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SYSTEMATICS OF THE GENUS MINOSESTES (COLEOPTERA BRUCHIDAE)
KINGSOLVER, J. M. JOHNSON, G. D. 1 OF 2

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SYSTEMATICS OF THE GENUS MIMOSESTES (COLEOPTERA: BRUCHIDAE)

By
JOHN M. KINGSOLVER
CLARENCE D. JOHNSON



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SYSTEMATICS OF THE GENUS MIMOSESTES (COLEOPTERA: BRUCHIDAE)

By JOHN M. KINGSOLVER and CLARENCE D. JOHNSON¹

ABSTRACT

A diagnosis of the genus, key to species, synonymical names, geographical distribution, and host associations are presented for the 15 species now assigned to this genus. Illustrations of habitus and male and female genitalia are provided. All known host associations are with seeds of leguminous trees. Of the 15 *Mimosestes* species, 9 are restricted to various *Acacia* species. Three of them are widespread because of man's planting host trees for ornamental or medicinal purposes, and two of them are established in the Hawaiian Islands. Two species attacking the seeds of *Prosopis* are being investigated as potential biological control agents.

INTRODUCTION

The history of the taxonomic studies of the Bruchidae in the New World by such earlier workers as Horn, Schaeffer, Fall, and Bridwell was discussed by Johnson (1970).² Several later workers have published taxonomic as well as ecological studies on the Bruchidae of the New World. Kingsolver dealt with the taxonomy of *Pygiopachymerus* (1970a), *Amblycerus*, (1970c), and *Stator* (1972); Kingsolver and Whitehead revised *Ctenocolum* (1974a), *Caryedes* (1974b), and *Meibomeus* (1976); Whitehead and Kingsolver revised *Gibbobruchus* (1975); Johnson revised *Stator* (1963), *Acanthoscelides* (1970), *Stylanthus* (1976a), and *Kytorhinus* (1976b); and Johnson and Kingsolver revised *Sennius* (1973) and *Stator* (1976). Ecological studies of note were made by Janzen (1967, 1969, 1971a, b, c, 1972, 1976) and Center and Johnson (1974), whereas Pfaffenberger (1974, 1977) and Pfaffen-

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² The year in italic after the authors' names indicates the reference in Literature Cited, p. 69.

berger and Johnson (1976) have made meaningful contributions to our knowledge of larval bruchidae.

The present study concerning the genus *Mimosestes* is a further effort to learn more about the relationships between insects and between insects and their food plants. *Mimosestes* occurs naturally in the New World in North, Central, and northern South America, but some species have apparently been introduced into Hawaii, the Philippine Islands, New Caledonia, and the West Indies along with their host plants.

Mimosestes has well-defined generic limits, but until other New World genera are studied, the analysis of the relationships of *Mimosestes* to other genera must wait. *Mimosestes* is a natural group related to *Acanthoscelides* Schilsky, *Algarobius* Bridwell, and *Merobruchus* Bridwell, as well as most of the other genera described by Bridwell (1946).

In this bulletin we redescribe *Mimosestes*, delineate its species, define tentative species groups, compile lists of host plants from published data, and add new host data. Our classification is based on ecological as well as on morphological data.

Genus MIMOSESTES Bridwell

Mimosestes Bridwell, 1946: 54; Bradley, 1947: 39; Blackwelder and Blackwelder, 1948: 45; Kingsolver, 1968: 280; Bottimer, 1968: 1024, 1039, 1041; Johnson, 1968: 1269; Johnson, 1970: 28. Type-species: *Bruchus sallaei* Sharp, 1885, by original designation.

Cercidistes Bridwell, 1946: 55; Blackwelder and Blackwelder, 1948: 45; Bottimer, 1968: 1021, 1039, 1041; Johnson, 1968: 1269. Type-species: *Bruchus ulkei* Horn, 1873, by original designation. NEW SYNONYMY.

Medium-sized to large bruchids in the tribe Acanthoscelidini with the following morphological characteristics:

Head.—Frons usually with median, glabrous line or carina extending from frontoclypeal suture to granulate glabrous area, or boss, on vertex, glabrous area of variable size and shape in various species, sometimes with pit or impressed line on dorsomedial surface; antennae usually not sexually dimorphic, distal segments slightly eccentric, not serrate, usually reaching to humerus; posterior margin of eye protruding from adjacent surfaces or merging smoothly into contour of head.

Prothorax.—Disk subcampanulate to conical, with many coarse punctures; cervical sulcus present on anterolateral margin; lateral carina ranging from vague, incomplete, and obscured by pubes-

cence to strong, spinulate, and extending to coxal cavity; lateral margins near apex usually swollen, sometimes with pronounced hump and strong spines; short median impressed line on median basal lobe; procoxae contiguous at apices or well separated by prosternum. The term "cervical sulcus" refers to the short, vertical sulcus parallel to the anterolateral margin of the prothorax dorsad to the insertion of the front coxae.

Scutellum.—Small, usually transverse, sometimes quadrate.

Elytra.—Striae subequal at base or with 2 and 3, or 3 and 4 closely approaching at base; strong, flattened spines at base of striae 3-4, sometimes at 3-5, 3-6, and 10.

Hindleg (figs. 4, 8).—Femur usually expanded medially to about width of or wider than width of hindcoxa, occasionally with femur more narrow than hindcoxa; in all but one species (*M. enterolobii*) ventral surface of femur of males channeled, usually deeply, and lined with elongate, dense hairs, females without channel; apical mesoventral margin of femur usually armed with acuminate spine about as long as or longer than width of tibial base followed by one to four smaller spines, one species (*M. ulkei*) with single spine shorter than width of tibial base; mucro 0.2 to 0.5 as long as first tarsomere.

Abdomen.—Usually with sterna unmodified, but sterna 2-5 sometimes with faint to deep medial sulcus; pygidium evenly rounded or slightly convex; apical margin of last sternum of male usually slightly emarginate to receive apex of pygidium, apical margin of last sternum of female and males of some species without emargination; often with last abdominal segment flattened and elongated in females, apex of last sternum often bent downward.

Male Genitalia.—Usually with well- to moderately developed dorsal hood at apex; ventral valve not articulated; armature of internal sac simple, without large, heavily sclerotized spines or processes, and without hinge sclerites; lateral lobes expanded mesally at apex.

The terminology of parts of the male genitalia follows that proposed by Kingsolver (1970b), and the terminology of parts of the posterior leg follows that of Johnson and Kingsolver (1973).

From other New World genera lacking gibbosities at the base of the elytral striae and with an evenly convex pronotal disk, *Mimosestes* can be distinguished by one or more of the following characters: Short apical mucro of metatibia, a glabrous area on the vertex of the head, usually with a channel on the ventral surface of the hindfemora of the males, scutellum quadrate and

male genitalia with a simple, lightly sclerotized armature of the internal sac, a dorsal membranous hood, and ventral valve not articulated or absent.

Mimosestes most closely resembles the genera *Acanthoscelides*, *Algarobius*, and *Merobruchus*. Until these genera are more adequately defined and species placements made, however, the listing of distinctions between *Mimosestes* and these genera must wait. For now, the glabrous area on the vertex of both sexes, the channeled hindfemur of most male *Mimosestes*, and the unarticulated ventral valve separate this genus from the other three genera.

The generic name *Cercidiestes* was proposed by Bridwell for the single species *Bruchus ulkei*. Since the genus was described, no other species have been assigned to it, and we have found no close relative species in our studies. No known synonym for *B. ulkei* has appeared in the literature perhaps owing to its distinctness and relative scarcity.

Of the generic characters listed by Bridwell in describing *Cercidiestes*, the only character not possessed by at least some species of *Mimosestes* is the single subapical spine on the ventral surface of the hindfemur. Shared with *M. obscuriceps* and *brevicornis* is a strong lateral prothoracic carina; with *M. protractus*, the shape, color, and length of the antenna; with *M. humeralis* and *janzeni*, the extremely short mucro (shorter than the lateral spinule); with all species of *Mimosestes*, a frontal boss, an unarticulated ventral valve and dorsal hood in the male genitalia, and a channeled hindfemur (except in *M. enterolobii*). For these reasons, we consider *B. ulkei* and the species originally included in *Mimosestes* to comprise a monophyletic group, and we are thus synonymizing *Cercidiestes* with *Mimosestes*. Both generic names were proposed in the same report by Bridwell, but we here adopt *Mimosestes* partly because of page priority and partly because *Mimosestes* has been used more often in the literature.

Bridwell inappropriately chose the name *Mimosestes* for this group (*Mimos*=*Mimosa*, *estes*=eater), since no species of *Mimosa* has been verified as a host for any species of *Mimosestes*.

PHYLOGENETIC GROUPS OF MIMOSESTES

Characters

Many structures of *Mimosestes* species were studied to find both generic and specific characters. Generic characters and their value were previously discussed. External characters of value for separating *Mimosestes* species are body length; color of head, anten-

nae, and pygidium; patterns, if any, of vestiture of pronotum, elytra, pygidium, and abdominal sterna; length of head; shape of glabrous area on vertex; size and shape of eyes and postocular lobe; length of muzzle; antennal length and shape; visibility of cervical sulcus; degree of development of lateral prothoracic carina and lateral hump at apex of prothorax; distance to which prosternum separates procoxae; shape of scutellum; presence or absence of spines and punctures on elytral intervals; distance between elytral striae at their bases; size and number of spines at base of elytral striae; width of hindfemur; degree of channeling of male and number and size of inner subapical spines of hindfemur; degree of development of ventral carina on hindtibia; length of mucro and also spine at apex of lateral tibial carina; number of ventral carinae on first hindtarsomere; and shape of abdominal sterna.

Characters of the male genitalia that are of value in separating species are shape of ventral valve, degree of development of dorsal hood, pattern of armature and shape of spines of internal sac, and shape of lateral lobes. Characters of the female genitalia are shape of eighth sternal fork and length of ovipositor tube, but extent of sclerotization is variable.

Host Plants and Distribution

Species in the genus *Mimosestes* are known to feed only in the seeds of the two most primitive subfamilies of the Leguminosae, the Mimosoideae (*Acacia*, *Enterolobium*, *Prosopis*) and the Caesalpinioideae (*Caesalpinia*, *Ceratonia*, *Cercidium*, *Parkinsonia*) (see appendix). More specifically, most prefer seeds of *Acacia* species. Only *M. enterolobii*, *protractus*, and *ulkei* are not known to feed in the seeds of acacias. Conversely, *M. amicus*, *mimosae*, and *insularis* are known to feed not only in acacia seeds but also in seeds of other genera. Only *M. amicus* and *mimosae* feed in the seeds of both the Caesalpinioideae and the Mimosoideae. *M. ulkei* is the only *Mimosestes* known to feed only in the seeds of the Caesalpinioideae, although *M. amicus* feeds in the same host seeds as does *M. ulkei*.

Three species of *Mimosestes* have a very broad range of host plants. *M. amicus* feeds in 4 genera and 11 species, *M. mimosae* in 3 genera and 10 species, and *M. viduatus* in 7 species of *Acacia*. Both *M. amicus* and *mimosae* appear to have evolved generalist strategies in their host preferences.

The *Mimosestes* species with the most widespread distribution are *acaciastes*, *amicus*, *mimosae*, *nubigenis*, and *viduatus*. The wide

distribution of *M. amicus* and *mimosae* appears to be due to their broad range of hosts and thus their generalist strategies. The other three species each attack seeds of several acacias (appendix), which have wide or very wide distributions. *Acacia farnesiana*, the preferred host of *M. nubigens*, not only has a wide distribution but also is very abundant and thus provides *nubigens* with plentiful seeds and a wide distribution. *M. viduatus* has apparently exploited mostly swollen-thorn acacia seeds (*A. chapensis*, *collinsii*, *cornigera*, *gentlei*, *globulifera*, *hindsii*), whereas *M. acaciastes* has exploited only nonswollen-thorn acacias. Consequently, *M. viduatus* is a tropical species and *M. acaciastes* is generally nontropical.

M. insularis, found mostly on islands, has a moderately wide distribution, probably because of its preference for two host genera and probable lack of competition from other bruchids on islands. The other two species with moderately wide distributions, *M. janzeni* and *protractus*, have only two host species each. These hosts are abundant where they are found but have restricted distributions and thus limit the bruchids.

Both *M. humeralis* and *ulkei* have restricted ranges, probably because they have only one and two hosts, respectively. *M. humeralis* appears to be more successful than *M. ulkei*, since it is reared in much larger numbers from its host than *ulkei* is from its hosts.

M. anomalus, *cinerifer*, *viduatus*, *brevicornis*, and *obscuriceps* are, for the most part, restricted to swollen-thorn acacias. Both *M. cinerifer* and *viduatus* are more plentiful in these seeds than the other three species. *M. cinerifer* is the most abundant of the five species, but its distribution is apparently limited because of its greater specificity to *Acacia cornigera* and thus it has a more narrow distribution. The narrow host range apparently limits the distribution and total numbers of *M. anomalus*, *brevicornis*, and *obscuriceps*.

The reported narrow distribution of *M. enterolobii* may possibly be due to a phenomenon described earlier that some species of *Sennius* and of *Stator* are active in the seeds of a host species in only a limited part of the host's range (Johnson and Kingsolver, 1973, 1976). This is probably due to a high degree of specialization by *M. enterolobii* and other species in unique ecological situations. Possibly *M. enterolobii* is widespread in Brazil, but it has not yet been collected.

Scientific names with their authors of all confirmed host plants are listed in the appendix.

Relationships of Groups

Although *Mimosestes* appears to be a natural group of bruchids and its included species are well defined, evolutionary relationships within the genus are less precisely determined. We are tentatively placing the 15 species included in this bulletin into 6 groups based on morphology and host relationships. Our interpretations, however, are necessarily subject to revision pending further studies in related South American groups.

Our tentative groups are listed in the appendix. They are arranged in a linear sequence of specialization.

(1) *Enterolobii* Group.—This group, containing only *M. enterolobii*, is characterized by lack of a channel on the male hindfemur (typical of all other *Mimosestes*), absence of a ventral valve in the male genitalia (fig. 22), procoxae separated completely by the prosternum, and vestiture uniform without a pattern. Since the channeled male femur is found only in *Mimosestes* and the separated procoxae are found elsewhere in this genus only in the two species in group 4 and one species in group 6, we regard *M. enterolobii* as being primitive in these two characters. This species appears to be a link between "typical" *Mimosestes* and some problematical undescribed South American forms. Despite the atypical characters for its placement in *Mimosestes*, we believe that *M. enterolobii* should be assigned to this genus. Its host association with *Enterolobium* is likewise atypical in a genus predominantly oriented to species of *Acacia*.

(2) *Protractus* Group.—The relationships of the single species in this group with other groups is somewhat problematical. In general form, details of the male genitalia, and dorsal and pygidial patterns, it appears to be related to group 6, but the longer pale antennae, the shallow femoral channel, and the obsolete tibial mucro are shared with group 3. Distinctive for *M. protractus* are the broad median sulcus on abdominal sterna 2-5 in both sexes (fig. 53) and its preference for *Prosopis* seeds. The shallow femoral channel of *M. protractus* and *ulkei* (group 3) represents an intermediate step leading to the deep channel in groups 4, 5, and 6.

(3) *Ulkei* Group.—When Bridwell (1946) made *Bruchus ulkei* the type-species of *Cercidiestes*, he cited as distinctive characters the strong, denticulate pronotal carina, the single femoral spine, the serrate antennae longer in the male, and the hindtibia with mucro much shorter than the lateral terminal spine. We are here using these characters and the distinctive color pattern of the elytra and pygidium as group characters. We consider, however,

that the form of the male genitalia, the presence of a femoral channel in the male, and a well-developed frontal boss are primary characters for placing *B. ulkei* in *Mimosestes*. The host preference for seeds of *Cercidium* and *Parkinsonia* is notable.

(4) **Obscuriceps Group.**—The two closely related species in this group, *M. brevicornis* and *obscuriceps*, share the separated procoxae with group 1 and *M. anomalus* in group 6, the channeled femur with groups 5 and 6, and the patterned elytral vestiture with group 6. They are distinguished as a group by their larger size, long tibial mucro (fig. 15), elongate head with elongated frontal boss, dorsally flattened eyes, angulate postocular lobe, and lateral prothoracic carina produced into a strong anteroventral ridge.

(5) **Humeralis Group.**—The two species in this group, *M. humeralis* and *janzeni*, are the most strikingly colored in the genus. Each has a reddish to black body, black elytra, and large red humeral spots. The uniform pubescence and flattened eyes of *M. janzeni* link this group to group 6 through *M. amicus*. Shared with *M. ulkei* of group 3 are a striking color pattern, the spine at the apex of the lateral tibial carina surpassing the mucro in length (fig. 27), and the presence of two ventral carinae on the first hindtarsomere. The male genitalia of group 5 have a shorter, broader based ventral valve and more truncate lateral lobes than do those of *M. ulkei* (cf. figs. 26, 34, and 56). The femoral channel is deep in group 5 species.

(6) **Mimosae Group.**—This group of eight species (*M. acaciastes*, *amicus*, *anomalus*, *cinerifer*, *insularis*, *mimosae*, *nubigens*, and *viduatus*) could be subdivided into four subgroups but is held together by the following characters: (1) A variously shaped median sclerite in the internal sac of the male genitalia (cf. figs. 7, 11, 18, 30, 38, 43, 60) (except *M. acaciastes*). (2) Mucro on hindtibia about as long as the spine at the apex of the lateral carina (fig. 8). (3) Deeply channeled hindfemur in the male. (4) Dorsal pattern of light and dark setae (except *M. amicus*). (5) A strap-like ventral valve (except *M. acaciastes* and *anomalus*).

Within the Mimosae group, *M. cinerifer*, *insularis*, *mimosae*, and *viduatus* are so closely related that it not always possible to differentiate them without resorting to an examination of the male genitalia. External similarities between the small species *M. acaciastes* and these four are so pronounced that they are frequently mixed in general sorting. However, the clustered femoral spines (fig. 4) and rounded ventral valve (fig. 3) are distinctive for *M. acaciastes*.

M. anomalus is a problematical species with a link to groups 1

and 4 in its separated procoxae (fig. 9), but it is placed in group 6 by its dorsal vestitural pattern, channeled hindfemur, and elongated ventral valve (fig. 11). This last character appears to be an intermediate step from the rounded form found in *M. acaciastes* (fig. 2) and the straplike form in *M. mimosae* (fig. 38) and others in the group.

We believe this group to be the most actively evolving, the most successful, and probably the youngest of the six groups.

KEY TO MIMOSESTES SPECIES

1. Prosterum separating procoxae for their entire length --- 2
 Prosterum separating procoxae for less than their entire length ----- 6
2. (1). Pronotal and elytral pubescence uniform, without pattern 3
 Pronotal and elytral pubescence forming pattern of some darker and lighter shades ----- 4
3. (2). Lateral prothoracic carina vague, not well developed; with elytral striae 2 and 3 usually closer to one another at base than to adjacent striae; hindfemur of male deeply channeled beneath; male genitalia as in figure 11; reared from seeds of *Acacia chiapensis*, *globulifera*, *macracantha*, and *pennatula*; southeastern Mexico -- *anomalus*, new species (part)
 Lateral prothoracic carina well developed; with elytral striae 3 and 4 usually closer to one another at base than to adjacent striae; hindfemur of male not channeled beneath; male genitalia as in figure 22; reared from seeds of *Enterolobium schomburgkii*; Panama and Brazil ----
 ----- *enterolobii*, new species
4. (2). Lateral prothoracic carina well developed, produced into small ridge near coxal cavity; head elongate, eyes slightly flattened dorsally, postocular lobe angulate; mucro about 0.2 as long as first tarsomere ----- 5
 Lateral prothoracic carina vague, not well developed nor produced into small ridge near coxal cavity; head short and broad, eyes not flattened dorsally, postocular lobe rounded; mucro about 0.1 as long as first tarsomere; male genitalia as in figure 11; reared from seeds of *Acacia chiapensis*, *globulifera*, *macracantha*, and *pennatula*; southeastern Mexico and Honduras -----
 ----- *anomalus*, new species (part)
5. (4). Boss on vertex elongate; cervical sulcus obscured by pubescence; muzzle usually shorter, about 0.33 as long as distance from upper limits of eyes to apex of labrum as from base of antennae to apex of labrum; usually larger (pronotum-elytra length 3.5-4.7 mm); darker in color; elytral vestiture as in figure 45; male genitalia as in figure 47; reared from seeds of *Acacia cornigera* and *sphaerocphala*; Veracruz and Tamaulipas States, Mexico ----- *obscuriceps* (Sharp)

Boss on vertex broader at apex; cervical sulcus prominent, not obscured by pubescence; muzzle usually longer, about half as long as distance from upper limits of eyes to apex of labrum as from base of antennae to apex of labrum; usually smaller (pronotum-elytra 3.1-3.8 mm); body and appendages usually reddish; elytral vestiture as in figure 12; male genitalia as in figure 14; reared from seeds of *Acacia gentlei*; Belize and Guatemala

- *brevicornis* (Sharp)
6. (1). Posterior margin of eye not protruding from adjacent surfaces, postocular lobe merging smoothly into contour of head (figs. 76, 77) ----- 7
- Posterior margin of eye and postocular lobe protruding from adjacent surfaces, not merging into contour of head (figs. 36, 80) ----- 8
7. (6). Elytron black with large red-orange humeral maculation usually extending from elytral stria 2 to lateral margin and from base to about 0.33 length of elytron (fig. 32); maculation sometimes larger; size larger, length of pronotum-elytra 3.5-5.6 mm; with two ventral carinae on first hindtarsomere; genitalia as in figure 34; reared from seeds of *Acacia cochliacantha* and *cymbispina*; southern Mexico and Honduras ----- *janzeni*, new species
- Elytron variable in color and vestiture but not black with large red-orange humeral maculation, usually gray to light brown in appearance; size smaller, length of pronotum-elytra 2.1-3.8 mm; one ventral carina on first hindtarsomere; genitalia as in figure 7; reared from seeds of *Acacia constricta*, *cymbispina*, *farnesiana*, *pennatula*, *Cercidium floridum*, *microphyllum*, *praecox*, *Parkinsonia aculeata*, *Prosopis juliflora*, *pallida*, and *palmeri*; Hawaii, California to Texas, and south through Mexico to Costa Rica ----- *amicus* (Horn)
8. (6). One large spine on mesoventral margin of apex of hindfemur about 0.66 as long as width of base of hindtibia (fig. 57); elytra white with broad black stripes on lateral margins (fig. 54); genitalia as in figure 56; reared from seeds of *Cercidium floridum* and *Parkinsonia aculeata*; Arizona, Sonora, Sinaloa, and Baja California --- *ulkei* (Horn)
- One large spine on mesoventral margin at apex of hindfemur as long as or longer than width of base of hindtibia and with two to four smaller accessory spines ----- 9
9. (8). Pygidium red orange with large hourglass-shaped dark-brown to black maculation (fig. 49); abdominal sterna 2-5 sulcate medially, sternum 5 in male with deep round depression (fig. 53); dark-brown hairs on lateral margins of abdominal sterna 2-5; male genitalia as in figure 51; reared from seeds of *Prosopis juliflora* and *laevigata*; California to Texas, Baja California to Nuevo Leon, and south to Michoacan ----- *protractus* (Horn)

Without the above combination of characters -----

10. (9). Usually large, 3.6-6.0 mm; elytra usually black with large red-orange humeral maculations extending from elytral stria 3 to lateral margin and from base to slightly more than 0.33 length of elytron (fig. 24), elytron sometimes all red orange; mucro about 0.05 as long as first tarsomere, spine at apex of lateral carina of hindtibia longer, about 0.1 as long as first tarsomere; first hindtarsomere with two ventral carinae; genitalia as in figure 26; reared from seeds of *Acacia pennatula*; western, central, and southern Mexico to Nicaragua ----- *humeralis* (Gyllenhal)

Without the above combination of characters ----- 11

11. (10). Lateral margins near apex of prothorax swollen, with strong spines (fig. 83) and pronounced hump (figs. 41, 82), prothorax almost quadrate in dorsal aspect (fig. 41); male genitalia as in figure 43; reared from seeds of *Acacia cochliacantha*, *cornigera*, *farnesiana*, *globulifera*, *schaffneri*, and *tortuosa*; Florida, Hawaii, California to Texas, and south throughout Mexico and Central America to Brazil ----- *nubigenis* (Motschulsky)

Lateral margins near apex of prothorax swollen but without strong spines and pronounced hump, prothorax subcampanulate in dorsal aspect ----- 12

12. (11). Hindfemur with elevated cluster of sometimes two, usually three, spines on mesoventral margin near apex, first spine about as long as width of tibial base, other spines 0.33 to 0.5 as long as first spine (fig. 4); size smaller, pronotum-elytra 1.6-2.7 mm; male genitalia as in figure 3; reared from seeds of *Acacia amentacea*, *berlandieri*, *constricta*, *rigidula*, and *vernicaosa*; Arizona to Texas and south to Puebla State, Mexico ----- *acuciestes*, new species

Hindfemur with mesoventral spines not raised (fig. 31); size of pronotum-elytra usually larger, 2.0-4.4 mm ---- 13

13. (12). Width of eye 1.5 to 2 times wider than width of frons; muzzle short, distance from base of antennae to apex of labrum about 0.33 as long as distance from upper limits of eyes to apex of labrum; body, head, and appendages usually all red orange; pygidium with dark-brown maculation of variable size located centrally or near apex; elytral striae usually subequally spaced at base; male genitalia as in figure 30; reared from seeds of *Acacia farnesiana*, *Prosopis juliflora*, and *pallida*; Hawaii, Puerto Rico, Jamaica, Colombia ----- *insularis*, new species

Width of eye 1.5 times or less width of frons; muzzle longer, distance from base of antennae to apex of labrum 0.2 to 0.5 as long as distance from upper limits of eyes to apex of labrum; elytral striae 2 and 3 usually closer at base than either is to adjacent striae; male genitalia not as in figure 30 ----- 14

14. (13). With uniform white or uniform intermixed yellow and golden hairs, without patterns; body usually reddish brown; male genitalia as in figure 18; reared from seeds of *Acacia cornigera* and *macracantha*; eastern Mexico ----- *cinerifer* (Fähræus)
- With uniform pubescence without patterns or with patterns as in figures 36, 58; male genitalia not as in figure 18 --- 15
15. (14). Usually larger than *viduatus*; vestiture varying from uniform white to yellow hairs to a pattern as in figure 36; male genitalia with elongated lateral clusters of denticles at middle of internal sac flanking an oblong, sclerotized medial plate (fig. 38); cervical sulcus prominent behind eye (fig. 40, cs); lateral carina of pronotum obsolete immediately dorsad of procoxal cavity; postocular fringe somewhat angular at posterodorsal margin of eye; apical margin of elytra not evenly arcuate, vaguely angulate; reared from seeds of *Acacia cochliacantha*, *cymbispina*, *farnesiana*, *globulifera*, *hindsii*, *macracantha*, *pennatula*, *Cacsalpinia coriaria*, *sclerocarpa*, and *Ceratonia siliqua*; most of Mexico through Central America to Colombia, Venezuela, Brazil, and West Indies ----- *mimosae* (Fabricius)
- Usually smaller than *mimosae*; pattern variable but always with two patches of white to yellowish hairs on either side of midline about halfway from bases of pronotum and pygidium (fig. 58); male genitalia lacking lateral clusters of spicules at middle of internal sac, median sclerite trapezoidal (fig. 60); cervical sulcus not prominent, somewhat depressed anterior to prominent lateral pronotal hump; lateral carina of pronotum prominent on strong, curved ridge extending to procoxal cavity; postocular fringe evenly rounded on posterodorsal margin of eye; apical margin of elytra evenly rounded; reared from seeds of *Acacia chiapensis*, *collinsii*, *cornigera*, *cymbispina*, *gentlei*, *globulifera*, and *hindsii*; western and southern Mexico to Costa Rica ----- *viduatus* (Sharp)

SYSTEMATICS OF MIMOSESTES

Mimosestes acuciestes, new species

(Figs. 1-4, 62)

Length (pronotum-elytra) 1.6-2.7 mm. Width 0.9-1.7 mm.
Maximum thoracic depth 0.7-1.4 mm.

Male

Similar to *M. mimosae* with the following exceptions:

Integument Color

Head black with red-orange labrum; usually four basal antennal segments red orange, apical seven segments dark brown to black, varying to all segments red orange. Body usually all black with broad red-orange stripe in center of elytron and abdomen red orange, body varying from all black to all red orange with thoracic sterna black; legs all red orange, occasionally with base of hind-femur black.

