

REVISION OF *BLEDIUS*  
AND RELATED GENERA  
PART II. THE *ARMATUS*, *BASALIS*,  
AND *MELANOCEPHALUS* GROUPS  
(COLEOPTERA, STAPHYLINIDAE,  
OXYTELINAE)

LEE H. HERMAN, JR.

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## ABSTRACT

In the present paper, the second of a three part series on *Bledius*, the *armatus*, *basalis*, and *melanocephalus* groups from the Nearctic region are discussed. In addition to a revised key to the species groups of the New World, illustrations, keys, diagnoses and distributional and habitat data are presented for each species. *Bledius notialis*, *B. aquilonarius*, and *B. thinopus* are newly described. *Bledius cuspidatus* Le Conte, *B. agonus* Casey, *B. tenuis* Casey, and *B. nelsoni* Hatch are new junior synonyms of *B. flavipennis* Le Conte. *Bledius lectus* Casey, *B. piceus* Fall, *B. specularis* Fall, *B. regularis* Fall, and *B. condonensis* Hatch are new junior synonyms of *B. opacifrons* Le Conte. *Bledius nigriceps* Notman is a new junior synonym of *B. politus* Erichson. *Bledius gradatus* Fall and *B. boddyi* Hatch are new junior synonyms of *B. eximius* Casey. *Bledius arizonensis* Fall is a new junior synonym of *B. strenuus* Casey. *Bledius ignavus* Casey and *B. misellus* Casey are new junior synonyms of *B.*

*basalis* Le Conte. *Bledius confinus* Fall is a new junior synonym of *B. melanocephalus* (Say).

*Bledius melanocephalus* (Say), the only species in the *melanocephalus* group, is recognized and discussed for the first time in more than 150 years. *Bledius cordatus* (Say), *B. basalis* Le Conte, *B. turbulentus* Casey, *B. dimidiatus* Le Conte, *B. opaculus* Le Conte, *B. neglectus* Casey, and *B. thinopus*, new species, comprise the *basalis* group and, but for *B. dimidiatus*, all live on the coast of eastern North America. The *armatus* group includes *B. flavipennis* Le Conte, *B. nitidiceps* Le Conte, *B. opacifrons* Le Conte, *B. ineptus* Casey, *B. consimilis* Fall, *B. monstratus* Casey, *B. fenyesi* Bernhauer and Schubert, *B. politus* Erichson, *B. episcopalis* Fall, *B. eximius* Casey, *B. bellicus* Blackwelder, *B. strenuus* Casey, *B. aquilonarius*, new species, and *B. notialis*, new species. All species of the *armatus* group except *B. politus* live principally west of the Mississippi River.

## INTRODUCTION

*Bledius* are a cosmopolitan rove beetle genus of about 450 species. They burrow into moist soil near lakes, rivers, and oceans as well as temporarily wet soil where they eat interstitial diatoms and algae. Sympatric species occur in different habitats. The presence of *Bledius* is indicated by soil casts outside their burrows. When the soil particles are small enough, the burrow is excavated with the mandibles. Particles are simply picked up and moved to the surface. If the particles are too large for the beetle to lift, it merely wriggles between them, creating the mole-like tunnel characteristic of some species. *Bledius* are most effectively collected by placing soil suspected of harboring specimens into a bucket of water; the beetles float, the soil sinks.

*Bledius* may be divided into many species groups based on variation of about 50 characters. In Part I of a three part series monographing *Bledius* the *aequatorialis*, *mandibularis*, and *semiferrugineus* groups were revised and two genera were separated from *Bledius* and revised (Herman, 1972). In Part II, I discuss three more

groups, the *basalis*, the *melanocephalus*, and the *armatus*. Part III provides a revision of the North American species of the *annularis* group, a classification and phylogeny of all the species groups, and a discussion of their distribution. Although Part III will summarize the accumulated data on *Bledius*, some observations on species in the present work are worth mentioning now.

Species of the *basalis* group occur on the coast of eastern North America from as far north as Newfoundland to as far south as the Yucatan Peninsula in Mexico. Absence of the group from the West Indies is notable because the related species *Psamathobledius punctatissimus* and *Bledius mandibularis* with similar coastal distributions are found there (see Herman, 1972). *Bledius dimidiatus*, the only noncoastal inhabitant, is probably associated with the acid waters of swamps in the southeastern United States.

*Bledius melanocephalus*, the only representative of the *melanocephalus* group, lives near rivers in the central United States and is discussed herein for the first time since its discovery



more than 150 years ago. In the north the species is restricted to moist banks a few inches high, in the south it is a dominant form occupying broad sand flats.

The species of the *armatus* group occur principally in the arid central and western parts of the United States. Two exceptions are *Bledius politus*, which lives on the eastern and southern coasts of the United States from New York to Texas, and *Bledius aquilonarius*, which is found in both eastern and western Canada. *Bledius notialis*, *Bledius bellicus*, and *Bledius consimilis* are found near rivers in the central United States. *Bledius monstratus* and *Bledius fenyessi* live under decaying seaweed on the western coast of North America. The remaining seven species live near permanent or temporary saline or alkali lakes and in temporarily wet soil.

The most difficult but most important aspect of this study was the analysis of specific variation. This variability rendered delimitation of species difficult at best and uncertain at worst and, in the past, has resulted in description of the same species under several names. Some examples are given below.

In the north the pronotum of *melanocephalus* is dark reddish brown and the mandibular denticle short or absent. In the south the pronotum is pale reddish brown and the mandibular denticle longer. Each form has been described as a separate species, but they intergrade.

*Bledius politus*, *Bledius neglectus*, and *Bledius monstratus* each are coastal species and exhibit clinal variation. In *politus* the variation occurs in both color and pronotal sculpturing and for *neglectus* in the shape of the pronotum and the elytral color pattern. Collections from the southern part of the range of *neglectus* indicate potential intergradation with *Bledius turbulentus*.

For *monstratus* clinal variation occurs in the length of the pronotum, elytra, and metathoracic (flying) wings. In the north the metathoracic wings are fully developed and the elytra longer than the pronotum; in the south the metathoracic wings are reduced to pads and the elytra much shorter than the pronotum. The change between the northernmost locality and San Francisco (about 1200 miles [1931 km.] by air) is relatively slight, but within the next 90 miles (145 km.) south to Carmel, California, the wings and elytra become reduced to the maximum ex-

tent. The populations within the next 45 miles (72 km.) gradually revert to the wing, elytral, and pronotal lengths found in the San Francisco region.

Another problem exists with regard to whether *monstratus* and *Bledius fenyessi* actually represent two species. The two are similar in all respects except in length of the elytra and pronotum. They represent one polymorphic species or two similar species, *monstratus* being more variable. I have opted for the latter possibility for reasons I give below.

In addition to *monstratus*, brachyptery of the metathoracic wings is found polymorphically in two other species of the *armatus* group. A brachypterous population of *Bledius strenuus* occurs in west central North America. Brachypterous individuals of *Bledius opacifrons* are found scattered throughout the range of the species. For both *strenuus* and *opacifrons* the frequency of brachyptery is low. As is the case with other rove beetles exhibiting reduced flying wings, the metathorax and elytra of brachypterous *strenuus* and *opacifrons* are shorter than in individuals with complete flying wings. Both *strenuus* and *opacifrons* are variable with regard to pronotal shape and sculpturing and elytral and metathoracic wing length. In both cases some of these variants have been described as different species.

By far the most variable species is the geographically widespread *Bledius flavipennis*, which is composed of seven more or less distinct populations. Variation exists in features of the head, mandibles, and pronotum. All intergrade from one population to the next but populations from different regions are recognizable. Some of the forms have been regarded as different species.

In summary, variation of the species discussed herein has resulted in eight of 22 species being described more than once, and 11 of the 22 being confused with one or more other species. Satisfactory resolution of these problems required years of study in the laboratory and field and examination of 8049 specimens, almost half of which I collected.

The measurements are described in Herman, 1972 (p. 16).

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TAXONOMY

REVISED KEY TO THE SPECIES-GROUPS OF *BLEDIUS* FROM THE NEW WORLD

A revision of the Key to the species-groups published in Part I is necessary because of an error in the characterization of the *annularis* group.

- 1. Labrum fused medially (figs. 39, 48, 106) . . . . . 2
  - Labrum divided medially (fig. 151) . . . . . 4
- 2(1). Procoxal fissure open (Herman, 1972, Part I, as in fig. 86) . . . See Part III . . . . . (in part) . . . . . *annularis*
- Procoxal fissure closed (figs. 25, 97) . . . . . 3
- 3(2). Elytron without membranous lobe on posterior margin (fig. 95) . . . . . See Part II, *melanocephalus*, species 8 . . . . . *melanocephalus*
- Elytron with membranous lobe on posterior margin (fig. 7) . . . . . See Part II, Key I . . . . . *basalis*
- 4(1). Elytral epipleural ridge present only on apex of elytron (Herman, 1972, Part I, figs. 161, 236) . . . . . 5
- Elytral epipleural ridge present along entire length of elytron (Herman, 1972, Part I, fig. 371) . . . . . 6
- 5(4). Procoxal fissure open, protrochantin exposed (Herman, 1972, Part I, figs. 171, 172, 175) . . . . . See Part I, Key I . . . . . *aequatorialis*
- Procoxal fissure closed, protrochantin concealed (Herman, 1972, Part I, figs. 209, 211) . . . . . See Part I, Key II . . . . . *mandibularis*

- 6(4). Prosternal setigerous pit absent (figs. 246, 251) . . . . . 7
- Prosternal setigerous pit present (as in figs. 90, 97) . . . See Part III . . (in part) . . . . . *annularis*
- 7(6). Cuticular processes of hypopharynx shorter than lateral and median rows of setae; protergosternal suture present (Herman, 1972, Part I, figs. 369, 428, 430, 433) . . . . . See Part I, Key III . . . . . *semiferrugineus*
- Cuticular processes of hypopharynx longer than lateral and median rows of setae (figs. 359-387); protergosternal suture usually absent (fig. 246) . . . See Part II, Key II . . . . . *armatus*

KEY I. NEW WORLD SPECIES OF THE *BASALIS* GROUP

- 1. Lateral margin of pronotum with basal third strongly sinuate, producing basally constricted pronotum (fig. 24) . . . . . 2. *dimidiatus*
- Lateral margin of pronotum evenly rounded from anterior margin to posterior margin (fig. 88) or basal angle (figs. 6, 54) or with basal third straight (figs. 63, 68) or sinuate (fig. 54), but base of pronotum not constructed as above . . . . . 2
- 2(1). Lateral margin of pronotum evenly rounded to strongly angulate basal angle (fig. 6); pronotal pubescence directed toward median point (fig. 15) . . . . . 1. *cordatus*

- Lateral margin of pronotum evenly round to basal margin (fig. 88) or to obtusely rounded basal angle (fig. 54) or basal third of lateral margin straight (figs. 63, 68) or sinuate; pronotal pubescence directed toward midline (fig. 43) . . . 3
- 3(2). Basal third of lateral margin of pronotum strongly sinuate (figs. 40, 54, 61) . . . 4
- Basal third of lateral margin straight or evenly curved to basal margin (figs. 31, 73, 79) . . . . . 6
- 4(3). Pronotal lateral marginal bead broad and strongly explanate (figs. 40, 43, 45) . 5
- Pronotal lateral marginal bead narrow and moderately explanate (fig. 73) . . . . . (a few individuals) . . . . 6. *turbulentus*
- 5(4). Elytral color pattern as in figures 42, 44; eyes large (fig. 36, table 1, see head width); elytral length/pronotal length = 1.58 to 1.76; pronotal shape as in figures 40, 45, 47 . . . . . 4. *opaculus*
- Elytral color pattern as in figures 56, 57, 59; eyes moderately large (fig. 49, table 1, see head width); elytral length/pronotal length = 1.33 to 1.50; pronotal shape as in figures 54, 60, 61, 63, 65 . . . . . 5. *neglectus*
- 6(3). Pronotal lateral marginal bead broad and strongly explanate (fig. 31); head width/interocular width = 1.64 to 1.80; pronotal lateral margin evenly rounded to basal margin (fig. 31) . . . . 3. *thinopus*
- Pronotal lateral marginal bead narrow and slightly to moderately explanate (figs. 73, 88); head width/interocular width = 1.41 to 1.60; pronotal lateral margin evenly rounded to basal margin (fig. 88) or with basal third straight to slightly sinuate (fig. 73) . . . . . 7
- 7(6). Pronotal lateral margin evenly rounded to basal margin (fig. 88); eyes small (fig. 79); head width/interocular width = 1.41 to 1.54; elytra usually with black strip along suture (figs. 83-87) . . . 7. *basalis*<sup>1</sup>
- Pronotal lateral margin with basal third sinuate to straight (fig. 73); eyes prominent (fig. 68), head width/interocular width = 1.52 to 1.60; elytra without black stripe along suture but with black sutural bead (figs. 71-72) . . . . . 6. *turbulentus*<sup>2</sup>

<sup>1,2</sup>See Diagnoses of *B. turbulentus* and *B. basalis* and the discussion under *basalis*.

## KEY II. SPECIES OF THE *ARMATUS* GROUP

Caution must be exercised when using this key, particularly in the case of the bidentate females. Several species are taken out in more than one place in the key to help account for variation.

1. Antennomeres 3 to 7 each with carina encircling apex (fig. 337) . . . . . 21. *nitidiceps*
- Antennomeres 3 to 7 each with apex rounded (figs. 306, 315), not carinate . . . . . 2
- 2(1). Mandibles tridentate . . . . . 3
- Mandibles bidentate . . . . . 14
- 3(2). Pronotum with large, coarse punctation (figs. 291, 303) . . . . . 4
- Pronotum moderately large, moderately coarse to fine punctation (figs. 279, 328, 336) . . . . . 5
- 4(3). Ratio of elytral length/pronotal length = 0.86 to 1.14 (table 2; see also figs. 291, 292); brachypterous species . . . . . 18. *monstratus*
- Ratio of elytral length/pronotal length = 1.17 to 1.36 (table 2; see also figs. 303, 304); normally winged species . . . . . 19. *fenyesi*
- 5(3). Basal angles of pronotum rounded or absent . . . . . 6
- Basal angles of pronotum rectangulate . . . . . 10
- 6(5). Basal angles of pronotum absent, lateral and basal margin continuously rounded (fig. 314) . . . (most specimens) . . . . . 20. *strenuus*
- Basal angles of pronotum rounded but distinct (figs. 129, 351) . . . . . 7
- 7(6). Basal (third) denticle distinctly separated from second (fig. 133) . . . . . (most males) . . . 9. *episcopalis*
- Basal (third) denticle with anterior edge more or less fused to posterior edge of second . . . . . 8
- 8(7). Elytra bicolored, with broad, dark reddish brown to black sutural stripe and narrow pale yellowish brown disk, epipleuron usually concolorous with sutural stripe . . . (a few) . . . . . 12. *aquilonarius*
- Elytra concolorous, reddish brown to dark reddish brown or bicolored, with dark reddish brown to black sutural stripe and reddish brown to

- dark reddish brown disk and epipleuron . . . . . 9
- 9(8). Pronotum distinctly wider than long, pronotal width/pronotal length = 1.06 to 1.14 (table 2, figs. 314, 328) . . . . . (a few) . . . . . 20. *strenuus*<sup>1</sup>
- Pronotal length and width nearly or nearly equal, pronotal width/pronotal length = 0.95 to 1.04 (table 2, fig. 351) . . . . . 22. *opacifrons*
- 10(5). Abdomen yellowish brown, with dark reddish brown apex . . . (most) . . . . . 16. *bellicus*
- Abdomen black or dark reddish brown, apex concolorous or at times paler . . . . . 11
- 11(10). Basal denticle of mandible strongly separated from second (figs. 133, 271) . . . . . 12
- Basal denticle of mandible with anterior edge more or less fused to posterior edge of second, presenting appearance of small basal denticle (figs. 158, 164, 199) . . . . . 13
- 12(11). Abdominal terga V and VI sparsely pubescent, with three or four long setae on disk and, at times, row of shorter setae on posterior edge (fig. 265) . . . . . (a few) . . . . . 16. *bellicus*
- Abdominal terga V and VI more densely pubescent than described above and setae on posterior margin nearly as long as those on disk (fig. 136) . . . . . 9. *episcopalis*
- 13(11). Clypeal tubercles large to moderately large (figs. 155, 163, 171, 186) . . . . . 11. *flavipennis*
- Clypeal tubercles small (fig. 196) . . . . . 12. *aquilonarius*
- 14(2). Abdominal terga V and VI with four pair of long setae on disk (figs. 152, 265) . . . . . 15
- Abdominal terga V and VI with four or more pair of long setae and usually many shorter setae on disk and row of setae on posterior margin (figs. 136, 153, 217, 233) . . . . . 16
- 15(14). Abdomen bicolored, yellowish brown with dark reddish brown apex . . . . . 16. *bellicus*
- Abdomen unicolorous, dark reddish brown to black, apex often paler . . . . . 10. *consimilis*<sup>2</sup>
- 16(14). Basal angles of pronotum rounded or absent (figs. 231, 232, 279, 284) . . . . . 17
- Basal angles of pronotum rectangulate (figs. 168, 202, 255, 256) . . . . . 22
- 17(16). Pronotum with deep, well-developed midlongitudinal groove (figs. 231, 232, 279, 284) . . . . . 18<sup>3</sup>
- Pronotum without midlongitudinal groove or with groove poorly developed (figs. 128, 129, 225, 256) . . 19
- 18(17). Pronotum with rectangulate anterior angles (figs. 279, 284); metasternum (fig. 391) and abdominal sternites (fig. 390) with dense punctulation; pronotal surface shining dully except near median region that may be polished; pronotum dark reddish brown . . . . . 17. *eximius*
- Pronotum with rounded anterior angles (figs. 231, 232); metasternum (fig. 389) and abdominal sternites (fig. 388) without punctulation; pronotal surface shining to polished; pronotum reddish to orangish . . . . . 14. *politus*
- 19(17). Abdomen bicolored, yellowish brown to pale reddish brown with dark reddish brown apex . . . . . 15. *notialis*
- Abdomen usually unicolorous, pale reddish brown to dark reddish to black, if bicolored apical segments paler than basal segments . . . . . 20
- 20(19). Elytral epipleuron black, concolorous with sutural stripe; elytral sutural stripe broad . . . . . 12. *aquilonarius*
- Elytral epipleuron yellowish brown or reddish brown, concolorous with

<sup>2</sup>A few darkly pigmented specimens of *bellicus* run to this part of the couplet because the abdomen is darkly pigmented. They can be separated, although with difficulty, by the more strongly constricted pronotal base and more polished abdominal terga.

<sup>3</sup>Some specimens of *flavipennis* and *aquilonarius* run to this part of the couplet and can be separated from *eximius* by the more rounded anterior angles of the pronotum and from *politus* by the dully shining pronotum.

<sup>1</sup>A few specimens of *flavipennis* will also run here but can be distinguished by the yellowish brown elytra. The elytra of *strenuus* are dark reddish to dark reddish brown.



- disk; elytral sutural stripe narrow . . .  
 . . . . . 21<sup>1</sup>
- 21(20). Dorsum of head with tumescence;  
 tumescence with moderately deep to  
 deep midlongitudinal groove (fig.  
 127) . . . . . 9. *episcopalis*
- Dorsum of head with or without tumescence;  
 tumescence when present with  
 shallow to obsolete midlongitudinal  
 groove (figs. 207, 209, 218, 220) . . .  
 . . . . . 13. *ineptus*
- 22(16). Abdomen bicolored, yellowish brown to  
 light reddish brown with dark  
 reddish brown apex . . . . . 23
- Abdomen usually unicolored black to  
 dark reddish brown, at times, bi-  
 colored with apex paler . . . . . 26
- 23(22). Clypeal tubercles large and well devel-  
 oped (fig. 253) . . . . (males) . . . .  
 . . . . . 15. *notialis*
- Clypeal tubercles small (figs. 254, 268)  
 . . . . . 24
- 24(23). Pronotal midlongitudinal groove absent  
 . . . . (females) . . . . 15. *notialis*
- Pronotal midlongitudinal groove present  
 (fig. 272) . . . . . 25
- 25(24). Pronotum with strong granulate ground  
 sculpturing, surface shining dully . . .  
 . . . . (females) . . . . 16. *bellicus*
- Pronotum with weak ground sculptur-  
 ing, surface strongly shining and usu-  
 ally with polished spots . . (females)  
 . . . . . 15. *notialis*
- 25(22). Dorsum of head with tumescence;  
 tumescence with deep to moderately  
 deep midlongitudinal groove (fig.  
 127) . . . . . 9. *episcopalis*
- Dorsum of head with or without tumescence;  
 tumescence often with shallow  
 midlongitudinal groove (figs. 207,  
 209, 218, 220) . . . . . 27
- 27(26). Abdominal terga V and VI sparsely  
 pubescent, with five to seven or eight  
 pairs of long setae on disk and row of  
 subapical setae (fig. 214) . . . (most  
 specimens) . . . . . 13. *ineptus*<sup>2</sup>

<sup>1</sup>Some specimens of *aquilonarius* have yellowish brown elytral epipleura, which are concolorous with the lateral portion of the disk but they can be distinguished from both *ineptus* and *episcopalis* by the broad elytral sutural stripe.

<sup>2</sup>A few individuals of *flavipennis*, particularly from the Dakotas, will run to *ineptus* in this couplet, but can be separated by the presence of a midlongitudinal pronotal groove, strong granulate ground sculpturing of

- Abdominal terga V and VI more densely  
 pubescent than described above  
 (figs. 156, 192, 197) . . . . . 28
- 28(27). Elytral epipleuron black, concolorous  
 with sutural stripe . 12. *aquilonarius*<sup>3</sup>
- Elytral epipleuron yellow, concolorous  
 with lateral portion of disk . . . . .  
 . . . . . 11. *flavipennis*<sup>4</sup>

#### BASALIS GROUP

Figures 1-89, 108-119, 123-125; Table 1

*Diagnosis.* This group can be separated from all the other North American groups of *Bledius* by the presence of the setigerous prosternal pit (fig. 25), membranous lobe on the posterior margin of the elytron (figs. 7-12), and medially fused labrum (figs. 39, 48). In addition, the head and pronotum lack horns (figs. 2, 36), the pronotal lateral marginal bead is present (fig. 25), the prosternal suture is absent (fig. 25), the procoxal fissure is closed (fig. 25), and the elytral epipleural ridge is present (as in fig. 91).

*Description.* *Bledius*. Supra-antennal horns absent (figs. 2, 20, 28, 36). Clypeal tubercles present (figs. 2, 20, 68, 79). Gular sutures confluent to submentum and sharply divergent at base (as in fig. 92). Labrum (fig. 39, 48) with anterior margin reflexed; reflexed portion truncate to strongly emarginate; midlongitudinal groove absent; membranous lobes as in figure 48. Labial palpus (fig. 53) with second segment shorter than or equal to length of apical segment; apical segment slightly narrower than second; second segment much more slender than basal; basal and second segments each with seta (fig. 53). Mentum as in figure 52. Hypopharynx as in figures 108-119, 123-125. Maxillary palpus as in figure

the pronotum, and large eyes. In contrast, the pronotum of *ineptus* lacks or has a weakly developed midlongitudinal groove, has weak ground sculpturing and shining spots, and the eyes are small.

<sup>3</sup>A few females of *flavipennis* with elytral epipleura concolorous and a broad elytral sutural stripe will run to *aquilonarius* in this couplet. These individuals will have to be identified by association with the male and by slight differences in the shape of the pronotum, and the more diffuse sutural stripe.

<sup>4</sup>A few females of *aquilonarius* with yellowish brown epipleura run to *flavipennis* in this couplet and can be separated by association with the male, and the well-delimited elytral sutural stripe.

102. Galea with numerous curved spinelike setae. Mandibles moderately prominent.

Pronotal shape as in figures 6, 24, 31, 40, 54, 60, 61, 63, 65, 73, 88. Pronotal horns absent (figs. 6, 31). Pronotal lateral marginal bead present and complete (fig. 25). Protergosternal suture absent (fig. 25). Prosternal process present (fig. 25). Prosternum with small, well-defined setigerous pit anterior to procoxae (fig. 25).

Elytron with membranous lobe on posterior margin (fig. 7); epipleural ridge present and complete (as in fig. 91).

Abdomen with posterior margin of eighth tergum emarginate (figs. 38, 70) or truncate; margin entire (figs. 32, 38, 70), not serrulate.

Aedeagus (figs. 13, 14, 62, 64, 75, 76) trilobed. Parameres long and slender (figs. 62, 64, 75, 76) or broad with posterior margin of base fused to ventral surface of median lobe; parameres with a few setae at apex; parameres extending from ventral surface around to dorsal surface. Median lobe rounded apically, bulbous basally; dorsal surface almost entirely membranous, at times with sclerotized stripe extending onto surface from lateral side; ventral surface nearly completely sclerotized; apical half of ventral surface with broad, elongate depression and with midlongitudinal division. Ostium at apex.

Spermatheca as shown in figures 16, 21, 29, 46, 51, 69, 77.

*Discussion.* The only species known for this group from the New World are the seven included in the present work. There are also some others in the Old World that will be referred to in Part III of this series.

### 1. *Bledius cordatus* (Say)

Figures 1-17, 108-110; Table 1

*Oxytelus cordatus* Say, 1834, p. 461. Erichson, 1840, p. 780.

*Bledius cordatus* (Say): Erichson, 1840, p. 780. Le Conte, 1877, pp. 232, 233. Casey, 1889, p. 67. Fall, 1910, p. 114. Blatchley, 1910, p. 467. Notman, 1920, p. 698. (Type locality: Virginia, under the sand on sea beaches. Holotype apparently lost or destroyed.)

*Diagnosis.* *Bledius cordatus* can be separated from the other members of the *basalis* group by the shape of the pronotum (fig. 6), pattern of the

pronotal pubescence in which the setae are directed to a central point (fig. 15), and the unique form of the spermatheca (fig. 16). The large eyes (fig. 2) and color pattern of the elytra (figs. 7-12) will aid in recognition of this species. The lateral margin of the procoxa (fig. 5) is sharply explanate and the procoxae are generally yellowish brown. The parameres are broad (figs. 13, 14).

*Description.* *basalis* group.

Length 3.5 to 4.5 mm.

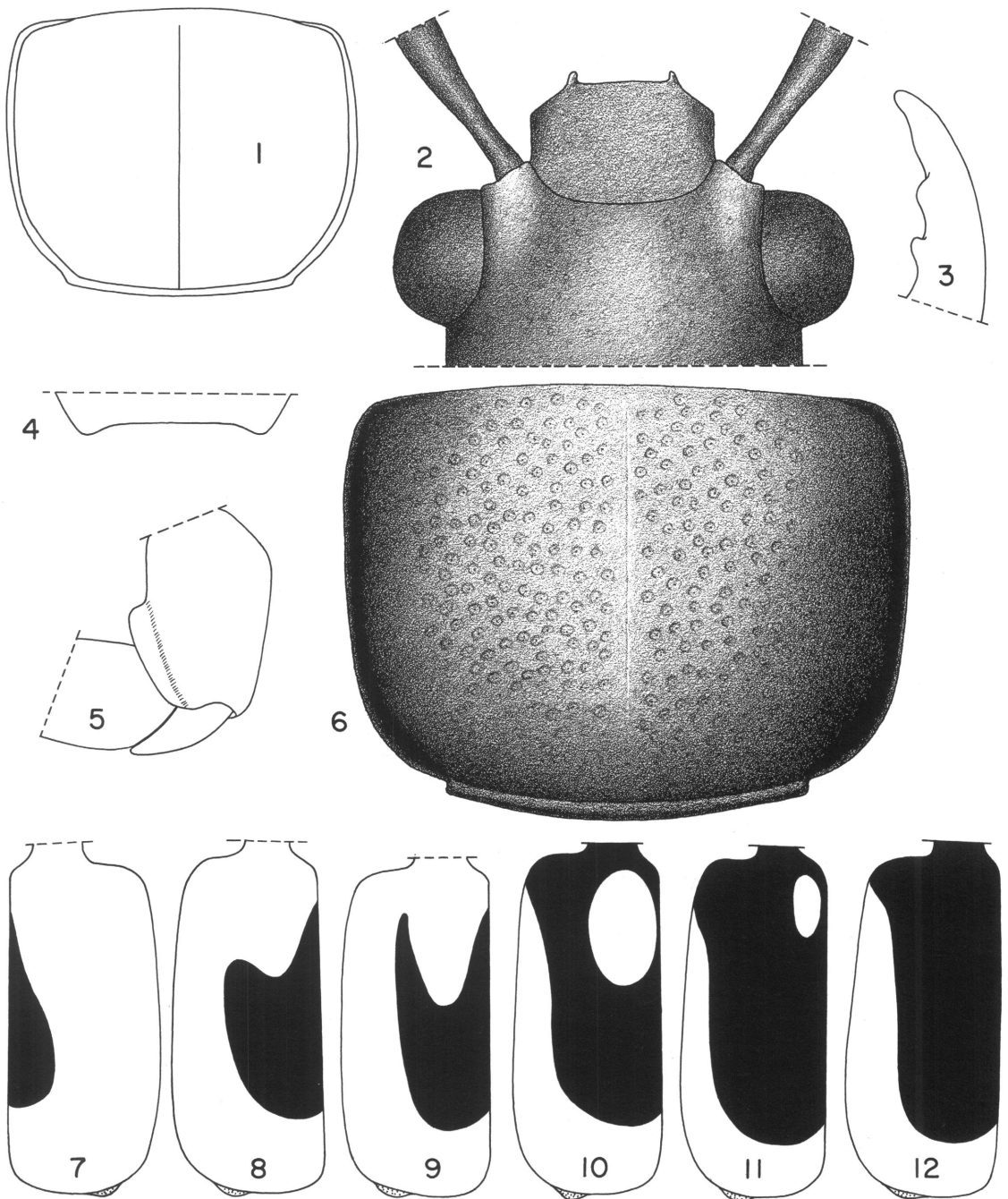
Body black; elytra yellow with brownish black sutural stripe, stripe broad or narrow.

