EC5 and SC, and special patterns of carinae on pygidium.

Description. Female. Body length 3.5–3.7 mm between anterior angles of pronotum and apices of elytra. Width 3.2–3.4 mm. Body oval, black. Maxillae, mouth palpi and tarsi fuscous. **Head:** carinae reduced, forming tubercle-like elevations, with latero-frontal carinae near the antennal pits and the vertico-frontal carina in the middle between them. Punctures large, deep and irregular in form and arrangement, especially on the concave areas of face and vertex, where the punctures 2–4 times as large as those on the vertices of elevations and separated by 0.5–0.3 times their diameters. Punctuation not so strong on clypeus and even smaller along front margin. Labrum punctured, with setiferous punctures in lateral 0.2, front margin arcuate. Mandibles strongly developed, with large punctures except the apical third. Antenna scape long and thick, with punctured ectal surface. **Pronotum:** transverse, 0.5 as long as wide. Lateral margin feebly arcuate and convergent anteriorly; sides reflexed except near the mid-point. Front margin slightly emarginate in the middle 0.5 and strongly reflexed in lateral 0.2. Front angles obtuse and rounded. Hind angles well developed. Hind margin extended posteriorly, roundly angulated before scutellum, and triangle-form in outline. Disk 6-costate. PC1 (costa closest to the lateral edge) short, reduced to a elongate tubercle-like elevation, reaching from front 0.6 to hind 0.1 and near hind angle of pronotum. PC2 (costa immediately mesad of PC1) feebly curved, abbreviated in front and behind, about one third of the length the pronotum, reaching from front two fifth to hind one fourth. PC3 (costa closest to the longitudinal midline) interrupted in front one to two fifth, thus, the two PC3 forming two pairs of parallel costae along the midline, with the front pair near front margin and relatively wider from each other; the hind pair reaching from front two fifth to hind one fifth, with a closer distance between them. Punctures deep and round, separated by their diameters, elongated in the middle area. Vertices of elevations with much small and round punctures. **Elytra:** wider than pronotum. ISC, EC2 and EC4 interrupted and forming very prominent elongate tubercles; ESC, EC1, EC3, EC5 and SC much lower and reduced, only suggested by feeble elevations of irregular forms. All costae abbreviated just behind front margin and before hind margin. EC4 interrupted and forming three elongate tubercles, with two in front 0.5 and the other one in the middle of hind half. EC 2 represented by two much prominent tubercles; the front one much larger and longer than all other elytral tubercles, reaching just behind front margin. ISC represented by three tubercles, with the front one longer than the other two. At the base of elytron between EC2 and EC4, a large, deep and transverse fossa terminated EC3 just behind front margin. Striae clear bordered, shining, with round and deep punctures. Elytral surface dim except shiny striae, punctured along margins; punctured areas wider in apex than on base. **Propygidium:** with front margin slightly reflexed. Carina along the longitudinal midline strong, reaching from just behind front margin to hind 0.2. Lateral carinae short, only suggested by round elevations near the middle point of lateral margin.

