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The Pselaphidae of South Bimini Island, Bahamas, British West Indies (Coleoptera)

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INTRODUCTION

Hitherto Pselaphidae have been unreported from the Bahamas (Park, 1942, p. 371). The entire Antillean subregion is poorly known. In this chain of islands, of roughly 90,000 square miles, from near the delta of the Orinoco northwestward nearly to Florida, only about 57 species are known. Information on this subregion is greatly to be desired, especially if the faunal affinities to peninsular Florida, Yucatan, and northern South America, or the lack thereof, are under examination.

Some of these islands have no pselaphids reported, including Jamaica, Trinidad, Barbados, and the Bahamas, which must surely be a lack of collecting effort or of getting material into the hands of specialists.

The known pselaphid fauna in the Antilles is as follows: Cuba (seven species), Dominica (one), Grenada (13), Guadeloupe (12), Hispaniola (three), Martinique (one), Puerto Rico (four), St. Thomas (15), St. Vincent (five), and Water Island (one). The number of inter-island

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distributions is small, as far as is known, and these distributions have not been checked since the description of the species so that their validity cannot be vouched for. Such inter-island distributions are limited to four species of the genus *Melba*, as follows: *M. (Quadrelba) parmata* (Reitter), *M. (Quadrelba) ventricosa* (Reitter), and *M. (Melba) eggersi* (Reitter) from St. Thomas and Puerto Rico; and *M. (Melba) specularis* (Reitter) from St. Thomas, Water Island, and Dominica.

This discontinuous island chain includes land masses of greatly differing size, local weather, and terrain. In most cases the only datum is the locality where the type was collected, namely, Cuba. Hence we are a long way from either a sound taxonomic survey or information on the ecology of the populations.

Of interest is the disparity between the known taxonomic density and the size of the land masses from which collections were made. Whereas Cuba has seven species reported, the Leeward Islands have 12, the Windward Islands have 20, and the Virgin Islands have 16 species. Obviously this is the result of differential collecting and study, rather than a true picture of dispersal.

The author has had little first-hand contact with the Antilles, this being limited to brief field experience in Cuba and Jamaica. Through the courtesy of the American Museum of Natural History, some 300 pselaphids from South Bimini Island were sent for identification and study. These were obtained by operating a Berlese funnel, from May through August, 1951, and a smaller number was collected in April, 1952. The author thanks Dr. Mont A. Cazier, Chairman of the Department of Insects and Spiders of the American Museum, for making this valuable collection available to him.

This Bahama sample contained two subfamilies, three tribes, seven genera, and seven species. Of these, three genera and six of the species were new.

GENERAL KEY TO THE KNOWN PSELAPHID FAUNA OF SOUTH BIMINI

1. Antennae of nine segments *Bythinoplectus bahamicus*
 Antennae of more than nine segments. 2
- 2(1). Antennae of 10 segments *Decarthron vauriei*
 Antennae of 11 segments 3
- 3(2). Body glabrous *Eupsentius glaber*
 Body never glabrous, the pubescence varying from conspicuous to inconspicuous, and from abundant to very sparse, but always present. . . . 4
- 4(3). Flank of each elytron bearing a minute subhumeral fovea
 *Allomelba antennata*
 Flanks of elytra not bearing subhumeral foveae 5

- 5(4). Ventral surface of head bearing capitulate setae 6
 No capitulate setae on ventral surface of head . . . *Dalmomelba cazieri*
 6(5). Pronotal disc bisected by a broad, shallow, sulcoid, longitudinal impression,
 from near apical margin to antebasal sulcus . . . *Trimiovillus bahamicus*
 Pronotal disc simple, evenly convex, not bearing a longitudinal sulcus . .
 *Melba zonula*

The above key has been drawn up to differentiate quickly the known pselaphid fauna of South Bimini Island. Because the key characters used are often at the generic level, the key will not serve to discriminate new species or genera.

KEY TO THE TRIBES OF PSELAPHIDAE OCCURRING ON SOUTH BIMINI

1. Antennae of nine segments; tarsi apparently two-segmented, appearing to consist of a minute proximal segment and a long distal segment . . . Pyxidicerini
 Antennae of 10 to 11 segments; tarsi obviously three-segmented, consisting of a minute first segment and two relatively long distal segments . . . 2
 2(1). Venter with only five sternites visible Brachyglutini
 Venter with six or seven sternites visible Euplectini

SUBFAMILY FARONINAE

TRIBE PYXIDICERINI

GENUS *BYTHINOPECTUS*

Bythinoplectus is the only genus in the tribe in the Western Hemisphere. This exclusively American genus at present contains one species from southern Arizona (Park, 1949, p. 316), and 12 species from the Neotropical region, of which the following is a new addition. The Neotropical species have been keyed out recently and their distribution has been discussed (Park, 1952, pp. 7-13).

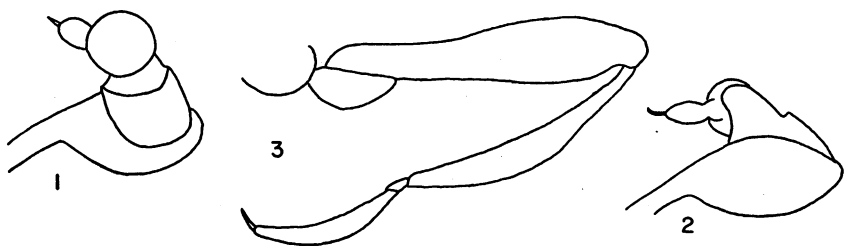
Bythinoplectus bahamicus, new species

Figures 1-3

FEMALE TYPE: Shining, reddish brown, dorsoventrally flattened, with very short, sparse, inconspicuous pubescence. Head very sparsely subgranulate and sparsely punctulate; pronotum not granulate but distinctly punctate; elytra and abdomen not granulate and almost impunctate. Total length, 1.22 mm.

Head distinctly wider than pronotum; epicranium in the form of an inverted T, with small eyes near base and inconspicuous tempora; vertexal rostrum not transversely divided, bearing a minute, free vertexal

fovea near each basal angle, and a vague median rostral impression. Nine-segmented antennae subcontiguously articulated at distal rostral margin; segment I large, subquadrate, dorsoventrally flattened, with ventral face flat to slightly concave near glabrous base; segment II sub-spherical, smaller than first; segments III to VII very small, subequal in width, third obconical, others transverse moniliform; segment VIII slightly wider, transverse-obtrapezoidal; segment XI largest, suboval. Maxillary palpi four-segmented, received at rest in spacious palpal fossae, and when extended are of the bizarre form characteristic of genus (figs. 1, 2), the distal segment bearing a distal cone.



FIGS. 1-3. *Bythinoplectus bahamicus*. 1. Maxillary palpus, mesial view. 2. Maxillary palpus, lateral view. 3. Mesoleg.

Pronotum longer than broad, distinctly punctate except for the glabrous foveae; disc with median fovea; a deep fovea each side near center of lateral margin; base with two foveae separated by an inconspicuous longitudinal elevation; lateral pronotal margins rounded, without distinct apical or basal angles.