Vestiture

Pronotum, elytra, and pygidium almost always patterned, occasionally with dense uniform yellowish hairs and lateral spots on pronotum and pygidium; pronotum with intermixed white, golden, and brown hairs, two patches of white hairs on either side of midline at about midlength; elytron sometimes with pattern similar to that of *M. mimosae*, varying to usual pattern of moderately dense white hairs with basal, medial, and apical spots or bands of brown hairs; pygidium of forms from Texas and Mexico usually with central patch of brown hairs flanked by single white patch on either side at about midlength, usually with central white patch at base of pygidium, patch sometimes expanded to form stripe along midline; pygidium of forms from Arizona usually uniformly white with median stripe of dense white hairs, stripe flanked by single white patch on either side at about midlength; undersurfaces covered with dense white to yellowish hairs.

Structure

Head.—Boss without pit or impressed line between arms.

Prothorax.—Lateral carina varying from obsolete in smaller forms to well marked in larger forms, spinulate.

Mesothorax and Metathorax.—Strial intervals occasionally with small spines followed by coarse punctures; flattened spines at bases of striae 3 and 4 usually stronger than others, sometimes with spine at base of stria 5 well developed, spine at base of stria 6 usually obsolete, sometimes with all four spines obsolete; deep channel on ventral surface of hindfemur 0.33 to 0.50 as long as femur; femur armed with a cluster of two, usually three, spines on inner ventral surface near apex, first spine about as long as width of tibial base, other spines 0.33 to 0.50 as long as first spine (fig. 4).

Abdomen.—Sterna sometimes flattened medially; first sternum about 0.33 as long as abdomen, posterior margin straight; sterna

2 to 4 unmodified; fifth emarginate; pygidium punctate, convex in lateral view.

Genitalia (figs. 2, 3).—Median lobe moderate in length (3.8 times as long as width at middle), with dorsal hood at apex well developed; in ventral view, ventral valve with convex sides gently curving to rounded apex, not heavily sclerotized, ventral valve without round, translucent spots, base about 0.75 as wide as apex of median lobe, straight to slightly arcuate in lateral view; armature of internal sac consisting of many fine spinules basally and mesally, bilobed spiny amorphous mass of spinules apically, sometimes with vaguely sclerotized plate apically; apical mass and structures sometimes heavily sclerotized; armature of internal sac more heavily sclerotized in forms from Texas and northeastern Mexico. Lateral lobes expanded apically, cleft to about 0.75 their length (fig. 2).

Female

Similar to male except ventral surface of hindfemur not channeled beneath, fifth sternum as long as three preceding sterna, apex convex, not bent downward; genitalia as in figure 62.

Host Plants

Acacia amentacea: TEXAS. Nueces Co.: Corpus Christi, 19 April 1907 (Hunter). MEXICO. Nuevo Leon: Near Monterrey, 11 June 1889 (collector unknown).

A. berlandieri: MEXICO. Nuevo Leon: 16 mi S Sabinas Hidalgo, 19 June 1964 (C. D. Johnson).

A. constricta: ARIZONA. Yavapai Co.: 10 mi S Camp Verde, 10, 17, and 24 July 1969 and 8, 14, and 21 August 1969 (G. W. Forister); W. Clear Creek Camp, 3,500', 7½ mi ESE Camp Verde, 21 and 27 August 1969, 4, 11, and 18 September 1969, 9 October 1969 (G. W. Forister); Clear Creek Campgrounds, 8 mi SE Camp Verde, 17 October 1970, 26 September 1970 (T. D. Center). PIMA Co.: S end Tucson Mts., 2,600', 26 June 1925 (L. J. Bottimer #54b). COCHISE Co.: Tombstone, 1 October 1947 (L. J. Bottimer #89t); Portal, 26 September 1914 (Eggleston); 3 mi W Bisbee, 16 August 1977 (C. D. Johnson #74-77). TEXAS. Starr Co.: Roma, 16 December 1939 (collector unknown); Roma, 4-5 July 1947 (L. J. Bottimer #88b). PRESIDIO Co.: 5 August 1966 (collector unknown). NEW MEXICO. Hidalgo Co.: 1 October 1956 (L. J. Bottimer #99f). MEXICO. Sonora: Empalme, 10 September 1934 (Wiggins #7103); 2 mi SE Altar, 2 December 1968 (Rudd #2076); Santa Ana, 28 January 1939.

A. rigidula: TEXAS. Webb Co.: La Mesa Ranch, 3 May 1955 (L. J. Bottimer #94s). Starr Co.: Roma, 5 July 1947 (L. J. Bottimer #88c); Devil's River, 9 June 1948, 18 June 1957 (L. J. Bottimer #90t, 100i, 100j). MEXICO. Tamaulipas: 6.2 mi S San Fernando, 9 June 1966 (D. H. Janzen). Nuevo Leon: Monterrey, 11 June 1898 (Pringle #2526).

A. vernicosa: TEXAS. Presidio Co.: Presidio, 1 November 1941, 10 January 1942, 6 February 1942 (collector unknown). Brewster Co.: Big Bend National Park, 20 June 1957 and 21 June 1957 (L. J. Bottimer #100v, 100z). NEW MEXICO. Eddy Co.: Artesia, 7 August 1961 (L. J. Bottimer #112f).

Type Series

Holotype male and many paratypes: ARIZONA. Yavapai Co.: W. Clear Creek Cp., 3,500', 7½ mi ESE Camp Verde, 11 September 1969, reared from seeds of *Acacia constricta* (G. W. Forister), USNM 72778. Allotype female: TEXAS. Presidio Co.: Nr. Presidio, 1 November 1941, Em. 13 February 1942, Presidio #744, in *Acacia vernicosa* seed pods, lot No. 42-2866 (collector unknown). Paratypes: Those listed under previous Host Plants and the following: TEXAS. Bexar Co.: Ft. Sam Houston, 28 March 1953 (B. J. Adelson). Brewster Co.: 37 mi S Marathon, 9 June 1972 (W. E. Clark). Starr Co.: Roma, 10 July 1941 (B. E. White). Brewster Co.: Chisos Mts., 14 July 1941 (W. F. Barr); Chisos Mts., 12-16 July 1941 (B. E. White); The Basin, Big Bend National Park, 15 August 1968 (J. E. Hafernik); South Rim Trail, Big Bend National Park, 14 and 15 August 1969 (Board and Hafernik); Big Bend National Park, 23 June 1947 (R. E. Elbel). Presidio Co.: Shafter, 22 June 1968 (J. E. Hafernik); Presidio, 12 October 1945 (collector unknown), 29 May 1945 (Glick); 13 mi N Presidio (C. L. Cole). Jeff Davis Co.: Davis Mts., 2 August 1937 (D. J. and J. N. Knull). DeWitt Co.: 12 mi SW Cuero, 9 June 1971 (W. E. Clark). Victoria Co.: Victoria, December 1920, (J. C. Bridwell). ARIZONA. Gila Co.: Miami, 16 November 1940 (R. L. Furniss). Navajo Co.: 5 mi W Ft. Apache, 21 June 1957 (F. W. Werner and G. Butler). Pima Co.: Vail, 18 July 1938 (R. H. Beamer); Sabino Cn., Catalina Mts., 5 June 1959 (K. W. Radford and W. Patterson); Sabino Cn., 31 July 1941 (L. H. Banker); 6,000', Santa Rita Mts., 16 May 1928 (F. H. Parker); S. Rita Mts., 15 August 1940 (B. E. White). Pinal Co.: Oracle, 8 July 1950 (P. P. Cook). Cochise Co.: Chiricahua Mts., 6,400', 15 January 1965 (collector unknown); 3 mi E Montezuma Pass, Huachuca Mts., 17 July 1941 (B. E. White);

Huachuca Mts., 20 July 1936 (J. N. Knull); Elfrida, 2 May 1956 (F. Werner and G. Butler); Palmerlee, 9 July (no year) (H. A. Wenzel), 8 July 1909 (Kaeber). Yavapai Co.: Congress Jc., 14 June 1937 (D. J. and J. N. Knull). MEXICO. Chihuahua: 27 mi E Parral, 22 August 1964 (Timberlake); Chihuahua (Wickham), 9 mi S Parral, 26 July 1953, 5,200 ft. San Luis Potosi: 20 mi S San Luis Potosi, 7 July 1964 (C. D. Johnson); 16 mi S Sta. Maria del Rio, 6,500', 29 June 1971 (Ward; C. O'Brien and Marshall) and 5 July 1974 (Clark, Murray, Ashe, Schaffner). Veracruz: Veracruz, 30 June 1953. Nuevo Leon: Colonial Privado, 10 mi SW Monterrey, 22 November 1972 (G. W. Frankie); Montemorelos, 1,400', 20 May 1937 (M. A. Embury); 5 mi S Montemorelos, 20 June 1964 (C. D. Johnson); 9 mi NE Montemorelos, 20 June 1964 (C. D. Johnson); 2 mi SE Salinas Victoria, 19 and 20 June 1964 (C. D. Johnson); Monterrey, Chipinque Mesa, 24-26 July 1960 (H. F. Howden). Durango: 9 mi SW Cuencame, 10 July 1964 (C. D. Johnson). Morelos: 10 mi E Cuernavaca, 8 July 1974 (Clark, Murray, Ashe, Schaffner). Guerrero: Revolcadero, 2 December 1966 (Krauss). Sonora: La Angostura near Magdalena, 23 January 1963 (Burrue). Puebla: 13.3 mi NE Tehuizingo, 13-14 July 1974 (Clark, Murray, Ashe, Schaffner); 11.8 mi NW Izucar de Matamoros, 13 July 1974 (Clark, Murray, Ashe, Schaffner). Oaxaca: 5.5 mi NE Huajuapán de Leon, 14 July 1974 (Clark, Murray, Ashe, Schaffner); Santa Cruz, 29 February 1948 (T. MacDougall).

Holotype, allotype, and numerous paratypes deposited in the U.S. National Museum of Natural History. Paratypes retained in the C. D. Johnson collection, Flagstaff, Ariz., and also deposited in the following collections: Arizona State University, Tempe; University of Arizona, Tuscon; California Academy of Sciences, San Francisco; California Insect Survey, Berkeley; University of California, Riverside; Canadian National Collection of Insects, Ottawa; Museum of Comparative Zoology, Harvard University, Cambridge, Mass.; Texas A & M University, College Station; Texas Tech University, Lubbock; the Timberlake Collection, Riverside, Calif.; and the University of Kansas, Manhattan.

Discussion

M. acaciastes is in the *Mimosae* species group. Characters used to separate *M. acaciastes* from other species of *Mimosastes* are the consistently all black head, small size, a cluster of three spines on the mesoventral, apical margin of the hindfemur, an elytral pattern of moderately dense white hairs with basal, medial, and

apical spots or bands of brown hairs, and preference for seeds such as of *Acacia constricta* and *vernica*. The male genitalia are very distinct from those of other species in the group. *M. acaciastes* is the only species in the group with a broad, relatively unsclerotized ventral valve with a gently rounded apex. The armature of the internal sac is similar to but distinct from that of other members of the *Mimosae* group.

The external structures of this species are somewhat variable. Although the elytra most often have a distinct pattern (see description), occasional specimens have a variegated pattern similar to that of *M. mimosae*. The pronotum and pygidium vary as mentioned in the description. Individuals from Arizona usually have a weakly sclerotized armature in the internal sac, whereas those from Texas and northeastern Mexico usually have much more heavily sclerotized spines and spinules.

Of the hosts listed for *M. acaciastes*, we have found *Acacia constricta* to be the most common. According to Turner (1959), *A. constricta* and *vernica* are closely related as are *A. amentacea* and *rigidula*. *M. acaciastes*, then, seems to prefer these closely related species of *Acacia*, and, to our knowledge, is confined mostly to them.

This species is common in areas where its hosts grow and is fairly abundant in collections. It is named *acaciastes* because of a preference for *Acacia* seeds.

Speciation in the *Mimosae* group appears to have produced several populations, which we term species. *M. acaciastes* apparently represents a species that evolved from a common ancestor of *M. mimosae* and has exploited a group of *Acacia* species in central North America. Another species, *M. insularis*, appears to have evolved in a similar fashion but primarily on islands of the West Indies. It has been introduced into Hawaii through commerce.

Mimosestes amicus (Horn)

(Figs. 5-8, 63, 76-78)

- Bruchus amicus* Horn, 1873: 337 (Texas and Arizona); Riley and Howard, 1892: 165; Ashmead, 1894: 342; Horn, 1894: 345; Townsend, 1895: 277; Cockerell, 1902: 379; Schaeffer, 1907: 292, 300; Fall and Cockerell, 1907: 201; Fall, 1910: 164, 166, 169, 174, 186; Cushman, 1911: 495, 497, 498, 505; Swezey, 1925: 3; Zacher, 1952: 471; Prevett, 1966: 13.
- Mylabris amicus*: Leng, 1920: 306; Kunhikannan, 1923: 20.
- Acanthoscelides amicus*: Blackwelder, 1946: 758; Zacher, 1952: 465, 470, 472.
- Mimosestes amicus*: Muesebeck et al., 1951: 467; Hinckley, 1960: 261; Peck, 1963: 956; de Luca, 1965: 67; Johnson, 1968: 1269; Bottimer, 1968:

1024, 1039; Johnson, 1969: 55; Moldenke, 1971: 108; Smith and Ueckert, 1974: 63; Center and Johnson, 1976: 196; Pfaffenberger and Johnson, 1976: 34; Janzen, 1976: 187.

Male

Length (pronotum-elytra) 2.1–3.8 mm. Width 1.4–2.5 mm. Maximum thoracic depth 1.0–2.0 mm.

Similar to *M. mimosae* with the following exceptions:

Integument Color

Head black, occasionally with dark-brown suffusion behind eyes, or all red orange; basal four antennal segments red orange, apical seven usually black, sometimes all red orange. Body varying from all black to all red orange, usually black with red-orange base of pronotum, narrow red-orange stripe in center of elytron, and red-orange abdominal sterna; usually with apices of mesothoracic and metathoracic femora red orange, remaining legs and parts of legs usually black.

Vestiture

With white, golden, yellow, light-brown, and dark-brown hairs as follows: Pronotum, elytra, and pygidium covered with dense uniform white to dense intermixed dark reddish-brown hairs, usually with dense intermixed white, yellowish, and/or golden hairs in no apparent pattern, usually with darker hairs in vague clumps; when faint pattern is infrequently evident on elytron, intervals between striae 2 and 3, 4 and 5, and 6 and 7 with dense lines of white hairs, remainder of elytron normal; occasionally with vague white stripe along midline of pronotum and/or pygidium; lateral margins of prothorax, undersurfaces, and appendages clothed with moderately dense to dense white hairs.

Structure

Head.—Boss granulate, sometimes V-shaped, usually wedge-shaped (fig. 76); width of eye equal to or slightly wider than width of frons; ocular sinus about 0.4 as long as width of eye; posterior margin of eye not protruding from adjacent surfaces, postocular lobe blending smoothly into contour of head (figs. 76, 77); muzzle short, distance from base of antennae to apex of labrum about 0.23 to 0.50 as long as distance from upper limits of eyes to apex of labrum; antennae reaching nearly to humerus.

Prothorax.—Disk conical (fig. 5); lateral prothoracic carina obsolete, extending only about halfway to coxal cavity, without

spines; lateral margins near apex of prothorax not swollen, gently curving to apex.

Mesothorax and Metathorax.—Scutellum very small, subquadrate, with lateral posterior teeth, clothed with dense white or intermixed white and golden recumbent hairs; strial intervals with few small spines followed by coarse punctures, more common at base of elytron; striae 3 and 4 usually closer to one another at base than to adjacent striae, others subequally spaced at base; strong flattened spines usually present at bases of striae 3–5 (fig. 78); deep channel on ventral surface of hindfemur 0.33 to 0.50 as long as femur.

Abdomen.—See *M. mimosae*.

Genitalia (figs. 6, 7).—Median lobe moderate in length (3.8 times as long as width at middle), with moderately developed dorsal hood at apex; in ventral view, ventral valve elongate, narrow to broad, straight sides attenuated to truncate apex, apex sometimes with distinct notch in middle, apex and portions of sides near apex heavily sclerotized, ventral valve with many round, translucent spots, base 0.50 to 0.66 as broad as apex of median lobe, straight to slightly arcuate in lateral view; armature of internal sac consisting of many lines of fine spinules basally, medial curved sclerite and apical amorphous mass of spicules and spinules. Lateral lobes expanded apically, cleft to about 0.8 their length (fig. 6).

Female

Similar to male except ventral surface of hindfemur not channeled beneath, fifth sternum about as long as three preceding sterna, apex convex, usually not bent downward; genitalia as in figure 63.

Host Plants

Old Records

Acacia farnesiana: Cushman, 1911: 498, 505; Zacher, 1952: 465.

Caesalpinia coriaria: Zacher, 1952: 465.

Cassia occidentalis: Zacher, 1952: 472.

Cercidium (torreyanum) = floridum: Kunhikannan, 1923: 20; Zacher, 1952: 465.

Parkinsonia microphylla: Riley and Howard, 1892: 165; Cushman, 1911: 498, 505; Kunhikannan, 1923: 20; Zacher, 1952: 465.

P. (torreyana) = florida: Riley and Howard, 1892: 165; Cushman, 1911: 498, 505.

Prosopis chilensis: Hinckley, 1960: 262 (Hawaiian Is.).

P. glandulosa: Cushman, 1911: 498, 505; Kunhikannan, 1923: 20; Zacher, 1952: 465.

P. juliflora: Zacher, 1952: 465.

P. pubescens: Townsend, 1895: 277; Cushman, 1911: 498, 505; Zacher, 1952: 465.

P. siliquastrum: Zacher, 1952: 471.

P. velutina: Cushman, 1911: 498, 505; Zacher, 1952: 465.

New Records

Acacia constricta: ARIZONA. Cochise Co.: Portal, 29 September 1956 (L. J. Bottimer #99d); 4 mi E Portal, 7 September 1964 (C. D. Johnson); 3 mi NW St. David, 6 November 1976 (C. D. Johnson #93-76); 12 mi S Tombstone, 6 November 1976 (C. D. Johnson #97-76). Pima Co.: Ca 3,000', 1 mi W Hdqtrs., Saguaro Nat'l. Monument, 14 October 1976 (C. D. Johnson #36-76). Yavapai Co.: 10 mi S Camp Verde, 14 and 21 August 1969 (G. W. Forister); W Clear Creek Camp, 3,500', 7½ mi ESE Camp Verde, 21 August 1969, 4 and 11 September 1969, 3 October 1969 (G. W. Forister); Clear Creek Campground, 8 mi SE Camp Verde, 26 September 1970 and 17 October 1970 (T. D. Center). Gila Co.: Miami, 22 November 1959 (C. D. Johnson). Yuma Co.: 20 mi E and 20 mi E Ehrenberg, both 18 December 1959 (C. D. Johnson). NEW MEXICO. Hidalgo Co.: Granite Pass, 1 October 1956 (L. J. Bottimer #99f). TEXAS. Culberson Co.: Van Horn, 27 August 1924 (L. J. Bottimer #52×3a).

A. cymbispina: MEXICO. Jalisco: Ca 4,000', 3 mi S Tecolatlán, 1 January 1973 (C. D. Johnson #4-73).

A. farnesiana: CALIFORNIA. San Bernardino Co.: 8 mi SE Needles, 2 December 1974 (C. D. Johnson). HAWAII. Oahu: Waianae, 28 July-8 August 1975 (Nishida #75-1B).

A. pennatula: MEXICO. Jalisco: Ca 4,000', 3 mi S Tecolatlán, 1 January 1973 (C. D. Johnson #6-73).

Cercidium floridum: CALIFORNIA. Imperial Co.: Salton Sea Beach, 13 June 1963 (C. D. Johnson); Desert Shores, 13 June 1963 (C. D. Johnson); 1 mi W Glamis, 13 April 1965 (C. D. Johnson); 3 mi W Winterhaven, 14 April 1964 (C. D. Johnson). Riverside Co.: Indio, 11 June 1961 (C. D. Johnson); 9 mi N Blythe, 18 December 1959 (C. D. Johnson); 21 mi N Blythe, 18 December 1959 (C. D. Johnson); 19 mi W Blythe, 26 December 1959 (C. D. Johnson). San Bernardino Co.: 14 mi SE Needles, 17 July 1964 (C. D. Johnson). San Diego Co.: Borrego Springs, 12 June 1963 (C. D. Johnson). ARIZONA. Mohave Co.: 6 mi S Yucca, 17 July

1964 (C. D. Johnson). Maricopa Co.: 8 mi S Sunflower, 11 November 1959 (C. D. Johnson); 9 mi S Sunflower, 29 November 1959 (C. D. Johnson); 10 mi S Sunflower, 11 November 1959 (C. D. Johnson); Phoenix Mts., 21 September 1924 (L. J. Bottimer #52a9) (as *torreyanum*); Deer Valley, October 1965 (R. S. Beal); Salt River Valley, Phoenix, 5-6 November 1925 (L. J. Bottimer #54p3) (as *torreyanum*); nr. Lake Pleasant, 18 October 1975 (C. D. Johnson #83-75). Pinal Co.: Apache Junction, 8 November 1959 (C. D. Johnson); 5 mi N Casa Grande, 21 February 1960 (C. D. Johnson). Yuma Co.: Martinez Lake, 27 March 1967 (R. Phillips); Martinez Lake, 21 March 1964 (S. Rosenthal). TEXAS. Val Verde Co.: 10 mi E Del Rio, 17 June 1964 (C. D. Johnson). Duval Co.: 7 mi SW Freer, 18 June 1964 (C. D. Johnson).

C. microphyllum: ARIZONA. Pinal Co.: Florence, 2 September 1924 (L. J. Bottimer #52-Z-9); 15 mi S Florence, 13 June 1961 (C. D. Johnson). Yuma Co.: 10 mi E Ehrenberg, 11 June 1961 (C. D. Johnson). Maricopa Co.: 9 mi N Scottsdale, 25 June 1977 (C. D. Johnson #45-77); 14 mi N Scottsdale, 13 August 1977 (C. D. Johnson #64-77). Pima Co.: Ca 2,600', 2.3 mi S Sells, 15 August 1977 (C. D. Johnson #68-77). Yavapai Co.: Black Canyon City, 13 August 1977 (C. D. Johnson #63-77).

C. praecox: MEXICO. Sonora: 12 mi NW Ciudad Obregon, 15 July 1968 (C. D. Johnson #343-68); 31 mi S Navojoa, 20 August 1965 (C. D. Johnson). Oaxaca: 3,500', 51 mi SE Oaxaca, 6 July 1968 (C. D. Johnson #228-68).

Parkinsonia aculeata: TEXAS. Brownsville, 21 September 1927 (L. J. Bottimer #89i). COSTA RICA. Guanacaste: M.A.G. Station, Finca Taboga, 6 mi SW Cañas, 5 May 1971 (D. H. Janzen #743); Palo Verde, Comelco nr. Bagaces, 17 April 1971 (D. H. Janzen #674), 8 March 1972 (D. H. Janzen #20-37, 18-1, 20-18).

Prosopis juliflora: ARIZONA. Yavapai Co.: 1 mi W Beaver Creek Ranger Station, 30 July 1970 (T. D. Center); Clear Creek Campgrounds, 8 mi SE Camp Verde, 6 August 1970 (T. D. Center); 2.6 mi N Cottonwood, 8 October 1967 (S. M. Anderson); 3 mi N Mayer, 2 September 1964 (C. D. Johnson). Maricopa Co.: Wickenburg, 18 December 1959 and 11 June 1961 (C. D. Johnson); Mesa, 16 November 1959 (C. D. Johnson). Pinal Co.: 20 mi N Florence, 22 November 1959 (C. D. Johnson). Pima Co.: Madera Canyon, Santa Rita Mts., 4,800', 3 September 1964 (C. D. Johnson). Yuma Co.: 10 mi E Ehrenberg, 11 June 1961 (C. D. Johnson). Cochise Co.: 4,500', 15 mi E Pearce, 8 September 1964

(C. D. Johnson); 6 mi S Sierra Vista, 23 August 1967 and 7 mi S Sierra Vista, 22 August 1967 (both C. D. Johnson). TEXAS. Howard Co.: 10 mi SE Big Spring, 14 July 1964 (C. D. Johnson). Terrell Co.: 12 mi E Sanderson, 17 June 1964 (C. D. Johnson). Val Verde Co.: 10 mi E Del Rio, 17 June 1964 (C. D. Johnson). Uvalde Co.: Uvalde, 12 July 1964 (C. D. Johnson). Atascosa Co.: 1 mi S Pleasanton, 18 June 1964 (C. D. Johnson). Duval Co.: 7 mi SW Freer, 18 June 1964 (C. D. Johnson). Concho Co.: 14 mi W Eden, 13 July 1964 (C. D. Johnson). MEXICO. Sonora: 40 mi N Ciudad Obregon, 29 June 1964 (C. McMillan); 12 mi NW C. Obregon, 15 July 1968 (C. D. Johnson #342-68); 3 mi NW Est. Don, 14 July 1968 (C. D. Johnson #324-68); 14 mi N Hermosillo, 15 July 1968 (C. D. Johnson #352-68). Sinaloa: 3 mi NE Los Mochis, 20 August 1965 (C. D. Johnson). Durango: 5 mi SE Cuencame, 10 July 1964 (C. D. Johnson). Coahuila: 9 mi SE La Rosa, 10 July 1964 (C. D. Johnson); 13 mi S Monclava, 11 July 1964 (C. D. Johnson). Aguascalientes: 2 mi N Rincon de Romas, 8 July 1964 (C. D. Johnson). Colima: Beach, 4 mi NW Manzanillo, 7 March 1973 (C. D. Johnson #410-73).

P. pallida: HAWAII. Oahu: Waikiki, 26 October 1929 (F. C. Hadden); Waianae, 28 July-8 August, 1975 (Nishida #75-1B).

P. palmeri: MEXICO. Baja California: Sierra de la Giganta, 20 October 1964 (A. Carter); 9 mi S Villa Constitucion, 25 December 1975 (C. D. Johnson #104-75).

Location of Type

Museum of Comparative Zoology, Harvard University, Cambridge, Mass.

Distribution

United States: Arizona, California, Hawaii (Oahu, Maui), Kansas, Nevada, New Mexico, Texas. Mexico: Aguascalientes, Baja California, Chihuahua, Coahuila, Colima, Durango, Jalisco, Mexico State, Nuevo Leon, Oaxaca, Sinaloa, Sonora, Tamaulipas, Veracruz. Costa Rica.

Discussion

M. amicus is in the Mimosae species group. It is one of the most widespread and abundant of the bruchids of the Southwestern United States and of Mexico. This is no doubt due to its success in feeding in the seeds of the widely distributed species of

Acacia, *Cercidium*, and *Prosopis*. It is easily separated from other *Mimosestes* species by its flattened eyes and generally gray appearance.

The male genitalia of *M. amicus* (fig. 7) resemble those of *M. mimosae* in most respects. The medial, curved sclerite in the internal sac separates it from all others including *M. mimosae*, however.

Although *M. amicus* has been reared in numbers from the seeds of several species in several genera of plants, it is probably most abundant and successful in the seeds of *Cercidium* species. It is widespread in the seeds of *Prosopis*, but a study by Swier (1974)³ has shown it to be much less successful in the seeds of *Prosopis juliflora* than is the bruchid *Algarobius prosopis* (LeConte).

The record of *M. amicus* being reared from *Acacia farnesiana* from near Needles, Calif., is undoubtedly unique. The acacias were planted as ornamentals and only two specimens of *M. amicus* emerged from a sample of their seeds. *Cercidium* and *Prosopis* are common in the area and probably provided the *M. amicus* for oviposition. *M. nubigens*, commonly reared from this acacia when grown as an ornamental in Arizona, was not reared from this lot of seeds. It probably was not introduced along with the plants.

Many of the hosts listed by Zacher (1952) need to be verified.

Mimosestes anomalus, new species

(Figs. 9-11, 64)

Length (pronotum-elytra) 3.0-3.6 mm. Width 1.9-2.2 mm.
Maximum thoracic depth 1.5-1.8 mm.

Male

Similar to *M. mimosae* with the following exceptions:

Integument Color

Head and body usually mostly red orange to dark brown, thoracic sterna sometimes black, otherwise variable as in *M. mimosae*.

³ COMPARATIVE SEED PREDATION STRATEGIES OF MESQUITE BRUCHIDS IN ARIZONA WITH PARTICULAR REFERENCE TO SEED HEIGHT, DIRECTION, AND DENSITY. 97 pp. [Unpublished master's thesis. Copy on file Northern Ariz. Univ.] 1974.

Vestiture

With patterns as in *M. mimosae* and *viduatus*.