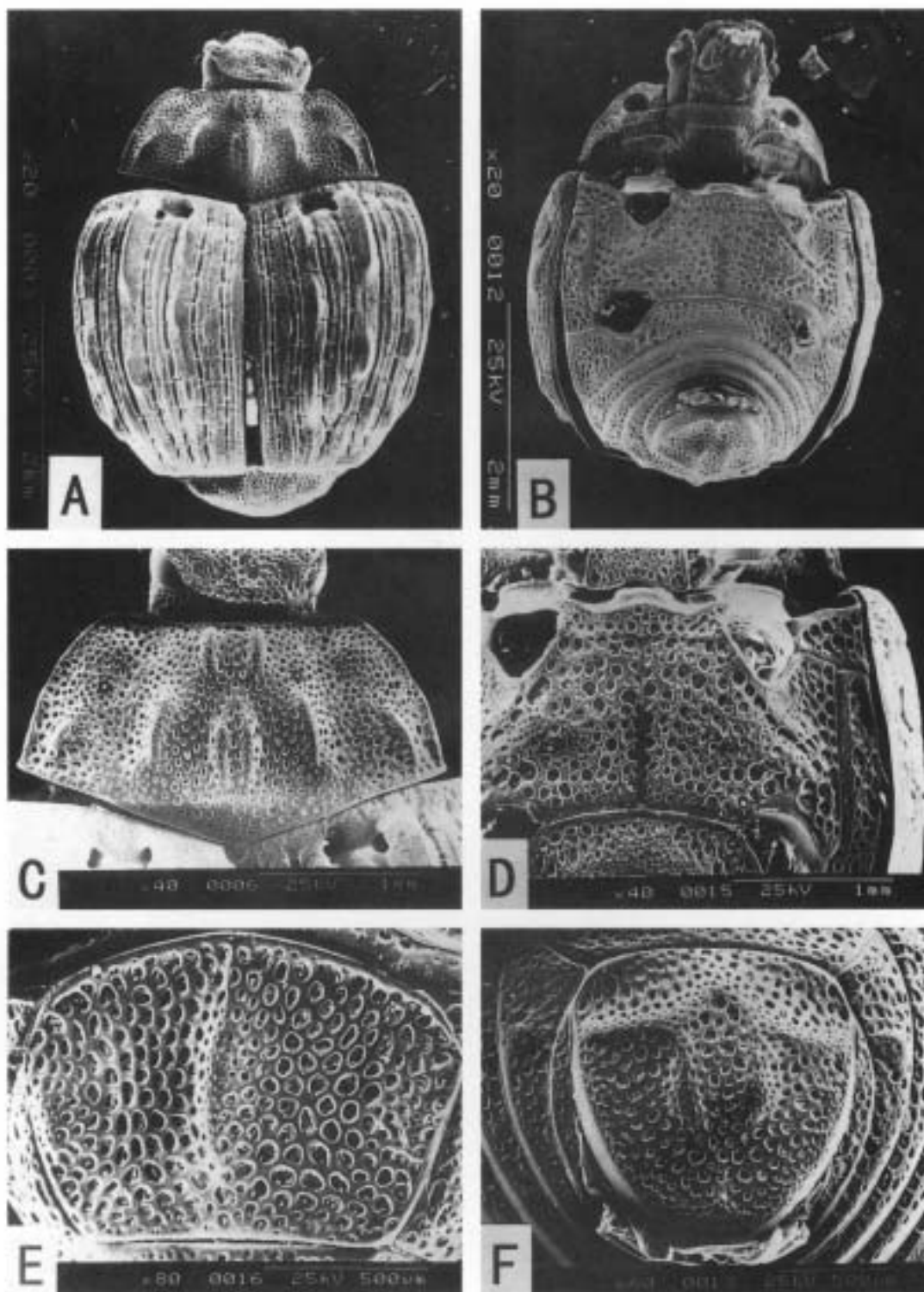


Fig. 1. *Onthophilus lijiangensis* Zhou and Luo, new species. A) Dorsal habitus; B) ventral aspect; C) pronotum; D) meso- and metasternum; E) propygidium; F) pygidium.

Punctures crateriform and larger in the concave area, but much smaller on vertices of elevations; interstices with minute sculpture. *Pygidium*: with transverse carina running across pygidium in front 0.3, reaching lateral margins; curved forwards in the middle. Longitudinal carina not clear and incomplete, represented by three tubercle-like elevations, with two elongate in the middle area and one small near the middle point of hind

