

FIVE NEW SPECIES OF *MEIBOMEUS* BRIDWELL  
FROM THE NEW WORLD  
WITH HOST RECORDS FOR THEM AND SIX NAMED SPECIES  
(COLEOPTERA: BRUCHIDAE)

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**Abstract**

The five new species, *Meibomeus dirli*, *M. jacki*, *M. juarez*, *M. kirki*, and *M. rodneyi*, are described. The taxonomic relationships between the new species of *Meibomeus* Bridwell and named species are discussed. Valuable new taxonomic characters used are basal or apical metasternal spines in some species. Host plants are reported for the five new species and for the named species *Meibomeus apicicornis* (Pic), *M. howdeni* Kingsolver and Whitehead, *M. mitchelli* Kingsolver and Whitehead, *M. panamensis* Kingsolver and Whitehead, *M. ptinoides* (Sharp), and *M. surrubresus* (Pic). The hosts of all known species of *Meibomeus* are compiled. All hosts are in the Fabaceae, subfamily Papilionoideae. About 60% of the hosts are in the genus *Desmodium* Desv. Species in the genera *Desmodium*, *Aeschynomene* L., *Lespedeza* Michx., *Indigofera* L., and *Coursetia* DC. are reported to have their seeds fed upon by species of *Meibomeus*.

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Bridwell (1946) based his new genus *Meibomeus* upon *Bruchus musculus* (Say). Other named species that were phylogenetically *Meibomeus* were later placed in the genus by various authors (e.g., Kingsolver and Whitehead 1976). Bridwell used two characters to distinguish *Meibomeus musculus* from his other new genera *Merobruchus* Bridwell, *Mimosestes* Bridwell, and *Algarobius* Bridwell and from *Acanthoscelides* Schilsky: 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) wrote the only revision of the genus *Meibomeus* they hypothesized that the genus contained approximately 30 species, all but *Meibomeus musculus* were in the tropical regions of the New World. They also considered the characters used by Bridwell to define *Meibomeus* to be invalid and thus used several other characters to define *Meibomeus*. These characters were “among American genera of Bruchinae with the hind tibia strongly arcuate and the pronotum campaniform, *Meibomeus* alone has fine teeth of the hind femoral pecten slanted toward the apex of the femur.” They also stated that “only *Meibomeus* and *Caryedes* in this group of genera have the male genitalia elongate and with straplike lateral lobes.” They did

not point out that in bruchids the depth of the arcuation of the hind tibia is dependent upon how wide the hind femur is. They also listed several characters to distinguish *Meibomeus* from *Caryedes* Hummel and *Ctenocolum* Kingsolver and Whitehead and stated that in many species of *Meibomeus* elytral stria 4 is abbreviated basally and ends in a strong spine. In their revision they described or redescribed 15 species of *Meibomeus* principally from North and Central America, discussed their zoogeography, and compared their zoogeographical patterns with closely related genera. In addition, they conducted the first phylogenetic (cladistic) analysis of a genus of bruchids.

The objectives of this paper are to describe five new species of *Meibomeus* from Latin America. These species fit the definition of *Meibomeus* as given by Kingsolver and Whitehead (1976). All of the new species were reared from seeds. We also report new host records and new distributions for six named species of *Meibomeus* (Table 1).

### Materials and Methods

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

**Type depositories for new species of *Meibomeus*.** All specimens used here are the property of the Clarence Dan Johnson Collection that is now deposited in the Texas A&M University Insect Collection, Department of Entomology, College Station, Texas 77843, U.S.A. (CDJ). Paratypes were deposited in the above collection and in the J. Romero Collection whose address is listed at the beginning of this paper (JRN). The following paratype depositories are listed as abbreviations under the species concerned: Florida State Collections of Arthropods, Division of Plant Industry, P.O. Box 147100, Gainesville FL 32614-7100, USA (FDA); Arturo Terán, Fundación Miguel Lillo, Entomología, Miguel Lillo 251, (4000) San Miguel de Tucumán, Argentina (AT); and C.S. Ribeiro-Costa, Departamento de Zoologia, Universidade Federal do Paraná, Caixa Postal 19020, 81531-990 Curitiba, PR, Brazil (CIB).

### Taxonomy

#### *Meibomeus dirli* Romero and Johnson, new species

**Male.** Length (pronotum-elytra) 1.5–1.6 mm. Width 0.7–0.8 mm. Maximum thoracic depth 0.5–0.6 mm.

**Integument color.** Integument black, not metallic; antennal segments, front legs, two thirds of mesofemur, mesotibia, mesotarsus, and two thirds of metatarsus and tip yellowish; eyes shiny black.

**Vestiture.** Moderately dense, pronotum with mixed golden and whitish hairs, with more dense golden hairs surrounding dense patch of white hairs on median basal lobe; scutellum covered with dense white hairs; elytra with moderately dense mixed golden and white hairs; dense white hairs on small apical portion of mesepisternum and ocular sinus; pygidium with moderately dense, short white and golden hairs, but with dense basal band of white somewhat longer hairs.

**Structure.** Head. Frons with fine medial longitudinal carina; eyes about 2.5 times as long as width of frons, in some specimens facets coarse, about two to three rows of facets behind ocular sinus; interocular ratio about 0.75–0.80; antenna extended to 0.25 to 0.30 length of elytron, pedicel about 0.75 of scape length and about 0.83–0.95 as long as segment 3, segment 11 about 1.5 times 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;

**Table 1.** New host and locality records for named species of *Meibomeus*. All of the host plants are in the family Fabaceae, subfamily Papilionoideae.

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- Meibomeus apicicornis* (Pic): *Desmodium incanum* DC.: Panama. Canal Zone: 2 km S. Summit Gardens, III-28-80 (CDJ # 2179-80). Mexico. Quintana Roo: 34 km NW Felipe Carrillo Puerto, III-9-1980 (CDJ # 1804-80).
- M. howdeni* Kingsolver and Whitehead: *Indigofera platycarpa* Rose: Mexico. Michoacan: 31 km N. Playa Azul, XII-30-1979 (CDJ # 1233-79).
- M. mitchelli* Kingsolver and Whitehead: *Desmodium* sp.: Mexico. Oaxaca: 55 km SE Oaxaca, I-5-1979 (CDJ # 578-79).
- M. panamensis* Kingsolver and Whitehead: *Desmodium incanum*: Panama. Canal Zone: 2 km S. Summit Gardens, III-28-80 (CDJ # 2179-80). *Desmodium* sp.: Colombia: Valle del Cauca: 46 km N. Roldanillo, VIII-20-1983 (CDJ # 2582-83).
- M. ptnoides* (Sharp): *Coursetia caribaea* (Jacquin) Lavin var. *caribaea*: Mexico. Yucatan: 11 km SW Uman, I-1-1979 (CDJ # 498-79); Michoacan: 13 km W Playa Azul, XII-29-1979 (CDJ # 1187-79). *Coursetia caribaea* var. *trifoliolata* (Rydberg) Lavin: Mexico. Oaxaca: Tamazulapan, A. Delgado, Collector.
- M. surrubesus* (Pic): *Aeschynomene Americana* L.: Mexico. Campeche: 29 km N. Francisco Escarcega, III-3-1980 (CDJ # 1623-80); Michoacan: 13 km W Playa Azul, XII-29-1979 (CDJ # 1174-79). Honduras. Corte: 17 km S. San Pedro Sula, III-20-1980 (CDJ # 2025-80); Atlantida: 22 km SW LaCeiba, III-21-1980 (CDJ # 2071-80), 41 km ESE Tela, III-21-1980 (CDJ # 2068-80). Panama. Canal Zone: 1 km NE Gamboa, III-27-1980 (CDJ # 2133-80); Herrera: 7 km S Ocu, III-30-1980 (CDJ # 2216-80), 11 km E Las Minas, III-30-1980 (CDJ # 2226-80); Panama: 3 km W Chepo, IV-2-80 (CDJ # 2272-80). Colombia. Valle del Cauca: Bosque Choco, ca. 26 km NE Buenaventura, VIII-22-1983 (CDJ # 2607-83), ca. 30 km E Buenaventura, VIII-23-83 (CDJ # 2620-80), 5 km S Buga, VII-20-1982 (CDJ # 2507-82); Cundinamarca: Manta, 1700 m, X-20-1983 (CDJ # 3053-83). Venezuela. Tachira: 23 km N San Cristobal, IX-25-1983 (CDJ # 2901-83); Miranda: ca. 300', Sta. Teresa, I-16-85 (CDJ # 3634-85), Cua, II-6-1989 (CDJ # 4388-89). *Aeschynomene* sp.: Ecuador. El Oro: Portovelo, VIII-31-1983 (CDJ # 2683-83). Venezuela. Portuguesa: ca. 400', 4 km S Turen, I-22-1985 (CDJ # 3749-85); Lara: ca. 900', 30 km S Barquisimeto, I-22-1985 (CDJ # 3735-85); Monagas: 7 km SE San Antonio de Maturin, III-9-1989 (CDJ # 4683-89). Colombia. Cundinamarca: 2500', 25 km NE Tocaima, VIII-16-1984 (CDJ # 3484-84). *Desmodium tortuosum* (Sw.) DC.: Mexico. Oaxaca: 28 km N Pochutla, I-4-1980 (CDJ # 1355-80). *Rhynchosia calycosa* Hemsl.: Panama. Canal Zone: Pipeline Road, 2 km NE Gamboa, III-27-1980 (CDJ # 2136-80).
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lateral prothoracic carina vague, extending from base to about 0.3 distance to coxal cavity; prosternum separating procoxae for about 0.6 their length; short median basal line on median basal lobe often obscured by dense white hairs; a deep, broad, gentle, diagonal sulcus on either side of midline near base.