Dorsum of head, clypeus, and labrum black to dark reddish brown. Venter of head, mentum, and submentum black to reddish brown. Maxilla, labial palpus, and antenna yellowish brown; antenna with infusions of brown on outer segments. Mandibles reddish brown. Pronotum black to reddish brown. Prohypomeron and prosternum dark reddish brown to yellowish brown. Elytron yellowish or yellowish brown with large (covering nearly all of disk) (fig. 12) to small (restricted to area adjacent to suture) (fig. 7) reddish brown sutural spot; subscutellar region often with yellow spot partially or entirely surrounded by sutural spot (figs. 8-11). Elytra occasionally entirely yellow. Pterothoracic sterna and pleura black to dark reddish brown. Legs yellowish brown. Abdomen black to dark reddish brown with apex reddish to yellowish brown.

Dorsum of head shining dully, not polished, with dense microgranulate ground sculpturing and moderately dense, shallow, fine setigerous punctation (fig. 2); pubescence and punctation absent from midlongitudinal strip; pubescence moderately long; middorsal region broadly and shallowly convex and without longitudinal groove or punctiform fovea (fig. 2). Supra-antennal ridge low but well defined and without horns; surface with microgranulate ground sculpturing. Epistomal suture broadly and shallowly arcuate medially and sharply angulate at juncture with supra-antennal ridge. Clypeus shining dully with granulate ground sculpturing and with moderately dense, fine, shallow setigerous punctation; pubescence absent from midlongitudinal strip; anterior margin with well-developed tubercles (fig. 2). Eyes large and prominent (fig. 2). Lateral side of head with glabrous strip extending

TABLE 1  
 Measurements (in Millimeters) of the Head, Prothorax, and Elytra of Adults  
 of the Species of the *basalis* and *melanocephalus* Groups  
 (The mean, standard deviation, and sample size are given in that order for each sample.)

	Head		Interocular		Pronotal		Elytral		Head		Pronotal		Elytral		
	Width	Width	Width	Width	Width	Width	Length	Length	Width	Width	Width	Length	Length	Length	
<i>basalis</i> group															
<i>basalis</i>	0.42 0.01 20	0.29 0.01 20	0.51 0.02 20	0.42 0.01 20	0.54 0.03 20	1.49 0.04 20	1.23 0.03 20	1.30 0.04 20							
<i>cordatus</i>	0.64 0.03 20	0.40 0.01 20	0.79 0.03 20	0.62 0.03 20	0.93 0.05 20	1.60 0.04 20	1.26 0.03 20	1.51 0.04 20							
<i>dimidiatus</i>	0.50 0.02 20	0.35 0.02 20	0.56 0.03 20	0.44 0.02 20	0.58 0.03 20	1.43 0.03 20	1.28 0.02 20	1.33 0.03 20							
<i>neglectus</i>	0.60 0.02 20	0.40 0.02 20	0.76 0.03 20	0.59 0.03 20	0.85 0.04 20	1.52 0.02 20	1.28 0.03 20	1.44 0.04 20							
<i>opaculus</i>	0.72 0.02 20	0.46 0.02 20	0.84 0.04 20	0.62 0.03 20	1.02 0.04 20	1.55 0.03 20	1.36 0.03 20	1.63 0.05 20							
<i>thinopus</i>	0.55 0.02 20	0.32 0.01 20	0.66 0.03 20	0.51 0.03 20	0.74 0.04 20	1.72 0.05 20	1.30 0.03 20	1.46 0.05 20							
<i>turbulentus</i>	0.53 0.02 20	0.34 0.01 20	0.62 0.02 20	0.50 0.02 20	0.67 0.03 20	1.55 0.02 20	1.25 0.02 20	1.36 0.04 20							
<i>melanocephalus</i> group															
<i>melanocephalus</i>															
Niobrara, Nebraska	0.44 0.02 20	0.28 0.02 20	0.50 0.02 20	0.43 0.01 20	0.62 0.02 20	1.58 0.04 20	1.18 0.02 20	1.47 0.04 20							
Belen, New Mexico	0.46 0.01 20	0.29 0.01 20	0.53 0.02 20	0.43 0.01 20	0.64 0.02 20	1.60 0.05 20	1.24 0.03 20	1.47 0.05 20							



FIGS. 1-12. *Bledius cordatus*. 1. Pronotum, variation of shape. 2. Head. 3. Mandible, right, dorsal view. 4. Tergum VIII, apex. 5. Procoxa, trochanter and base of femur, anterior view. 6. Pronotum. 7. Elytron, right, variation of color pattern. 8-12. Elytra, left, variation of color pattern.



toward but not reaching posterior margin of eye; strip broad at base and strongly attenuated anteriorly with anterior portion elongate, narrow and parallel sided. Venter of head with microreticulate ground sculpturing. Width of head 0.58 to 0.68 mm.; interocular width 0.38 to 0.43 mm.; head width/interocular width 1.48 to 1.65. Labrum with microgranulate ground sculpturing and shallow setigerous punctation; anterior margin strongly reflexed; margin of reflexed portion strongly emarginate. Mandibles tridentate (fig. 3).

Pronotum 0.56 to 0.65 mm. long; 0.74 to 0.84 mm. wide; pronotal width/pronotal length 1.19 to 1.31; surface moderately strongly convex (fig. 6); basal angles distinctly developed and rectangular (fig. 6); basal angles short (figs. 1, 6); lateral margin broadly curved from anterior margin to basal angles. Anterior angles not or only slightly produced (fig. 6). Pronotum with surface shining dully, not polished, with microgranulate ground sculpturing and with dense, moderately coarse setigerous punctation; midlongitudinal groove distinct and well developed; pubescence

moderately long and directed toward median point (fig. 15); setae on anterior portion of pronotum posteriorly directed. Pronotal lateral marginal bead strongly and distinctly explanate (fig. 6). Elytra 0.82 to 1.00 mm. long; elytral length/pronotal length 1.44 to 1.58; surface shining dully, not polished, and with dense, moderately deep, setigerous punctation. Metathoracic wings fully developed. Procoxa with lateral side sharply expanded and explanate (fig. 5).

Abdominal segments unmodified; eighth tergum shallowly emarginate (fig. 4).

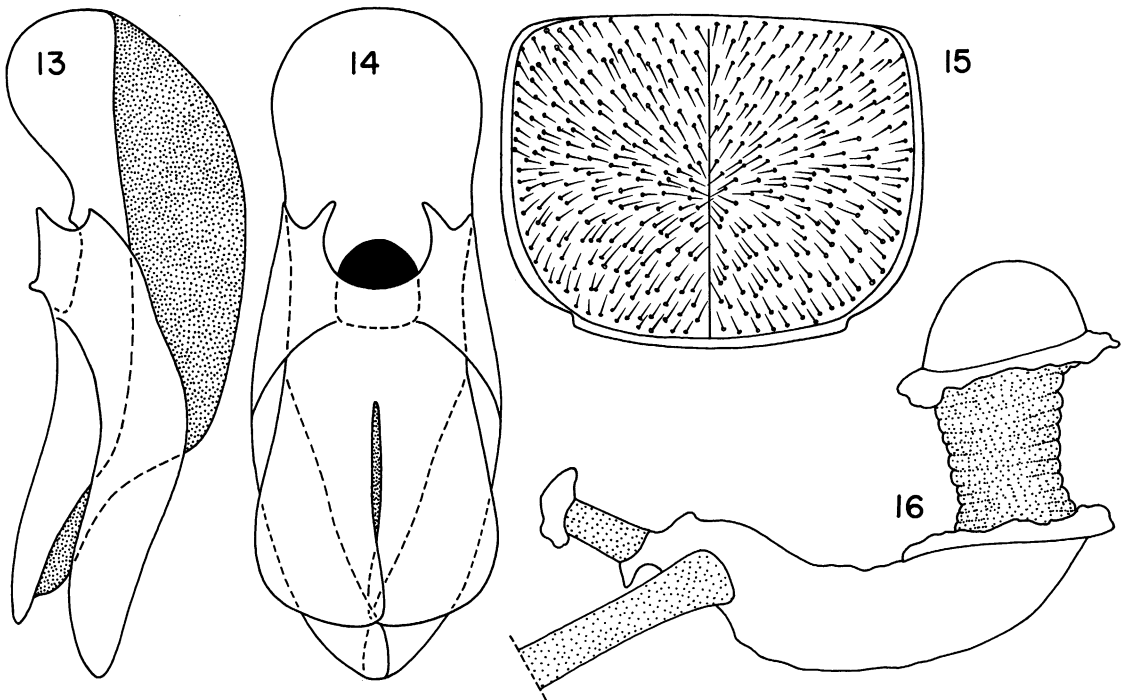
Spermatheca as shown in figure 16, largest of *basalis* group.

Aedeagus with broad parameres (figs. 13, 14).

*Sexual Dimorphism.* There is apparently no means of distinguishing the sexes externally.

*Variation.* The variation of the elytral color pattern is shown in figures 7 to 12. Entirely or nearly entirely dark elytra are rare as are those without dark pigmentation. Variation of the pronotal shape is shown in figures 1 and 6.

*Habitat and Distribution.* *United States:*



FIGS. 13-16. *Bledius cordatus*. 13. Aedeagus, lateral view. 14. Aedeagus, ventral view. 15. Pronotum, setal pattern. 16. Spermatheca.

Florida, Georgia, Maryland, Mississippi, New Jersey, New York, North Carolina, South Carolina, Texas, Virginia. (fig. 17; see appendix for localities.)

*Bledius cordatus* occurs along the sea coast from New York to Texas. It can be collected on moist, unvegetated parts of sand flats near the ocean on the tips or leeward sides of coastal islands or peninsulas.

2. *Bledius dimidiatus* Le Conte  
Figures 17-25, 118, 119; Table 1

*Bledius dimidiatus* Le Conte, 1877, p. 232. Casey, 1889, p. 67. Notman, 1920, p. 698. (Type locality: Florida, Enterprise. Holotype in the Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts. Type examined.)

**Diagnosis.** This species is readily separated from all the other species in this group by the strongly constricted basal third of the pronotum (fig. 24) and by the bicolored elytron in which the basal half is black, and the apical half yellow (figs. 18, 19).

**Description.** *basalis* group.

**Length.** 2.5 to 3.0 mm.

Body black; elytra transversely bicolored black and yellow, base black.

Dorsum of head, clypeus, and labrum black to

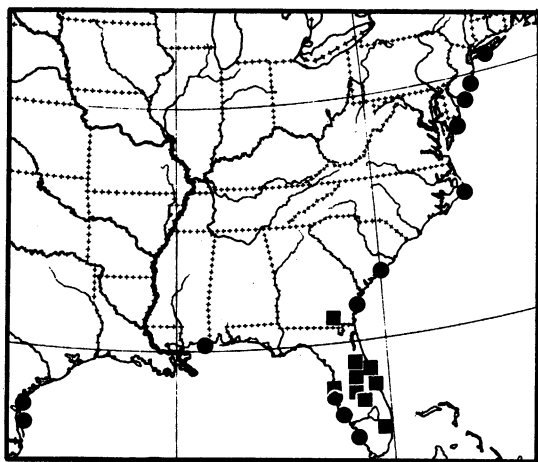


FIG. 17. Distribution of *Bledius cordatus* (dots), and *Bledius dimidiatus* (squares) in the eastern United States.

dark reddish brown, venter of head, mentum, and submentum dark reddish brown. Labial palps, maxilla, mandibles, and antennae reddish brown. Antenna with basal segment darker reddish brown. Pronotum black to dark reddish brown. Prohypomeron and prosternum dark reddish brown. Elytra with basal third to half black and remainder yellow (figs. 18, 19); black spot with sutural portion longer than lateral. Pterothoracic sterna and pleura black to dark reddish brown. Legs reddish brown to dark reddish brown. Abdomen black to dark reddish brown.

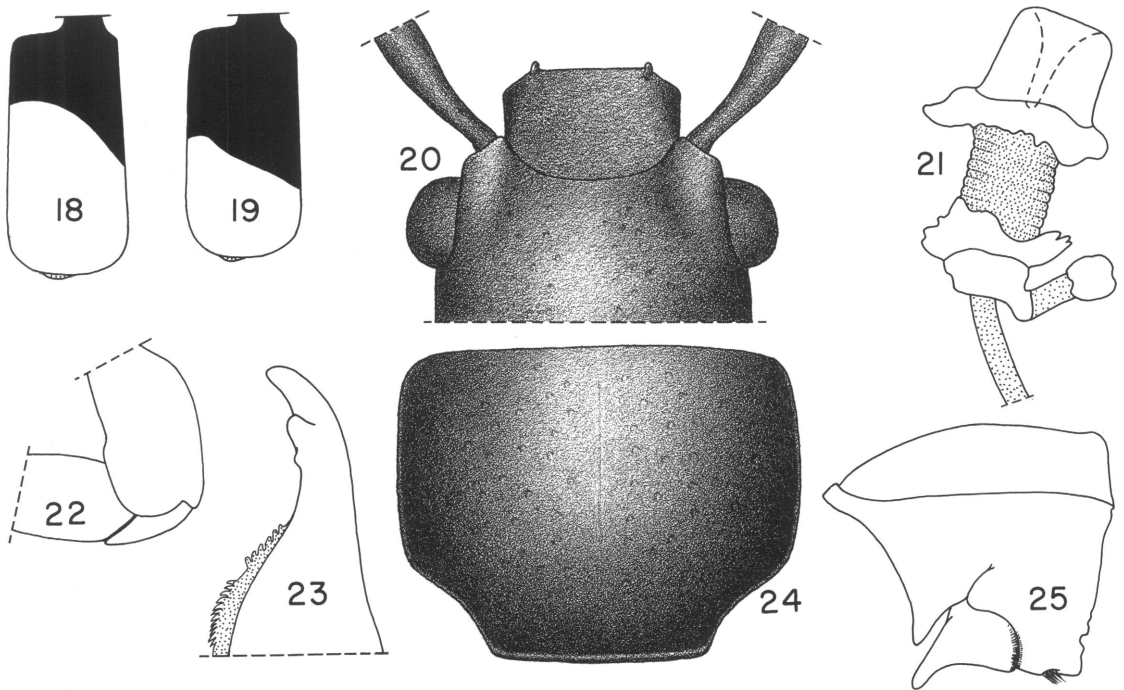
Head, supra-antennal ridge, epistomal suture, clypeus, and labrum as described for *cordatus* with following exceptions: dorsum of head shining strongly but not polished; pubescence long. Clypeus with moderately well-developed tubercles on anterior margin (fig. 20). Eyes moderately large and moderately prominent (fig. 20). Width of head 0.46 to 0.53 mm.; interocular width 0.31 to 0.38 mm.; head width/interocular width 1.38 to 1.47. Labral anterior margin moderately strongly reflexed; margin of reflexed portion more or less truncate, not strongly emarginate. Mandibles tridentate (fig. 23); basal denticles small.

Pronotum and elytra as described for *B. cordatus* with following exceptions: pronotum 0.41 to 0.47 mm. long; 0.51 to 0.61 mm. wide; pronotal width/pronotal length 1.23 to 1.32; surface strongly convex (fig. 24); basal angles distinctly developed and rectangulate (fig. 24); lateral margins with anterior two-thirds slightly rounded and nearly parallel to one another; lateral margins with basal one-third strongly sinuate and convergent to basal angle, giving pronotum constricted appearance of base. Anterior angles not produced. Pronotal punctation moderately dense to moderately sparse (fig. 24); pubescence long and directed toward midlongitudinal groove. Pronotal lateral marginal bead small and not strongly explanate.

Elytra 0.54 to 0.63 mm. long; elytral length/pronotal length 1.26 to 1.38; surface strongly shining and with moderately sparse setigerous punctation. Metathoracic wings fully developed. Procoxae with lateral side expanded but only slightly explanate (fig. 22).

Abdominal segments unmodified; eighth tergum shallowly emarginate.

Spermatheca as shown in figure 21.



FIGS. 18-25. *Bledius dimidiatus*. 18-19. Elytra, left, variation of color pattern. 20. Head. 21. Spermatheca. 22. Procoxa, trochanter and base of femur, anterior view. 23. Mandible, right, dorsal view. 24. Pronotum. 25. Prothorax, lateral view, anterior end at right.

Aedeagus with slender parameres (as in figs. 75, 76).

**Sexual Dimorphism.** There are no apparent means of distinguishing the sexes externally.

**Habitat and Distribution.** This species, known only from Florida and Georgia, has been collected rarely (fig. 17; see Appendix for localities). It is probably found near rivers and lakes, rather than the ocean, but I have no collecting data for the species.

### 3. *Bledius thinopus*, new species Figures 26-34, 114, 115; Table 1

**Holotype.** Florida, Wakulla County, 10 miles south of Panacea, Alligator Point, collected by Lee H. Herman, March 22, 1971, from beach flats; deposited in the American Museum of Natural History, New York.

**Paratypes.** With same data as holotype; 17 de-

posited with holotype and two at each of the following institutions: British Museum (Natural History), California Academy of Sciences, Canadian National Collection, Field Museum of Natural History, and National Museum of Natural History.

**Diagnosis.** This species can be separated from *neglectus*, *cordatus*, and *opaculus* by the smaller size, shape of the pronotum (fig. 31) in which the basal angles are distinct but rounded, and color pattern of the elytra. From *turbulentus*, *thinopus* can be distinguished because the eyes are more prominent (fig. 28), the basal third of the lateral margin of the pronotum is more rounded (fig. 31) and the pronotal lateral marginal bead is explanate (fig. 31). *Bledius thinopus* can be separated from *basalis* by the larger size, elytral color pattern (fig. 26, 27, 30), broad, explanate lateral marginal bead (fig. 31) and more strongly prominent eyes (fig. 28). *Bledius dimid-*

*iatus* and *thinopus* are easily distinguished by the pronotal shape and elytral color pattern.

*Description. basalis* group.

Length approximately 2.5 to 3.5 mm.

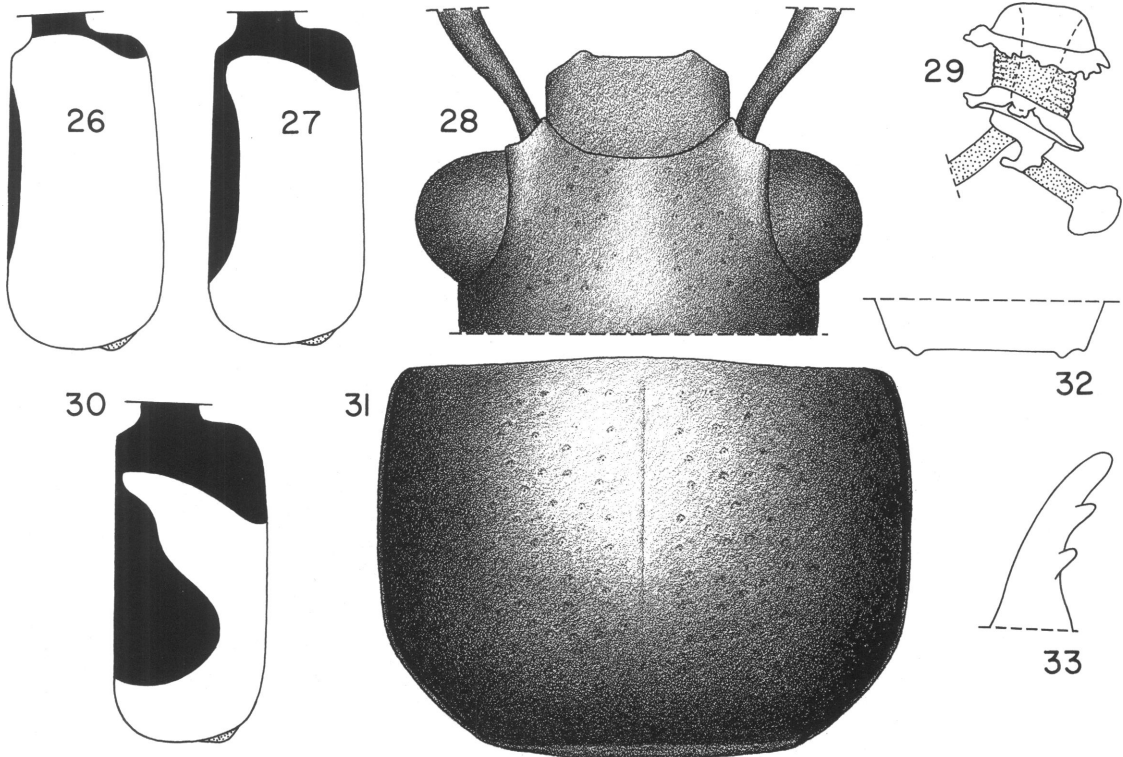
Body black with yellow elytra; elytra with dark reddish brown or black spot along base and suture.

Dorsum of head, clypeus, and labrum black. Venter of head, mentum, and submentum black to dark reddish brown. Maxillae and mandibles reddish brown. Maxillary and labial palps and antennae yellowish brown. Pronotum black to reddish brown. Prohypomeron and prosternum dark reddish brown to pale reddish brown. Elytra pale yellow; base and suture with dark reddish brown to black spot along suture and base of variable size (figs. 26, 27, 30); sutural and basal spots usually disconnected and small (fig. 26), rarely

larger and connected (figs. 27, 30). Pterothoracic sterna and pleura black to dark reddish brown. Legs reddish brown to pale reddish brown. Abdomen black to dark reddish brown.

Head, supra-antennal ridge, epistomal suture, and clypeus as described for *cordatus* with following exceptions: Clypeus with moderately well-developed tubercles on anterior margin (fig. 28). Eyes large and prominent (fig. 28). Width of head 0.50 to 0.59 mm.; interocular width 0.30 to 0.35 mm.; head width/interocular width 1.64 to 1.80. Labrum with microgranulate ground sculpturing and shallow setigerous punctation; anterior margin strongly to moderately strongly reflexed; margin of reflexed portion not or only slightly emarginate. Mandibles tridentate (fig. 33).

Pronotum and elytra as described for *B. cor-*



FIGS. 26-33. *Bledius thinopus*. 26-27. Elytra, right, variation of color pattern. 28. Head. 29. Spermatheca. 30. Elytron, right, variation of color pattern. 31. Pronotum. 32. Tergum VIII, apex. 33. Mandible, left, dorsal view.



*datius* with following exceptions: pronotum 0.44 to 0.56 mm. long; 0.58 to 0.72 mm. wide; pronotal width/pronotal length 1.25 to 1.34; surface strongly convex (fig. 31); basal angles distinct, but obtuse and rounded (fig. 31); lateral margins broadly and evenly rounded from anterior angle to basal angle, basal third rounded and neither sinuate nor straight; anterior angles not (fig. 31) or slightly produced. Pronotal pubescence directed toward midlongitudinal groove. Pronotal lateral marginal bead moderately strongly explanate (fig. 31). Elytra 0.64 to 0.81 mm. long; elytral length/pronotal length 1.37 to 1.55. Metathoracic wing present and fully developed. Procoxae with lateral margin moderately expanded and slightly explanate.

Abdominal segments unmodified; eighth tergum shallowly emarginate (fig. 32).

Spermatheca as shown in figure 29.

Aedeagus with slender parameres (as in figs. 75, 76).

**Sexual Dimorphism.** There are no apparent means of distinguishing the sexes externally.

**Habitat and Distribution.** *United States:* Alabama, Florida, Texas (fig. 34; see Appendix for localities).

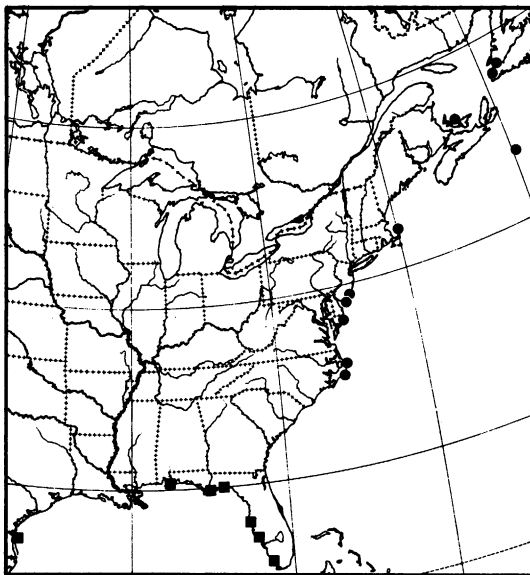


FIG. 34. Distribution of *Bledius thinopus* (squares) and *Bledius opaculus* (dots) in eastern North America.

The species is found along the coast of the Gulf of Mexico, but there are habitat data for only three Florida localities. Near Englewood, Florida, the species was collected both at the edge of the water on the leeward side of a peninsula, and at Alligator Point in drier sand farther from the water. Near St. Petersburg it was found on moist, unvegetated beach flats.

**Etymology.** From the Greek *thinós*, for beach, and referring to the habitat of the species.

#### 4. *Bledius opaculus* Le Conte Figures 34-47, 111-113; Table 1

*Bledius opaculus* Le Conte, 1863, p. 54; 1877, pp. 232, 233. Casey, 1889, p. 67. (Type locality: Maine, on coast. Holotype in the Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts. Type examined.)

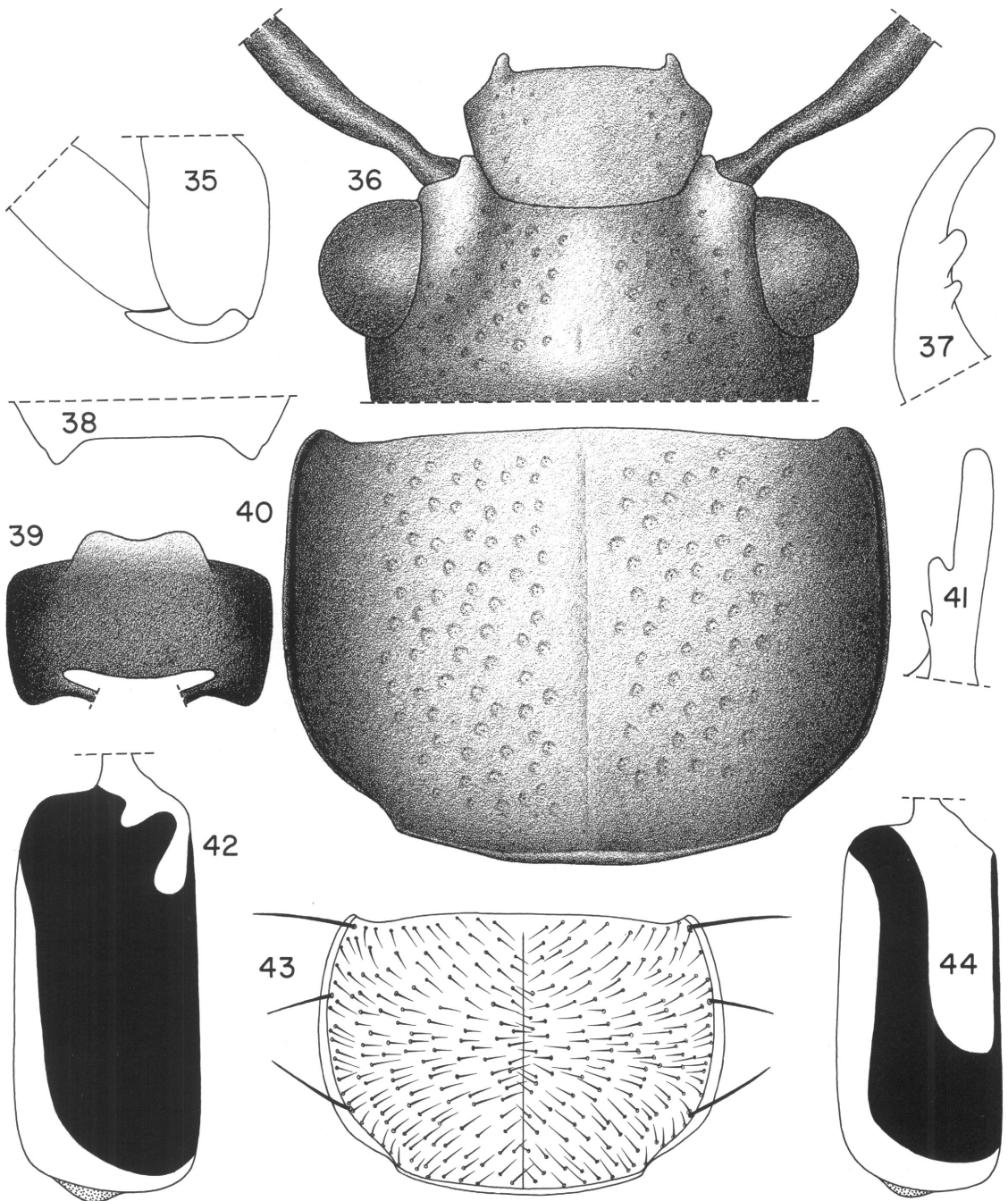
**Diagnosis.** *Bledius opaculus* can be separated from *cordatus* by the characters given in the diagnosis of *cordatus*, but particularly by the shape (fig. 40) and setal pattern (fig. 43) of the pronotum, and the more or less straight lateral side (fig. 35) and dark color of the procoxa. *Bledius opaculus* is large and can be separated from other species in the group by the elytral color pattern (figs. 42, 44), large eyes (fig. 36), long elytra (fig. 42; table 1), generally pale metafemora, and strongly sinuate posterior third of the lateral margin of the pronotum (fig. 40). *Bledius neglectus* might be confused with *opaculus*, but *neglectus* is smaller, has smaller eyes, shorter elytra, and a different elytral color pattern.

**Description.** *basalis* group.

Length approximately 3.6 to 4.7 mm.

Body black; elytra brownish black with subscutellar yellowish spot.