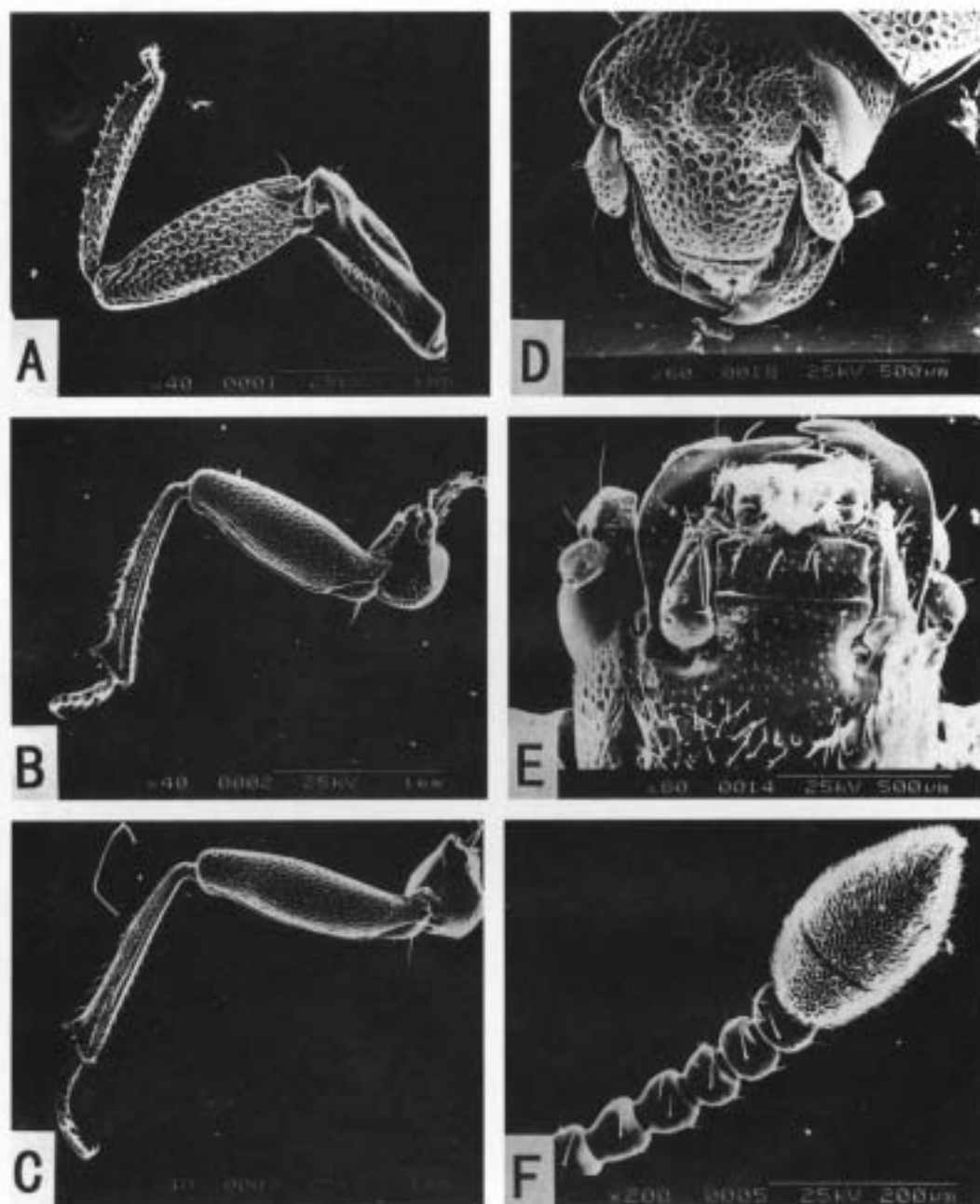


Fig. 2. *Onthophilus lijiangensis* Zhou and Luo, new species. A) Fore leg; B) middle leg; C) hind leg; D) head, E. head, ventral view; F) antenna.

margin. Punctuation patterns same as that of propygidium, but punctures slightly smaller and sparser. *Prosternum*: about as long as wide. Punctures round, deep, not in equal size; the bigger ones smaller than those on metasternum, but larger than those on prosternal lobe. Hind margin broadly and roundly emarginate. Prosternal lobe transverse, moderately and regularly punctured, with straight front and hind margin. *Mesosternum*: transverse, front margin lobed to fit prosternal emargination. Punctures of different size, with the large ones more or less in a row along hind margin. *Metasternum*: separated from mesosternum by clear meso-metasternal stria. Median longitudinal suture distinct, area along it depressed with large and confluent punctures. Punctures irregularly distributed, with large crateriform punctures closely distributed along lateral and hind margins and in the middle area; interstices with minute punctures. Feeble elevation located be-

tween meso- and metacoxa, where large crateriform punctures becoming fewer. *First abdominal sternum*: punctured irregularly, with large crateriform punctures behind the inside half of metacoxae and on the lateral 0.2. In the middle toward hind margin, punctures becoming small and sparse. *Protibia*: slender, punctured, with two rows of spicules; the ectal row thicker and more irregular in arrangement than the intal row. *Male*: body length 3.0 mm between anterior angles of pronotum and apices of elytra. Width 2.8 mm. Similar to the females, but relatively small in body size, Tibiae fuscous, not as black as in females. Metasternum surface strongly depressed.

Specimens Examined. Holotype Female. CHINA: Yunnan Province, Lijiang County, Mao-niu-ping (27°11'N, 100°16'E), 3,115 m, 3. Aug. 2000, Xiao-dong Yu.

Paratypes. 1 ♂ and 3 ♀♀, same locality as holotype, 1–3. Aug. 2000, Hong-zhang Zhou and Xiao-dong Yu.

Etymology. The specific epithet refers to the type locality, Lijiang.

Remarks. The beetles were collected from decayed large mushrooms in a coniferous forest.

7. *Onthophilus heilongjiangensis* Li 1993

Onthophilus heilongjiangensis Li 1993, in Li and Cheng 1993:115–116. (Heilongjiang); Mazur 1997:8 (catalogued).

Distribution. China (Heilongjiang).

Remarks. Li published this species in a book in Chinese (Li and Cheng 1993), based on a single female from Heilongjiang, a province of China, near the border with Russia. According to his description in Chinese, this species may be a synonym of *O. foveipennis* Lewis, which occurs in Russia (Amurskiy Kray) and north China. The type was not available for comparison. Thus, this species is not included in the key to species above.