Elytra with rounded humeri; each elytron with two deep, circular, antebasal foveae, the inner at origin of entire sutural stria, the outer at origin of a weak discal impression that becomes shallower and narrower to reach center of elytral length. Elytral flank simple, not bearing a subhumeral fovea. Metawings long and narrow.

Abdomen much longer and slightly wider than elytra, of five tergites and six sternites. First four tergites with wide lateral margins; first three tergites each with a pair of basal abdominal carinae; these carinae separated by about one-half of total segmental width and bound a deep, basally pubescent, transverse fossa at base of each of first three tergites; these carinae slender and inconspicuous on first, and quite conspicuous and thicker on third, the carinae being about one-half of segmental length on first and second, and about one-third of segmental length on third tergite. Sternites simple, convex in lateral view. Metasternum convex

and simple. Legs brachysceline, simple, as for females of genus (fig. 3); tarsi apparently two-segmented at 430 diameters (from slide of paratype in Hoyer's medium), tarsal claw long and simple.

Described from 11 specimens, all apparently females, as they lack the conspicuously transversely divided rostrum and have a simple first antennal segment and convex metasternum and convex venter. One paratype was dissected to verify sex and mounted in Hoyer's medium. There is considerable size variation, the 10 point-mounted specimens having a total contracted body length of: 1.07, 1.10, 1.12, 1.17, 1.20, 1.22, 1.25, 1.26, 1.40, and 1.46 mm. This gives an average length of 1.22 mm. for the population fragment studied.

Six paratypes May, 1951, by Cazier and Gertsch; type and two paratypes June, 1951, by Cazier and C. and P. Vaurie; two paratypes July, 1951, by C. and P. Vaurie. Type and five paratypes in the American Museum of Natural History; five paratypes in the author's collection.

Structurally, *bahamicus* is most closely allied to *transversiceps* Raffray of Brazil, but the latter species has all integuments very finely punctulate to impunctate, with no traces of granules, whereas *bahamicus* has traces of granulation on the rostrum, the head is distinctly punctulate, and the pronotum is distinctly punctate.

Geographically, *bahamicus* has two allies. These are *acutangulus* Raffray (Grenada, Windward Islands) and the genotype, *foveatus* Reitter (St. Thomas, Virgin Islands). The types have been studied by the author in the Muséum National d'Histoire Naturelle, Paris, and are very distinct in their differences from *bahamicus*, viz., *acutangulus* has each lateral pronotal margin suddenly produced as an obtuse lobular angle at apical three-fourths, and *foveatus* has distinct apical pronotal angles, with the sides thence almost obliquely straight to base.

SUBFAMILY PSELAPHINAE

TRIBE EUPLECTINI

SUBTRIBE TRIMIINA

So far only one subtribe, Trimiina, out of nine Neotropical subtribes of Euplectini, *sensu latiore*, is known from South Bimini Island. Trimiina are differentiated by having eyes (when present) visible from a dorsal view; no cervical peduncle articulating within a small apical pronotal lobe; front not prolonged as a rostrum; tarsi with a single claw and at times an accessory setiform appendage; prosternum not medianly, longitudinally carinate; and the antennal club formed by the distal segment only.

Although but one subtribe was collected on South Bimini, it was represented by four genera, three of which are new.

KEY TO THE GENERA BELONGING TO THE SUBTRIBE TRIMIINA
OCCURRING ON SOUTH BIMINI

1. Flank of each elytron bearing a small subhumeral fovea . . . *Allomelba*
Elytral flank without a subhumeral fovea 2
- 2(1). Ventral surface without capitulate setae *Dalmomelba*
Ventral surface of head bearing capitulate setae 3
- 3(2). Pronotal disc longitudinally bisected by a broad, shallow, sulcoid impression from near apical margin to transverse antebasal sulcus . *Trimiovillus*
Pronotal disc simple, evenly convex, not bearing a sulcus or fovea . *Melba*

DALMOMELBA, NEW GENUS

GENOTYPE: *Dalmomelba cazieri*, new species.

DIAGNOSIS: Members of the subtribe Trimiina having the following combination of structural features: each elytron bearing two antebasal foveae; pronotal disc simply convex, not foveate, sulcoid, or carinoid; metacoxae separated, not subcontiguous; eyes normal, at center of head; elytral flank simple, not bearing a subhumeral fovea or sulcus; elytra with strong, entire sutural striae; no capitulate setae on ventral surface of head; and female with six, male with seven, sternites.

In this diagnosis the critical character is the separated metacoxae. There are only three other genera of Trimiina known from the Neotropical region with this feature, the others having the metacoxae subcontiguous to contiguous. These genera may be separated from *Dalmomelba* by the following key:

1. Elytral sutural striae absent; Mexico *Dalmoplectus*
Each elytron with entire sutural stria 2
- 2(1). Elytral flank without a subhumeral fovea; ventral surface of head with no capitulate setae *Dalmomelba*
Elytron with a subhumeral fovea; ventral surface of head with capitulate setae 3
- 3(2). Pronotal base bisected from basal bead to transverse antebasal sulcus by a strong carinoid ridge; tergites with conspicuous guard setae; Florida Everglades *Lemelba*
Pronotal base not so bisected; guard setae absent; Mexico . . . *Dalmosanus*

Dalmomelba cazieri, new species

Figures 4-12

MALE TYPE: Shining yellowish brown; pubescence short, sparse, and inconspicuous except on distal antennal segment and parts of pronotum described below. Integuments subimpunctate, occasionally a minute

punctule can be discerned. Measurements, 0.94 mm. long by 0.33 mm. wide.

Head wider than long, slightly wider than pronotum, subogival, with well-developed eyes near center of head length; tempora rounded; occiput medianly indented; a pair of small, nude but conspicuous vertexal foveae in a line through anterior eye margins; face evenly, rather steeply declivous and simple; labrum relatively large. A short carina from eye to antennal acetabulum. Ventral surface of head devoid of capitulate setae. Antennae 11-segmented, distantly articulated; segment I actually elongate but visible portion subquadrate; segment II large, as wide as first, slightly obconical; segments III to VIII very small and subequal in width, third obconical, fourth to eighth subquadrate; segment IX slightly larger, slightly transverse; segment X bilaterally symmetrical, transverse trapezoidal, larger than ninth; segment XI very large, oviform, heavily pubescent, forming the antennal club. Maxillary palpi four-segmented; first segment short but distinct; second elongate-pedunculate; third about as wide as distal swelling of second, rounded-triangular; fourth largest, elongate-oviform, bearing a palpal cone at apex (fig. 4).