**Mesothorax and Metathorax.** Scutellum quadrate, bifurcate at apex; elytron without distinct basal gibbosity; stria 4 only slightly abbreviated basally by a smooth area, not ended by strong tooth, striae 3 and 5 slightly less abbreviated by smooth area; other striae subequal at base; elytron about twice as long as broad; striae deep, punctate; stria intervals punctulate; metasternum deep, rounded in profile; metasternum separated medially at apex by vague, short sulcus, without two strong spines projecting ventrally on either side of sulcus near apex; hind femur constricted basally and apically, expanded medially to slightly more than width of coxa (Fig. 1); inner ventral surface without longitudinal carina; lateral margin of femur in a long gentle curve to apex; lateral margin without minute spines from near base to a single spine about 0.60 from base, spine about 0.5 as long as width of tibial base; inner margin with 3 subapical acuminate spines beginning about 0.3 from apex; each spine about 0.6 as long as width of tibial base; tibia with ventral, lateroventral, lateral and dorsomesal glabrous carinae; dorsal surface of tibia rugulose, without fossa; tibial corona with one vague lateral spinule, mucro small,

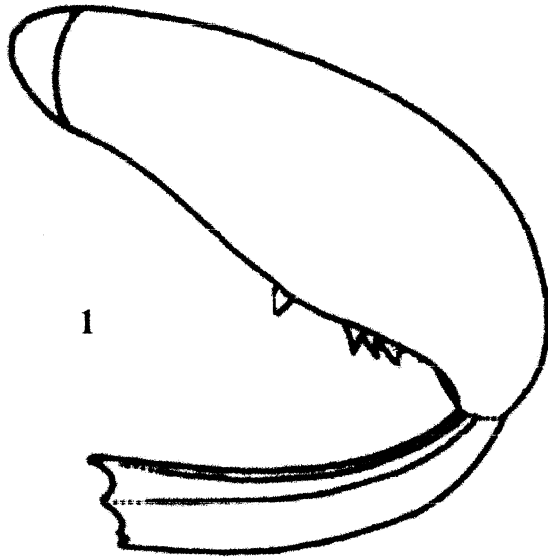


Fig. 1. *Meibomeus dirli*, hind leg.

about 0.1 as long as first tarsomere; tarsomere 1 with vague ventral, lateral and mesal longitudinal carinae.

**Abdomen.** First abdominal sternum with polished lateral apical band, sternum flattened medially; sterna 2–4 unmodified, fifth sternum elongate, 3.0 times as long as fourth, gently curved at apex, not emarginate, apex produced ventrally. Pygidium with many fine punctations, narrow, apex narrow, curved ventrad at apex.

**Genitalia.** Median lobe very thin, elongate, apex broad, about 2 times wider than remainder of median lobe; ventral valve broadly Y-shaped, apex bent ventrally, emarginate at apex; dorsal valve less sclerotized, blunt apically; apical one-half of internal sac lined with fine spicules (Fig. 2). Lateral lobes elongate, cleft to one-fifth their length, apex of lobes more strongly sclerotized, with strong setae at apex of lobes, apices strongly bent ventrad (Fig. 3).

**Female.** Length (pronotum-elytra) 1.5–1.6 mm. Width 0.7–0.8 mm. Maximum thoracic depth 0.5–0.6 mm.

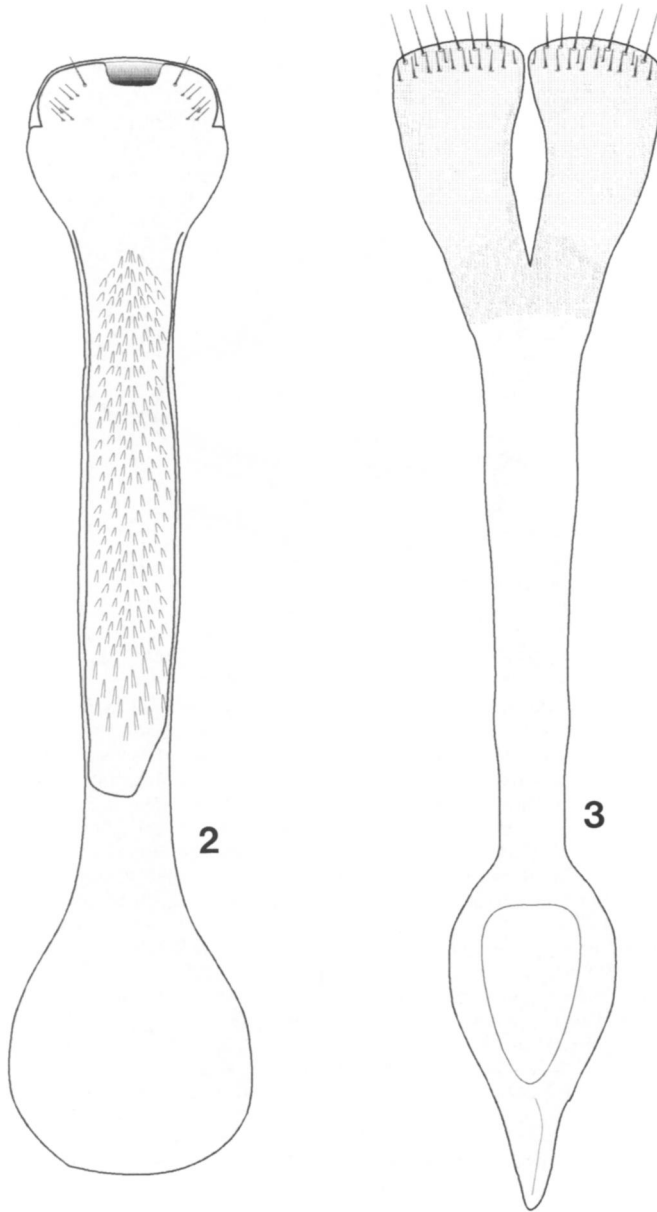
Similar to male except antenna with segments 6–10 dark brown; antenna extended to about 0.25 length of elytron; lateral margin of femur in a long gentle curve to apex, with a single spine about 0.60 from base, spine about 0.3 as long as width of tibial base; inner margin with 3–4 subapical acuminate spines beginning about 0.3 from apex; fifth abdominal sternum small, about 2.0 as long as fourth, apex not produced ventrally.

