Biosystematics of the Genus *Merobruchus* of Continental North America and the West Indies
(Coleoptera: Bruchidae)
Abstract


A diagnosis of the genus *Merobruchus* is presented, including a key to species, synonymical names, geographical distribution, and host plant associations detailed for the 22 species now assigned to this genus for the United States, Mexico, Central America, and the West Indies. The following seven of these species are new to science: *chetumalae, cristoensis, lysilomae, politus, porphyreus, triacanthus*, and *xanthopygus.* *Pseudopachymerus steinbachi* Pic is a NEW SYNONYM of *Merobruchus pickeli* (Pic) (NEW COMBINATION), and *Pachymerus subuniformis* Pic is a NEW SYNONYM of *Merobruchus bicoloripes* (Pic). *Bruchus flexicaulis* Schaeffer is shown to be an available name and is provisionally synonymized with *Merobruchus major* (Fall) (NEW SYNONYMY). *Bruchus limpidus* Sharp is synonymized with *Merobruchus placidus* (Horn) (NEW SYNONYMY). Illustrations of salient characters are provided for each species. All known host associations are with seeds of leguminous trees and shrubs in the subfamily Mimosoideae, mostly in the genera *Acacia, Lysiloma,* and *Pithecellobium.* None of the species affect major agricultural crops, but they reduce the potential for regeneration of trees used for fuel, furniture, vegetable gums, tanbark, honey sources, and ornamental plantings.

This is part of a series of studies on bruchid genera contributing to a comprehensive database for this important seed-feeding beetle family of North America. It provides scientific names for taxonomists and ecologists conducting studies in rangeland, pasture, and forest management in the Southwestern United States, Mexico, and Central America.

KEYWORDS: *Acacia, Albizia, Enterolobium,* Leguminosae, *Leucaena, Lysiloma, Merobruchus, Mimosoideae, Pithecellobium,* seed beetles.

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By

John M. Kingsolver
Acknowledgments

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Biosystematics of the Genus *Merobruchus* of Continental North America and the West Indies (Coleoptera: Bruchidae)

John M. Kingsolver

During the 1970's and 1980's, nearly all the 27 Bruchidae genera now known from continental North America and the West Indies have been monographed or revised, so that this fauna is now one of the most thoroughly documented in the world. It would be imprudent, however, to infer that all the Bruchidae species in this area are well known or even that all of them are described. The rich leguminous flora in the subtropical and tropical regions is still poorly sampled despite the years of extensive collecting and rearing by workers such as C.D. Johnson in Mexico and Central America and D.H. Janzen in Costa Rica. A taxonomic base is being established, however, for subsequent workers to build upon. Generic limits are rather nebulous in several sections of the family, and although additional species undoubtedly await discovery, most of the known species now have been well characterized. This study and one in progress will complement already published monographs and revisions to provide workers with means of identifying most of the bruchids attacking the seeds of desert, range-land, and pasture plants of North America and the Caribbean area.

Larvae of *Merobruchus* species develop in the seeds of leguminous trees and shrubs that are characteristic of the more xeric areas of the tropical and subtropical regions. Adults feed on nectar and pollen of available flowers. Host plant genera include *Acacia*, *Albizia*, *Leucaena*, *Lysiloma*, and *Pithecellobium* north of Panama and *Pithecellobium*, *Pseudosamanea*, and *Enterolobium* south of Panama; the last genus is a host for *Merobruchus bicoloripes* (Pic). Although members of this genus are not of primary economic significance to man and his activities, they do affect the potential regeneration of trees and shrubs that locally provide fuel, wood for furniture, vegetable gums, and tanbark. Several of the plants are used in ornamental plantings, and a number of the shrubby species are good honey plants.

Materials and Methods

Approximately 6,000 specimens were examined during this study. Many were without host associations, but most of the specimens provided by C.D. Johnson and D.H. Janzen were reared from seed pods collected in the field.

Since male genitalia provide a major source of distinguishing characters for species, careful preparation is necessary. The following procedure should produce satisfactory results. Relax the specimen thoroughly either by soaking in hot water or alcohol or by using a relaxing chamber. Hold the specimen between thumb and forefinger, and gently lift the apex of the pygidium with fine forceps. Sever the dorsal and ventral membranes surrounding the genital apparatus, and remove the parts from the body. The eighth tergum and the Y-shaped eighth sternum are usually extracted with the median and lateral lobes. Extracted genitalia are cleared of tissue by treatment in 10 percent sodium hydroxide solution and subsequently washed in acidified ethanol. Muscle fibers are then gently pressed out of the genitalia by using blunt forceps or probes. The parts can be mounted in glycerin on slides for examination and illustration. Permanent storage is in glycerin in microvials attached to the specimen pin.

For each species, the following illustrations are given: Habitus, pygidium, median and lateral lobes of the male genitalia, hindleg, and for some species the antenna. A few species are further illustrated by drawings or photographs of the head, female fifth sternum, and other isolated characters.

Several techniques were used for the illustrations. Habitus and pygidial drawings are on coquille board with either negro or carbon pencils; line drawings were made on bristol board using a microprojector; photographs were taken with either a Wild M-400 Photomakroscop or a scanning electron microscope.

Descriptions vary in their extent. Species previously but inadequately characterized are fully described as though they were new species, whereas for those I described in 1980, the diagnosis includes little more than color and salient morphological characters.

A glossary of morphological terms and definitions is in Appendix 1. Many of these terms have been used in previous publications on the Bruchidae by various authors without explanation.

The geographical distribution for each species is divided into two sections: A list of countries and States to provide a quick summary for mapping and for automated data processing, and a more detailed list of localities given in the literature as well as those for which I have examined speci-
History of the Genus

Merobruchus was proposed by Bridwell in 1946 based on Bruchus julianus Horn. He did not assign any additional species to Merobruchus in this or any subsequent publication, but Bradley later that year transferred Bruchus major Fall to the newly proposed genus. Species subsequently assigned to Merobruchus were Bruchus placidus Horn (Johnson, 1967), B. knulli White (Johnson, 1968), B. vacillator Sharp (Bottimer, 1968), B. columbinus Sharp (Kingsolver, 1975), B. limpidus Sharp¹ and B. solitarius Sharp (Johnson and Kingsolver, 1977), B. insolitus Sharp (Johnson, 1979), and B. lineaticollis Sharp (Johnson and Kingsolver, 1982). Some of these names had been placed in as many as four genera by various workers. In 1980, Kingsolver described six new species in Merobruchus from Mexico and Central America. An additional 7 new taxa are described in this publication, bringing the total to 22 species from the United States, Mexico, Central America, and the West Indies. Merobruchus apparently has its greatest development of species in Central America.

Two species have been described from South America, M. pickeli Pic, 1927 (NEW COMBINATION) (= steinbachi Pic, 1934, NEW SYNONYMY), and M. bicoloripes Pic, 1927 (= subuniformis Pic, 1938, NEW SYNONYMY). Several South American species remain to be described.

Except for the few characters given in Bridwell’s generic key (1946) and the brief, tentative diagnosis by Kingsolver (1980), no formal generic description of Merobruchus appeared in the literature until Borowiec’s (1987) treatment of the bruchid genera of the world. His description is reasonably accurate, but some important characters were overlooked, probably because he based it largely on the literature. The present publication is the first to bring together the described species placed in Merobruchus by various authors, with additional descriptions of new species, to include a thorough generic diagnosis based on 22 species with keys, redescriptions, synonymies, lists of host plants, and geographical distribution for continental North America and the West Indies. Characters for delimiting the genus as well as those for species and for species groups are found in external morphology, especially in the male genitalia. Other genera and species, described and undescribed, were examined to delimit the genus and to attempt to determine its position within the family; however, no attempt has been made to devise a phylogenetic scheme for the genus, since only two South American species are considered and several more await description.

¹Now a synonym of B. placidus.
Group characterizations rely largely on details of the male genitalia. These organs show a remarkable consistency of form within each species in this genus (except *M. placidus*, q.v.), and at the same time they afford a source of characters for grouping species.

In nearly all species of *Merobruchus*, the internal sac of the genitalic median lobe bears a Y-shaped sclerite, sometimes termed a “wishbone” wherever the resemblance is appropriate. The median sclerite, however, may be slender, sub-triangular, or thornlike. *Merobruchus major* is the only species in the genus without a median sclerite.

All known host plants with which *Merobruchus* is associated belong to the subfamily Mimosoideae in the family Fabaceae. Members of this subfamily are, for the most part, trees or shrubs found in tropical or subtropical regions, with some genera penetrating into temperate areas (Pohill and Raven, 1981). Fruit types vary from indehiscent to partially dehiscent to fully dehiscent. Many species are well adapted to a xeric climate.

Seven genera of mimosoids in 3 tribes are known to be hosts for *Merobruchus*—*Acacia* in the Acacieae with 8 bruchid species; *Leucaena* in the Mimoseae with 1 bruchid species; and *Albizia, Enterolobium, Lysiloma, Pithecellobium, and Pseudosamanea* in the Ingeae with 16 bruchid species feeding on seeds of 1 or more genera in this tribe. The five genera in the tribe Ingeae are closely related, with similar pod structure, and generic assignment of the plant species is often a matter of opinion. The common denominator for this assemblage of genera in the three tribes is probably the partial dehiscence of the seed pod valves.

A summary of host plant genera (see Appendix 3) shows that the major group, the columbinus group, and *boucheri* in the insolitus group are associated only with seeds of *Pithecellobium*, four of the six species in the vacillator group with *Lysiloma*, and the sole species in the terani group with *Acacia*; whereas the julianus group is associated with *Acacia, Lysiloma, Leucaena*, and *Pithecellobium*, and the insolitus group with *Acacia, Albizia, Lysiloma, Pithecellobium*, and *Pseudosamanea*. The association of *Enterolobium* with *Merobruchus bicoloripes* occurs only in South America.
Genus *Merobruchus* Bridwell


Type-species: *Bruchus julianus* Horn, 1894:410, monotypic.

Small to medium-sized beetles (1.8–8.8 mm). Body subdepressed dorsally or with elytra slightly concave. Head with frontal carina usually prominent (fig. 3); ocular sinus about one-half length of eye (fig. 3); antenna gradually clavate (fig. 4), segments of club ovate or elliptical. Lateral carina of pronotum with distinct sinuation at middle in lateral aspect. Prosternum Y-shaped, acutely triangular between coxae, sometimes separating coxal apices; cervical boss always present and bisetose. Elytron with striae 3 and 4 usually arising basally from denticles on summit of basal gibbosity (except *columinus* and *major*). Pygidium of male usually reflexed apically to fit sternal emargination. Foreleg and midleg not especially modified; metatarsus strongly swollen dorsoventrally (fig. 2); ventral margin proximad of pecten carinate, lacking fine denticles; pecten with three to five denticles, first denticle sometimes separated from those following by gap of varying width (fig. 38); metatibia usually straight but with base bent at insertion into apex of femur, some species with tibia slightly arcuate (fig. 2). Abdomen with first sternum as long as or longer than remaining four sterna combined; fifth sternum in both sexes usually with carinate flange flanking emargination of posterior margin (fig. 8, extreme development), some males with slight flange. Male genitalia with ventral valve nearly as broad as apex of median lobe (fig. 10); internal sac usually with wishbone-shaped median sclerite (figs. 10, 36) or modification thereof, sclerites of internal sac characteristic for species, lateral lobes with sensory pores along lateral basal margin, ventral strut flat, not carinate.

Relationships of *Merobruchus* to Other Genera

No one yet has attempted a phylogenetic study of the Bruchidae at the generic level. Some indications of affinities, however, were suggested by Whitehead and Kingsolver (1975b, p. 212 et seq.), who advanced the tentative hypothesis that *Merobruchus* belongs to a group of three “assemblages” of acanthoscelidin genera corresponding roughly to their host plants in the leguminous subfamilies Mimosoideae, Caesalpinioideae, and Papilionoideae. They are, respectively, the *Merobruchus* assemblage (including only *Merobruchus*), the Gibbobruchus assemblage (*Gibbobruchus*, *Pentobruchus*, and *Pygiopachymerus*), and the Caryedes assemblage (*Caryedes*, *Meiborneus*, and perhaps *Ctenocolum*, although the affinities of the last two genera are yet somewhat obscure).

In most characters, *Merobruchus* would fall into the definition of the genus *Acanthoscelides* presented by Johnson (1983:5). He stated, however, that *Acanthoscelides* does not appear to be a natural group; it is composed of many disparate entities. *Merobruchus* could, with a slight expansion of his definition of *Acanthoscelides*, be considered a species group within *Acanthoscelides*, but I believe that the following characters are sufficient to segregate the species here assigned to *Merobruchus* as a distinct genus: The distinctive combination of elytral striae 3 and 4 arising basally from bidentate basal gibbosities (except *columinus* and *major*), anal notch of female deeply emarginate and usually with lateral flanges, ventral valve of the male genitalia broadly rounded or truncate, and armature of the internal sac of most species with a recognizable common theme of form and placement of sclerites, especially a Y-shaped median sclerite. Each of these characters, however, can be found individually in one or another of the species now placed in *Acanthoscelides*.

Perhaps the species group in *Acanthoscelides* most closely approaching *Merobruchus* is the mexicanus group (Johnson, 1983, p. 6, No. 9). It differs principally in lacking the deep anal notch and accompanying flanges, in a distinctive pattern of internal sac sclerites, and in the shape of the ventral valve. In addition, nearly all 20 species tentatively assigned to the mexicanus group, like *Merobruchus*, are associated with plant genera in the subfamily Mimosoideae.