Structure

Head.—See *M. mimosae*.

Prothorax.—Prosternum separating coxae for their entire length (fig. 9).

Mesothorax and Metathorax.—See *M. mimosae*.

Abdomen.—See *M. mimosae*.

Genitalia (figs. 10, 11).—Median lobe moderate in length (3.8 times as long as width at middle), with dorsal hood at apex; in ventral view, ventral valve shorter than in *M. mimosae*, sides gently curved to rounded tip, without notch in middle of tip, apex and portions of sides near tip sclerotized, ventral valve with many round, translucent spots, base about 0.50 to 0.75 as wide as apex of median lobe, straight to slightly arcuate in lateral view; armature of internal sac consisting of many fine spicules medially connected to distinct, rhomboidal sclerite (fig. 11), apex with amorphous mass of fine spinules. Lateral lobes expanded apically, cleft to about 0.75 their length (fig. 10).

Female

Last abdominal sternum about 0.4 as long as three preceding sterna, not bent down at apex; genitalia as in figure 64.

Host Plants

Acacia chiapensis: MEXICO. Oaxaca: Temascal, 10 May 1964 (D. H. Janzen).

A. globulifera: MEXICO. Oaxaca: Temascal, 10 May 1964 (D. H. Janzen).

A. macracantha: MEXICO. Oaxaca: Temascal, 17 April 1964 (K. H. Janzen).

A. pennatula: HONDURAS. Duyure, 5,000 ft alt., 6 March–20 April 1969 (J. Lipes).

Type Series

Holotype male: MEXICO. Oaxaca: Temascal, 10 May 1964, reared from seeds of *Acacia macracantha* (K. H. Janzen), USNM 72777. Allotype female and one paratype male: MEXICO. Veracruz: 3 mi N Fortin de las Flores, 28 June 1964 (A. G. Raske). Paratypes: MEXICO. Chiapas: 7 mi W Tuxtla Gutierrez, 2 April 1958 (R. C. Bechtel and E. I. Schlinger). Oaxaca: Temascal, 10

May 1964, reared from seeds of *Acacia chiapensis* (D. H. Janzen); Temascal, 10 May 1964, reared from seeds of *Acacia globulifera* (D. H. Janzen). Veracruz: 3 mi N Fortin de las Flores, 3 July 1964, ex leguminous tree pods (A. G. Raske). HONDURAS. Duyure, 5,000 ft alt., 6 March–20 April 1969, reared from seeds of *Acacia pennatula* (J. Lipes).

Holotype, allotype, and some paratypes deposited in the U.S. National Museum of Natural History. Paratypes deposited in the California Insect Survey, Berkeley, and the C. D. Johnson collection, Flagstaff, Ariz.

Discussion

M. anomalus is in the Mimosae species group. This species is represented by only a few specimens, which we initially named *M. anomalus* because we thought the differences in the male genitalia were due to anomalies of either *M. mimosae* or *viduatus*. More specimens and further study confirmed that it is a distinct species, since the prosternum separates the procoxae for their entire length, a feature unique in the Mimosae group. The male genitalia show several unique features, but the most notable is the distinct rhomboidal medial sclerite in the internal sac.

M. anomalus has been associated only with species in the genus *Acacia*. It is probably a species with marginal success, because specimens of other species have been reared in greater numbers from the same lots of seeds.

Mimosestes brevicornis (Sharp)

(Figs. 12–15)

Bruchus brevicornis Sharp, 1885: 463 (British Honduras, Belize).

Acanthoscelides brevicornis: Blackwelder, 1946: 759.

Mimosestes brevicornis: Johnson and Kingsolver, 1977: 154.

Length (pronotum-elytra) 3.1–3.8 mm. Width 2.1–2.5 mm. Maximum thoracic depth 1.6–2.0 mm.

Male

Similar to *M. obscuriceps* with the following exceptions:

Integument Color

Usually more red orange to reddish brown than *M. obscuriceps*; sometimes antennae all red orange.

Vestiture

Postocular lobe with short white to yellowish hairs. Elytral pattern as in *M. obscuriceps*, but hairs usually encompassing more stria intervals; pygidium often without two swirls of hairs directed laterally on either side of midline near center of pygidium.

Structure

Head.—Boss broader at apex than in *M. obscuriceps*, without pit at apex; muzzle longer, distance from base of antennae to apex of labrum about half as long as distance from upper limits of eyes to apex of labrum.

Prothorax.—Cervical sulcus moderately deep, extending from near coxal cavity to about 0.5 distance to pronotal midline, not obscured by pubescence; median impressed line on median basal lobe present but usually obscured by pubescence.

Mesothorax and Metathorax.—Hindfemur 1.5 times as wide as width of hindcoxa; deep channel on ventral surface of hindfemur about 0.33 as long as femur.

Abdomen.—See *M. obscuriceps*.

Genitalia (figs. 13, 14).—Median lobe moderate in length (four times as long as width at middle), with moderately developed dorsal hood at apex; in ventral view, ventral valve short, sides convex, gently rounded to broad apex, ventral valve faint, not heavily sclerotized, base 0.50 to 0.75 as wide as apex of median lobe, straight to slightly arcuate in lateral view; many microscopic spinules lining internal sac; armature consisting of indistinct, apical lyre-shaped process with projection at base with heavily sclerotized lateral margins. Lateral lobes expanded apically, cleft to about 0.6 their length (fig. 13).

Female

No specimen available.

Host Plants

Old Records

None.

New Records

Acacia sp.: GUATEMALA. Cacao, Trece Aguas, Alta Verapaz, 22 April (Schwarz and Barber).

Acacia gentlei: GUATEMALA. Izabal Quirigua, 19 May 1965 (D. H. Janzen).

Location of Type

British Museum (Natural History), London.

Distribution

Belize. Guatemala.

Discussion

M. brevicornis is in the *Obscuriceps* species group. See *M. obscuriceps* discussion.

***Mimosestes cinerifer* (Fahraeus)**

(Figs. 16-19, 65, 79)

Bruchus cinerifer Fahraeus, 1839: 21 (Mexico); Allard, 1869: 328; Sharp, 1885: 474; Pic, 1913: 20; Zacher, 1952: 461, 471.

Acanthoscelides cinerifer: Blackwelder, 1946: 759.

Mimosestes cinerifer: Johnson and Kingsolver, 1977: 154.

Length (pronotum-elytra) 3.0-3.9 mm. Width 1.9-2.3 mm. Maximum thoracic depth 1.5-1.9 mm.

Male

Similar to *M. mimosae* with the following exceptions:

Integument Color

Head usually black with red-orange labrum, sometimes red orange with black V-shaped boss on vertex; usually with basal four antennal segments red orange, apical seven black. Body varies from red orange to black, usually reddish brown.

Vestiture

With uniform white or uniform intermixed yellow and golden hairs, without patterns.

Structure

Head.—Ocular sinus 0.50 to 0.66 as long as width of eye.

Prothorax.—Lateral prothoracic carina distinct, usually strong, spinulate, extending to coxal cavity.

Mesothorax and Metathorax.—Spines at base of elytral striae 3 and 4 strong, spines at base of striae 5 and 6 weak, not well developed (fig. 79); deep channel on ventral surface of hindfemur 0.33 to 0.50 as long as femur; hindfemur armed with mesoventral,

subapical acuminate spine slightly longer than width of tibial base, followed by two to four, usually three, spines about 0.33 as long as first spine; mesal glabrous longitudinal carina on first tarsomere sometimes vague.

Abdomen.—First sternum sometimes flattened medially.

Genitalia (figs. 17, 18).—Median lobe moderate in length (four times as long as width at middle), with well-developed inflated dorsal hood at apex (fig. 18); in ventral view, ventral valve elongate, margins sclerotized, nearly straight (fig. 18), ventral valve with many round, translucent spots, apex gently rounded, without notch in middle, base about half as wide as apex of median lobe, slightly arcuate in lateral view; armature of internal sac with several rows of blunt denticles extending from base to about middle of internal sac, lagenoid sclerite near apex, apical half of internal sac unlined. Lateral lobes expanded apically, cleft to about 0.8 their length (fig. 17).

Female

Similar to male except ventral surface of hindfemur not channeled beneath, last sternum usually bent downward at apex, curving to gentle point, about as long as three preceding sterna; genitalia as in figure 65.

Host Plants

Old Records

Mimosa sp.: Zacher, 1952: 461, 471.

New Records

Acacia cornigera: MEXICO. Veracruz: Cotaxtla Exp. Sta., Cotaxtla, 28–31 July 1962 (D. H. Janzen); 3 mi N Tres Valles, 26 September 1963 (D. H. Janzen); Tres Valles area, August 1962 (D. H. Janzen); 16 mi SE Tantoyuca, 22 June 1964 (C. D. Johnson); 10 mi E. Acayucan, 15 June 1968 (C. D. Johnson \pm 116–68); 5 mi W Cosamaloapan, 26 January 1964 (D. H. Janzen). Chiapas: 7 mi W Tuxtla Gutierrez, 16 June 1968 (C. D. Johnson \pm 133–68). Oaxaca: 5 mi E Temascal, 30 June 1964 (C. D. Johnson).

A. macracantha: MEXICO. Campeche: 4 mi E Ruinas Edzna, 25 June 1966 (D. H. Janzen).

Location of Type

British Museum (Natural History), London.

Distribution

Mexico: Campeche, Chiapas, Oaxaca, Veracruz.

Discussion

M. cinerifer is in the *Mimosae* species group. This species very closely resembles those specimens of *M. mimosae* that have uniformly colored integuments and pubescence. Its lateral prothoracic carina is usually stronger than that of *M. mimosae*. Its male genitalia resemble those of *M. mimosae*, but they are easily separated by the presence of a hemispherical sclerite with a serrated periphery near the apex of the internal sac (fig. 18) in *M. cinerifer*.

The limited number of hosts apparently is responsible for the distribution being limited to southeastern Mexico. *M. cinerifer* seems to prefer the seeds of swollen-thorn acacias.

Two possible synonyms for *M. cinerifer* have appeared in the literature. Pic (1913) indicated that *Bruchus centromaculatus* Allard was possibly a synonym of *M. cinerifer*, and Sharp (1885) suggested *B. incanus* Boheman as a possible synonym of *cinerifer*. Since both the names *B. centromaculatus* and *incanus* were applied to specimens collected in Africa, it is improbable that either is synonymous with *M. cinerifer*.

Mimosestes enterolobii, new species

(Figs. 20-23, 66)

Length (pronotum-elytra) 2.2-3.6 mm. Width 1.5-2.4 mm.
Maximum thoracic depth 1.1-1.8 mm.

Male

Similar to *M. mimosae* with the following exceptions:

Integument Color

Varying from usual all red orange to uncommon all black, with red-orange four basal antennal segments, prothoracic and mesothoracic legs; often all red orange, with black boss on vertex; dorsal surfaces and hindlegs usually dark reddish brown.

Vestiture

Uniform, moderately dense pubescence without pattern; hairs on dorsal surfaces white to yellow, on undersurfaces white.

Structure

Head.—Boss on vertex usually wedge shaped, without pit or impressed line between arms; width of eye equal to or slightly wider than width of frons; posterior margin of eye protruding from adjacent surfaces; postocular lobe rounded, not angulate.

Prothorax.—Lateral prothoracic carina usually well marked, finely serrate extending to coxal cavity; prosternum separating procoxae for their entire length (as in fig. 9).

Mesothorax and Metathorax.—Striae 3 and 4 usually closer to one another at base than each is to adjacent striae, others subequal at base (fig. 20); strong flattened spines at base of striae 3–6, those at base of 3 and 4 stronger; very large, flattened, shiny spinelike ridge anterior to humerus at base of stria 10 (fig. 20); without deep channel on ventral surface of hindfemur; inner and outer surfaces with longitudinal carinae; femur armed with mesoventral acuminate spine about 0.25 longer than width of tibial base, large spine followed by two, occasionally three, spines each about 0.33 as long as first spine (fig. 23); slight sinus at base of mucro.

Abdomen.—First sternum flattened medially.

Genitalia (figs. 21, 22).—Median lobe moderate in length (four times as long as width at middle), with moderately developed dorsal hood at apex; without ventral valve; armature of internal sac consisting of two large semicylindrical clusters of setae connected by emarginate band near apex, internal sac lacking minute denticles. Lateral lobes expanded apically, cleft to about 0.75 their length (fig. 21).

Female

Similar to male; last abdominal sternum about as long as three preceding sterna, apex convex, not bent downward; genitalia as in figure 66.

Host Plants

Enterolobium sp.: PANAMA. Canal Zone: Cerro Pelado, Gamboa, 14 February 1964 and 21 February 1964 (L. J. Bottimer #121c).

Enterolobium schomburgkii: PANAMA. Canal Zone, 1 and 15 April 1976 (D. H. Janzen).

Type Series

Holotype male: PANAMA. Canal Zone, 15 April 1976, D. H. Janzen, from pod of *Enterolobium schomburgkii*, USNM type

#72784. Allotype female: Same data as holotype. Paratypes: 47 from localities listed under previous Host Plants. PANAMA. Paraiso, 14 April 1911 (E. A. Schwarz) (2), 14 July 1976 (W. E. Clark) (1).

Holotype, allotype, and paratypes deposited in the U.S. National Museum of Natural History. Paratypes also deposited in the C. D. Johnson collection, Flagstaff, Ariz., and in the Canadian National Collections, Ottawa.

Discussion

M. enterolobii is in the *Enterolobii* species group. This species deviates somewhat from typical *Mimosestes* in that males lack a channel on the ventral face of the hindfemur. From other species of *Mimosestes*, except *anomalus*, *brevicornis*, and *obscuriceps*, *enterolobii* is distinguished by the prosternum completely separating the procoxae. From these three, it is distinguished by the lack of a pattern in the dorsal vestiture and by the presence of a flattened, spinelike ridge at the base of stria 10. Although it closely resembles species in the *Mimosae* group, it differs from them by having the divided procoxae, the lack of a channel on the male hindfemur, and the lack of a distinct ventral valve in the male genitalia. The three last characters also appear to be primitive in *Mimosestes*.

Stator generalis Johnson and Kingsolver is the only bruchid heretofore reported breeding in seeds of an *Enterolobium*, and it develops in *E. cyclocarpum* (Jacq.) Griseb. in Panama. Because the seeds of *Enterolobium* are toxic, these host associations of bruchids are of considerable significance to ecologists and toxicologists. *Enterolobium* apparently supports no bruchids north of Panama.

The specific epithet *enterolobii* is the genitive form of *Enterolobium*.

Mimosestes humeralis (Gyllenhal)

(Figs. 24-27, 67)

Bruchius humeralis Gyllenhal, 1833: 39 (Mexico); Sharp, 1885: 447, 473, 474, 476.

Acanthoscelides humeralis: Blackwelder, 1946: 759.

Mimosestes humeralis: Moldenke, 1971: 108.

Length (pronotum-elytra) 3.6-6.0 mm. Width 2.2-3.6 mm. Maximum thoracic depth 1.8-3.0 mm.

Male

Integument Color

Head usually all black, sometimes varying to all red orange, occasional specimens with black boss and vertex, remainder red orange; four basal antennal segments black with some red orange, apical seven segments black. Pronotum varying from all black to all red orange, usually black with lateral margins and spot near apical midline red orange; elytron usually black with large red-orange humeral maculation extending from third elytral stria to lateral margin and from base to slightly more than 0.33 length of elytron (fig. 24), if maculation larger then usually extending apically between striae 3 and 6, sometimes elytron varying to all red orange; undersurfaces and pygidium varying from all black to all red orange, usually all black; legs usually mostly red orange with bases black.

Vestiture

With recumbent white, golden, or yellow hairs as follows: Eye with medial fringe of white hairs; postocular lobe with short white hairs; dense postocular patch of white hairs; hairs on remainder of head sometimes so dense that postocular patch is obscured, sometimes with intermixed golden and white hairs on vertex; hairs on pronotum, elytra, and pygidium usually white, sometimes intermixed golden and white; undersurfaces and legs with moderately dense to dense white hairs; pubescence of pygidium uniform.

Structure

Head.—Short and broad, densely punctulate; frons with median, usually with glabrous, finely punctulate line extending from frontoclypeal suture to small wedge-shaped finely granulate boss on vertex; boss sometimes with pit at apex; vague transverse sulcus between upper limits of eyes; width of eye about equal to width of frons; ocular sinus about half as long as width of eye; posterior margin of eye protruding from adjacent surfaces but eyes flattened dorsally; postocular lobe rounded to slightly angulate, about one-third of dorsal surface confluent with head, remaining two-thirds free; distance from base of antennae to apex of labrum about half as long as distance from upper limits of eyes to apex of labrum; antennal segments variable in form but usually 1, 3, and 4 filiform, 2 moniliform, 5 to 10 eccentric, 11 subacute

apically, 5 to 10 usually slightly broader than long; antenna reaching to or almost to humerus.

Prothorax.—Disk subcampanulate (fig. 24), with many coarse punctations in no apparent pattern; cervical sulcus deep, extending from near cavity to about half distance to pronotal midline; lateral prothoracic carina usually vague, usually extending only halfway from base to apex, usually obscured by pubescence; lateral margins near apex only slightly swollen, without hump or spines; short median impressed line on median basal lobe; usually with vague small depressions near basolateral margins; prosternum separating procoxae for about 0.9 their length.

Mesothorax and Metathorax.—Scutellum small, transverse, with lateral posterior teeth, usually clothed with dense recumbent white hairs; elytron about twice as long as broad; striae deep, punctate, strial intervals punctulate, with coarse punctures; striae 2 and 3, and 4 and 5 usually closer to one another at base than to adjacent striae; base of striae 3-5 usually with strong flattened spines, spine at base of stria 6 usually obsolete; humerus rugulose, often glabrous; undersurfaces punctate; all of hindcoxa punctate; hindfemur constricted basally and apically, expanded medially to about width of coxa (fig. 27); deep channel on ventral surface of femur about half as long as femur, lined with elongate, dense white hairs, inner and outer margins of channel with smooth carinae; femur armed with inner subapical acuminate spine equal to or slightly longer than width of tibial base, followed by one or two spines 0.17 to 0.33 as long as first spine; tibia with ventral, lateroventral, lateral, and dorsomesal glabrous longitudinal carinae; ventral carina bladelike, erect, lateroventral carina sometimes vague; dorsal surface without fossa; tibial corona with three to four spinules, spinule at apex of lateral carina strong, about 0.1 as long as first tarsomere, mucro about 0.05 as long as first tarsomere; without sinus at base of mucro; first tarsomere with two ventral, one lateral, and one mesal glabrous longitudinal carinae, ventral carinae separated by shallow sulcus.

Abdomen.—Sterna usually not flattened medially; first sternum usually about 0.4 as long as abdomen, posterior margin straight; sterna 2 to 4 unmodified; fifth emarginate; pygidium punctate, convex in lateral view.

Genitalia (figs. 25, 26).—Median lobe moderate in length (four times as long as width at middle), with well-developed dorsal hood at apex; in ventral view, ventral valve variable in shape from

narrow to broad, usually with convex sides and subtruncate apex, ventral valve with many round translucent spots, base 0.50 to 0.66 as wide as apex of median lobe, straight to slightly arcuate in lateral view; armature of internal sac usually with many microscopic spinules extending from base to apex, spinules occasionally heavily sclerotized from base to middle of internal sac, apex of internal sac with variable number of sclerotized spicules and plates. Lateral lobes expanded apically, cleft to about 0.75 their length (fig. 25).

Female

Similar to male except ventral surface of hindfemur not channeled beneath, last sternum not bent downward at apex, apex convex or almost straight; genitalia as in figure 67.

Host Plants

Old Records

None.

New Records

Acacia pennatula: MEXICO. Nayarit: 200', 26 mi NW Tepic, 10 March 1973 (C. D. Johnson #474-73). Jalisco: 7 mi W Magdalena, 2 March 1973 (C. D. Johnson #321-73); ca 4,000', 8 mi S Atenquique, 3 January 1973 (C. D. Johnson #42-73); ca 4,000', 8 mi S Atenquique, 6 March 1973 (C. D. Johnson #359-73); 5,100', 5 mi S Zacoalco, 6 March 1973 (C. D. Johnson #345-73); hillside, 3 mi W Chapala, 5 March 1973 (C. D. Johnson #332-73); ca 4,000', 3 mi S Tecolatlán, 1 January 1973 (C. D. Johnson #6-73). Colima: Ca 3,700', 10 mi N Colima, 6 March 1973 (C. D. Johnson #365-73). Mexico: Zacualpan, 29 April 1929 (Whiton). GUATEMALA. Baja Verapaz, Sierra de las Minas, 3,300', 5 January 1908 (Kellerman 7660). EL SALVADOR. Santa Ana, 8 January 1922 (P. C. Standley).

Location of Type

Naturhistoriske Riksmuseet, Stockholm.

Distribution

Mexico: Chiapas, Colima, Durango, Guanajuato, Jalisco, Mexico State, Morelos, Nayarit, Oaxaca, Sinaloa, Sonora, Veracruz. Nicaragua. Honduras. Guatemala. El Salvador.

Discussion

M. humeralis is in the Humeralis species group. It is one of the largest of the acanthoscelidine bruchids, and its size and red humeral maculations distinguish it from most other New World Bruchidae. Means of separating it from *M. janzeni*, with which it is most likely to be confused, are given in the key and under the discussion of *janzeni*. Both *M. humeralis* and *janzeni* resemble *Sennius militaris* (Sharp) in that all have red humeral maculations on black elytra. Although most specimens of *M. humeralis* are usually large with black elytra and red humeral maculations, some are smaller and have all red-orange elytra. Characters for separating these unique forms from other *Mimosestes* are given in the key.

Four specimens of *M. humeralis*, of about 400 examined, had rows of heavily sclerotized spinules from the base to the middle of the internal sac of the male genitalia. Although this genital pattern is strikingly different from the usual microscopic spinules of the common form, we believe both forms belong to the same species because there are no consistent external differences between the two forms, and small numbers of these aberrant forms were reared as part of the same series from the same lots of seeds as the more common form. Ecological preferences also indicate that these two forms belong to the same populations of the same species.

The male genitalia of *M. humeralis* (figs. 25, 26) are typical of *Mimosestes* but are diagnostic for the species.

The only verified host for *M. humeralis* is *Acacia pennatula*, from which large numbers of beetles have been reared. The distribution of *A. pennatula* and *M. humeralis* is essentially coincidental.

Mimosestes insularis, new species

(Figs. 28-31, 68, 80, 81)

Length (pronotum-elytra) 2.3-4.4 mm. Width 1.5-2.8 mm.
Maximum thoracic depth 1.1-2.3 mm.

Male

Similar to *M. mimosae* with the following exceptions:

Integument Color

Head varying as in *M. mimosae* but most often all red orange;

antennae usually all red orange, occasionally with apical seven segments brown. Body usually red orange, occasionally dark reddish brown; pygidium with dark-brown maculation of variable size located centrally or near apex; legs usually red orange; insular forms usually not lighter in color than mainland forms.

Vestiture

As in *M. mimosae* but usually with pronotum uniform white to yellow, with dense patches of white hairs laterally and dense line of white hairs along midline; pattern of elytron sometimes as in *mimosae* but usually with uniform white to yellow hairs with three patches of darker hairs lateromedially, apex usually with darker hairs, patches variable in size and position; pygidium with white patch of hairs basomedially, which sometimes is extended into white stripe of hairs along midline, line sometimes incomplete, usually with patches of white hairs on either side of midline about halfway from base; pygidium with white hairs covering red-orange integument, dark-brown hairs covering dark central maculation.

Structure

Head.—Width of eye 1.5 to 2.0 times wider than width of frons (fig. 80); muzzle short, distance from base of antennae to apex of labrum about 0.33 as long as distance from upper limits of eyes to apex of labrum; antennae variable but usually as in *M. mimosae*.

Prothorax.—Lateral prothoracic carina usually strong, spinulate, extending to coxal cavity; usually with small depressions near basolateral margins and on either side of midline near apex (fig. 28), anterolateral angles gently rounded (fig. 81).

Mesothorax and Metathorax.—Striae usually subequal at base, sometimes 3 and 4 closer to one another, others subequal; hind-femur constricted basally and apically, expanded medially to about 0.3 wider than width of coxa (fig. 81); deep channel on ventral surface of femur about 0.5 to 0.6 as long as femur.

Abdomen.—Sterna slightly flattened medially; pygidium finely punctate.

Genitalia (figs. 29, 30).—Median lobe moderate in length (4.25 times as long as width at middle), with moderately developed dorsal hood at apex; in ventral view, ventral valve elongate, straplike with concave sides, apex gently rounded, sometimes with distinct notch at middle, narrow heavily sclerotized band on sides and apex, ventral valve with translucent spots, base about half

as wide as apex of median lobe, straight to slightly arcuate in lateral view; armature of internal sac consisting of many rows of spicules extending from base to apex, becoming more heavily sclerotized at apex, with moderately sclerotized elongate sclerite at apex. Lateral lobes expanded apically, cleft to about 0.75 their length (fig. 29).

Female

Similar to male except ventral surface of hindfemur not channeled beneath, last abdominal sternum about 0.66 as long as three preceding sterna, usually bent downward and convex at apex; genitalia as in figure 68.

Host Plants

Acacia sp.: PUERTO RICO. Fortuna, 11 January 1934 (R. G. Oakley #5076); Guanica, Boriquen Forest Pres., 25 June 1934 (R. G. Oakley #5711).

Acacia farnesiana: PUERTO RICO. S. W. Area, 3 and 4 March 1969 (D. H. Janzen #5609 and #5655); 2 mi N Yauco, 4 March 1969 (D. H. Janzen). HAWAII. Oahu: Honolulu, 1 and 17 July 1929 (F. C. Hadden); Waianae, 29 August (collector unknown); Waianae, 28 July-8 August 1975 (Nishida #75-1B); Diamond Head, 20 August 1919 (E. H. Bryan).

Prosopis juliflora: PUERTO RICO. Guanica Forest Pres., Guanica, July 1975 (J. Micheli), 4 March 1969 (D. H. Janzen), 5 December 1940, L. F. Martorell #813-40. DOMINICAN REPUBLIC. Monte Cristi Province, 23 October 1946 (R. A. Howard).

P. pallida: HAWAII. Oahu: Waikiki, 26 October 1929 (F. C. Hadden); Waianae, 28 July-8 August 1975 (Nishida #75-1B). Maui: Kahului, intercepted Plant Quarantine, 17 August 1976.

Type Series

Holotype male and several paratypes: HAWAII. Oahu: Waikiki, 26 October 1929, ex Kiawe (F. C. Hadden), USNM 72779. Allotype female and two paratypes: PUERTO RICO. Nr. Fajardo, rt. 194, km 46.7, 20 August 1961 (Flint and Spangler). Paratypes: Those listed under previous Host Plants and the following: PUERTO RICO. Soroco, 20 August 1961 (Flint and Spangler); La Parguera, 28, 29, and 30 July 1969 (H. and A. Howden); Guanica Forest, 29 July 1969 (H. and A. Howden); Aguirre, 5 May 1925 (H. E. Box); Ponce, 8 September 1933 (R. G. Oakley); San German, Acc. 100-1923 (G. N. Wolcott);

Guanica, July 1975 (J. Micheli); Caja de Muerta, 11 December 1947. JAMAICA. Pt. Royal, 5 August 1967 (L. and C. W. O'Brien); King. Palisadoes, 25 August 1966 (Howden and Becker). CURACAO. Damacar, 1-5 July 1962 (J. Maldonado C.). HAWAII. Oahu: Waialae Beach, 8 September 1922 (E. H. Bryan); Honolulu, 1 July 1929 (F. C. Hadden); Mt. Tantalus, 26 March 1919 (collector unknown). COLOMBIA. Santa Marta (Darlington); Magdal., Santa Marta, 8 October 1971 (G. E. Bohart).

Holotype, allotype, and numerous paratypes deposited in the U.S. National Museum of Natural History. Paratypes retained in the C. D. Johnson collection, Flagstaff, Ariz., and also deposited in the following collections: Bernice P. Bishop Museum, Honolulu; California Academy of Sciences, San Francisco; Canadian National Collection of Insects, Ottawa; the H. F. Howden Collection, Ottawa; the Los Angeles County Natural History Museum; the University of Minnesota, Minneapolis; and the Museum of Comparative Zoology, Harvard University, Cambridge, Mass.