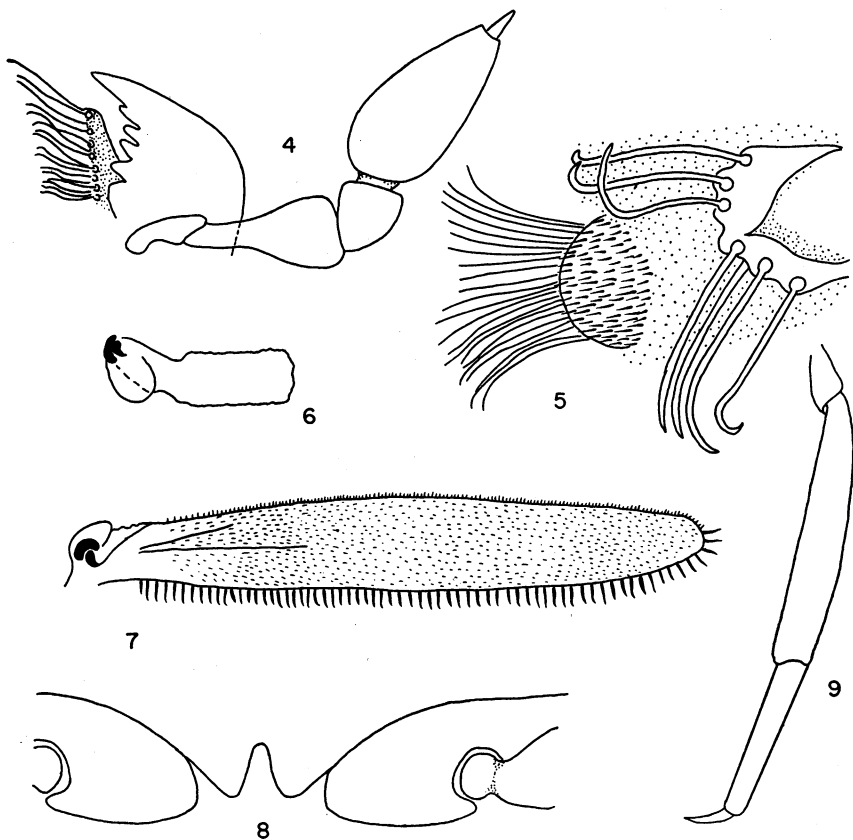
Pronotum as wide as long, with simple, convex, unmodified disc; divided into a large apical and a small basal lobe by a deep and almost straight antebasal sulcus; antebasal foveae or dilations of this sulcus not apparent; on either side, where the lateral margin is cut by the sulcus, several long guard setae arch over the sulcus from its anterior border (very similar to the condition found in *Dalmosella tenuis* Casey of eastern United States).

Elytra together wider than long, slightly wider than abdomen, with rounded humeri; each elytron with two antebasal foveae, the inner at origin of entire sutural stria and the outer at origin of a vague, short, discal impression; flank without a subhumeral fovea but with an oblique line that can be seen from distal elytral margin over flank obliquely to lateral elytral margin as in the species of *Melba* (*Melba*).

Abdomen with five tergites and seven sternites. Tergites in median length ratio of 1.6/1.4/1.2/1.1/0.8, with the first three margined laterally. First tergite with a pair of minute basal abdominal carinae, separated by one-third of total segmental width and only one-seventh of segmental length. Sternites in median length ratio of 0.7/1.2/0.8/0.6/0.3/0.3/0.4, not including alutaceous intersegmental membranes. Seventh sternite a small, transversely oval aedeagal plate. Venter with sternites II, III, and IV modified; second bearing an oblique tumidity in each lateral third of width; third in each lateral third bearing two complicated structures, most mesial of the two is a distally flattened tumulus from

which radiate lateral setae, and lateral to this process is a tubercle which bears an erect bundle of setae (fig. 5); fourth sternite bears an oblique tumidity in each lateral third.

Metasternum produced and bifid between the distinctly separated metacoxae (fig. 8). Legs brachysceline, simple and slender, with three-segmented tarsi, with proportions as illustrated (fig. 9).

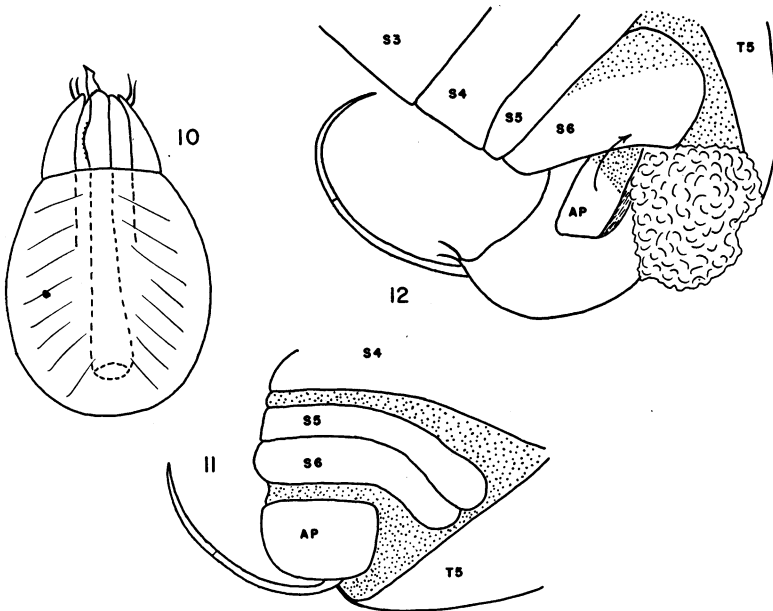


FIGS. 4-9. *Dalmomelba cazieri*. 4. Maxillary palpus, mandible and lacinia. 5. Secondary sex characters on third sternite of male. 6. Vestigial metawing of female. 7. Metawing of male. 8. Metacoxal separation. 9. Metatarsus.

FEMALE: Differs from the male in several external features. Whereas the male has long wings (1.00 mm. in length), the posterior margins of which bear a fringe of long alar setae (fig. 7), the female has minute, vestigial wings (fig. 6) that are about 0.25 mm. long and devoid of setae. The eyes of the male are relatively large, with about 32 facets, whereas

the female eyes are obviously smaller, of about 16 facets, with a correspondingly long carina from eye to antennal acetabulum. The female has only six sternites visible, which are simply convex and unmodified.

Several males were dissected, and the aedeagus was studied. The aedeagus is bilaterally symmetrical, with a pair of bisetose distal processes (fig. 10). With the internal sac withdrawn into the basal bulb, the aedeagus averages 0.154 mm. long by 0.093 mm. wide. The internal sac is in two tubular pieces apparently, the one telescoped within the other when the structure is withdrawn. Several males had the aedeagus in different degrees of exsertion (figs. 11, 12). At an early stage of exsertion the aedeagal plate ("velum aedeagi" of Pearce, 1951) is asymmetrically



FIGS. 10-12. *Dalmomelba cazieri*. 10. Aedeagus with internal sac retracted. 11. Lateral view of distal end of abdomen with internal sac extruded. 12. Lateral view of distal end of abdomen with aedeagus almost fully extruded. Abbreviations: AP, aedeagal plate; S, sternite; T, tergite.

lowered to the left (fig. 11). Later, at nearly full exsertion (fig. 12) the aedeagal plate has swung downward along its left lateral margin, to the left of the aedeagus. At this stage the aedeagus is seen to be quite long. The internal sac, fully extruded, is a long, delicate, apparently at least partially sclerotized, strongly arcuate tube, measuring about 0.15 mm., to give the total extruded aedeagal length about 0.30, or almost one-third

as long as the male's body. In copulation, possibly not more than the tip of the basal bulb and the internal sac are inserted in the female bursa.