Dorsum of head, clypeus, and labrum black. Venter of head, mentum, submentum, and maxilla black to reddish brown. Maxillary palpus, labial palpus, and antenna yellowish brown; antenna with outer segments often brownish. Mandibles reddish brown. Pronotum black to brown. Prohypomeron and prosternum black to brown. Elytron with disk black to brown with subscutellar yellowish brown spot of variable size (figs. 42, 44); lateral side yellowish brown. Elytra occasionally entirely yellowish brown. Pterothoracic sterna and pleura black to dark reddish brown.



FIGS. 35-44. *Bledius opaculus*. 35. Procoxa, trochanter, and base of femur, anterior view. 36. Head. 37. Mandible, left, dorsal view. 38. Tergum VIII, apex. 39. Labrum, dorsal view. 40. Pronotum. 41. Mandible, right, anterolateral view. 42. Elytron, left, variation of color pattern. 43. Pronotum, setal pattern. 44. Elytron, left, variation of color pattern.

Coxae black to brown, remaining parts of legs yellowish brown, at times dark reddish brown. Abdomen black to brown.

Head, supra-antennal ridge, epistomal suture, clypeus, and labrum as described for *cordatus* with these exceptions: setigerous punctation dense, moderately deep and coarse; pubescence long to moderately long; midlongitudinal groove usually present and well defined, at times obsolete, occasionally absent. Eyes large (fig. 36). Width of head 0.58 to 0.68 mm.; interocular width 0.38 to 0.43 mm.; head width/interocular width 1.48 to 1.65. Mandibles tridentate (figs. 37, 41).

Pronotum and elytra as described for *cordatus* except as follows: pronotum 0.56 to 0.65 mm. long; 0.74 to 0.84 mm. wide; pronotal width/pronotal length 1.19 to 1.31; surface moderately strongly convex (fig. 40); basal angles distinct, more or less rectangulate and moderately long (fig. 40); lateral margin broadly and shallowly curved from anterior margin to basal third; basal third strongly (figs. 40, 45) to moderately strongly (fig. 47) sinuate to basal angle; anterior angle strongly to moderately strongly produced (fig. 45). Punctation moderately dense; pubescence directed toward midlongitudinal groove but not toward central point (fig. 43); setae on anterior portion of notum directed only slightly posteriorly. Pronotal lateral marginal bead strongly explanate (fig. 40).

Elytra 0.82 to 1.00 mm. long; elytral length/pronotal length 1.44 to 1.58; procoxa with lateral side more or less straight (fig. 35).

Abdominal segments unmodified, eighth tergum shallowly to moderately deeply emarginate (fig. 38).

Spermatheca as shown in figure 46.

Aedeagus with slender parameres (as in figs. 75, 76).

*Sexual Dimorphism.* There is apparently no way to distinguish the sexes externally.

*Variation.* Variation of the elytral color pattern is shown in figures 42 and 44. In general the disk is black with a subscutellar yellow spot of variable size. Occasionally the elytra are entirely yellow.

Variation of the pronotal shape is shown in figures 40, 45, and 47.

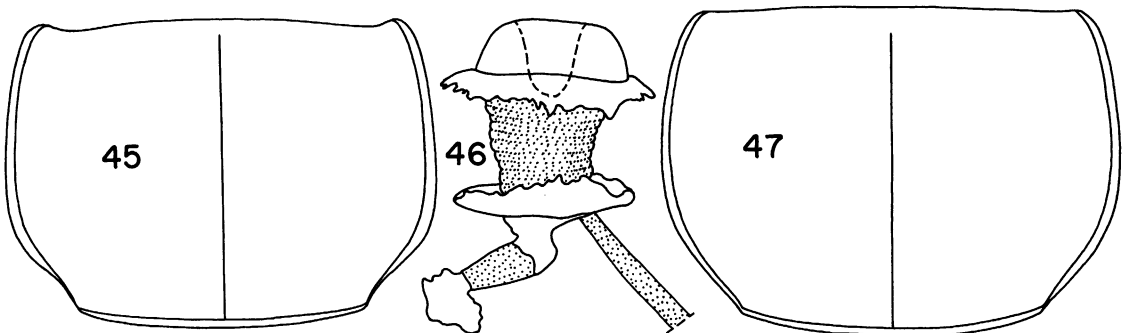
*Habitat and Distribution.* *Canada:* Newfoundland, Nova Scotia, Prince Edward Island. *United States:* Maine, Maryland, Massachusetts, New Jersey, New York, North Carolina.

The species lives on the Atlantic coast from Newfoundland to North Carolina (fig. 34; see Appendix for localities). It has been collected from moist, unvegetated sand flats on the leeward side of Assateague Island, Maryland, and in North Carolina on the tip of Hatteras Island near Oregon Inlet. At Cape Hatteras, many specimens of the species were collected from algae covered, moist sand flats.

##### 5. *Bledius neglectus* Casey

Figures 48-66, 116; Table 1

*Bledius neglectus* Casey, 1889, p. 69. (Type locality: Rhode Island. Holotype in the Na-



FIGS. 45-47. *Bledius opaculus*. 45. Pronotum, variation of shape. 46. Spermatheca. 47. Pronotum, variation of shape.

tional Museum of Natural History, Smithsonian Institution, Washington, D.C. Type examined).

*Diagnosis.* The strongly sinuate basal third of the lateral side of the pronotum (figs. 54, 60, 61, 63) separates this species from all the others of the group except for *opaculus*, *dimidiatus*, and some individuals of *turbulentus*. *Bledius opaculus* is larger and has longer elytra than *neglectus* (see table 1, elytral length/pronotal length), and the elytral color pattern of the two species is different (figs. 56, 57, and 42, 44). The few individuals of *turbulentus* with a slightly sinuate basal third of the pronotal lateral margin can be separated from *neglectus* by the smaller size, the absence of salient anterior angles of the pronotum (fig. 73) and the narrow, slightly explanate pronotal lateral marginal bead. *Bledius dimidiatus* can be separated by the small size, elytral color pattern (figs. 18, 19) and strongly constricted basal third of the pronotum (fig. 24).

*Description.* *basalis* group.

Length approximately 2.4 to 4.0 mm.

Body black; elytra yellowish with black sutural and basal stripes; sutural stripe often extending onto disk; basal stripe transverse.

Dorsum of head, clypeus, and labrum black to reddish brown. Venter of head, mentum, submentum, cardo, and stipes dark reddish brown to reddish brown; maxillary and labial palps yellowish brown. Antenna brown to yellowish brown; basal segment often black. Mandibles reddish brown. Pronotum black to reddish brown. Prohypomeron and prosternum dark reddish brown to yellowish brown. Elytron generally yellowish brown with broad basal and sutural stripes that are connected (fig. 59); at times basal and sutural strip separated and narrow (figs. 56, 57) or, occasionally, disk entirely black, or rarely, only sutural bead black. Pterothoracic sterna and pleura black to reddish brown. Leg dark reddish brown, nearly black at times to yellowish brown. Abdomen black to reddish brown.

Head, supra-antennal ridge, epistomal suture, clypeus, and labrum as described for *cordatus* with exception of following characteristics: punctuation of dorsum of head moderately dense and moderately coarse. Clypeal tubercles of anterior margin short and moderately well developed (fig. 49). Eyes moderately large (fig. 49).

Glabrous strip on lateral side of head gradually attenuate anteriorly. Width of head 0.56 to 0.63 mm.; interocular width 0.36 to 0.43 mm.; head width/interocular width 1.47 to 1.57. Anterior margin of labrum not or only slightly reflexed. Margin of reflexed portion not or slightly emarginate. Mandibles tridentate (fig. 55).

Pronotum and elytra as described for *B. cordatus* except as follows: pronotum 0.55 to 0.63 mm. long; 0.71 to 0.81 mm. wide; pronotal width/pronotal length 1.20 to 1.33; surface moderately strongly convex (fig. 54); basal angles distinctly developed but rounded and subrectangulate (figs. 54, 60, 61); basal angle moderately long (fig. 54); lateral margin broadly and shallowly curved to nearly straight from anterior angle to basal third of lateral margin; basal third strongly (figs. 54, 60, 61) to weakly (figs. 63, 65) sinuate; anterior angles slightly to moderately strongly produced. Pronotal pubescence directed toward midline (fig. 58). Pronotal lateral marginal bead moderately strongly explanate. Elytra 0.80 to 0.94 mm. long; elytral length/pronotal length 1.33 to 1.50. Metathoracic wings fully developed. Procoxa with lateral side moderately explanate and expanded (fig. 50).

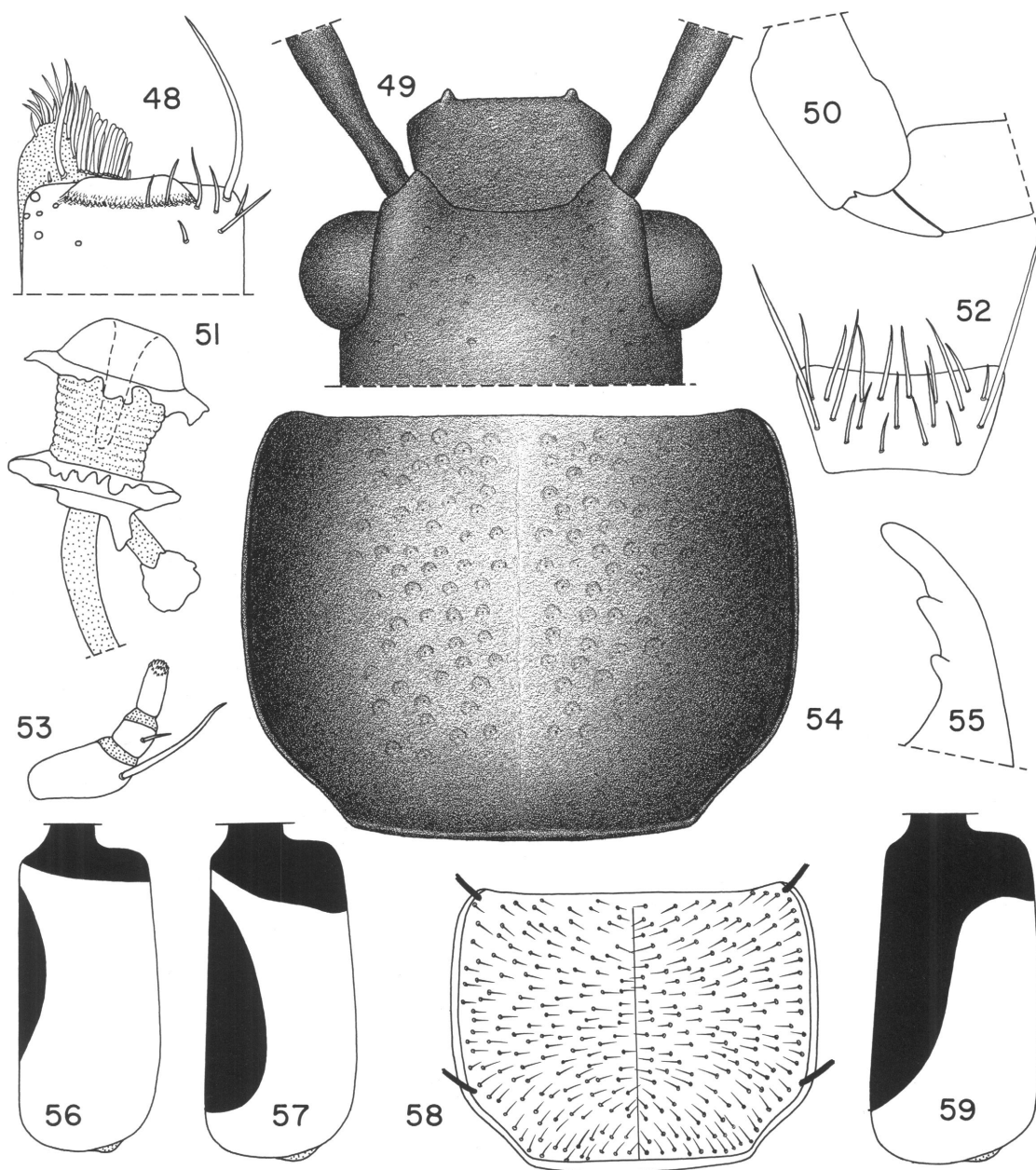
Spermatheca as shown in figure 51.

Aedeagus with slender parameres (figs. 62, 64).

*Sexual Dimorphism.* There is no apparent means of distinguishing the sexes externally.

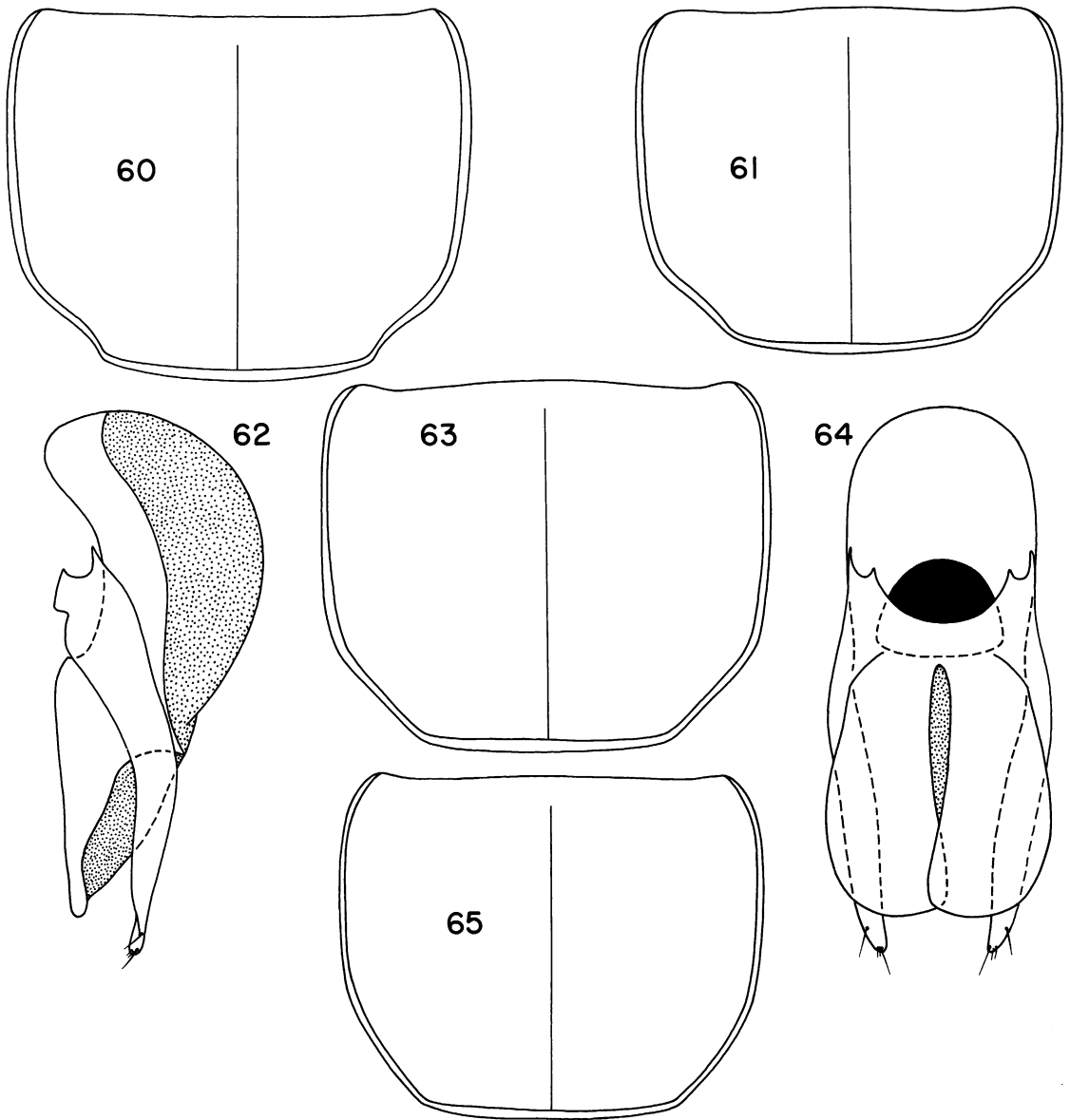
*Variation.* *Bledius neglectus* varies between the ends of its geographical range. Specimens from Newfoundland have a strongly sinuate basal third of the lateral margin of the pronotum (figs. 54, 60), long pubescence and a broad sutural spot which often covers the entire elytral surface. Georgian specimens, in addition to being smaller than the Newfoundland individuals, have a less strongly sinuate basal third of the lateral pronotal margin (figs. 61, 63, 65), shorter pubescence, and a smaller sutural spot that is occasionally restricted to the sutural bead. Samples of populations living at intermediate localities such as New Jersey, Maryland, or North Carolina provide examples of clinal intergradation of these pronotal, elytral, and pubescence characters.

*Habitat and Distribution.* *Canada:* Newfoundland. *United States:* Georgia, Maine, Maryland, Massachusetts, New Jersey, New York, North Carolina, Rhode Island (fig. 66; see Appendix for localities).



FIGS. 48-59. *Bledius neglectus*. 48. Labrum, dorsal view, setae of left side and right epipharyngeal lobe removed. 49. Head. 50. Procoxa, trochanter, and base of femur, anterior view. 51. Spermatheca. 52. Mentum, ventral view. 53. Labial palpus. 54. Pronotum. 55. Mandible, right, dorsal view. 56-57. Elytra, right, variation of color pattern. 58. Pronotum, seta pattern, larger seta broken. 59. Elytron, right, variation of color pattern.





FIGS. 60-65. *Bledius neglectus*. 60-61. Pronotum, variation of shape. 62. Aedeagus, lateral view. 63. Pronotum, variation of shape. 64. Aedeagus, ventral view. 65. Pronotum, variation of shape.

*Bledius neglectus* occurs on the Atlantic coast from Newfoundland to Georgia. It can be collected in New Jersey, Maryland, and North Carolina from moist, unvegetated sand flats.

Specimens have been taken commonly on the leeward side of islands and peninsulas some distance from water. At Assateague Island, Maryland, the species was collected near the intertidal

zone and near Bourne, Massachusetts, it was collected in the intertidal zone.

*Natural History.* The species has been collected with *Dyschirius sphaericollis* Say and *Dyschirius pallipennis* Say in Newfoundland and Nova Scotia respectively.

*Discussion.* As a result of the clinal change described for *neglectus* under "Variation" the specimens from St. Catherine's Island are less readily distinguished from *turbulentus* than are those from the more northerly localities.

The slight anatomical gap between *turbulentus* and the Georgian *neglectus* might be closed if more adequate samples were known from the east coast of Florida. The few specimens collected from eastern Florida are *turbulentus*.

#### 6. *Bledius turbulentus* Casey

Figures 66-74, 117; Table 1

*Bledius turbulentus* Casey, 1889, p. 70. (Type locality: Florida. Holotype in the National Museum of Natural History, Smithsonian Institution, Washington, D.C. Type examined.)

*Diagnosis.* This species can be separated from *cordatus*, *opaculus*, *neglectus*, and *dimidiatus* by features of the pronotum and the color pattern of the elytra. *Bledius turbulentus* can be separated from *thinopus* by the smaller size, less prominent eyes (fig. 68), less strongly explanate pronotal lateral marginal bead and straighter basal third of the pronotal lateral margin (fig. 73). *Bledius turbulentus* and *basalis* can be separated because the former species is larger, has slightly more prominent eyes, and a straight basal third of the pronotal lateral marginal bead (fig. 73).

*Description. basalis* group.

Length approximately 3.5 to 2.5 mm.

Body black, elytra whitish yellow with transverse black spot on base and black sutural bead.

Dorsum of head, clypeus, and labrum black to dark reddish brown. Venter of head, mentum, and submentum dark reddish brown to reddish brown. Maxilla, labial palpus, and antenna reddish brown to yellowish brown. Mandibles reddish brown. Pronotum black to dark reddish brown. Prohypomeron and prosternum reddish brown. Elytron whitish yellow with basal, trans-

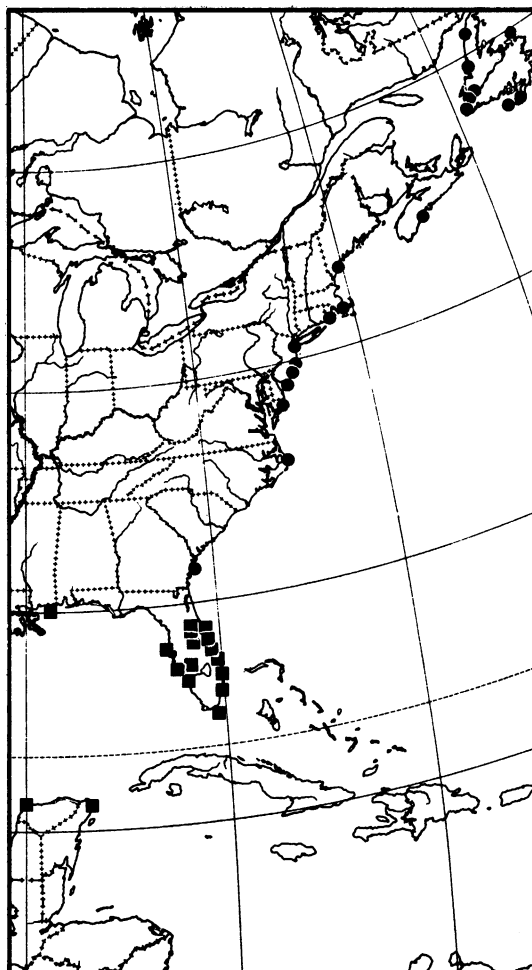
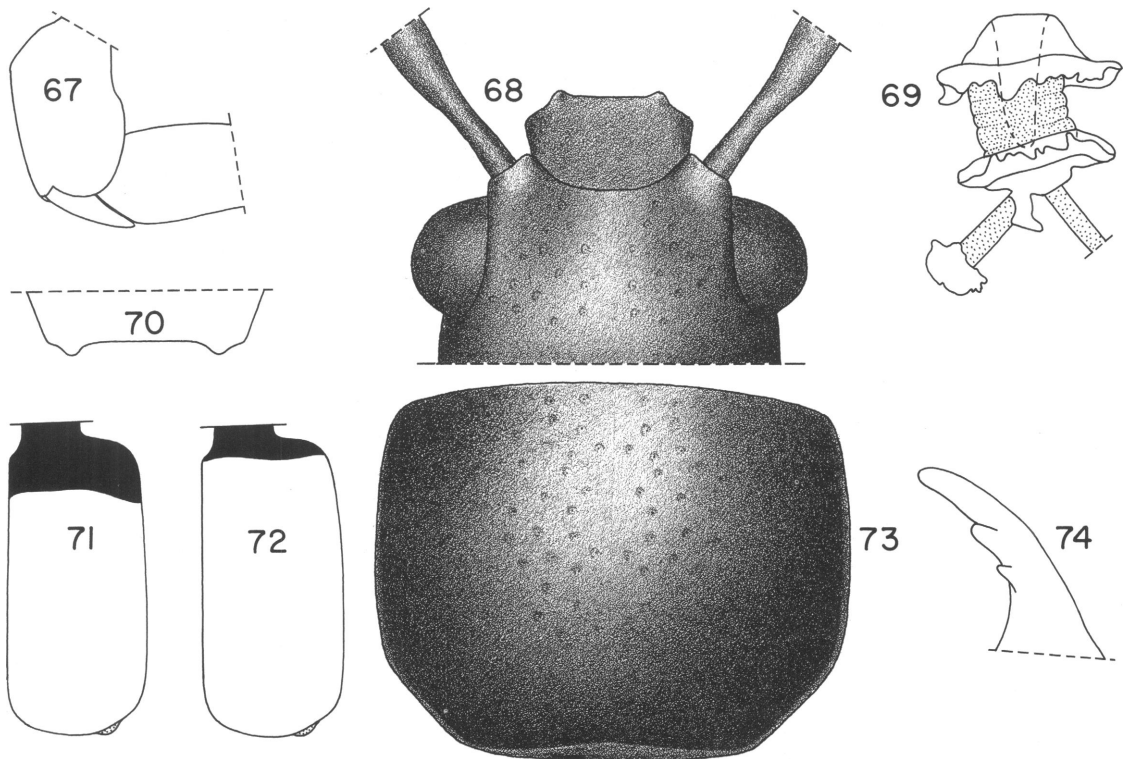


FIG. 66. Distribution of *Bledius neglectus* (dots) and *Bledius turbulentus* (squares) in eastern North America.

verse black spot, and black sutural bead (figs. 71, 72); size of basal spot variable; sutural spot usually absent but occasionally (three examples) present on elytral disk adjacent to sutural bead and forming narrow sutural stripe. Pterothoracic sterna and pleura black to reddish brown. Legs reddish brown. Abdomen black to reddish brown.

Head, supra-antennal ridge, epistomal suture, clypeus, and labrum as described for *cordatus* with following exceptions: dorsum of head shining strongly but not polished; punctation dis-



FIGS. 67-74. *Bledius turbulentus*. 67. Procoxa, trochanter, and base of femur, anterior view. 68. Head. 69. Spermatheca. 70. Tergum VIII, apex. 71-72. Elytra, right, variation of color pattern. 73. Pronotum. 74. Mandible, right, dorsal view.

tinct, moderately coarse (fig. 73). Clypeus with small, rounded tubercles on anterior margin (fig. 68). Eye moderately large and moderately prominent (fig. 68). Width of head 0.49 to 0.56 mm.; interocular width 0.31 to 0.36 mm.; head width/interocular width 1.52 to 1.60. Labrum with anterior margin moderately strongly reflexed; margin of reflexed portion truncate to weakly emarginate. Mandibles tridentate (fig. 74).

Pronotum and elytra as described for *B. cordatus* with following exceptions: pronotum 0.45 to 0.53 mm. long; 0.56 to 0.65 mm. wide; pronotal width/pronotal length 1.21 to 1.28; surface strongly convex (fig. 73); basal angles moderately distinct and rounded; lateral margin with anterior two-thirds broadly rounded from anterior margin to basal third; basal third of lateral margin nearly straight (fig. 73) or weakly sinuate. Anterior angles not produced. Pronotal

pubescence with setae directed toward mid-longitudinal groove (as in fig. 58). Pronotal lateral marginal bead narrow and slightly explanate (fig. 73). Elytra 0.59 to 0.74 mm. long; elytral length/pronotal length 1.28 to 1.41. Procoxa with lateral margin slightly expanded and slightly explanate (fig. 67).

Abdominal segments unmodified; eighth tergum moderately emarginate (fig. 70).

Spermatheca as shown in figure 69.

Aedeagus with slender parameres (as in figs. 62, 64).

*Sexual Dimorphism.* There are no apparent means of distinguishing the sexes externally.

*Habitat and Distribution.* *United States:* Florida, Mississippi. *Mexico:* Quintana Roo, Yucatan (fig. 66; see Appendix for localities).

This species lives on the coast of North America from Florida in the United States to Quintana

Roo in Mexico. With the exceptions of one from Mississippi, two from Yucatan, and one from Quintana Roo all the specimens are known from Florida. At Englewood, Lower Matecumbe Key, Palmetto, and St. Petersburg, Florida, the species was collected from sea beaches near the high tide mark with some individuals on the intertidal zone.

*Discussion.* This species is not always easy to separate from *basalis* and *thinopus*, but see the Discussion under *basalis*. The shape of the basal third of the prothorax and the width of the explanate pronotal lateral marginal bead will separate *thinopus* and *turbulentus*.

#### 7. *Bledius basalis* Le Conte

Figures 75-89, 124, 125; Table 1

*Bledius basalis* Le Conte, 1863, p. 54; 1877, p. 232. Casey, 1889, p. 67-71. Fall, 1910, p. 114. Notman, 1920, p. 698. (Type locality: New York, Coney Island, salt marsh. Holotype in the Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts. Type examined.)

*Bledius ignavus* Casey, 1889, p. 67. (Type locality: Rhode Island. Holotype in the National Museum of Natural History, Smithsonian Institution, Washington, D.C. Type examined.) NEW SYNONYM.

*Bledius misellus* Casey, 1889, p. 68. (Type locality: Texas, Galveston. Holotype in the National Museum of Natural History, Smithsonian Institution, Washington, D.C. Type examined.) NEW SYNONYM.

*Diagnosis.* *Bledius basalis* can be separated from *cordatus*, *neglectus*, and *opaculus* by the shape of the pronotum (fig. 88), color pattern of the elytra (figs. 82-87), and size of the eyes (fig. 79) and body. *Bledius dimidiatus* can be separated by the shape of the pronotum and color of the elytra. *Bledius thinopus* can be separated from *basalis* by the larger size, more prominent eyes, and moderately broad, explanate pronotal lateral marginal bead. *Bledius turbulentus* has the basal third of the pronotal lateral margin straight to slightly sinuate, slightly more prominent eyes, and a generally larger body. The elytral sutural bead is black but in most instances the area adjacent to the bead is immaculate. *Bledius basalis* on the other hand is smaller, generally has less

prominent eyes (fig. 79), a black spot adjacent to the elytral suture, and a gradually rounded basal third of the pronotal lateral margin (fig. 88).

*Description.* *basalis* group.