Discussion

M. insularis is in the Mimosae species group. It resembles insular forms of *M. mimosae* more than any other members of the group. It undoubtedly has been confused with *M. mimosae* in the West Indies and also with *M. nubigens* in Hawaii. It is separated from all other species in the group by characters given in the key. From insular forms of *M. mimosae* it is distinguished by the dark pygidial maculation, usually larger eyes, shorter muzzle, usually stronger lateral prothoracic carina, wider hindfemur, and longer channel on venter of the male hindfemur. The male genitalia are similar to those of *M. mimosae* but differ primarily by having a narrow ventral valve and a moderately sclerotized elongate sclerite at the apex of the internal sac.

The association of *M. insularis* with *Acacia farnesiana* and *Prosopis* spp. is of particular interest. Although these plants have a wide continental distribution in the New World, the sole continental record for *M. insularis* is in Colombia, South America. It is apparently mostly confined to the West Indies and was probably introduced into Hawaii with its hosts. For whatever reason, it is apparently unable to compete favorably with the more common bruchids in these hosts on the mainland.

Probably *M. insularis* evolved from a common ancestor that gave rise to the Mimosae group. This was probably possible because of a lack of gene exchange from the mainland and lack of

competition from similar species in the same hosts on the mainland. Thus, it is adapted to an insular existence and is so named.

Three specimens of this species from the Los Angeles County Museum collection are labeled "Madera Canyon, Arizona." This is almost certainly a case of mislabeling, for no other specimens of this species have been recorded from this well-collected area of Arizona or anywhere near it.

***Mimosestes janzeni*, new species**

(Figs. 32-35, 69)

Length (pronotum-elytra) 3.5-5.6 mm. Width 2.2-3.5 mm. Maximum thoracic depth 1.5-2.5 mm.

Male

Similar to *M. humeralis* with the following exceptions:

Integument Color

Head all black, occasionally base reddish brown. Pronotum usually all black, sometimes all red orange or black with red-orange lateral margins; elytron usually black with large red-orange humeral maculation extending from second elytral stria to lateral margin and from base to about 0.33 to 0.40 length of elytron (fig. 32), if maculation larger then usually extending apically between striae 2 and 5; sometimes prothoracic and mesothoracic legs all black.

Vestiture

With sparse white hairs on head (pattern as in *M. humeralis*), pronotum, and elytra; pygidium with uniform moderately dense white hairs; undersurfaces and legs with moderately dense to dense white hairs.

Structure

Head.—Boss on vertex usually large; posterior margin of eye not protruding from adjacent surfaces; postocular lobe angulate, confluent with lateral portions of head well past angulation (as in *M. amicus*, fig. 76).

Prothorax.—Cervical sulcus vague, usually obscured by pubescence, dorsal punctation fine.

Mesothorax and Metathorax.—Ventral tibial carina not blade-like or erect.

Abdomen.—Sterna sometimes flattened medially.

Genitalia (figs. 33, 34).—Median lobe moderate in length (3.5 times as long as width at middle), with well-developed dorsal hood at apex; in ventral view, ventral valve with sides almost straight, narrowing to blunt emarginate apex, broad sclerotized margins with many round translucent spots, base about 0.66 as wide as apex of median lobe, straight to convex in lateral view; armature of internal sac with two large, curved spinulate structures basomedially connected to apical mass of fine spinules and thinly sclerotized, rounded plate. Lateral lobes expanded apically, cleft to about 0.75 their length (fig. 33).

Female

Similar to male but may be lighter in color; genitalia as in figure 69.

Host Plants

Acacia cochliacantha: MEXICO. Guerrero: 8 mi N Acapulco, 8 January 1965 (D. H. Janzen); 25 mi N Acapulco, 18 January 1965 (D. H. Janzen).

A. cymbispina: MEXICO. Jalisco: Ca 4,000', 2 mi S Tecolatlán, 1 January 1973 (C. D. Johnson #4-73); 15 mi W Magdalena, 30 December 1972 (C. D. Johnson #205-72); ca 4,000', 6 mi N Atenquique, 6 March 1973 (C. D. Johnson #351-73). Sonora: 700', San Bernardo, 31 mi NW Alamos, 23 December 1976 (C. D. Johnson #154-76). Colima: Ca 3,700', 10 N Colima, 6 March 1973 (C. D. Johnson #370-73). Nayarit: 10 mi E San Blas, 28 February 1973 (C. D. Johnson #248-73); 18 mi SW Compostela, 28 February 1973 (C. D. Johnson #253-73); 14 mi SE Sayulita, 1 March 1973 (C. D. Johnson #290-73).

Type Series

Holotype male and one paratype: MEXICO. Guerrero: 25 mi N Acapulco, 18 January 1965, ex *Acacia cochliacantha* (D. H. Janzen), USNM 72780. Allotype female and one paratype female: MEXICO. Jalisco: Ca 4,000', 3 mi S Tecolatlán, 1 January 1973, reared from seeds of *Acacia cymbispina*, emerged by 15 January 1973 (C. D. Johnson #4-73). Paratypes: Those listed under previous Host Plants and from the following localities: MEXICO. Guerrero: 13 mi N Chilpancingo, 25 August 1958 (H. F. Howden); 20 mi E Acapulco, 10 July 1974 (Clark, Murray, Ashe, Schaffner); 20 mi N Iguala, 22 August 1958 (H. F. Howden); 10

mi N Acapulco, 8 January 1965, ex *Acacia cochliacantha* (D. H. Janzen). Oaxaca: 2.7 mi NW El Camaron, 14 July 1971 (Clark, Murray, Hart, Schaffner); Guelatao, 18 August 1969 (L. A. Kelton); 1 mi SE Rio Hondo, 22 July 1974 (Clark, Murray, Ashe, Schaffner); 500', 21 mi W Tehuantepec, 6 July 1968 (C. D. Johnson). Chiapas: 4,800', 10 km E La Trinitaria, 14 August 1967 (H. R. Burke and J. Hafern timer); La Trinitaria, 17 June 1965 (H. R. Burke, J. R. Meyer, J. C. Schaffner); Lagos de Colores, 12 May 1969 (J. M. Campbell); 7 mi W Tuxtla Gutierrez, 16 June 1968 (C. D. Johnson). Puebla: 13.3 mi NE Tehuiztingo, 13-14 July 1974 (Clark, Murray, Ashe, Schaffner); 4,800', 11 mi SE Acatlan, 10 July 1952 (E. E. Gilbert and C. D. MacNeil); 9 mi W Izucar de Matamoros, 16 September 1972 (Hanson and Poff). Veracruz: Vera Cruz (sic) (Koebele); Cordoba, 8 October 1941 (DeLong, Good, Caldwell, and Plummer); Cordoba, 15 May 1946 (J. and D. Pallister). Sonora: Alamos, 7 September 1970 (G. E. and R. M. Bohart) on *Baccharis*. HONDURAS. East of Tegucigalpa, Francisco Morazan, 21 December 1960 (Paul H. Freytag and George F. Freytag).

Holotype, allotype, and several paratypes deposited in the U.S. National Museum of Natural History. Paratypes retained in the C. D. Johnson collection, Flagstaff, Ariz., and also deposited in the following collections: American Museum of Natural History, New York; California Academy of Sciences, San Francisco; California Insect Survey, Berkeley; Canadian National Collection of Insects, Ottawa; Ohio State University, Columbus; and Texas A & M University, College Station.

Discussion

M. janzeni is in the Humeralis species group. It is most closely related to *M. humeralis* and is most often confused with that species because both usually have black elytra with large red humeral maculations. *M. humeralis* is usually larger than *M. janzeni*. They are easily separated by the size of the humeral maculation. In *M. humeralis* this maculation extends from the third elytral stria to the lateral margin and from the base to about 0.33 the length of the elytron (fig. 24). The maculation in *M. janzeni* is slightly larger, starting at stria 2 (fig. 32). In addition, the posterior margins of the eyes of *M. janzeni* are flattened and the postocular lobe is confluent with the lateral portions of the head, whereas in *M. humeralis* the eyes are more protruding. There are also significant differences in the male genitalia (figs. 26, 34).

The male genitalia of *M. janzeni* are unique for a *Mimosestes*. The shape and pattern of sclerotization of the ventral valve are distinct from those of other species as are the two large, curved spinulate structures located basomedially in the internal sac.

M. humeralis and *janzeni* have evolved a preference for the seeds of species of *Acacia*. *M. humeralis* has been found only in *A. pennatula*, whereas *M. janzeni* prefers *A. cochliacantha* and *cymbispina*. *M. janzeni* apparently is a poor competitor since it has been collected and reared in very small numbers.

M. janzeni is named in honor of Daniel H. Janzen, who has collected many bruchids that we have used in our studies.

***Mimosestes mimosae* (Fabricius)**

(Figs. 36-40, 70)

Bruchus mimosae Fabricius, 1781: 76 (*Americae meridionalis*); Boheman, 1839: 18; Allard, 1868: 92; Sharp, 1885: 458.

Acanthoscelides mimosae: Blackwelder, 1946: 760; Zacher, 1952: 465, 471, 472, 475, 476, 477; Johnson, 1970: 27.

Mimosestes mimosae: Decelle, 1975: 138.

Bruchus dominicanus Jekel, 1855: 12 (S. Domingo: Dom. Sallé); Bridwell, 1942: 251. NEW SYNONYMY.

Acanthoscelides dominicanus: Blackwelder, 1946: 759; Zacher, 1952: 465, 470, 471, 472, 475, 478, 479.

Mimosestes dominicanus: Johnson and Kingsolver, 1977: 154.

Bruchus breweri Crotch, 1867: 389 (Santa Maria, Azores). NEW SYNONYMY.

Acanthoscelides breweri: Blackwelder, 1946: 760 (as syn. of *obtectus* (Say)).

Bruchus inornatus Horn, 1873: 333 (middle States) (not *inornatus* Küster, 1850: 72); Fall, 1910: 170; Pic, 1912: 92; Pic, 1913: 29. NEW SYNONYMY.

Mimosestes inornatus: Johnson, 1968: 1269.

Bruchus subrufus Motschulsky, 1874: 225 (Columbia, sic). NEW SYNONYMY.

Acanthoscelides subrufus: Blackwelder, 1946: 761.

Bruchus strigatus Motschulsky, 1874: 237 (Antil. Mexico). NEW SYNONYMY.

Acanthoscelides strigatus: Blackwelder, 1946: 761.

Mimosestes strigatus: Johnson and Kingsolver, 1977: 154.

Bruchus immunis Sharp, 1885: 474 (Panama, Peña Blanca, 3,000-4,000 ft, San Lorenzo). NEW SYNONYMY.

Acanthoscelides immunis: Blackwelder, 1946: 759.

Mimosestes immunis: Kingsolver, 1975: 60; Janzen, 1975: 157; Johnson and Kingsolver, 1977: 154.

Bruchus innotatus Pic, 1912: 92; Pic, 1913: 29. NEW SYNONYMY.

Mylabris innotatus: Leng, 1920: 305.

Acanthoscelides innotatus: Bradley, 1947: 40; Blackwelder and Blackwelder, 1948: 44.

Mimosestes innotatus: Bottimer, 1968: 1024.

Length (pronotum-elytra) 2.0-4.2 mm. Width 1.3-2.5 mm. Maximum thoracic depth 1.0-2.2 mm.

Male

Integument Color

Head varying from black with red-orange labrum to all red orange; usually red orange with black V-shaped boss on vertex, black maculation often expanded to posterior part of head; antennae varying from all red orange to basal four segments red orange and apical seven dark brown. Body usually red orange, varying to dark reddish brown, thoracic sterna sometimes black, pronotum and elytra usually darker than other parts; insular forms usually lighter in color than mainland forms.

Vestiture

With recumbent white, golden, brown, or yellow hairs as follows: Eye with medial fringe of white, golden, or yellow hairs; postocular lobe with short, white hairs; dense postocular patch of white, golden, or yellowish hairs; remainder of head with moderately dense to dense hairs, often with hairs on frons and vertex intermixed white, golden, and yellow; body, elytra, and legs often with moderately dense, uniform, white to yellow hairs, some forms with patterns on prothorax, elytra, and pygidium as follows: Pronotum with dense patches of white hairs laterally with dense line of white hairs along midline flanked by broad stripes of golden to dark-brown hairs, sometimes with denser spots of white hairs flanking midline in center of darker stripes (fig. 36); elytron with light-brown to dark-brown hairs, interval between striae 2 and 3 with dense white to yellow hairs, intervals between striae 4 and 5, 6 and 7, 8 and 9 usually with short, elongate patches of dense white to yellow hairs 0.33 from base and 0.33 from apex (fig. 36), sometimes entire intervals with dense white to yellow hairs; pygidium with light-brown to dark-brown hairs, dense white hairs along midline, flanked by two dense white patches of hairs (fig. 36); these patterns sometimes vague; pronotal, elytral, and pygidial patterns may not occur together on same individual.

Structure

Head.—Short and broad, densely punctulate; frons with median, usually glabrous, finely punctulate line extending from fronto-clypeal suture to large Y- or V-shaped finely granulate boss on

vertex; boss sometimes with pit or impressed line between arms; vague transverse sulcus between upper limits of eyes; width of eye equal to or slightly wider than (1.5-1.2) width of frons; ocular sinus about half as long as width of eye; posterior margin of eye protruding from adjacent surfaces (fig. 36); postocular lobe rounded, not angulate; distance from base of antennae to apex of labrum about half as long as distance from upper limits of eyes to apex of labrum; antennal segments 1 and 3 usually filiform, 2 and 4 usually moniliform, 5 to 10 eccentric, 11th subacute apically, 5 to 11 slightly broader than long; antenna reaching to or almost to humerus.

Prothorax.—Disk subcampanulate, with many coarse punctures in no apparent pattern (fig. 36); cervical sulcus deep, extending from near coxal cavity to about half distance to pronotal midline (fig. 40); lateral prothoracic carina usually vague, spinulate, extending to coxal cavity (fig. 40); lateral margins near apex of prothorax swollen, but without spines or pronounced "hump"; short median impressed line on median basal lobe; usually with small depressions near basolateral margins (fig. 36); prosternum separating procoxae for about 0.8 their length.

Mesothorax and Metathorax.—Scutellum small, transverse, with lateral posterior teeth, usually clothed with dense recumbent yellow or white hairs; elytron about twice as long as broad; striae deep, punctate, strial intervals with many small spines followed by coarse punctures, especially prevalent at base of elytron; striae 2 and 3 usually closer to one another at base than each is to adjacent striae, others subequal at base; strong flattened spines usually present at base of striae 3-6; humerus rugulose, usually glabrous; undersurfaces punctate; all of hindcoxa punctate; hindfemur constricted basally and apically, expanded medially to about width or slightly wider than width of coxa (fig. 29); deep channel on ventral surface of femur about half as long as femur, lined with elongate, dense white hairs, inner and outer margins of channel with smooth carinae; femur armed with mesoventral subapical acuminate spine slightly longer than width of tibial base, followed by two, sometimes three, spines about 0.33 as long as first spine; tibia with ventral, lateroventral, lateral, and dorso-mesal glabrous longitudinal carinae; ventral carina bladelike, erect; lateroventral carina sometimes vague; dorsal surface without fossa; tibial corona with three to four spinules; mucro about 0.1 as long as first tarsomere, without sinus at base of mucro; first tarsomere with ventral, lateral, and mesal glabrous longitudinal carinae.

Abdomen.—Sterna not flattened medially; first sternum about 0.33 as long as abdomen, posterior margin straight; sterna 2 to 4 unmodified; fifth emarginate; pygidium punctate, convex in lateral view.

Genitalia (figs. 37, 38).—Median lobe moderate in length (3.8 times as long as width at middle), with moderately developed dorsal hood at apex; in ventral view, ventral valve elongate, varying from sides straight to sides convex, apex truncate or with distinct notch in middle, apex and portions of sides near apex heavily sclerotized, ventral valve with many round translucent spots, base 0.33 to 0.50 as wide as apex of median lobe, straight to slightly arcuate in lateral view; armature of internal sac consisting of rows of fine spicules basally which connect to two elongate curved masses of spines medially; apex with rectangular plate connected to more apical amorphous, nonspinulate mass. Lateral lobes expanded apically, cleft to about 0.8 their length (fig. 37).

Female

Similar to male except ventral surface of hindfemur not channeled beneath, fifth abdominal sternum convex, sometimes bent downward at apex, about as long as three preceding sterna; genitalia as in figure 70.

Host Plants

Old Records

- Acacia farnesiana*: Zacher, 1952: 465, 470, 479.
Caesalpinia coriaria: Zacher, 1952: 465.
C. trijuga: Zacher, 1952: 465.
Ceratonia siliqua: Zacher, 1952: 465.
Cybistax donnelsmithii: Zacher, 1952: 465.
Hymenaea courbaril: Zacher, 1952: 465.
Ochroma lagopus: Zacher, 1952: 465.
Prosopis juliflora: Zacher, 1952: 465.
P. siliquastrum: Zacher, 1952: 471.
Sauvagesia erecta: Zacher, 1952: 465.
Vicia sativa: Zacher, 1952: 465.

New Records

- Acacia cochliacantha*: MEXICO. Sinaloa: 23 mi SE Escuinapa, 12 July 1968 (C. D. Johnson \pm 282-68); 1 mi S Rosario, 12 July 1968 (C. D. Johnson \pm 286-68). Guerrero: 10 mi N Acapulco, 8 January 1965 (D. H. Janzen).

A. cymbispina: MEXICO. Sinaloa: 12 mi S Guamuchil, 26 December 1972 (C. D. Johnson #179-72); 46 mi N Mazatlan, 7 January 1973 (C. D. Johnson #131-73); 38 mi S Culiacan, 11 March 1973 (C. D. Johnson #495-73); 30 mi S Guamuchil, 7 January 1973 (C. D. Johnson #138-73); 33 mi S Escuinapa, 6 January 1973 (C. D. Johnson #120-73). Jalisco: Ca 4,000', 3 mi S Tecolatlán, 1 January 1973 (C. D. Johnson #4-73); 15 mi W Magdalena, 30 December 1972 (C. D. Johnson #205-72); ca 4,000', 15 mi W Magdalena, 2 March 1973 (C. D. Johnson #315-73); ca 4,000', 6 mi N Atenquique, 6 March 1973 (C. D. Johnson #351-73). Sonora: 13 mi E Navojoa, 25 December 1972 (C. D. Johnson #168-72); 5 mi NW Navojoa, 8 January 1973 (C. D. Johnson #139-73); 14 mi W Alamos, 24 February 1973 (C. D. Johnson #168-73); 4 mi S Lake Mocuzari, 22 December 1976 (C. D. Johnson #145-76); 700', San Bernardo, 31 mi NW Alamos, 23 December 1976 (C. D. Johnson #154-76); 21 mi NW Alamos, 23 December 1976 (C. D. Johnson #159-76); 13 mi NW Alamos, 26 December 1976 (C. D. Johnson #196-76). Nayarit: 18 mi SW Compostela, 28 February 1973 (C. D. Johnson #253-73); 14 mi SE Sayulita, 1 March 1973 (C. D. Johnson #290-73). Colima: Ca 3,700', 10 mi N Colima, 6 March 1973 (C. D. Johnson #370-73); 7 mi NE Armeria, 7 March 1973 (C. D. Johnson #396-73).

A. farnesiana: MEXICO. Sonora: Mazatlan, 17 August 1965 (C. D. Johnson). Sinaloa: 38 mi S Culiacan, 25 February 1973 (C. D. Johnson #198-73); 6 mi N Mazatlan, near beach, 26 February 1973 (C. D. Johnson #213-73). Jalisco: 56 mi S Puerto Vallarta, 9 March 1973 (C. D. Johnson #449-73); 6 mi W Ocotlán, 5 March 1973 (C. D. Johnson #335-73); 29 mi W Ocotlán, 5 March 1973 (C. D. Johnson #341-73). Colima: 7 mi S Colima, ca 1,100', 7 March 1973 (C. D. Johnson #386-73). GUATEMALA. Guat.: Amatitlán, 1 August 1966 (D. H. Janzen). COSTA RICA. Tree #3, 22 April 1971 (D. H. Janzen); Great Swamp, Comelco, Bagaces, Guanacaste Prov., 28 April 1971 (D. H. Janzen). PUERTO RICO. 2 mi N Yauco, 4 March 1969 (D. H. Janzen); S. W. Area, 3 and 4 March 1969 (D. H. Janzen).

A. globulifera: MEXICO. Oaxaca: Temascal, 10 May 1964 (K. H. Janzen).

A. hindsii \times *A. pennatula* hybrid (probably): MEXICO. Oaxaca: 46.7 mi NW Tehuantepec, 10 January 1965 (D. H. Janzen).

A. hindsii: MEXICO. Nayarit: 16 mi E San Blas, 27 February 1973 (C. D. Johnson #239-73). Jalisco: 48 mi S Puerto Vallarta,

9 March 1973 (C. D. Johnson #456-73). EL SALVADOR. San Salvador, 24 May 1958 and 14 June 1958 (L. J. Bottimer #101j).

A. macracantha: MEXICO. Oaxaca: Temascal, 17 April 1964 (K. H. Janzen). Campeche: 4 mi E Ruinas Edzna, 25 June 1966 (D. H. Janzen). Guerrero: 25 mi N Acapulco, 18 January 1965 (D. H. Janzen).

A. pennatula: MEXICO. Jalisco: 7 mi W Magdalena, 2 March 1973 (C. D. Johnson #321-73); ca 4,000', 8 mi S Atenquique, 6 March 1973 (C. D. Johnson #359-73); ca 4,000', 3 mi S Tecolatlán, 1 January 1973 (C. D. Johnson #6-73); 20 mi W Ocotlán, 5 March 1973 (C. D. Johnson #339-73); 38 mi S Puerto Vallarta, 9 March 1973 (C. D. Johnson #459-73). Nayarit: 200', 26 mi NW Tepic, 10 March 1973 (C. D. Johnson #474-73). Colima: Ca 3,700', 10 mi N Colima, 6 March 1973 (C. D. Johnson #365-73).

Caesalpinia sp.: DOMINICAN REPUBLIC. 10 January 1927 (F. H. B. #66359).

Caesalpinia coriaria, "Divi-divi," "cascalote": DOMINICAN REPUBLIC. Intercepted, Plant Quarantine, Tampa, Fla., 19 May 1942 (McMullen and Lyle #81940). JAMAICA. Intercepted, Plant Quarantine, Miami, Fla., 30 April 1956 (D. A. Miller). FLORIDA. Key West, 25 February 1920 (Warner and Millington). COSTA RICA. Puerto Viejo, Heredia, March 1969 (G. Frankie); Guanaacaste, Santa Rosa N. P., El Naranjo, 9 March 1972 (D. H. Janzen #20-39); Palo Verde, Ots Comelco near Bagaces, 16 February 1972 (D. H. Janzen #19-31). MEXICO. Michoacan State: 6 December 1939 (as "*Caesalpine coriata*"), 6 December 1939 (as "cascalote"). NICARAGUA. San Benito, Man., 26 June 1963 (L. J. Bottimer #1150). COLOMBIA. Intercepted Plant Quarantine New York, 28 November 1941; Colombia, 30 July 1946. HAITI. 28 April 1939 (A. Audant). SANTO DOMINGO. 5 May 1923. ARUBA, NETH. W.I. Intercepted Hoboken, Plant Quarantine, 1 August 1941. VENEZUELA. Intercepted Plant Quarantine New York, 17 May 1926.

C. sclerocarpa: MEXICO. Sinaloa: 6 mi N Mazatlan, near beach, 26 February 1973 (C. D. Johnson #215-73).

Ceratonia siliqua: DOMINICAN REPUBLIC. Plant Quarantine interception San Juan, P.R., 5 September 1973.

Location of Types

Bruchus breweri: British Museum (Natural History), London.

B. dominicanus: British Museum (Natural History), London.

B. immunis: British Museum (Natural History), London.

B. inornatus: Museum of Comparative Zoology, Cambridge, Mass.

B. mimosae: Zoologisk Museum, Copenhagen.

B. strigatus: Zoological Museum, University of Moscow.

B. subrufus: Zoological Museum, University of Moscow.

Distribution

Mexico: Campeche, Chiapas, Colima, Guerrero, Jalisco, Michoacan, Nayarit, Oaxaca, San Luis Potosi, Sinaloa, Sonora, Veracruz. Guatemala. Honduras. Nicaragua. Costa Rica. Colombia. Venezuela. Trinidad. British Guiana. Brazil. Cuba. Curacao. Dominican Republic. Haiti. Jamaica. Netherlands West Indies. Puerto Rico.

Discussion

M. mimosae is in the Mimosae species group. This very widespread and abundant species is the reference point for a group of closely related species that are probably more similar to each other than any other group of bruchids we have studied.

Apparently, because of its widespread distribution and extensive variety of hosts, *M. mimosae* is variable in its morphology. The male genitalia, however, consistently serve to separate *M. mimosae* from other species closely related to it.

M. mimosae is separated from other members of the group and genus by characters given in the key, but a discussion of the nature of the variation we observed in *mimosae* is necessary because this cannot be explicitly stated in a key. Variations in color and vestitural patterns of reared series of specimens of *M. mimosae* may resemble those of *M. nubigenis*, *viduatus*, or *cinerifer*; however, the male genitalia of specimens within a series are consistently similar. Our interpretation of this phenomenon is that *M. mimosae* is a variable species with small but consistent differences in male genitalia reflecting small pockets of probably reproductively isolated populations of *mimosae* but with an overall distinctness from closely related species.

Characters to differentiate other species in the Mimosae group from *M. mimosae* follow:

M. acaciestes can usually be distinguished by the clustered spines on the inner, apical ventral surface of the hindfemur, small body, generally distinct color pattern, and preference for *Acacia constricta* seeds. Male genitalia will always distinguish it.

M. insularis resembles *M. mimosae* closely, but its larger eyes, dark maculation on the elytra, larger hindfemur, and longer channel on the ventral surface of the hindfemur, stronger lateral

prothoracic carina, and generally paler integumental color separate them. These two species are especially difficult to separate using external characters in specimens from South America because of intergradation of external characters there.

The small size, usually darker ground color, and paired white patches on the pronotum and pygidium are usually of value in recognizing *M. viduatus*. The structure of the male genitalia is the only reliable means of determining it.

The only species in the group that consistently has uniformly colored pubescence without patterns is *M. cinerifer*. Its preference for *Acacia cornigera* as a host, its male genitalia, and a distribution confined to southeastern Mexico usually separate it from *M. mimosae*.

M. anomalus is the only species in the group whose prosternum separates the procoxae for their entire length. The male genitalia are distinct.

The male genitalia of *M. mimosae* are variable but have a consistent basic pattern. The ventral valve may be broad or narrow but is truncate at its apex with a notch in the middle. This general pattern is found in all species in the group except *M. acacies-tes*, which has a broad ventral valve with a gently rounded apex. The armature of the internal sac varies somewhat, but the basic pattern is distinct from other species in the genus.

M. mimosae is most abundant in the seeds of *Acacia cymbispina*, *farnesiana*, *hindsii*, *pennatula*, and *Caesalpinia coriaria*. It probably breeds in these seeds because of similarities in pod structure rather than taxonomic affinities of the hosts. Many of the host records listed by Zacher (1952) must be verified by further studies.

We have examined the types of *Bruchus breweri*, *dominicanus*, *immunis*, *inornatus*, *mimosae*, *strigatus*, and *subrufus* and conclude that all seven names refer to the same species.

Mimosestes nubigens (Motschulsky)

(Figs. 41-44, 71, 82, 83)

Bruchus nubigens Motschulsky, 1874: 237 (Brésil).

Acanthoscelides nubigens: Blackwelder, 1946: 760.

Mimosestes nubigens: Johnson and Kingsolver, 1977: 151.

Bruchus sallaci Sharp, 1885: 475 (Mexico, Guanajuato, San Luis Potosi; Guatemala, San Gerónimo); Schaeffer, 1907: 292; Fall, 1910: 169; Cushman, 1911: 491, 494, 507; Bridwell, 1919: 13; Bridwell, 1920a: 405, 408, 409; Bridwell, 1920b: 337; Bridwell, 1921: 465; Swezey, 1925: 3.

NEW SYNONYMY.

B. sallei (sic): Pic, 1913: 47.

Mylabris sallei (sic): Leng, 1920: 305.

M. sallaei: Kunhikannan, 1923: 22.

Acanthoscelides sallaei: Blackwelder, 1946: 761.

Mimosestes sallaei: Bridwell, 1946: 54; Blackwelder and Blackwelder, 1948: 45; Zacher, 1952: 462; Hinckley, 1960: 261; Hinckley, 1961: 526; Peck, 1963: 956; de Luca, 1965: 67; Bottimer, 1968: 1025, 1039, 1041; Kingsolver, 1970b: 383; Moldenke, 1971: 108; Forister and Johnson, 1971: 232; Bottimer, 1973: 549; Janzen, 1975: 157; Decelle, 1975: 137; Center and Johnson, 1976: 196; Pfaffenberger and Johnson, 1976: 36; Janzen, 1976: 187 (as *sallaei*).