Described from 257 specimens, of which the type and half of the paratypes are in the American Museum of Natural History, and half of the paratypes are in the author's collection.

Since the entire South Bimini collection numbered only 300 pselaphids, *cazieri* composed some 86 per cent of the total. The breakdown of the data provides some interesting speculation:

DATE COLLECTED	TOTAL	MALES	FEMALES	SEX RATIO	TENERALS
May, 1951	76	18	58	3.2/1	0
June, 1951,					
including type	115	22	93	4.2/1	2 ♂, 5 ♀
July, 1951	21	9	12	1.3/1	1 ♂
August, 1951	13	1	12	12.0/1	1 ♀
April 10, 14, 1952	32	7	25	3.5/1	0
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	257	57	200	3.5/1	3 ♂, 6 ♀

It will be noted that there were no callow or teneral individuals in April and May, seven in June, and one each in July and August. The teneral pselaphid is light straw-yellow in color, quite translucent, and the integuments are very thin, pliable, and but little sclerotized. In the experience of the author, such callow individuals attain full sclerotization apparently in advance of full adult coloration, and this process of integument hardening and coloring may endure for as little as a week to a month or more. If we assume that the collection under study represents a typical one for South Bimini, then June or possibly late May is the period in which pupation ends, and pselaphid larvae of *cazieri* should be sought for in April or May. This is mentioned, because no complete life history of a pselaphid species is known (Park, 1942, 1947a, 1947b; Jeannel, 1950), and only recently has a pupa been described (Besuchet, 1952).

In the next place, the great preponderance of female *cazieri* is of interest. The average sex ratio for the sample studied was about three females to one male. If this ratio represents a real situation in nature, is it a consequence of genetic or ecologic causes, or a combination of both?

Of interest here are the wings of *cazieri* (figs. 6, 7). The male wing is a little longer than the body (six specimens measured), viz., 1.0 mm., rather narrow, with the membrane and anterior margin beset with minute setae, and the posterior bearing a fringe of long alar setae. There appears to be a slight stiffening of the anterior margin for a short proximal distance and another stiffened line in the center of the membrane in the proximal

third. The paraptera are well developed. When under the elytra, the wings are folded proximally in three pieces, forming a pair of neat oblongs beneath the elytral covering. Pselaphids are known to fly readily to lights at night, in the tropics and subtropics especially, and *cazieri* can probably fly with its equipment. The eye of the male is well developed relative to that of the female.

The female, on the other hand, has vestigial wings. These are short oblongs of crinkled membrane, without setae, measuring only about 0.25 mm. in length (10 specimens measured). On slide mounts, at 430 diameters, the paraptera appear to be as well developed as in the male. The author believes that in life the female could vibrate these minute pads, but that she would be flightless. The female eye is subject to some variation in size in *cazieri*, but usually the facet number is about 16, or about half that of the male.

If we assume that the males of *cazieri* fly, whereas the females do not, then males might tend to be lost from South Bimini, flying at night and being carried away on winds. If this were so we would expect to have the male population reduced each year from June (when the new generation has pupated) onward. This is discussed below.

The large size of the male compound eyes and metathoracic wings and reduced eyes and vestigial wings of the female are almost certainly genetic. This being the case, one simple explanation would be a sex-limited inheritance. Most Coleoptera investigated have either the XY or the XO type of sex determination. The eye-wing combination in *Dalmomelba cazieri*, if sex-limited, would favor the hypothesis that this species, at least, is of the XY type, viz., a pleiotropic gene on the Y chromosome that would be dominant for eye size and wing size so that males would be large-eyed and large-winged, whereas the females would be small-eyed and small-winged.¹

TRIMIOVILLUS, NEW GENUS

GENOTYPE: *Trimiovillus bahamicus*, new species.

DIAGNOSIS: Members of the subtribe Trimiina having the following combination of structural features: vertex with a single pair of foveae, these foveae pubescent, between the eyes, and with the interfoveal sulcus represented by an imperfect, rudimentary sulcoid impression; tenth antennal segment bilaterally symmetrical; pronotum with the disc bearing a median, longitudinal, sulcoid impression from near apex to transverse antebasal sulcus, and with the pubescent, lateral antebasal foveae visible

¹ The author is indebted to Dr. J. Blount, Dr. George Mickey, and Dr. F. Sturtevant for helpful advice on this point.

from above; each elytron bifoveate, with a rounded and simple humeral angle, and with the flank not bearing a subhumeral fovea; metacoxae subcontiguous.

Trimiovillus has but one ally in the subtribe. This is *Trimiosella*, with one species, *T. anguina* (Reitter), known from St. Thomas, Virgin Islands. *Trimiosella* has the pronotal disc simple and evenly convex, the head slightly wider than pronotum, and the first two visible tergites subequally long; *Trimiovillus* is quickly differentiated by the sulcoid pronotal disc and, in addition, the head is narrower than the pronotum, and the first visible tergite is obviously longer than the second.

Trimiovillus bahamicus, new species

FEMALE TYPE: Shining yellowish brown; pubescence conspicuous, consisting of sparse, suberect, bristling setae; integuments subimpunctate. Measurements, 1.15 mm. long by 0.42 mm., greatest width.

Head wider than long, narrower than pronotum, subtriangular. Eyes prominent, set about their own length from posterior margin of head and rather far down on sides of head, of about 40 small facets; tempora with rounded posterior angles; occiput deeply indented; a pair of conspicuous, pubescent vertexal foveae between the eyes; these foveae connected by an imperfectly developed interfoveal impression, and this impression Y-shaped, the stem of the Y passing over the dorsal surface to end between antennal bases; face evenly declivous and simple; ventral surface of head with the genal processes at base of the maxillary cardo bearing capitate setae. Antennae not so long as head and pronotum united, 11-segmented, segments I and II large, second subspherical; segments III to VIII small, subequal in width, third slightly longer, the others transverse; segment IX wider than eighth, transverse trapezoidal; segment X wider than ninth, bilaterally symmetrical, transverse trapezoidal; segment XI very large, heavily pubescent, forming the antennal club and suboval in outline. Maxillary palpi four-segmented, as described for *Dalmomelba* except that the third segment is quadrate-subcircular.

Pronotum with disc divided longitudinally by a broad, shallow, and glabrous impression from near apical margin to the antebasal transverse sulcus; this latter sulcus is glabrous, biarcuate, deep, with a pubescent lateral fovea, wholly visible from a dorsal view, at each lateral margin; medianly this biarcuate sulcus is greatly broadened and deepened to form a median antebasal fovea; this median fovea extends posteriorly as a triangular point, where there arises a short, cuspid ridge that extends to basal bead of pronotum.