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***EPITRAGOSOMA ARENARIA*, A New Genus and Species from Texas
(Coleoptera: Tenebrionidae)**

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Abstract

Epitragosoma arenaria **new genus** and **new species**, an unusual brachypterous beetle in the tribe Epitragini, is described. It is locally abundant in the Llano Estacado area of western Texas on stems of the dune-stabilizing grass, *Panicum havardii* Vasey.

Almost three decades ago both of us had collected numerous specimens of a peculiar small epitragine tenebrionid beetle on dune-stabilizing grasses in western Texas. In the summer of 1972 we were both visiting the National Museum of Natural History at the same time and discovered that we were working on the same species. Subsequent study has convinced us that the specimens in question represent an undescribed genus and species. Other priorities prevented a timely follow-up on this discovery. Since the species is locally common and is likely to be found by any collector in the area we felt that the time had come to publish our findings.

***Epitragosoma* Brown and Triplehorn, new genus**
Figs. 1–8

Description. Body (Fig. 1) elongate-elliptical, convex, clothed with short but conspicuous pubescence. *Head*: (Fig. 5) convex; epistoma with median lobe prolonged, moderately acute; lateral lobes obtusely rounded, not prominent. Ventral post-genal process prolonged, narrow, sharp and slightly everted. Eyes large, weakly convex and not protruding, coarsely faceted; supraorbital carina absent to extremely weak. Maxillary palpus with apical segment securiform. Antenna (Fig. 6) not reaching hind margin of pronotum when extended caudad, basal six segments cylindrical with third and fourth segments longest and subequal, width one-half length, segments 7–10 somewhat flattened, subequal in length but each slightly broader than preceding segment, each with a tomentose sensory area, eleventh segment two-thirds as broad as tenth, rounded apically with apical half occupied with a tomentose sensory area. *Pronotum*: convex, lateral margin rounded, lateral marginal head scarcely defined and not reaching posterior angle; lateral margin arcuate in dorsal view, widest at middle or at hind angles; apical and basal angles acute; apical margin broadly and shallowly concave; basal margin strongly bisinuate. *Elytra*: fused along suture, convex, broadly oval; pseudopleural crest faintly carinate from apex to humeri, interval narrow at apex, gradually widening towards humeri. *Metathoracic wings*: (Fig. 8) reduced and non-functional, venation vestigial. *Prosternal process*: (Fig. 4) horizontally produced behind coxae. *Mesosternum*: distinctly but not