Length (pronotum-elytra) 2.2–4.1 mm. Width 1.3–2.7 mm.
Maximum thoracic depth 1.0–2.2 mm.

Male

Similar to *M. mimosae* with the following exceptions:

Integument Color

Head usually red orange, varying to red orange with black maculation expanded to posterior of head, sometimes all dark reddish brown or black. Pronotum, elytra, and abdomen usually lighter in color than undersurfaces of thorax.

Vestiture

With recumbent white, golden, dark-brown, or yellow hairs as follows: Never with uniformly white to yellow hairs on pronotum, elytra, and pygidium, always with some variation in pattern of pubescence; pattern on pronotum similar to that for *M. mimosae*; pattern on elytra often similar to that for *mimosae* but commonly with uniformly white to yellow pubescence with darker bands of hairs at base, middle, and apex of elytra, varying to uniform pubescence with small, dark spots near middle on striae intervals between striae 4–6 and 7–9; pygidium occasionally with uniformly white to golden hairs, varying to dense white hairs along midline, flanked by two dense white patches of hairs, usually with dark-brown hairs in center forming hourglass or variation thereof, often with faint line of pubescence along midline.

Structure

Head.—Boss on vertex without pit or impressed line between arms; width of eye equal to width of frons; posterior margin of eye protruding from adjacent surfaces; postocular lobe slightly angulate at posterior margin; distance from base of antennae to apex of labrum about 0.33 as long as distance from upper limits

of eyes to apex of labrum; usually only segment 2 of antennae moniliform, occasionally segment 4 moniliform, usually filiform.

Prothorax.—Lateral margins near apex swollen, with strong spines and pronounced "hump" (figs. 41, 82, 83); prothorax almost quadrate in dorsal aspect (fig. 41).

Mesothorax and Metathorax.—Strial intervals occasionally with small spines followed by punctures near base, punctures not nearly as evident as in *M. mimosae*; strong flattened spines at base of striae 3 and 4, spines at base of striae 5 and 6 small, not well marked.

Abdomen.—First sternum slightly flattened medially, 0.33 to 0.50 as long as abdomen, posterior margin straight; sterna 2 to 4 unmodified; fifth emarginate.

Genitalia (figs. 42, 43).—Median lobe moderate in length (3.8 times as long as width at middle), with well-developed dorsal hood at apex; in ventral view, ventral valve elongate with convex sides, apex usually truncate with small notch in middle, sometimes rounded to gentle point without notch, apex and portions of sides near apex heavily sclerotized, ventral valve with many, round, unsclerotized spots, base 0.50 to 0.66 as wide as apex of median lobe, straight to slightly arcuate in lateral view; armature of internal sac with faint lines of small spicules near base, faintly sclerotized quadrangular structure near middle, and many small faint spicules in amorphous mass near apex. Lateral lobes expanded apically, cleft to about 0.8 their length (fig. 42).

Female

Similar to male except ventral surface of hindfemur not channeled beneath, last abdominal sternum about as long as three preceding sterna, apex convex, sometimes bent downward at apex; genitalia as in figure 71.

Host Plants

Old Records

Acacia amentacea: Cushman, 1911: 495, 505; Zacher, 1952: 462.

A. farnesiana: Cushman, 1911: 497, 507; Bridwell, 1919: 15; 1920a: 405; 1920b: 339; Kunhikannan, 1923: 22; Zacher, 1952: 462; Hinckley, 1960: 261 (Hawaiian Is.); Bottimer, 1973: 549.

A. tortuosa: Kunhikannan, 1923: 22; Zacher, 1952: 462.

Caesalpinia coriaria: Zacher, 1952: 462.

Ceratonia siliqua: Zacher, 1952: 462.

Gleditsia triacanthos: Cushman, 1911: 495, 507; Zacher, 1952: 462.

Prosopis chilensis: Zacher, 1952: 462; Hinckley, 1960: 261 (Hawaiian Is.).

P. juliflora: Bridwell, 1920a: 405.

New Records

Acacia coehliacantha: MEXICO. Sinaloa: 23 mi SE Escuinapa, 12 July 1968 (C. D. Johnson #282-68).

A. cornigera: MEXICO. Veracruz: 10 mi E Acayucan, 15 June 1968 (C. D. Johnson #116-68).

A. farnesiana: FLORIDA. Dade Co.: Hialeah, 5 August 1966 and 20 July 1960 (D. A. Palmer). Polk Co.: Winter Haven, 30 June 1928 (L. J. Bottimer #55a1); Lake Alfred, 22 August 1929 (L. J. Bottimer #55g5); Auburndale, 31 March 1933 (L. J. Bottimer #65f). TEXAS. Austin Co.: San Felipe, 15 September 1960 (L. J. Bottimer #108z). Brewster Co.: Big Bend National Park, December 1968 (H. M. Breendett); Boquillas Crossing, Big Bend National Park, 7 May 1956 (L. J. Bottimer #96x). Kelberg Co.: Kingsville, 23 and 29 January 1923 (L. J. Bottimer #51a and 51b4). Cameron Co.: Brownsville, 10 October 1960 (L. J. Bottimer #109m); Harlingen, 9 July 1922 (L. J. Bottimer #50b); Brownsville, 7 February 1948 (L. J. Bottimer #90k); Brownsville, 8 June 1921 (collector unknown). Hidalgo Co.: McAllen, July 1923 (L. J. Bottimer #52g2). Victoria Co.: Victoria, 13 June 1907 (Hunter #7410). Val Verde Co.: 2 mi E Del Rio, 17 June 1964 (C. D. Johnson). ARIZONA. Maricopa Co.: Tempe, 6 December 1959 (C. D. Johnson); Wickenburg, 11 June 1961 (C. D. Johnson); Phoenix, 26 December 1959 (C. D. Johnson). CALIFORNIA. Imperial Co.: Calexico, 5 April 1971 (collector unknown). HAWAII. Honolulu, 15 August 1941 (collector unknown); Honolulu, 24 August 1926 (collector unknown). Oahu: Waianae, 23 July-8 August 1975 (Nishida #75-1A 1B). MEXICO. Sonora: 5 mi NW Est. Don, 14 July 1968 (C. D. Johnson #327-68); 12 mi NW Ciudad Obregon, 15 July 1968 (C. D. Johnson #341-68); 19 mi SE Navojoa, 14 July 1968 (C. D. Johnson #328-68); 11 mi S Hermosillo, 27 December 1976 (C. D. Johnson #211-76). Sinaloa: 41 mi SE Culiacan, 13 July 1968 (C. D. Johnson #297-68); 12 mi SE Guasave, 13 July 1968 (C. D. Johnson #310-68); 38 mi S Culiacan, 25 February 1973 (C. D. Johnson #198-73); 38 mi S Culiacan, 11 March 1973 (C. D. Johnson #503-73); nr. beach, 6 mi N Mazatlan, 26 February 1973 (C. D. Johnson #213-73). Michoa-

can: 5,300', 16 mi E. Jiquilpan, 9 July 1968 (C. D. Johnson #255-68). Morelos: Cuernavaca, February 1945 (N. L. H. Krauss). Nuevo Leon: 9 mi NW Montemorelos, 20 June 1964 (C. D. Johnson). Tamaulipas: 6.2 mi S San Fernando, 9 June 1966 (D. H. Janzen); 20 mi E Manuel, 25 May 1963 (L. E. Caltagirone). Veracruz: 1 mi NE Acultzingo, 27 June 1964 (C. D. Johnson); 41 mi S Tantoyuca, 11 June 1966 (D. H. Janzen). Oaxaca: 700', 27 mi W Tehuantepec, 6 July 1968 (C. D. Johnson #223-68); 6 mi NE Oaxaca, 6 July 1963 (L. E. Caltagirone). Jalisco: 5,100', 4 mi SE Jocotepec, 10 July 1968 (C. D. Johnson #257-68); ca 4,000', 6 mi N Atenquique, 6 March 1973 (C. D. Johnson #350-73); ca 4,000', 15 mi W Magdalena, 2 March 1973 (C. D. Johnson #320-73); 29 mi W Ocotlan, 5 March 1973 (C. D. Johnson #341-73); 20 mi W Ocotlan, 5 March 1973 (C. D. Johnson #340-73); 6 mi W Ocotlan, 5 March 1973 (C. D. Johnson #335-73); ca 4,000', 8 mi S Atenquique, 6 March 1973 (C. D. Johnson #358-73); ca 4,000', 8 mi S Atenquique, 3 January 1973 (C. D. Johnson #41-73); 56 mi S Puerto Vallarta, 9 March 1973 (C. D. Johnson #449-73). Puebla: 5,600', 7 mi S Petlalcingo, 7 July 1968 (C. D. Johnson #238-68). Chiapas: 3-5 mi W Ocozacoautla, 17 June 1968 (C. D. Johnson #141-68). Guerrero: Tixtla, 4,600', 10 August 1963 (L. E. Caltagirone). Colima: Ca 3,700', 10 mi N Colima, 6 March 1973 (C. D. Johnson #364-73); 7 mi S Colima, 7 March 1973 (C. D. Johnson #386-73). GUATEMALA. 2,900', 9 mi SW Jutiapa, 19 June 1968 (C. D. Johnson #149-68); 6.6 mi NE Escuintla, 31 July 1966 (D. H. Janzen); Amatitlan, 1 August 1966 (D. H. Janzen). EL SALVADOR. 14 mi SW La Union, 23 June 1968 (C. D. Johnson #158-68); 1,900', 6 mi S Candelaria, 20 June 1968 (C. D. Johnson #152-68); El Carmen, 27 May 1958 (L. J. Bottimer #101m). HONDURAS. 300', 8 mi NW Nacaome, 2 July 1968 (C. D. Johnson #201-68). NICARAGUA. Granada, Gran., 20 June 1963 (L. J. Bottimer #115f). COSTA RICA. Great Swamp, Comeico, Bagaces, Guanacaste Prov., 28 April 1971 (D. H. Janzen). PANAMA. Las Sabanas, May 1921 (J. Zetek #1443).

A. globulifera: MEXICO. Oaxaca: Temascal, 10 May 1964 (K. H. Janzen).

A. schaffneri: MEXICO. Queretaro: 1 mi NW San Juan Del Rio, 6 July 1964 (C. D. Johnson). Guanajuato: 22 mi NE Guanajuato, 6 June 1968 (C. D. Johnson #60-68).

A. tortuosa: TEXAS. Kinney Co.: 16 August 1959 (L. J. Bottimer #105r). Uvalde Co: Uvalde, February 1923 (L. J. Bottimer

#51c6) ; Uvalde, June 1923 (L. J. Bottimer). MEXICO. San Luis Potosi: 20 mi S San Luis Potosi, 7 March 1964 (D. H. Janzen).

Location of Types

Bruchus nubigens: Zoological Museum, University of Moscow.

B. sallaei: British Museum (Natural History), London.

Distribution

United States: Arizona, California, Florida, Hawaii, Texas. Mexico: Aguascalientes, Baja California, Campeche, Chiapas, Coahuila, Colima, Durango, Guanajuato, Guerrero, Jalisco, Michoacan, Morelos, Nayarit, Nuevo Leon, Oaxaca, Puebla, Queretaro, San Luis Potosi, Sinaloa, Sonora, Tamaulipas, Veracruz, Zacatecas. Guatemala. El Salvador. Honduras. Nicaragua. Costa Rica, Panama. Brazil. Cuba. Philippine Islands (Luzon). New Caledonia.

Discussion

M. nubigens is in the *Mimosae* species group. This unique, abundant, and widespread species is easily distinguished from all other *Mimosestes* species because the lateral margins of the prothorax near the apex are swollen into a pronounced "hump" on either side (fig. 82). Each hump bears prominent triangular teeth (fig. 83). The humps give the prothorax a quadrangular appearance in dorsal aspect. In color and structure it closely resembles *M. mimosae*, *viduatus*, and *anomalus*. Less closely related is *M. acaciastes*.

The male genitalia differ from those of *M. mimosae* in subtle but consistent ways. The major difference is the faintly sclerotized square structure near the middle of the internal sac in *M. nubigens* contrasted with the large, lateral clusters of spines in *M. mimosae*.

Acacia farnesiana is by far the preferred host for *M. nubigens*. Seed lots of this species yield thousands of specimens when reared in the laboratory. Most seed lots consistently yield large numbers of *M. nubigens* when collected in any part of the range of this species. *M. nubigens* is found infrequently in other species of *Acacia*. Why it infests seeds of *Prosopis* in Hawaii and not on the mainland is a subject for future research. The records from the Philippine Islands and New Caledonia are apparently from trees planted for landscape or for medicinal products.

We have examined the types of *Bruchus nubigens* and *sallaei* and conclude that both represent the same species.

***Mimosestes obscuriceps* (Sharp)**

(Figs. 45-48, 72)

Bruchus obscuriceps Sharp, 1895: 463 (Mexico, Vera Cruz).*Acanthoscelides obscuriceps*: Blackwelder, 1946: 760.*Mimosestes obscuriceps*: Johnson and Kingsolver, 1977: 154.

Length (pronotum-elytra) 3.5-4.7 mm. Width 2.6-3.3 mm.
Maximum thoracic depth 1.9-2.6 mm.

Male**Integument Color**

Head varying from all black to all red orange, usually all black with dark red-orange base; antennae with four basal segments red orange, apical seven black. Body and appendages varying from all red orange to all black; usually with pronotum, prothoracic and mesothoracic legs, elytra, pygidium, and abdominal sterna with some red orange to reddish brown, remainder of body usually black.

Vestiture

With recumbent white, golden, brown, and yellow hairs as follows: Eye with medial fringe of white, golden, or yellow hairs; postocular lobe with short, white hairs; dense postocular patch of white, golden, or yellowish hairs; remainder of head with moderately dense to dense hairs, often with hairs on frons and vertex intermixed brown and yellow, sometimes with hairs on head all white; legs and undersurfaces of body covered with dense to very dense white or usually yellowish-white to light-brown hairs; pronotum usually with uniform, dense yellowish hairs except broad to narrow stripe along midline, sometimes without stripe; elytron usually with sparse brown hairs interrupted by dense yellowish to white hairs to form pattern as follows: Lighter hairs covering intervals between striae 1-4 from base to 0.66 length of elytron, usually with narrow band of hairs at base, narrow band medially, and patches about 0.33 from apex between striae 4 and 5, and 6 and 7 (fig. 45); pattern sometimes incomplete; pygidium with very dense white to yellow hairs, denser patches of hairs at base near midline and sometimes on either side of midline near center; two swirls of hairs directed laterally on either side of midline near center of pygidium, often with dark maculation in center of pygidium.

Structure

Head.—Elongate, densely punctulate; frons with median, glabrous, finely granulate line on carina extending from frontoclypeal suture to vertex; elongate boss on vertex finely granulate, narrow; boss sometimes with pit at apex; vague transverse sulcus between upper limits of eyes; width of eye equal to or slightly wider than width of frons; ocular sinus 0.50 to 0.66 as long as width of eye; posterior margin of eye protruding from adjacent surfaces but dorsal surfaces somewhat flattened; postocular lobe angulate; distance from base of antennae to apex of labrum about 0.33 as long as distance from upper limits of eyes to apex of labrum; antennal segments variable in shape but usually 1 and 3 filiform, 2 and 4 moniliform, 5 to 10 eccentric, 11 subacute apically, 5 to 11 slightly broader than long; antenna reaching to or almost to humerus.

Prothorax.—Disk subcampanulate, with many coarse punctations in no apparent pattern; cervical sulcus obscured by dense pubescence; lateral prothoracic carina strong, usually obscured by pubescence and usually without spines, produced into strong ridge near coxal cavity; lateral margins near apex of prothorax swollen, but without spines or pronounced "hump"; short median impressed line on median basal lobe; usually without small depressions near basolateral margins; prosternum separating procoxae for their entire length (as in fig. 9).

Mesothorax and Metathorax.—Scutellum small, transverse, with lateral posterior teeth, usually clothed with dense recumbent yellow or white hairs; elytron about twice as long as broad; striae deep, punctate, strial intervals occasionally with small spines followed by punctures; striae usually subequal at base; weak, flattened spines usually at bases of striae 3-5 and sometimes 6; humerus rugulose, usually glabrous; undersurfaces punctate; all of hindcoxa punctate; hindfemur constricted basally and apically, expanded medially to about width or slightly wider than width of coxa (fig. 48); deep channel on ventral surface of femur about half as long as femur, lined with elongate, dense white hairs, inner and outer margins of channel with slightly roughened carinae; femur armed with inner subapical acuminate spine equal to 1.33 times as long as width of tibial base, followed by three spines 0.33 to 0.50 as long as first spine; first smaller spine sometime attached to larger spine; tibia with ventral, lateroventral, lateral, and dorsomesal glabrous longitudinal carinae, usually with deep sulcus between ventral and lateroventral carinae; ventral

carina bladellike, erect; dorsal surface without fossa; tibial corona with three to four spinules, mucro about 0.2 as long as first tarsomere, with slight sinus at base of mucro; first tarsomere with ventral, lateral, and mesal glabrous longitudinal carinae.

Abdomen.—Sterna not flattened medially; first sternum about half as long as abdomen, posterior margin straight; sterna 2 to 4 unmodified; fifth emarginate; pygidium punctate, convex in lateral view.

Genitalia (figs. 46, 47).—Median lobe moderate in length (4.5 times as long as width at middle), with moderately developed dorsal hood at apex; in ventral view, ventral valve short, sides convex, gently rounded to broad apex, ventral valve usually faint, not heavily sclerotized, when sclerotized then with many round translucent spots, base 0.50 to 0.75 as wide as apex of median lobe, straight to slightly arcuate in lateral view; many microscopic spinules lining internal sac; armature consisting of cluster of spicules at apex of internal sac. Lateral lobes expanded apically, cleft to about 0.75 their length (fig. 46).

Female

Similar to male except ventral surface of hindfemur not channeled beneath, last abdominal sternum slightly shorter than three preceding sterna, apex convex, usually bent downward; females usually of lighter integumental color than males; genitalia as in figure 72.

Host Plants

Old Records

None.

New Records

Acacia cornigera: MEXICO. Veracruz: 3 mi N Tres Valles, 26 September 1963 (D. H. Janzen); Cotaxtla Exp. Sta., Cotaxtla, 28 August 1962 (D. H. Janzen); 10 mi E Acayucan, 15 June 1968 (C. D. Johnson #116-68).

A. sphaerocephala: MEXICO. Veracruz: 1½ mi N Mocambo, 6 December 1963 (D. H. Janzen); 6 mi E Jalapa, 10 November 1963 (D. H. Janzen).

Location of Type

British Museum (Natural History), London.

Distribution

Mexico: Tamaulipas, Veracruz.

Discussion

M. obscuriceps is in the *Obscuriceps* species group. It resembles *M. brevicornis* closely but with the following differences: *M. brevicornis* is usually lighter in color than *M. obscuriceps*, often lacks the two swirls of hairs directed laterally on either side of the midline near the center of the pygidium, and has a broader apex on the frontal boss, a longer muzzle, cervical sulcus not obscured by pubescence, a shorter channel on the hindfemur of males, a lyre-shaped structure in the internal sac, and lateral lobes cleft to only 0.6 their length.

Species of swollen-thorn acacias are hosts for both *M. brevicornis* and *obscuriceps*. Apparently *M. brevicornis* is confined to *Acacia gentlei* in Guatemala and *M. obscuriceps* to *A. cornigera* and *sphaerocephala* in Veracruz State, Mexico.

Mimosestes protractus (Horn)

(Figs. 49-53, 73)

Bruchus protractus Horn, 1873: 332 (peninsula of Lower California); Sharp, 1885: 476; Horn, 1886: xi; Horn, 1894: 345; Schaeffer, 1907: 291; Fall, 1910: 169, 173, 186; Cushman, 1911: 507.

Mylabris protractus: Leng, 1920: 305.

Acanthoscelides protractus: Blackwelder, 1946: 760; Zacher, 1952: 465, 471.

Mimosestes protractus: Johnson, 1968: 1270; Bottimer, 1968: 1025, 1039; Center and Johnson, 1976: 196; Pfaffenberger and Johnson, 1976: 35.

Bruchus longiventris Sharp, 1885: 476 (North America, Arizona; Mexico, northern Sonora); Horn, 1886: xi; Horn, 1894: 345; Bottimer, 1968: 1025.

Mimosestes longiventris: Johnson and Kingsolver, 1977: 154.

Length (pronotum-elytra) 2.0-3.5 mm. Width 1.2-2.1 mm.
Maximum thoracic depth 0.9-1.6 mm.

Male

Integument Color

Head usually black with red-orange labrum, sometimes red-orange with black V-shaped boss on vertex or all black with base red orange to brown; antennae all red orange to all light brown. Body and legs sometimes all red orange with black undersurfaces of thorax; varying to more usual dark reddish-brown prothorax

with red-orange stripe along midline; elytron dark brown with red-orange stripe in center, often dark maculation extending from lateral margin at about middle of elytron to stria 6 or 7; legs usually red orange except large black maculation on lateral surface of hindfemur; abdomen usually lighter in color than thorax; pygidium red orange with large hourglass-shaped dark-brown to black maculation (fig. 49).

Vestiture

With recumbent white, golden, or brown hairs as follows: Eye with medial fringe of white to light-brown hairs; postocular lobe with short, white hairs; dense postocular patch of white hairs; remainder of head with moderately dense to dense white, light-brown or intermixed light-brown and white hairs, usually more light-brown hairs on vertex; pronotum usually with white hairs laterally, disk varying from white with vague scattered patches of light-brown hairs to more usual white with brown patches having central white spots on either side of midline about halfway from base; elytron with moderately dense white hairs with light- to dark-brown maculations of variable size at base, near lateromedial margin, and at apex (fig. 49); pygidial hourglass-shaped maculation covered with light-brown to dark-brown hairs, remainder of pygidium usually with white hairs, often with denser patches of white in notches of hourglass; undersurfaces and legs with moderately dense to dense white hairs, occasionally with vague patches of light-brown hairs; small patches of light-brown to dark-brown hairs on lateral margins of abdominal sterna 2-5.

Structure

Head.—Short and broad, densely punctulate; frons with median, usually glabrous, finely punctulate line extending from frontoclypeal suture to large V- or Y-shaped finely granulate boss on vertex; boss without pit or impressed line between arms; vague transverse sulcus between upper limits of eyes; width of eye about 0.25 wider than width of frons; ocular sinus about half as long as width of eye; posterior margin of eye protruding from adjacent surfaces; postocular lobe rounded, not angulate; muzzle short, distance from base of antennae to apex of labrum about 0.33 as long as distance from upper limits of eyes to apex of labrum; antennal segments 1 and 3 usually filiform, 2 usually moniliform, 4 to 10 eccentric, 11th subacute apically, 4 to 11 about as long as broad; antenna reaching to or slightly beyond humerus.

Prothorax.—Disk subcampanulate (fig. 49), with many coarse punctures in no apparent pattern; cervical sulcus deep, extending from near coxal cavity to about half distance to pronotal midline; lateral prothoracic carina usually vague, spinulate, extending to coxal cavity, usually obscured by pubescence; lateral margins near apex of prothorax swollen, but without spines or pronounced "hump"; short median impressed line on median basal lobe usually obscured by pubescence; small depressions usually present near basolateral margins; prosternum separating procoxae for about 0.8 their length.

Mesothorax and Metathorax.—Scutellum small, slightly transverse, with lateral posterior teeth, usually clothed with dense recumbent white hairs; elytron slightly more than twice as long as broad; striae deep, punctate, strial intervals without many small spines followed by coarse punctures; striae usually subequal at base, sometimes striae 3 and 4 closer to one another at base than each is to adjacent striae; strong flattened spines at base of striae 3-5; spine at base of stria 6 usually small or obsolete; humerus rugulose, usually glabrous; undersurfaces punctate; face of hindcoxa evenly punctate; hindfemur constricted basally and apically, expanded medially to about width of coxa (fig. 52); shallow, sometimes vague, channel on ventral surface of femur, starting at base and extending 0.25 to 0.50 length of femur, lined with white hairs; mesal and lateral margins of channel with smooth carinae; femur armed with mesoventral, subapical acuminate spine slightly longer than width of tibial base, followed by two spines about 0.33 to 0.50 as long as first spine; tibia with ventral, lateroventral, lateral, and dorsomesal glabrous longitudinal carinae; ventral carina usually bladelike, erect; lateroventral carina sometimes vague; dorsal surface without fossa; tibial corona with three to four spinules, spinule at apex of lateral carina longer than others and mucro, mucro about 0.05 as long as first tarsomere or absent; without sinus at base of mucro; first tarsomere with ventral, lateral, and mesal glabrous longitudinal carinae.

Abdomen.—First sternum flattened medially, about 0.25 to 0.33 as long as abdomen, posterior margin straight; sterna 2-5 sulcate, sterna 3 and 4, usually 2, with broad shallow medial sulcus, fifth sternum with deep round depression lined by hairs pointing laterally (fig. 53); apex of fifth sternum rounded, not emarginate; pygidium punctate, convex in lateral view.

Genitalia (figs. 50, 51).—Median lobe elongate (7.3 times as long as width at middle), arched in lateral view, dorsal hood at apex not well developed; in ventral view, ventral valve elon-

gate, pointed, sides convex, about apical 0.25 nipplelike with almost straight sides, not heavily sclerotized, base about 0.50 as wide as apex of median lobe, slightly arcuate in lateral view; armature of internal sac consisting of many fine spinules lining sac from base to about middle. Lateral lobes not expanded apically, broad, sometimes overlapping at apex, cleft to about 0.9 their length (fig. 50).

Female

Similar to male except ventral surface of hindfemur not channeled beneath, sterna 2-5 sulcate but sulcus much more shallow than in male, especially fifth sternum, fifth sternum sometimes bent downward at apex; genitalia as in figure 73.

Host Plants

Old Records

Prosopis glandulosa: Cushman, 1911: 507; Zacher, 1952: 465.

P. juliflora: Riley and Howard, 1892: 165; Zacher, 1952: 465.

P. siliquastrum: Zacher, 1952: 471.

New Records

Prosopis juliflora: CALIFORNIA. San Diego Co.: Agua Caliente Springs, 3 July 1965 (C. D. Johnson). ARIZONA. Yavapai Co.: Mouth, Sycamore Cyn., 10 mi N Clarkdale, 17 and 24 July 1969 (G. W. Forister); 1 mi W Beaver Creek Ranger Station, 30 July 1970 (T. D. Center); Clarkdale, 10 July 1969 (G. W. Forister); Black Canyon City, 24 June 1969 and 10 July 1969 (G. W. Forister); 5 mi S Camp Verde, 17 July 1969 (G. W. Forister); 10 mi S Camp Verde, 10 July 1969 (G. W. Forister). Cochise Co.: 5,000', Ramsey Cyn., Huachuca Mts., 23 August 1967 (C. D. Johnson). TEXAS. Howard Co.: 10 mi SE Big Spring, 14 July 1964 (C. D. Johnson). MEXICO. Aguascalientes: 2 mi N Rincon de Romas, 8 July 1964 (C. D. Johnson). Sonora: 3 mi NW Estacion Don, 14 July 1968 (C. D. Johnson \pm 324-68); 12 mi NW Ciudad Obregon, 15 July 1968 (C. D. Johnson \pm 342-68); 14 mi N Hermosillo, 15 July 1968 (C. D. Johnson \pm 352-68).

P. laevigata: MEXICO. Michoacan: 5,700', 6 mi W. Jacona, 9 July 1968 (C. D. Johnson \pm 251-68). Nayarit: 3,300', 2 mi S Jala, 10 July 1968 (C. D. Johnson \pm 261-68).

Location of Types

Bruchas longicastris: British Museum (Natural History), London.

B. protractus: Museum of Comparative Zoology, Harvard University, Cambridge, Mass.

Distribution

United States: Arizona, California, Nevada, New Mexico, Texas, Utah. Mexico: Aguascalientes, Baja California, Durango, Michoacan, Nayarit, Nuevo Leon, Sonora, Zacatecas.

Discussion

M. protractus is in the *Protractus* species group. It is easily separated from all other *Mimosestes* species because of the hour-glass-shaped maculation on the pygidium (fig. 49), the small patches of darker hairs on the lateral margins of abdominal sterna 2-5, the median, broad sulcus on abdominal sterna 2-5, and other characters given in the key. It is a somewhat aberrant *Mimosestes* because of its atypically long antennae and shallow, sometimes vague channel on the ventral surface of the hindfemur of the male. These last two features plus male genital characters ally it somewhat loosely to *M. ulkei*. Except for its usually more flattened body, its other characters are those of a typical *Mimosestes*.