Elytra with rounded humeri; each elytron with two antebasal foveae,

each set in a deep circumfoveal impression, of which the outer impression is larger and sparsely and coarsely setose; sutural stria deep and entire; discal impression a continuation of the outer circumfoveal impression that becomes rapidly narrower and shallower to basal third of elytral length; elytral flank not bearing a subhumeral fovea.

Abdomen as wide as, and longer than, the elytra; with five tergites and six sternites; tergites in a median length ratio of 2.0/1.2/1.0/1.4/1.4, with first three bearing lateral margins; first tergite bearing a pair of cuneiform basal abdominal carinae that are separated by one-fourth of the segmental width and are one-fifth of the segmental length. Six sternites in a median length ratio of 0.7/1.5/1.0/0.7/0.3/1.5, with the last sternite having its distal margin slightly medianly lobed; sternites simple; venter convex in profile.

Prosternum not medianly longitudinally carinate; metasternum medianly broadly, slightly depressed. Legs simple, with slightly inflated femora, and three-segmented tarsi as described for *Dalmomelba*.

Described from a single female, the type, in the American Museum of Natural History. Collected in June, 1951, by Cazier and C. and P. Vaurie.

GENUS *MELBA*

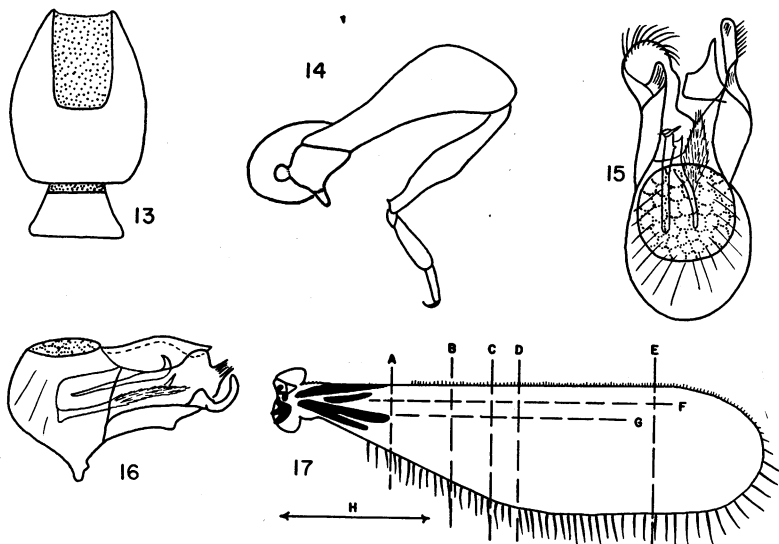
Melba (Melba) zonula, new species

Figures 13-17

MALE TYPE: Shining, deep yellowish brown; integuments lightly, sparsely, but distinctly punctulate; pubescence moderately abundant, semi-appressed, moderately conspicuous. Measurements, 0.9 mm. long by 0.335 mm., greatest width through elytra.

Head wider than long, slightly narrower than pronotum, rounded-triangular; eyes moderately prominent from above, well developed, of about 32 facets, set at slightly more than their length from the posterior margin of head and slightly less than their depth from the vertex; relatively long tempora with rounded posterior angles; occiput deeply medianly indented; a pair of circular vertexal foveae on the simply convex vertex, between the eyes, connected by an entire, semicircular, interfoveal sulcus; face simple, evenly declivous to the large labrum; ventral surface of head with six capitulate setae, these setae with the tips not spherically expanded but lengthily, conically expanded; four of these setae are in a line across the oral margin of the gena and are large, one being on each subcardo process and a pair behind the submentum; the other two such setae are smaller and just behind the median distal pair. Antennae

melboid, well separated by the frontoclypeus, 11-segmented, and as described for *Trimiovillus* except for segment XI; segment XI bears a conspicuous sulcus from apex through distal half of lateroventral face (fig. 13). (In some of the paratypes this sulcus appears to be full of a pearly precipitate and may suggest a chemoreceptive area.) Maxillary palpi as described for *Dalmomelba*.



FIGS. 13-17. *Melba zonula*. 13. Eleventh and tenth antennal segments of male; pubescence not shown. 14. Mesoleg of male. 15. Aedeagus, dorsal view. 16. Aedeagus, lateral view. 17. Metawing. A, B, C, D, and E are horizontal folding planes; F and G are longitudinal folding planes; H is the elytral length.

Pronotum only slightly wider than long, with simple, flattened disc and lateral margins evenly rounded to where the antebasal sulcus sharply indents the lateral outlines; this transverse antebasal sulcus is glabrous, slightly biarcuate, medianly enlarged posteriorly as a foveoid impression; lateral foveae, one at either end of this sulcus, are vestigial, invisible from a dorsal view, and the lateral areas overhung by a few guard setae.

Elytra with rounded humeri; each elytron with two nude antebasal foveae, the inner of which is at origin of entire sutural stria, and the outer at origin of a short discal impression for basal fourth of elytral length; flank not bearing a subhumeral fovea. The oblique line from distal elytral margin to lateral elytral margin, diagnostic of the subgenus *Melba*, is present but less oblique than usual and difficult to trace.

Metathoracic wings present and well developed (discussed below).

Abdomen slightly longer than elytra and slightly narrower; with five tergites and seven sternites. Tergites in a median length ratio of 1.4/1.3/1.3/1.3/1.2, with first three laterally margined and fifth subvertical. First three tergites each with a pair of basal abdominal carinae, each pair separated by slightly less than one-third of segmental width and almost one-half as long as segment, but slender, low, and almost invisible on third tergite. (Slide mounts show the carinae very clearly.) Sternites in a median length ratio of 0.4/1.3/1.0/0.5/0.2/1.0/1.3, with the seventh a large subcircular aedeagal plate. Sternites unmodified, except that the sixth is medianly flattened. Venter slightly concave in profile.

Prosternum not medianly, longitudinally carinate; metasternum medianly, longitudinally impressed; mesocoxae contiguous, in confluent cavities; metacoxae contiguous; legs with inflated femora, especially the two anterior pairs; mesotrochanters each armed with a conspicuous spine (fig. 14); mesotibiae each armed with a minute spur at apex of ventral face; tarsi melboid, as illustrated.

FEMALE: Like male except that there are only six sternites, with the sixth nearly as long as third, with apical margin produced in median third; venter slightly convex in lateral view; mesotrochanters and mesotibiae unarmed; femora inflated but less so than in male.

Aedeagus studied in two males (figs. 15, 16), and reminds one of the aedeagei of *Bibloplectus*. Oddly enough, the resemblance is closer to aedeagei of British species, so carefully delineated by Pearce (1951), rather than the aedeagei of American species, in that the basal bulb lacks the long, sclerotized, ventral strut of so many American species.