The two described southern South American species, *M. pickeli* and *M. bicoloripes*, possess the principal characters outlined in the generic description, i.e., anal notch of female deep and flanged on lateral borders, pronotum without prominent gibbosities, head relatively short, pygidium convex and without gibbosities, male genitalia with ventral valve broad and arcuate, and internal sac with wishbone sclerite and lateral denticles (figs. 137 and 138), but they deviate in the position of the basal elytral denticles. The denticles in *M. pickeli* are basal to striae 4 to 6 and are sim-
Key to Species of *Merobruchus*

1. Elytra without bidentate basal gibbosity on striae 3 and 4 (figs. 19 and 63); size moderate to large (4.7–8.8 mm); metatibial macro length three-fourths width of metatibial apex ........................................... 2

2. Striae 3–6 strongly mucronate basally (fig. 63); stria 6 and 7 not joined basally by carinate loop; ♀ fifth sternum truncate or shallowly emarginate and with rounded flange either side of anal notch; ♀ internal sac without sclerites (fig. 64); postocular lobe long (fig. 66) ................................................................. major (Fall)

3. Middle of third elytral interval with elongate, golden stripe; flanks of pronotum with dense gray vestiture; pygidium variegated ............................................ 4

4. First and second abdominal sterna each with denuded, polished spot caudad of middle of metacoxa (fig. 89); pronotal disk with subtriangular, subdepressed, sometimes denuded area; ♀ median lobe with median sclerite Y-shaped and pair of slender lateral spines (fig. 87); lateral lobes slightly bowed (fig. 88) .......................................................... politus, new species

5. Pronotum with narrow median line of yellow setae sometimes extending from base to apex but sometimes only in basal one-half of disk (fig. 41); internal sac with median Y-shaped sclerite and paired, elongate lateral spines (fig. 42); size larger (3.2–5.5 mm) ........................................... julianus (Horn)

6. Pronotum and pygidium reddish brown, with narrow, strongly contrasting, median, yellowish white stripe (fig. 53); median lobe with ventral valve truncate; internal sac with elongated U-shaped sclerite (fig. 54); lateral lobes nearly straight; spatulate (fig. 55) .......................................................... lineaticollis (Sharp)

7. Pronotum with sparse or variegated yellow or gray vestiture .................................................. 13

8. Pronotum with uniformly dense yellow or yellowish gray vestiture ........................................... 8

ilar to those of *M. major* except nearer the basal margin of the elytra, whereas *M. bicoloripes* has a single broad denticle extending across the bases of striae 4 and 5, with stria 4 deflected laterally to meet the denticle. The male genitalia of both South American species are strikingly similar to those of *M. columbinus* (cf. figs. 137 and 138). (See also Teran and L'Argentier, 1981:74–83, for a description of the morphology and life history of *M. bicoloripes*.)
8. Fifth sternum with prominent digitate process either side of anal notch; elytra usually with submarginal, rounded black macula (fig. 99) — ♀ santarosae Kingsolver

5th sternum without prominent process, at most with marginal carina; elytral vestiture usually with lateral yellowish patches — ♀ knulli (White)

Pygidium uniformly pubescent except for small, median dark spot or large cordate spot — pygidium with large, cordate, dark brown spot (fig. 52); 5th abdominal sternum with rounded, flangelike carina; genitalia flat (fig. 132)

10. Pygidium with large, cordate, dark brown spot (fig. 52); elytral vestiture yellowish, diffuse; pronotal vestiture usually with lateral yellowish patches — ♀ knulli (White)

Pygidium without large cordate spot, uniformly yellow, or with small median spot, or pair of small spots (figs. 51 and 135); basal two-thirds of elytra, pronotum, and pygidium densely clothed with yellow vestiture; apical one-third of elytra black mottled with yellow and white — Pygidium without large cordate spot, uniformly yellow, or with small median spot, or pair of small spots (figs. 51 and 135)

11. Fifth abdominal sternum with rounded, flangelike carinae; genitalia flat (best seen in caudal view) — ♀ xanthopygus, new species

12. Y-shaped sclerite in genitalia flat (fig. 132) — ♀ knulli (White)

Y-shaped sclerite skewed (fig. 48) — ♀ knulli (White)

13. Vestiture of pygidium bright yellow, of scutellum gray; metepisternum with inconspicuous grayish yellow spots of vestiture; ventral valve broadly arcuate, wishbone sclerite large, internal sac with pair of lateral spines (fig. 26) — ♀ cristensis, new species

Combination of vestiture colors on pygidium and scutellum otherwise; ventral valve and internal sac armature otherwise — ♀ cristensis, new species

14. Vestiture of pygidium and scutellum bright yellow; metepisternum with prominent pubescent spots distinct; ventral valve broader than long (fig. 117) — pygidium and scutellum bright yellow; ventral valve broader than long (fig. 117)

Vestiture of pygidium and scutellum yellowish gray or gray; metepisternum without distinct spots; ventral valve as long or longer than broad — ♀ cristensis, new species

Body broad, elytra nearly quadrate (fig. 116); lateral parts of pronotal disk densely, conspicuously pubescent; pygidium densely pubescent except for median denuded area (fig. 120); 5th sternum with prominent processes flanking anal notch — ♀ terani Kingsolver

Body narrow, elytra 1½ times as long as wide (fig. 93); lateral parts of pronotal disk not conspicuously pubescent except for lateral spots in some species; processes of 5th sternum variously developed — ♀ terani Kingsolver

15. Body broad, elytra nearly quadrate (fig. 116); lateral parts of pronotal disk densely, conspicuously pubescent; pygidium densely pubescent except for median denuded area (fig. 120); 5th sternum with prominent processes flanking anal notch — ♀ terani Kingsolver

Body narrow, elytra 1½ times as long as wide (fig. 93); lateral parts of pronotal disk not conspicuously pubescent except for lateral spots in some species; processes of 5th sternum variously developed — ♀ terani Kingsolver

16. Pronotum with lateral patch of bright yellow setae near anterior border; ♀ genitalia with Y-shaped sclerite skewed (fig. 94); 5th sternum lacking prominent carinate processes; anal notch shallow — ♀ porphyreus, new species

Pronotum without lateral patch; vestiture on disk lightly variegated, sometimes condensed into round spot either side of midline near middle of disk (fig. 126); Y-shaped sclerite flat, middle of sac with two broad, thornlike spines and U-shaped sclerotized plate (fig. 127); 5th sternum with prominent processes; anal notch shallow, truncate between processes — ♀ porphyreus, new species

17. Pygidium with narrow median stripe of white pubescence, in most specimens reaching nearly to apex (figs. 39 and 40); lateral margins of elytra suffused with dark brown (fig. 35); pronotum with patchy dark brown areas; ♀ genitalia with nipple at apex of ventral valve; sclerites of internal sac slender, acute — ♀ xanthopygus, new species

Pygidium, elytra, and pronotum otherwise; ventral valve truncate, emarginate, or obtuse, lacking terminal nipple; sclerites of internal sac otherwise — ♀ xanthopygus, new species

18. Pygidium with setal pattern as in figure 14; setae yellowish gray; elytral setal pattern of transverse bands of small patches of white setae alternating with bands of dark brown spots (fig. 9); pronotum with broad, dark median stripe, lateral margins with dense, gray pubescence; ♀ genitalia with three small, thornlike spines in internal sac; ♀ 5th sternum with two prominent, digitate apical processes (fig. 8) — ♀ boucher Kingsolver

Pygidium with median stripe or basal triangle of setae (figs. 75 and 106); setal pattern of elytra various; pronotum lacking distinct median stripe, usually vaguely mottled; internal sac of ♀ genitalia with median subtriangular sclerite and two lateral thornlike sclerites (figs. 79 and 81-85); ♀ 5th sternum with slight flange-like processes or processes lacking — ♀ boucher Kingsolver

19. Pygidium with basal triangle indistinct (figs. 20 and 21); apical one-half of pronotum usually with paired dark brown spots, sometimes with additional paired subbasal spots; 5th sternum lacking apical flanges or digital processes; ♀ genitalia with paired basal spines in internal sac — ♀ boucher Kingsolver

Pygidium with basal triangle or median stripe of setae distinct (fig. 115); apical spots lacking; ♀ 5th sternum with or without apical flanges; ♀ genitalia with or without basal spines in internal sac — ♀ boucher Kingsolver

20. Lateral margins of pronotum evenly arcuate (fig. 75); elytral pattern ranging from nearly immaculate with at most faint brown spots on third interval to pattern in figure 75; base of median sclerite of internal sac broad (figs. 81-85) — ♀ placidus (Horn)

Lateral margins of pronotum slightly sinuate (fig. 106); elytral pattern strongly mottled, usually with intensely dark brown lateral maculae; median sclerite of internal sac slender, wedge-shaped (fig. 107) — ♀ solitarius (Sharp)

21. Pygidium black with small, narrow, white basal triangle (fig. 18); body small (2.1-2.3 mm); integumental color evenly dark red; dorsal vestiture inconspicuous (Yucatan Peninsula) — ♀ chetumala, new species

Pygidium otherwise; integumental color and dorsal pubescence various — ♀ chetumala, new species
The species included in the major group differ from all other *Merobruchus* by the following combination of characters: Postocular lobe prominent, elongated; elytra without gibbosities at bases of striae 3 and 4 but with prominent denticles at bases of striae 3–6; internal sac of genitalia without large sclerites. Additional characters are pronotum moderately gibbous with median sulcus and subbasal gibbosities evident; pecten of metafemur lamellar with five evenly spaced denticles; metatibia with micro about one-half as long as apical width of tibia, lateral and coronal denticles sharply developed; thoracic pleura lacking setal patches; elytral surface strongly concave mesally, apices of seventh and ninth intervals convex; pygidium medially sulcate before apex, both sexes with slight depression before apex; pattern dimorphic, ♀ more strongly contrasting. One species.

*Merobruchus major* (Fall)

(Figs. 63–69)

*Bruchus major* Fall, 1912:320; White, 1941:189.

*Mylabris major*: Leng, 1920:304.


*Bruchus flexicaulis* Schaeffer, 1904:229 (manuscript name).


*Bruchus julianus*: Schaeffer, 1904:229 (misidentification); Cushman, 1911:491 (misidentification).

Color. Integument deep red to piceous. Recumbent vestiture of ochreous, gray, and brown hairs in mottled pattern, some pale yellow hairs with brassy sheen, distributed as follows: Head densely clothed with pale yellow hairs and scattered gray hairs on vertex and gena, antenna with segments 1–7 gray, 8–10 dense brown, 11 with brown and gray mixed. Pronotum with mostly pale yellow and some intermixed gray hairs in median one-third of disk, lateral parts of disk and flanks gray. Elytra with gray, brown, pale yellow, and brassy hairs in pattern as in figure 63. Pygidium of ♀ (fig. 68) evenly gray to pale yellow with dark integument underlying vestiture, pygidium of ♂ with pale yellow, gray, and brown in pattern of figure 69; venter of body mostly gray with some intermixing on legs, metepisternum, and posterior margins of abdominal sternum.

Structure. Body elongate-ovate (fig. 63). Head broad, obovate (fig. 66), ocular sinus less than one-half eye length; frontal carina vaguely defined, expanded dorsally into flat-
tended, triangular boss with fine longitudinal sulcus; frons, clypeus, and lateral face of mandible finely, densely punctate except boss minutely striate; postocular lobe broad, crescentic, vaguely limited posteriorly by shallow sulcus (fig. 68); antenna gradually clavate from fourth segment, club segments eccentric and subserrate. Pronotum campaniform in dorsal aspect (fig. 63), disk slightly elevated in median one-third with anterior part of elevation flat to slightly depressed, posterior part sulcate, lateral parts of disk convex, indistinct umbo present each side near basal border; lateral margin of disk demarcated by low, sinuate carina extending from postero-lateral corner of disk to midway between anterior and posterior borders; cervical sulcus narrow, deep; prosternum sharply triangular between coxae, then vertically emarginate to acute apex beyond contiguous coxal apices. Scutellum quadrangular, deeply emarginate apically, bidentate. Elytra together about as long as wide, middle of lateral margins nearly straight; median one-third depressed between low ridges running along fifth intervals two-thirds length from base; striae regular in course, slightly deflected laterad in basal one-third, striae 1 and 2 arising from deep basal pits, striae 3, 4, 5, and 6 arising from beneath flattened, triangular, scalelike subbasal denticles, all striae free apically except 4 and 5 conjoined; stria punctures closely placed and slightly depressed in sharp, narrow grooves; mesosternum with intercoxal process flat, subtruncated; postmesocoxal sulcus rounded, following contour of coxal cavity. Abdomen with first segment 1.8 x as long as remaining segments in $\delta$, 1.2 x in $\gamma$, fifth segment deeply emarginate apically for reception of pygidial apex in $\delta$, emargination with distinct reflexion with posterior face concave and slightly lobed laterally, emargination shallow in $\gamma$ but with reflexion similar to that of $\delta$. Pygidium of $\delta$ obovate (fig. 68) with apex truncate, apical one-half of disk shallowly, broadly sulcate, sulcus flanked by low umbones; pygidium of $\gamma$ semicircular but with apex slightly elongated and truncate, disk with paired slight convexities one-third from apex. Metacoxa with moderately dense, setigerous punctures except in polished area immediately lateral of trochanteral insertion; metatarsem as in figure 67, pecten with all denticles having common, bladelike base, ventral face of femur slightly concave; metatibia slightly bent at extreme base (fig. 67), microslender, acute, lateral denticle short, blunt, coronal denticles small, ventral carina flange-like, terminating in micro, lateral carina terminating in lateral denticle, ventrolateral carina terminating in sinus between micro and lateral denticle, dorsosomal carina prominent, terminating short of terminal margin. Male genitalia: Median lobe (fig. 64) 3 x as long as wide, ventral valve cordate, apex rounded; internal sac densely lined with fine spicules, devoid of large sclerites, spicules condensed into two lobate masses near base of sac, middle of sac with apparent wide rows of denticles, apex with cylindrical structure. Lateral lobes (fig. 65) bowed, rounded apically, cleft two-thirds their length. Body length 5.2–8.8 mm, width 2.8–4.7 mm; pronotal length 1.5–2.2 mm, width 1.9–2.9 mm.


Biology. The only host plant recorded for this species is *Pithecellobium flexicaule* (*Siderocarpus in older literature*), and *M. major* is the only known obligate bruchid predator of this tree. *Stator beali* Johnson has also been reared from this host, but it attacks other species of *Pithecellobium* as well. The common name of the tree is Texas ebony. It is used locally for fenceposts, cabinet wood, and fuel; the seeds are sometimes used to make an ersatz coffee.

*Merobruchus major* attacks seeds contained in a woody, indehiscent pod and exits through holes drilled by the larva through the pod wall. Two other species, *Megasennius muri- catus* (Sharp) from Central America and *Pygiopachymerus lineola* (Chevrolat) from Central and South America, which have in common an elongated postocular lobe and elevated basal elytral spines, also breed in woody pods (Whitehead and Kingolver, 1975a). Whether these shared morphological features have any significance or not is unknown.

Discussion. This species is the largest one treated in this publication. It is sometimes confused with *M. julianus*, but it is larger (length 5.2–8.8 mm vs. 3.2–5.5 mm for *julianus*), has prominent, flattened denticles at the bases of striae 3, 4, 5, and 6 (denticles on striae 3 and 4 only), and lacks any large sclerites in the male genitalia (large, U-shaped sclerite present).

Schaeffer (1904) discussed under the name *julianus* a “gigantic *Bruchus . . . on Acacia flexicaulis*, in the large seed pods of which it undoubtedly breeds.” He noted the differences in size between smaller, “starved” specimens described by Horn and the larger specimens from *A. flexicaulis*, but he did not formally describe the larger specimens; instead, he noted that he distributed specimens under the manuscript name *flexicaulis*, and some museums may yet have specimens labeled *flexicaulis*. Since the name *flexicaulis* was first listed as a synonym of *Bruchus julianus*, it has been treated as an unavailable name by Johnson.
Columbinus Group

The single species in this group is distinctive in several respects. Elytral intervals are of equal width basally and bear individual denticles (fig. 19), whereas in all other groups, except the major group, the basal denticles of striae 3 and 4 are elevated on a gibbosity; striae 5 and 6 are joined basally by a carinate loop, a unique character (fig. 19); the third interval, pygidium, and pleura lack distinct patches of golden setae; postocular lobe narrow. The deep sternal notch with lateral flanges in the female is consistent with other groups in Merobruchus. Male genitalic characters indicate a similarity more to the julianus group than to any other.

Merobruchus columbinus (Sharp)

(Figs. 19–24)

Bruchus columbinus Sharp, 1885:447.
Caryedes columbina: Blackwelder, 1946:758.

Color. Integument dark red to piceous; antenna reddish brown except segments 8–10 piceous; eye usually black; metacoxal face piceous. Pubescence of gray, brown, and bronzy fine hairs in faint but variable pattern on pronotum and elytra ranging from most distinct pattern shown in figure 19 to uniform distribution of gray with bronzy highlights, sometimes with brown spots on third elytral interval; pygidium usually with small, paired median spots.