**Host Plants.** *Desmodium cajanifolium* (Kunth) DC.: Panama: Canal Zone: Pipeline Road, 2 km NE Gamboa, 27-III-80, C.D. Johnson collector (CDJ #2137-80).

**Type Series.** Holotype male, allotype female and paratypes: Panama: Canal Zone: Pipeline Road, 2 km NE Gamboa, 27-III-80, reared seeds no. 2137–80, 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. Paratypes deposited in the CDJ, JRN, AT, CIB, and FDA collections.

**Distribution.** Panama (Canal Zone).

**Discussion.** *Meibomeus dirli* is very similar to *M. campbelli* Kingsolver and



**Figs. 2–3.** *Meibomeus dirli* male genitalia. 2) Median lobe; 3) lateral lobes.

Whitehead in its structures and keys to that species in Kingsolver and Whitehead (1976). *Meibomeus campbelli* has apical spines at the apex of the metasternum that *M. dirli* lacks. *M. campbelli* has minute spines from near the base on the lateral margin of the hind femur that *M. dirli* lacks (Fig. 1). The inner margin of the hind femur has three subapical acuminate spines of *M. dirli* but the femur of *M. campbelli* has four. The very complex apex of the median lobe of *M. campbelli* is very similar to the male genitalia of this species but the median lobe of *M. dirli* is more narrow. See the discussion of *M. rodneyi* for more information on this group of species.

**Etymology.** This species is named in honor of Dirl Lee Johnson, father of the second author.

*Meibomeus jacki* Romero and Johnson, **new species**

**Male.** Length (pronotum-elytra) 1.6 mm. Width 0.7 mm. Maximum thoracic depth 0.6 mm.

**Integument color.** Integument not metallic, all black except basal 4 antennal segments, front legs, apical 0.5 of mesofemur and remainder of mesoleg yellowish; eyes shiny black.

**Vestiture.** Moderately dense elongate white hairs over head, body, and appendages in no apparent pattern; with postocular patch of short, dense white hairs; patch of short white hairs surrounding median basal lobe of pronotum; scutellum covered with dense white hairs; short, dense white hairs on undersurfaces of thorax and ocular sinus.

**Structure.** Head. Frons with strong medial longitudinal carina extending through frons almost to base of head; eyes about 10 times as long as width of frons, facets coarse, two rows of facets behind ocular sinus; interocular ratio about 0.70; antenna extended to about 0.40 length of elytron, pedicel about 0.75 of scape length and about 0.95 as long as segment 3; segments 5–10 eccentric; 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 extending from base to about 0.6 distance to coxal cavity; short median basal line on median basal lobe obscured by dense white hairs; without deep, broad, gentle, diagonal sulcus on either side of midline near base.

**Mesothorax and Metathorax.** Scutellum quadrate, bifurcate at apex; elytron without distinct basal gibbosity; stria 4 slightly abbreviated basally by a rugulose area, not ended by strong tooth, striae 3 and 5 slightly less abbreviated by rugulose area; base of striae 6 extended to base of elytron by large sulcus medial to humerus; humerus shiny black; other striae subequal at base; elytron about twice as long as broad; striae very wide and deep with large punctations; striae intervals narrow, punctulate; metasternum deep, rounded in profile; metasternum separated medially at apex by vague, short sulcus, without two strong spines projecting ventrally on either side of sulcus near apex; hind femur constricted basally and apically, expanded medially to about width of coxa (Fig. 4); inner ventral surface with vague longitudinal carina; lateral margin of femur in a long gentle curve to apex; lateral margin without minute or large spines; inner margin with 5 subapical acuminate spines beginning about 0.3 from apex, larger spine about as long as width of tibial base followed by 4 spines about 0.5 as long as width of tibial base; tibia with ventral, lateroventral, lateral and dorsomesal glabrous carinae; dorsal surface of tibia with many small spines from base to apex, without fossa; tibial corona with one vague lateral spinule, small dorsal spine, mucro small, about 0.1 as long as first tarsomere; tarsomere 1 with vague ventral, lateral and mesal longitudinal carinae.

**Abdomen.** First abdominal sternum without polished lateral apical band, sternum flattened medially, 0.75 length of abdomen; sterna 2–5 unmodified, fifth sternum gently curved at apex, not emarginate, apex produced ventrally. Pygidium with many fine punctations, narrow, apex narrow, curved ventrad at apex.

**Genitalia.** Median lobe long, slightly constricted on lateral margins near apex, lateral

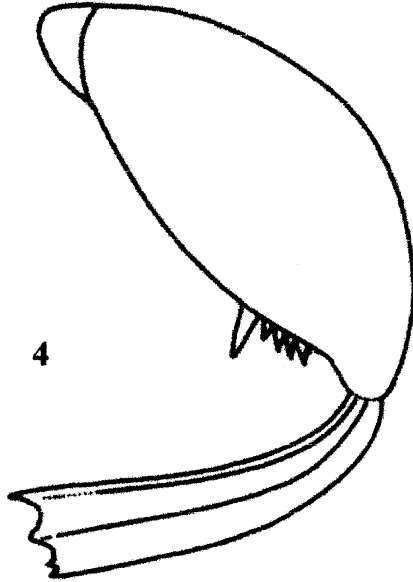


Fig. 4. *Meibomeus jacki*, hind leg.

margins sclerotized, especially near apex; in ventral view ventral valve about 0.8 as wide as apex of median lobe, lateral margins slightly concave, acuminate at apex, in lateral view, apex bent ventrally; dorsal valve membranous, apex sclerotized, blunt to slightly rounded apically; armature of internal sac simple: two small serrate spines medially to basally, one elongate spicule at base (Fig. 5). Lateral lobes elongate, enlarged and scarcely cleft at apex, with strong setae at apex of lobes (Fig. 6).