The metathoracic wings of *zonula* deserve additional consideration. These organs have been given little attention in Pselaphidae. In the present species they are well developed in both sexes, as are the eyes, in contrast to *Dalmomelba cazieri* just discussed. In *zonula* the wings are distinctly longer than the body and proportionately wider than in *cazieri*, and measure 1.172 mm. in length by 0.335 mm. in greatest width (fig. 17). The anterior margin is fringed with short setae, and the posterior margin with long alar setae; the membrane on point mounts appears alutaceous at 70 diameters, but in slide mounts at 340 diameters, the membrane is seen to be beset with very minute setae. At the wing base there are three sclerotized lines: an anterior line near the margin; a slender, shorter one that apparently is free; and a bifurcated one near posterior margin.

In repose the wings are folded beneath the elytra. The wing is folded longitudinally twice and folded horizontally five times at places shown

approximately in figure 7. The sclerotized areas of the wing base all lie proximal to the first folding plane. The paraptera appear to be well developed.

The suggestion is that both sexes of *zonula* fly and should be taken at lights at night.

Described from 16 specimens, of which the type and eight paratypes are in the American Museum of Natural History, and seven paratypes in the author's collection. These specimens were collected as follows: five males and four females in June, 1951 (Cazier and C. and P. Vaurie); one male and four females in May, 1951 (Cazier and Gertsch); one male, the type, and one female between April 10 and 14, 1952 (Ernst Mayr).

It will be seen that in *zonula* an approximate 1/1 sex ratio was collected, viz., seven males and nine females, and that both sexes have relatively well-developed eyes and wings. This is in marked contrast to the situation in *Dalmomelba cazieri*.

On structural grounds, there appears to be one close ally of *Melba* (*Melba*) *zonula*. This is *Melba* (*Melba*) *grenadensis* Raffray known only from Grenada, Windward Islands. Although the author is familiar with most of the species of the genus, *grenadensis* has not been seen by him. Raffray's simple description is not adequate for a certain discrimination, and the aedeagus of his species has not been illustrated. The original description of *grenadensis* (Raffray, 1903-1904, vol. 72, p. 535) gives the vertexal foveae as oblong and the aedeagal plate as irregularly transversely rhomboidal; although the minute mesotibial spur is mentioned, no mention is made of any conspicuous mesotrochantal spine. Among species of the subgenus inhabiting the United States, *zonula* may be compared only with *sulcatula* Casey and *dentipes* Raffray. The aedeagus and mesolegs of *sulcatula* are very different, and *dentipes* has the male mesotibial subapical tooth slender and recurved like a diminutive fish-hook.

ALLOMELBA, NEW GENUS

GENOTYPE: *Allomelba antennata*, new species.

DIAGNOSIS: Members of the subtribe Trimiina having the following combination of structural features: pronotum with simple disc that is neither foveoid nor sulcoid, and with no lateral foveae visible from above at either end of the antebasal sulcus; each elytron with two antebasal foveae, the humerus rounded and not dentate, the elytral flank bearing a longitudinal carina that parallels the lateral margin to the humerus, where the carina turns abruptly to form the distal margin of a minute fovea; female with six sternites and male with seven sternites, the seventh

with the normally exposed portion a large, transversely oval aedeagal plate; and metacoxae subcontiguous.

Allomelba antennata, new species

Figures 18-21

MALE TYPE: Yellowish brown; pubescence abundant, short, appressed; integuments closely, minutely punctulate. The effect of the relatively abundant but inconspicuous pubescence and punctulation is to reduce greatly the shine. Measurements, 0.87 mm. long by 0.03 mm., greatest width through elytra.

Head transversely rounded-triangular, with flattened eyes that are visible but not prominent from above; occiput medianly indented; tempora as long as eyes, with rounded posterior angles; a pair of minute vertexal foveae between the eyes on the simple, convex vertex; each vertexal fovea set in a circular impression and these foveae united by an entire interfoveal impression; this latter becomes deep distally, where it forms a transverse sulcus separating front and vertex; face simple, declivous to subquadrate labrum; the relatively narrow labrum leaves the heavy mandibles unusually exposed; ventral surface of head with capitulate setae as described for *Melba zonula*. Maxillary palpi as described for *Dalmomelba*.

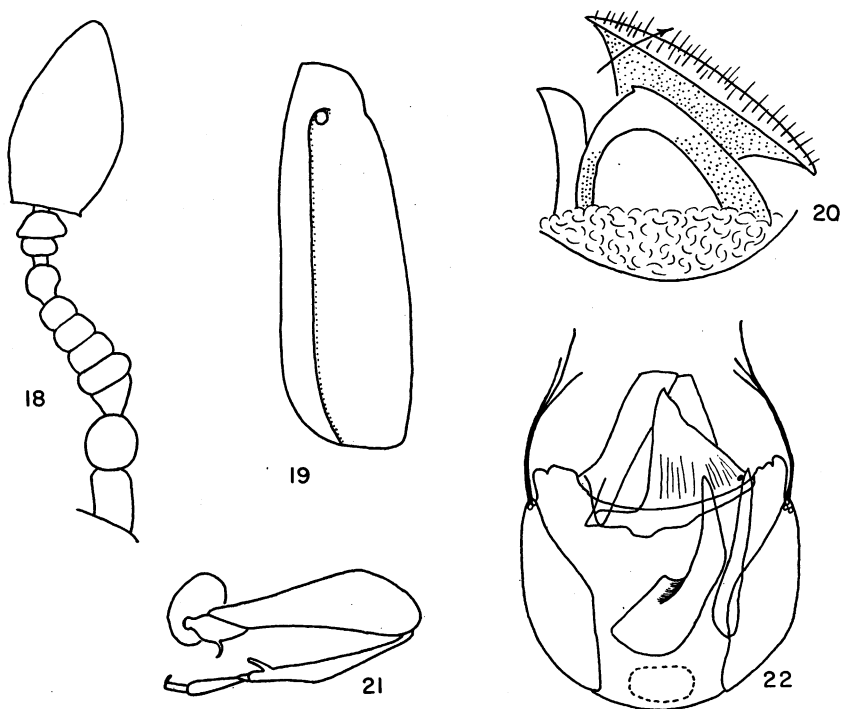
Antennae not so long as head and pronotum united, distant, 11-segmented, greatly modified (fig. 18). The unique feature is provided by the intermediate segments. Segments III to VII form a tightly compacted, swollen-oblong mass of gradually decreasing width. Segment XI has the ventral face deeply sulcate for distal half of length.

Pronotum transverse, slightly wider than head, with simple, slightly flattened disc; lateral pronotal foveae not evident, vestigial if present and not visible from above; transverse antebasal sulcus biarcuate, deep, glabrous, slightly expanded medianly, and with lateral areas overhung by coarser setae.