Structure. Body ovate, moderately deep. Head obovate (fig. 22), postocular lobe narrow; vertex finely, densely punctate, vestiture directed cephalad, frons more coarsely punctate, punctures tending to coalesce longitudinally, vestiture directed mesad, frontal carina prominent, border between vertex and frons marked by shallow, transverse depression; clypeus punctate as on head; ocular sinus one-half length of eye; antenna slender, reaching past posterolateral corner of pronotum, serrate from 5th segment, club strongly eccentric, 11th elliptical. Pronotum (fig. 22) elongate-trapezoidal, lateral margins gently concave, apical margin truncate, base bisinuate, disk evenly convex except shallow sulcus on basal lobe and shallow depressions at posterolateral corners; surface with scattered microfoveolae, each with central seta, interspaces punctulate; lateral carina represented by short, curved ridge above coxal cavity; cervical sulcus short, fine; prosternal apex separating procoxae and extending above and slightly beyond them; mesosternum truncate apically, postmesocoxal sulci slightly widened behind coxae but not angulate. Scutellum small, quadrate, deeply emarginate. Elytra (fig. 19) as long as wide, depressed between seventh intervals; striae regular in

(1967) and Bottimer (1968) referring to Article 11d of the International Code of Zoological Nomenclature (1961). According to the 1985 Code (Article 11e), however, a name first cited in synonymy may be made available if it was used as a name of a taxon prior to 1961. In 1940, the U.S. Department of Agriculture List of Intercepted Plant Pests (p. 36) listed Acanthoscelides flexicaulis, and in subsequent years (1942, 1943, 1944, and 1945), the same annual publication listed Acanthoscelides flexicaulis (Schaeffer). In 1948, Wheeler et al. used the combination Merobruchus flexicaulis (Schaeffer), and in 1952, Zacher used Acanthoscelides flexicaulis and A. flexicaule in a summary of bruchid host plants. These listings constitute usage within the meaning of Article 11e.

Although the name flexicaulis (Schaeffer, 1904) predates major (Fall, 1912), I prefer to use the latter name for this species in the interests of stability since major has been used in several publications, and I intend to apply to the International Congress of Zoological Nomenclature to suppress the name flexicaulis in favor of major.

One female specimen collected by Janzen at Puente Nacional, Veracruz, 21–VI–1962, is strongly melanistic and may represent a new species. Since Pithecellobium flexicaule apparently does not extend into Veracruz, the specimen probably emerged from a different host plant.
course, 3, 4, and 5 with small basal denticles, basal margin lacking gibbosity at striae 3 and 4; striae 6 and 7 connected basally with U-shaped carina (fig. 19); striae fine, narrow; intervals of even width; minutely strigose. Metacoxal face finely, densely punctate; hindleg as in figure 23, pecten without gap; metatibia (fig. 23) slightly arcuate, channel between ventrolateral and ventral carinae polished; muero slender; lateral denticle small, blunt; coronal denticles three or four. Abdomen of ♂ with fifth sternum broadly emarginate to one-half length of sternum, emargination slightly flanged, in ♀ more narrowly emarginate one-fourth length of sternum, strongly flanged and with setal tufts; ♀ and ♂ pygidia similar, truncate apically. Male genitalia: Median lobe (fig. 20) about 3 x as long as width across apex, ventral valve arcuate; internal sac with large, wishbone-shaped sclerite near base and two thornlike sclerites at middle; base of sac with minute denticles, apex with mixture of fine, slender spines, minute denticles, and minute, pectinate sensory processes; apical closure valve ringlike, on dorsal side of apex. Lateral lobes as in figure 21.

Body length 4.0–5.4 mm, width 2.3–2.9 mm; pronotal length 1.3–1.5 mm, width 1.7–2.1 mm.

Type locality. GUATEMALA: Rio Maria Linda, 500’.

Holotype depository. British Museum (Natural History), London.

Distribution. GUATEMALA: Escuintla. HONDURAS: Cortés, Valle. EL SALVADOR: San Salvador, La Libertad, La Paz. NICARAGUA: Carazo, Chinandega, Granada. COSTA RICA: Guanacaste, Limón, Puntarenas, San José. PANAMA: Canal Zone, Veraguas. COLOMBIA: Valle del Cauca. VENEZUELA: Carabobo, Falcon, Lara, Los Andes, Miranda. TRINIDAD. The countries but not specific provinces or localities were listed by Janzen (1977).

Specific records. HONDURAS: Cortés; Nacaome. EL SALVADOR: Lake Ilopango; La Liberatad; San Vicente. NICARAGUA: Diría; Chinandega; San Cristóbal. COSTA RICA: 4 mi N Las Cañas; Taboga, 6 mi SW Cañas; Bagaces; 10 mi NW Esparta; Turrubares; San José; Batán; Palo Verde. PANAMA: Gatun Locks; 35 mi NE Santiago. COLOMBIA: Rio Frio; Merida. VENEZUELA: Cagua; Rancho Grande; Choroni; Puerto Cabello; Caracas; Felipe; Zulia; Carabobo. TRINIDAD (no locality).

Biology. The only host association known for this species is with Pithecellobium saman. The majority of collections were in March, but the range was from January to July and September, with one collection in Venezuela in November.

Janzen (1977) discussed the life history of M. columbinus on P. saman in Guanacaste Province, Costa Rica. He stated that larvae of this bruchid kill at least 43 percent of the seed crop of each tree. Females glue eggs on the pods when the seeds are well formed in the pod yet green and soft. Within 2 weeks, larvae hatch and bore directly through the pod wall into the seed. Before pupating, mature larvae cut through the seed coat and partly through the pod wall leaving a “trap door” through which the adult can easily emerge usually immediately before the pods drop to the ground. Merobruchus columbinus apparently has one generation per year and is not attacked by any parasites (Janzen, 1977, p. 165). Another bruchid, Stator limbatus (Horn), oviposits on seeds of P. saman through the exit holes of M. columbinus or through moth exit holes, and it completes its development in the seeds fallen to the ground.

Discussion. Pithecellobium saman is used locally as a shade and garden tree, for furniture and paneling, carvings, and bowls. The seeds are edible.
Members of the julianus group differ from all other Merobruchus by the following combination of characters: Postocular lobe short (fig. 44); base of each elytron with dentate gibbosities at bases of striae 3 and 4; ventral valve arcuate (fig. 42); lateral lobes elongated (fig. 43). Additional characteristics are pronotum barely gibbose, median sulcus evident only at base, subbasal gibbosities obsolete; elytral disk convex or depressed, third interval with elongate yellow spot; metepisternum with vaguely defined yellow spots; pygidium not dimorphic. Three species.

Merobruchus julianus (Horn)

(Figs. 41–46)

Bruchus julianus Horn, 1894:410; Fall, 1910:186, 1912:320; Wenzel, 1912:140.

Mylabris julianus: Leng, 1920:304; Böving, 1927:141.


Acanthoscelides julianus: Blackwelder, 1946:759.


Bruchus ochrolineatus: Pic, 1913:38.

Color. Integument dark red throughout except antennal club piceous. Pubescence of recumbent gray, coppery, and pale yellow hairs distributed as follows: Head, venter of body, and clypeus densely punctate and setose; lobe postocular dorsally into small, flattened, impunctate boss; vertex, frons, and clypeus densely punctate and setose; postocular lobe narrowly expanded dorsally, fringed with cinereous hairs; antenna short, barely reaching posterior corner of prothorax; clavate, subserrate from fifth segment. Prothorax subcampaniform in dorsal aspect (fig. 41), lateral margins nearly straight, disk evenly convex without asperities, small depression near each postero lateral corner, shallow longitudinal sulcus in prescutellar lobe; disk densely, minutely, discretely foveolate, each foveola with recumbent seta arising near anterior border; lateral carina a distinct ridge extending from postero lateral corner nearly to articulation of coxa; cervical sulcus short, deep; prosternum Y-shaped, intercoxal piece acutely triangular, not separating coxal apices. Scutellum angulately emarginate apically, densely setose. Elytra together slightly longer than wide, appearing quadrate (fig. 41); disk flat mesally, slightly depressed around scutellum; striae regular in course, intervals of uniform width, integument strigose; stria punctures deep, separated by their diameter, strial sulci shallow or obsolete, stria 1 arising at apex of scutellum, striae 3 and 4 arising basally from distinct denticles on prominent gibbosities, striae 2, 5, and 6 each arising from small, deep pit, all striae except conjoined 5 and 6 free apically. Mesosternum with intercoxal process rounded apically, densely punctulate, postmesocoxal sulcus angulate. Metacoxa densely, finely punctate in posterior two-thirds, polished and impunctate in anterior one-third; metafemur (fig. 45) moderately incrassate, densely punctate on anterior face, subapical pecten with one long and three or four shorter denticles, all denticles about equally spaced; metabidia (fig. 45) strongly arcuate basally, slightly arcuate in apical four-fifths; micro short, slender; lateral denticle prominent, coronal denticles usually five; ventral carina flange like in apical two-thirds, ventrolateral carina extending nearly to base of micro, lateral carina ending in lateral denticle, dorsomesal carina complete. Abdomen with first sternum as long as remaining sterna combined; fifth sternum strongly emarginate to receive apex of pygidium in 3, shallowly emarginate and without prominent ridges flanking emargination in 2; pygidium (fig. 46) in both sexes evenly convex. Male genitalia: Median lobe (fig. 42) 4 x as long as wide, ventral valve with apical margin evenly arcuate; internal sac with wishbone-shaped median sclerite and two long, slender flanking sclerites, interior of sac lined with fine spicules. Lateral lobes as in figure 43.

Body length 3.2–5.5 mm, width 1.9–3.1 mm; pronotal length 1.1–1.5 mm, width 1.4–2.1 mm.


Coconino, Pinal, Santa Cruz, Yavapai. MEXICO: Baja California Norte and Sur, Chihuahua, Coahuila, Nuevo Leon, Tamaulipas.

Biology. Adults have been collected from April through August; specimens have been reared from host material collected throughout the year. Some specimens probably represent flower visitation records: "cotton," Phacelia integrifolia Torr. (Hydrophyllaceae), and Sphaeralcea angustifolia (Cav.) G. Don. (Malvaceae).

The host plants for M. julianus for which authentic rearing records are known include at least Acacia berlandieri Benth., A. coulteri Benth., A. greggi Gray, A. roemeriana Scheele, and A. wrightii Benth. Specimen labels were taken at face value. Some records were obtained from herbarium specimens. Records in the literature of the following host plants need confirmation: Acacia juncifolia Benth., A. rigidula Benth., Desmanthus illinoensis (Michaux) Kuntze, Mimosa borealis Gray, and Pithecellobium sp. Acacia juncifolia is an introduced Australian species. Records from A. rigidula and Pithecellobium are based on plant quarantine intercep tions from Mexico. No Merobruchus species are otherwise known to infest seeds of either Mimosa or Desmanthus, and these records are probably the result of misidentifications of plants. Seeds of Mimosa borealis are too small to support even the smallest individuals of M. julianus. Seeds of Desmanthus are likewise too small.

L.J. Bottimer's unpublished field notes for 1924–25 for julianus at Uvalde, Texas, stated "In Acacia berlandieri, larva eats an irregularly oval hole in one side of seed then fastens edge of hole to valve. Adult cuts a hole through pod to escape; in Acacia greggi, however, the larva cuts a clean hole in seed but does not fasten seed to pod." He also found julianus hibernating in capsules of buckeye at Ft. Davis, Texas. Johnson (1967) stated that A. berlandieri pods dehisce soon after they ripen, and seeds fall to the substrate except for those infested by julianus, which remain glued to the inner wall of the pod. A larva may feed in more than one seed of this host by cutting a passage between seeds and gluing the seeds together forming a tube-like structure, but in A. greggi, the larvae develop one to a seed. This may be explained by the fact that seeds of A. greggi are larger than those of A. berlandieri and have sufficient nutrients in one seed for a larva to develop fully. Forister and Johnson (1970) found that eggs of julianus are laid on immature pods and that they are fastened to the pod surface with several strands of mucilage to permit the egg to remain attached during growth expansion of the pods, but egg shells are sloughed off after eclosion and no evidence remains on mature pods. Adults hatch in the pupal chamber, then cut a symmetrical hole in the pod wall to escape. The cycle from egg to adult is about 60 days. This bruchid is parasitized by Eupelmus cushmani (Crawford), Urosigalphus bruchi Crawford (Forister and Johnson, 1970), and three unidentified species of Eurytoma (Johnson, 1967:269). Forister and Johnson (1970) have more extensively discussed the biology of this bruchid.

Discussion. Some specimens of julianus overlap in size those of major and are sometimes confused with it (cf. discussion of major).

The species of Acacia listed as hosts of julianus are excellent honey plants. Acacia berlandieri, wrightii, and roemeriana are used as ornamental shrubs, and berlandieri and greggi are potential commercial sources of plant gums.

Merobruchus triacanthus, new species

(Figs. 121–125)

Merobruchus sp. 3: Johnson, 1979:123.

Color. Integument deep red to piceous. Head usually red, sometimes with vertex piceous, antenna with segments 1–5 and 11 reddish, intermediate segments piceous; pronotum with most of disk piceous, flank deep red, prosternum piceous; most of elytra piceous with small reddish areas laterally, mesosternum and metasternum deep red to piceous, metepisternum reddish, abdomen reddish with piceous blotches; pygidium reddish with piceous median spots (fig. 125); legs mostly deep red with ventral margins piceous. Pubescence of recumbent gray, coppery, brown, and pale yellow hairs distributed as follows: Head usually yellowish mixed with gray. Pronotum on darker area of pronotal disk (fig. 121) with coppery and yellowish hairs, rarely with fragmented median line of yellowish hairs, flanks of pronotum largely gray, occasionally intermixed with pale yellow. Elytra predominantly gray in middle of disk intermixed with brown and coppery (fig. 121), middle of third interval with elongated pale yellow spot, lateral areas of elytra with vague bar pattern, bases of elytra occasionally with pale yellow patches. Pygidium (fig. 125) mostly pale yellow with intermixed grayish patches, base with three yellowish patches in both sexes, piceous integumental spots showing through vestiture. Venter of body with intermixed gray and yellowish hairs in no particular pattern except mesepimeron yellowish and metepisternum with three yellowish patches, each abdominal segment with small, indistinct yellowish patch near lateral margin; legs mostly gray, sometimes mixed with yellow mottled pattern evident on metafemur and metatibia.