**Female.** Length (pronotum-elytra) 1.5–1.8 mm. Width 0.8–1.0 mm. Maximum thoracic depth 0.6–0.8 mm.

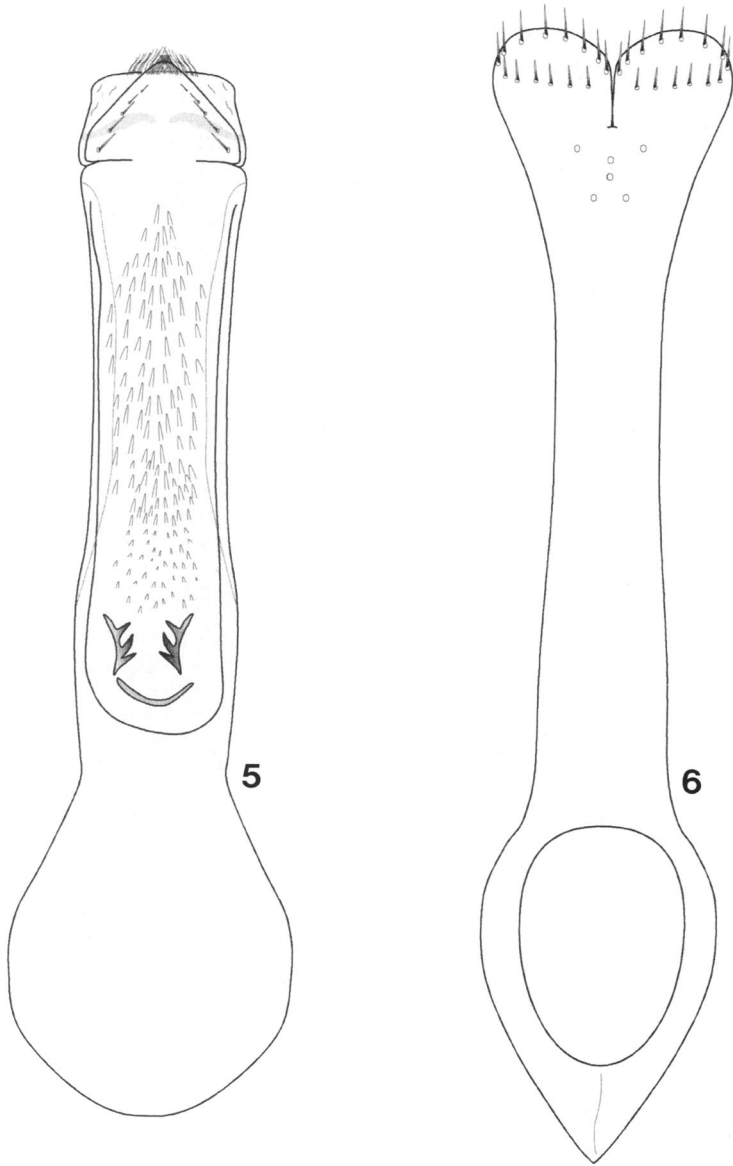
Similar to male except covered with moderately dense, short white hairs; length of eye about 2 times width of frons; antenna extended to about 0.25 length of elytron; base of striae 6 not extended to base of elytron by large sulcus medial to humerus; striae narrow, shallow, without large punctations; some may have a slight sulcus medial to humerus; prosternum separating procoxae for about 0.8 their length; dorsal surface of hind tibia rugulose, without spines; first abdominal sternum with polished lateral apical band, sternum flattened medially; sterna 2–4 unmodified, fifth sternum elongate, 3.0 times as long as fourth, gently curved at apex, not emarginate, apex not produced ventrally. Pygidium with many fine punctations, moderate in width, apex narrow, not curved ventrad at apex.

**Host Plants.** *Zornia marajoara* Huber: Venezuela: Bolivar: 700', Guasipati, 13-II-85, C.D. Johnson collector (CDJ #3996–85).

**Type Series.** Holotype male, allotype female and 5 paratypes: Venezuela: Bolivar: 700', Guasipati, 13-II-85, C.D. Johnson collector (CDJ #3996–85). One paratype: Mexico: Oaxaca: 18 mi. SE. Tlacolula 6,500', Aug. 12, 1974, C. W. & L. B. O'Brien & Marshall. Holotype and allotype deposited in the U.S. National Museum of Natural History, Washington, D.C., U.S.A. Paratypes deposited in the CDJ and JRN collections.

**Distribution.** Venezuela (Bolivar).

**Discussion.** *Meibomeus jacki* keys to near *M. panamensis* Kingsolver and



**Figs. 5–6.** *Meibomeus jacki* male genitalia. **5)** Median lobe; **6)** lateral lobes.

Whitehead in Kingsolver and Whitehead (1976) and the hind femur is almost identical to *M. apicicornis* (Pic). But the large sulcus at the base of stria 6 medial to the elytral humerus of males and the simple male genitalia (Figs. 5, 6) serve to distinguish this distinct species from other *Meibomeus*. There are many other structures that separate this species from other *Meibomeus*. Some



of these characters are the frons with a strong medial longitudinal carina extending through the frons almost to the base of the head and the eyes about 10 times as long as the width of the frons. Elytral stria 4 is slightly abbreviated basally by a rugulose area, not ended by a strong tooth, and striae 3 and 5 slightly less abbreviated by a rugulose area. The lateral margin of the hind femur without minute or large spines; inner margin with two small spines, one about 0.3 from base and the other about 0.6 from base (Fig. 4) and with four subapical acuminate spines beginning about 0.3 from apex of femur, the larger spine about as long as the width of the base of the tibia followed by three spines about 0.5 as long as the width of the tibial base.

**Etymology.** This species is named for John Daniel (Jack) Johnson, son of the second author, for his assistance in the field while collecting bruchids and plants.

*Meibomeus juarez* Romero and Johnson, **new species**

**Male.** Length (pronotum-elytra) 2.1–2.5 mm. Width 1.2–1.5 mm. Maximum thoracic depth 1.0–1.3 mm.

**Integument Color.** Integument black, not metallic; some specimens with first three or four antennal segments dark brown; eyes dark red to shiny black.

**Vestiture.** Moderately dense, grayish, not variegated; dense white hairs on scutellum, small apical portion of mesepisternum, and ocular sinus.

**Structure.** Head. Frons with fine medial longitudinal carina; eyes not sexually dimorphic, in some specimens facets coarse, about 5 rows of facets behind ocular sinus; interocular ratio about 0.15–0.31; antenna extended to about 0.8 length of elytron, pedicel about 0.25–0.75 of scape length and about 0.4–0.6 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 0.6 distance to pronotal midline; lateral prothoracic carina vague, extending from base to about 0.3 distance to coxal cavity; prosternum separating procoxae for about 0.5 their length; short median basal line on median basal lobe often obscured by hairs.

**Mesothorax and Metathorax.** Scutellum small, quadrate, bifurcate at apex; stria subequal at base, sometimes slightly abbreviated at base; elytron about twice as long as broad; striae deep, punctate; stria intervals punctulate; metasternum deep, rounded in profile; metasternum with 2 strong medial spines at base on either side of midline projecting ventrally, spines of metasternum followed by a narrow, elongate sulcus; hind femur constricted basally and apically, expanded medially to slightly more than width of coxa (Fig. 7); inner ventral surface without longitudinal carina; lateral margin of femur in a long gentle curve to apex; inner margin armed with 4–5 small, subapical acuminate spines each about 0.3 as long as width of tibial base; tibia with ventral, lateroventral, lateral and dorsomesal glabrous carinae; dorsal surface of tibia without fossa; tibial corona with one vague lateral spinule, mucro small, about 0.1 as long as first tarsomere; tarsomere 1 with distinct ventral, lateral and mesal longitudinal carinae.

**Abdomen.** First abdominal sternum without polished lateral apical band; sterna 2–4 unmodified, fifth sternum elongate, 3.6–5.5 as long as fourth, gently curved at apex, not emarginate, apex produced ventrally. Pygidium with many fine punctations, wide, apex gently curved ventrad.

**Genitalia.** Median lobe slightly constricted on lateral margins; ventral valve acuminate apically but modified laterally with elongate projections, each projecting well beyond apex of ventral valve, distance between lateral margins of projections 3.5 times as wide as most narrow portion of median lobe, each projection with small area laterally with fine setae (Fig. 8); dorsal valve rounded apically; armature of internal sac with triangular, medial sclerite near apex flanked by two large curved sclerites, internal sac lined on medial third with minute flattened spines, basal third lined with fine denticles (Fig. 8).

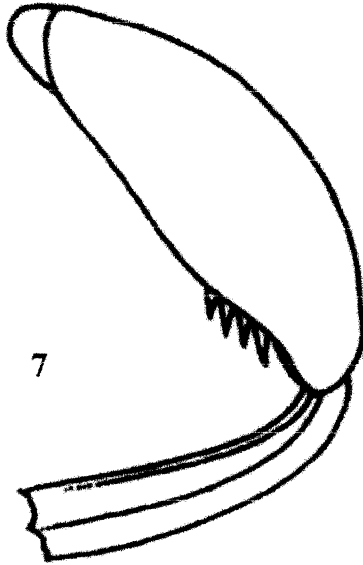


Fig. 7. *Meibomeus juarez* hind leg.

Lateral lobes cleft to 0.4 their length, each lobe curved and with medial spine about 0.2 from apex to give appearance of large, curved forceps (Fig. 9).