The male genitalia of *M. protractus* are rather distinct with the elongate and arched median lobe, the distinctive ventral valve, and the broad lateral lobes that sometimes overlap at their tips, unlike most other *Mimosestes*.

Prosopis juliflora and *laevigata* are the only verified hosts for *M. protractus*. It has been reared from *Prosopis* from a variety of localities but rarely, if ever, in large numbers. According to Swier,⁴ it loses in a competitive struggle with *Algarobius prosopis* (Le Conte).

We have examined the types of *M. protractus* and *longiventris* and conclude that both names apply to the same species.

Mimosestes ulkei (Horn), new combination

(Figs. 54-57, 74)

Bruchus ulkei Horn, 1873: 324 (Arizona); Riley and Howard, 1892: 165; Fall, 1910: 164, 165, 166, 186; Cushman, 1911: 494, 508.

Mytabris ulkei: Leng, 1920: 365; Kunhikannan, 1923: 19.

Cercidiestes ulkei: Bridwell, 1946: 55; Blackwelder and Blackwelder, 1948: 45; Zacher, 1952: 463, 472; Johnson, 1968: 1269; Rottimer, 1968: 1021, 1030, 1041; Johnson, 1969: 54; Center and Johnson, 1976: 196.

⁴ See footnote 3, p. 23.

Length (pronotum-elytra) 2.5-4.8 mm. Width 1.9-2.9 mm. Maximum thoracic depth 1.3-2.3 mm.

Male

Similar to *M. protractus* with the following exceptions:

Integument Color

Head black; antennae all red orange. Body varying from all black to all red orange with black thoracic sterna, usually black with short red-orange stripe near base of striae 5 and 6 and with red-orange prothoracic and mesothoracic legs, abdomen and metathoracic legs often with some red orange.

Vestiture

Head as in *M. protractus* but usually without postocular patch because of dense pubescence; prothorax, undersurfaces, and legs with uniformly dense white hairs; two light-brown to black spots on either side of midline on fifth abdominal sternum; elytron usually with dense white hairs medially and light-brown, dark-brown, or black hairs laterally, lateral maculation beginning near base of stria 5 or 6 and extending obliquely toward medial margin and attaining it about 0.17 from apex (fig. 54), often white patch of hairs on space between base of stria 10 and apico-lateral margin; sometimes with lateral dark maculation almost obsolete, represented only by light-brown basal, medial, and apical patches; pygidium with dense white pubescence usually interrupted by light-brown to black spots of variable size on either side of midline near apex (fig. 54).

Structure

Head.—Boss on vertex usually wedge shaped; sometimes with pit or impressed line between arms of boss; eyes large, width of eye almost twice as wide as width of frons (ca 1.8 to 1.0); ocular sinus 0.66 to 0.75 as long as width of eye; postocular lobe usually rounded, sometimes angulate; muzzle long, usually with distance from base of antennae to apex of labrum about 0.50 as long as distance from upper limits of eyes to labrum; antennae long, antennal segments 1 and 3 usually filiform, 2 and 4 usually moniliform, 4 shorter than adjacent segments, 5 to 10 eccentric, 11 subacute apically, 5 to 11 longer than broad; antennae reaching to slightly beyond humerus.

Prothorax.—Disk subcampanulate (fig. 54); cervical sulcus deep, often obscured by pubescence, extending from near coxal

cavity to about 0.25 distance to pronotal midline; lateral prothoracic carina strong, well defined, spinulate, extending from base to coxal cavity, produced into strong ridge near coxal cavity.

Mesothorax and Metathorax.—Scutellum small, quadrate; striae 3 and 4 usually closer to one another at base than to adjacent striae; hindfemur constricted basally and apically, expanded medially to slightly less than width of coxa; shallow channel on ventral surface of femur, starting at base and extending about 0.17 length of femur, channel sparsely lined with white hairs; rugulose carinae on mesal and lateral margins of channel; glabrous longitudinal carina on mesoventral margin of femur; femur armed with mesoventral, subapical, oblique spine about 0.66 as long as width of tibial base, without accessory spines (fig. 57); ventral tibial carina not erect and bladelike; first tarsomere with two ventral carinae.

Abdomen.—First sternum flattened medially, about 0.33 as long as abdomen; sterna 2-4 unmodified; 5 emarginate and usually bent downward at apex; pygidium punctate, convex in lateral view.

Genitalia (figs. 55, 56).—Median lobe moderate in length (5.5 times as long as width at middle), with dorsal hood at apex well developed; in ventral view, ventral valve elongate, narrow, sides slightly convex, gradually narrowing to gently rounded apex, sclerotized but with many round, translucent spots, base about half as wide as apex of median lobe, straight to slightly arcuate in lateral view; armature of internal sac consisting of many spines lining sac medially connected to two spinulate lobes apically. Lateral lobes expanded apically, sometimes with tips overlapping, cleft to about 0.6 their length (fig. 55).

Female

Similar to male except antennae usually shorter, only reaching to humerus; ventral surface of hindfemur not channeled beneath; apex of fifth abdominal sternum convex, usually bent downward, and about 0.66 as long as three preceding sterna; genitalia as in figure 74.

Host Plants

Old Records

Cercidium (*torreyana* = *floridum*): Kunthikanal, 1925: 19; Zacher, 1952: 463, 472.

Parkinsonia aculeata: Cushman, 1911: 494, 508.

New Records

Cercidium sp.: MEXICO. Baja California Sur: 6 mi S La Paz, 26 December 1975 (C. D. Johnson #117-75).

Cercidium floridum: ARIZONA. Pima Co.: Rillito, 20 October 1925 (L. J. Bottimer #54r2); Sierrita Mts., 26 August 1925 (L. J. Bottimer #54h7); Continental, 14 June 1961 (C. D. Johnson); Continental, 5 September 1964 (C. D. Johnson). Maricopa Co.: 20 mi N Phoenix, 26 October 1967 (R. Garrison and J. Miller); Phoenix Mts., 21 September 1924 (L. J. Bottimer #53a9); Phoenix, 5-6 November 1925 (L. J. Bottimer #54p3) (both as *torreyanum*); 9 mi S Sunflower, 29 November 1959 (C. D. Johnson); nr. Lake Pleasant, 18 October 1975 (C. D. Johnson #83-75). Gila Co.: Salt River Canyon at Hwy 60, 28 February 1960 (C. D. Johnson). Yavapai Co.: Black Canyon City, 8 August 1969 (G. W. Forister). Santa Cruz Co.: Nogales, 13 April 1948 (L. J. Bottimer #89s).

Parkinsonia sp.: MEXICO. Sinaloa: 14 mi S Los Mochis, 6 February 1964 (P. M. Estes).

Parkinsonia aculeata: ARIZONA. Maricopa Co.: Mesa, 2 January 1960 (C. D. Johnson). MEXICO. Sonora: Lake Mocuzari, 24 December 1792 (C. D. Johnson #148-72). Sinaloa: 12 mi SE Guasave, 13 July 1968 (C. D. Johnson #309-68). Baja California Sur: 2 mi S La Paz, 15 August 1966 (J. Powell).

Location of Type

Museum of Comparative Zoology, Harvard University, Cambridge, Mass.

Distribution

United States: Arizona. Mexico: Baja California, Sinaloa, Sonora.

Discussion

M. ulkei is in the Ulkei species group. This gaudy species is one of the most attractive of our North American species of bruchids. The white elytra with the lateral darker maculations are usually sufficient to separate this species from any other. In those few specimens where the elytral markings are vague, the elongate, red-orange antennae, the two darker spots on either side of the midline on both the fifth abdominal sternum and the pygidium, the large eyes, the narrow hindfemur with only one short subapical spine, the short deep channel on the hindfemur in the males,

and other characters given in the key separate it from any other *Mimosestes* species and make it sufficiently distinct to form a separate species group. Characters of the male genitalia, the longer antennae, and the short channel of the hindfemur ally it loosely with *M. protractus*.

The male genitalia are typical of *Mimosestes* in most characters, but the narrow, elongate ventral valve and the short cleft in the lateral lobes are unique.

The closely related paloverdes, *Parkinsonia aculeata* and *Cercidium floridum*, are the only verified hosts for *M. ulkei*. Because it is not abundant in collections and because it is not reared in large numbers from the seeds of its hosts, it is apparently a marginal species that is outcompeted by *M. amicus* and *Stator limbatus* (Horn) in paloverde seeds. Its limited distribution suggests narrow ecological requisites when compared with such wide-ranging species as *M. nubigena* and *mimosae*.

Although the host associations with *Cercidium* and *Parkinsonia* appear to represent a somewhat radical departure from the more typically *Acacia*-oriented *Mimosestes*, *M. ulkei* is not unique in this respect. The list of verified host plants of *M. amicus* includes *Parkinsonia* and *Cercidium* as well as *Acacia* and *Prosopis* species.

Mimosestes viduatus (Sharp)

(Figs. 58-61, 75)

Bruchus viduatus Sharp, 1885: 474 (Panama, Caldera 1,200 ft, Volcan de Chiriqui 2,000 to 3,000 ft).

Acanthoscelides viduatus: Blackwelder, 1946: 761.

Mimosestes viduatus: Johnson and Kingsolver, 1977: 154.

Length (pronotum-elytra) 2.4-4.0 mm. Width 1.6-2.5 mm.
Maximum thoracic depth 1.0-2.0 mm.

Male

Similar to *M. mimosae* with the following exceptions:

Integument Color

Head usually black but variable as in *M. mimosae*. Body usually with pronotum, elytra, and undersurfaces dark reddish brown, abdomen and legs usually red orange, varying to all red orange.

Vestiture

With white, yellow, golden, and brown hairs as follows: Pro-

notum and elytra always with some pattern, sometimes vague; pattern variable but always with two patches of white to yellowish hairs on either side of midline about halfway from bases of pronotum and pygidium; prothorax usually with dense white hairs below lateral prothoracic carina; elytral pattern similar to *M. mimosae* but usually more striking because of greater areas covered with dark-brown hairs and ground color usually dark reddish brown; white patches usually in ill-defined medial and apical bands.

Structure

Head.—Boss without pit or impressed line between arms; ocular sinus of eye 0.50 to 0.66 as long as width of eye; distance from base of antennae to apex of labrum about 0.4 as long as distance from upper limits of eyes to apex of labrum; antennal segments 1 and 2 usually moniliform, 3 and 4 usually filiform.

Prothorax.—See *M. mimosae*.

Mesothorax and Metathorax.—Flattened spines at bases of striae 3 and 4 larger than those at bases of striae 5 and 6.

Abdomen.—Sterna sometimes flattened medially; first sternum 0.33 to 0.40 as long as abdomen.

Genitalia (figs. 59, 60).—Median lobe moderate in length (4.5 times as long as width at middle), with moderately developed dorsal hood at apex; in ventral view, ventral valve elongate, sides usually convex, sometimes slightly concave, apex truncate or gently rounded, without notch in middle, apex and portions of sides near apex heavily sclerotized, ventral valve with many round, unsclerotized spots, base 0.50 to 0.66 as wide as apex of median lobe, straight to slightly arcuate in lateral view; armature of internal sac consisting of many very fine spicules near base, faintly sclerotized, almost rectangular sclerite medially, and amorphous mass of very fine spicules at apex. Lateral lobes expanded apically, cleft to about 0.75 their length (fig. 59).

Female

Similar to male except ventral surface of hindfemur not channeled beneath, last abdominal sternum about as long as three preceding sterna, sometimes bent downward at apex; genitalia as in figure 75.

Host Plants

Old Records

None.

New Records

Acacia chiapensis: MEXICO. Oaxaca: Temascal, 8 April 1964, 10 May 1964 (D. H. Janzen).

A. collinsii: COSTA RICA. San Jose Prov.: Escuzu, Santa Ana area, 1 February 1970 (D. H. Janzen). Guanacaste Prov.: Great Swamp, Comelco, Bagaces, 14 March 1971 (D. H. Janzen #627), Area B, 9 March 1976 (D. H. Janzen); Santa Rosa N. P., El Naranjo, 9 March 1972 (D. H. Janzen #20-33), 15 March 1972 (D. H. Janzen #19-19), 12 April 1974 (D. H. Janzen).

A. cornigera: COSTA RICA. Guanacaste Prov.: Taboga, 6 March 1976 (D. H. Janzen), 1.6 mi W Hwy. 21, Comunidad, 14 March 1971 (D. H. Janzen #622).

A. cymbispina: MEXICO. Sinaloa: 30 mi S Guamuchil, 7 January 1973 (C. D. Johnson #138-73).

A. gentlei: GUATEMALA. 1.5 km NE El Estor. L. Izabal, 16 May 1965 (D. H. Janzen).

A. globulifera: MEXICO. Oaxaca: Temascal, 10 May 1964 (K. H. Janzen).

A. hindsii: MEXICO. Jalisco: 48 mi S Puerto Vallarta, 9 March 1973 (C. D. Johnson #456-73).

Location of Type

British Museum (Natural History), London.

Distribution

Mexico: Jalisco, Oaxaca, Sinaloa. Guatemala. Costa Rica.

Discussion

M. viduatus is in the *Mimosae* species group. Its small size and darker body usually separate it from other members of the species group. Although other species may have paired white patches of hairs on the pronotum and pygidium, *M. viduatus* is the only species that consistently bears these. It is most similar to *M. anomalus* and forms of *M. mimosae* that have patterns on their pronotums and elytra. The ventral valve of the male genitalia of *M. viduatus* is not emarginate apically and the internal sac has a faintly sclerotized subrectangular sclerite unique to this species.

M. viduatus has a variety of hosts in the genus *Acacia* but is not abundant in any one host species. Its distribution suggests a preference for swollen-thorn acacias.

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APPENDIX

Mimosestes Species and Their Host Plants ¹

<i>Mimosestes</i> spp.	<i>Host plants</i>
(1) <i>acaciastes</i> -----	<i>Acacia amentacea</i> <i>A. berlandieri</i> <i>A. constricta</i> <i>A. rigidula</i> <i>A. vernicosa</i>
(2) <i>amicus</i> -----	<i>Acacia constricta</i> <i>A. cymbispina</i> <i>A. farnesiana</i> <i>A. pennatula</i> <i>Cercidium floridum</i> <i>C. microphyllum</i> <i>C. praecox</i> <i>Parkinsonia aculeata</i> <i>Prosopis juliflora</i> <i>P. pallida</i> <i>P. palmeri</i>
(3) <i>anomalus</i> -----	<i>Acacia chiapensis</i> <i>A. globulifera</i> <i>A. macracantha</i> <i>A. pennatula</i>
(4) <i>brevicornis</i> -----	<i>Acacia gentlei</i>
(5) <i>cinerifer</i> -----	<i>Acacia cornigera</i> <i>A. macracantha</i>
(6) <i>enterolobii</i> -----	<i>Enterolobium schomburgkii</i>
(7) <i>humeralis</i> -----	<i>Acacia pennatula</i>
(8) <i>insularis</i> -----	<i>Acacia farnesiana</i> <i>Prosopis juliflora</i> <i>P. pallida</i>
(9) <i>janzeni</i> -----	<i>Acacia cochliacantha</i> <i>A. cymbispina</i>
(10) <i>mimosae</i> -----	<i>Acacia cochliacantha</i> <i>A. cymbispina</i> <i>A. farnesiana</i> <i>A. globulifera</i> <i>A. hindsii</i> <i>A. macracantha</i> <i>A. pennatula</i> <i>Caesalpinia coriaria</i> <i>C. sclerocarpa</i> <i>Ceratonia siliqua</i>

¹ Only confirmed host records are listed here.

<i>Mimosestes</i> spp.	Host plants
(11) <i>nubigena</i> -----	<i>Acacia cochliacantha</i> <i>A. cornigera</i> <i>A. farnesiana</i> <i>A. globulifera</i> <i>A. schaffneri</i> <i>A. tortuosa</i>
(12) <i>obscuriceps</i> -----	<i>Acacia cornigera</i> <i>A. sphaerocephala</i>
(13) <i>protractus</i> -----	<i>Prosopis juliflora</i> <i>P. laevigata</i>
(14) <i>ulkei</i> -----	<i>Cercidium floridum</i> <i>Parkinsonia aculeata</i>
(15) <i>viduatus</i> -----	<i>Acacia chiapensis</i> <i>A. collinsii</i> <i>A. cornigera</i> <i>A. cymbispina</i> <i>A. gentlei</i> <i>A. globulifera</i> <i>A. hindsii</i>

Plants Attacked by Species of *Mimosestes*

Host plants	<i>Mimosestes</i> spp.
<i>Acacia amentacea</i> DC. -----	<i>acaciestes</i>
<i>A. berlandieri</i> Benth. -----	<i>acaciestes</i>
<i>A. chiapensis</i> Safford -----	<i>anomalus</i> <i>viduatus</i>
<i>A. cochliacantha</i> Humb. and Bonpl. ex Willd. -----	<i>janzeni</i> <i>mimosae</i> <i>nubigena</i>
<i>A. collinsii</i> Safford -----	<i>viduatus</i>
<i>A. constricta</i> Benth. -----	<i>acaciestes</i> <i>amicus</i>
<i>A. cornigera</i> (L.) Willd. -----	<i>cinerifer</i> <i>nubigena</i> <i>obscuriceps</i> <i>viduatus</i>
<i>A. cymbispina</i> Sprague and Riley -----	<i>amicus</i> <i>janzeni</i> <i>mimosae</i> <i>viduatus</i>
<i>A. farnesiana</i> (L.) Willd. -----	<i>amicus</i> <i>insularis</i> <i>mimosae</i> <i>nubigena</i>
<i>A. gentlei</i> Standley -----	<i>brevicornis</i> <i>viduatus</i>

<i>Mimosestes</i> spp.	Host plants
<i>A. globulifera</i> Safford -----	<i>anomalus</i> <i>mimosae</i> <i>nubigen</i> <i>viduatus</i>
<i>A. hindsii</i> Bentham -----	<i>mimosae</i> <i>viduatus</i>
<i>A. macracantha</i> Humb. and Bonpl. -----	<i>anomalus</i> <i>cinerifer</i> <i>mimosae</i>
<i>A. pennatula</i> (Schlectendal and Chamisso) Bentham -----	<i>amicus</i> <i>anomalus</i> <i>humeralis</i> <i>mimosae</i>
<i>A. rigidula</i> Bentham -----	<i>acaciestes</i>
<i>A. schaffneri</i> (S. Wats.) Hermann -----	<i>nubigen</i>
<i>A. sphacerocephala</i> Schlectendal and Chamisso -----	<i>obscuriceps</i>
<i>A. tortuosa</i> (L.) Willd. -----	<i>nubigen</i>
<i>A. vernicosa</i> Standley -----	<i>acaciestes</i>
<i>Caesalpinia coriaria</i> (Jacq.) Willd. -----	<i>mimosae</i>
<i>C. sclerocarpa</i> Standley -----	<i>mimosae</i>
<i>Ceratonia siliqua</i> L. -----	<i>mimosae</i>
<i>Cercidium floridum</i> Bentham -----	<i>amicus</i> <i>ulkei</i>
<i>C. microphyllum</i> (Torr.) Rose and Johnston -----	<i>amicus</i>
<i>C. praecox</i> (Ruiz and Pav.) Harms -----	<i>amicus</i>
<i>Enterolobium schomburgkii</i> Bentham -----	<i>enterolobii</i>
<i>Parkinsonia aculeata</i> L. -----	<i>amicus</i> <i>ulkei</i>
<i>Prosopis juliflora</i> (Sw.) DC. -----	<i>amicus</i> <i>insularis</i> <i>protractus</i>
<i>P. laevigata</i> (H. and B. ex Willd.) M. C. Johnston --	<i>protractus</i>
<i>P. pallida</i> (H. and B. ex Willd.) H. B. K. -----	<i>amicus</i> <i>insularis</i>
<i>P. palmeri</i> S. Wats. -----	<i>amicus</i>

Phylogenetic Groups of *Mimosestes* Species

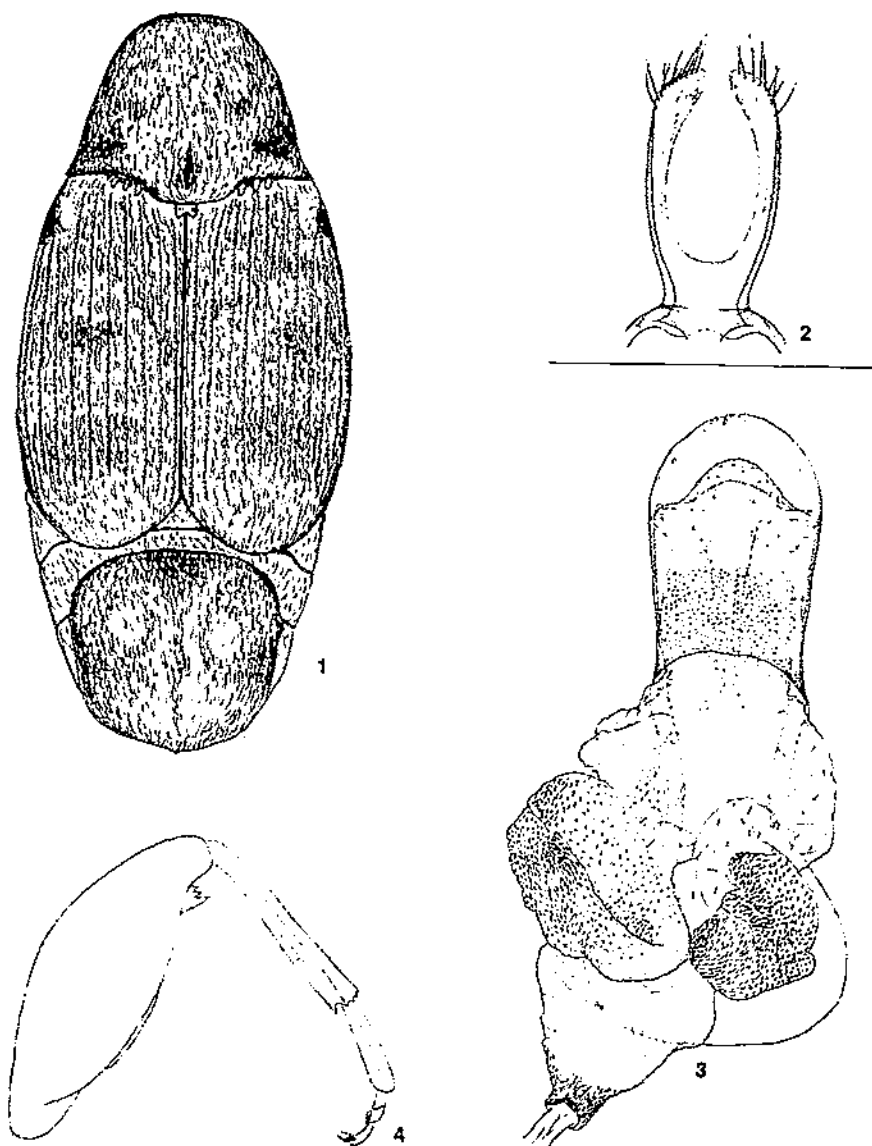
Group

- (1) *Enterolobii*:
 enterolobii Kingsolver and Johnson
- (2) *Protractus*:
 protractus (Horn)
- (3) *Ulkei*:
 ulkei (Horn)
- (4) *Obscuriceps*:
 brevicornis (Sharp)
 obscuriceps (Sharp)

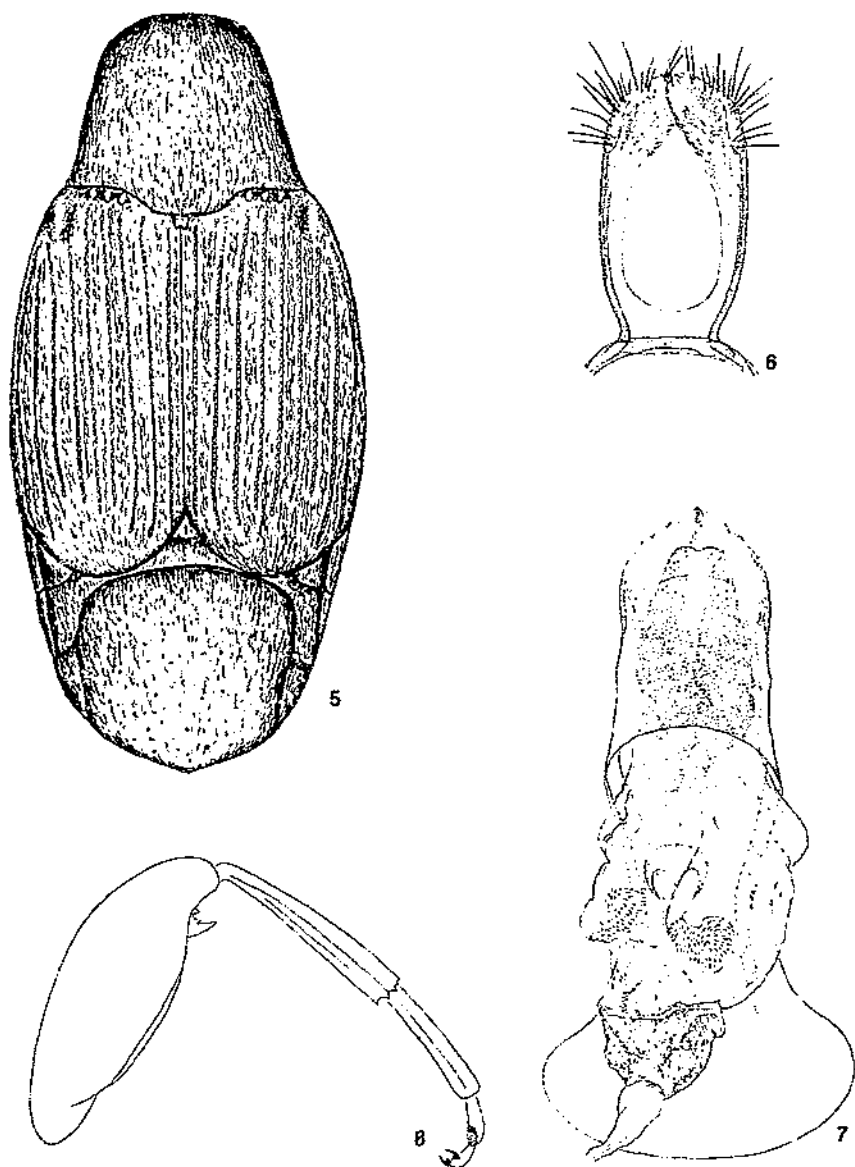
- (5) *Humeralis*:
 humeralis (Gyllenhal)
 janzeni Kingsolver and Johnson
- (6) *Mimosae*:
 acaciestes Kingsolver and Johnson
 amicus (Horn)
 anomalus Kingsolver and Johnson
 cinerifer (Fähræus)
 insularis Kingsolver and Johnson
 mimosae (Fabricius)
 nubigena (Motschulsky)
 viduatus (Sharp)