Structure. Head turbiniform, not sexually dimorphic, postocular lobe narrow, setose; vertex, frons, and basal two-thirds of clypeus strongly but finely punctate, frons with prominent carina ending dorsally in small impunctate boss; antenna short, barely reaching posterior corner of pronotum, subserrate-clavate from fifth segment. Pronotum cam-
paniform (fig. 121), disk convex without asperities except short, shallow sulcus on prescutellar lobe and slight depression on each posterolateral corner of disk; surface with densely placed, fine, circular foveae, each with a seta arising beneath its anterior rim, most foveae discrete; lateral margin of disk marked with blunt carina extending from posterolateral corner one-half distance to coxal cavity; cervical sulcus short; prosternum with apex separating coxae at their apices. Scutellum quadrate, emarginate, and bidentate apically. Elytra together (fig. 121) slightly longer than wide, disk flat or slightly depressed mesally; striae regular in course, intervals of uniform width, surface strigose, striae punctures small, deep, strial sulci shallow; stria arising at end of scutellum, 2, 5, and 7 arising from deep basal pits beneath anterior rim of elytron, 3 and 4 each arising from small denticle on prominent gibbosity, all striae ending free apically or occasionally with 4 and 5 conjoined. Mesosternum with intercoxal process rounded apically, postmesocoxal sulcus angulate. Metacoxa densely punctate; metafemur as in figure 124, with lateral face finely, densely punctate, pecten with one long, acute, slightly curved denticle, and three shorter denticles, long denticle separated from others by a gap (fig. 124); metatibia strongly arcuate at base, muro short, slender; lateral denticle blunt, coronal denticles minute, ventral carina flanglelike in apical three-fourths, ventrolateral carina extending nearly to notch between muro and lateral denticle, lateral carina ending in lateral denticle, dorsomesal carina prominent, complete. Abdomen with first sternum longer than remaining sterna combined in 5, subequal to remaining segments in 5, slightly emarginate for reception of reflected pygidial apex in 5, slightly emarginate but without lateral ridges in 5; pygidium densely, finely punctate. Male genitalia: Median lobe broad (fig. 122), 4 x as long as wide, ventral valve evenly arcuate; internal sac with three elongated spines of nearly equal size and shape, entire sac lined with minute spicules. Lateral lobes (fig. 123) nearly straight, apices rounded, cleft about two-thirds their length.

Body length 2.3–3.5 mm, width 1.5–2.3 mm; pronotal length 0.9–1.1 mm, width 1.1–1.6 mm.


Holotype, allotype, and paratypes deposited in National Museum of Natural History, Washington, DC. Paratypes also deposited in C.D. Johnson collection, Flagstaff, Arizona; Canadian National Collection, Ottawa; British Museum of Natural History, London; and Museum G. Frey, Tutzing, Munich, West Germany.

Distribution. MEXICO: Michoacán, Colima.

Biology. Five host plants are known for this species: Acacia acatensis, coulteri, and aff. riparioideae; Leucaena guatemalensis; and Lysiloma divaricata. Lysiloma divaricata is an excellent source of tanbark in Mexico and Central America.

Discussion. Merobruchus triacanthus is most similar to M. julianus in color pattern, body shape, details of the male genitalia, and lack of a definite ridge on either side of the genital notch of the terminal sternum. Specimens of triacanthus average smaller than those of julianus, the micro is shorter (fig. 45, cf. with 124), the elongated ochreous spot in the middle of the third interval is not as prominent, the gap between the first and second denticles of the pecten is wider, and the middle spine of the internal sac is more slender (fig. 42, cf. with 122).

The name triacanthus refers to the three nearly equal spines in the internal sac of the male genitalia.

Merobruchus politus, new species.

(Figs. 86–92)

Color. Integument reddish brown to piceous; head with frons and clypeus piceous except for narrow reddish band inside each eye; antenna with segments 1–5 reddish, 6–11 piceous; legs mostly reddish, metacoxa and polished area on first and second abdominal sternae piceous. Pubescence of gray, yellow, and dark brown setae; flanks of prothorax densely clothed with yellowish gray to gray setae contrasting sharply with yellow discal stripe; venter of body densely clothed with gray; elytra mottled gray, yellowish gray, and brown in vague pattern; third interval with elongate yellowish gray (in some specimens golden yellow) median stripe limited by dark brown spots, a short, similarly colored spot near apex; fifth interval and small apicolateral and mediolateral spots yellowish gray, scattered spots gray; pygidium (fig. 91) evenly clothed with yellow except for small median spot at basal one-third and two lateral spots; pygidium (fig. 92) with median line and lateral stripes yellowish.

Structure. Body somewhat elongated, nearly 2 x as long as wide (fig. 86). Head turbiniform, eyes protuberant, vertex densely microfoveolate, each foveola with recumbent seta arising from middle, frontal carina prominent, frons microru-
gose with foveolae crowded and convergent; clypeus irregularly microfoveolate except apex polished; postocular lobe narrow; antenna capituate, eccentric from fifth segment, club segments nearly 2 x as wide as long, terminal segment ovate. Pronotum campaniform (fig. 86), lateral margins sinuate, disk convex with subbasal, rounded gibbosity either side at basal one-third, disk appearing slightly constricted apical of gibbosities, middle of disk microfoveolate, depressions irregularly spaced; lateral carina obtuse, becoming obsolete at one-third distance from procoxal fossa; cervical sulcus short, deep, nearly hidden in vestiture; prosternum sulcus short, deep, nearly hidden in vestiture; metasternum sub-rounded at one-third, disk appearing slightly constricted basai ovate. Pronotum campaniform (fig. 86), lateral margins sinuate, disk depressed in middle one-third; striae regular except striae 4 and 5 sometimes conjoined; intervals flat, third and fifth wider than others, surface finely imbricate. Metacoxal transverse, bidentate, emarginate apically. Elytra together (fig. 86) longer than wide, disk depressed in middle one-third; striae regular in course, stria 1 arising in scutellar depression, stria 2 from pit beneath oblique ridge, striae 3 and 4 from closely set flat denticles atop slight gibbosity, striae 5 and 6 from minute basal denticles; striae free apically except striae 4 and 5 sometimes conjoined; intervals flat, third and fifth wider than others, surface finely imbricate. Metacoxa densely, finely punctate except for glabrous band on anterior margin, pecten of metafemur (fig. 90) with one long, slender subapical denticle separated from succeeding two or three denticles by slight gap; metatibia (fig. 90) strongly bent at base, apical two-thirds nearly straight, gradually expanded base to apex, micro short, scarcely longer than lateral denticle; ventral, lateral, and dorsomedial carinae complete, lateroventral carina abbreviated. Abdomen with first sternum slightly longer than remaining sterna together in \( \delta \), subequal in \( \varphi \); fifth sternum broadly emarginate in \( \delta \), nearly evenly rounded in \( \varphi \) but with submarginal carina slightly lobed either side of pygidial apex, polished spot on lateral area of first and second abdominal sterna (fig. 89). Pygidium of \( \delta \) convex, reflexed into emargination of terminal sternum, of \( \varphi \) nearly flat, disk in both sexes densely microfoveolate, surface nearly obscured by vestiture in male. Male genitalia: Median lobe about three times as long as width across apex (fig. 87), ventral valve arcuate, dorsal valve truncate, membranous; internal sac with one large forkted sclerite at basal one-third and two slender, tapered spicules at middle, basal one-fourth of sac lined with minute, blunt denticles, apical one-third lined with minute, acute denticles, apical closure valve circular. Lateral lobes (fig. 88) slightly bowed, perceptibly expanded apically, cleft three-fourths their length.

Body length 4.0–4.9 mm, width 2.6–2.9 mm; pronotal length 1.1–1.5 mm, width 1.7–1.9 mm.


Holotype, allotype, and paratypes deposited in National Museum of Natural History, Washington, DC. Paratypes also deposited in American Museum of Natural History, New York; Canadian National Collection, Ottawa; California Insect Survey, University of California, Berkeley; Snow Museum, Lawrence, Kansas; Naturhistoriska Riksmuseet, Stockholm, Sweden; and C.D. Johnson collection, Flagstaff, Arizona.

Distribution. MEXICO: Durango, Chihuahua, Tlaxcala, Distrito Federal, Mexico.

Biology. Of all the plant names given in the paratype lists, only Pithecellobium leptophyllum is a rearing record and was found on a herbarium sheet in the National Museum of Natural History; the others are probably pollen feeding records. Apparently only one beetle develops in a seed. Pods are rather thin walled and adults emerge through circular exits cut in the pod wall.

Discussion. This species is distinguished from all other members of the genus by the polished areas on abdominal sterna 1 and 2 and by details of the internal sac armature of the male genitalia.

The specific name is derived from polio (Latin) = polished and refers to the polished area on the abdominal sternum.
Vacillator Group

The vacillator group is distinguished by the following combination of characteristics: Integument usually dark red; pubescence yellow, especially on the pygidium; pygidium dimorphic in some species; three prominent spots of yellow hairs on metepisternum; postocular lobe short; elytra longer than wide; basal elytral gibbosities prominent on striae 3 and 4; carinae flanking anal notch not prominent (except in *vacillator*); lateral margins of pronotum straight or slightly bowed; postmesocoxal sulcus angulate behind coxa; ventral valve broad, truncate in most species; internal sac with large, wishbone-shaped sclerite; lateral lobes bowed except in *porphyreus* and *cristoensis*; all known host associations with *Lysiloma* spp. Six species.

This group appears to be most similar to the terani group.

**Merobruchus vacillator** (Sharp)

(Figs. 126–130)

*Bruchus vacillator* Sharp, 1885:457; Pic, 1913:54.

*Acanthoscelides vacillator* Blackwelder, 1946:761.


Color. Integument reddish brown to deep purplish red with pale reddish variegation; antenna with basal segments reddish yellow, apical four segments contrasting dark red, terminal segment sometimes reddish yellow; forelegs and midlegs reddish brown. Pubescence of mostly yellowish gray setae in vague pattern on pronotum and elytra (fig. 126) except for pair of usually prominent spots on disk of pronotum; scutellar and metepisternal spots yellow; pygidial setae yellow in pattern illustrated (fig. 130).

Structure. Essentially as for *M. porphyreus* except basal striae gibbosities more prominent, ‡ fifth sternum shallowly emarginate, emargination limited by prominent straight processes, and in details of ‡ genitalia. Male genitalia: Median lobe short (fig. 127), slightly more than 2 x as long as width across apex; ventral valve transverse, gently arcuate, without median process; internal sac with wishbone sclerite at base, middle of sac with paired, broad-based, hollow spines, apical one-half of sac sparsely lined with slender spicules, apex with arched, slightly sclerotized structure, and terminal closure ring. Lateral lobes slender (fig. 128), less bowed than in *cristoensis* and *porphyreus*.

Body length 2.7–3.3 mm, width 1.6–1.9 mm; pronotal length 0.9–1.1 mm, width 1.2–1.4 mm.

Type locality. MEXICO: Guanajuato.

Holotype depository. British Museum (Natural History), London.


Bottimer (1968) reported *vacillator* from Big Bend, Texas, and I have confirmed that identification.

Biology. Nothing is known of the biology of this species except the host plant record.

Discussion. Characters to separate *M. vacillator* from others in the group are the lack of distinctive setal patches on the pronotum and lateral pronotal sclerites, the prominent elytral gibbosities, two prominent processes on the ‡ fifth sternum, and conformation of the internal sac sclerites (cf. figs. 26, 94, and 127).

The only known host plant, *Lysiloma divaricata*, is used locally in Mexico and Central America for tanbark.

**Merobruchus porphyreus**, new species

(Figs. 93–97)

Color. Integument reddish brown to deep purplish red with paler red variegation; antenna yellowish red to piceous; forelegs and midlegs yellowish, occasionally with piceous suffusion, hindlegs reddish brown to piceous, all tarsi usually yellowish. Pubescence of gray, black, and yellow hairs; head with fine yellow setae, pronotal disk with sparse gray pubescence on intervals between foveolae, each foveola with centrally placed fine black seta, anterior flank of pronotum with patch of yellow hairs, middle of basal lobe with few yellow hairs; scutellum yellow, yellow patches on mesepimeron, middle and caudal margin of metepisternum, and lateral margin of abdominal sterna 2–5; venter of body otherwise gray; legs gray except tarsal pads yellow; pygidium with variegated pattern of yellow and black setae, usually with vague, paired dark spots near apex (fig. 97).

Structure. Body subfusiform, subdepressed dorsally (fig. 93). Head turbiniform, frons and clypeus densely, finely fo-
veolate, each foveola with centrally placed seta, frontal carina obtuse, postocular fringe narrow; antenna gradually clavate from fourth segment, terminal segment elliptical. Pronotum campaniform (fig. 93), lateral margins straight, basal lobe prominent, shallowly sulcate; disk convex, without major asperities, slightly depressed near posterolateral angles, surface of disk densely, irregularly, finely foveolate, intervals finely rugose; lateral margins of pronotal disk marked by poorly defined, obtuse ridge, cervical sulcus indistinct, intercoxal process barely separating procoxal apex, angles, surface of disk densely, irregularly, finely foveolate, intervals finely rugose; lateral margins of pronotal disk marked by poorly defined, obtuse ridge, cervical sulcus indistinct, intercoxal process barely separating procoxal apexes. Scutellum quadrate, deeply incised apically. Postmesocoxal sulcus strongly angulate. Elytra together (fig. 93) slightly longer than wide, subdepressed, stria 1 arising near scutellar apex, 3 and 4 from low gibbosity surmounted by two blunt denticles, 5 and 6 from basal pits, all striae free apically except 6 and 7 conjoined; strial lines shallow, regularly punctate; intervals flat, finely imbricate. Forelegs and midlegs not modified; metacoxal face densely punctate; pecten of metafemur with one long denticle separated by gap from one or two shorter denticles (fig. 96); metatibia (fig. 96) with ventral, lateral, and dorsomesal carinae complete, lateroventral carina obsolete apically; mucro short, acute, lateral denticle barely evident, coronal denticles two or three. First abdominal sternum as long as remaining sterna together; fifth sternum broadly emarginate in ♂, more narrowly emarginate in ♀, and lacking lateral carinate processes flanking emargination. Pygidium oblique in ♂, more convex and slightly reflexed apically in ♀, discal surface densely, finely imbricate in both sexes. Male genitalia: Median lobe (fig. 94) about 3 x as long as apical width, ventral valve short, broad, apical border somewhat angulate, tip rounded, dorsal valve membranous with brush of hairs apically; internal sac lined with fine denticles in basal one-half, fine setae in apical one-half, middle of sac with large, wishbone-like, skewed sclerite with attenuated flattened arms, acute lateral process at fork. Lateral lobes bowed (fig. 95), attenuate apically.

Body length 2.7–3.5 mm, width 1.4–2.1 mm; pronotal length 1.5–2.2 mm, width 1.1–1.3 mm.


Holotype, allotype, and paratypes deposited in National Museum of Natural History, Washington, DC. Paratypes also deposited in Canadian National Collection, Ottawa; California Academy of Sciences, San Francisco; J.E. Wappes collection, Chadds Ford, Pennsylvania; and C.D. Johnson collection, Flagstaff, Arizona.

Distribution. MEXICO: Jalisco, Sinaloa, Durango, Veracruz, Chiapas.

Biology. Only two host plants are recorded here for porphyreus, Lysiloma acapulcensis and L. kellermani. Nothing else is known of the life history of this species.

Discussion. The characters to separate M. porphyreus from other in the vacuumator group are the bright yellow setal patch on the pronotal flank, on the mesepimeron, and in the middle and on the caudal margin of the metepisternum, the short apicoconal line of setae on the disk of the pronotum, lack of apical processes at the apex of the ♀ fifth sternum, and wishbone sclerite skewed and paired median spines absent in the ♀ genitalia.

The specific name is derived from porphyra (Gr. = purple) alluding to the reddish-purple integument.

Lysiloma acapulcensis is a source of plant gums. The bark is astringent and is used in local medicine in Mexico.

Merobruchus cristoensis, new species

(Figs. 25–29)

Color. Integument reddish purple, pygidium, antennae, forelegs, and midlegs reddish yellow. Vestiture mostly yellowish gray, vaguely condensed into patches (fig. 25); pronotal disk with thin median line of setae; pygidium (fig. 29) with yellow setae nearly obscuring disk, inconspicuous median stripe of condensed hairs constricted at middle.