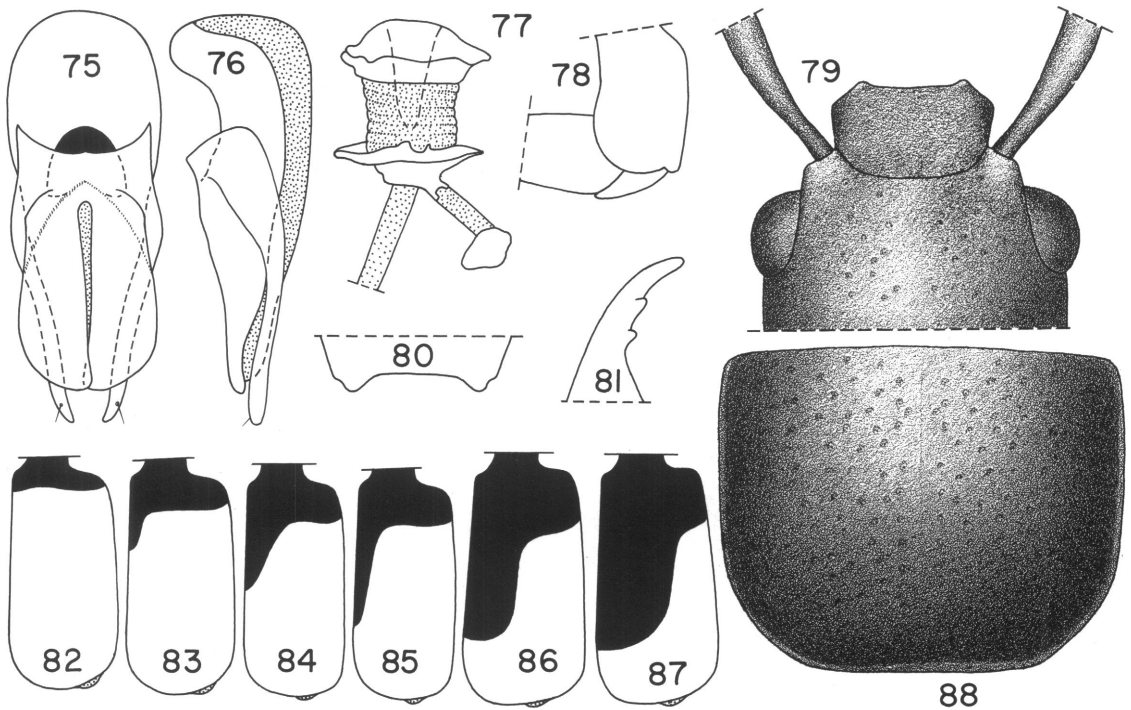
Length approximately 1.9 to 3.2 mm.

Body black; elytra whitish yellow with transverse black spot on base and generally with black spot along suture.

Dorsum of head, clypeus, and labrum black to dark reddish brown. Venter of head, mentum, and submentum dark reddish brown to reddish brown. Maxilla, labial palps, and antenna pale reddish brown to yellowish brown. Mandibles reddish brown. Pronotum black to dark reddish brown. Prohypomeron and prosternum dark reddish brown to reddish brown. Elytra whitish yellow with black spot across base (fig. 82) that extends posteriorly along suture (figs. 83-87); spot of variable size particularly along suture; spot along suture often obsolete or absent (fig. 82). Pterothoracic sternum and pleura black to reddish brown. Legs dark reddish brown with patches of black to reddish brown. Abdomen black to dark reddish brown.

Head, supra-antennal ridge, epistomal suture, clypeus, and labrum as described for *cordatus* with the following exceptions: dorsum of head shining moderately strongly, not polished; punctuation distinct, moderately strong (fig. 79). Clypeus with small tubercles on anterior margin (fig. 79). Eyes moderately small and weakly prominent (fig. 79). Width of head 0.40 to 0.45 mm.; interocular width 0.27 to 0.31 mm.; head width/interocular width 1.41 to 1.54. Labrum with anterior margin moderately strongly reflexed; margin of reflexed portion truncate to weakly emarginate. Mandibles tridentate (fig. 81).

Pronotum, elytron, and metathorax as described for *B. cordatus* with following exceptions: pronotum 0.38 to 0.44 mm. long, 0.48 to 0.56 mm. wide; pronotal width/pronotal length 1.18 to 1.28; surface strongly convex (fig. 88); basal angles absent to obsoletely developed (fig. 88), lateral margin broadly rounded from anterior margin to basal margin; basal third of lateral margin usually not distinguished from anterior two-thirds (fig. 88), but rarely basal third slightly straighter or less curved to basal margin. Anterior angles not produced. Pronotal



FIGS. 75-88. *Bledius basalis*. 75. Aedeagus, ventral view. 76. Aedeagus, lateral view. 77. Spermatheca. 78. Procoxa, trochanter, base of femur. 79. Head, dorsal view. 80. Tergum VIII, apex. 81. Mandible, left, dorsal view. 82-87. Elytra, right, variation of color pattern. 88. Pronotum.

pubescence directed toward midlongitudinal groove. Pronotal lateral marginal bead narrow and not prominently explanate. Elytra 0.48 to 0.60 mm. long; elytral length/pronotal length 1.24 to 1.37. Procoxa with lateral margin slightly expanded and slightly explanate (fig. 78).

Abdominal segments unmodified; eighth tergum deeply emarginate (fig. 80) to truncate.

Spermatheca as shown in figure 77.

Aedeagus with slender parameres (figs. 75, 76).

**Sexual Dimorphism.** There are no apparent means of distinguishing the sexes externally.

**Synonymy.** The holotypes of *Bledius ignavus* and *Bledius misellus* fit within the range of variation of *basalis*. I can find no character or group of characters that can be used to divide *basalis*.

The holotype of *misellus* has a broad sutural and basal spot on the elytra and the elytra are longer than most other specimens of *basalis*. I have studied specimens of a population from

near the type locality in Texas and the length of the elytra is variable. The elytral spot is large but variable and specimens from Florida have an elytral spot almost as large. This character appears to intergrade.

Casey (1889) stated that *basalis* and *ignavus* from New York and Rhode Island respectively, can be distinguished by the small round fovea on the mentum of *ignavus*. The holotypes of both nominal species have this fovea, and further, the distinctness of this depression is variable. Other differences between the holotypes were also found to be variable and to intergrade when many specimens were studied.

**Habitat and Distribution.** *United States:* Florida, Georgia, Maryland, New Jersey, New York, North Carolina, Rhode Island, Texas (fig. 89; see Appendix for localities).

*Bledius basalis* is known at coastal habitats from Rhode Island to Texas. The species was collected in slightly moist sand on the leeward side

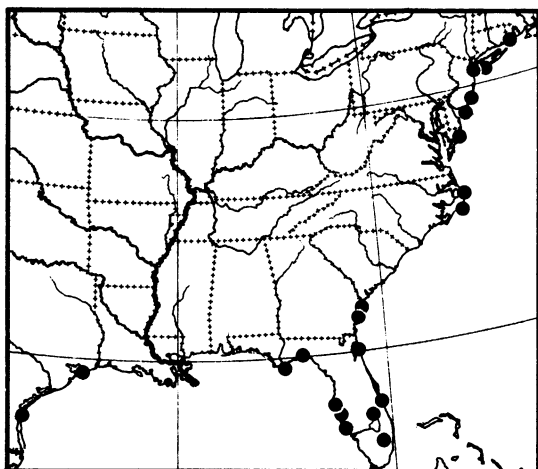


FIG. 89. Distribution of *Bledius basalis* in eastern United States.

of Assateague Island, Maryland, in slightly moist sand of beach flats near Panacea, Florida, near St. Petersburg, Florida, and at Oregon Inlet on Cape Hatteras National Seashore. Near Englewood, Florida, and St. George Island, Florida, the species was collected from slightly moist, slightly vegetated sand flats.

*Discussion.* *Bledius basalis* can be separated from *turbulentus* only with difficulty. The eyes of *basalis* (see figs. 79 and 68, table 1) are smaller and less prominent, the color of the elytra is different (see figs. 82-87 and 71-72), the species somewhat smaller, and the shape of the pronotum slightly different than for *turbulentus*. For each species there are exceptions to each of these characters. Most individuals of *basalis* have a black elytral sutural stripe and most *turbulentus* lack it; however, some specimens of *basalis* lack the stripe and a few of *turbulentus* have it. The size of the eyes and body also is bridged by intermediates. The lateral margin of the pronotum of *basalis* is generally evenly rounded from the anterior margin to the posterior margin, whereas in *turbulentus* the basal third is straight or sinuate. As a result of variation some individuals may be unidentifiable and others only by association with members of the same population.

Although not always easily separable anatomically, the species seem to occupy different

habitats when they occur together. At Punta Gorda Beach, near Englewood, Florida, the only locality where I collected *basalis* and *turbulentus* together, *turbulentus* was in very moist sand at the high tide line and intertidal zone on the leeward side of a peninsula, and *basalis* was in drier, vegetated sand some distance from the edge of the water. At other localities my habitat records for the two species indicate similar circumstances may prevail.

#### MELANOCEPHALUS GROUP

Figures 90-107, 120-122; Table 1

*Diagnosis.* This group can be separated from all other groups of *Bledius* in North America by the presence of the prosternal setigerous pit (figs. 90, 97) and the absence of the membranous lobe on the posterior margin of the elytron (fig. 95). Additional characters useful for recognition of this group are the undivided labrum (fig. 106), short parameres (figs. 99, 100), absence of setae on the second segment of the labial palp (fig. 96), absence of the protergosternal suture (fig. 97), closed procoxal fissure (fig. 97), and presence of an entire elytral epipleural ridge (fig. 91).

The species in this group is similar to those of the *basalis* group, but can be separated by the above features of the aedeagus, labial palpus, and elytron. The mandibles also have fewer denticles.

*Description.* *Bledius*. Supra-antennal horns absent (fig. 94). Clypeus with tubercle on anterior margin (fig. 94). Gular sutures of normal length and confluent to submentum and sharply divergent at base (fig. 92). Labrum (fig. 106) with anterior margin broadly emarginate, occasionally broadly sinuate; anterior margin occasionally slightly reflexed; midlongitudinal groove absent; membranous lobe as in figure 106. Labial palpus (fig. 96) with second article shorter than first or third; third article longer than first and very stout; each article narrower than preceding article; first article with seta, second and third without setae. Mentum as in figure 93. Hypopharynx as in figures 120-122. Maxillary palpus as in figure 102. Galea with numerous, curved, spinelike setae. Mandibles prominent.

Pronotal shape as in figure 98. Pronotal horns absent. Pronotal lateral marginal bead present

(fig. 97). Protergosternal suture absent (fig. 97). Procoxal fissure of moderate length and closed (fig. 97). Protrochantin concealed. Prosternal process present. Prosternum with small, setigerous pit anterior to procoxae (figs. 90, 97).

Elytron without membranous lobe on posterior margin (fig. 95); epipleural ridge present and complete (fig. 91).

Abdomen with posterior margin of eighth tergum truncate or slightly emarginate and entire, not serrulate.

Aedeagus trilobed (figs. 99, 100). Paramere short, broad, flattened, without setae and appressed to lateral side of median lobe; posterior margin partly fused to median lobe. Median lobe rounded apically, bulbous basally, broad and flattened apically; dorsal surface membranous; ventral surface nearly entirely sclerotized; apical half of ventral surface with broad, elongate depression and divided midlongitudinally. Ostium at apex.

Spermatheca lightly sclerotized; further characters as shown in figure 105.

#### 8. *Bledius melanocephalus* (Say)

Figures 90-107, 120-122; Table 1

*Oxytelus melanocephalus* Say, 1823, p. 156.  
Erichson, 1840, p. 780.

*Bledius melanocephalus* (Say): Erichson, 1840, p. 780. (Type locality: "On the banks of the Missouri above the confluence of the Platte River." Type apparently lost.)

*Bledius confinis* Fall, 1910, p. 114. (Type locality: Texas, El Paso. Holotype deposited in the Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts. Type examined.) NEW SYNONYM.

**Diagnosis.** Since *B. melanocephalus* is the only species in the *melanocephalus* group, the group characteristics can be used to separate the species from all of the known species of *Bledius* in North America.

**Description.** *melanocephalus* group.

Length 2.1 to 3.2 mm.

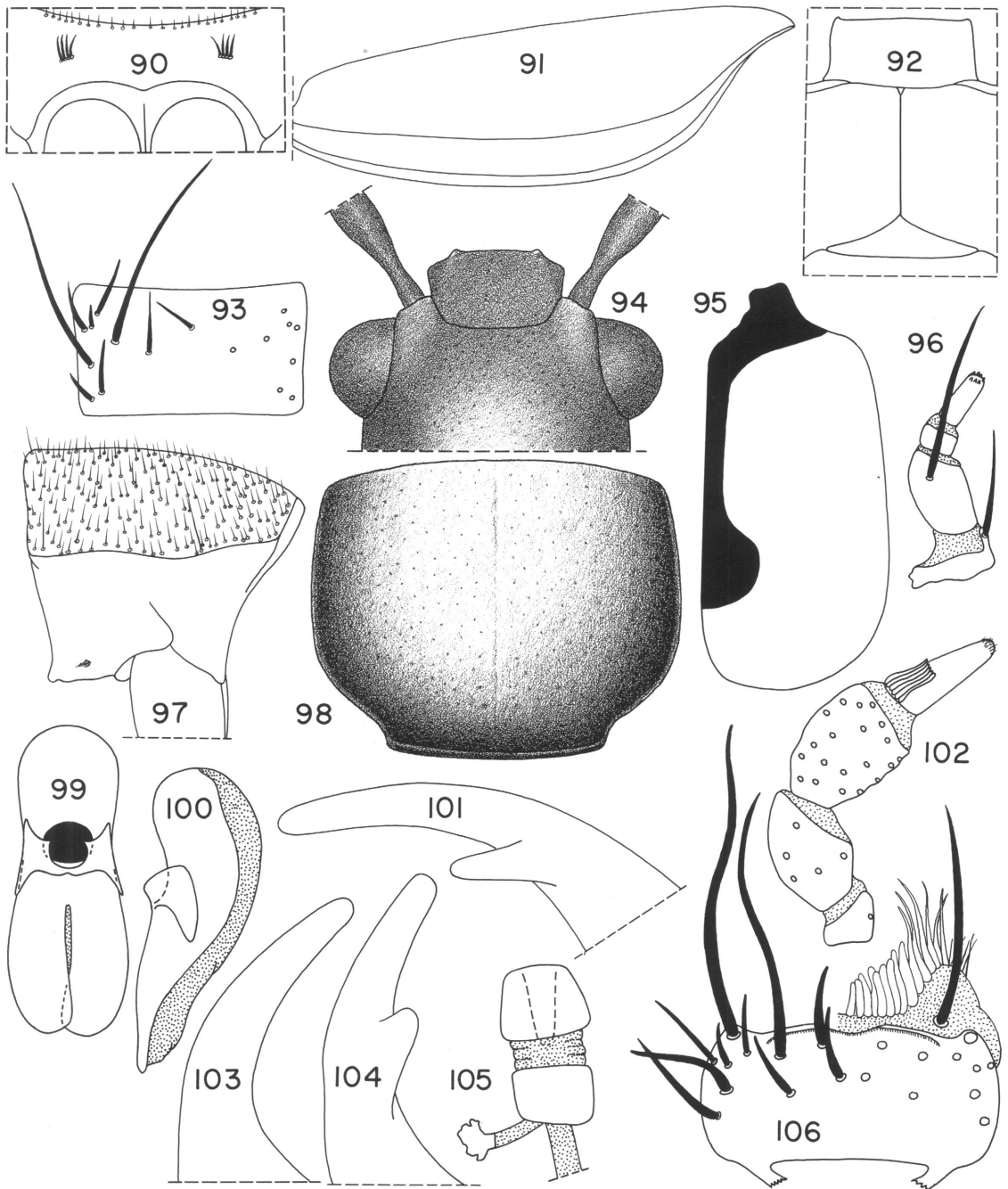
Dorsum of head, clypeus, and labrum black. Venter of head brownish black. Mentum and submentum pale reddish brown. Maxilla, labial palpus, and antenna yellowish brown. Mandible yellowish brown with infusions of brown along

base and edges. Pronotum yellowish brown to reddish brown to dark reddish brown. Prohypomeron and prosternum yellowish brown to reddish brown. Elytra yellowish to yellowish brown with infusion of brown along suture (fig. 95); width of infusion variable. Pterothoracic sterna and pleura dark brownish black to dark brown with infusions of yellowish brown to entirely yellowish brown. Legs yellowish brown. Abdomen yellowish brown to reddish brown to dark reddish brown.

Dorsum of head shining dully, not polished, with dense, microgranulate ground sculpturing and with moderately dense, shallow, fine setigerous punctation (fig. 94); pubescence and punctation absent from narrow midlongitudinal strip; pubescence moderately long; middorsal region broadly and shallowly convex and without longitudinal groove or punctiform fovea. Supra-antennal ridge low, poorly differentiated (fig. 94); surface with microgranulate ground sculpturing. Epistomal suture broadly and shallowly arcuate with suture sharply angulate at intersection with supra-antennal ridge. Clypeus shining dully, with granulate ground sculpturing and with moderately dense, setigerous punctation; pubescence absent from narrow median line; anterior margin with small tubercles present and well developed (fig. 94) or poorly developed, or tubercles absent. Eyes large (fig. 94). Lateral side of head with glabrous strip extending from base of head toward but not reaching posterior margin of eye; glabrous strip broad at base and strongly attenuated and narrow anteriorly. Venter of head with microgranulate ground sculpturing. Width of head 0.4 to 0.5; interocular width 0.2 to 0.3; head width/interocular width 1.5 to 1.7. Labrum with microgranulate ground sculpturing and shallow, setigerous punctation; anterior margin broadly sinuate and slightly reflexed (fig. 106). Mandibles edentate (fig. 103) or bidentate (figs. 101, 104); when bidentate, length of basal (or dorsal) denticle variable; anterior (or ventral) denticle long and slender.

Pronotum 0.4 to 0.5 mm. long; 0.4 to 0.6 mm. wide; pronotal width/pronotal length 1.2 to 1.3; surface moderately strongly convex and of more or less pentagonal shape (fig. 98); basal angles distinctly developed (fig. 98); lateral margin with anterior portion broadly and shallowly





FIGS. 90-106. *Bledius melanocephalus*. 90. Prosternum, anterior portion. 91. Elytron, left, lateral view. 92. Head, ventral view. 93. Mentum, ventral view, setae removed from right side. 94. Head. 95. Elytron, right. 96. Labial palpus. 97. Prothorax, lateral view. 98. Pronotum. 99. Aedeagus, ventral view. 100. Aedeagus, lateral view. 101. Mandible, right, dorsal view. 102. Maxillary palpus, setae removed. 103. Mandible, left, dorsal view. 104. Mandible, left, dorsal view. 105. Spermatheca. 106. Labrum, dorsal view, setae of right side and left epipharyngeal lobe removed.

arcuate and anterior portion of lateral margins nearly parallel to one another; posterior portion of lateral margin straight and strongly convergent to basal angles. Pronotum with surface shining dully, not polished, with microgranulate ground sculpturing and with fine, shallow, setigerous punctation; midlongitudinal groove present, fine and shallow (fig. 98); pubescence moderately long. Prohypomeron and prosternum with microreticulate ground sculpturing. Elytra 0.6 to 0.7 mm. long; elytral length/pronotal length 1.4 to 1.6; surface shining dully, not polished and with dense, moderately deep, setigerous punctation. Metathoracic wings fully developed.

Abdominal segments unmodified.

Spermatheca as shown in figure 105.

*Sexual Dimorphism.* There is no apparent means of distinguishing the sexes externally.

*Variation.* The head is nearly always black and the elytra yellowish brown, but the prothorax and abdomen vary from yellowish brown to dark reddish brown. A large series collected in Arkansas is basically yellowish brown, and a population from Belen, New Mexico, is dark reddish brown. The populations from Nebraska are more variable and exhibit the whole range of variation of color.

*Bledius melanocephalus* has mandibles that are unique in the North American fauna of *Bledius* because of the absence of a basal (dorsal) denticle. However, this state apparently is not common. In Nebraska and Arkansas about 12 to 13 percent of the individuals have edentate mandibles. When the mandibles are bidentate the length of the basal (or dorsal) denticle is variable. All specimens taken at Belen, New Mexico, have bidentate mandibles, and the basal denticle in all cases is large. Mandibular denticulation is not sex linked, as both sexes have both types.

*Synonyms.* In the original description *Bledius confinis* was put in the *basalis* group (Fall, 1910) where it is different from all the other species that have been placed there. This species was not then and, until now, has not been compared with *melanocephalus*. Although Say stated that *melanocephalus* has edentate mandibles and the type of *confinis* has bidentate mandibles, *melanocephalus* is variable with respect to the mandibular denticulation. My concept of *melanocephalus* includes, as part of the range of variation, the type of *confinis*.

*Habitat and Distribution.* *Canada:* Manitoba. *United States:* Arkansas, Iowa, Montana, Nebraska, New Mexico, Oklahoma, South Dakota (fig. 107; see Appendix for localities).

Most of the collection localities for *melanocephalus* are along the Mississippi drainage with isolated collections in southern Manitoba and on the Rio Grande near Belen, New Mexico. The species probably lives along many parts of the Rio Grande and Pecos rivers in Texas and New Mexico, and with further collecting it may be found on other Texas rivers emptying into the Gulf of Mexico.

At collecting sites on the Rio Grande at Belen, New Mexico; on the Arkansas River at Fort Smith, Ozark, and Pine Bluff, Arkansas; on the Red River near Hugo, Oklahoma; and on the Mississippi River at West Memphis, Arkansas, *melanocephalus* is one of the most abundant and widespread of the species of *Bledius*. At these localities *melanocephalus* makes a short, shallow, molelike tunnel in very moist sand of unvegetated sand flats. In some instances the species is found nearly to the edge of the water.

By contrast, on the Platte River, near Wahoo, Nebraska, on the Elkhorn River at West Point, Nebraska, on the Verdigre River near Niobrara, and on the Niobrara River near Hay Springs, Nebraska, the species is not one of the dominant species, not particularly abundant, and has a

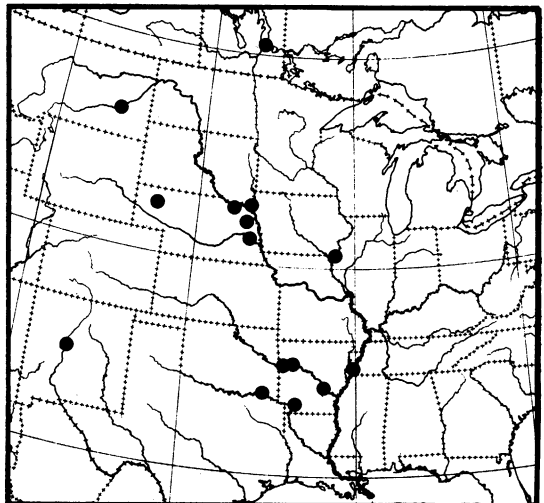
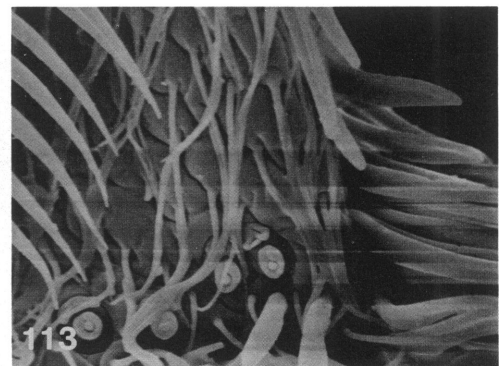
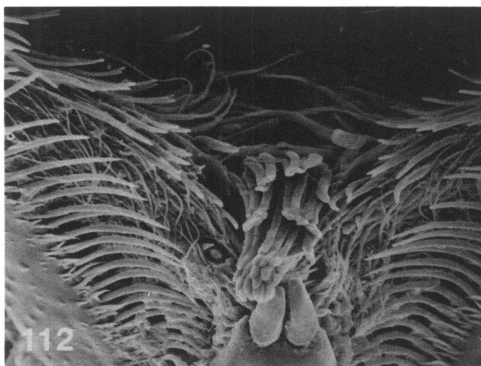
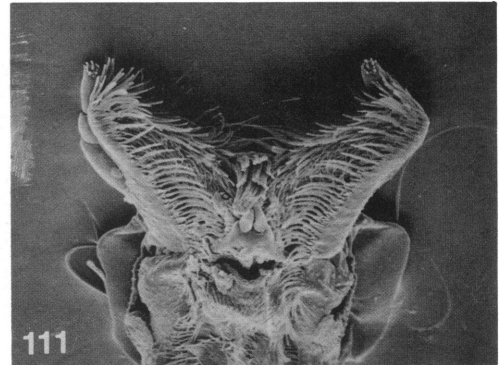
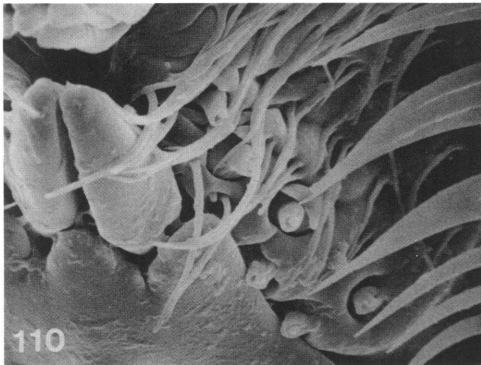
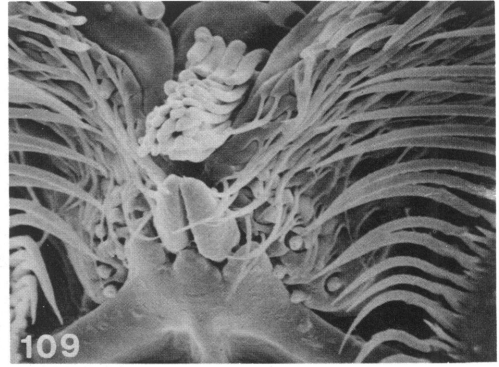
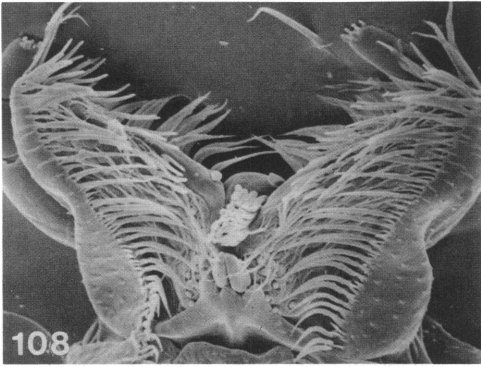


FIG. 107. Distribution of *Bledius melanocephalus* in central United States and Canada.

restricted habitat. Near Niobrara, Nebraska on the Verdigre River, *Bledius melanocephalus* is found in 6-inch-high moist sand banks near the edge of the water. The burrow casts are difficult to see. They are small, hemispherical casts rather

than short elevations that follow the outline of the tunnel.

*Discussion.* With the exception of the shift of the species from *Oxytelus* to *Bledius* (Erichson, 1840) and until this monograph, *melanocephalus*

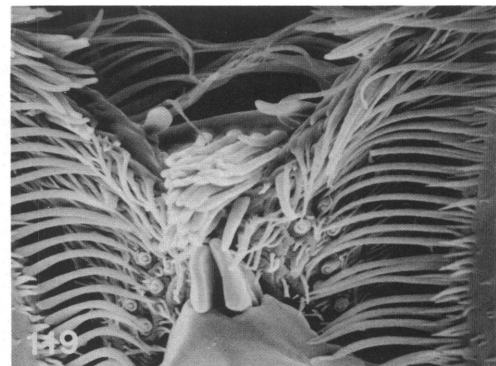
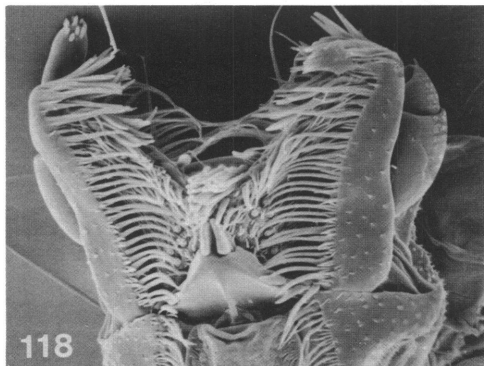
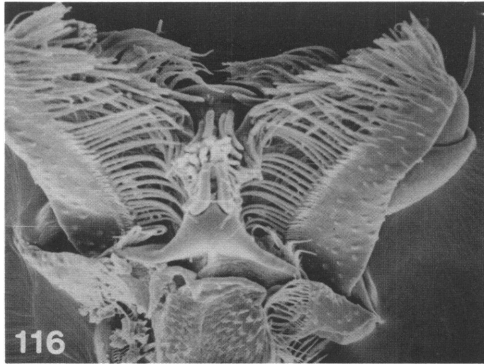
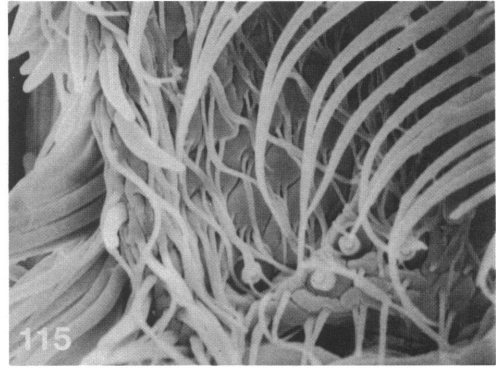
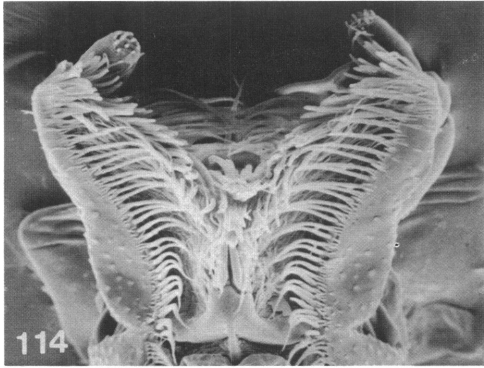


FIGS. 108-110. *Bledius cordatus*, hypopharynx. 108. General aspect, 300X. 109. Central region, 910X. 110. Right basal region, 1820X.

FIGS. 111-113. *Bledius opaculus*, hypopharynx. 111. General aspect, 260X. 112. Central region, 650X. 113. Left side, dorsolateral view, 1830X.

was not discussed or described in the literature and apparently was unknown by anyone after Say's description. As so little was known about

the species, I deduced its identity by correlating the brief description with specimens of *Bledius* collected at the type locality of *melanocephalus*.



FIGS. 114, 115. *Bledius thinopus*, hypopharynx. 114. General aspect, 500X. 115. Right side, laterodorsal view. 1750X.