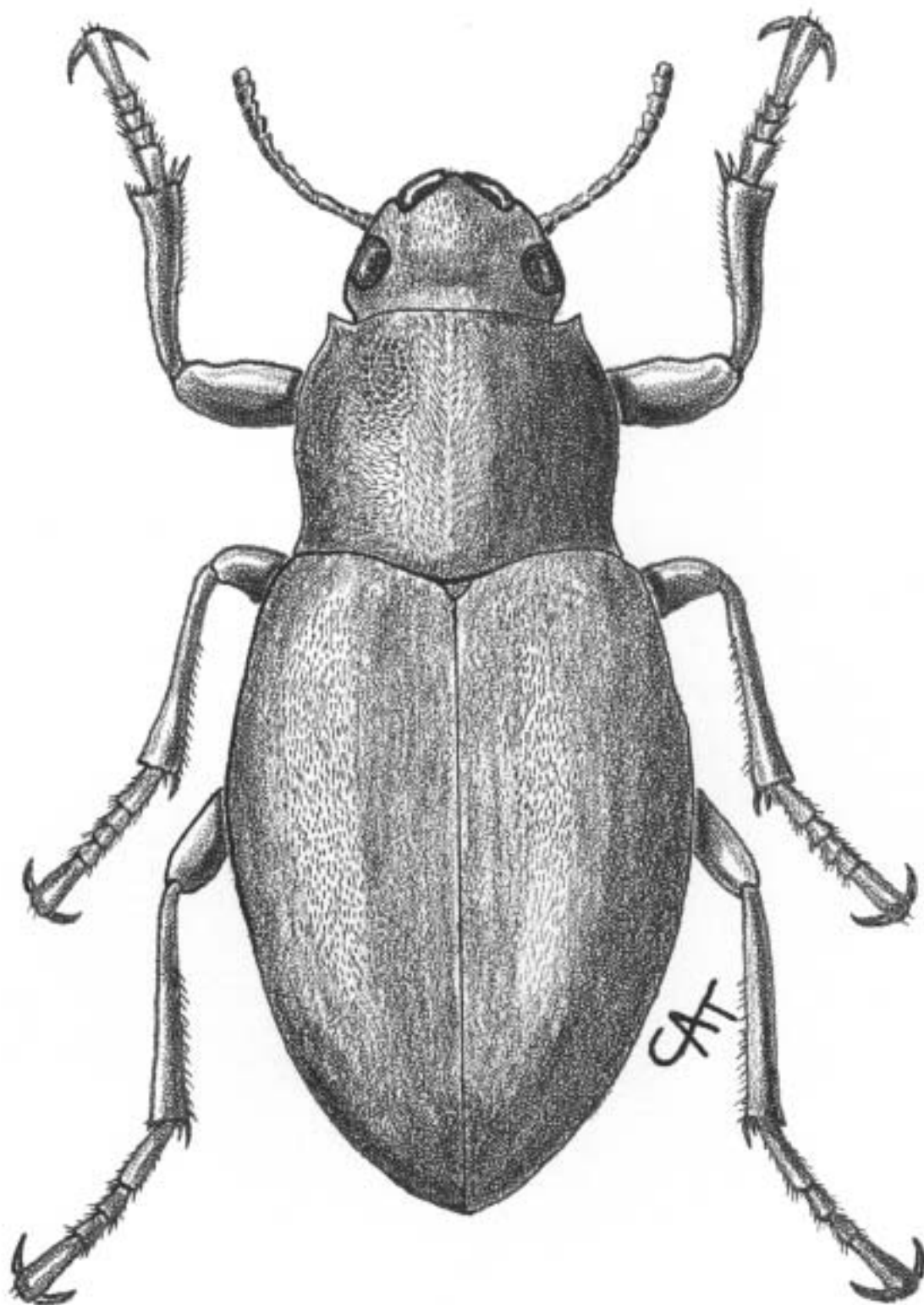
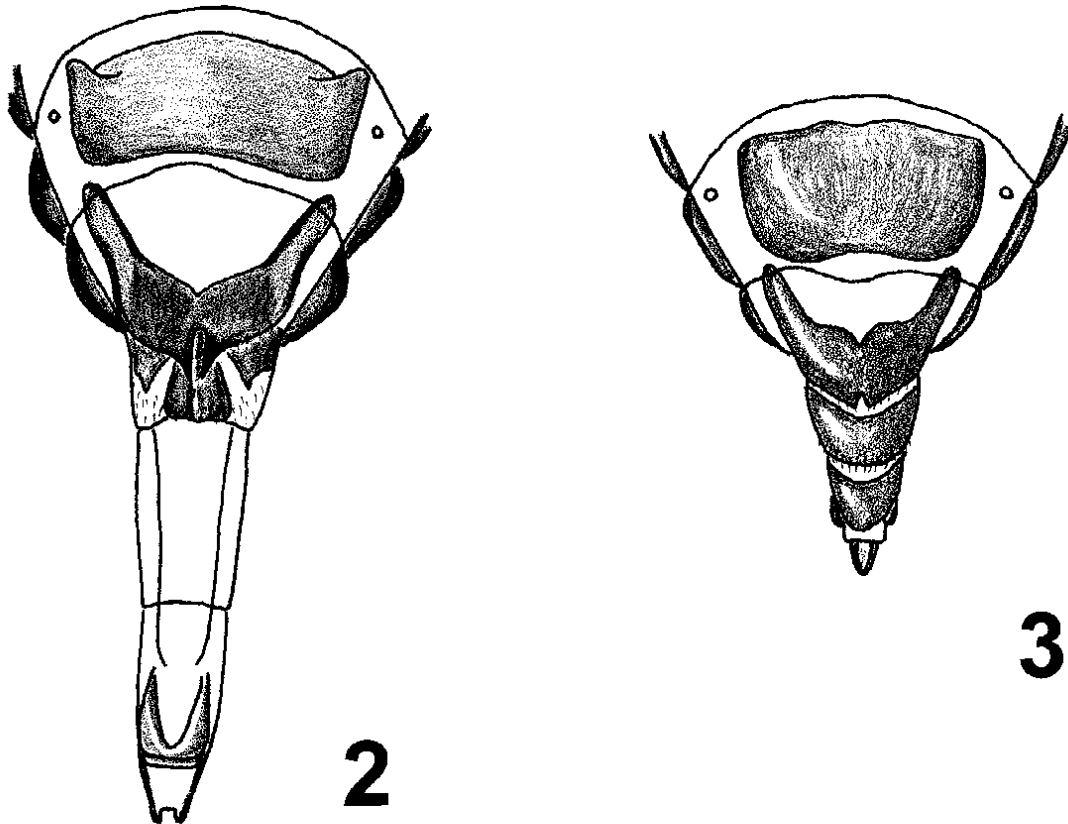


Fig. 1. *Epitragosoma arenaria* dorsal habitus, female.