Structure. Similar to porphyreus except for distinctive ♀ genitalia. Pecten of metafemur with distinct gap between long proximal denticle and two distal denticles. Male genitalia: Median lobe (fig. 26) 2½ times as long as width across apex, ventral valve as illustrated, similar to that of porphyreus; armature of internal sac with flat, wishbone-shaped sclerite near base of sac, sclerite not skewed, and pair of slender spines at middle of sac, apex of sac lined with extremely fine spicules. Lateral lobes as illustrated (fig. 27), nearly identical to those of porphyreus.

Body length 3.4 mm, width 1.9 mm; pronotal length 1.0 mm, width 1.4 mm.
Holotype ♂. EL SALVADOR: Monte Cristo, 23 km N Metapan, 2800 m, 8–10–V–1971, H.F. Howden.

The unique type is deposited in Canadian National Collection, Ottawa, Ontario.

Distribution. El Salvador.

Biology. Nothing is known of the host plants or habits of this species.

Discussion. The principal characters that distinguish *M. cristoensis* are the fine median line of setae on the pronotal disk, absence of a yellow setal patch on the pronotal flank, grayish yellow setal patches on the mesepisternum and metepisternum, the flat, not skewed, wishbone sclerite, and the pair of acute median spines in the male genitalia.

The specific name is derived from the type-locality.

**Merobruchus lineaticollis** (Sharp)

(Figs. 53–57)


Color. Integument reddish brown to piceous; basal fifth and terminal segments of antenna, forelegs, and midlegs yellowish brown, pygidium mostly dark brown. Vestiture of yellowish grey and dark brown setae, those on pronotum mostly dark brown with contrasting, intensely yellowish white median stripe (fig. 53); elytra with second interval yellowish nearly to apex, third interval yellowish but interrupted by two dark brown spots, apical one-half of elytra with vaguely defined, oblique, grayish yellow band, median transverse band vaguely defined; pygidium dark brown in basal three-fourths with median stripe and lateral margins yellowish (fig. 57); venter of body densely clothed with yellowish gray setae.

Structure. Body subfusiform, subdepressed dorsally. Head turbiniform, eye with postocular fringe narrow; frons with narrow median carina, vertex finely, densely ciliate, frons more coarsely punctate, clypeus coarsely punctate to strigate, antenna with segments 1–4 slender, 5–10 eccentric, 11 elliptical. Pronotum campaniform (fig. 53), lateral margins slightly sinuate, disk evenly convex except slightly depressed near posterolateral corners, and perceptibly channeled on basal lobe; surface of disk densely microveolate, with foveolae generally separated by less than one-half diameter, on flanks separated by more than 1 diameter, each foveola with fine, dark brown seta arising from center of depression; lateral ridge sinuate, extending one-half way from posterolateral corner toward procoxal cavity; cervical sulcus short, prominent; prosternum not separating procoxal apices; mesosternal apex truncate, postmesocoxal sulcus strongly angulate. Scutellum subquadrate, deeply emarginate apically. Elytra together slightly longer than wide (fig. 53), evenly convex except slightly depressed behind scutellum; striae normal in course, striae 3 and 4 each arising from small, blunt denticle on low basal gibbosity; all striae free apically, 4 and 5 abbreviated; intervals flat, finely imbricate. Metacoxa finely, discretely punctulate; pecten of metafemur (fig. 56) with one large denticle separated by gap from two or three progressively smaller subapical denticles; metatibia (fig. 56) strongly arcuate; ventral, lateral, and dorsomesal carinae complete, lateroventral carina obsolete in apical one-sixth; micro short, acute, lateral denticle short, coronal denticles three or four. First abdominal sternum subequal in length to remaining sterna combined, fifth sternum emarginate. Pygidium nearly flat in basal one-half, strongly convex in apical one-half, apex truncate in ♂, rounded in ♀. Male genitalia: Median lobe apically broad (fig. 54), ventral valve transverse, slightly arcuate apically, dorsal valve membranous; internal sac with elongate wishbone sclerite, interior of sac lined with minute setae visible only under high magnification, apex of sac with patch of ciliate scales and circular closure valve. Lateral lobes as illustrated (fig. 55).

Body length 2.7–3.1 mm, width 1.5–1.7 mm; pronotal length 0.7–0.8 mm, width 1.0–1.3 mm.

Type locality. GUATEMALA: Panjachel, 5000’.

Holotype depository. British Museum (Natural History), London.

Distribution. MEXICO: Chiapas. GUATEMALA: Salama.


Biology. No host data are available for this species.

Discussion. Only four specimens of this species have been seen. It is placed in the vacillator group by virtue of the shape of the ventral valve and internal sac sclerites and by the red integument and yellow pubescence, but it is easily distinguished from other members of the group by the distinct median stripe of yellow setae on the pronotal disk and pygidium and again by characters in the male genitalia. It is illustrated in color in Sharp’s treatment in the Biologia Centrali-Americana (vol. 5, plate 26, fig. 12).
Merobruchus knulli (White)

(FIGS. 47–52)

Bruchus knulli White, 1941:189.
Mylabris knulli: Blackwelder and Blackwelder, 1948:44.


Color. Integument reddish brown, eyes black, apical one-third of elytra, especially in ♂, usually clouded with dark brown or piceous (fig. 47); ♀ pygidium with small, irregularly rounded median spot divided by narrow line of setae and vague diagonal bands (fig. 51), ♀ pygidium with large, brown, bare coriaceous patch (fig. 52); terminal four antennal segments often dark brown. Vestiture of pale yellow, gray, vague diagonal bands (fig. 51), ♀ pygidium with large, yellow setae in basal one-half, ♀ with mixed yellow and gray brown or piceous (fig. 47); ♀ pygidium with small, irregularly shaped median spot divided by narrow line of setae and vague diagonal bands (fig. 51), ♀ pygidium with large, brown, bare cordate patch (fig. 52); terminal four antennal segments often dark brown.

Biology. Three host plants are known for this species: Lysiloma microphylla var. thornberi in Arizona, L. watsonii in Jalisco, Michoacán, Morelos, Oaxaca, Sonora. HONDURAS: Comayagua. Guate-

MAPA: El Progreso. EL SALVADOR: San Vicente.


loma acapulcensis, CDJ 357–73. Morelos, Cuernavaca. Michoacán, Uruapan (no locality). Oaxaca, 15 mi S Sola de Vega, Howden. GUATEMALA: El Progreso, 17 mi W Sana-

rate, in Lysiloma acapulcensis, CDJ 1953–80. EL SALVA-


Discussion. This species closely resembles M. xanthopygus. Salient characters are the simply punctate pronotal disk, ♀ pygidium with a small median bare spot, ♀ pygidium immaculate or with a very small, irregular median spot, and ♀ genitalia with a semicircular wishbone sclerite.

Lysiloma acapulcensis is a source of gums and local medicines.
Merobruchus xanthopygus, new species

(Figs. 131–136)

Color. As for knulli except distal one-half of elytra darker than proximal one-half in most specimens (fig. 131); pronotum uniformly clothed with yellow setae; pygidium (fig. 135) almost uniformly yellow, occasionally with faint medio-basal dart of pale yellow and small, median bare spot bisected by dart; similar to that of knulli.

Structure. As for knulli except for following differences: Pronotum sparsely, simply punctate, not densely foveolate; genitalia with wishbone sclerite nearly semicircular, flat, not skewed (fig. 132). Lateral lobes elongate (fig. 133), bowed toward apices. Hindleg as in figure 134.

Body length 3.8–4.0 mm, width 2.1–2.5 mm; pronotal length 1.2–1.3 mm, width 1.7–1.9 mm.


Holotype, allotype, and paratypes deposited in National Museum of Natural History, Washington, DC. Paratypes also deposited in British Museum (Natural History), London; California Academy of Sciences, San Francisco; California Insect Survey, Berkeley; Louisiana State University, Baton Rouge; Canadian National Collection, Ottawa; and C.D. Johnson collection, Flagstaff, Arizona.

Distribution: MEXICO: Jalisco, Morelos, Mexico, Oaxaca. GUATEMALA: El Progreso. HONDURAS: Comayagua.

Biology. Only one host plant, Lysiloma acapulcensis, has been recorded for this species.

Discussion. The characters in the key and in the preceding description should suffice to distinguish this species from M. knulli. The salient characters are pronotal disk irregularly foveolate, pygidium with a large cordate spot, pygidium with a bisected median spot, and genitalia with an angular, usually skewed wishbone sclerite. These two species are extremely similar, and three series of rearings yielded both species. No specimens of xanthopygus have been collected north of Jalisco, whereas knulli is known from as far north as Arizona. The temptation is strong to combine these two species as a variable species, but the characters appear to be clearly diagnostic.

The name xanthopygus, which is derived from xanthos (Gr. = yellow) and pygus (Gr. = rump), refers to the yellow pygidium.
Terani Group

The terani group with one known species is most similar to the vacillator group but with the following differences: Elytra quadrate, not longer than wide; postocular lobe short; anal notch of female flanked by prominent processes; lateral margins of pronotum concave; metepisternum with prominent patches of yellow hairs; lateral lobes slightly bowed; all known host plants of larva in the genus *Acacia*.

**Merobruchus terani** Kingsolver

(Figs. 116–120)

**Merobruchus sp.** 4: Johnson, 1979:123.  

For detailed description, see Kingsolver, 1980:256.

Color. Integument deep red to piceous, prosternum, mesosternum, and metasternum piceous; forelegs, midlegs, and proximal five or six and terminal segments of antennae reddish yellow, middle segments of antennal club sometimes dusky. Vestiture of yellowish orange, gray, and dark brown recumbent hairs, those on head, pronotum, and pygidium orange; elytra light orange, gray, and brown, with broad, transverse orange band and basal spots orange, apical one-third mottled with orange, brown, and gray hairs intermixed; scutellum orange; body beneath mostly gray with orange spots on mesepimeron, metepisternum, and on lateral margins of fourth and fifth abdominal segments; pygidium (fig. 120) with densely placed orange vestiture, dark areas often with brown hair but usually bare; legs cinereous, apices of protibia, mesotibia, and tarsal pads yellowish.

Structure. Body ovate (fig. 116), broadest at middle of elytra. Head short, subtriangular; vertex finely, densely punctate, punctures on frons and clypeus somewhat coarser, deeper, and approximate, sometimes merging, each puncture setose, frontal carina prominent but not sharp, slightly expanded dorsally; postocular lobe narrow, setose; antenna reaching posteralaterolateral corner of pronotum, strongly clavate from 5th segment, 11th subtriangular. Pronotum campaniform (fig. 116), convex, subdepressed basally, posteralaterolateral corners strongly depressed, depression delimited laterally by oblique, obtuse ridges, basal lobe shallowly sulcate, disk densely foveolate, each foveola round and setose, punctures generally crowded, separated by less than diameter of puncture, sometimes coalescing; cervical sulcus short, deep; prosternum barely separating procoxal apices. Siiiae of elytra shallow, deepening toward apex, 2, 5, and 6 arising basally from deep pits, 3 and 4 from prominent, bidenticate subbasal gibbosity; intervals minutely strigose; postmeso coxal sulcus strongly angulate. Mesocoxal face densely punctate, hindleg as in figure 119. Fifth abdominal sternum of ♂ deeply emarginate with lateral margins of notch slightly elevated and carinate, of ♀ with lateral margin more prominently elevated and angulately carinate; pygidium as in figure 120. Male genitalia: Median lobe (fig. 117) broad apically, base emarginate; ventral valve broad, arcuate; internal sac with single wishbone-shaped sclerite, apex of sac with large patches of fine denticles. Lateral lobes as in figure 118.

Body length 2.9–4.5 mm, width 1.9–2.5 mm; pronotal length 1.0–1.5 mm, width 1.3–1.7 mm.

Type locality. COSTA RICA: Gste. Prov., Santa Rosa N.P.

Type depository. In National Museum of Natural History, Washington, DC.


Biology. This species has been reared from the following host plants: *Acacia angustissima*, *berlandieri*, *gaumeri*, *picachensis*, and *tenuifolia*. It has been collected in January, March, and May to September.

Discussion. *Merobruchus terani* is perhaps most similar to vacillator in the vacillator group, but the elytra of *terani* are nearly quadrate and the pronotal lateral margins are concave, whereas the elytra of those species in the vacillator group are longer than wide, and the pronotal margins are straight or slightly bowed. The bright yellow vestiture, dark red integument, broad truncate ventral valve, and flat wishbone sclerite in the internal sac are associating characteristics between the two groups.

Members of the vacillator group are associated with species of *Lysiloma*, whereas *terani* is known only from species of *Acacia*. 
The pattern of pubescence on the pygidium and elytra is similar to that of *M. boucheri* but is bright yellowish orange, whereas that of *boucheri* is grayish yellow. Comparison of the male genitalia (figs. 10 and 117) shows fundamental differences in the form of the median lobe and armature of the internal sac.

*Acacia berlandieri* is used as an ornamental shrub, is a good honey plant, and is a potential source of commercial plant gum.

**Insolitus Group**

The insolitus group is characterized by the following in combination: Small relative size (2.2-3.3 mm); elytra subdepressed (except *placidus* and *solitarius*); postocular lobe narrow; metepisternum lacking prominent patches of hairs; striae 3 and 4 with basal denticles; postmesocoxal line angulate (except *paquetae*); pygidium with basal triangular pad of white or yellowish hairs sometimes extending as narrow line toward apex or broken into median segments; female sometimes with well-developed lateral flanges or processes flanking anal notch; male genitalia with median triangular sclerite (wishbone) and pair of lateral, usually thornlike sclerites near apex of sac, some species with pair of spines near base of sac; lateral lobes broad, spatulate (except *boucheri*).

The 10 species in the insolitus group are separated into 4 subgroups: Insolitus, sonorensis, placidus, and boucheri.

**Insolitus Subgroup**

Characteristics of the insolitus subgroup are elytral pattern contrastingly marked, pronotum subconical with lateral margins straight, elytral disk subdepressed, pygidium with distinct pattern, processes flanking anal notch well developed. Three species.

**Merobruchus insolitus** (Sharp)

(Figs. 35–40)

*Bruchus insolitus* Sharp, 1885:476.

*Acanthoscelides insolitus*: Blackwelder, 1946:759.


Color. Integument dark red to piceous; head dark red, eyes black, antenna reddish yellow, sometimes with segments 8, 9, and 10 darker than remaining segments; pronotum red tending toward piceous; elytra red with piceous umbones (fig. 35), lateral borders usually dark in basal one-half, third interval with rounded dark spots at basal one-sixth and apical two-thirds, lateral intervals with variable individual dark spots, or spots merged; pygidium piceous with reddish median streak; body venter reddish except prosternum and mesosternum tending to be piceous. Vestiture of yellowish white, white, and brown slender hairs; head, pronotum, elytra, and venter of body yellowish white, brown elytral spots with brown hairs, pygidium (figs. 39 and 40) with yellowish white hairs sparsely distributed except for conspicuous, narrow, white, median "dart" usually extending about two-thirds from base, occasionally to apex, usually evenly attenuated, occasionally "pinched," or rarely interrupted.
Structure. Body subfusiform, subdepressed dorsally. Head with vertex densely punctulate, vestiture directed cephalad; frons more coarsely punctate, vestiture directed mesad, frontal carina ridgelike, frons separated from vertex by transverse sulcus; clypeus scabridulous; antenna slender, extending beyond posterolateral corner of pronotum, serrate from 4th segment, 11th elliptical. Pronotum (fig. 35) elongate-campaniform, lateral margins slightly sinuate, apex rounded; disk evenly convex except for slight depression on basal lobe and at posterolateral corners; lateral carina ridgelike, sinuate; cervical sulcus hidden in vestiture; prosternum barely separating procoxal apices; postmesocoxal ventral at base of procoxa, sternum barely separating procoxal apices; postmesocoxal sulcus strongly angulate. Scutellum wider than long, deeply emarginate, and bidentate. Elytra together (fig. 35) about as long as wide; striae on disk nar-

Biology. Host plants recorded for *M. insolitus* are in the genera *Acacia, Albizia, Lysiloma, and Pithecellobium*. See Appendix 3 for specific hosts. This species has the longest host list of any *Merobruchus* species. It was collected each month except September. *Merobruchus insolitus* is parasitized by the braconid wasp *Urosigalphus neobruchi* Gibson and by the chalcid wasp *Chryseidea benneti* Burks (Burks, 1956).