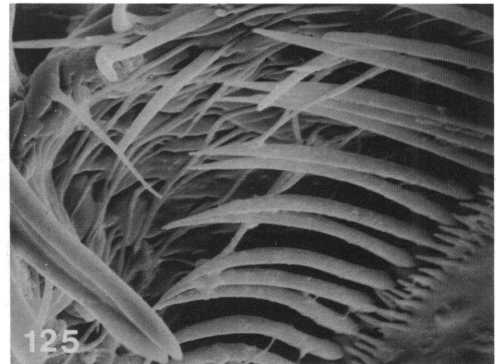
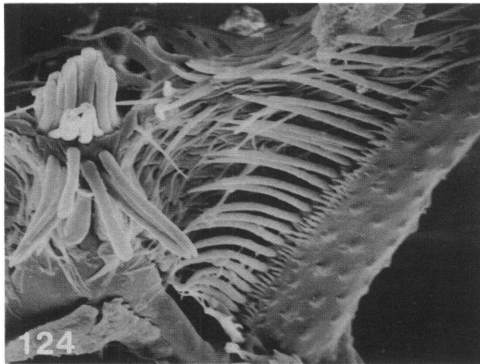
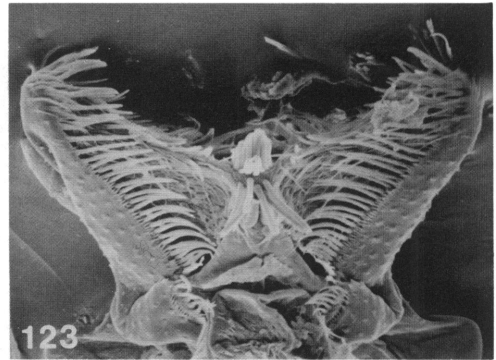
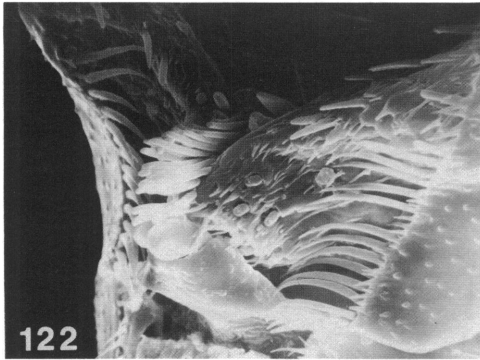
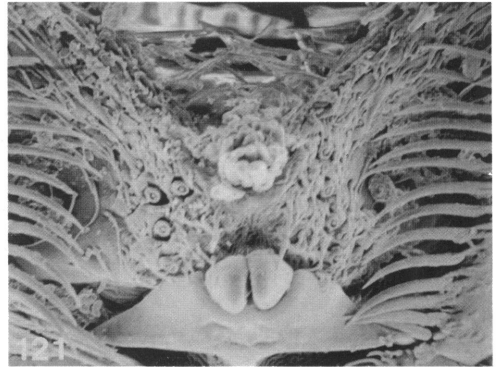
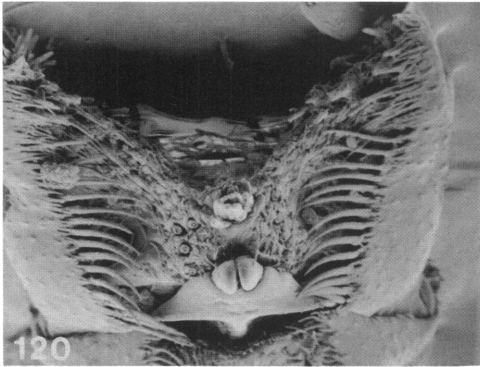
FIG. 116. *Bledius neglectus*, hypopharynx, general aspect, 475X.

FIG. 117. *Bledius turbulentus*, hypopharynx, general aspect, 460X.

FIGS. 118, 119. *Bledius dimidiatus*, hypopharynx. 118. General aspect, 475X. 119. Central region, 950X.

Fortunately, in his description of the species, in addition to size and color, Say (1823) mentioned the "unarmed" mandibles. The absence of mandibular denticulation is important because all other North American species of *Bledius* have denticles. Individuals with edentate

mandibles, collected near the type locality of *melanocephalus*, matched *melanocephalus* in the other characters attributed to it. However, since not all individuals of the sample lack denticles, Say's observation assumes even more importance for recognition of the form he found.



FIGS. 120-122. *Bledius melanocephalus*, hypopharynx. 120. General aspect, 700 $\times$ . 121. Central region, 1400 $\times$ . 122. Right side, dorsolateral view. 1000 $\times$ .

FIGS. 123-125. *Bledius basalis*, hypopharynx. 123. General aspect, 525 $\times$ . 124. Central region and right side, 1050 $\times$ . 125. Right side, 2100 $\times$ .

*ARMATUS* GROUP  
 Figures 126-391; Table 2

*Diagnosis.* The *armatus* group can be distinguished from all the other North American groups of *Bledius*, except the *semiferrugineus* group, by the medially divided labrum (fig. 151), the presence of the completely developed pronotal marginal bead (fig. 246), the closed procoxal fissure (fig. 246), the absence of a well-defined prosternal pit (figs. 246, 251), the presence of the membranous lobe of the posterior margin of the elytra (fig. 250) and the presence of the elytral epipleural ridge (fig. 249). Most of the species of the *armatus* group lack the protergosternal suture (fig. 246) and can be thusly separated from the *semiferrugineus* group. Those species of the *armatus* group with the protergosternal suture usually have a midlongitudinal groove dividing the median tumescence of the dorsum of the head into a pair of tubercles. The males of the *armatus* group do not have sternum VIII modified as do the species of the *semiferrugineus* group. Finally the most important, but most difficult to use character is the hypopharynx. The hypopharynx of the *armatus* group has longer cuticular processes and *semiferrugineus* has shorter cuticular processes relative to the length of the lateral and median rows of spines (figs. 359-391; compare with Herman, 1972, figs. 424-447). (See also the Discussion following Description of the *armatus* group.)

*Description.* *Bledius*. Supra-antennal horns absent (figs. 126, 264). Clypeal tubercles present and small to large (figs. 155, 301). Gular sutures confluent to submentum and sharply divergent at base (fig. 247). Labrum with acute, usually shallow, median emargination and with midlongitudinal groove continuous with emargination (fig. 234); anterior margin slightly reflexed and sinuate (figs. 234, 266) to slightly bilobed (fig. 135). Labial palpus with second segment longer than first or third (fig. 312); articles each slightly narrower than preceding article; basal and second article each with one seta. Hypopharynx as in figures 359-391; surface with numerous long cuticular processes; cuticular processes longer than median and lateral rows of setae. Maxillary palpus as in figure 248. Galea with numerous spinelike setae (fig. 344). Mandibles moderately well developed.

Pronotal shape variable. Pronotal horn absent (figs. 128, 221). Pronotal lateral marginal bead present and entire (fig. 246). Protergosternal suture usually absent (fig. 246), at times present; suture, when present, incomplete or complete and obsolete to moderately well developed; suture, when present, and lateral marginal bead slightly convergent apically. Procoxal fissure closed (fig. 246). Protrochantin concealed (fig. 246). Prosternal process present. Prosternum with large patch of scattered pubescence laterad and anterior to procoxa (fig. 251) and without small, densely setigerous pit anterior to procoxa.

Elytra with small membranous lobe on posterior margin (fig. 250); epipleural ridge present and complete (fig. 249).

Abdomen with posterior margin of tergum VIII emarginate and margin serrulate to serrate (figs. 289, 343).

Aedeagus trilobed (figs. 331-333). Median lobe moderately acuminate to rounded apically and dorsoventrally flattened apically; base bulbous; dorsal surface membranous; apical half of ventral surface of median lobe with apex longitudinally bisected; ventral surface sclerotized; ostium at apex. Parameres extending from ventral surface, around to dorsal surface, and enveloping dorsal surface of median lobe; parameres broad; median surface with membrane capable of inflation (when paramere dried, median surface scooped out); parameres apically acuminate and longer than median lobe.

Spermatheca as shown in figures 132, 148, 193, 195, 215, 228.

*Discussion.* The only species known in this group are from the United States, Canada, and Mexico and are presented herein.

Some species of the *armatus* group always possess the protergosternal suture, others do not. Most species lack the suture. The possession of the suture creates some problems for separation of the *armatus* and *semiferrugineus* groups. This confusion is most clearly resolved by the presence of long, cuticular processes of the hypopharynx. These processes can be seen with a slide preparation of the hypopharynx under a compound microscope (figs. 359-387). The cephalic characters discussed in the preceding Diagnosis and those given by Herman (1972, p. 155, footnotes) for several species of the *armatus* group will also enable separation of the *armatus* and *semiferrugineus* groups.

TABLE 2  
 Measurements (in Millimeters) of the Head, Prothorax, and Elytra  
 of Adults of the Species of the *armatus* Group  
 (The mean, standard deviation, and sample size are given in that order for each sample.)

	Head Width	Interocular Width	Pronotal Width	Pronotal Length	Elytral Length	Head Width		Pronotal Width	Pronotal Length	Elytral Length
						Interocular Width	Elytral Length			
<i>aquilomarius</i>	0.61 0.02 20	0.42 0.01 20	0.74 0.03 20	0.67 0.03 20	0.83 0.04 20	1.46 0.02 20	1.10 0.01 20	1.10 0.01 20	1.23 0.02 20	1.23 0.02 20
<i>bellicus</i> ♂	0.88 0.04 20	0.54 0.03 20	1.08 0.06 20	0.93 0.05 20	1.19 0.06 20	1.63 0.03 20	1.16 0.01 20	1.16 0.01 20	1.28 0.03 20	1.28 0.03 20
♀	0.87 0.04 20	0.54 0.03 20	0.99 0.06 20	0.86 0.05 20	1.19 0.08 20	1.62 0.03 20	1.16 0.02 20	1.16 0.02 20	1.40 0.04 20	1.40 0.04 20
<i>consimilis</i> ♂	0.81 0.03 20	0.52 0.02 20	1.03 0.05 20	0.92 0.04 20	1.15 0.04 20	1.57 0.03 20	1.12 0.02 20	1.12 0.02 20	1.25 0.03 20	1.25 0.03 20
♀	0.78 0.03 20	0.52 0.01 20	0.91 0.03 20	0.82 0.03 20	1.11 0.04 20	1.57 0.03 20	1.12 0.02 20	1.12 0.02 20	1.36 0.04 20	1.36 0.04 20
<i>episcopalis</i> ♂	0.80 0.04 20	0.54 0.03 20	0.96 0.06 20	0.85 0.06 20	1.06 0.06 20	1.48 0.02 20	1.14 0.02 20	1.14 0.02 20	1.25 0.04 20	1.25 0.04 20
♀	0.78 0.04 19	0.52 0.03 19	0.87 0.05 19	0.76 0.04 19	1.04 0.06 19	1.50 0.02 19	1.14 0.02 19	1.14 0.02 19	1.36 0.04 19	1.36 0.04 19
<i>eximius</i>										
New Mexico ♂	0.73 0.07 2	0.53 0.04 2	0.84 0.11 2	0.79 0.10 2	0.93 0.09 2	1.40 0.01 2	1.07 0.00 2	1.07 0.00 2	1.19 0.03 2	1.19 0.03 2
♀	0.75 0.04 6	0.53 0.03 6	0.86 0.05 6	0.80 0.03 6	0.94 0.05 6	1.35 0.16 6	1.08 0.03 6	1.08 0.03 6	1.18 0.03 6	1.18 0.03 6
Utah ♂	0.74 0.06 12	0.52 0.04 12	0.89 0.11 12	0.81 0.10 12	0.91 0.09 12	1.42 0.02 12	1.10 0.02 12	1.10 0.02 12	1.13 0.04 12	1.13 0.04 12
♀	0.77 0.04 8	0.57 0.08 8	0.89 0.06 8	0.79 0.04 8	0.92 0.06 8	1.36 0.17 8	1.12 0.02 8	1.12 0.02 8	1.15 0.03 8	1.15 0.03 8
Oregon ♂	0.98 0.05 20	0.66 0.03 20	1.25 0.07 20	1.06 0.06 20	1.35 0.06 20	1.48 0.03 20	1.18 0.02 20	1.18 0.02 20	1.28 0.03 20	1.28 0.03 20
♀	0.96 0.04 20	0.65 0.03 20	1.13 0.06 20	0.96 0.05 20	1.35 0.07 20	1.48 0.02 20	1.17 0.02 20	1.17 0.02 20	1.39 0.03 20	1.39 0.03 20
<i>fenyesi</i>										
Millers Landing Baja California	0.61 0.02 9	0.44 0.01 9	0.79 0.02 9	0.74 0.01 9	0.96 0.03 9	1.39 0.02 9	1.07 0.02 9	1.07 0.02 9	1.29 0.05 9	1.29 0.05 9
San Diego, California	0.62 0.02 20	0.44 0.01 20	0.79 0.03 20	0.74 0.03 20	0.93 0.05 20	1.41 0.02 20	1.07 0.02 20	1.07 0.02 20	1.26 0.04 20	1.26 0.04 20
Los Angeles, California	0.65 0.02 20	0.47 0.02 20	0.85 0.03 20	0.79 0.03 20	1.01 0.04 20	1.40 0.02 20	1.08 0.02 20	1.08 0.02 20	1.28 0.04 20	1.28 0.04 20
Pismo Beach, California	0.61 0.02 8	0.44 0.01 8	0.83 0.03 8	0.78 0.03 8	0.94 0.04 8	1.38 0.02 8	1.06 0.02 8	1.06 0.02 8	1.21 0.03 8	1.21 0.03 8
San Francisco, California	0.64 0.02 4	0.46 0.02 4	0.81 0.04 4	0.76 0.03 4	0.98 0.05 4	1.39 0.02 4	1.08 0.01 4	1.08 0.01 4	1.29 0.02 4	1.29 0.02 4



TABLE 2 – (Continued)

	Head Width	Interocular Width	Pronotal Width	Pronotal Length	Elytral Length	Head Width		Elytral Length	Pronotal		Elytral Length	
						Interocular Width	Pronotal Length		Width	Length		
<i>flavipennis</i>												
Western California ♂	0.93 0.10 6	0.64 0.07 6	1.09 0.15 6	1.00 0.14 6	1.23 0.14 6	1.53 0.04 6	1.10 0.02 6	1.24 0.06 6	1.10 0.02 6	1.24 0.06 6	1.24 0.06 6	
♀	0.93 0.04 7	0.61 0.03 7	1.04 0.06 7	0.95 0.06 7	1.26 0.05 7	1.54 0.01 7	1.09 0.02 7	1.33 0.03 7	1.09 0.02 7	1.33 0.03 7	1.33 0.03 7	
New Mexico ♂	0.90 0.04 20	0.57 0.03 20	0.99 0.06 20	0.90 0.05 20	1.10 0.05 20	1.59 0.02 20	1.10 0.02 20	1.22 0.03 20	1.10 0.02 20	1.22 0.03 20	1.22 0.03 20	
♀	0.87 0.04 20	0.54 0.03 20	0.90 0.05 20	0.82 0.04 20	1.07 0.07 20	1.61 0.02 20	1.10 0.02 20	1.30 0.04 20	1.10 0.02 20	1.30 0.04 20	1.30 0.04 20	
Nevada ♂	0.84 0.04 20	0.53 0.03 20	0.96 0.06 20	0.87 0.06 20	1.15 0.06 20	1.60 0.03 20	1.10 0.02 20	1.33 0.04 20	1.10 0.02 20	1.33 0.04 20	1.33 0.04 20	
♀	0.83 0.04 20	0.51 0.03 20	0.88 0.05 20	0.81 0.05 20	1.15 0.05 20	1.61 0.02 20	1.09 0.01 20	1.42 0.04 20	1.09 0.01 20	1.42 0.04 20	1.42 0.04 20	
Utah ♂ and ♀	0.76 0.05 20	0.47 0.03 20	0.79 0.07 20	0.72 0.06 20	1.05 0.08 20	1.61 0.03 20	1.10 0.02 20	1.46 0.05 20	1.10 0.02 20	1.46 0.05 20	1.46 0.05 20	
Washington ♂	0.73 0.03 20	0.48 0.02 20	0.83 0.04 20	0.76 0.04 20	0.97 0.05 20	1.54 0.03 20	1.10 0.01 20	1.28 0.03 20	1.10 0.01 20	1.28 0.03 20	1.28 0.03 20	
♀	0.71 0.04 20	0.46 0.03 20	0.77 0.06 20	0.76 0.06 20	0.98 0.08 20	1.55 0.03 20	1.10 0.02 20	1.40 0.04 20	1.10 0.02 20	1.40 0.04 20	1.40 0.04 20	
Eastern California ♂	0.69 0.03 9	0.45 0.02 9	0.79 0.04 9	0.74 0.05 9	0.90 0.04 9	1.53 0.03 9	1.07 0.03 9	1.22 0.04 9	1.07 0.03 9	1.22 0.04 9	1.22 0.04 9	
♀	0.68 0.04 16	0.44 0.03 16	0.73 0.05 16	0.68 0.05 16	0.90 0.05 16	1.56 0.04 16	1.07 0.02 16	1.32 0.03 16	1.07 0.02 16	1.32 0.03 16	1.32 0.03 16	
<i>ineptus</i>												
Nebraska ♂	0.75 0.03 20	0.49 0.02 20	0.92 0.04 20	0.87 0.04 20	1.03 0.04 20	1.54 0.03 20	1.06 0.02 20	1.18 0.03 20	1.06 0.02 20	1.18 0.03 20	1.18 0.03 20	
♀	0.73 0.03 20	0.47 0.02 20	0.84 0.04 20	0.79 0.04 20	1.01 0.05 20	1.55 0.03 20	1.06 0.02 20	1.27 0.03 20	1.06 0.02 20	1.27 0.03 20	1.27 0.03 20	
Utah ♂	0.68 0.02 20	0.44 0.02 20	0.83 0.04 20	0.79 0.04 20	0.95 0.04 20	1.54 0.03 20	1.06 0.03 20	1.22 0.03 20	1.06 0.03 20	1.22 0.03 20	1.22 0.03 20	
♀	0.67 0.02 20	0.44 0.02 20	0.75 0.03 20	0.71 0.04 20	0.93 0.04 20	1.53 0.02 20	1.06 0.02 20	1.31 0.03 20	1.06 0.02 20	1.31 0.03 20	1.31 0.03 20	
Texas ♂	0.78 0.03 9	0.47 0.02 9	0.89 0.05 9	0.82 0.05 9	1.01 0.04 9	1.68 0.03 9	1.08 0.02 9	1.23 0.04 9	1.08 0.02 9	1.23 0.04 9	1.23 0.04 9	
♀	0.73 0.04 16	0.44 0.02 16	0.79 0.05 16	0.72 0.05 16	0.95 0.06 16	1.66 0.02 16	1.10 0.01 16	1.32 0.02 16	1.10 0.01 16	1.32 0.02 16	1.32 0.02 16	
<i>monstratus</i>												
British Columbia	0.67 0.03 9	0.49 0.02 9	0.86 0.03 9	0.79 0.04 9	0.86 0.05 9	1.41 0.04 9	1.08 0.01 9	1.08 0.02 9	1.08 0.01 9	1.08 0.02 9	1.08 0.02 9	
San Francisco, California	0.67 0.02 18	0.49 0.02 18	0.86 0.03 18	0.82 0.03 18	0.85 0.03 18	1.40 0.03 18	1.06 0.02 18	1.03 0.03 18	1.06 0.02 18	1.03 0.03 18	1.03 0.03 18	
Aptos, California	0.64 0.02 10	0.46 0.02 10	0.83 0.04 10	0.78 0.05 10	0.76 0.03 10	1.42 0.01 10	1.06 0.02 10	0.98 0.05 10	1.06 0.02 10	0.98 0.05 10	0.98 0.05 10	
Carmel, California	0.68 0.03 20	0.49 0.01 20	0.92 0.04 20	0.88 0.03 20	0.81 0.03 20	1.38 0.02 20	1.05 0.01 20	0.91 0.03 20	1.05 0.01 20	0.91 0.03 20	0.91 0.03 20	
Point Sur, California	–	–	–	0.88 0.03 20	0.82 0.03 20	–	–	0.93 0.02 20	–	0.93 0.02 20	0.93 0.02 20	
Lucia, California	–	–	–	0.81 0.04 20	0.84 0.03 20	–	–	1.03 0.04 20	–	1.03 0.04 20	1.03 0.04 20	
Cambria, California	–	–	–	0.84 0.03 20	0.88 0.03 20	–	–	1.04 0.04 20	–	1.04 0.04 20	1.04 0.04 20	
Cayucos, California	–	–	–	0.80 0.04 20	0.81 0.04 20	–	–	1.02 0.03 20	–	1.02 0.03 20	1.02 0.03 20	

TABLE 2 – (Continued)

	Head Width	Interocular Width	Pronotal Width	Pronotal Length	Elytral Length	Head Width		Pronotal Width	Elytral Length
						Interocular Width	Pronotal Length		
<i>nitidiceps</i> ♂	1.14 0.04 11	0.81 0.02 11	1.38 0.07 11	1.33 0.06 11	1.47 0.05 11	1.41 0.02 11	1.03 0.01 11	1.10 0.02 11	
	1.04 0.05 20	0.70 0.15 20	1.21 0.08 20	1.17 0.07 20	1.36 0.06 20	1.41 0.02 20	1.03 0.01 20	1.16 0.03 20	
<i>notialis</i> ♂	0.85 0.05 20	0.53 0.04 20	1.03 0.07 20	0.94 0.07 20	1.13 0.07 20	1.63 0.04 20	1.10 0.02 20	1.20 0.04 20	
	0.89 0.04 20	0.53 0.02 20	0.99 0.05 20	0.91 0.05 20	1.14 0.05 20	1.66 0.03 20	1.09 0.03 20	1.26 0.03 20	
<i>politus</i> Florida ♂	0.78 0.03 20	0.49 0.02 20	0.91 0.04 20	0.87 0.03 20	1.02 0.04 20	1.57 0.02 20	1.04 0.02 20	1.18 0.02 20	
	0.77 0.03 20	0.48 0.02 20	0.81 0.04 20	0.77 0.04 20	1.00 0.05 20	1.59 0.03 20	1.06 0.01 20	1.31 0.03 20	
Maryland ♂	0.67 0.04 7	0.45 0.03 7	0.78 0.06 7	0.74 0.07 7	0.84 0.08 7	1.49 0.03 7	1.05 0.03 7	1.13 0.02 7	
	0.67 0.03 13	0.45 0.02 13	0.75 0.04 13	0.69 0.04 13	0.86 0.05 13	1.50 0.04 13	1.09 0.01 13	1.25 0.04 13	
<i>specularis</i> California ♂	0.77 0.02 20	0.53 0.02 20	0.95 0.03 20	0.96 0.06 20	1.11 0.04 20	1.48 0.02 20	0.98 0.02 20	1.15 0.02 20	
	0.74 0.02 20	0.50 0.01 20	0.87 0.03 20	0.87 0.04 20	1.06 0.04 20	1.47 0.02 20	0.99 0.01 20	1.21 0.04 20	
Oregon ♂	0.72 0.04 20	0.50 0.03 20	0.88 0.06 20	0.87 0.06 20	1.04 0.05 20	1.44 0.03 20	1.02 0.02 20	1.20 0.04 20	
	0.71 0.02 20	0.49 0.02 20	0.82 0.04 20	0.81 0.04 20	1.03 0.04 20	1.44 0.02 20	1.02 0.01 20	1.27 0.02 20	
<i>strenuus</i> California ♂	1.05 0.05 20	0.69 0.04 20	1.33 0.07 20	1.23 0.07 20	1.47 0.07 20	1.52 0.03 20	1.07 0.01 20	1.19 0.02 20	
	1.00 0.04 20	0.67 0.03 20	1.17 0.05 20	1.09 0.04 20	1.39 0.05 20	1.50 0.02 20	1.08 0.01 20	1.28 0.03 20	
Oregon ♂	0.99 0.04 11	0.68 0.03 11	1.33 0.07 11	1.21 0.06 11	1.30 0.06 11	1.47 0.02 11	1.10 0.02 11	1.07 0.02 11	
	0.95 0.04 17	0.65 0.02 17	1.18 0.05 17	1.08 0.05 17	1.25 0.05 17	1.45 0.02 17	1.09 0.02 17	1.15 0.01 17	

9. *Bledius episcopalis* Fall

Figures 126-137, 359-361; Table 2

*Bledius episcopalis* Fall, 1910, p. 104. Notman, 1920, p. 696. (Type locality: California, Bishop. Holotype in the Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts. Type examined.)

**Diagnosis.** The males, with tridentate mandibles (fig. 133), can be distinguished from other groups because the basal (third) mandibular denticle is distinctly separated from the others, the pronotal punctation is moderately coarse (fig. 128), and the abdomen concolorous dark reddish brown to black. The females, with bidentate mandibles (fig. 134), can be separated from others in the group by the obsolete to moderately well-developed pronotal midlongitudinal groove (fig. 129), distinct pronotal basal angles, deeply divided tumescence of the head (fig. 127), moderately densely pubescent, dark reddish brown to black abdomen and nearly straight, convergent basal third of the pronotal lateral margin.

**Description.** *armatus* group.

Length 3.8 to 5.2 mm.

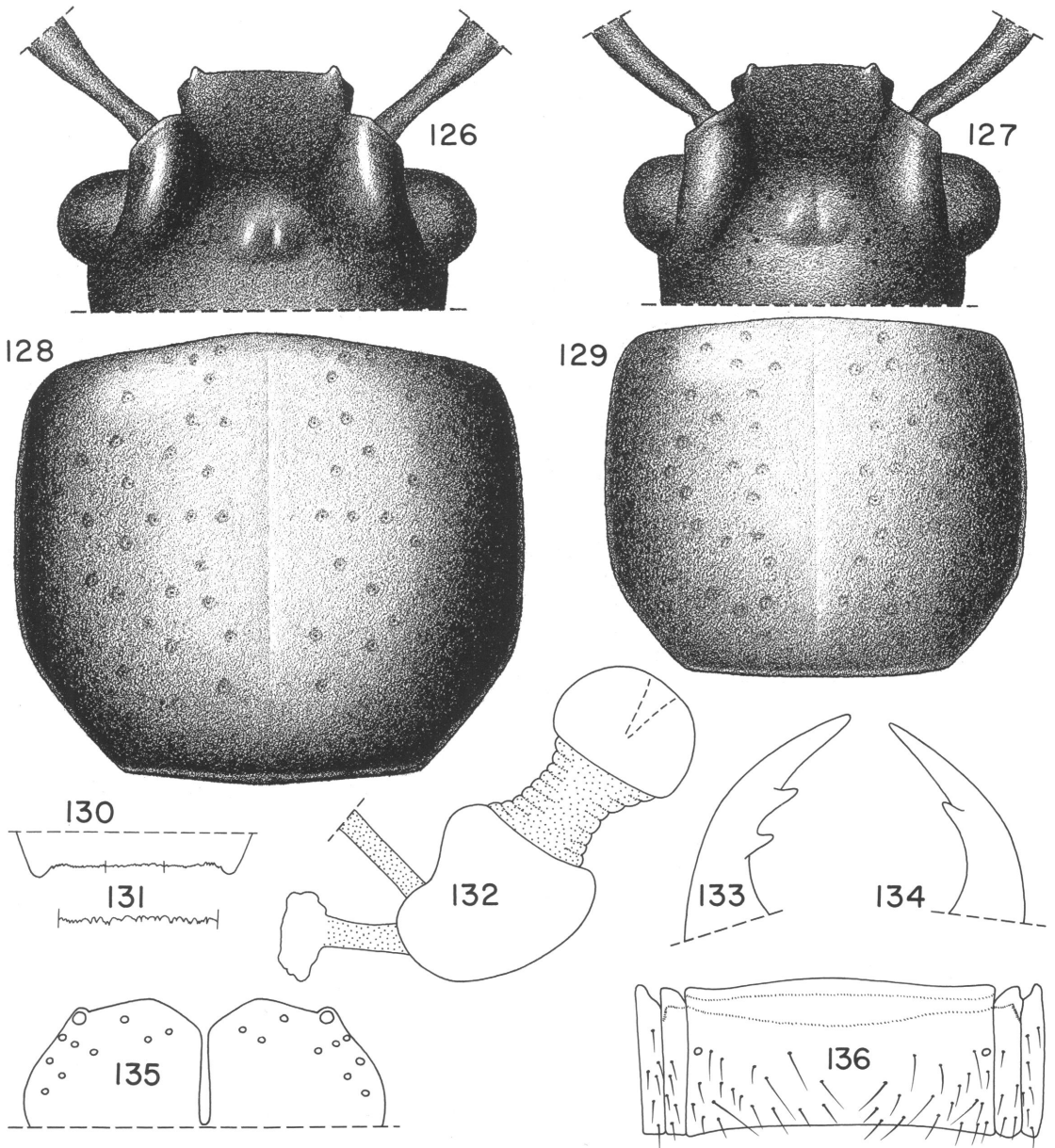
Color black or dark reddish brown with reddish or orangish elytra.

Dorsum of head, clypeus, labrum, venter of head, mentum, and submentum black to dark reddish brown. Maxilla, labial palpus, and antenna reddish brown to yellowish brown. Mandibles reddish brown. Pronotum black to dark reddish brown. Prohypomeron and prosternum dark reddish brown to reddish brown. Elytron reddish brown to yellowish brown and usually with blackish or reddish brown infusion along base; epipleuron concolorous with disk. Pterothoracic sterna and pleura black to dark reddish brown. Legs reddish brown to yellowish brown. Abdomen black to dark reddish brown.