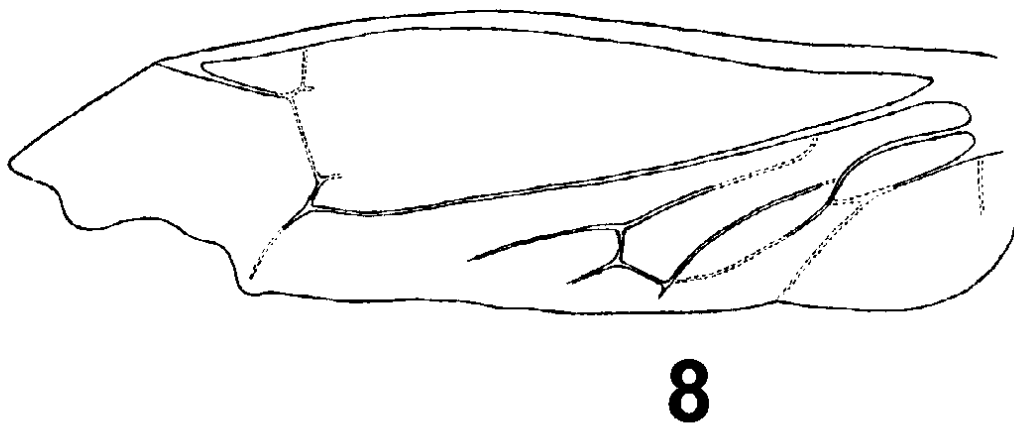
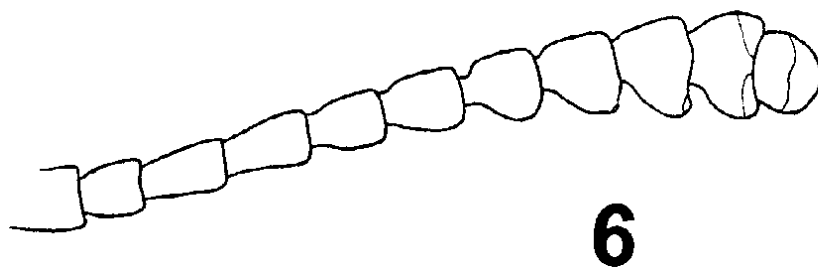
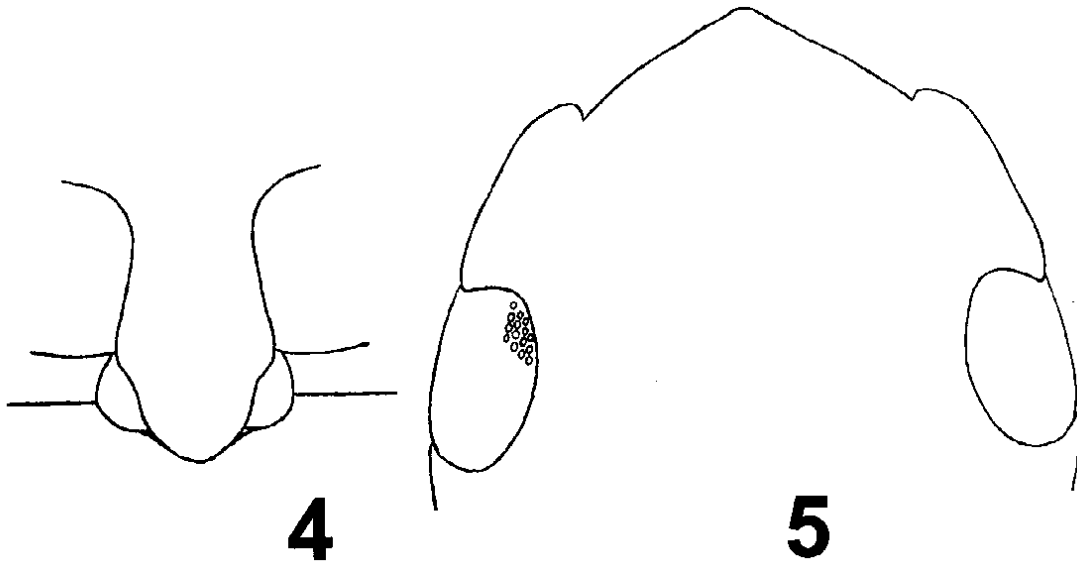
Figs. 2–3. *Epitragosoma arenaria*. 2) apical abdominal tergites, female; 3) apical abdominal tergites, male.

deeply excavate. *Metasternum*: short, strongly bifurcate posteriorly. *Legs*: stout; profemur weakly expanded apically and not acute; protarsus and mesotarsus with dense pads of golden setae on plantar surfaces of basal four segments, with occasional coarse, stout setae; metatarsus (Fig. 7) with pads more poorly developed and stout setae more prominent. *Abdominal tergum* 7 of female (Fig. 2) highly modified, sharply bifurcate with a deep central sinus; of male (Fig. 3) weakly bifurcate with a shallow V shaped sinus. *Abdominal tergum* 8 of female trapezoidal, wider apically; of male normal lunate in shape.