Host data labels in some collections listing *Havardia brevifolia* are referable to *Pithecellobium pallens*.

Discussion. The principal distinctive characters for this species are the dark red body, piceous elytral margins, white basal pygidal triangle elongated into an evenly tapered dart, and, in the 5 genitalia, the apical nipple on the ventral
valve, three subequal median sclerites, and the basal pair of small, thornlike sclerites. The apparently nearest relative of *insolitus* is *paquetae*.

*Lysiloma acapulcensis* is a local source of medicines and gums, and *L. divaricata* is a source of tanbark.

**Merobruchus hastatus** Kingsolver

(Figs. 30–34)


For detailed description, see Kingsolver, 1980:250.

Color. Integument reddish to piceous; eyes black; forelegs, metatibia, and usually apex of metafemur reddish yellow; antenna with proximal 7 segments and 11 reddish yellow, 8–10 piceous to black. Dorsal vestiture of grayish yellow and dark brown hairs, ventral of silvery gray hairs; dark brown hairs on piceous spots on pronotum, elytra, and pygidium in pattern in figure 30.

Salient characters. Pronotal margins slightly sinuate (fig. 30), vestiture nearly concealing punctuation; elytral pattern more contrasting in *S* than in *h*; pygidium with dense white basal triangle (fig. 34), usually with small, median, elongate white spot separated from basal triangle by black integument; anal notch of 2 short, deep, lateral tufts prominent, that of *S* broad, nearly dividing fifth sternum; postmesocoxal sulcus arcuate, not angulate; antenna with segments 8–10 piceous; hindleg as in figure 33. Male genitalia as in figures 31 and 32.

Body length 3.25–3.75 mm, width 2.0–2.7 mm; pronotal length 1.9–2.0 mm, width 1.4–1.5 mm.

Type locality. COSTA RICA: Gste. Prov., Santa Rosa N.R

Holotype depository. In National Museum of Natural History, Washington, DC.

Distribution. COSTA RICA: Gste., Santa Rosa N.P. No additional records are known.

Biology. This species has been reared from seeds of *Lysiloma desmostachys*, erroneously identified as *Piptadenia flava* in the original description (Kingsolver, 1980) and in Janzen (1980). No other hosts are known.

Discussion. Despite the resemblance of the ventral valve of *hastatus* to that of *santarosae*, *sonorenisis*, *lysilomae*, and *chetumalae*, *hastatus* appears to be somewhat isolated as evidenced by the bold elytral and pygidial patterns. The basal thornlike sclerites in *hastatus*, *insolitus*, and *paquetae* are absent in the other four species. This is the only species in the insolitus group in which the postmesocoxal sulcus is not angulate.

**Merobruchus paquetae** Kingsolver

(Figs. 70–74)


For detailed description, see Kingsolver, 1980:252.

Color. Integumental color dark red to piceous, forelegs, midlegs, and antennae reddish yellow, in some darker specimens with segments 8–10 piceous; eyes black; metafemur mostly piceous with dorsal one-third dark red, pronotum with broad median stripe dusky; elytra with lateral margins usually clouded with piceous, sometimes with strong lateromedian, dark rounded spot; pygidium usually with paired, median, irregular dark areas showing through vestiture, more prominent in darker specimens. Vestiture of yellowish gray, silvery gray, white, and dark brown slender hairs in pattern shown in figures 70 and 74, dark brown hairs restricted to piceous areas; scutellum white; pygidium (fig. 74) with basal triangle and median lozenge-shaped mark yellowish gray to white, rarely with basal triangle connected to lozenge, paired dark, median patches encroaching on white patches; venter of body with evenly distributed silvery gray hairs.

Salient characters. Pronotum with dense vestiture but with discal foveae showing through vestiture, middle of disk darker than lateral areas, pronotum evenly arcuate in lateral aspect; antennae entirely yellow; elytra with moderately strong pattern of brown maculae; pygidium with basal triangle yellowish constricted by lateral, depressed dark spots; postmesocoxal sulcus angulate; anal notch of 5 fifth sternum shallowly sulcate, slightly reflexed; ventral emargination nearly dividing sternum; postmesocoxal sulcus angulate. Male genitalia as in figures 71 and 72.

Body length 2.0–3.1 mm, width 1.1–1.9 mm; pronotal length 0.6–1.0 mm, width 0.9–1.4 mm.

Type locality. COSTA RICA: Gste. Prov., 1 mi W Tilaran.

Holotype depository. In National Museum of Natural History, Washington, DC.


Biology. This species has been reared from the following host seeds: Albizia adinocedra, caribaea, lebbek (Rio de Janeiro), longipedata, Albizia sp. (Mato Grosso, Brazil), Lysiloma sp., Pseudosamanea guachepele (Colombia), and questionably Acacia sp. Collections have been made in February, March, and July.

Discussion. Characters sufficient to separate paquetae are the drab, yellowish gray appearance, entirely yellow antennae, yellowish gray pygidial stripe divided or nearly divided by lateral integumental spots, the very shallow 2 anal notch, and genitalia with the ventral valve arcuate, median sclerite wishbone shaped, and a pair of small, basal, thorn-like denticles. The pronotal disk is often darker than in figure 70. Compare this species with the closely related insolitus.

The extensive host list and broad geographical range are noteworthy.

Sonorensis Subgroup

Characteristics of this subgroup are internal sac lacking basal paired sclerites; ventral valve truncate; wishbone sclerite broad-based, acute apically; dorsal pattern obscure (except santarosae usually with black lateral maculae). Four species.

Merobruchus sonorensis Kingsolver

(Figs. 111–115)


For detailed description, see Kingsolver, 1980:254.

Color. Integument mostly dark red with some piceous obfuscation on head, pronotum, and pygidium, eyes black, antenna yellowish red with segments 8–10 dark, forelegs and midlegs yellowish red. Vestiture of grayish yellow, dark brown and white hairs; head, pronotum, and venter of body grayish yellow; pronotum with vague, median, grayish yellow median stripe in most specimens; scutellum white; elytra (fig. 111) grayish yellow except dark brown on dark integumental spots; pygidium (fig. 115) with dark brown hairs on piceous spots, basal triangle and median spot white, otherwise grayish yellow.

Salient characters. Color pattern muted; antenna with segments 8–10 piceous, scutellum prominently white; pygidium with prominent, densely white basal triangle narrowly connected to median diamond-shaped white spot; postmeso-coxal sulcus sharply angulate; ventral notch of 2 fifth sternum broad, lateral carinate flanges moderately prominent, emargination in 5 broad, about one-half length of sternum, slightly flanged; in lateral aspect, basal two-thirds of pronotum plane, apical one-third arcuate. Male genitalia as in figures 112 and 113.

Body length 2.9–3.5 mm, width 1.6–2.0 mm; pronotal length 0.9–1.2 mm, width 1.2–1.4 mm.

Type locality. COSTA RICA: Gste. Prov., Santa Rosa N.P.

Holotype depository. In National Museum of Natural History, Washington, DC.

Distribution. MEXICO: Sonora, Sinaloa, Jalisco, Nayarit, Campeche. HONDURAS: Comayagua. COSTA RICA: Guanacaste. COLOMBIA.


Biology. The host plants for sonorensis include Albizia adinocepha, caribaea, lebbek, occidentalis, ortegae, sinaloensis, fomentosa; Lysiloma divaricata, seemani; and Pithecellobium sonorae. Collections were made in March, April, July, and December.

Discussion. Despite the close resemblance of the male genitalia to those of santarosae (figs. 101 and 112), sonorensis is distinctive in the dark red integument with an indistinct elytral and pronotal pattern, prominent, elongate, white pygidial triangle, and broad anal notch of the 5th sternum. See also the discussions of chetumalae, lysilomae, and santarosae. The wood of Albizia occidentalis is used in carpentry in northern Mexico, and A. lebbbeck, introduced from Asia, is a useful shade and ornamental tree.

Merobruchus santarosae Kingsolver

(Figs. 98–105)


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For detailed description, see Kingsolver, 1980:246.

Color. Integument deep red above with piceous maculae on elytra; venter of body usually somewhat darker especially on thoracic sterna; eyes piceous, antenna reddish yellow with segments 8–10 piceous; forelegs and midlegs reddish yellow, hindlegs usually dark red. Vestiture of yellowish gray and dark brown, slender, recumbent hairs, brown hairs only on piceous integumental maculae on elytra and occasionally on pronotum. Hindleg as in figure 103.

Salient characters. Pronotum (fig. 98) immaculate, densely covered with pubescence concealing punctuation, in lateral aspect dorsal profile evenly arcuate; dark brown or piceous lateral elytral maculae (figs. 98–100) prominent in most specimens; pygidium (figs. 104 and 105) with basal triangle of setae of same color as those on remainder of pygidium, not strongly differentiated, indistinct median dart usually constricted by dark integumental spots, apex of ♀ fifth sternum with moderately long tufts, ventral notch deep; postmesocoxal sulcus strongly angulate. Male genitalia as in figures 101 and 102.

Body length 3.1–4.2 mm, width 1.9–2.1 mm; pronotal length 0.9–1.3 mm, width 1.3–1.4 mm.

Type locality. COSTA RICA: Gste. Prov., Santa Rosa N.P.

Holotype depository. In National Museum of Natural History, Washington, DC.


Biology. Host plants recorded for this species are Acacia coulteri, Albizia sp., and Lysiloma desmostachys. It has been collected from December to March and in May, July, and August. In the original description (Kingsolver, 1980), the common name “palo amarillo” was listed, but since this name can be applied to several plants in Mexico, no definite species can be indicated.

Discussion. Although details of the male genitalia of santarosae indicate a close similarity to sonoren시스, lysiомae, and chetumалae, its external characters differ. The dense yellowish gray pubescence of santarosae with dark brown or black lateral maculae in 90 percent of the specimens is distinct from the sparse, dark brown pubescence of the other two species. See the discussion of chetumalae.

Acacia coulteri is a local source of fuel in Mexico.

*Merobruchus lysilomae*, new species

(Figs. 58–62)

Color. Integument dark reddish brown except antennae, forelegs and midlegs, and metatarsi yellowish; elytra mottled with dark brown spots and vaguely defined transverse bars; pronotum usually with narrow yellowish red median stripe. Vestiture of short yellowish gray hairs evenly distributed over body except in some dark elytral spots and dark areas on pygidium; postocular spot and pronotal flanks with dense yellow setae; pygidium with vaguely defined to distinct basal triangle of yellowish white setae delimited by dark integument.

Structure. Body elongate-ovate, widest behind humeri, somewhat depressed dorsally. Head turbiniform, frons slightly convex, some specimens with narrow, median globose line; vertex finely, transversely punctate, frons and clypeus more coarsely punctate; postocular lobe narrow; antenna clavate from fifth segment, terminal segment oval. Pronotum campaniform in dorsal aspect (fig. 58), lateral margins nearly straight, apical margin evenly rounded, basal margin sinuate; disk slightly convex, discal surface with distinct and discrete microfoveolae, each bearing recumbent hair in its center, basal lobe with shallow median sulcus; lateral carina obsolete, present only as intermittent ridge; cervical sulcus short, deep; prosternum barely separating procoxae; postmesocoxal sulcus vaguely angulate. Scutellum short, broad, deeply emarginate. Elytra together slightly longer than broad (fig. 58), widest at apical one-third, subdepressed, especially around scutellum; striae narrow, shallow, regular in course, 3 and 4 arising basally from bidentate basal gibbosity; interspaces flat, finely imbricate. Metaxocyst face finely, evenly punctate, metafemoral pecten (fig. 61) with four denticles on triangular lamina, basal denticle 2 × as long as others; metatibia abruptly bent at base, nearly straight and gradually broadened toward apex; muro short, slightly longer than lateral denticle, coronal denticles three, lateroventral carina obsolete apically, not joined to ventral carina at muro base. Terminal sternum of ♀ broadly emarginate to one-half its length, broadly emarginate also in ♀ but with lateral borders of emargination slightly prominent and carinate; ♀ pygidium oblique in basal two-thirds, strongly convex and reflexed apically, extreme apex truncate, ♀ pygidium similar but apex not reflexed, extreme apex rounded, disk in both sexes finely strigose, strigae unevenly distributed. Male genitalia: Median lobe more than 4 × as long as wide (fig. 59), ventral valve broad, quadrate, slightly emarginate apically; in-
ternal sac with rows of fine, sharp denticles basally, middle of sac with triangular median sclerite and two identical, lateral, thornlike sclerites, apex lined with fine denticles. Lateral lobes as illustrated (fig. 60).

Body length 2.4–3.1 mm, width 1.4–1.7 mm; pronotal length 0.8–0.9 mm, width 1.1–1.3 mm.


Holotype and paratypes deposited in Canadian National Collection, Ottawa, Ontario; allotype and paratypes in National Museum of Natural History, Washington, DC.

Paratypes deposited in Blatchley collection, Purdue University, W. Lafayette, Indiana; C.D. Johnson collection, Flaggstaff, Arizona; J.E. Wappes collection, Chadds Ford, Pennsylvania; Division of Plant Industry, Florida Department of Agriculture, Gainesville; and British Museum (Natural History), London.


Biological. This species has been reared from seeds of several host plants, including Lysiloma sabicu and latisiliqua, Albizia lebbek and polyphylla, and Acacia richii and simplicifolia. It was collected during June and July, September through January, and March.

Lysiloma latisiliqua is planted as an ornamental tree around homes and along highways, and L. sabicu is used in ship building in the West Indies.

Discussion. Characters sufficient to separate this species from others in the sonorensis group are the purplish red integument, sparse body vestiture, poorly defined basal triangle of the pygidium, ratio of pronotal width to length 1.3:1, paired median sclerites of the internal sac each with a broad base and with the lateral spine set at 90 degrees, wishbone sclerite elongate-triangular, and carinate processes flanking the fifth sternal notch prominent.

The species is named for one of its host plant genera.

Merobruchus chetumalae, new species

(Figs. 15–18)

Color. Integument dark purplish brown, forelegs and midlegs yellowish, metafemur sometimes reddish brown; antenna yellowish with segments 8–10 reddish brown, segment 11 usually yellowish; pygidium reddish brown, sometimes with lateral yellowish areas, pygidium dark brown. Ventrise of short, silvery gray, and brown hairs arranged in pattern similar to that of lysiomae; pronotum often with slender median line of gray hairs; flanks of pronotum and of venter of body with vestiture dense; pygidium (fig. 17) evenly clothed with gray hairs except for short, broad basal triangle extending to one-third from pygidial base; pygidium (fig. 18) with narrow basal triangle of silvery gray hairs, in some specimens reaching nearly to apex, sometimes interrupted at basal one-third, remainder of pygidium covered with dark brown hairs.