Elytra with rounded humeri; each elytron with two large, circular, perforate, pubescent, antebasal foveae; sutural stria entire; a short sub-oblong discal impression from outer fovea for basal fifth of elytral length. Flank bearing a fine carinoid line from distal margin to subhumeral area, parallel to lateral elytral margin, and at subhumeral area this line is abruptly arcuate dorsally to enclose partially a small subhumeral fovea (fig. 19). In good light at 70 diameters this line appears to mark the lateral wall of a fine sulcoid impression.

Metathoracic wings present. (Wings could be studied in the paratypes. These organs were found to be well-developed, fringed with alar

setae along the posterior margin, and to be about as long as the body. In one paratype with body length 0.80 mm., the wings were 0.83 mm. long by 0.167 mm. wide; in a second paratype, with a body length of the type, 0.87 mm., the wings were 0.85 mm. long by 0.187 mm. wide.)



FIGS. 18–21. *Allomelba antennata*. 18. Male antenna, laterodorsal view. 19. Left elytral flank. 20. Partially extruded aedeagus and aedeagal plate of type specimen, ventrodistal view. 21. Left mesoleg of male.

FIG. 22. *Decarthron vauriei*, aedeagus, dorsal view.

Abdomen narrower than elytra, with five tergites and seven sternites. First four tergites subequal in length, fifth slightly shorter. First three tergites laterally margined. First tergite obscured by elytra in the type, so the basal abdominal carinae were studied from paratypes. These carinae were found to be short, thick, and conspicuous, separated by slightly less than one-fourth of width of first tergite and about one-fifth of segmental length. Sternites in a median length ratio of 0.7/1.0/1.0/0.8/0.3/0.3/1.0, with the sternites simple and unmodified. Seventh in the form of a large, transversely oval aedeagal plate. Unusually enough, the venter was convex in profile. In the type the aedeagus is partially

extruded and the aedeagal plate is partially swung back asymmetrically on its left lateroproximal margin, and exposing that part of the plate which is normally invisible beneath the sixth (fig. 20).

Prosternum not medianly longitudinally carinate; metasternum very tumid, medianly flattened; mesocoxae contiguous in confluent cavities; metacoxae subcontiguous; legs brachysceline, with profemora moderately inflated, the other femora much less so; mesotrochanters each with a very slender, arcuate spine, and mesotibiae each with an exceptionally large subapical spine (fig. 21); tarsi melboid.

FEMALE: As described for male except that the antennae are not modified, and of the usual melboid form; six sternites in a median length ratio of 0.6/1.3/1.3/1.3/0.6/1.3, with the venter more convex in profile; metasternum much less tumid; femora less inflated; mesotrochanters and mesotibiae unarmed.

Described from eight specimens: type and four paratypes in the American Museum of Natural History; three paratypes in author's collection. The series was collected as follows: one female in May, 1951 (Cazier and Gertsch); two females in June, 1951 (Cazier and C. and P. Vaurie); three females and the male type in July, 1951 (C. and P. Vaurie); one female in August, 1951 (C. and P. Vaurie).

It will be noted that, again, there is a high proportion of females (7/1), but that unlike the situation in *Dalmomelba cazieri*, the eyes and metawings are well developed in both sexes.

Allomelba has a general resemblance to those species of *Melba* with dull luster but is differentiated by the presence of the subhumeral fovea. Structurally *Allomelba* is allied to but one genus in the American Trimiina, *Allotrimium*. *Allotrimium* has males with unmodified, melboid antennae, remarkably modified tergites and sternites, and the aedeagal plate is minute, being less than half as long as the sixth sternite.

TRIBE BRACHYGLUTINI

KEY TO THE GENERA BELONGING TO THE TRIBE BRACHYGLUTINI OCCURRING ON SOUTH BIMINI

Antennae 11-segmented; ventral surface of head lacking a median fossa; integuments glabrous, shining, devoid of punctures or general pubescence. *Eupsenius*
Antennae 10-segmented; ventral surface of head with a longitudinally oval fossa; integuments normally punctulate and pubescent *Decarthron*

GENUS *EUPSENIUS*

Eupsenius glaber LeConte

The genotype, *glaber* LeConte, of this strictly American genus was represented by two females. One was collected in May, 1951 (Cazier and

Gertsch), and one in July, 1951 (C. and P. Vaurie). The species has well-developed wings and eyes in both sexes and is known to fly to lights at night. It has a rather wide distribution but appears to be scarce in collections. The type locality is South Carolina (LeConte, 1850), and the species also occurs in Louisiana and peninsular Florida. It has been berlesed from soil in extreme southern Illinois, near the confluence of the Ohio and Mississippi rivers. A closely related species, *rufus* LeConte, has been taken at light at night near Mobile, Alabama. Otherwise the genus is Neotropical, with one species in Hispaniola (*dominicanus* Schaufuss), one from Grenada, Windward Islands (*gracilis* Raffray), one from St. Thomas, Virgin Islands, and Guadeloupe, Leeward Islands (*politus* Reitter), two from Mexico (*grouvellei* Raffray and *mexicanus* Raffray), and one from Colombia (*longicollis* Raffray).

The unique type of *dominicanus* lacked antennae when it was described (Schaufuss, 1887) and has vestigial to no pronotal foveae, as does *politus*. These items are mentioned, because at first it was thought that the South Bimini specimens might represent *dominicanus*. *Eupsenius* is a difficult genus, as there are very slight external manifestations of sex and the species resemble one another to an unusual degree for pselaphids. The aedeagei have not been studied. It is possible that these South Bimini females represent a new species, but long comparison with *glaber* showed no important discernible differences. Here again we await the discovery of the male sex.

GENUS *DECARTHON*

Decarthron vauriei, new species

Figure 22

MALE TYPE: Shining reddish brown; integuments subimpunctate; the pubescence moderately long, sparse, appressed, not conspicuous. Measurements, 1.80 mm. long by 0.75 mm. wide through elytra.

Head wider than long if eyes are included; eyes prominent, of about 34 very coarse facets; short tempora about three ocular facets in length; a pair of nude vertexal foveae between the eyes, each fovea about the diameter of an ocular facet; a rather vague, broad impression from each fovea, these impressions oblique but do not unite and end freely on the front between the low antennal tubercles; vertex strongly convex between the foveae, the crown of the convexity flattened; postantennal incisures strong, straight, separating the antennal tubercles from the vertex; face simple, declivous, with the front not prolonged between antennal bases; labrum transverse; ventral surface of head and maxillary palpi typical of genus. Antennae distant, 10-segmented, relatively simple

and unmodified except that the third segment is slightly larger than the second or fourth, with mesial face very slightly produced.

Pronotum wider than long, slightly wider than head including eyes; base with a single fovea, the median; pronotal base not punctate.

Elytra with rounded humeri; each elytron with two antebasal, nude foveae, entire sutural stria, and a very weak discal impression to about center of elytral length; flanks unmodified.

Metathoracic wings large, 2.0 mm. long, with alar setae on the posterior margin.