Dorsum of head shining dully, not polished; surface with dense microgranulate ground sculpturing and sparse, shallow, fine setigerous punctation; pubescence and punctation absent from midlongitudinal stripe; pubescence moderately long; middorsal region bituberculate (figs. 126, 127); tubercles of male (fig. 126) larger, higher, and farther apart than on female (fig. 127); separation of tubercles forming midlongitudinal groove that at times extends to or nearly to epi-

stomal suture. Supra-antennal ridge of male high and robust, that of female lower and less robust; anterior portion of supra-antennal ridge with strong transverse groove that extends on to lateral sides; surface shining dully and with microgranulate ground sculpturing; apex usually polished. Dorsum of head without distinct, well-developed postocular groove. Epistomal suture broadly and shallowly arcuate medially and sharply angulate at juncture with supra-antennal ridge. Clypeus sharply depressed at epistomal suture with clypeal surface at lower level than dorsum; surface shining dully, with dense granulate ground sculpturing and sparse, fine, setigerous punctation; pubescence absent from midlongitudinal strip; anterior margin with moderately large, slender tubercle near lateral margin; tubercle of male larger and stouter than that of female. Eye moderately large (figs. 126, 127). Width of head 0.71 to 0.89 mm.; interocular width 0.46 to 0.59 mm.; head width/interocular width 1.44 to 1.57. Labrum with microgranulate ground sculpturing and shallow setigerous punctation; anterior margin weakly but distinctly reflexed and with deep and broad median V-shaped emargination (fig. 135). Mandibles of female bidentate (fig. 134). Mandibles of male tridentate with basal and middle denticles completely separated (fig. 133). Antennomeres 3 to 7 without ridge or carina encircling apex (as in fig. 315); apex of antenna without club.

Pronotum 0.68 to 0.98 mm. long; 0.76 to 1.08 mm. wide; pronotal width/pronotal length 1.09 to 1.18; surface of male moderately strongly convex (fig. 128), that of female more weakly convex (fig. 129); anterior two-thirds of lateral margin slightly arcuate to nearly parallel to other lateral margin; basal third of lateral margin straight or nearly so and strongly convergent to basal angles; basal third at times sinuate with effect of producing more distinct basal angles; basal angles rounded to weakly rectangulate (figs. 128, 129); pronotum of male more robust than that of female; anterior angles moderately distinct. Pronotum usually with lateral and basal surfaces shining dully and median and anterior regions polished; proportion of dully shining to polished regions variable from individuals with surface nearly completely polished with only narrow band of lateral and basal margin shining dully to others with polished portion restricted



FIGS. 126-136. *Bledius episcopalis*. 126. Head, male. 127. Head, female. 128. Pronotum, male. 129. Pronotum, female. 130. Tergum VIII, apex. 131. Tergum VIII, enlargement of posterior margin. 132. Spermatheca. 133. Mandible, male, left, dorsal view. 134. Mandible, female, right, dorsal view. 135. Labrum, dorsal view, setae and epipharyngeal lobes removed. 136. Tergum VI, pubescence, dorsal view.

to area in and adjacent to midlongitudinal groove and remainder of notum shining dully; polished surface without microgranulate ground sculptur-

ing; dully shining surface with dense microgranulate ground sculpturing; microgranulate ground sculpturing dense and moderately coarse to obso-

lete or absent; surface with moderately dense, moderately coarse setigerous punctation; pubescence long; midlongitudinal groove usually poorly developed and shallow, at times deeper and more defined. Protergosternal suture present and moderately well developed to obsolete or absent; procoxal fissure closed. Elytra 0.87 to 1.21 mm. long; elytral length/pronotal length 1.15 to 1.42; surface polished and with dense, moderately deep, setigerous punctation; pubescence moderately long. Metathoracic wings fully developed. Metathoracic sternum with sparse pubescence, without punctulation, surface polished. Protibia (as in fig. 313) more or less cylindrical, not strongly expanded and compressed; spinelike setae long, slender and acute; surface with many setae interspersed between spinelike setae.

Abdomen with moderately coarse punctation; terga V and VI with moderately dense pubescence; many setae on disk and posterior margin (fig. 136); emargination of tergum VIII finely serrate (figs. 130, 131). Sterna moderately densely pubescent; punctulation absent; surface shining strongly or polished and with obsolete microgranulate ground sculpturing.

Spermatheca as shown in figure 132.

**Sexual Dimorphism.** The males have tridentate mandibles (fig. 133); the clypeal tubercles on the dorsum of the head, and the supra-antennal ridges of the males (fig. 126) are larger than those of the females (fig. 127). The females have bidentate mandibles (fig. 134). The pronotum of the male is more convex and robust (fig. 128) than that of the female (fig. 129).

**Habitat and Distribution.** *United States:* California, Nevada (fig. 137; see Appendix for localities).

I have not collected this species, but judging from the four known localities I would expect to find the species near alkali or salt lakes. One collector found it under rocks at a fountain near Furnace River in Death Valley.

#### 10. *Bledius consimilis* Fall

Figures 137-153, 262, 263; Table 2

*Bledius consimilis* Fall, 1910, pp. 105, 106. Notman, 1920, p. 695. Ortenburger and Bird, 1933 (cited as *B. ineptus*). (Type locality: New Mexico, Thorton. Holotype in the Mu-

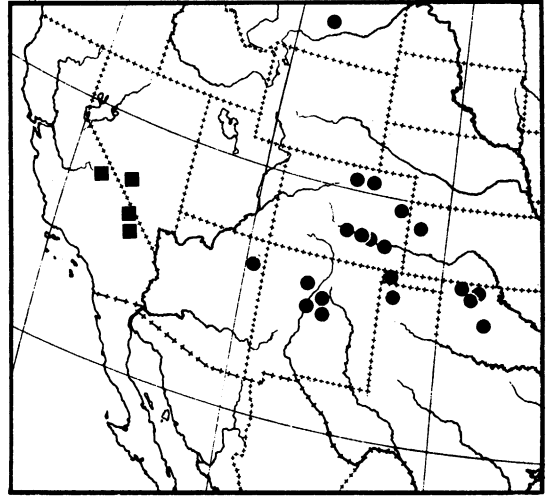


FIG. 137. Distribution of *Bledius episcopalis* (squares) and *Bledius consimilis* (dots) in southwestern United States.

seum of Comparative Zoology, Harvard University, Cambridge, Massachusetts. Type examined.)

**Diagnosis.** This species has a sparsely pubescent abdomen, terga V and VI having only four long setae on the disk (fig. 152), a tumescence on the dorsum of the head (figs. 138, 139), distinct basal angles of the pronotum (figs. 140, 141), and a moderately well-developed to obsolete pronotal midlongitudinal groove.

The sparsely pubescent abdomen will separate *consimilis* from the other species of the group, particularly in combination with the above characters and the bidentate mandibles.

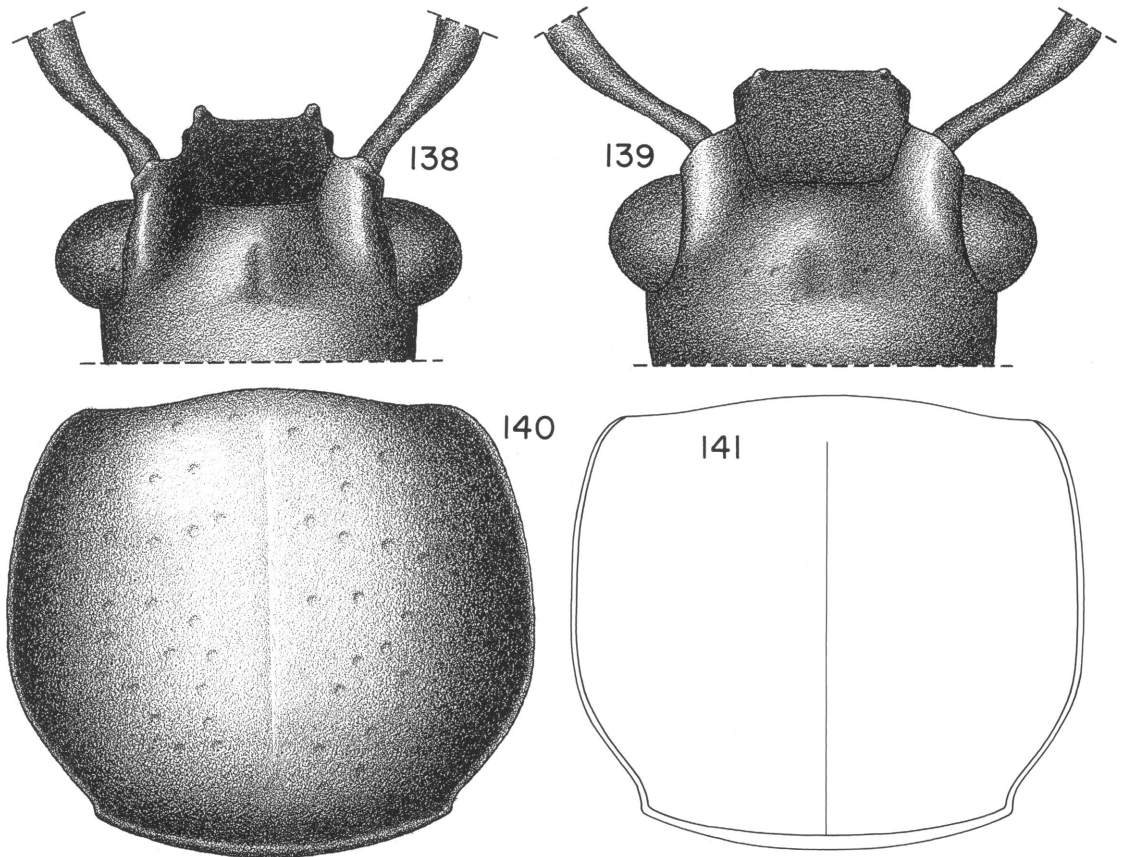
Occasionally it may be confused with *ineptus* but can be separated by the more strongly angulate basal angles of the pronotum. *Bledius ineptus* usually has shining spots on the pronotum, *consimilis* does not.

**Description.** *armatus* group.

Length 3.5 to 6.6 mm.

Color dark reddish brown to reddish brown with head darker, elytra pale reddish brown to yellowish brown with darker sutural stripe.

Dorsum of head, clypeus, and labrum dark reddish brown to at times black. Venter of head, and submentum dark reddish brown to reddish brown. Mentum, labial palpus, maxilla pale reddish brown to at times yellowish brown. Antenna



FIGS. 138-141. *Bledius consimilis*. 138. Head, male. 139. Head, female. 140. Pronotum, male. 141. Pronotum, female.

pale reddish brown. Mandibles dark reddish brown. Pronotum dark reddish to reddish brown. Prohypomeron and prosternum reddish brown. Elytron pale reddish brown to yellowish brown with long, narrow, triangular darker reddish brown sutural stripe extending from base to near apex; epipleuron concolorous with disk. Pterothoracic sterna and pleura dark reddish brown to black. Legs reddish brown. Abdomen reddish brown to dark reddish brown, occasionally black.

Dorsum of head, supra-antennal ridge, epistomal suture, clypeus, eye, labrum, mandible, and antennomeres as described for *episcopalis* with following exceptions: dorsum of head with middorsal tumescence; tumescence of male large, high and distinct and with midlongitudinal

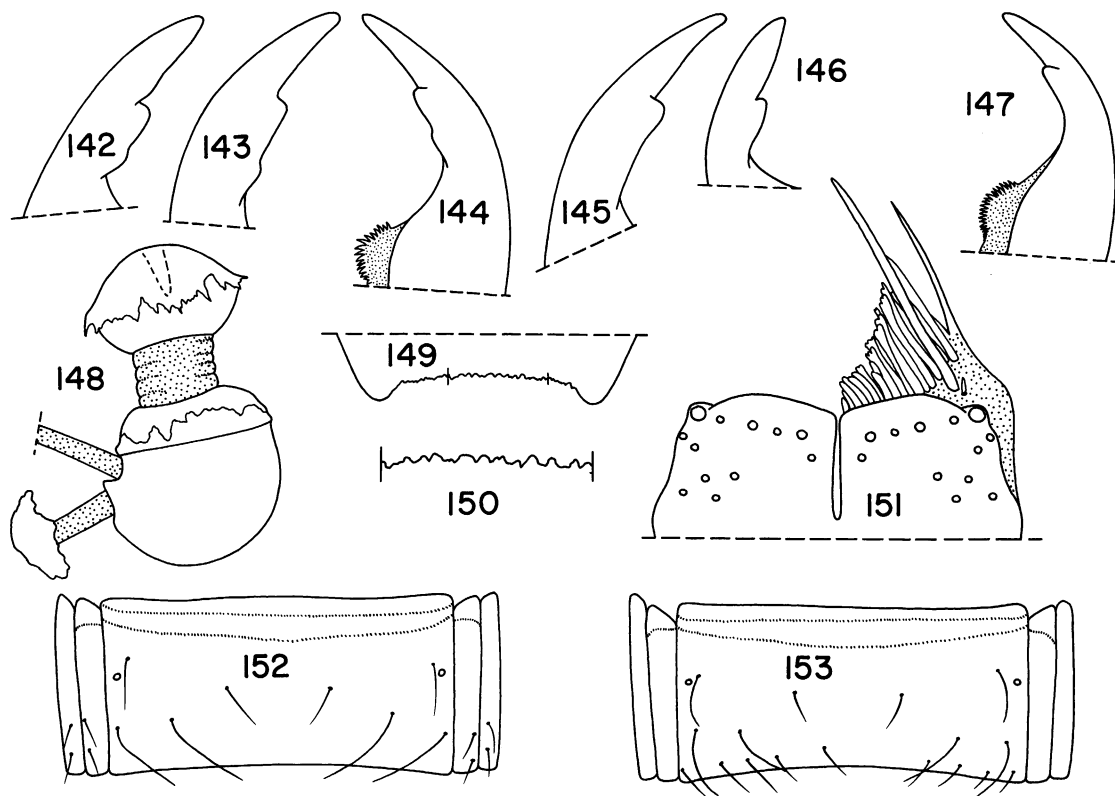
groove present (fig. 138); tumescence of female low, small, often poorly developed, and with shallow midlongitudinal groove (fig. 139). Supra-antennal ridge of male with moderately well-developed groove on anterior portion, that of female poorly developed to obsolete. Clypeal tubercle of male moderately high, and stout with apex rounded (fig. 138); tubercle of female low, and apex rounded (fig. 139). Width of head 0.74 to 0.85 mm.; interocular width 0.48 to 0.54 mm.; head width/interocular width 1.48 to 1.61. Labrum with shallow, narrow, V-shaped emargination (fig. 151). Mandibles bidentate (figs. 145-147); basal region of second denticle of male at times with tumescence to weakly developed denticle (figs. 142-144).

Pronotum, prohypomeron, prosternum, elytra, and protibia as described for *episcopalis* except as follows: pronotum 0.76 to 0.98 mm. long; 0.86 to 1.10 mm. wide; pronotal width/pronotal length 1.08 to 1.16; basal angles rectangular (figs. 140, 141) to slightly rounded; anterior two-thirds of lateral margin slightly to moderately arcuate on males; females with lateral margin slightly arcuate to nearly straight and parallel to other lateral margin (fig. 141); basal third of lateral margin slightly rounded to nearly straight and convergent to basal angle. Pronotum with surface shining dully, not polished; surface with dense microgranulate sculpturing; median region often more shiny; surface with moderately sparse, moderately fine setigerous punctation;

pubescence short; midlongitudinal groove usually shallow, broad and moderately well developed (fig. 140), at times obsolete or absent. Protergosternal suture usually absent, occasionally present, but obsolete or weakly developed. Elytra 1.02 to 1.23 mm. long; elytral length/pronotal length 1.20 to 1.42.

Abdomen as described for *episcopalis* with following exceptions: terga V and VI sparsely pubescent; disk with four long setae; row of setae on posterior margin absent (fig. 152), rarely short row present (fig. 153). Tergum VIII with moderately coarse serration of posterior margin (figs. 149, 150). Sterna shining dully, with microgranulate ground sculpturing.

Spermatheca as shown in figure 148.



FIGS. 142-153. *Bledius consimilis*. 142-143. Mandibles, male, left, dorsal view. 144. Mandible, male, right, dorsal view. 145. Mandible, male, left, dorsal view. 146. Mandible, female, left, anterolateral view. 147. Mandible, female, right, dorsal view. 148. Spermatheca. 149. Tergum VIII, apex. 150. Tergum VIII, enlargement of posterior margin. 151. Labrum, dorsal view, setae and left epipharyngeal lobe removed. 152. Tergum VI, pubescence, Colorado. 153. Tergum VI, pubescence, Montana.



*Sexual Dimorphism.* The males have large, stout clypeal tubercles (fig. 138), a large, high median tumescence on the dorsum of the head (fig. 138), high supra-antennal ridges, and the prothorax has moderately strongly rounded lateral margins (fig. 140).

The females have small clypeal tubercles (fig. 139), a low median cephalic tumescence, low supra-antennal ridges, and the prothorax has slightly arcuate to straight lateral margins that are nearly parallel to one another (fig. 141).

*Habitat and Distribution. United States:* Arizona, Colorado, Kansas, Montana, New Mexico, Oklahoma, Texas (fig. 137; see Appendix for localities.)

The species appears to be associated with sand flats on rivers as they leave the mountains along the front range of the Rockies. In the south, where the mountains are lower the species range extends farther west. *Bledius consimilis* generally has been found on unvegetated sand flats on the South Fork of the Republican, Huerfano, Canadian, Cimarron, Rio Grande, Aphishapa, Purgatoire, Salt Fork of the Arkansas, and South Platte rivers. On the Musselshell River the species is found in vegetated sand banks that have salt deposits. Near Loveland, Colorado, the species was found near an alkali lake. Near Cherokee, Oklahoma, the species is said to be associated with the more moist parts of the salt flats on the Great Salt Plains (Ortenburger and Bird, 1933, cited as *B. ineptus*).

*Discussion.* I have tentatively identified some specimens from Montana with sparse tergal pubescence (fig. 153) as *consimilis*. They are from far north of the localities of the other specimens and are mixed in a series of *ineptus*. (See also the Discussion under *flavipennis*.)

#### 11. *Bledius flavipennis* Le Conte

Figures 154-193, 266, 267; Table 2

*Bledius flavipennis* Le Conte, 1863, p. 52; 1877, pp. 221, 222. Casey, 1889, p. 50. Fall, 1901, p. 75; 1910, p. 105. Notman, 1920, p. 695. Blackwelder, 1944, p. 106. (Type locality: California, San Diego, in salt marsh. Holotype in the Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts. Type examined.)

*Bledius cuspidatus* Le Conte, 1877, pp. 221, 222. Casey, 1889, p. 48. Fall, 1910, p. 106. Notman, 1920, p. 696. (Type locality: Dakota. Holotype in the Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts. Type examined.) NEW SYNONYM.

*Bledius agonus* Casey, 1889, p. 48. Notman, 1920, p. 695. (Type locality: Utah. Holotype in the National Museum of Natural History, Smithsonian Institution, Washington, D.C. Type examined.) NEW SYNONYM.

*Bledius tenuis* Casey, 1889, pp. 50, 51. Fall, 1910, p. 106. Notman, 1920, p. 696. (Type locality: Nevada. Holotype in the National Museum of Natural History, Smithsonian Institution, Washington, D.C. Type examined.) NEW SYNONYM.

*Bledius nelsoni* Hatch, 1957, p. 101. (Type locality: Washington, Deep Lake. Holotype in the Burke Museum, University of Washington, Seattle, Washington. Paratype examined.) NEW SYNONYM.

*Diagnosis.* The males are recognizable by the tridentate mandible (figs. 158, 177), the often posteriorly curved clypeal horn (fig. 155), the low to moderately high tumescence on the dorsum of the head (fig. 155), the strong microgranulate ground sculpturing of the pronotum producing a dully shining surface and the usually strongly rectangulate basal angles of the pronotum (figs. 157, 167, 174).

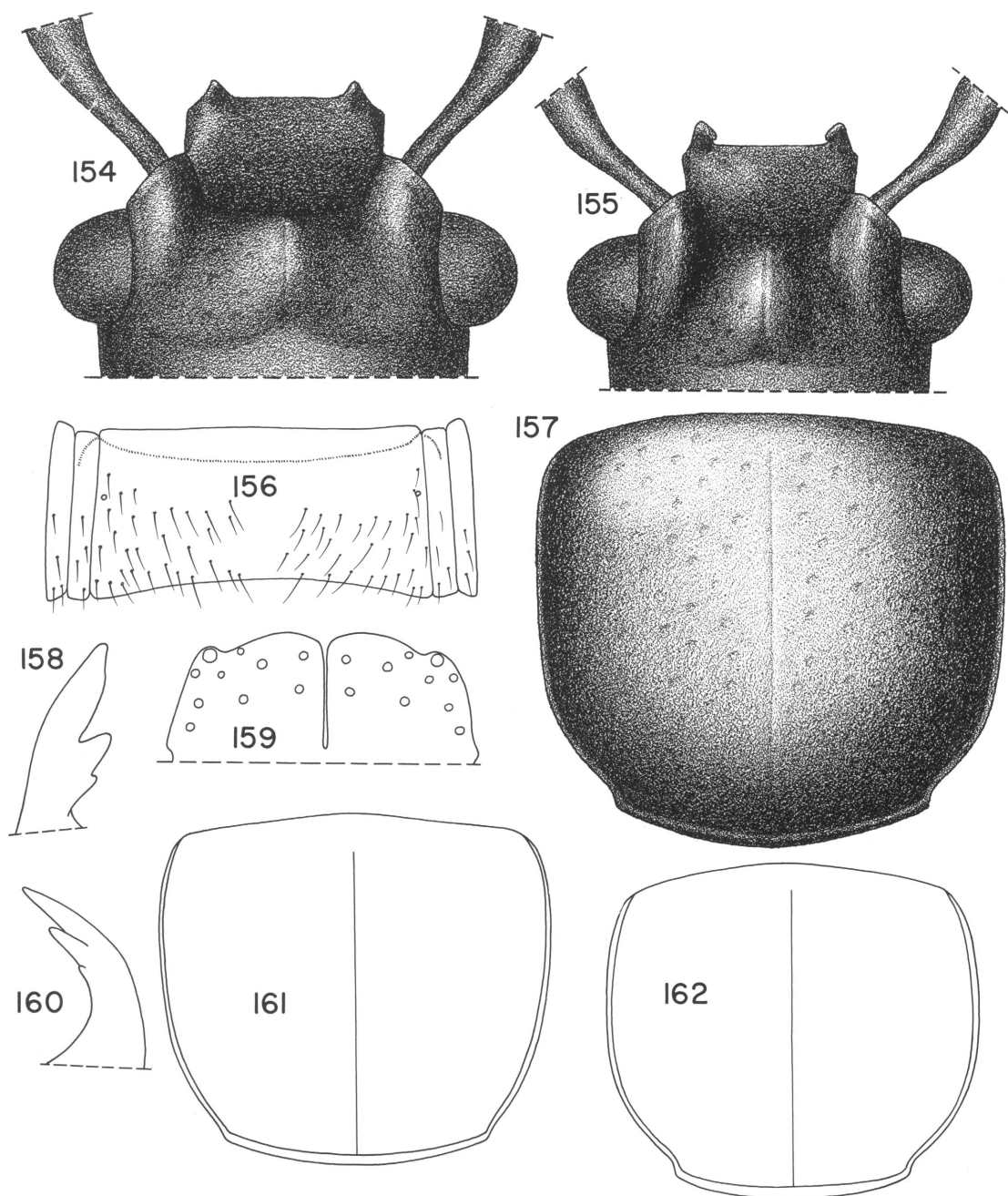
The female, with bidentate mandibles, is recognized by the rectangulate basal pronotal angles (figs. 168, 190, 191) and the strong microgranulate ground sculpturing of the pronotal surface.

The stronger granulate ground sculpturing, larger eyes (fig. 155) and denser pubescence of abdominal terga V and VI (figs. 156, 192) will usually separate *flavipennis* from *ineptus*. A few individuals of *flavipennis* have dark elytral epipleura that are concolorous with a broad elytral sutural stripe. If females, they will run to *aquilonarius* in the Key and will have to be identified by association with males. Other problems of identification are discussed in footnotes to the Key to the species of the *armatus* group.

*Description. armatus* group.

Length 3.5 to 6.0 mm.

Color dark reddish brown with reddish brown



FIGS. 154-162. *Bledius flavipennis*. 154. Head, female, dorsal view, western California. 155. Head, male, western California. 156. Tergum VI, pubescence, western California. 157. Pronotum, male, western California. 158. Mandible, female, left, anterolateral view, western California. 159. Labrum, setae and epipharyngeal lobes removed. 160. Mandible, female, right, dorsal view, western California. 161. Pronotum, male, South Dakota. 162. Pronotum, male, South Dakota.

pronotum, yellowish brown elytra, and a dark reddish brown elytral sutural stripe.

Dorsum of head, clypeus, labrum, and venter of head dark reddish to, at times black. Maxilla, labium, and antenna reddish brown to yellowish brown. Mandibles reddish brown. Pronotum usually reddish brown, at times dark reddish brown to nearly black. Prohypomeron and prosternum reddish brown. Elytron yellowish brown, at times orangish brown; sutural stripe usually present; stripe dark reddish brown and restricted to sutural bead to long, narrow triangle widest at base of elytron to brown and diffuse area covering part or all of disk; epipleuron usually yellowish brown and concolorous with disk, occasionally dark reddish brown and concolorous with sutural stripe. Pterothoracic sterna dark reddish brown to black. Legs yellowish brown. Abdomen dark reddish brown to black.

Dorsum of head, supra-antennal ridge, epistomal suture, clypeus, eye, labrum, mandible and antenna as described for *episcopalis* except as follows: dorsum with middorsal tumescence (figs. 154, 155); tumescence often with shallow, poorly developed midlongitudinal groove extending from broad shallow fovea posterior to tumescence; tumescence low to moderately high, that of male (fig. 155) generally higher than that of female (fig. 154). Clypeus of male with large (figs. 155, 163, 171, 186) to moderately large (figs. 166, 181) tubercle near lateral margin; tubercle strongly curved posteriorly when large, less strongly curved when moderately large; tubercle of female small (figs. 154, 165, 170, 187, 188) and usually rounded.

Eye moderately large (fig. 154). Width of head 0.61 to 1.01 mm.; interocular width 0.39 to 0.66 mm.; head width/interocular width 1.48 to 1.67. Labrum with broad, shallow emargination of anterior margin (fig. 159). Mandible of male tridentate with basal denticle more or less appressed to middle denticle and large to moderately large to small, to at times minute, to obsolete (figs. 164, 176, 177, 182, 184). Mandible of female bidentate, occasionally with basal (third) denticle (figs. 158, 160).

Pronotum, prosternal suture, elytra, metathorax, and protibia as described for *episcopalis* except as follows: pronotum 0.56 to 1.11 mm. long; 0.63 to 1.19 mm. wide; pronotal width/pronotal length 1.02 to 1.15; basal angle distinctly developed and strongly rectangulate (figs.

157, 162, 167, 168, 169, 174) to slightly rounded (fig. 175); anterior two-thirds of lateral margins of male slightly rounded (fig. 157) to nearly straight and nearly parallel (figs. 185, 189) to one another; basal third of lateral margin strongly rounded to basal angle; pronotum of male more robust than that of female; lateral margin of female with anterior two-thirds usually nearly straight and parallel (fig. 168) and basal third moderately strongly rounded to basal angle. Pronotal surface shining dully, with dense, very strong to moderately strong microgranulate ground sculpturing; punctation moderately dense and moderately coarse; pubescence moderately long; midlongitudinal groove present and well developed (figs. 157, 162) to obsolete or absent (figs. 180, 183, 185). Protergosternal suture present and moderately well developed to obsolete or absent. Elytra 0.81 to 1.36 mm. long; elytral length/pronotal length 1.18 to 1.57; metathoracic sternum with moderately dense pubescence and dense punctation, surface shining strongly.

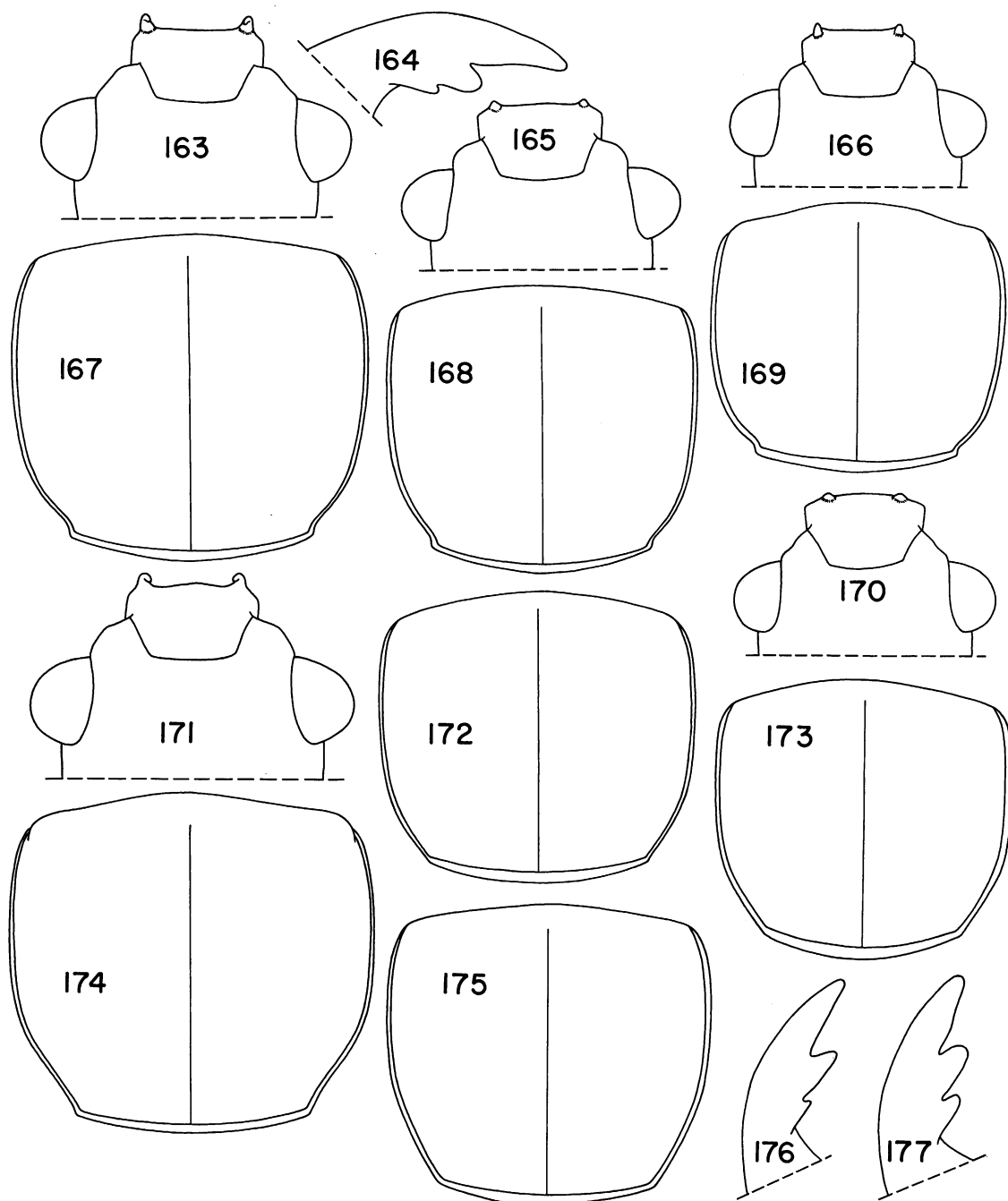
Abdomen as described for *episcopalis* except as follows: abdominal terga with dense pubescence. Terga V and VI with dense pubescence; disk and posterior margin with many setae (figs. 156, 192), occasionally discal pubescence reduced to a five or six pairs of setae. Abdominal sterna with dense punctation; surface shining strongly.