Structure. Similar to lysiomae, with following differences: Ratio of pronotal width to length 1.24:1 in chetumalae (fig. 15). (1.31:1 in lysiomae, fig. 58); paired median sclerites of internal sac more slender with spine projecting at about 30° in chetumalae (fig. 16) (sclerite broad based and with spine at 90° in lysiomae, fig. 59); overall measurements average smaller in chetumalae; carinate processes flanking fifth sternal emargination in not as prominent in chetumalae. Male genitalia: Median lobe (fig. 16) 4.5 x as long as width across ventral valve; similar to lysiomae but with ventral valve longer, paired sclerites of internal sac elongated, and with lateral spine set at about 30°, not 90° as in lysiomae; wishbone sclerite much smaller than in lysiomae.

Body length 2.1–2.3 mm, width 1.2–1.3 mm; pronotal length 0.6–0.7 mm, width 0.8–0.9 mm.

Collections were made in December and March.

Johnson collection, Flagstaff, Arizona, and J.E. Wappes

Acanthoscelides limpidus:

Blackwelder, 1946:760.

Merobruchus placidus

(Horn)

(Figs. 75–85)

Bruchus placidus Horn, 1873:341, 1894:345; Fall, 1910:184; Cushman, 1911:498.

Bruchus limpidus Sharp, 1885:456; Pic, 1913:31 (NEW SYNONYMY).

Mylabris placidus: Leng, 1920:306.

Acanthoscelides placidus: Blackwelder, 1946:760.

Acanthoscelides limpidus: Blackwelder, 1946:760.


Color. Integument dark red to dark brown with some sternal areas piceous; legs and antennae sometimes with piceous suffusion; pubescence of short, grayish yellow, grayish white, and brown hairs, latter inserted on maculations of elytra; grayish white hairs on ventral areas of body and legs; scutellum with white hairs; pattern of vestiture on pronotum variable from nearly uniformly clothed with yellowish hairs to having distinct median and lateral lines of hairs; pattern on elytra variable from nearly unicolorous to vaguely maculate at middle of lateral margins and at apex, and third interval with prominent, elongated yellowish spot; pygidium yellowish with variable basal triangular spot.

Structure. Body ovate, convex dorsally (fig. 75). Head turbiniform, eyes with ocular sinus about five-eighths length of eye; postocular fringe narrow, densely setose; vertex densely, finely punctulate, punctures becoming coarser and striated on frons; antenna serrate from fifth segment, terminal segment subelliptical. Pronotum campaniform, lateral margins straight to slightly arcuate, disk evenly convex with slight depressions near posterior corners and on basal lobe; surface minutely foveolate, each foveolar seta arising from center; prosternum short, not separating coxal apices; mesosternum truncate apically, postmesocoxal sulcus strongly angulate. Scutellum quadrate, deeply emarginate. Elytra together (fig. 75) about as long as wide; striae shallow, serially punctate, normal in course except 3 and 4 slightly deflected laterally toward paired basal denticles; intervals flat, finely imbricate. Metacoxal face densely, discretely punctulate proximally, punctures crowded distally; metatibia as in figure 76, pecten with one long and three shorter denticles, metatibia as in figure 76, carinae complete except lateroventral abbreviated apically, coronal denticles as figured. Abdomen with first segment longer than remaining segments combined in both sexes;  with broad, shallow emargination on terminal margin;  anal notch narrowly emarginate, lateral limits obtusely angulate, projecting perceptibly. Pygidium as in figures 77 and 78, basal triangle absent to moderately prominent, sometimes with median pale line extending to apex. Male genitalia: Median lobe 4 × as long as width of apex; ventral valve variable in form (figs. 79 and 81–85); armature of internal sac with paired sclerites of variable form near base of sac, subtriangular median "wishbone" sclerite and paired thornlike sclerites near apex of sac; extreme apex of sac lined with minute, acute denticles, closure valve circular. Lateral lobes (fig. 80) variable in width.

Body length 1.8–2.8 mm, width 1.1–1.8 mm; pronotal length 0.5–0.9 mm, width 0.9–1.3 mm.

Type locality. Of Bruchus placidus, Texas; of Bruchus limpidus, Guatemala, Capetillo.

Type depository. Bruchus placidus (lectotype 8210) in Museum of Comparative Zoology, Cambridge, Massachusetts, designated by Johnson (1968). Bruchus limpidus, lectotype  here designated, marked with small red cross on card mount of three cotypes, in British Museum (Natural History), London.

Specific records. U.S.A.: Missouri, Jasper Co., Alta, ex Acacia angustissima var. hirta. Oklahoma, (no locality). Kansas, Cowley Co., ex Acacia “hirta.” Texas, Dallas, ex Acacia angustissima var. hirta; Bangs; Big Bend N.P., El Paso, ex Acacia texensis (now a var. of angustissima); Chambers Co.; Rio Pecos, Arizona, Santa Rita Forest, ex Acacia angustissima var. suffruticosa; Palmerlee; Sierra Ancha Mts.; Pima Co., Kitt Peak, CDJ 91–72; Huachuca Mts.; Ramsey Canyon, ex Acacia angustissima. MEXICO: Baja California, San Jose del Cabo, La Higuera, ex Acacia goldmani. Chihuahua, nr. Morita, ex Acacia cuspidata; 35 mi N Chihuahua, San Luis Potosi, Tamazunchale. Veracruz, 13 mi N Jalapa, Lake Catemaco; Cordoba. Guerrero, Acapulco, ex Aca

Biography. The principal host for placidus is Acacia angustis
Acacia bicolor, cuspidata, filicoides, goldmani, and rosei are also
listed on specimen labels. Acacia filicoides is listed as a
synonym of angustissima in Isely (1973), but as a valid
species name in Standley (1922).

Discussion. Merobruchus placidus as treated here ranges
from Oklahoma and Missouri to Costa Rica with little varia
tion in external appearance but with considerable diversity
in male genitalia details. With the specimen material avail
able to me, I am unable to find any consistency in these
genitalic characters that would indicate a further breakdown
of placidus. I am assuming here that the variation in pla
cidus genitalia is random and represents no more than geo
geraphic variation. Several forms of the male genitalia are illustrated.

The diversities in the median lobe are as follows: The ven
tral valve ranges from a short, broad, arcuate form (fig. 85)
to a more elongate type (figs. 82 and 84). The basal sclerites
are with or without auxiliary spines (figs. 79 and 82),
and the apex of the spines is straight or curved (figs. 82
and 83). The median sclerite is always broad-based but
variable in shape. The apical sclerites are always thornlike
but differ in the outline of the apex. The lateral lobes offer
no consistent characters for specific differentiation. Further
collections in Mexico and Central America with longer se
ries are needed to decipher this problem.

Merobruchus limpidus is here synonymized based on the
male genitalia (fig. 85) and external characters falling within
the range of variation of placidus.

Capetillo is an estate near Dueñas, Guatemala.

Merobruchus solitarius (Sharpl)

(Figs. 106–110)

Bruchus solitarius Sharp, 1885:456; Pic, 1913:50.
Acanthoscelides solitarius: Blackwelder, 1946:761.
Merobruchus solitarius: Johnson and Kingsolver, 1977:154,
1982:418.

Color. Integument dark red to piceous. Head with vertex,
eyes, and base of clypeus piceous, frons and antenna red,
pronotum evenly dark red or medium red with paired pic
eous maculae, thoracic sterna piceous, abdomen with
basal sternum piceous along basal margin and sterna 2–5
red to black with lateral parts red; elytra varying from all red
to red with contrasting black maculae (fig. 106); foreleg and
midleg reddish yellow to red, hindleg dark red with base of
femur piceous; pygidium red. Vestiture of white or yellowish
grey and brown hairs above, all gray hairs ventrally; macu
lations on pronotum and elytra of darker forms accented
with brown hairs; pronotum with vestiture patchy, more con
trasted in darker specimens; scutellum white; elytra in ten
eral forms with maculae marked by brown hairs, in spec
imens with developed pattern, third interval with series of
elongated whitish spots alternated with quadrate brown
spots, transverse bars of white or yellowish hairs outlining
humeral, lateral, and apical maculae; contrasting dark and
light areas less obvious in teneral specimens; pygidium yel
lowish, basal triangle indistinct, paired dark spots of brown
setae varying in size and shape, ≥ usually with only two
spots (fig. 109), ≥ often with scattered additional brownish
areas (fig. 110).

Structure. Body ovate, convex above. Head short, vertex
densely punctulate, frons longitudinally rugose, frontal ca
rina prominent; transverse sulcus connecting dorsal limits
of eyes prominent; pubescence located along fronsocypeal
suture shaggy; postocular lobe narrow, setose; antenna ex
tending past humerus, clavate, segments 5–10 eccentric,
11 subtriangular. Pronotum campaniform (fig. 108), lateral
margins slightly to moderately convex, disk almost evenly
convex but with slight depressions near posterolateral corners; surface irregularly foveolate, each foveola with central black seta, interpaces microrugose; prosternum barely separating procoxal apices; postmesocoxal sulcus broadly angulate. Scutellum transverse, bilobed. Elytra together (fig. 106) slightly longer than wide, convex; striae slightly sinuate, 1 to 4 slightly deflected laterally near base, 3 and 4 arising from small, bidentate gibbosity on basal margin, striae deep, narrow; intervals 3, 5, and 7 wider than 2, 4, and 6. Metacoxae face densely punctulate except elongate polished space near anterior border; pecten of metatibia short, lateroventral carina obsolete apically. Abdomen with fifth sternum of \( \frac{3}{8} \) broadly emarginate about one-half length of sternum, not flanged laterally, fifth sternum of \( \frac{3}{8} \) shallowly emarginate but with small lateral flanges; pygidium of \( \frac{3}{8} \) slightly convex basally, reflected apically, of \( \frac{3}{8} \) oblique, not reflected. Male genitalia: Median lobe (fig. 107) nearly 4 × as long as wide, ventral valve broad, arcuate; internal sac lacking basal spines; wishbone sclerite minute with quadrate, transparent base; apical spines minute; lateral lobes slender, bowed. One species.

Merobruchus boucheri Kingsolver

(Figs. 1–14)

Merobruchus sp. 2: Johnson, 1979:123.

For detailed description, see Kingsolver, 1980:248.

Color. Integument yellowish to piceous, forelegs and midlegs yellowish red, hindlegs dark red; antenna yellowish except segments 8–10 dark brown (fig. 12). Vestiture of yellowish gray and dark brown slender hairs with scattered coppery hairs on disk in pattern shown in figure 9; pronotum (fig. 9) with dark median stripe; elytra with dark brown hairs on piceous spots, yellowish gray and coppery on light colored areas; pygidium (fig. 14) with basal triangular spot yellowish white, median and lateral dark spots brown, median spot yellowish; forelegs and midlegs yellowish red, hindlegs dark red; antenna yellowish except segments 7–9 dark brown in most specimens.

Salient characters. Pronotum elongated with dark median stripe; antenna with segments 8–10 dark brown; pygidium with basal triangle and median diamond spot prominent, anal notch of \( \frac{3}{8} \) deep, processes long with prominent tufts (figs. 7 and 8); postmesocoxal sulcus strongly angulate (fig. 5); pronotum evenly arcuate in lateral aspect; mesopleural suture meeting middle of anterior margin of metepisternum. Male genitalia as in figures 10 and 11.

Body length 3.2–3.7 mm, width 1.5–2.2 mm; pronotal width 0.8–1.3 mm, width 1.1–1.5 mm.

Type locality. COSTA RICA: Guanacaste Prov.

Holotype depository. In National Museum of Natural History, Washington, DC.


Biology. Host plants for boucheri include Pithecellobium mangense and P. undulatum in North America and P. tortum in Brazil. It has been collected in December, February, and March.

Discussion. A combination of characters separates this species from others in the insolitus group, specifically the elongated, conical pronotum, dorsal median stripe of the pronotum, pattern of pubescence on the elytra and pygidium, and digitate apical processes of the female terminal sternum. Associating characters are the median and two lateral thornlike sclerites in the internal sac, bowed lateral lobes, and basal triangular pad of white pubescence on the pygidium.

The Brazilian record is a significant extension of geographical range for this species known previously no farther south than Panama.

Literature Cited


Appendix 1. Morphological Terms

A number of morphological terms in this and other reports on the Bruchidae have been used with little or no explanation or illustration. Johnson and Kingsolver (1973) established a nomenclature for the hindleg of the genus *Sennius* that generally applies to other genera in the tribe Acanthoscelidini. I (1970) characterized several forms of male genitalia in the family, and the nomenclature proposed here has been used in subsequent reports on the Bruchidae.

Basal denticle of the elytra—a recumbent, toothlike process at the base of a stria. In most species of *Merobruchus*, the denticles of striae 3 and 4 are elevated on a basal gibbosity.

Basal lobe—a broad, antescutellar lobe of the posterior margin of the pronotal disk.

Cervical boss—a small, polished elevation on the lower lateral margin of the anterior foramen of the pronotum. It bears two long setae each set deeply into a puncture. This may be the marker of the anterolateral corner of the primitive pronotum.

Cervical sulcus—a vertical, lateral sulcus demarcating the cervix parallel to the margin of the anterior foramen of the pronotum and dorsad of the cervical boss.

Coronal denticles—small denticles (usually three) on the dorsoapical margin of the metatibia opposite the muero.

Dorsomesal carina of the mesotibia—a carina lying on the mesal face of the tibia near the dorsal margin.

Fifth sternum—the terminal sternum of the abdomen, morphologically the seventh but visibly the fifth. To avoid confusion, I number the sterna 1 to 5.

Fovea—a setal insertion enlarged to form a round or oval, flat-bottomed depression, with the seta emerging either from the center or from the anterior margin of the fovea (diminutive foveola).

Frontal carina—a vertical ridge extending from a line connecting the upper limits of the eyes (usually the transverse sulcus, q.v.) to the frontoclypeal suture.

Incrassate—thickened. In bruchid literature, the term is used to describe a metafemur that is expanded dorsoventrally.

Lateral carina of the metatibia—a carina extending the full length of the metatibia in the middle of the lateral face.

Lateral carina of the pronotum—a distinct to obsolete carina, or ridge, marking lateral limits of the disk of the pronotum. It extends from the posterolateral corner to the anterior corner of disk. In most of the Acanthoscelidini, the anterior one-half of the carina is bent ventrad and loses its identity as a carina. The cervical boss (q.v.) is probably the relic of the anterolateral corner.

Lateral denticle—the short denticle on the lateral, apical margin of the metatibia.

Lateral margin of the pronotum—configuration as seen in dorsal aspect.

Lateroventral carina of the metatibia—a carina on the lateral face of the metatibia lying between the lateral and ventral carinae, sometimes evanescent or missing.

Mesepisternum and mesepimeron—pleural sclerites of the mesothorax. In more generalized bruchid groups, these two sclerites are nearly equal in size. In the Bruchinae to which *Merobruchus* belongs, however, the posterior margin of the mesepisternum has overridden the mesepimeron, narrowing the latter so that in some genera the mesepimeron is reduced to a small, triangular sclerite isolated from the mesocoxal cavity.