Synonymical List of *Mimosestes* Species

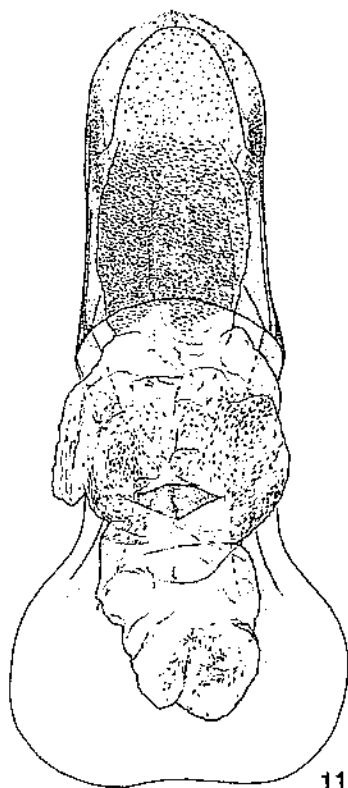
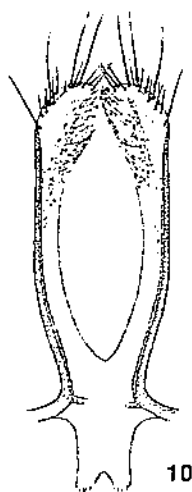
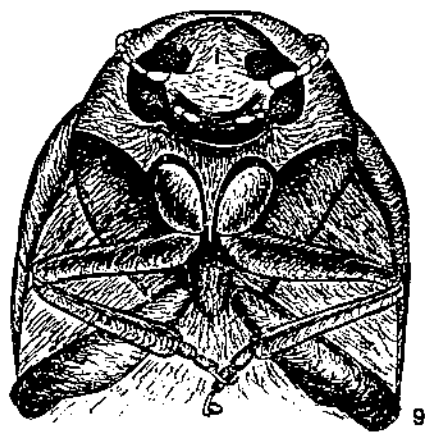
- (1) *Mimosestes acaciestes* Kingsolver and Johnson, new species
 (2) *Mimosestes amicus* (Horn, 1873: 337)
 (3) *Mimosestes anomalus* Kingsolver and Johnson, new species
 (4) *Mimosestes brevicornis* (Sharp, 1885: 463)
 (5) *Mimosestes cinerifer* (Fähræus, 1839: 21)
 (6) *Mimosestes enterolobii* Kingsolver and Johnson, new species
 (7) *Mimosestes humeralis* (Gyllenhal, 1833: 39)
 (8) *Mimosestes insularis* Kingsolver and Johnson, new species
 (9) *Mimosestes janzeni* Kingsolver and Johnson, new species
 (10) *Mimosestes mimosae* (Fabricius, 1781: 76)
 Bruchus breweri Crotch, 1867: 389. NEW SYNONYMY
 Bruchus dominicanus (Jekel, 1855: 12)
 Bruchus immunis Sharp, 1885: 474. NEW SYNONYMY
 Bruchus innotatus Pic, 1912: 92. NEW SYNONYMY
 Bruchus inornatus Horn, 1873: 333. NEW SYNONYMY
 Bruchus strigatus Motschulsky, 1874: 237. NEW SYNONYMY
 Bruchus subrufus Motschulsky, 1874: 225. NEW SYNONYMY
 (11) *Mimosestes nubigena* (Motschulsky, 1874: 237)
 Bruchus sallaci Sharp, 1885: 475. NEW SYNONYMY
 (12) *Mimosestes obscuriceps* (Sharp, 1885: 463)
 (13) *Mimosestes protractus* (Horn, 1873: 332)
 Bruchus longiventris Sharp, 1885: 476
 (14) *Mimosestes ulkei* (Horn, 1873: 324)
 (15) *Mimosestes viduatus* (Sharp, 1885: 474)



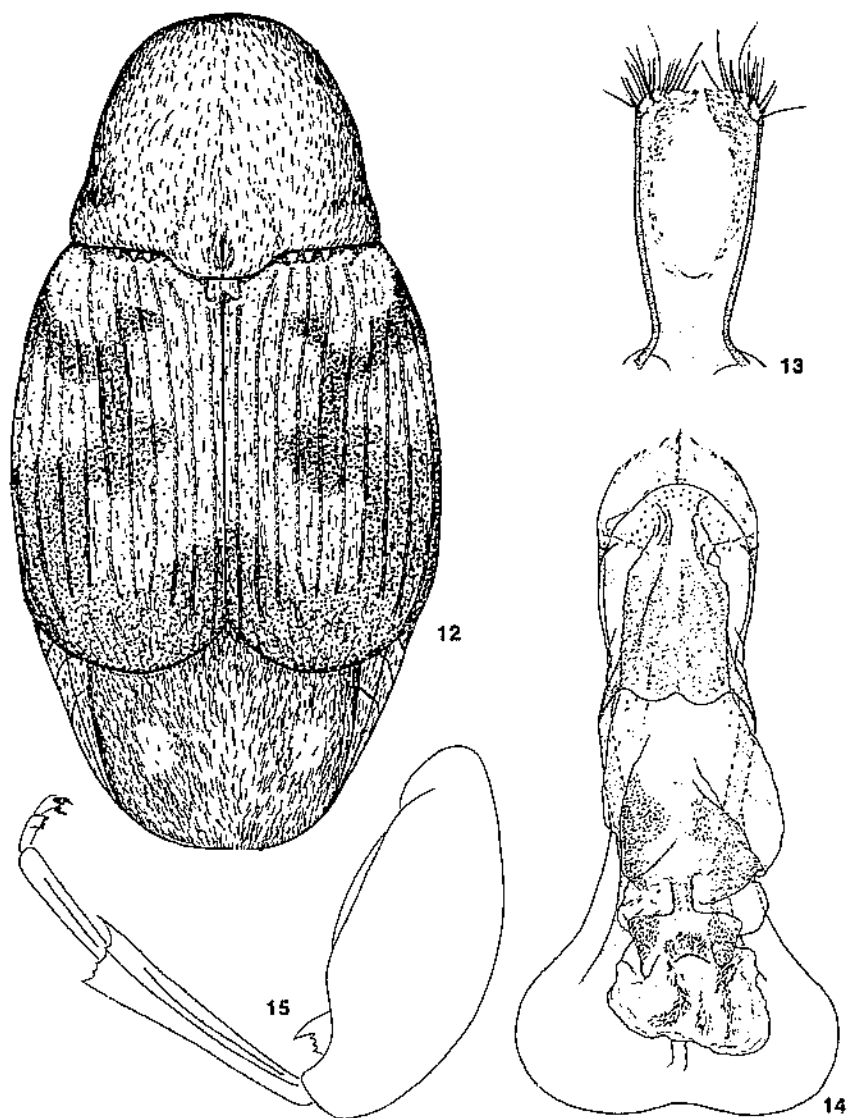
FIGURES 1-4.—*Mimosestes acaciastes*: 1, Dorsal aspect; 2, lateral lobes, ventral view; 3, median lobe, ventral view; 4, hindleg.



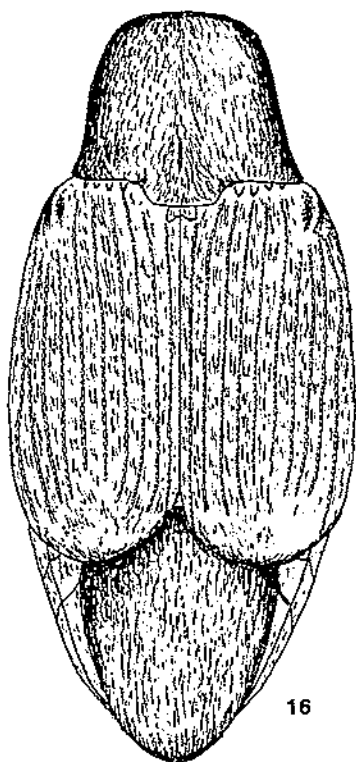
FIGURES 5-8.—*Mimosstes amicus*: 5, Dorsal aspect; 6, lateral lobes, ventral view; 7, median lobe, ventral view; 8, hindleg.



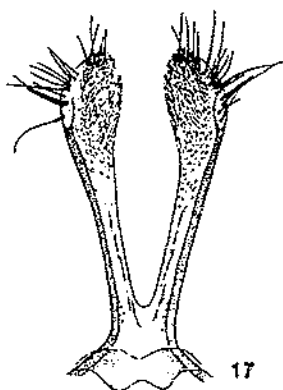
FIGURES 9-11.—*Mimosestes anomalus*: 9, Coxae separated by prosternum; 10, lateral lobes, ventral view; 11, median lobe, ventral view.



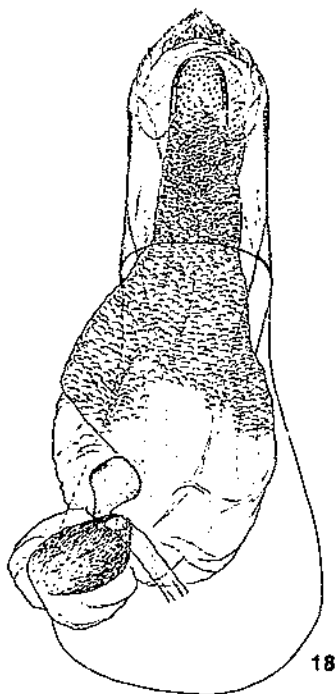
FIGURES 12-15.—*Mimosestes brevicornis*: 12, Dorsal aspect; 13, lateral lobes, ventral view; 14, median lobe, ventral view; 15, hindleg.



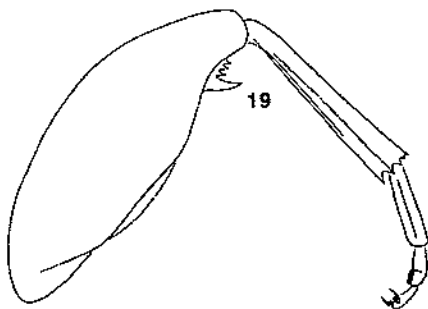
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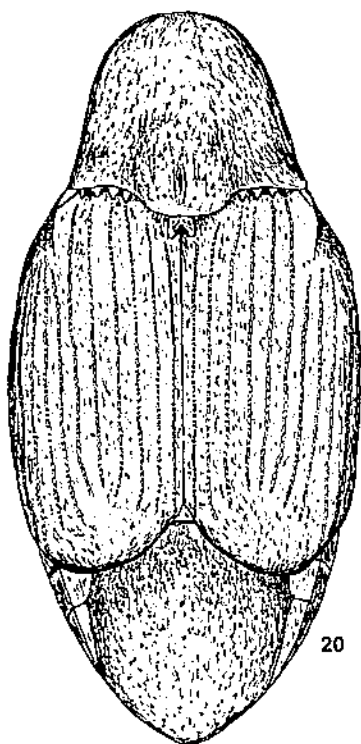


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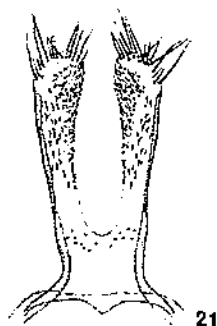


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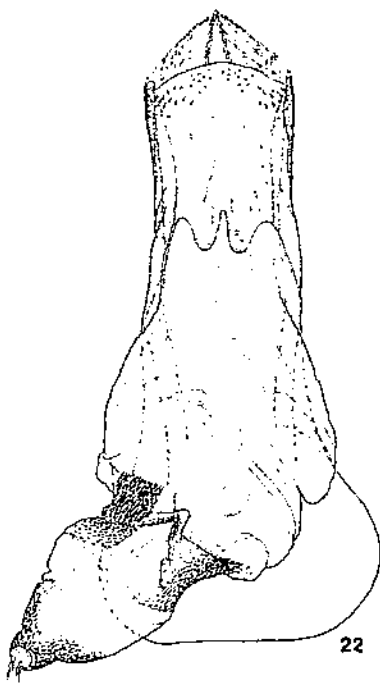
FIGURES 16-19.—*Mimosestes cinerifer*: 16, Dorsal aspect; 17, lateral lobes, ventral view; 18, median lobe, ventral view; 19, hindleg.



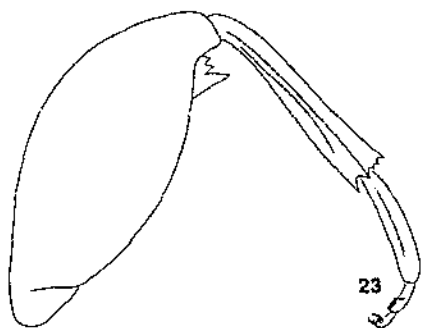
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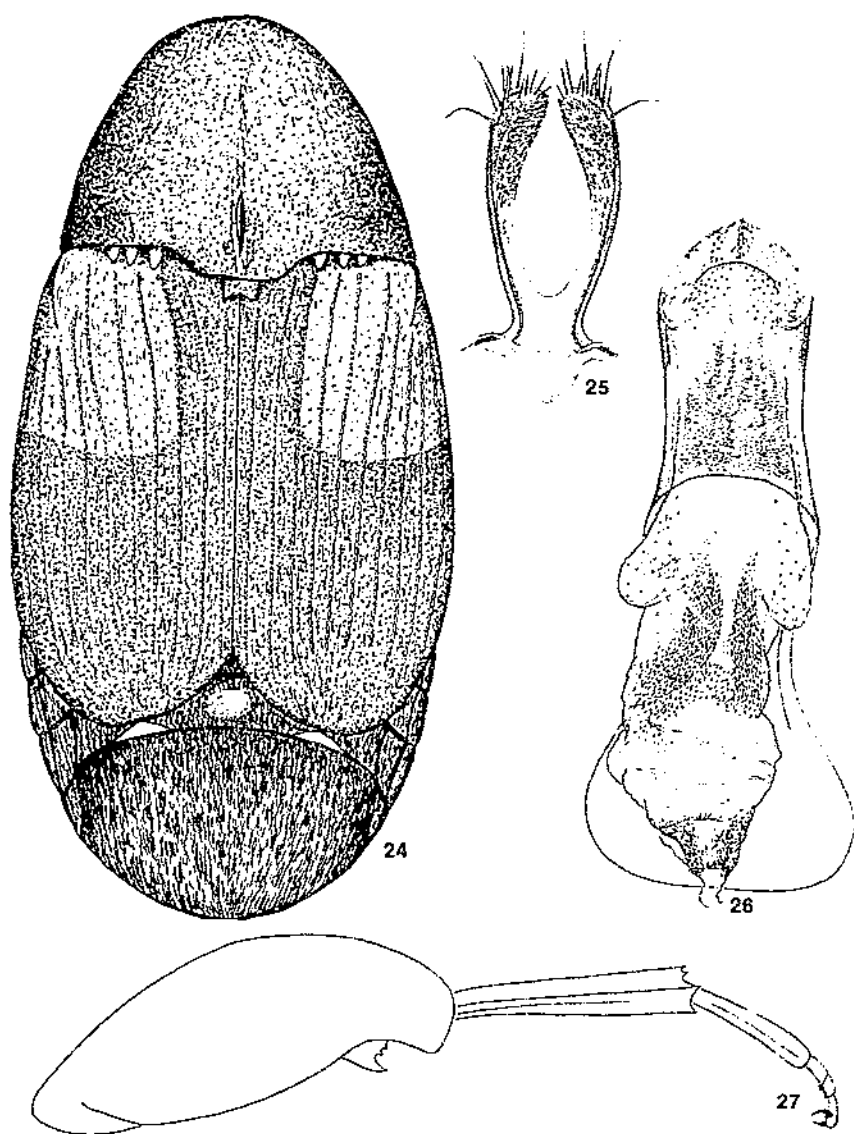


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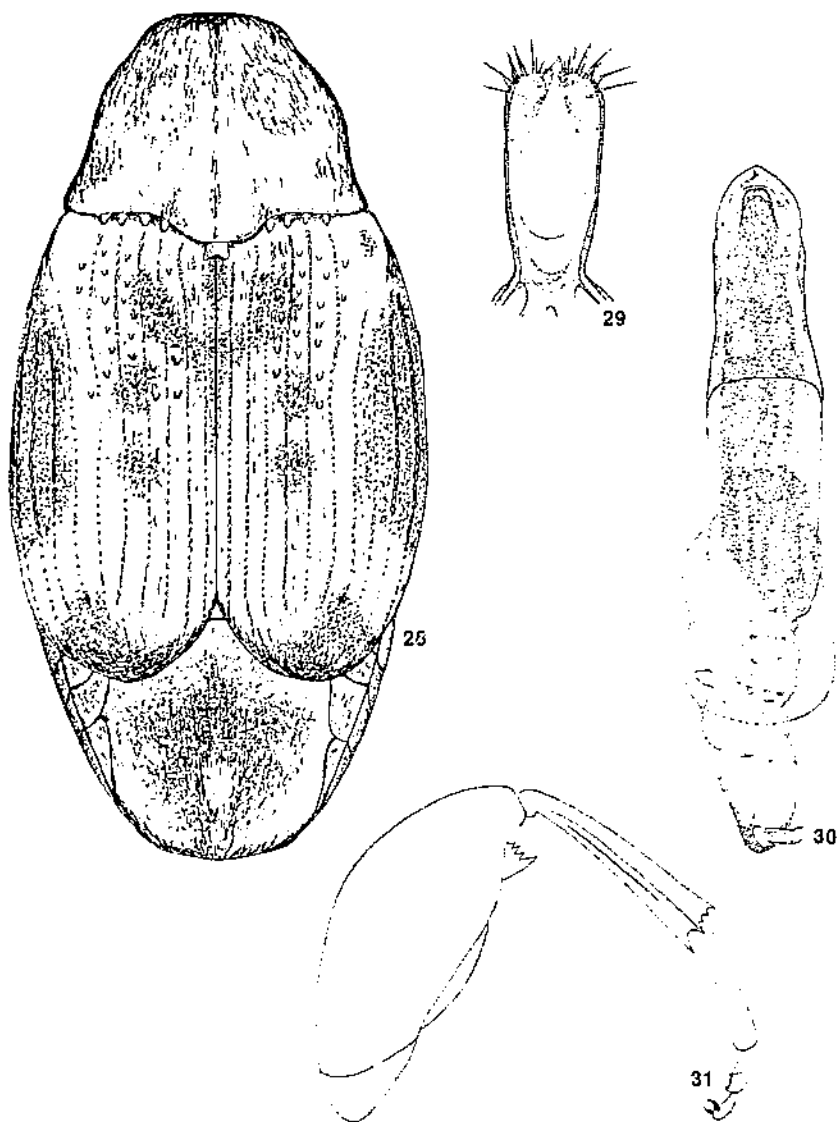


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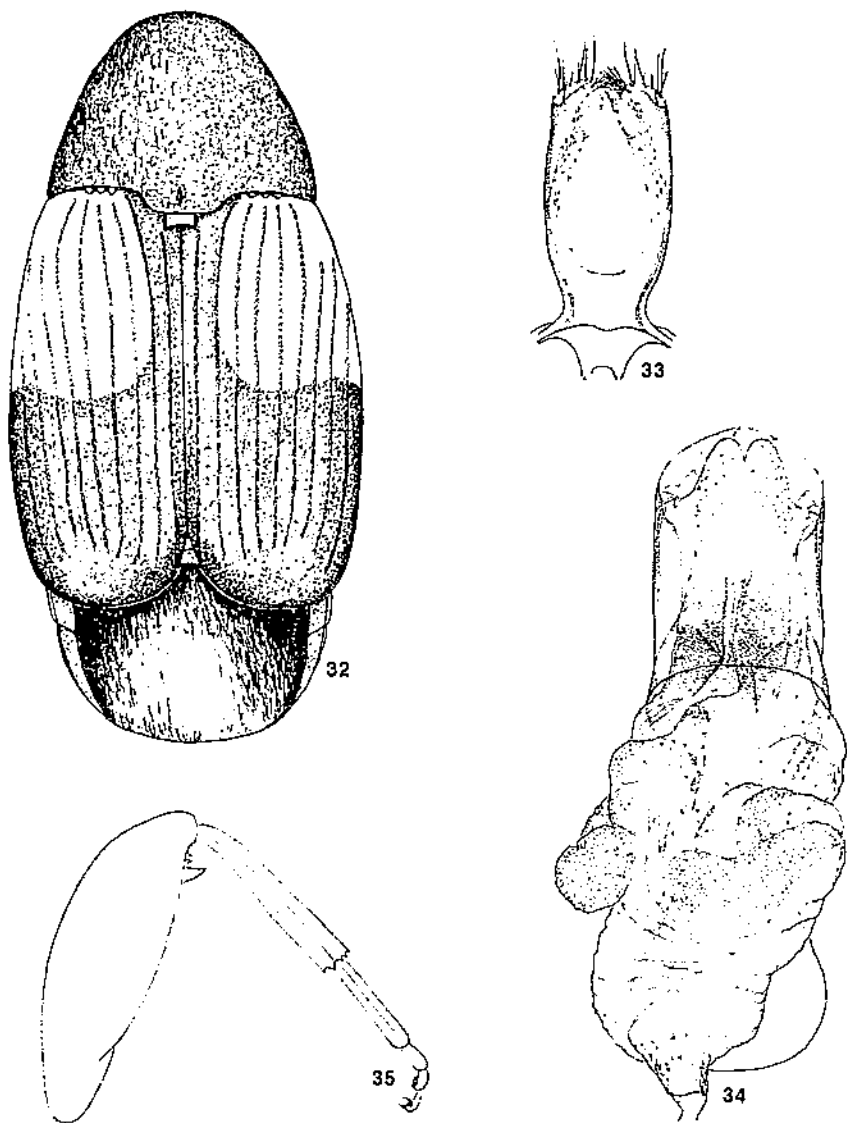
FIGURES 20-23.—*Mimosestes enterolobii*: 20, Dorsal aspect; 21, lateral lobes, ventral view; 22, median lobe, ventral view; 23, hindleg.



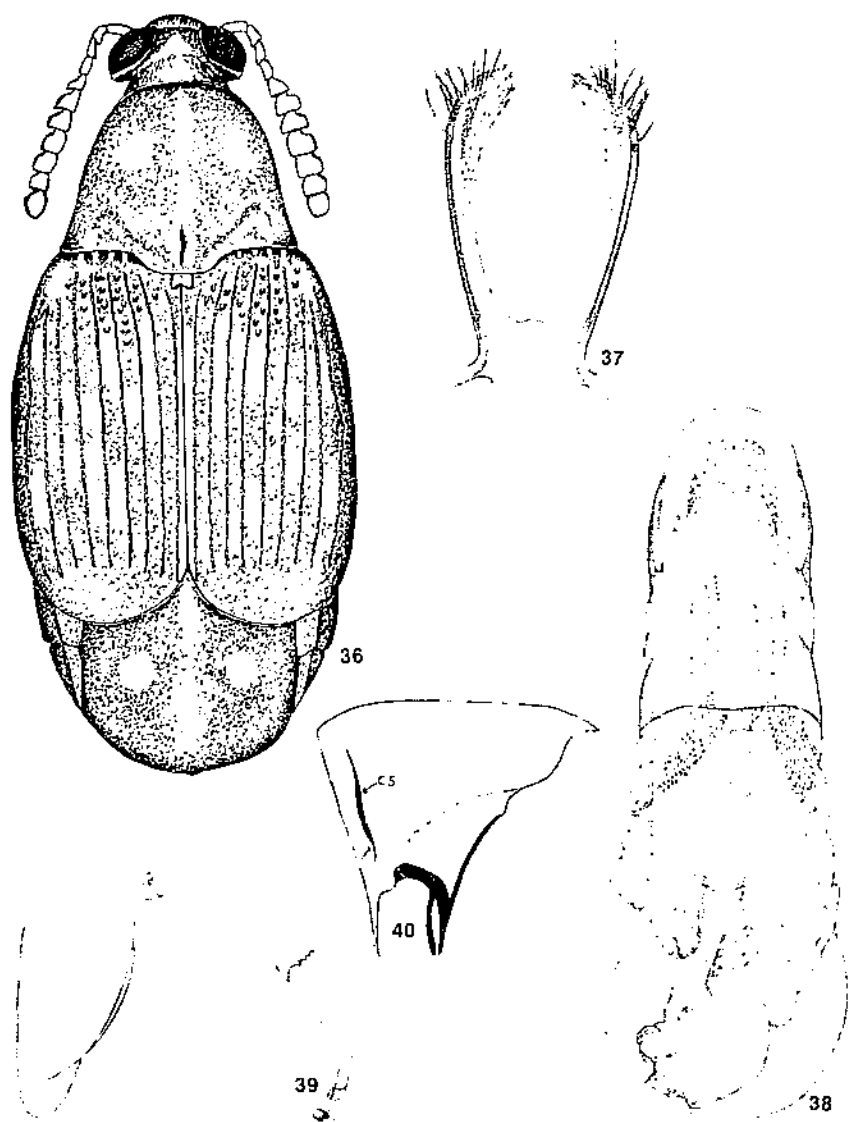
FIGURES 24-27.—*Mimosestes humeralis*: 24, Dorsal aspect; 25, lateral lobes, ventral view; 26, median lobe, ventral view; 27, hindleg.



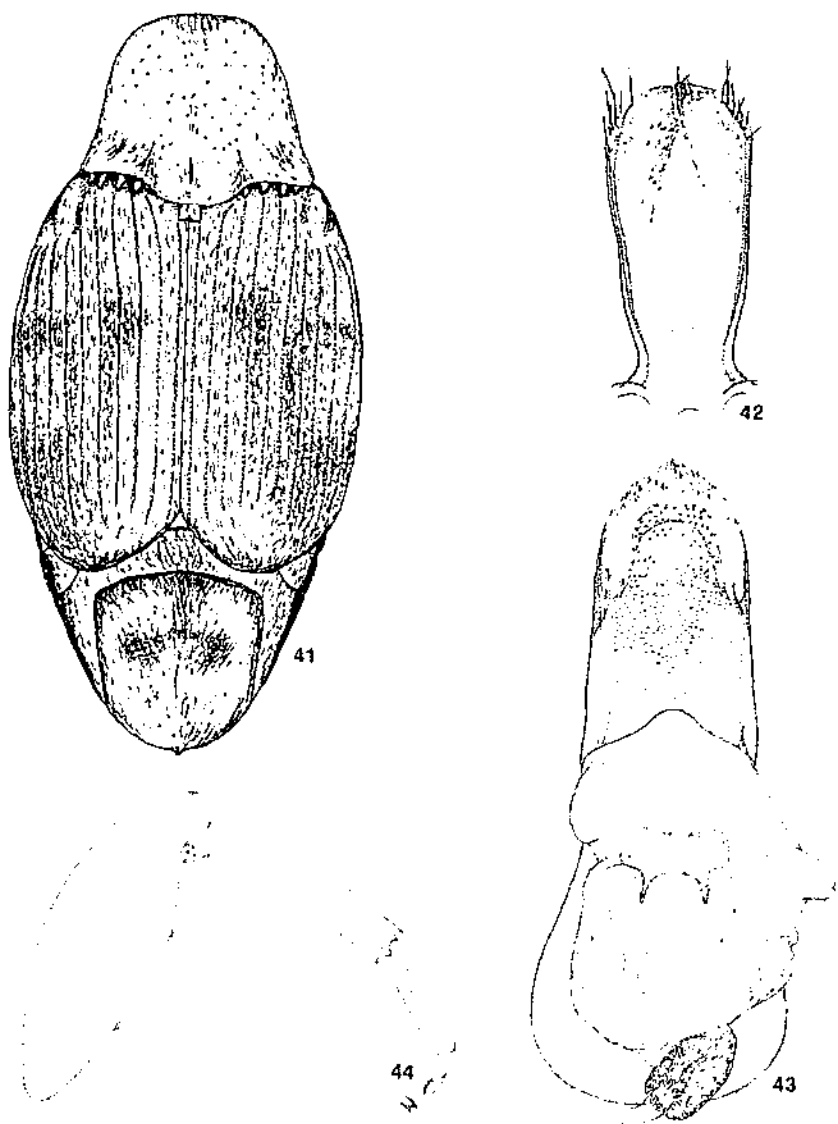
FIGURES 28-31.—*Mimosestes insularis*: 28, Dorsal aspect; 29, lateral lobes, ventral view; 30, median lobe, ventral view; 31, hindleg.



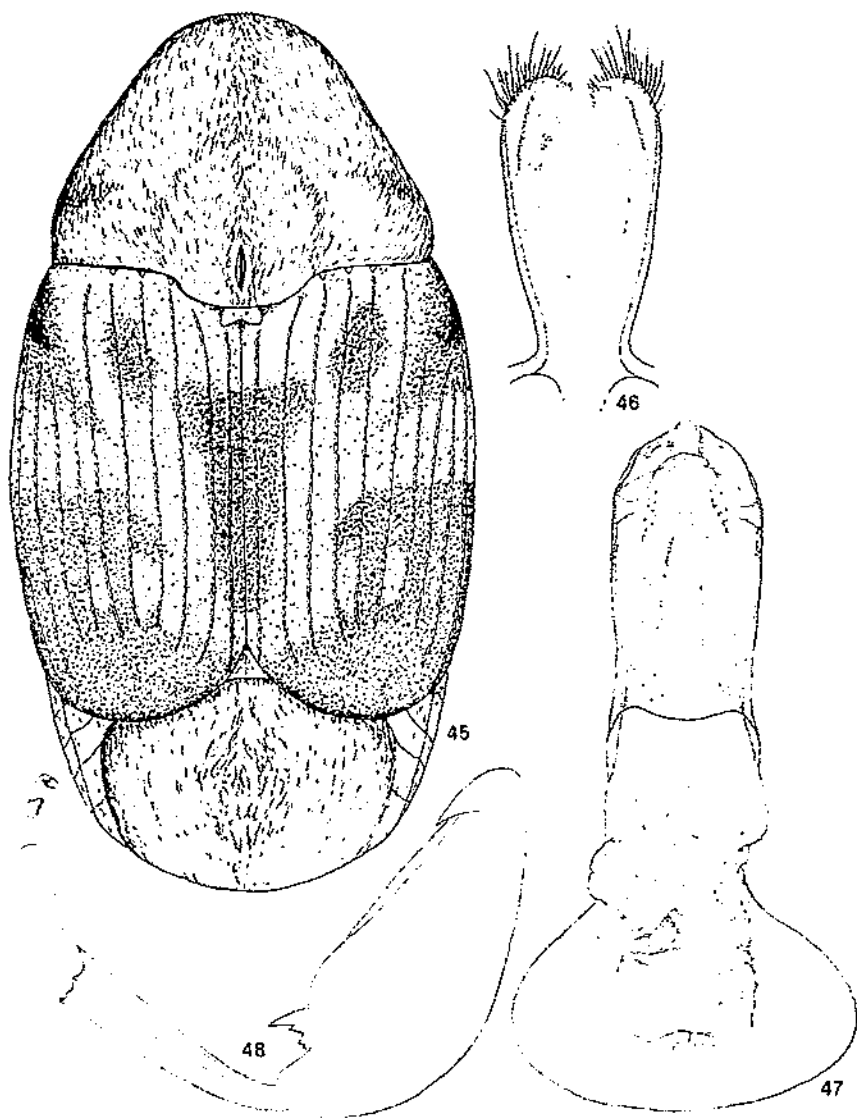
FIGURES 32-35.—*Mimosestes janzeni*: 32, Dorsal aspect; 33, lateral lobes, ventral view; 34, median lobe, ventral view; 35, hindleg.