**Female.** Length (pronotum-elytra) 2.2–2.5 mm. Width 1.2–1.5 mm. Maximum thoracic depth 1.1–1.2 mm.

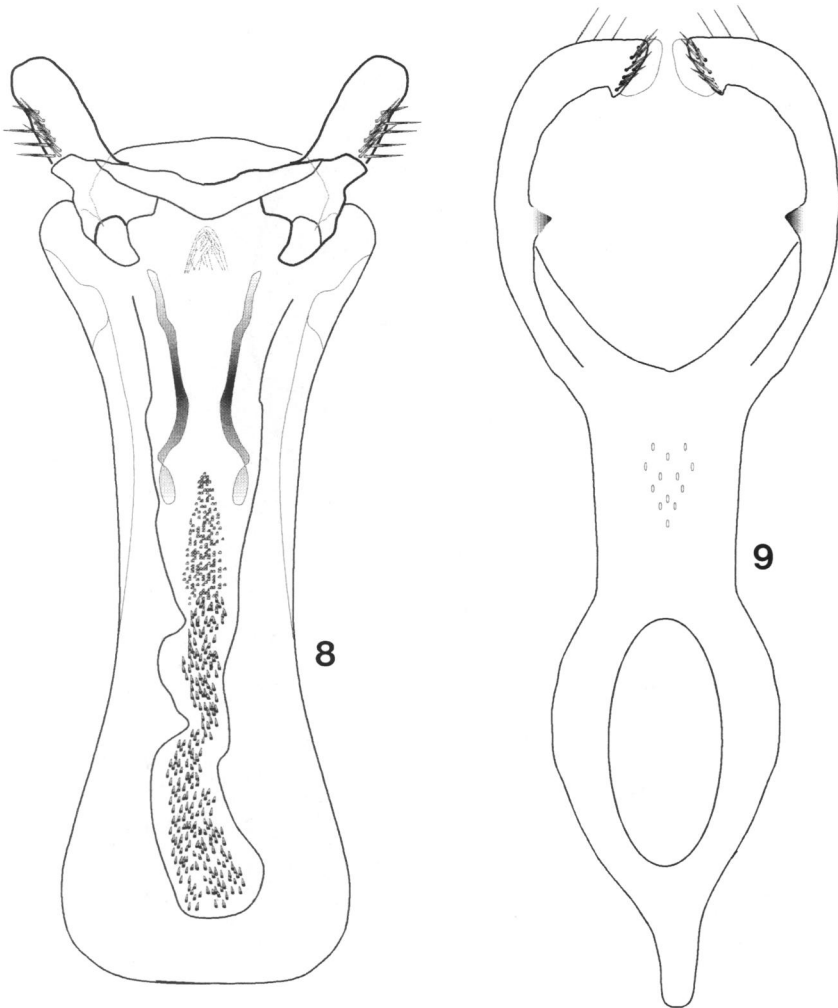
Similar to male except interocular ratio about 0.23–0.42, metasternum without two strong spines basally; hind femur with 4 to 5 strong subapical spines on medial margin; fifth sternum smaller 2.5–2.7 as long as fourth, pygidium less rounded apically.

**Host Plants.** *Indigofera thibaudiana* DC.: México. Oaxaca: 28 km N Pochutla, 1-4-80, C.D. Johnson collector (CDJ #1350-80).

**Type Series.** Holotype male, allotype female and paratypes: México. Oaxaca: 28 km N Pochutla, 1-4-80, C.D. Johnson collector. Holotype and allotype deposited in the U.S. National Museum of Natural History, Washington, D.C., U.S.A. Paratypes deposited in the CDJ, JRN, AT, CIB and FDA collections.

**Distribution.** México (Oaxaca).

**Discussion.** This is the only species of Bruchidae that we know in which males (or females) have two strong spines on the basal portion of the metasternum. The male genitalia are very different from other species of *Meibomeus* (Figs. 8, 9). The basal metasternal spines and structure of the male genitalia are differentiating external and internal features of this species and leave no doubt that this is a distinct species. *Meibomeus juarez* shares the pecten without a large tooth and with four to five small teeth on the hind femur (Fig. 7) with *M. serraticulus* (Sharp) and *M. viduus* (Sharp). The integument color is similar to *M. hidalgoi* Kingsolver and Whitehead, but *M. juarez* differs because its first abdominal sternum does not have a polished lateral apical band. *M. juarez* has a robust body shape as does the holotype of *M. howdeni* Kingsolver and Whitehead but the latter does not have basal metasternal spines.



Figs. 8–9. *Meibomeus juarez* male genitalia. 8) Median lobe; 9) lateral lobes.

**Etymology.** This species is named for our friend Betty Juarez. The specific epithet is a noun in apposition to *Meibomeus*.

*Meibomeus kirki* Romero and Johnson, **new species**

**Male.** Length (pronotum-elytra) 1.6–1.7 mm. Width 1.0 mm. Maximum thoracic depth 0.8–0.9 mm.

**Integument Color.** Body black, not metallic, appendages black, except first 2 antennal segments and apices of pro- and mesothorax tibiae, and femora light brown; eyes golden.

**Vestiture.** With recumbent, moderately dense to sparse white to intermixed white and golden hairs as follows: eye with vague medial fringe of white hairs; ocular sinus with

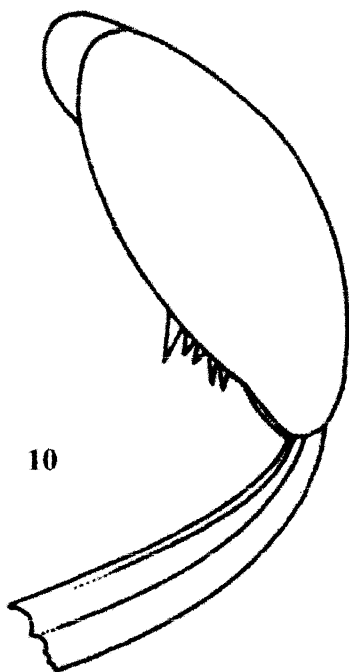


Fig. 10. *Meibomeus kirki*, hind leg.

dense white or golden hairs; postocular lobe with short white hairs; postocular patch of sparse to dense white hairs; pronotum with sparse white to intermixed white and golden hairs, median basal lobe covered with dense white hairs; elytron and pygidium with sparse intermixed white and golden hairs in no apparent pattern; undersurfaces and legs with sparse white hairs.

**Structure.** Head. Frons with medial longitudinal carina; eyes not sexually dimorphic, about 5 rows of facets behind ocular sinus; interocular ratio 0.5; antenna extended to about 0.4 length of elytron, pedicel about 0.7 of scape length and about 0.7 as long as segment 3, 5–10 eccentric, 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 0.6 distance to pronotal midline; lateral prothoracic carina vague, extending from base to about 0.3 distance to coxal cavity; prosternum separating procoxae for about 0.8 their length; short median basal line on median basal lobe usually not obscured by white hairs.

**Mesothorax and Metathorax.** Scutellum small, quadrate, bifurcate at apex; elytron with broad, flat, smooth basal area ending in a short spine at base of an abbreviated stria 4, flat, basal area also slightly abbreviating striae 3 and 5 at base, small spines at bases of striae 3 and 5; elytron about twice as long as broad; striae deep, punctate; stria intervals punctulate; metasternum not deep nor rounded in profile; metasternum without 2 strong medial spines projecting ventrally at apex on either side of midline, but with a narrow, elongate medial sulcus separating metasternum; hind femur constricted basally and apically, expanded medially to slightly more than width of coxa (Fig. 10); outer ventral surface with vague longitudinal carina without spines or spinules, inner surface usually without carina; femur armed on inner margin near apex with one large acuminate spine about as long as width of tibial base followed by 4 small, subapical acuminate

spines each about 0.4 as long as first spine (Fig. 10); tibia with ventral, lateroventral, lateral and dorsomesal glabrous carinae; dorsal surface of tibia without fossa but sometimes rugulose; tibial corona with one vague dorsal spinule, mucro short, about 0.1 as long as first tarsomere; tarsomere 1 with vague ventral, lateral and mesal glabrous longitudinal carinae.