Etymology. The name of this genus refers to its resemblance to *Epitragopsis* Casey.

Type species. *Epitragosoma arenaria* Brown and Triplhorn, **new species**.

Comparison. This new genus resembles *Lobometopon* Casey and keys to that genus in Arnett 1960 (it is included in Arnett and Thomas 2001). It differs in the supraorbital carina usually totally absent, third antennal segment subequal to fourth (third much longer than fourth in *Lobometopon*), weak to absent lateral marginal ridge on pronotum almost never reaching posterior angles, and brachypterous wings with fused elytra and short metasternum. Only two other genera of Epitragini are brachypterous, *Conoecus* Horn and *Tydeolus* Champion. Both have the pronotum widest anterior to the midpoint. *Conoecus* has a deflexed prosternal process, convex rather than excavate mesosternum, and rounded posterior pronotal angles. *Tydeolus* known from one species in Mexico has a flattened rather than convex head. *Epitragosoma* superficially resembles *Epitragopsis* Casey which has a weak prosternal process, weakly excavated mesosternum, and more protruding eyes.



The structure of the seventh tergite (Figs. 2, 3) is a remarkable and previously overlooked character in Epitragini. It is sexually dimorphic in many genera and more highly modified in females than in males. The following discussion pertains to females. The seventh tergite in *Cyrtomius* Casey, *Bothrotes* Casey and most *Pechalius* Casey has an apical cavity with a central projection. In *Epitragosoma*, *Lobometopon*, *Pechalius dentiger* (Horn) and *Metopoloba* Casey the apical cavity lacks a central projection. In *Lobometopon*, and *Epitragosoma* the cavity is deep and located between two pronounced projections that in *Epitragosoma* are sharp and narrow. The seventh tergite is only weakly emarginate in *Schoenicus* LeConte and is unmodified in *Epitragodes* Casey.

Epitragosoma arenaria Brown and Triplehorn, new species

Figs. 1–8

Description. Female (Fig. 1). Moderately shining reddish-brown with an aeneous tinge, clothed with short, fine but conspicuous, appressed, grayish-silver pubescence. **Head:** (Fig. 5) slightly broader than long; temporal area scarcely swollen behind eyes, much less than one half the length of longitudinal diameter of eye; head surface coarsely and densely punctured, each puncture with a conspicuous appressed seta. **Pronotum:** slightly broader than long, about equally wide at middle and at hind angles; lateral margins distinctly sinuate in basal one third with basal angles notably everted and apical angles not to slightly everted; surface coarsely and densely punctured, each puncture with a prominent, appressed seta, setae of anterior portion of disc directed caudad, lateral setae directed mediad, forming a swirling dendritic effect over much of pronotum with a faint impunctate medial line. **Elytra:** surface finely and shallowly but densely punctured with a fine pattern of microreticulations between punctures; each puncture with a conspicuous, appressed seta directed caudad (setae somewhat shorter and finer than those of head and pronotum); faint dark subcutaneous longitudinal lines are visible but pattern of punctures is random. **Ventral surface:** of pronotum coarsely and rugosely punctured; punctures progressively less dense on prosternum and prosternal process, each puncture with an appressed seta similar to pronotum; metasternum with large, shallow, contiguous punctures; abdominal sterna finely and rugosely punctured, clothed with appressed setae that are similar in size but less conspicuous than those of elytra. **Legs:** densely punctured, each puncture bearing an appressed grayish-silver seta; femora smooth; tibiae rugose, bearing numerous ventral and latero-ventral stout orange spines especially towards apices; tarsi with dorsal and lateral surfaces similar to tibiae with coarse, stout setae confined to apices and ventro-apical surfaces of pre-apical segments except for metatarsus (Fig. 7) with a more general ventral distribution of stout setae; all apical tarsal segments with two regular ventral rows of stout setae. **Abdominal tergum:** 7 (Fig. 2) with two prolonged sharp projections; tergum 8 trapezoidal and with an apico-central uplifted spatulate structure. **Male:** Similar to female but slightly smaller and more slender. Abdominal tergum 7 weakly bifurcate; tergum 8 normal lunate (Fig. 3).

Etymology. The name of this species refers to its sand dune habitat.

Type locality. U.S.A., Texas, Ward County, Monahans Sand Hills State Park, 16 July 1972, C. A., W. E. and B. W. Triplehorn.

HOLOTYPE. Female. Length 9.6 mm, width 4.5 mm.

Allotype. Male, same data as Holotype. Length 9.3 mm, width 4.2 mm.