Abdomen narrower and about as long as elytra. Five tergites, with the first three laterally margined; first tergite very long, longer than next three united, with fifth subvertical; basal abdominal carinae (from a paratype male) separated by one-half of segmental width and about one-fifth as long as segment, divergent and straight. Five sternites in a median length ratio of 3.0/0.2/0.4/0.5/0.8, with third deeply separated from second and fourth and the fourth deeply separated from third and fifth; fifth lobed in median half.

Profemora modified; each inflated with a flat, elongate-oval granular patch that is one-third as long as femur and placed obliquely on the dorso-anterior face and faces slightly anteriorly; protibiae each with a boletiform spine at apex.

Mesofemora modified, very inflated, the inflation excavated on the distal declivity of the dorsal and posterior faces; proximal edge of excavation bearing a short, wide, truncate spine; distal edge of excavation not armed, simply triangular with carinoid edges; floor of excavation glabrous, not bearing a tooth or process; posterior wall of excavation medianly raised as a low, laminoid, setose ridge. Mesotibiae each with a very minute and slender apical spine that is discernible on slide mounts.

Metafemora not inflated or modified; metatibiae not apically armed. Tarsi as for genus.

FEMALE: Like the male except that the third antennal segment is relatively smaller; second sternite relatively longer and fifth sternite relatively shorter; legs simple and unmodified.

Aedeagus (fig. 22) large, its general construction typical of the genus.

Described from five specimens (type and three paratypes in the American Museum of Natural History, two paratypes in author's collection). Type and paratype collected in May, 1951 (Cazier and Gertsch); paratype in June, 1951 (Cazier and C. and P. Vaurie); paratype in July, 1951 (C. and P. Vaurie); paratype between April 10 and 14, 1952 (Ernst Mayr).

This species is not closely allied to the known species of this strictly

American genus. The combination of sparse, inconspicuous pubescence, very short and inconspicuous basal abdominal carinae, and the details of the profemoral and mesofemoral modifications separate it from Nearctic species. In key characters *vauriei* most closely approaches *noctiphoton* Park of the Canal Zone, but this latter species has the profemoral granular area placed on the dorsoposterior face and faces posteriad, and the pubescence and basal abdominal carinae are much more strongly developed. Finally, if the third antennal segment of *vauriei* is sufficiently modified to be considered "abnormal," then the species would be allied to *planiceps* Raffray of Brazil, but this latter species has a differently oriented profemoral granular field, and the third and fourth antennal segments are relatively much larger, about as wide as the eighth segment, whereas *vauriei* has the third segment only very slightly wider than the fourth and much narrower than the eighth segment.

CONSPECTUS OF KNOWN SOUTH BIMINI PSELAPHID FAUNA

In the preceding pages seven species, distributed between seven genera, three tribes, and two subfamilies, are examined from South Bimini Island, British West Indies.

The family Pselaphidae has not been reported previously from the Bahamas. As a reflection on the state of our information, three of seven genera and six of the seven species were undescribed.

SPECIES	TOTAL			METATHORACIC WINGS	
	STUDIED	MALES	FEMALES	Males	Females
<i>Bythinoplectus bahamicus</i>	11	0	11	?	Present
<i>Dalmomelba cazieri</i>	257	57	200	Present	Vestigial
<i>Trimiovillus bahamicus</i>	1	0	1	?	Present
<i>Melba (Melba) zonula</i>	16	7	9	Present	Present
<i>Allomelba antennata</i>	8	1	7	Present	Present
<i>Eupsenius glaber</i>	2	0	2	Present in U.S.	Present
<i>Decarthron vauriei</i>	5	2	3	Present	Present
Totals	300	67	233	4 of 5 species	6 of 7 species

Although the beetles were collected from Berlese funnels, there is an over-all sex ratio of about 3.6 females to 1.1 males. This suggests that either the males are less abundant than the females, or that some other factor, such as coincidence, time of collection, or a sex differential in habitat response, is involved.

If we assume that the sample studied is large enough to reflect the

natural situation, the simplest assumption is that there are about three times as many females as males on South Bimini.

With reference to the development of wings in this insular population, it will be seen from the above tabulation that, where both sexes were present, four of four species had males with well-developed wings; two species have the male sex unknown; and the seventh species has well-developed wings in the male, but no males were in the sample studied. Females of all seven species were present, and in six of these the wings were well developed; a seventh species had females with vestigial wings.

These data are in accord with the view of Darlington (1943) who found that Carabidae on low tropical islands usually have well-developed wings. Pselaphidae in general are nocturnal and fly at dusk (Park, 1942, 1947a, 1947b). They fly to lights at night, especially in tropical and subtropical regions. Although data on the nocturnalism of South Bimini pselaphids are lacking, the author believes that these beetles would conform to the general family pattern. Furthermore, all the genera known from other areas and collected on South Bimini (*Bythinoplectus*, *Melba*, *Eupsenius*, and *Decarthron*) are known to fly at night. For these reasons it is thought that the South Bimini pselaphids are at least as nocturnal as the Cerambycidae reported by Cazier and Lacey (1952, p. 3) from the Bimini Islands, in which 32 of 38 species were nocturnal.

The general assumption, then, is that the small, low, Neotropical island of South Bimini has a population of nocturnal, dusk-flying pselaphids. Since small islands usually have relatively fewer species than areas of similar size on the mainland, it is probable that the collection studied represents a majority of the resident soil-inhabiting species.

On the basis of the present sample, *Dalmomelba cazieri* is the most abundant species. This latter made up 86 per cent of the collection and may have influenced unduly the over-all sex ratio of the sample. It is the only species known from the island in which females are flightless, with vestigial wings (fig. 6), and in which the males have well-developed wings (fig. 7) and probably fly well. Such a species would spread with more difficulty than species in which both sexes bear functional wings. Darlington (1936) has discussed wing atrophy in the Carabidae, and the atrophied wings of *cazieri* females are reminiscent of cases he has described, but *cazieri* is a special case in which only the females have vestigial wings. This condition has been described as an assumed case of sex-limited inheritance.

The pselaphid fauna of the Antilles is so poorly known that little can be said as to the origin of the fauna. The pselaphid fauna of the Lesser Antilles is most closely allied to that of South America. The Greater

Antilles are much less well known. At present, on the basis of structural resemblances of the species of South Bimini to those known from other areas, the fauna shows a composition of about 14 per cent allied to Neotropical Florida, 28 per cent to the Lesser Antilles, 28 per cent to Mexico, and 28 per cent to South America. These estimates are based on current information; they suggest a very heterogeneous zoogeographic composition. Darlington (1938) found the several faunas reviewed by him to be moderately homogeneous in the Greater Antilles, and he thinks that they developed from stocks that crossed primarily from Central America over a water gap. Although pselaphid beetles are probably not capable of long flights, they might colonize by rafting or by being blown on winds across such a gap as that between lower Florida and South Bimini, or that between Cuba and the Bahamas, or inter-island gaps between the several Bahaman islands. The author believes that the South Bimini pselaphid fauna will appear much more homogeneous when the faunas of Cuba and Hispaniola are better known.

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