**Abdomen.** First abdominal sternum with small line of white hairs basomedially, with polished lateral apical band; sterna 2–4 unmodified, fifth sternum about 1.3 times as long as fourth, emarginate at apex, apex not produced ventrally. Pygidium with many fine punctations, apex gently curved ventrad, convex in lateral view.

**Genitalia.** Median lobe elongate, slightly constricted on lateral margins near apex, lateral margins heavily sclerotized, especially near apex; in ventral view ventral valve about 0.8 as wide as apex of median lobe; dorsal valve not sclerotized, rounded apically; armature of internal sac with two elongate lateral masses near apex, middle usually with spine with large round base that varies to triangular, 3 to 4 large, forked spines clumped near base, internal sac lined with many fine spines (Fig. 11). Lateral lobes elongate, cleft to 0.1 their length, apical portion of each lobe enlarged, covered with many fine setae (Fig. 12).

**Female.** Length (pronotum-elytra) 1.6–1.8 mm. Width 0.7–1.0 mm. Maximum thoracic depth 0.6–0.8 mm.

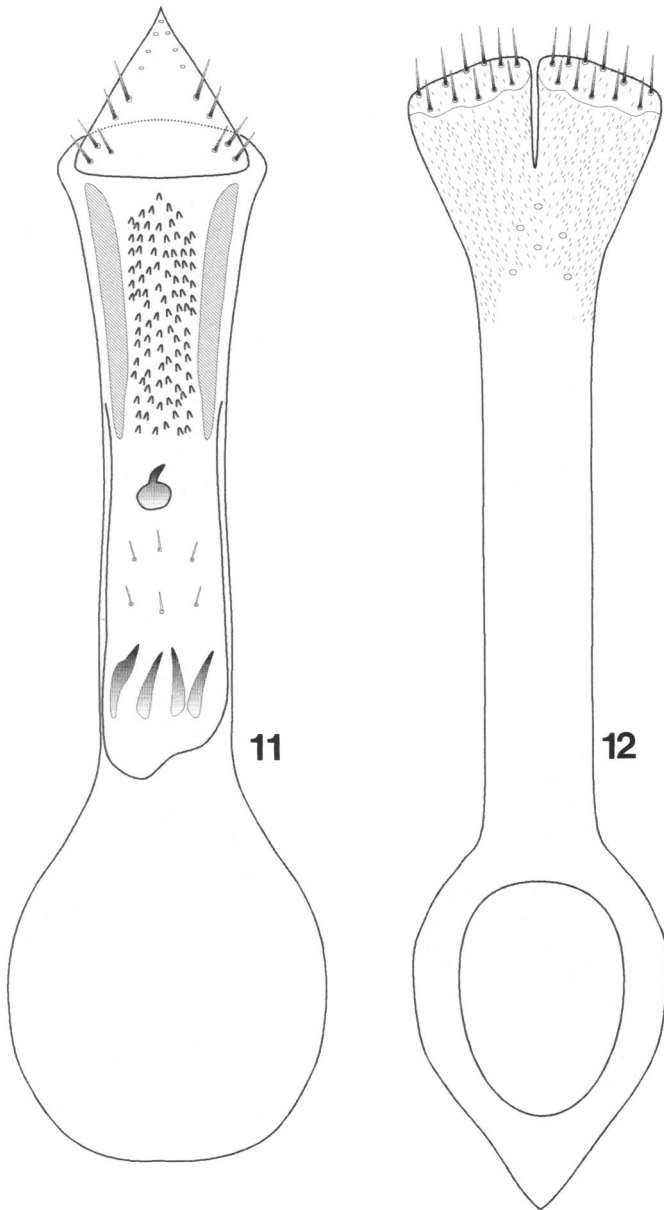
Similar to male except antenna reaching only to 0.2 length of elytron; basal gibbosity of elytron abbreviating striae 3–6; sternum 5 about 2 times longer than fourth, not emarginate at apex.

**Host Plants.** *Aeschynomene paniculata* Willd. ex Vogel: Venezuela: Anzoategui: 10 km N Soledad, X-9-83, C.D. Johnson collector (CDJ #3035-83). Monagas: 6 km S Chaguaramas, VIII-3-84 (CDJ #3439-84). *Zornia marajoara* Huber: Venezuela: Monagas: 16 km S Mata Negro, X-7-83, C.D. Johnson collector (CDJ #3016-83).

**Type Series.** Holotype male: Monagas: 6 km S Chaguaramas, VIII-3-84 (CDJ #3439-84). Allotype female and one paratype: Venezuela: Anzoategui: 10 km N Soledad, X-9-83, C.D. Johnson collector (CDJ #3035-83). Four paratypes: Venezuela: Monagas: 16 km S Mata Negro, X-7-83, C.D. Johnson collector (CDJ #3016-83). Holotype and allotype deposited in the U.S. National Museum of Natural History, Washington, D.C., U.S.A. Paratypes deposited in the CDJ and JRN collection.

**Distribution.** Venezuela (Anzoategui, Monagas).

**Discussion.** *M. kirki* is very near *M. surrubresus* (Pic) in external structure and keys to *M. surrubresus*. The male genitalia are also similar to *M. surrubresus*. The spines of the internal sac are distinct from *M. surrubresus* in that the internal sac has a triangular spine about 0.3 from the apex, three to four large, forked spines clumped near the middle, the internal sac is lined with many fine spines, and, especially, there are larger, more heavily sclerotized spinules lining the base of the internal sac (Fig. 11). The apex of the median lobe of *M. kirki* is more broad and less pointed than *M. surrubresus* and the forked spines medially in the internal sac of *M. kirki* are less sclerotized than the 3 to 4 large, dark spicules in *M. surrubresus*. *Meibomeus kirki* is also similar to *M. hidalgoi* but *M. hidalgoi* is more robust, has a hind femur with large tooth and 3 spines, as opposed to four spines in *M. kirki* (Fig. 10) and *M. kirki* has an abbreviated 4th stria with tooth at base which *M. hidalgoi* does not possess. To our knowledge, a species of *Zornia* has never been reported as a host for bruchids so *Z. marajoara* is a unique host. These two reports of *M. jacki* and *M. kirki* feeding in the seeds of this species should be verification that the hosts are valid. The two species are distantly related, however, so we believe these host records should be verified.



**Figs. 11–12.** *Meibomeus kirki* male genitalia. 11) Median lobe; 12) lateral lobes.

**Etymology.** This species is named in honor of the second author's son Kirk Donald Johnson for his assistance in collecting bruchids and plants.

*Meibomeus rodneyi* Romero and Johnson, **new species**

**Male.** Length (pronotum-elytra) 1.8–2.0 mm. Width 1.1–1.2 mm. Maximum thoracic depth 0.9–1.0 mm.

**Integument Color.** Integument black, not metallic; antennal segments, front legs, 0.66 of mesofemur, mesotibia, mesotarsus, and 0.66 of metatarsus and tip yellowish; eyes dark red to shiny black.

**Vestiture.** Sparse, pronotum with mixed golden and whitish hairs, with more dense golden hairs surrounding dense patch of white hairs on median basal lobe; scutellum white; elytra with sparse mixed golden and white hairs; dense white hairs on small apical portion of mesepisternum and ocular sinus; pygidium with sparse, short white and golden hairs, but with dense basal band of white somewhat longer hairs.