Muro—acute fixed spine at the apex of the ventral carina in more derived groups of bruchids.

Ocular sinus—the deep, usually setose emargination of the eye.

Pecten—a row of flat denticles set on the mesoventral, distal margin of the metafemur.

Postmesocoxal sulcus—a fine sulcus usually running parallel to the posterior margin of the mesocoxal cavity and extending laterad to the pleurosternal suture. In some species of *Merobruchus*, the sulcus is angulate caudad of the coxa.

Postocular lobe—a narrow to broad crescentic lobe, usually setose, attached to the posterior margin of the eye.

Pygidium—terminal (seventh) tergum usually fully exposed caudad of the elytral apices in the Bruchidae.

Subbasal gibbosities—small elevations near the posterior margin of the pronotal disk; present in several genera of Neotropical bruchids, especially *Caryedex, Gibbobruchus*, and *Ctenocolum*. In *Merobruchus*, the gibbosities are much reduced or absent. Only in *Merobruchus major* (Fall) are they apparent.
Appendix 2. Synonymical List of *Merobruchus*
Species

Transverse sulcus—a vague to well-defined transverse depression on the head separating the vertex from the frons.

Ventral carina of the metatibia—the hindleg is described as though it were open and extended. The morphologically ventral margin with the ventral carina and apical muco appears to be dorsal when the leg is closed.

1. *boucheri* Kingsolver
2. *chetumalae*, new species
3. *columbinus* (Sharp)
4. *cristoensis*, new species
5. *hastatus* Kingsolver
6. *insolitus* (Sharp)
7. *julianus* (Horn)
   ochreolineatus Fall
8. *knuli* (White)
9. *lineaticollis* (Sharp)
10. *lysilomae*, new species
11. *major* (Fall)
   flexicaulis Schaeffer
12. *paquetae* Kingsolver
13. *placidas* (Horn)
   limpidus Sharp
14. *politus*, new species
15. *porphyreus*, new species
16. *santarosae* Kingsolver
17. *solitarius* (Sharp)
18. *sonorensis* Kingsolver
19. *terani* Kingsolver
20. *triacanthus*, new species
21. *vacillator* (Sharp)
22. *xanthopygus*, new species
### Appendix 3. *Merobruchus* Species and Associated Host Plants

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<td><em>Pithecellobium</em> saman</td>
<td>triacanthus</td>
<td><em>Acacia</em> acatensis, coulteri, riparioideae; <em>Leucaena</em> guatemalensis; <em>Lysiloma</em> divaricata</td>
</tr>
<tr>
<td>cristoensis</td>
<td>No host known</td>
<td>vacillator</td>
<td><em>Lysiloma</em> divaricata</td>
</tr>
<tr>
<td>hastatus</td>
<td><em>Lysiloma</em> desmostachys</td>
<td>xanthopygus</td>
<td><em>Lysiloma</em> acapulcensis</td>
</tr>
<tr>
<td>insolitus</td>
<td><em>Acacia</em> occidentalis, tenuifolia; <em>Albizia</em> adinocephala, lebbek, occidentalis, sinaloensis; <em>Lysiloma</em> acapulcensis, candida, divaricata, kellermani, microphylla var. thornberi, seemani, <em>Lysiloma</em> sp.; <em>Pithecellobium</em> mangense, pallens, sonorae, undulatum</td>
<td></td>
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<tr>
<td>julianus</td>
<td><em>Acacia</em> berlandieri, coulteri, greggi, roemeriana, wrightii</td>
<td></td>
<td></td>
</tr>
<tr>
<td>knulli</td>
<td><em>Lysiloma</em> acapulcensis, microphylla var. thornberi, watsoni</td>
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<td></td>
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<tr>
<td>lineaticollis</td>
<td>No host known</td>
<td></td>
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<tr>
<td>lysilomae</td>
<td><em>Acacia</em> richii, simplicifolia; <em>Albizia</em> lebbek, polyphylla; <em>Lysiloma</em> latisiliqua, polyphylla, sabicu, <em>Lysiloma</em> sp.</td>
<td></td>
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</tr>
<tr>
<td>major</td>
<td><em>Pithecellobium</em> flexicaule</td>
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<tr>
<td>paquetae</td>
<td><em>Albizia</em> adinocephala, caribaea, lebbek, longipedata, <em>Albizia</em> sp.; <em>Lysiloma</em> sp.; <em>Pseudosamanea</em> guachepele, <em>Pseudosamanea</em> sp.</td>
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<tr>
<td>placidus</td>
<td><em>Acacia</em> angustissima, bicolor, cuspidata, filicoides, goldmani, rosei</td>
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<tr>
<td>politus</td>
<td><em>Pithecellobium</em> leptophyllum</td>
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<tr>
<td>porphyreus</td>
<td><em>Lysiloma</em> acapulcensis, kellermani</td>
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<tr>
<td>santarosae</td>
<td><em>Acacia</em> coulteri; <em>Albizia</em> sp.; <em>Lysiloma</em> desmostachys</td>
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<tr>
<td>solitarius</td>
<td><em>Acacia</em> angustissima</td>
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## Appendix 4. Host Plants Attacked by *Merobruchus* Species

<table>
<thead>
<tr>
<th>Host plant</th>
<th><em>Merobruchus</em> species</th>
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<tbody>
<tr>
<td><em>Acacia</em></td>
<td></td>
</tr>
<tr>
<td><em>acatiensis</em> Bentham</td>
<td>triacanthus</td>
</tr>
<tr>
<td><em>angustissima</em> (P. Miller) Kuntze</td>
<td>placidus, solitarius, terani</td>
</tr>
<tr>
<td><em>berlandieri</em> Bentham</td>
<td>julianus, terani</td>
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<tr>
<td><em>bicolor</em> Britton and Rose</td>
<td>placidus</td>
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<tr>
<td><em>coulteri</em> Bentham</td>
<td>julianus, santarosae, triacanthus</td>
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<tr>
<td><em>cuspidata</em> Schlectendal</td>
<td>placidus</td>
</tr>
<tr>
<td><em>filicoides</em> (Cavanille) Trelease</td>
<td>placidus</td>
</tr>
<tr>
<td><em>gaumeri</em> Blake</td>
<td>terani</td>
</tr>
<tr>
<td><em>goldmani</em> (Britton and Rose) Wiggins</td>
<td>placidus</td>
</tr>
<tr>
<td><em>greggi</em> A. Gray</td>
<td>julianus</td>
</tr>
<tr>
<td><em>occidentalis</em> Rose</td>
<td>insolitus</td>
</tr>
<tr>
<td><em>picachensis</em> T.S. Brandegee</td>
<td>terani</td>
</tr>
<tr>
<td><em>richii</em> A. Gray</td>
<td>lysilomae</td>
</tr>
<tr>
<td><em>riparioides</em> (Britton and Rose) Standley</td>
<td>triacanthus</td>
</tr>
<tr>
<td><em>roemeriana</em> Scheele</td>
<td>julianus</td>
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<tr>
<td><em>rosei</em> Standley</td>
<td>placidus</td>
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<tr>
<td><em>simplicifolia</em> (Linn.) Druce</td>
<td>lysilomae</td>
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<tr>
<td><em>tenuifolia</em> F. Muell.</td>
<td>insolitus, terani</td>
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<tr>
<td><em>wrightii</em> Bentham</td>
<td>julianus</td>
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<tr>
<td><em>Albizia</em></td>
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<tr>
<td><em>adinocephala</em> Britton and Rose</td>
<td>insolitus, paquetae, sonorensis</td>
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<tr>
<td><em>caribaea</em> Britton and Rose</td>
<td>paquetae, sonorensis</td>
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<tr>
<td><em>lebbek</em> (Linn.) Bentham</td>
<td>insolitus, lysilomae, paquetae, sonorensis</td>
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<tr>
<td><em>Lysiloma</em></td>
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<tr>
<td><em>acapulcensis</em> (Kunth) Bentham</td>
<td>insolitus, knulli, porphyreus, xanthopygus</td>
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<tr>
<td><em>candida</em> T.S. Brandegee</td>
<td>insolitus</td>
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<tr>
<td><em>desmostachys</em> Bentham</td>
<td>hastatus, santarosae</td>
</tr>
<tr>
<td><em>divaricata</em> (Jacquin) Macbride</td>
<td>insolitus, sonorensis, triacanthus, vacillator</td>
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<tr>
<td><em>kellermani</em> Britton and Rose</td>
<td>insolitus, porphyreus</td>
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<tr>
<td><em>latisiluca</em> (Linn.) Bentham</td>
<td>chetumala, lysilomae</td>
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<tr>
<td><em>microphylla</em> var. <em>thornberi</em> Britton and Rose</td>
<td>insolitus, knulli</td>
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<tr>
<td><em>politics</em> Bentham</td>
<td>lysilomae</td>
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<tr>
<td><em>sabicu</em> Bentham</td>
<td>lysilomae</td>
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<tr>
<td><em>seemani</em> Britton and Rose</td>
<td>insolitus, sonorensis</td>
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<tr>
<td><em>watsoni</em> J.N. Rose</td>
<td>knulli</td>
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<tr>
<td><em>sp.</em></td>
<td>chetumala, insolitus, lysilomae, paquetae</td>
</tr>
<tr>
<td><em>Pithecellobium</em></td>
<td></td>
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<tr>
<td><em>flexicaule</em> (Bentham) Coulter</td>
<td>major</td>
</tr>
<tr>
<td><em>leptophyllum</em> (Cavanille) Daveau</td>
<td>politus</td>
</tr>
<tr>
<td>Host plant</td>
<td>Merobruchus species</td>
</tr>
<tr>
<td>------------------------------------</td>
<td>---------------------</td>
</tr>
<tr>
<td><em>mangense</em> (Jaquin) Macbride</td>
<td><em>boucheri, insolitus</em></td>
</tr>
<tr>
<td><em>pallens</em> (Bentham) Standley</td>
<td><em>insolitus</em></td>
</tr>
<tr>
<td><em>saman</em> (Jacquin) Bentham</td>
<td><em>columbinus</em></td>
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<tr>
<td><em>sonorae</em> S. Watson</td>
<td><em>insolitus, sonorensis</em></td>
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<tr>
<td><em>tortum</em> Martius</td>
<td><em>boucheri</em></td>
</tr>
<tr>
<td><em>undulatum</em> (Britton and Rose) Gentry</td>
<td><em>boucheri, insolitus</em></td>
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</table>

*Pseudosamanea*

<table>
<thead>
<tr>
<th></th>
<th>paquetae</th>
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<tbody>
<tr>
<td><em>guachepele</em> Harms</td>
<td>paquetae</td>
</tr>
<tr>
<td>sp.</td>
<td>paquetae</td>
</tr>
</tbody>
</table>
Figures 1–8, *Merobruchus boucherii* Kingsolver: 1, Basal margin, right elytron, denticles at bases of striae 3 and 4; 2, lateral aspect of metasternum and left hindleg; 3, head, cephalic aspect; 4, antenna; 5, left mesocoxal cavity with postmesocoxal sulcus (arrows); 6, pronotal disk showing foveolae and pubescence; 7, apex of female pygidium showing apices of fifth sternal processes; 8, ventral aspect of female fifth sternum with digitate processes and anal notch.
Figures 9-14, *Merobruchus boucheri*
Kingsolver: 9, Dorsal habitus; 10, male genitalia, median lobe; 11, same, lateral lobes; 12, antenna; 13, hindleg; 14, pygidium.
Figures 15–18, *Merobruchus chetumalae*, new species: 15, Dorsal habitus; 16, male genitalia, median lobe; 17, pygidium; 18, same, female.
Figures 19–24, *Merobruchus columbinus* (Sharp): 19, Dorsal habitus; 20, male genitalia, median lobe; 21, same, lateral lobes; 22, head; 23, hindleg; 24, pygidium.
Figures 30-34, *Merobruchus hastatus*
Kingsolver: 30, Dorsal habitus; 31, male genitalia, median lobe; 32, same, lateral lobes; 33, hindleg; 34, pygidium.
Figures 35–40, *Merobruchus insolitus* (Sharp): 35, Dorsal habitus; 36, male genitalia, median lobe; 37, same, lateral lobes; 38, hindleg; 39, pygidium, male; 40, same, female.
Figures 41–46, *Merobruchus julianus* (Horn): 41, dorsal habitus; 42, male genitalia, median lobe; 43, same, lateral lobes; 44, head; 45, hindleg; 46, pygidium.
Figures 47–52, Merobruchus knulli (White): 47, Dorsal habitus; 48, male genitalia, median lobe; 49, same, lateral lobes; 50, hindleg; 51, pygidium, male; 52, same, female.
Figures 63–69, Merobruchus major (Fall): 63, Dorsal habitus; 64, male genitalia, median lobe; 65, same, lateral lobes; 66, head; 67, hindleg; 68, pygidium, male; 69, same, female.
Figures 70–74, *Merobruchus paquetae*
Kingsolver: 70, Dorsal habitus; 71, male genitalia, median lobe; 72, same, lateral lobes; 73, hindleg; 74, pygidium.
Figures 75–78, Merobruchus placidus (Horn): 75, Dorsal habitus; 76, hindleg; 77, pygidium, male; 78, same, female.
Figures 79–85, *Merobruchus placidus* (Horn), male genitalia: 79, Median lobe, Brownsville, Texas; 80, lateral lobes, Brownsville, Texas; 81, median lobe, Temascaltepec, Mex., Mexico; 82, median lobe, Acapulco, Guer., Mexico; 83, median lobe, Cuernavaca, Morelos, Mexico; 84, median lobe, Yucatan Peninsula, Mexico; 85, median lobe, *Bruchus limpidus* paratype, Sacatepequez, Guatemala.
Figures 86–92, *Merobruchus politus*, new species: 86, Dorsal habitus; 87, male genitalia, median lobe; 88, same, lateral lobes; 89, lateral outline of body with position of polished spot; 90, hindleg; 91, pygidium, male; 92, same, female.
Figures 93–97, *Merobruchus porphyreus*, new species: 93, Dorsal habitus; 94, male genitalia, median lobe; 95, same, lateral lobes; 96, hind-leg; 97, pygidium.
Figures 98–105, *Merobruchus santarosae*
Kingsolver: 98, Dorsal habitus; 99, elytron, dark phase; 100, elytron, pale phase; 101, male genitilia, median lobe; 102, same, lateral lobes; 103, hindleg; 104, pygidium, male; 105, same, female.
Figures 111–115, *Merobruchus sonorensis*
Kingsolver: 111, Dorsal habitus; 112, male genitalia, median lobe; 113, same, lateral lobes; 114, hindleg; 115, pygidium.
Figures 116–120, *Merobruchus terani*
Kingsolver: 116, Dorsal habitus; 117, male genitalia, median lobe; 118, same, lateral lobes; 119, hindleg; 120, pygidium.
Figures 121–125, Merobruchus triacanthus, new species: 121, Dorsal habitus; 122, male genitalia, median lobe; 123, same, lateral lobes; 124, hindleg; 125, pygidium.
Figures 126–130, *Merobruchus vacillator* (Sharp): 126, Dorsal habitus; 127, male genitalia, median lobe; 128, same, lateral lobes; 129, hindleg; 130, pygidium.
Figures 131–136, Merobruchus xanthopygus, new species: 131, Dorsal habitus; 132, male genitalia, median lobe; 133, same, lateral lobes; 134, hindleg; 135, pygidium; 136, anal notch.