Spermatheca as shown in figure 193.

*Sexual Dimorphism.* The male usually has tridentate mandibles (figs. 158, 177), a pair of large to small, usually posteriorly curved, clypeal horns (figs. 155, 171), large, high supra-antennal ridges (fig. 155) and a robust, strongly convex pronotum (fig. 157).

The female has bidentate mandibles, small clypeal tubercles, low supra-antennal ridges, and less robust, less convex pronotum.

*Variation.* *Bledius flavipennis* is a geographically widespread and variable species. The sundry populations possessing different names are a reflection of this variability. The populations are distinguishable, but the characters intergrade if numerous individuals from all parts of the range of the species are examined. The characters normally useful for separation of species in the *armatus* group are not sufficiently constant to characterize all the individuals of even a single population of *flavipennis*. Each character or combination of characters defining a population can



FIGS. 163-177. *Bledius flavipennis*. 163. Head, male, Nevada. 164. Mandible, male, left, anterolateral view, Nevada. 165. Head, female, Nevada. 166. Head, male, Washington. 167. Pronotum, Nevada. 168. Pronotum, female, Nevada. 169. Pronotum, male, Washington. 170. Head, female, Washington. 171. Head, male, New Mexico. 172. Pronotum, male, Washington. 173. Pronotum, female, Washington. 174. Pronotum, male, New Mexico. 175. Pronotum, female, New Mexico. 176. Mandible, male, left, anterolateral view, Washington. 177. Mandible, male, left, anterolateral view, New Mexico.

be found in different frequencies in another population. For example, most, but not all, individuals from Utah, Washington, and eastern California lack a midlongitudinal groove of the pronotum; other populations of the species generally have the groove, but some individuals lack it. Similar intrapopulation variation is evident for the size of the mandibular denticles and the clypeal horn, the rectangulation of the basal angle of the pronotum, the coarseness of the pronotal ground sculpturing and the color of the elytra or pronotum.

Seven populations are briefly diagnosed and the intergradations discussed below.

**New Mexican Population** (figs. 162, 171, 174, 175, 192). The basal denticle of the male is moderately large to small and the clypeal tubercle is moderately large (figs. 171). The pronotal basal angle is moderately (fig. 162) to weakly rectangulate (fig. 174) and at times slightly rounded. The pronotal midlongitudinal groove is moderately to poorly developed to obsolete and at times absent and the granulate ground sculpturing is moderately strong but at times weak or very strong. The elytra have a long, narrow sutural stripe that is occasionally restricted to the sutural bead. The pronotum is reddish brown and the elytra yellowish brown with a narrow, dark reddish brown sutural stripe. The type of *Bledius cuspidatus* falls here.

This population is more or less recognizable by the weaker granulate ground sculpturing and the more weakly rectangulate basal angles of the pronotum.

**Dakotan Population** (figs. 161, 184, 186, 187, 189, 190). This population is almost impossible to distinguish from the New Mexican one, but most of the individuals have more strongly granulated ground sculpturing. The basal angles of the pronotum are moderately strong (fig. 161) to strong (figs. 189, 190). The type of *B. cuspidatus* falls here.

**Nevadan Population** (figs. 163-165, 167, 168). Generally the basal mandibular denticle of the male is small (fig. 164), but it can be moderately large; the clypeal tubercle of the male is large (fig. 163) to, at times, small. The pronotal basal angle (figs. 167, 168) is strongly rectangulate, but can be more weakly rectangulate. The pronotal midlongitudinal groove is usually strongly

to moderately well developed, but some individuals have it weakly developed to obsolete and some lack it. The pronotal ground sculpturing is strong. The elytral sutural stripe is pale, poorly defined and often restricted to the sutural bead. In other respects the color is as described for the New Mexican population. The types of *B. flavipennis* and *B. tenuis* fall here.

**Washingtonian Population** (figs. 166, 169, 170, 172, 173, 176, 177). This population is as described for the Nevadan population except in the following respects: the clypeal tubercles of the male are moderately large (fig. 166) to small, the pronotal midlongitudinal groove is moderately developed to obsolete or absent, the elytral sutural stripe is narrow and well defined to broad and diffuse but dark, and the pronotum is darker reddish brown. The types of *B. nelsoni* and *B. agonus* fall here.

In this population the individuals are more apt to be darker, small, and the pronotal groove more likely to be absent than in populations from New Mexico, Nevada, the Dakotas, and western California.

**Eastern California Population** (figs. 181, 182, 185, 188, 191). The basal denticle of the mandible of the male is small (fig. 182), the clypeal

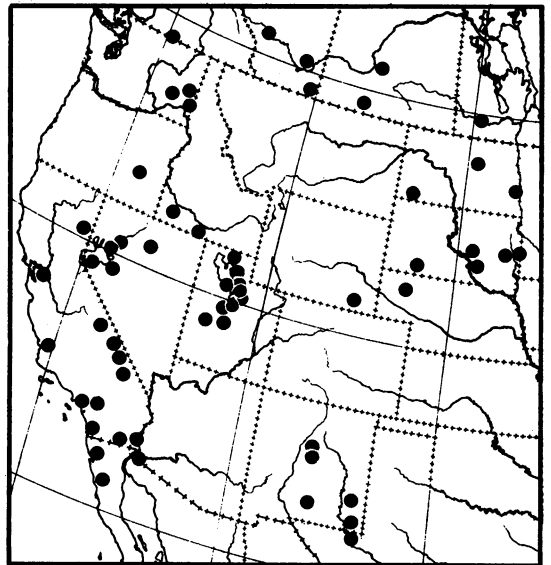


FIG. 178. Distribution of *Bledius flavipennis* in western United States and Canada.

tubercles are small to moderately large (fig. 181), and the pronotal basal angles are moderately to strongly rectangular (figs. 185, 191). The pronotal midlongitudinal groove is absent or obsolete but at times moderately well developed, and the pronotal granulation is strong. The elytral sutural stripe is usually well defined and narrow, but may be broad enough to cover most of disk or may be restricted to the sutural bead. The pronotum is reddish brown.

This population shares characters with both the Nevadan and Washingtonian populations, but the individuals are usually smaller.

Western Californian Population (figs. 154-158, 160). These individuals are virtually inseparable from those of Nevada, but do have a tendency to be larger, with correspondingly larger clypeal tubercle (fig. 155) and basal mandibular denticle. The types of *B. flavipennis* and *B. tenuis* fall here.

Utahan Population (figs. 179, 180, 183). This group is recognized by the absence (figs. 180, 183), obsolescence or moderate development of the pronotal groove, the small to obsolete basal mandibular denticle of the male, the small clypeal tubercle (fig. 179), and the strongly rectangular basal angles of the pronotum (figs. 180, 183). The pronotum is reddish brown to dark reddish brown, or nearly black at times, and the ground sculpturing is strong. The dark elytral stripe is narrow and well defined to diffuse, or it may be restricted to the sutural bead. This group of individuals is very similar to the Washingtonian population. The types of *B. agonus* and *B. nelsoni* fall here.

Each of the above populations differs to some degree from the other by mensural characters (table 2). The morphological and mensural characters distinguishing these populations are all of degree and all intergrade. Within any one population most of the different characters can be found, particularly the intermediates between the extremes of other populations. For example, the elytra are longest in the populations from Utah and shortest in the males from New Mexico, but other populations fill in the gap of these extremes (table 2).

These populations have been described because there are six species which were described to account for the variation. Single specimens

from any two different populations can easily be distinguished, but it must be emphasized that these differences are ones of degree and that the gaps invariably are bridged by intermediates whenever individuals from large samples and many localities are studied carefully.

The taxonomic problems of the variation of this species are difficult and unquestionably should be studied further to test my hypothesis.

*Synonyms.* *Bledius cuspidatus*, *agonus*, *tenuis*, and *nelsoni* should be regarded as intergrading geographical variants of *flavipennis*. The details of this variation are treated under Variation. The authors of these names did not discuss means of separating their specimens from *flavipennis* and I am unable to find sufficient nonintergrading characters to do so.

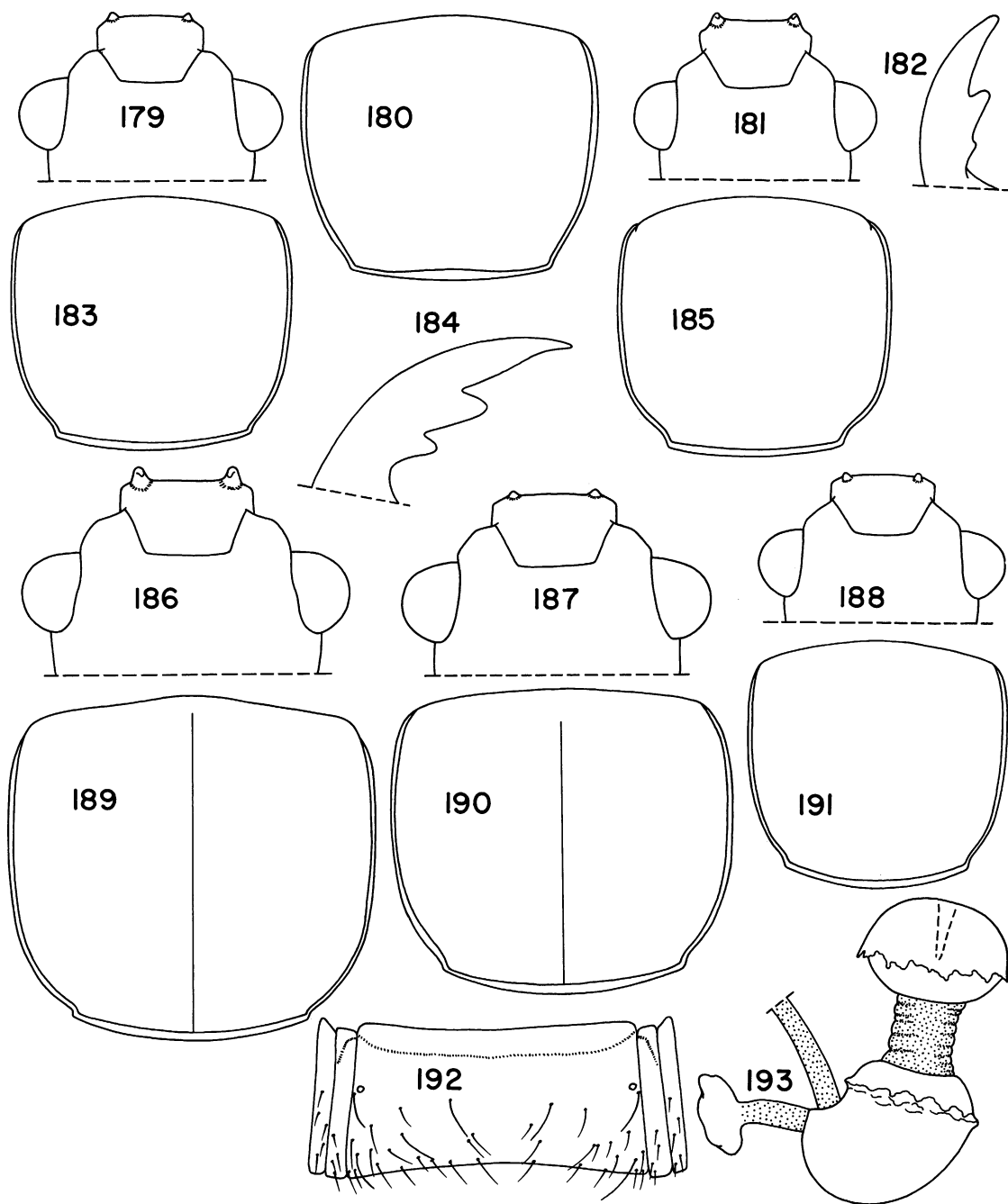
*Habitat and Distribution.* *Canada:* Alberta, British Columbia, Manitoba, Saskatchewan. *Mexico:* Baja California. *United States:* Arizona, California, Idaho, Nebraska, New Mexico, North Dakota, Nevada, Oregon, South Dakota, Texas, Utah, Washington, Wyoming (fig. 178; see Appendix for localities).

The species, associated with habitats near both alkalai and saline water, was collected by me near Estancias, Alamogordo, Willard, and Loving, New Mexico; Devils Lake, and Hettinger, North Dakota; Alliance, North Dakota; McElroy Lake, Washington; and Brigham City, Utah. Many of the localities of other collections are known to be alkali or saline situations.

*Discussion.* *Bledius flavipennis* (and its synonyms), *ineptus* and *consimilis*, have been confused with one another by many workers. Considerable effort was expended both in the field and in the laboratory in attempting to resolve the limits of the species. The analysis was hampered largely by the variability of the species.

Despite the variation, which at times makes some specimens, particularly females, difficult to identify, I believe the three forms represent species because where they occur together they are separable by a combination of at least several characters.

*Bledius consimilis* is recognized by the presence of only four pairs of long setae on the disk of abdominal tergum IV. The other species have more setae. The mandibles in both sexes are bidentate.



FIGS. 179-193. *Bledius flavipennis*. 179. Head, Utah. 180. Pronotum, Utah. 181. Head, male, eastern California. 182. Mandible, male, left, anterolateral view, eastern California. 183. Pronotum, Utah. 184. Mandible, male, left, anterolateral view, Nebraska. 185. Pronotum, male, eastern California. 186. Head, male, Nebraska. 187. Head, female, Nebraska. 188. Head, female, eastern California. 189. Pronotum, male, Nebraska. 190. Pronotum, female, Nebraska. 191. Pronotum, female, eastern California. 192. Tergum VI, pubescence, New Mexico. 193. Spermatheca.



*Bledius ineptus* has five to eight pairs of long setae on the disk of abdominal tergum IV in addition to a subapical row. The mandibles of both sexes are bidentate. A form, which I am tentatively assigning to *ineptus*, has rounded basal angles of the pronotum and the pubescence of abdominal tergum IV is denser than other members of the species.

The males of *flavipennis* are separated from all individuals of *ineptus* and *consimilis* by the tridentate mandibles. The females, with bidentate mandibles, are more difficult to separate from *ineptus* because the number of setae on the abdominal terga varies in both species. Most females of *flavipennis* have many more setae (on tergum IV) than the five to eight pairs of long discal setae and the subapical row found in *ineptus*. Unfortunately a few individuals of both *ineptus* and *flavipennis* have about the same number. Usually the pronotum of *ineptus* lacks or has a poorly developed midlongitudinal groove and granulate ground sculpturing, has polished spots on the surface, and rounded to at times rectangulate basal angles. In contrast, the pronotum of *flavipennis* usually has a midlongitudinal groove but some populations lack it or have it poorly developed, strong granulate ground sculpturing, a dully shining surface, and rectangulate to, occasionally, slightly rounded basal angle. All of these features vary and I attempted to account for them in the Key.

## 12. *Bledius aquilonarius*, new species

Figures 194-206, 374, 375; Table 2

*Holotype*. Male. Ontario, La Rose Forest, near Bourget; collected by R. deRuelle on June 29, 1967; deposited in the Canadian National Collection, Ottawa, Ontario, Canada.

*Paratypes*. Five males and five females with same collection data and collector as holotype; 12 males and 10 females with same collection data as holotype, but with J. M. Campbell as collector; 24 specimens deposited with the holotype, four males and four females deposited at the American Museum of Natural History.

*Diagnosis*. The dark elytral epipleuron, which is concolorous with the broad, dark sutural stripe of the elytra, the distinct basal angles of the pro-

notum (figs. 201, 202), tridentate mandibles of the male (figs. 199, 200), moderately densely pubescent fourth and fifth abdominal terga (fig. 197), and small size will separate this species from the others of the group. Some individuals have yellowish brown elytral epipleura and in the Key might be confused with other species. These exceptions are discussed in footnotes to the Key.

*Description*. *armatus* group.

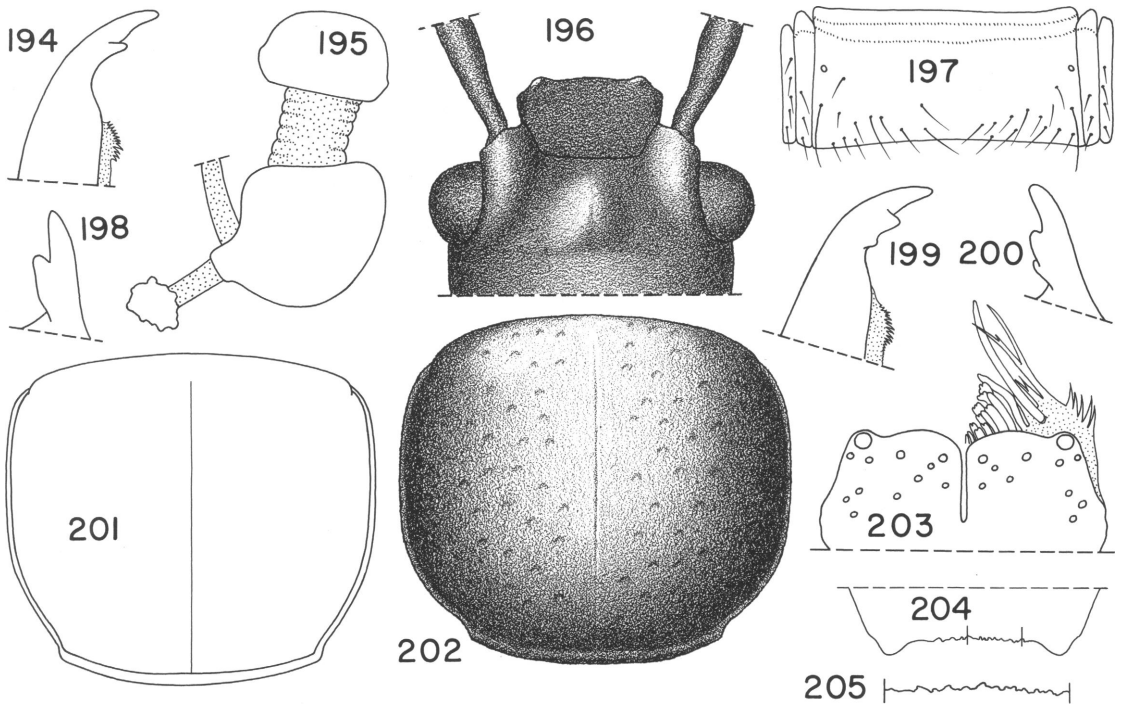
Length 3.2 to 4.5 mm.

Color black to dark reddish brown; elytra reddish brown or yellowish brown with broad, black sutural stripe.

Dorsum of head, clypeus, labrum, and venter of head black to dark reddish brown, at times venter reddish brown. Maxilla, labial palpus, and antenna reddish brown. Pronotum dark reddish brown to reddish brown, at times black. Prothorax and prosternum dark reddish to reddish brown. Elytra reddish brown to yellowish brown with broad black sutural stripe; epipleuron usually concolorous with sutural stripe, black or dark reddish brown, occasionally concolorous with lateral portion of disk, yellowish brown. Pterothoracic sterna and pleura black to dark reddish brown. Legs reddish brown to yellowish brown. Abdomen black to dark reddish brown.

Dorsum of head, supra-antennal ridge, epistomal suture, clypeus, eyes, labrum, mandible, and antenna as described for *episcopalis* except as follows: dorsum of head with middorsal tumescence (fig. 196); tumescence low to moderately high, with shallow midlongitudinal groove; fovea present behind tumescence. Supra-antennal ridge low (fig. 196); transverse groove on anterior portion poorly developed. Dorsum of head with obsolete transverse postocular groove. Clypeus slightly depressed at epistomal suture; anterior margin of male with small, rounded tubercle near lateral margin (fig. 196), female with low, rounded tumescence. Width of head 0.55 to 0.65 mm.; interocular width 0.39 to 0.44 mm.; head width/interocular width 1.41 to 1.50. Labrum with shallow, V-shaped emargination of anterior margin (fig. 203). Mandible of female bidentate (figs. 194, 198), of male tridentate (figs. 199, 200) with basal denticle separated from, or at times appressed to middle denticle.

Pronotum, procoxal fissure, elytra, meta-



FIGS. 194-205. *Bledius aquilonarius*. 194. Mandible, female, left, dorsal. 195. Spermatheca. 196. Head, male. 197. Tergum VI, pubescence. 198. Mandible, female, right, anterolateral view. 199. Mandible, male, left, dorsal view. 200. Mandible, male, right, anterolateral view. 201. Pronotum, female. 202. Pronotum, male. 203. Labrum, dorsal view, setae and left epipleural lobe absent. 204. Tergum VIII, apex. 205. Tergum VIII, enlargement of posterior margin.

thorax, and protibia as described for *episcopalis* except as follows: pronotum 0.61 to 0.74 mm. long; 0.67 to 0.79 mm. wide; pronotal width/pronotal length 1.04 to 1.18; surface strongly convex (fig. 202); basal angles distinct and rectangular (figs. 201, 202) or nearly so to rounded but distinct; anterior two-thirds of lateral margin broadly and continuously rounded to basal third (fig. 202); basal third of lateral margin more strongly rounded to basal angle (fig. 202); anterior two-thirds of lateral margin at times nearly parallel (fig. 201). Pronotal surface shining dully and with dense microgranulate surface; midlongitudinal groove well developed (fig. 202) to poorly developed to at times obsolete or absent; groove usually shallow. Protergosternal suture absent. Elytra 0.76 to 0.89 mm. long; elytral length/pronotal length 1.18 to 1.37.

Abdomen as described for *episcopalis* except as follows: abdomen with fine punctation. Terga V and VI moderately densely pubescent (fig. 197). Tergum VIII with moderately coarsely serrulate posterior margin (figs. 204, 205).

Spermatheca as shown in figure 195.

**Sexual Dimorphism.** The male has small clypeal tubercles (fig. 196) and tridentate mandibles (fig. 199). The clypeal tubercle of the female is reduced to a tumescence and the mandibles are bidentate (fig. 194).

**Variation.** Most of the specimens from the western part of the range lack a midlongitudinal groove of the pronotum, and most of those from the east have it. In one-third to one-half of the specimens the elytral epipleuron is pale instead of dark and concolorous with the sutural stripe. Those with a pale epipleuron are similar to *flavi-*

*pennis*. The males with tridentate mandibles can be distinguished as indicated in the Key to the species of the *armatus* group. The females with pale epipleura may be confused with *flavipennis* but in general are smaller and more darkly pigmented than *flavipennis*.

*Habitat and Distribution.* *Canada*: Northwest Territories, Ontario, Quebec, Yukon Territory. *United States*: Alaska (fig. 206; see Appendix for localities).

The species has a boreal distribution across North America. I have not collected the species and therefore know nothing of its habitat.

*Discussion.* This species seems to occur across the continent, but I have studied examples only from the eastern and western parts of the range.

*Etymology.* From the Latin, *aquilonarius*, meaning north or northern, applied to this species because it is found in the northern part of North America.

### 13. *Bledius ineptus* Casey

Figures 206-228, 368, 369; Table 2

*Bledius ineptus* Casey, 1889, pp. 48, 49. Notman, 1920, p. 695. (Type locality: New Mexico, Albuquerque. Holotype in the National Museum of Natural History, Smithsonian Institution, Washington, D.C. Type examined.)

*Diagnosis.* *Bledius ineptus* has bidentate mandibles (figs. 208, 222) in both sexes and usually has weak pronotal ground sculpturing, basal angles (figs. 210, 221), and midlongitudinal groove (fig. 212). The pubescence of abdominal terga V and VI is generally sparse (fig. 217) the disk having seven or eight pairs of long setae and the posterior edge a row of shorter ones. These characters separate the species from the others of the groups. Problems and exceptions are discussed in footnotes to the Key to the species of the *armatus* group. The species is most easily confused with some individuals of *consimilis* or some females of *flavipennis* and their separation from *ineptus* is discussed under the respective species.

*Description.* *armatus* group.

Length 3.5 mm. to 5.5 mm.

Color reddish brown to dark reddish brown

with black head and yellowish brown elytra; elytra usually with dark reddish brown stripe.

Dorsum of head, clypeus, labrum, and venter of head dark reddish brown to black. Maxilla, labium, and antenna reddish brown to yellowish brown. Mandible reddish brown. Pronotum reddish brown to dark reddish brown, darker than head. Prohypomeron and prosternum reddish brown to yellowish brown. Elytra yellowish brown with dark reddish brown sutural stripe; sutural stripe usually narrow but at times broad; epipleuron concolorous with disk. Pterothoracic sterna and pleura black to dark reddish brown. Legs pale reddish brown to yellowish brown. Abdomen usually reddish brown to dark reddish brown, at times black.

Dorsum of head, supra-antennal ridge, epistomal suture, clypeus, eye, labrum, mandible, and antenna as described for *episcopalis* except as follows: dorsum of head with middorsal tumescence (figs. 207, 209, 218, 220); tumescence with obsolete or poorly developed midlongitudinal groove; tumescence of male (fig. 207) usually large and with more evident groove than that of female; middorsal, shallow fovea present behind tumescence; dorsum with moderately well developed postocular groove. Clypeal tubercle of male (figs. 207, 218) moderately large, that of female small (figs. 209, 220). Eye moderately large. Width of head 0.63 to 0.81 mm.; interocular width 0.39 to 0.53 mm.; head width/interocular width 1.49 to 1.73. Labrum with anterior margin moderately deeply emarginate (figs. 216, 225). Mandible of male and female bidentate (figs. 208, 210, 222); mandible of male rarely with basal swelling (figs. 211, 213).