**Structure.** Head. Frons with fine medial longitudinal carina; eyes about twice as long as width of frons, not sexually dimorphic, in some specimens facets coarse, about 2 to 3 rows of facets behind ocular sinus; interocular ratio about 0.28–0.40; antenna extended to about 0.90–0.98 length of elytron, pedicel about 0.75 of scape length and about 0.83–0.95 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 0.3 distance to coxal cavity; prosternum separating procoxae for about 0.7 their length; short median basal line on median basal lobe often obscured by dense white hairs; a deep, broad, gentle, diagonal sulcus on either side of midline near base.

**Mesothorax and Metathorax.** Scutellum quadrate, bifurcate at apex; elytron without distinct basal gibbosity; stria 4 only slightly abbreviated basally, not ended by strong tooth; striae 3 and 5 slightly less abbreviated; other striae subequal at base; elytron about twice as long as broad; striae deep, punctate; striae intervals punctulate; metasternum deep, rounded in profile; metasternum separated medially at apex by vague, short sulcus, with 2 strong spines projecting ventrally on either side of sulcus near apex; hind femur constricted basally and apically, expanded medially to slightly more than width of coxa (Fig. 13); inner ventral surface with vague longitudinal carina; lateral margin of femur in a long gentle curve to apex; lateral margin with several minute spines from near base to a single large spine about 0.55 from base, spine about 0.8 as long as width of tibial base; inner margin with 4 subapical acuminate spines beginning about 0.3 from apex; each spine about 0.5 as long as width of tibial base; tibia with ventral, lateroventral, lateral and dorsomesal glabrous carinae; dorsal surface of tibia rugulose, without fossa; tibial corona with one vague lateral spinule, mucro small, about 0.1 as long as first tarsomere; tarsomere 1 with ventral, lateral and mesal longitudinal carinae.

**Abdomen.** First abdominal sternum with polished lateral apical band; sterna 2–4 unmodified, fifth sternum elongate, 2.5 as long as fourth, gently curved at apex, not emarginate, apex produced ventrally. Pygidium with many fine punctations, narrow, apex narrow, curved ventrad.

**Genitalia.** Median lobe thin, elongate, constricted on lateral margins; ventral valve sclerotized, apex bent ventrally, with one large seta on either side of midline and 3 small setae near lateral margins; dorsal valve less sclerotized, rounded apically; only apical 0.5 of internal sac with armature, most of apical 0.25 lined with fine scales and remaining 0.25 lined with small spinules (Fig. 14). Lateral lobes elongate, cleft to 0.2 their length, apex of lobes more strongly sclerotized, with strong setae at apex of lobes (Fig. 15).

**Female.** Length (pronotum-elytra) 1.7–2.0 mm. Width 1.0–1.3 mm. Maximum thoracic depth 0.85–1.0 mm.

Similar to male except interocular ratio about 0.38–0.44, antenna with segments 6–10 dark brown varying to yellowish with vague brown spots, some specimens with segment 5 and 11 partially brown; metasternum without medial, vague, short sulcus, with 2 poorly

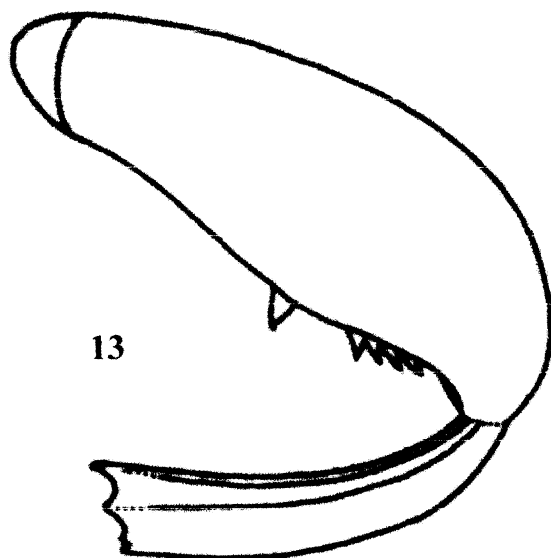


Fig. 13. *Meibomeus rodneyi*, hind leg.

developed spines projecting ventrally on either side near apex; fifth abdominal sternum small, 1.7–2.0 as long as fourth.

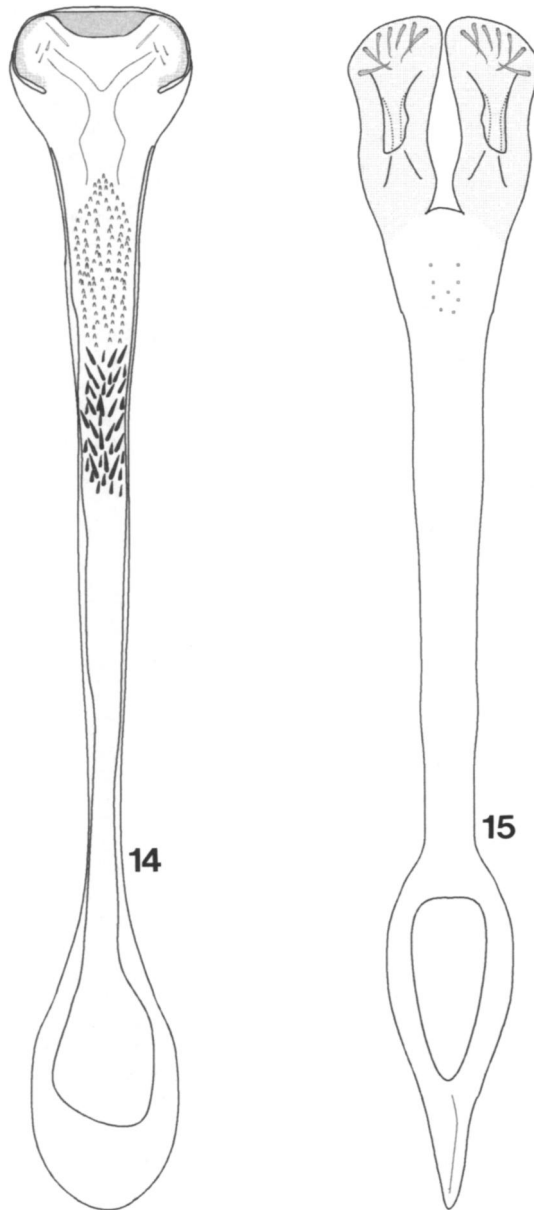
**Host Plants.** *Desmodium glabrum* (Mill.) DC.: México: Oaxaca: 2 km N Puerto Angel, I-4-80, C.D. Johnson collector (CDJ #1337-80).

**Type Series.** Holotype male, allotype female and paratypes: México: Oaxaca: 2 km N Puerto Angel, I-4-80, reared seeds no. 1337-80, C.D. Johnson collector. Holotype and allotype deposited in the U.S. National Museum of Natural History, Washington, D.C., U.S.A. Paratypes deposited in the CDJ, JRN, AT, CIB and FDA collections.

**Distribution.** México (Oaxaca).

**Discussion.** *Meibomeus rodneyi*, *M. campbelli*, *M. wenzeli* Kingsolver and Whitehead, and *M. juarez* are the only species of Bruchidae that we know in which males (or females) have two strong spines at the base or apex of the metasternum. *Meibomeus rodneyi*, *M. campbelli* and *M. wenzeli* have apical metasternal spines and *M. juarez* has basal metasternal spines. *Meibomeus juarez* has very distinct male genitalia that do not resemble the other three species discussed here. The genitalia of *M. rodneyi*, *M. wenzeli*, and *M. campbelli* separate the three species. *Meibomeus rodneyi* has an elongate, thin median lobe with few spinules in the internal sac and more deeply cleft lateral lobes (Figs. 14, 15) that separate it from *M. wenzeli*. The very complex apex of the median lobe of *M. campbelli* separates it from the other two. *M. wenzeli*, *M. campbelli* and *M. rodneyi* share the character “hind femur with a large tooth on the lateral margin of the hind femur separated from pecten on the apex of the medial margin by a wide gap and apical metasternal spines.” These structures hint that these three species may form a species group within *Meibomeus*. *Meibomeus juarez* has basal metasternal spines but does not have a large, lateral spine on the hind femur. Perhaps spines on the metasternum show