←

Figs. 4–8. *Epitragosoma arenaria*. 4) prosternal process, ventral view; 5) head, dorsal; 6) antenna; 7) metatarsus; 8) metathoracic wing.

Paratypes. All from same locality as Holotype: (110) same data as Holotype; (1) same collectors as Holotype except 8 July 1968; (23) same collectors as Holotype except 28 July 1973; (10) 12 Sept. 1970 A. S. Menke; (9) 3 Aug. 1963, J. G. and B. L. Rozen; (50) 31 Aug.–1 Sept. 1982, Rolf L. Aalbu; (32) 30 Sept. 1986, J. T. & E. A. Doyen; (1) 2 Aug. 1987 (night sweep), C. B. Barr; (1) 19 July 1977, A. V. Evans; (1) 13–14 Sept. 1959, E. R. Tinkham; (16) 21–22 Aug. 1982, R. Turnbow; (1) 6 July 1978, R. Turnbow; (6) 23 July 1976 (sweeping grass), G. H. Nelson; (10) 15–16 July 1975 (sweeping grass), G. H. Nelson; (12) 21 July 1972, Karl Stephan. *Measurements:* Length: 9.1–10.7 mm; width: 4.0–4.9 mm. Holotype, Allotype and Paratypes are deposited in the United States National Museum. Additional Paratypes are deposited in the Ohio State University Museum of Biological Diversity; Peabody Museum of Natural History, Yale University; Museum of Comparative Zoology, Harvard University; American Museum of Natural History; University of California, Berkeley and Davis; Texas Tech University, Lubbock, Texas; Florida A & M University, Tallahassee, Florida; Florida State Collection of Arthropods, Gainesville; California Academy of Sciences; British Museum (Natural History); Kirby W. Brown Collection, Paradise, California; G. H. Nelson Collection, Kansas City, Missouri; R. Turnbow Collection, Fort Rucker, Alabama; C. B. Barr Collection, Berkeley, California, and Rolf L. Aalbu Collection, Sacramento, California.

Other Specimens. TEXAS, Culberson County: (1) 5 miles east of Van Horn, 12 Sept. 1970, A. S. Menke. Reeves County: (4) Pecos, 23 Sept. 1938, D. J. and J. N. Knull. Winkler County: (91) 4 miles northeast of Kermit, 25 August 1971 (on tassels of tall grass), K. W. Brown, C. O'Brien and P. Petrulis; (25) 11 miles northeast of Kermit, 12 Sept. 1971 (on tassels of tall grass), K. W. Brown, (1) 10 miles northeast of Kermit on Hwy 115, 3,200', 12 Sept. 1971, K. W. Brown. NEW MEXICO, Chaves County: (10) Mescalero Sands, Caprock, 9 July 1954, Cazier and Gertsch; (3) Mescalero Sands, 45 miles east of Roswell, 12–13 Sept. 1959, E. R. Tinkham. Lea County: (8) 4 miles north of Maljamar, 1 Sept. 1962 (on *Helianthus*), H. V. Weems, Jr.

Habitat. Most of the large series taken by us in Ward and Winkler Counties, Texas, were found head down in the leaf axils of dune-stabilizing grasses. Specimens of this grass from Monahans were determined as *Panicum havardii* Vasey by Dr. David Keil. This is apparently a native grass in arroyos and sand hills of western Texas, southern New Mexico and northern Mexico (Hitchcock 1935). A few specimens were taken on the sand around clumps of grass and one was found on a sunflower head.

Comparison. Other than the superficial resemblance to *Epitragopsis* species discussed in the generic comparison, this species is most closely approached by *Lobometopon ovale* (Casey) found in eastern Texas (Triplehorn 1980). Besides characters already discussed at the generic level, *L. ovale* is less densely hirsute, posterior prothoracic angles not or only very weakly everted, and body slightly more robust. Furthermore *L. ovale* is associated with the dicotyledon plant *Eriogonum multiflorum* (Polygonaceae), while *E. arenaria* is associated with a monocotyledon grass (Graminae).

Variation. Three large series are on hand from rather close locations; (1) Monahans Sand Hills State Park, (2) 4 miles northeast of Kermit, and (3) 11 miles northeast of Kermit. Kermit is approximately 20 miles northwest of Monahans Sand Hills. When placed side by side, series of each population are recognizably distinct. Most notable are size differences (the Monahans specimens are larger than the Kermit specimens) but also there are subtle morpho-

logical differences. This is apparently a case of microgeographic variation similar to *Coelus ciliatus* (Doyen and Slobodchikoff 1984). Because of this variability we have restricted the type series to those specimens collected only at the type locality.

Sexual Dimorphism. Other than the structure of abdominal tergites 7 and 8, there appears to be little sexual dimorphism in this species. There is a weak tendency to a slightly smaller and narrower body in males.

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