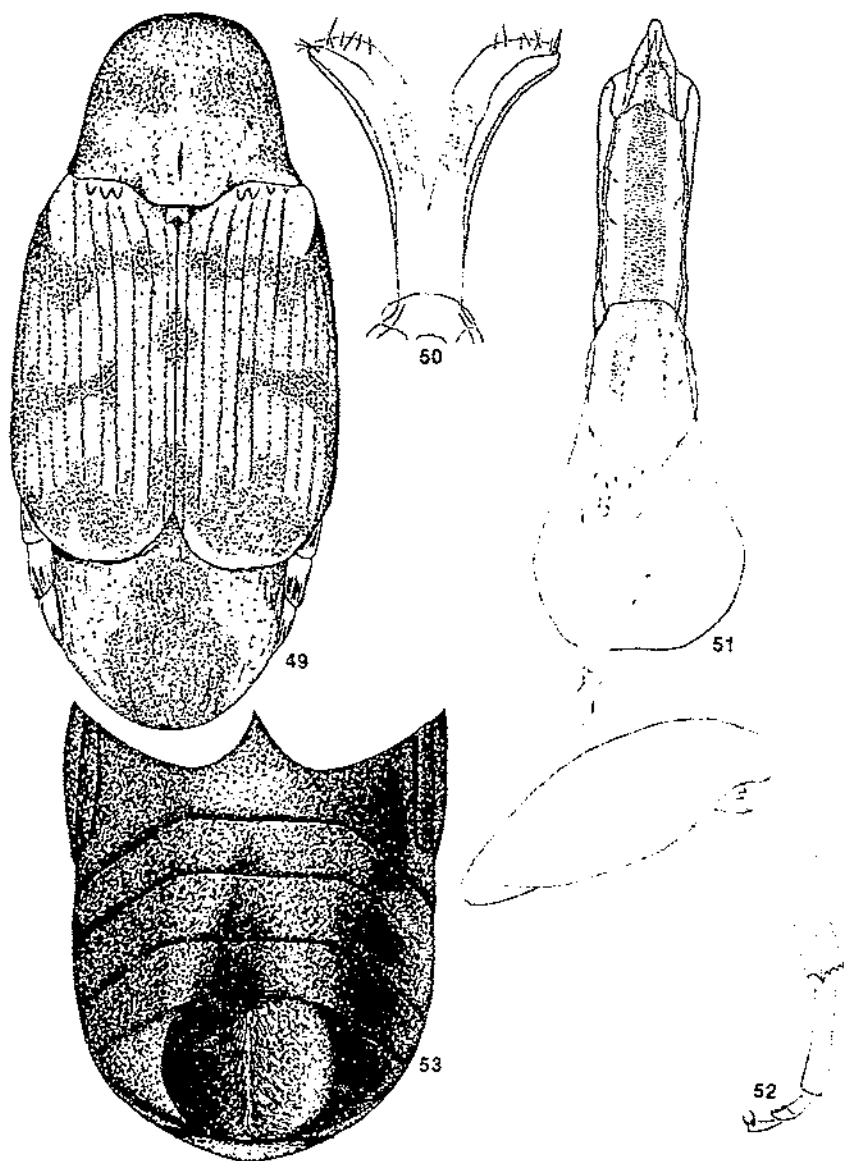
FIGURES 36-40.—*Mimosestes mimosae*: 36, Dorsal aspect; 37, lateral lobes, ventral view; 38, median lobe, ventral view; 39, hindleg; 40, prothorax, lateral aspect (cs=cervical sulcus).



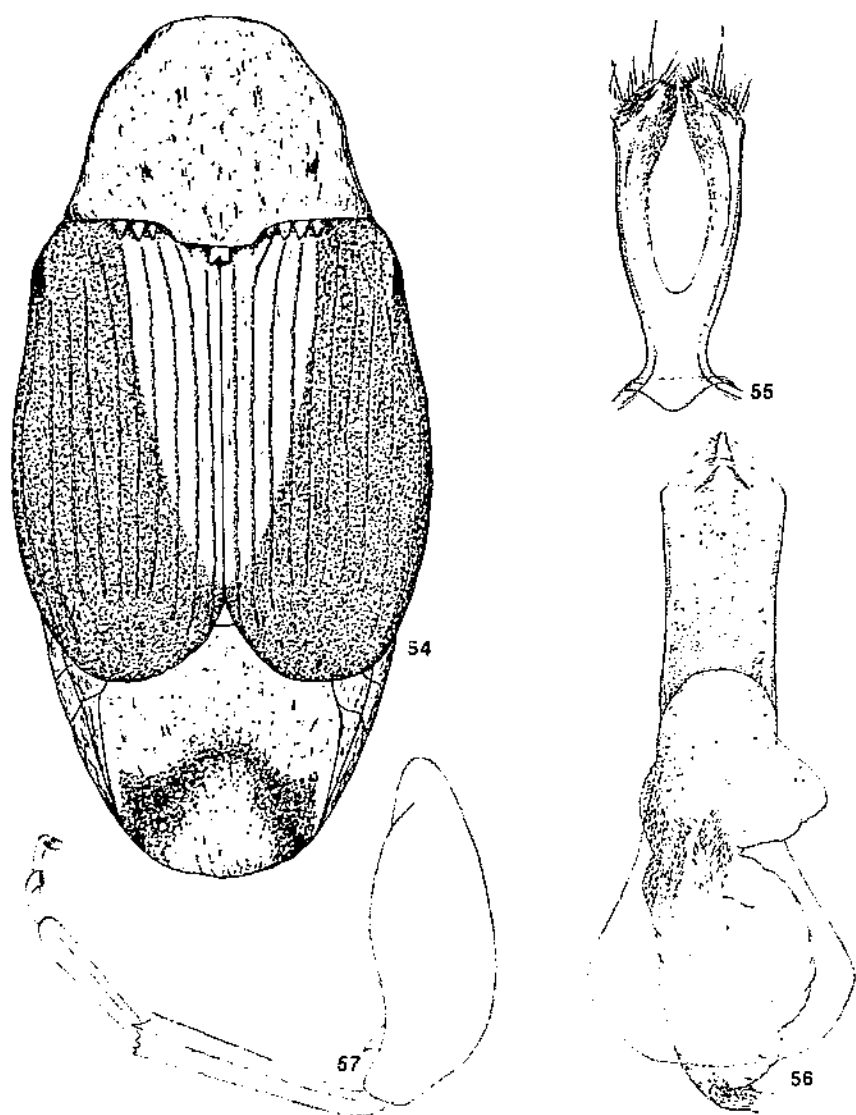
FIGURES 41-44.—*Mimosestes nubigens*: 41, Dorsal aspect; 42, lateral lobes, ventral view; 43, median lobe, ventral view; 44, hindleg.



FIGURES 45-48.—*Mimosestes obscuriceps*: 45, Dorsal aspect; 46, lateral lobes, ventral view; 47, median lobe, ventral view; 48, hindleg.



FIGURES 49-53.—*Mimosestes protractus*: 49 Dorsal aspect; 50, lateral lobes, ventral view; 51, median lobe, ventral view; 52, hindleg; 53, abdominal sulcus.



FIGURES 54-57.—*Mimosestes ulkei*: 54, Dorsal aspect; 55, lateral lobes, ventral view; 56, median lobe, ventral view; 57, hindleg.

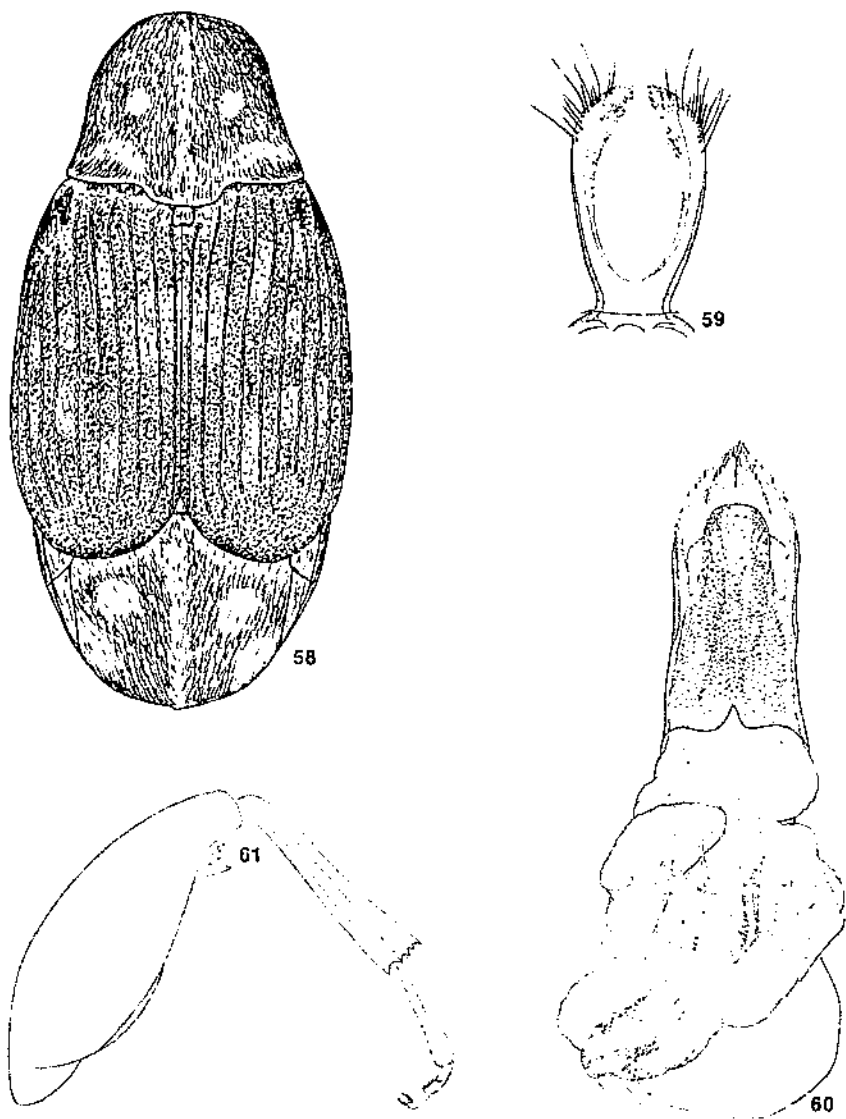
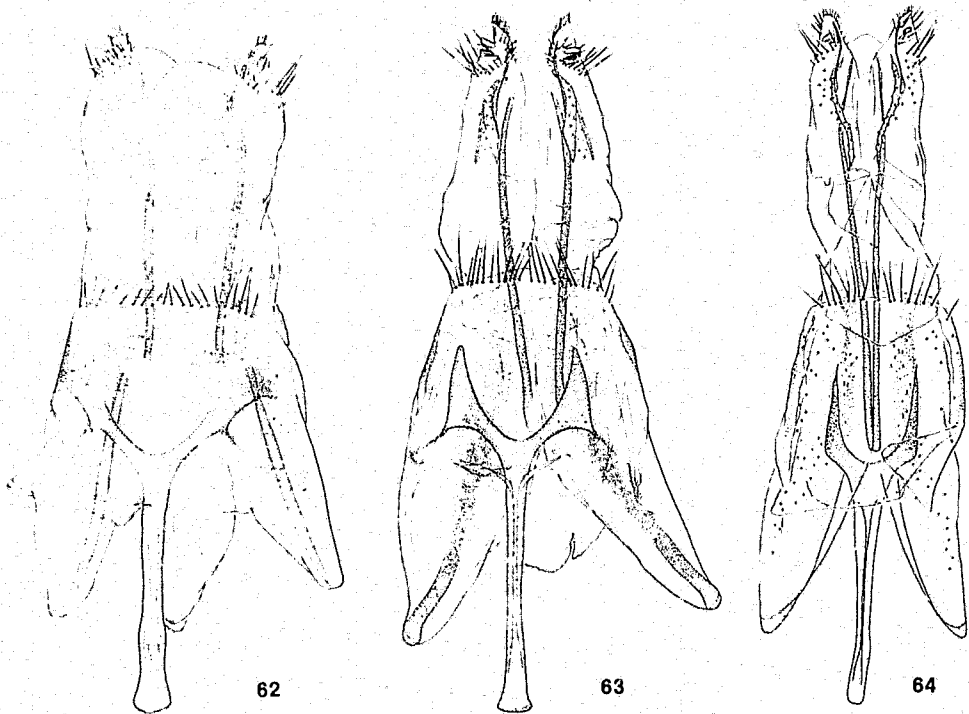
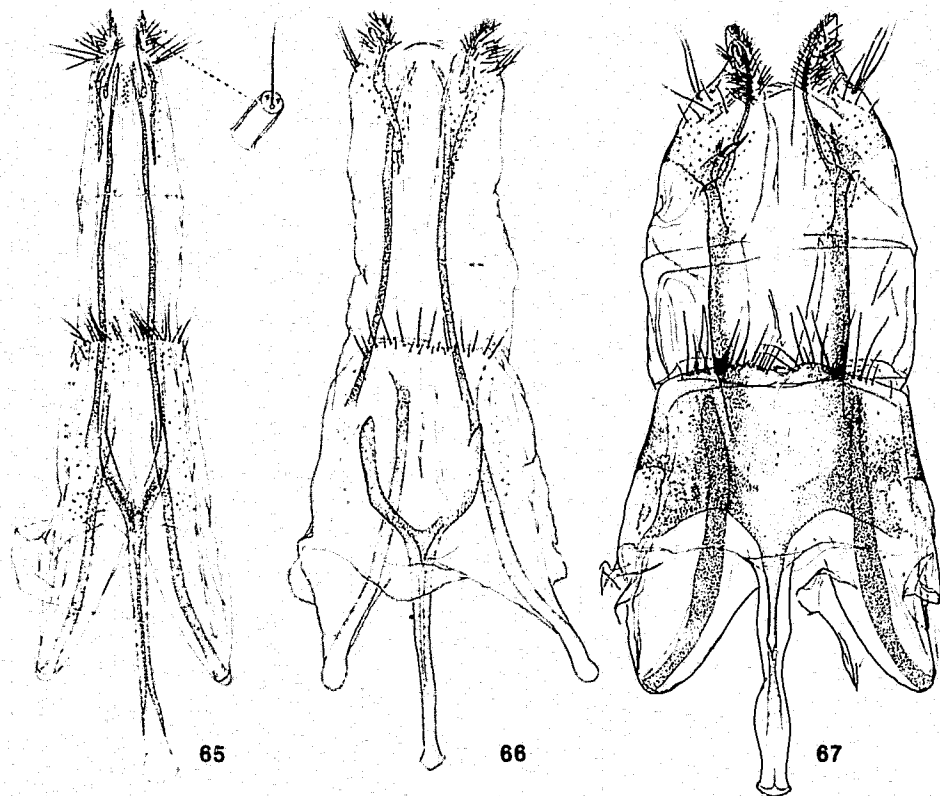


FIGURE 58-61.—*Mimosestes viduatus*: 58, Dorsal aspect; 59, lateral lobes, ventral view; 60, median lobe, ventral view; 61, hindleg.

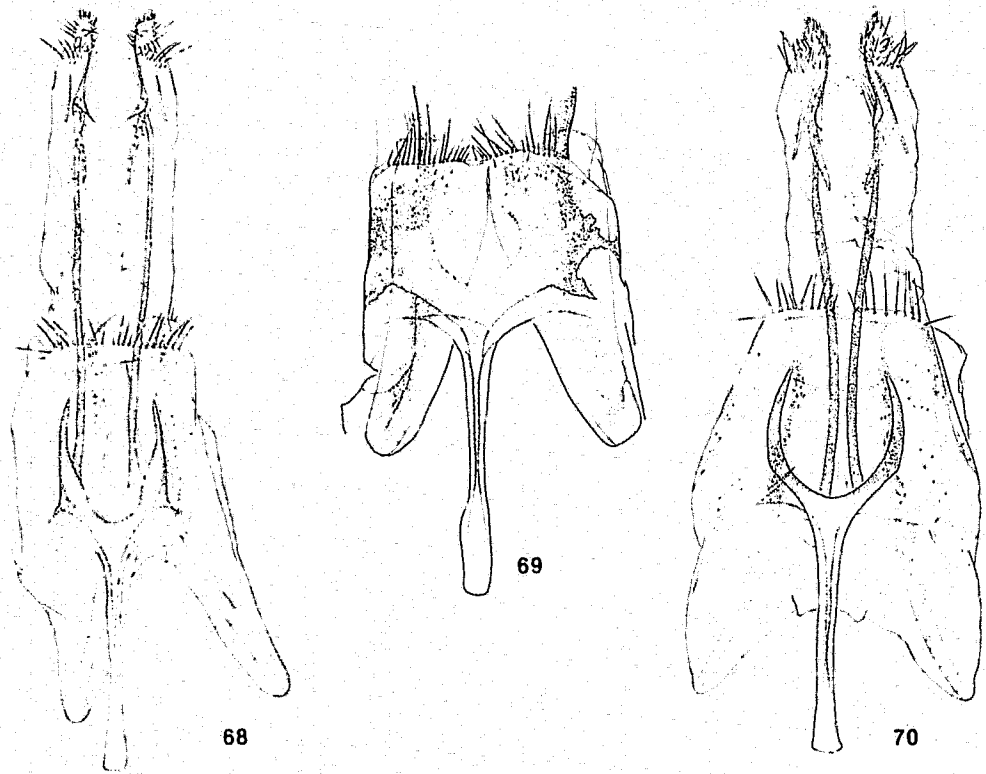
TB 1590 (1979) USDA TECHNICAL BULLETINS UPDATA
SYSTEMATICS OF THE GENUS MIMOSESTES (COLEOPTERA: BRUCHIDAE)
KINGSOLVER, J. M. JOHNSON, C. D. 2 OF 2



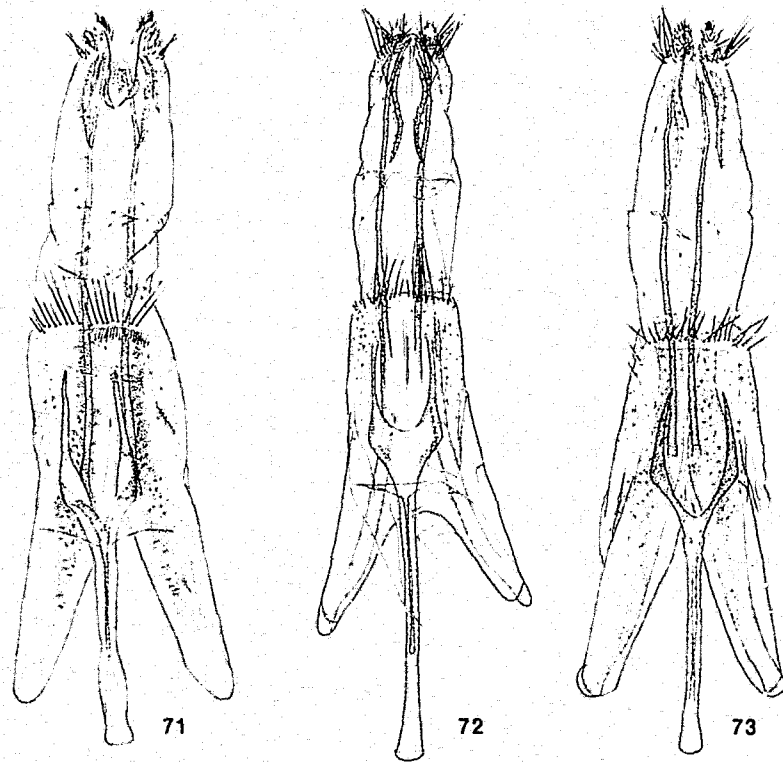
FIGURES 62-64.—*Mimosestes* spp., female genitalia, ventral view: 62, *acaciestes*; 63, *amicus*; 64, *anomalus*.



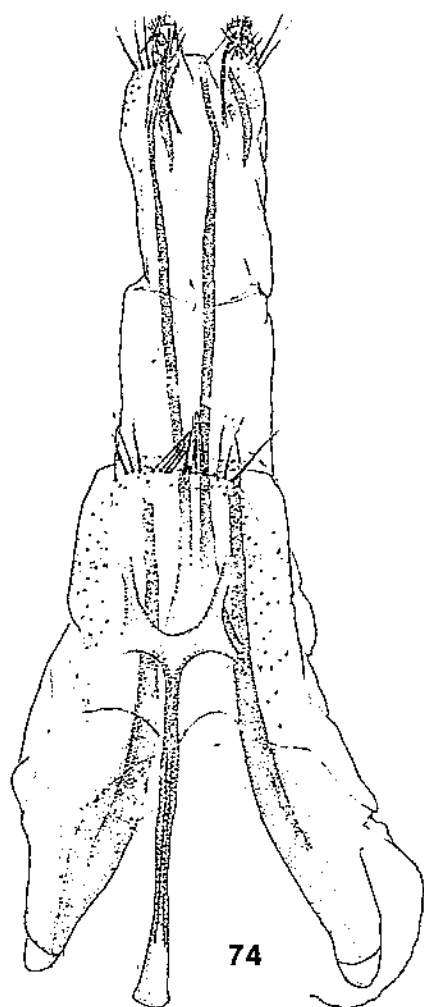
FIGURES 65-67.—*Mimosestes* spp., female genitalia, ventral view: 65, *cinerifer* (inset, stylus); 66, *enterolobii*; 67, *humeralis*.



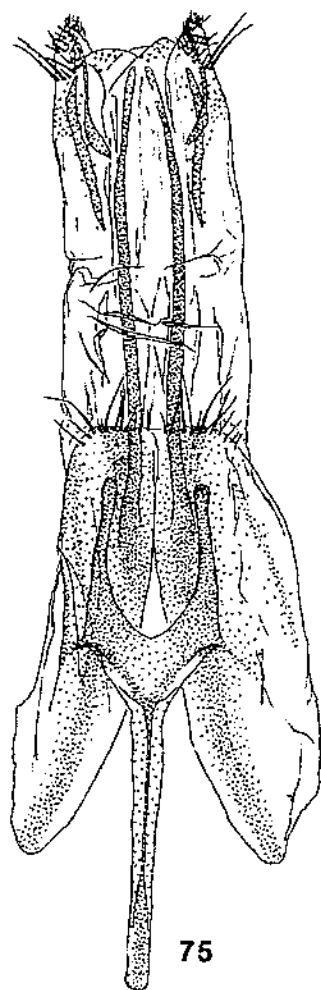
FIGURES 68-70.—*Mimosestes* spp., female genitalia, ventral view: 68, *insularis*; 69, *janzeni*; 70, *mimosae*.



FIGURES 71-73.—*Mimosestes* spp., female genitalia, ventral view: 71, *nubigena*; 72, *obscuriceps*; 73, *protractus*.



74



75

FIGURES 74-75.—*Mimosestes* spp., female genitalia, ventral view: 74, *ulkei*; 75, *viduatus*.



PN-6316

FIGURE 76.—*Mimosestes amicus*: Head, dorsal aspect (X 100).



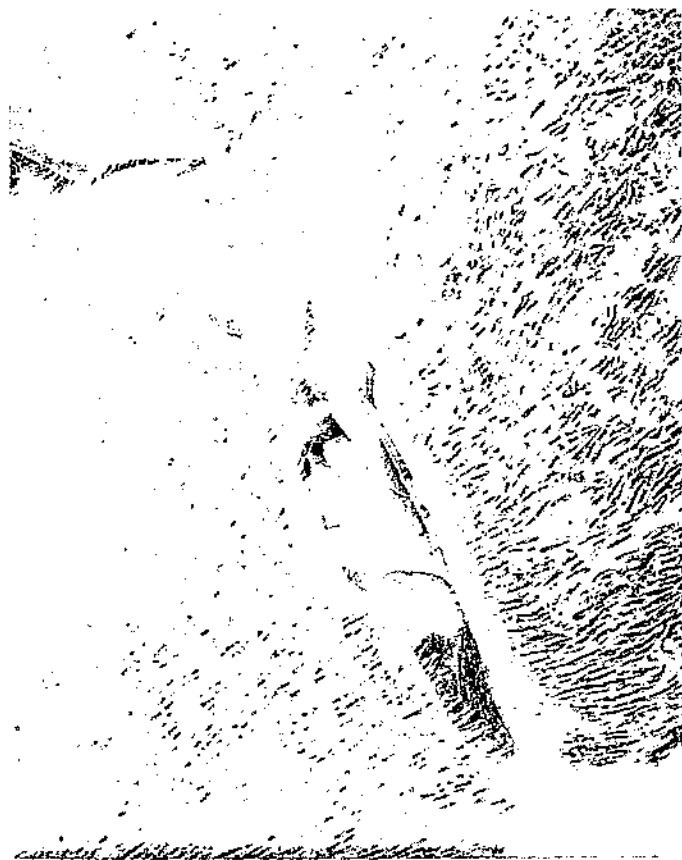
PN-6317

FIGURE 77.—*Mimosstes amicus*: Head, lateral aspect (X 100).



PN-6318

FIGURE 78.—*Mimosestes amicus*: Elytra, basal denticles (X 100).



PS-6319

FIGURE 79.—*Mimostes cinerifer*: Elytra, basal denticles (X 90).



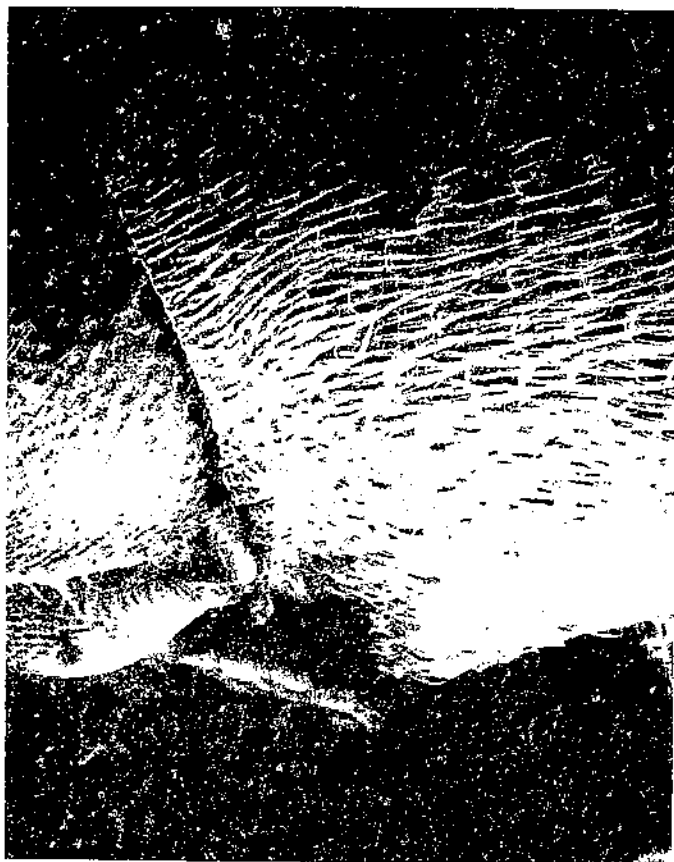
FN-6320

FIGURE 80.—*Mimosestes insularis*: Head, dorsal aspect (X 92).



PN-6321

FIGURE 81.—*Mimosestes insularis*: Pronotum, left anterior angle (X 112).



PN-6322

FIGURE 82.—*Mimosestes nubigens*: Pronotum, left anterior angle (X 176).



PN-6323

FIGURE 83.—*Mimosestes nubigens*: Pronotum, spines on left anterior angle (X 305).

END