**Figs. 14–15.** *Meibomeus rodneyi* male genitalia. **14)** Median lobe; **15)** lateral lobes.

**Table 2.** Known hosts of *Meibomeus*. All host plants are in the family Fabaceae, subfamily Papilionoideae.

<i>Meibomeus</i> spp.	Host Plant
<i>M. apicicornis</i>	<i>Desmodium incanum</i>
	<i>D. canum</i>
<i>M. desmoportheus</i>	<i>D. grahami</i>
	<i>D. campyloclados</i>
	<i>D. sumichrastii</i>
	<i>D. cajanifolium</i>
<i>M. dirli</i>	<i>Indigofera platycarpa</i>
<i>M. howdeni</i>	<i>Zornia marajoara</i>
<i>M. jacki</i>	<i>Indigofera thibaudiana</i>
<i>M. juarez</i>	<i>Aeschynomene paniculata</i>
<i>M. kirki</i>	<i>Zornia marajoara</i>
<i>M. mitchelli</i>	<i>Desmodium</i> sp.
<i>M. musculus</i>	<i>D. canescens</i>
	<i>D. purpureum</i>
	<i>D. tenuifolium</i>
	<i>D. triflorum</i>
	<i>Lespedeza hirta</i>
<i>M. panamensis</i>	<i>Desmodium incanum</i>
	<i>Coursetia caribaea caribaea</i>
<i>M. ptinoides</i>	<i>C. caribaea trifoliata</i>
<i>M. rodneyi</i>	<i>Desmodium glabrum</i>
<i>M. serraticulus</i>	<i>D. bellum</i>
<i>M. surrubresus</i>	<i>Aeschynomene americana</i>
	<i>A. sp.</i>
	<i>Desmodium tortuosum</i>
	<i>Rhynchosia calycosa</i>

affinities with the above three species but we only consider these spines as perhaps independently evolved.

**Etymology.** This species is named in honor of Rodney Dirl Johnson, son of the second author, for his contributions in gathering data on bruchids in the field.

#### Similarities of New Species and Named Species of *Meibomeus*

Of the new species described here, *M. juarez* is distinct from all other species of *Meibomeus* by having unique male genitalia (Figs. 8, 9) and basal metasternal spines. Although the structure of the hind femur of *M. jacki* is very similar to *M. apicicornis*, the many distinct differences between *M. jacki* (see above) and other *Meibomeus* set it apart as a distinct species. The hind femora of *M. dirli*, *M. rodneyi* and *M. campbelli* are indistinguishable from each other. *M. rodneyi*, *M. wenzeli*, and *M. campbelli*, however, have apical metasternal spines. *Meibomeus dirli* lacks apical metasternal spines and differs in the structure of the male genitalia from all species of *Meibomeus*. The structure of the male genitalia separates *M. rodneyi* from these species and other *Meibomeus*. *Meibomeus kirki* is very similar in its structure to *M. surrubresus* but differs in the structure of the male genitalia from *M. surrubresus* and other *Meibomeus*. We did not attempt to establish species groups within

**Table 3.** Host plants, their higher classification, and species of *Meibomeus* that feed in them. All known hosts of *Meibomeus* are in the family Fabaceae, subfamily Papilionoideae.

Tribe	Plant	<i>Meibomeus</i> spp.	
Aeschynomeneae	Subtribe Aeschynomeninae		
	<i>Aeschynomene americana</i>	<i>M. surrubresus</i>	
	<i>A. paniculata</i>	<i>M. kirki</i>	
	<i>A. sp.</i>	<i>M. surrubresus</i>	
	Subtribe Poiretiinae		
	<i>Zornia marajoara</i>	<i>M. jacki</i>	
	<i>Z. marajoara</i>	<i>M. kirki</i>	
Desmodieae	Subtribe Desmodiinae		
	<i>Desmodium bellum</i>	<i>M. serraticulus</i>	
	<i>D. cajanifolium</i>	<i>M. dirli</i>	
	<i>D. campyloclados</i>	<i>M. desmoportheus</i>	
	<i>D. canescens</i>	<i>M. musculus</i>	
	<i>D. canum</i>	<i>M. apicicornis</i>	
	<i>D. glabrum</i>	<i>M. rodneyi</i>	
	<i>D. grahami</i>	<i>M. desmoportheus</i>	
	<i>D. incanum</i>	<i>M. apicicornis</i>	
		<i>M. panamensis</i>	
		<i>M. musculus</i>	
		<i>M. desmoportheus</i>	
		<i>M. mitchelli</i>	
		<i>M. musculus</i>	
		<i>M. surrubresus</i>	
		<i>M. musculus</i>	
		Subtribe Lespedezinae	
		<i>Lespedeza hirta</i>	<i>M. musculus</i>
Indigofereae	Subtribe Indigoferinae		
	<i>Indigofera platycarpa</i>	<i>M. howdeni</i>	
	<i>I. thibaudiana</i>	<i>M. juarez</i>	
Phaseoleae	Subtribe Cajaninae		
	<i>Rhynchosia calycosa</i>	<i>M. surrubresus</i>	
Robinieae	<i>Coursetia caribaea caribaea</i>	<i>M. ptinoides</i>	
	<i>C. caribaea trifoliata</i>	<i>M. ptinoides</i>	

*Meibomeus* because we agree with Kingsolver and Whitehead (1976) who stated "we do not recognize species groups because the species are similar, phylogenetic relationships are not sufficiently clarified, and no ecological or biogeographic units are evident." We believe that there are ecological preferences shown by *Meibomeus* based on host preferences (see next section) that may be correlated with (perhaps causally) the phylogeny of species of *Meibomeus* and the phylogenetic differences between *Meibomeus* and other bruchid genera. The host data presented in this paper, however, were not available when Kingsolver and Whitehead studied *Meibomeus*.

#### Host Plants and *Meibomeus*

Many host records for *Meibomeus* were published in this paper (Table 1). Kingsolver and Whitehead (1976), and Johnson (1979) published new host records for *Meibomeus* then Udayagiri and Wadhi (1989) summarized many of the hosts published up to 1989. All of these records were used to formulate

Tables 2 and 3. All species of *Meibomeus* whose hosts are known feed in the seeds of the family Fabaceae, subfamily Papilionoideae. About 60% feed in species of *Desmodium* Desv. and slightly more prefer the tribe Desmodieae (Tables 2, 3). About 22% feed in seeds of the tribe Aeschynomeneae, a tribe more closely related to Desmodieae than to the other tribes that are hosts for *Meibomeus*. *Meibomeus musculus* feeds in seeds of five species of host plants, *M. surrubresus* feeds in four, and *M. desmoporthus* Kingsolver and Whitehead in three (Table 2). All the other species feed in either one or two hosts. We believe that it is likely that the host ranges of the species here are wider than reported because *M. musculus*, a species collected many times in the eastern United States, is more representative of most *Meibomeus* because the other species have not been as well sampled.

The trend of host range expansion of species groups of *Meibomeus* seems to have been into the tribe Desmodieae and less into other papilionoid Fabaceae, especially the Phaseolae and Robinieae. Further study of hosts of bruchids will determine if the tribes Indigofereae and Aeschynomeneae are frequent hosts for *Meibomeus*.

As with other taxa of bruchids and their hosts, our observations suggest a plethora of studies that could be conducted on species and populations of *Meibomeus* by systematists, ecologists, and other evolutionary biologists. For example, does selection on host preferences result in ecological speciation and drive the ecological diversification of this genus? Does the phylogenetic pattern of host use, whether causative or correlative, distinguish species within *Meibomeus* and between *Meibomeus* and closely related genera? Do species or populations that occur in marginal habitats use multiple hosts because of purely ecological pressures (e.g., *M. musculus*)?

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