Pronotum, protergosternal suture, elytra, metathorax, and protibia as described for *episcopalis* except as follows: pronotum 0.63 to 0.94 mm. long; 0.69 to 0.99 mm. wide; pronotal width/pronotal length 1.02 to 1.14; basal angles distinctly developed and usually strongly rounded (figs. 209, 221, 223) to slightly to strongly rectangulate (fig. 212); anterior two-thirds of lateral margin nearly straight to gradually rounded to basal third (figs. 210, 212); basal third of lateral margin straight or gradually rounded to basal angle; female more likely to have straight lateral margins (figs. 210, 223),

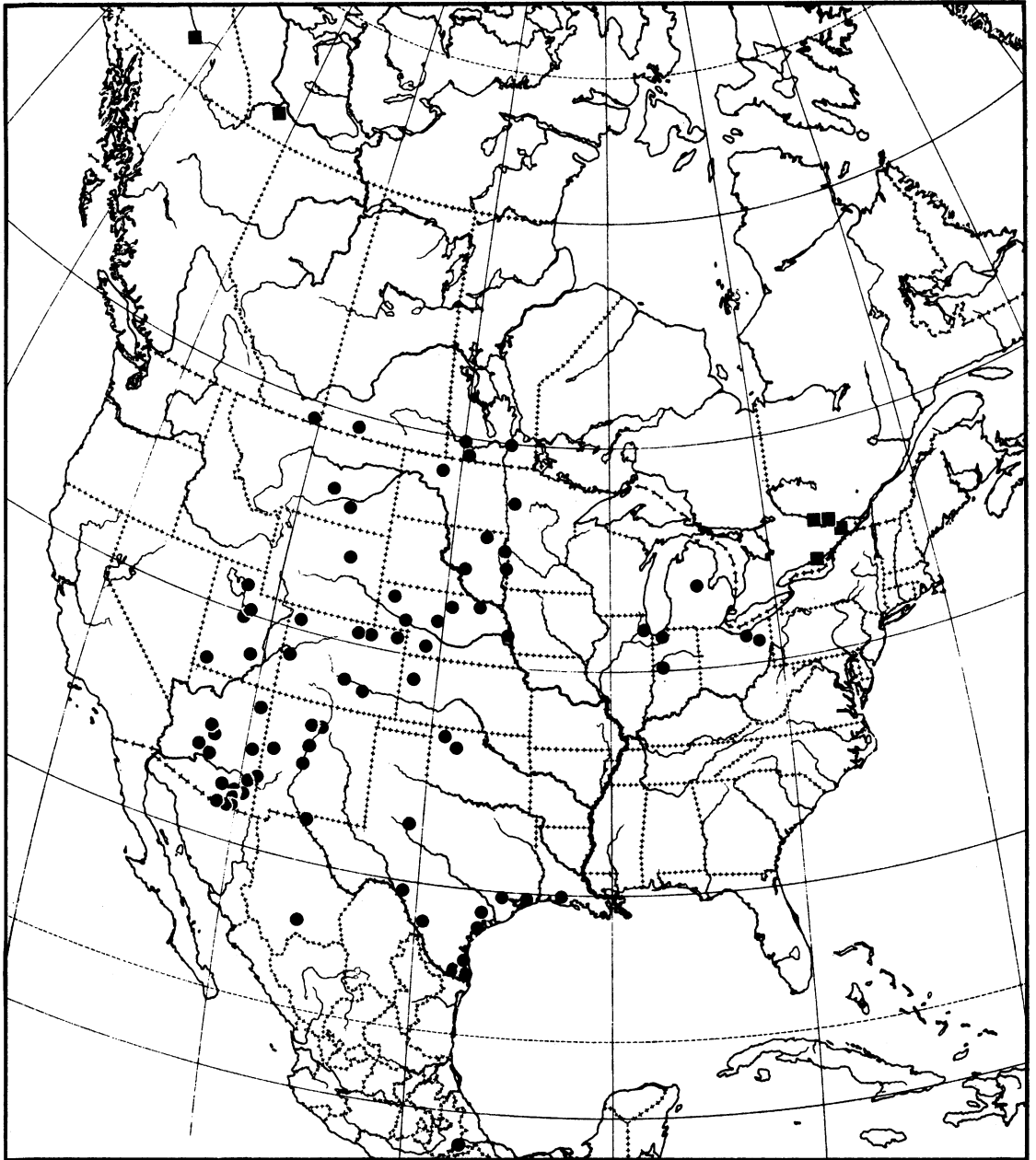


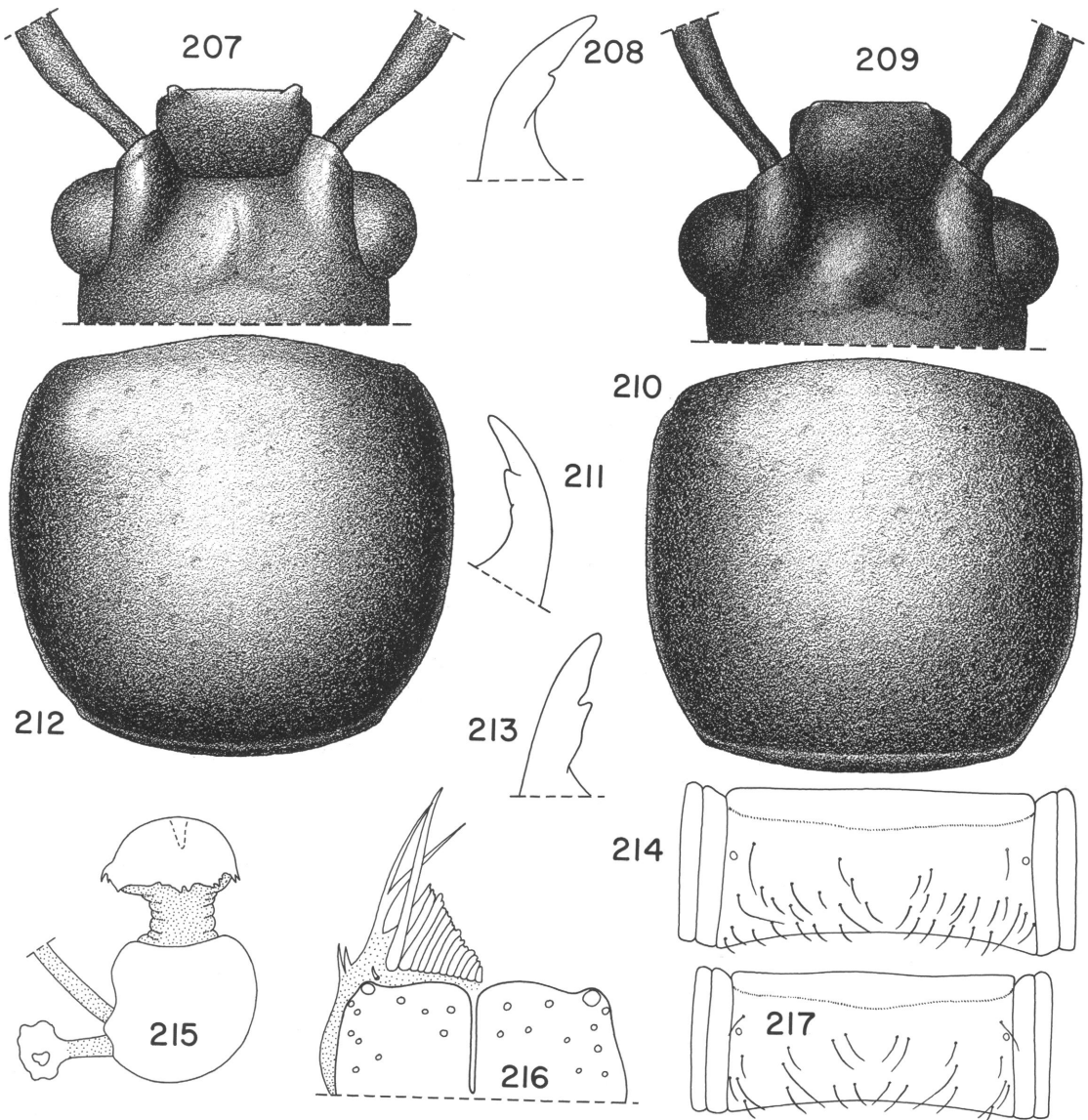
FIG. 206. Distribution of *Bledius aquilonarius* (squares) and *Bledius ineptus* (dots) in North America.

male usually with rounded margins (figs. 212, 221). Pronotal surface shining dully to strongly, often with polished spots; dully shining surface

with strong microgranulate ground sculpturing, strongly shining with weak to obsolete microgranulate ground sculpturing, polished portions

without ground sculpturing; polished portions usually near center; pubescence moderately long; midlongitudinal groove usually poorly (fig. 212) to moderately well developed (fig. 221), often obsolete (fig. 210) or absent, occasionally well developed. Protergosternal suture usually absent,

often weakly to moderately developed. Elytra 0.83 to 1.09 mm. long; elytral length/pronotal length 1.12 to 1.37. Pubescence moderately long and dense (fig. 219). Metathoracic sternum with moderately dense pubescence; punctulations absent to weakly developed.



FIGS. 207-217. *Bledius ineptus*. 207. Head, male. 208. Mandible, left, dorsal view, Oklahoma. 209. Head, female. 210. Pronotum, female. 211. Mandible, right, dorsal, Utah. 212. Pronotum, male. 213. Mandible, left, anterolateral, Utah. 214. Tergum VI, pubescence, Colorado. 215. Spermatheca. 216. Labrum, dorsal view, setae and right epipharyngeal lobe removed. 217. Tergum VI, New Mexico.

Abdomen as described for *episcopalis* except as follows: abdominal terga V and VI with sparse to moderately dense pubescence; disk usually with five to seven or eight pairs of long setae and row of setae near posterior margin (figs. 214, 217); some specimens with more setae on disk (fig. 224). Tergum VIII with finely serrulate posterior margin (figs. 226, 227). Sternal punctulation absent to weakly developed.

Spermatheca as shown in figures 215, 228.

**Sexual Dimorphism.** The male has a pair of moderately large clypeal tubercles (fig. 207), higher supra-antennal ridges and more strongly rounded lateral margins of the pronotum (fig. 212).

The female has small clypeal tubercles (fig. 209), low supra-antennal ridges and straighter, more nearly parallel lateral margins of the pronotum (fig. 210). The pronotum is less strongly convex than that of the male.

**Habitat and Distribution.** *Canada:* Alberta, Manitoba, Saskatchewan. *Mexico:* Chihuahua, Puebla. *United States:* Arizona, Colorado, Illinois, Indiana, Kansas, Louisiana, Michigan, Minnesota, Nebraska, New Mexico, North Dakota, Ohio, Oklahoma, South Dakota, Texas, Utah (fig. 206; see Appendix for localities).

This widespread species is found east of the Rockies and in Arizona, New Mexico, and southern Utah. It is relatively common west of the Mississippi River and apparently infrequent eastward. It has been collected on the shores of rivers, on unvegetated sand or muddy sand flats near Julesburg, Fowler, Loveland, and Greeley, Colorado; Hay Springs, Oshkosh, Niobrara, Wahoo, and Trenton, Nebraska; Guthrie, and Stafford, Arizona; Cedar City, Utah; and Belen, New Mexico. Near the Indiana Dunes I collected it in moist sand near the roadside. In Erie County, Ohio, the species was collected from a sand quarry.

**Variation and Discussion.** Specimens from southern Texas can be differentiated from others of *ineptus* by the larger eyes (head width/interocular width 1.61 to 1.73; figs. 218, 220) and denser pubescence of the abdominal terga (fig. 224). The size of the eye overlaps with that of other populations of *ineptus* (head width/interocular width 1.49 to 1.64; figs. 207, 209) and the pubescence is variable within both groups.

As I have studied only 25 specimens from southern Texas, none of which was collected with the other form, it is difficult to evaluate the consistency of these slight, intergrading differences. Pending study of additional material and discovery of specimens of both forms from the same locality, I consider the Texan specimens conspecific with *ineptus* (see also Discussion under *flavipennis*).

#### 14. *Bledius politus* Erichson

Figures 229-252, 372, 373, 388, 389;  
Table 2

*Bledius politus* Erichson, 1840, p. 766. Le Conte, 1877, p. 222. Casey, 1889, p. 49. Notman, 1920, p. 696. Hatch, 1957, p. 102. (Type locality: Carolina meridionali. Lectotype designated herein and labeled thusly, in the Institut für Spezielle Zoologie und Zoologisches Museum der Humboldt Universität zu Berlin, Deutsche Demokratische Republik. Type examined).

*Bledius nigriceps* Notman, 1920, pp. 695, 696. (Type locality: Florida, Fort Myers. Holotype in the American Museum of Natural History. Type examined. Male.) NEW SYNONYM.

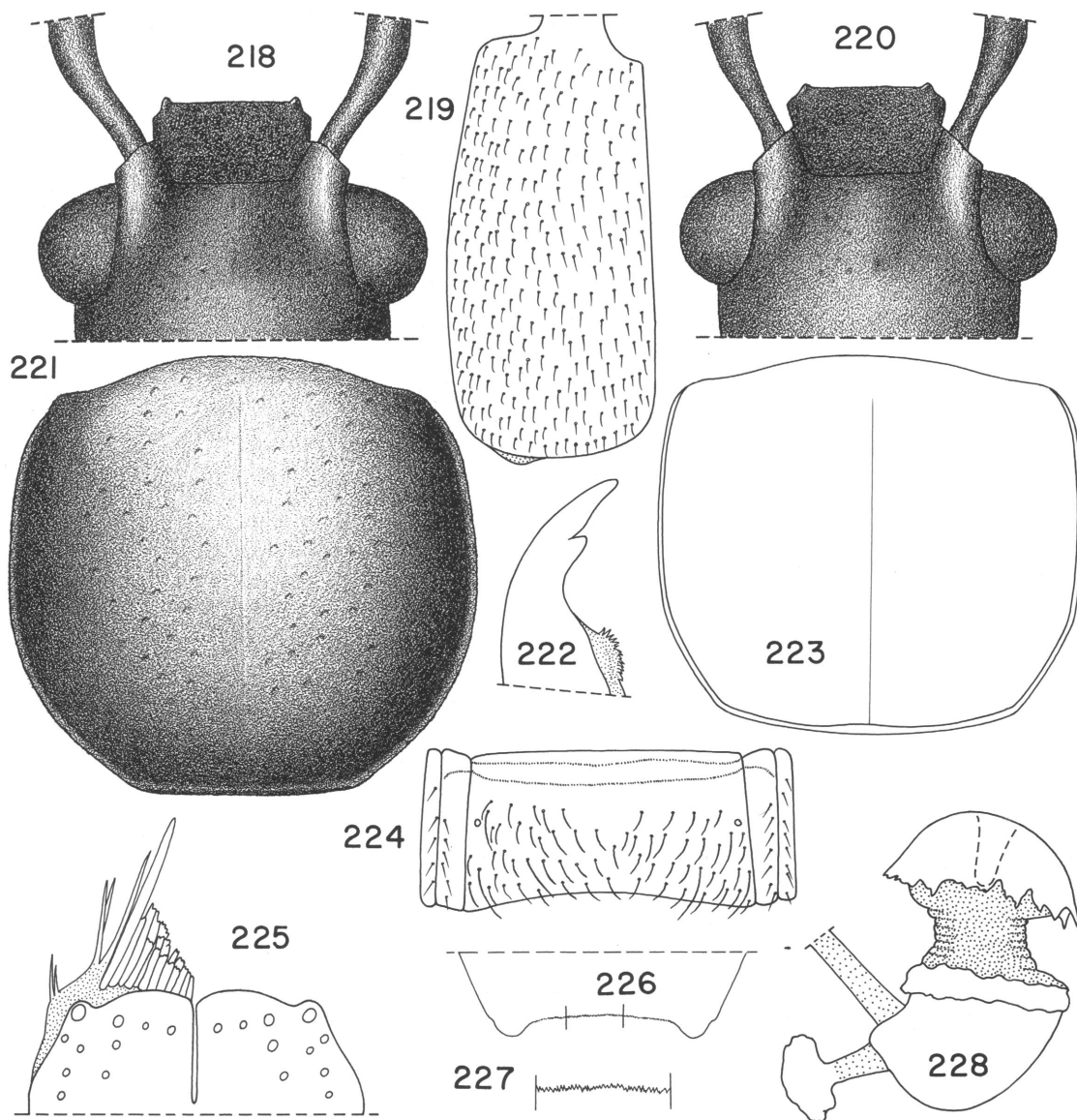
**Diagnosis.** The species can be separated from others of the group by the bidentate mandibles (figs. 237, 238), the often polished, reddish or orangish pronotum that has a deep midlongitudinal groove and rounded basal angles (figs. 231, 232), the polished elytra and the short pubescence, particularly on the pronotum and elytra (fig. 240). Some confusion with *ineptus* may be possible, but can be resolved by the deeper midlongitudinal groove of the pronotum and denser pubescence of the abdominal terga (fig. 233).

**Description.** *armatus* group.

Length 3.5 to 5.3 mm.

Color of head black, pronotum reddish to orangish, elytra yellowish brown, and often with blackish sutural stripe, abdomen black to reddish brown.

Dorsum of head, clypeus, and labrum black to dark reddish brown. Venter of head dark reddish brown. Maxilla, labium, and antenna yellowish brown. Mandibles reddish brown. Prothorax orangish brown to reddish, at times dark reddish brown with blackish infusions. Elytra usually yellowish brown, at times reddish or entirely dark reddish brown, with dark reddish brown sutural

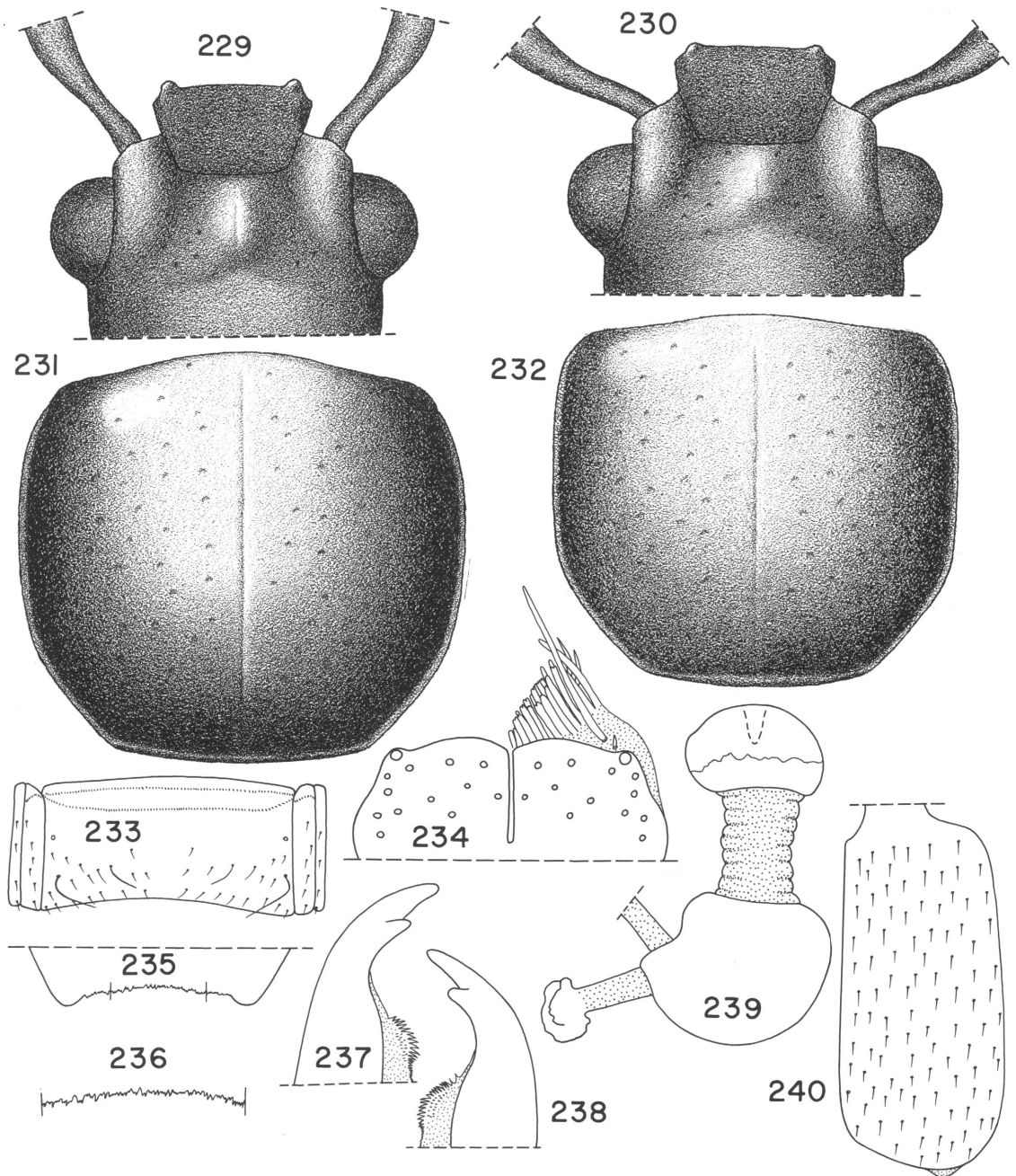


FIGS. 218-228. *Bledius ineptus*, Texas. 218. Head, male. 219. Elytron, left, pubescence. 220. Head, female. 221. Pronotum, male. 222. Mandible, left, dorsal view. 223. Pronotum, female. 224. Tergum VI, pubescence. 225. Labrum, dorsal view, setae and right epipharyngeal lobe removed. 226. Tergum VIII, apex. 227. Tergum VIII, enlargement of posterior margin. 228. Spermatheca.

stripe of varying width (figs. 241-245); sutural stripe slender and triangular to broad and rectangular; sutural stripe at times covering entire elytral surface and producing dark reddish brown elytra and at times sutural stripe absent; epipleuron usually concolorous with at least lateral por-

tion of disk. Pterothoracic sterna and pleura dark reddish brown to reddish brown. Legs yellowish brown. Abdomen dark reddish brown to reddish brown.

Dorsum of head, supra-antennal ridge, epistomal suture, clypeus, eye, labrum, mandible, an-



FIGS. 229-240. *Bledius politus*. 229. Head, male, 230. Head, female. 231. Pronotum, male. 232. Pronotum, female. 233. Tergum VI, pubescence. 234. Labrum, dorsal view, setae and left epipharyngeal lobe removed. 235. Tergum VIII, apex. 236. Tergum VIII, enlargement of posterior margin. 237. Mandible, left, dorsal view. 238. Mandible, right, dorsal view. 239. Spermatheca. 240. Elytron, right, pubescence.



tennomeres, and antenna as described for *episcopalis* except as follows: dorsum of head with generally short pubescence and some long setae; middorsal region of male (fig. 229) with moderately large tumescence; tumescence with midlongitudinal groove well developed to obsolete; middorsal region of female (fig. 230) with low tumescence; midlongitudinal groove of tumescence absent or obsolete. Supra-antennal ridge of male higher than that of female; transverse groove of apical portion poorly developed on males and obsolete on females. Dorsum of head with poorly developed postocular groove, often groove indistinct or absent. Clypeus weakly depressed at epistomal suture; anterior margin with small to moderately large tubercles on male (fig. 229) and small tubercles on the female (fig. 230); apex of tubercle rounded. Eye large (figs. 229, 230). Width of head 0.65 to 0.83 mm.; interocular width 0.40 to 0.53 mm.; head width/interocular width 1.44 to 1.64. Labrum with small, shallow, median, V-shaped emargination (fig. 234). Mandibles bidentate (figs. 237, 238); males occasionally with obsolete third denticle or swelling at base of second.

Pronotum, protergosternal suture, procoxal fissure, elytra, metathorax and protibia as described for *episcopalis* except as follows: pronotum 0.58 to 0.94 mm. long; 0.64 to 0.98 mm. wide; pronotal width/pronotal length 1.01 to 1.11; pronotum of male (fig. 231) with lateral margin more strongly rounded than that of female (fig. 232); lateral margin of female nearly straight and parallel; basal angles rounded but distinct. Pronotal surface shining dully to polished; surface with dense, distinct microgranulate ground sculpturing when shining dully and with microgranulate ground sculpturing absent or obsolete when surface polished; surface with moderately dense to sparse setigerous punctation; punctation moderately coarse to fine and more coarse near median and anterior regions than lateral and basal regions; pubescence short; midlongitudinal groove deep and well defined (figs. 231, 232). Protergosternal suture usually absent, at times present but obsolete or poorly developed. Elytra 0.67 to 1.09 mm. long; elytral length/pronotal length 1.07 to 1.42; surface polished and with dense, deep setigerous punctation; pubescence short (fig. 240).

Abdomen as described for *episcopalis* except as follows: abdomen with fine punctation; terga V and VI with moderately dense, short pubescence; many setae on disk and posterior margin (fig. 233). Tergum VIII with serrulate posterior margin (figs. 235, 236). Sternal surface shining dully to strongly and with well developed to obsolete microgranulate ground sculpturing.

Spermatheca as shown in figure 239.

*Sexual Dimorphism.* The male has a moderately large, median tumescence on the dorsum of the head, and a pair of moderately large clypeal tubercles (fig. 229). The pronotum is larger, more robust and the lateral margins more strongly rounded (fig. 231) than the female.

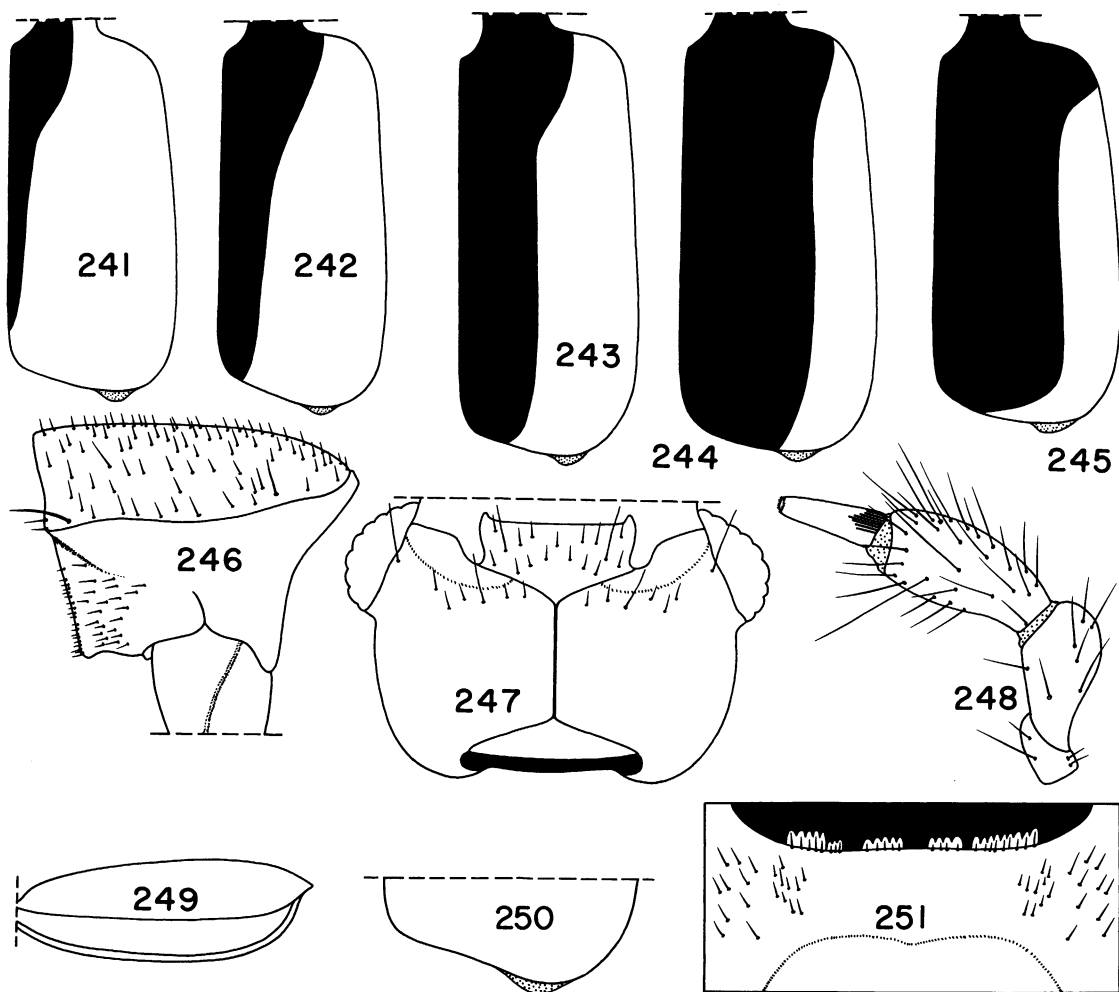
The females have a low, poorly developed median tumescence of the dorsum of the head, and small, low clypeal tubercles (fig. 230). The lateral margins of the anterior two-thirds of the pronotum are nearly straight and parallel (fig. 232).

*Variation.* Individuals from the northern part of the geographical range in New Jersey and Maryland have a dully shining pronotum with distinct, strong microgranulate ground sculpturing covering the whole surface, and moderately coarse, dense punctation; the surface is orangish. The sutural stripe is usually triangular and at times is absent (fig. 241).

The pronotum of specimens from Florida is polished and the ground sculpturing absent or obsolete on the median surface and distinct and moderately strong on the lateral and basal margins. The pronotal punctation is sparse and coarse to fine and the surface reddish. The sutural stripe of the elytra is broad and rectangular (figs. 242-245), and at times occupying the entire dorsal surface of the elytra.

The two types described in the two preceding paragraphs gradually intergrade between New Jersey and Florida, with northern types finally replaced by the southern types in Florida. The northern type can be found in the Floridian populations. The Floridian type is uncommon in New Jersey, but not in North Carolina and South Carolina. Some of the intermediate forms are found in Maryland.

The Texan populations are similar to those from Maryland and New Jersey but lack the dense, coarse punctation.



FIGS. 241-251. *Bledius politus*. 241-245. Elytra, right, color pattern. 246. Prothorax, lateral view. 247. Head, ventral view. 248. Maxillary palpus. 249. Elytron, left, lateral view. 250. Elytron, right, apex. 251. Prosternum, anterior portion.

*Synonymy.* Notman (1920) separated *nigriceps* from *politus* by the absence of an impressed line on the prosternum. The impressed line, indicated by Notman to be parallel to the prosternal margin, I find in all specimens of *politus* and on the types of *nigriceps*. I find no other line to which Notman might have referred and no characters that will support recognition of *nigriceps* as a species. *Bledius nigriceps* is thereby synonymized with *politus*.

*Habitat and Distribution. United States:*

Florida, Georgia, Maryland, Mississippi, New Jersey, New York, North Carolina, South Carolina, Texas (fig. 252; see Appendix for localities).

The species lives along the Atlantic coast from New York to Texas. Further collecting may establish the species in Mexico.

The species is associated not only with coastal areas but also some inland swamps and lakes, particularly those in Florida. I collected the species at Assateague Island; Cape Hatteras National Seashore Park; near Englewood, Florida; and on

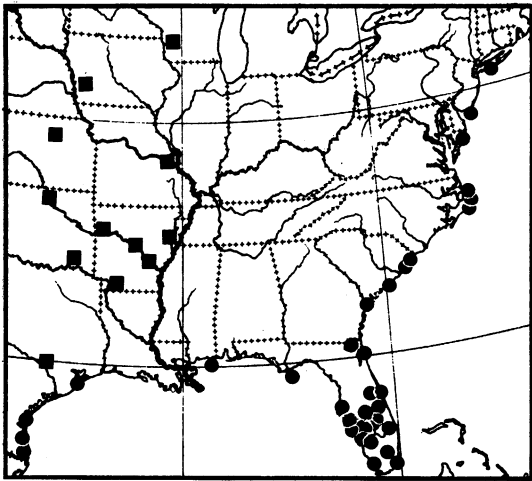


FIG. 252. Distribution of *Bledius politus* (dots) and *Bledius notialis* (squares) in eastern United States.

Saint George Island. The species was always found in slightly moist, heavily vegetated sand. It probably lives in similar circumstances throughout most of its range, including the inland regions of Florida and perhaps in swampy regions of other parts of the Atlantic and Gulf of Mexico coastal plain near the ocean.

#### 15. *Bledius notialis*, new species

Figures 252-263, 376, 377; Table 2

*Holotype*. Male. Oklahoma, Kay County, 1 mile east of Ponca City, Arkansas River; collected by Lee H. Herman, Jr. from sand flats on shore of river, June 17, 1968; deposited in the American Museum of Natural History, New York.

*Paratypes*. 14 males, 21 females with same collection data and place of deposition as holotype.

*Diagnosis*. The bicolored abdomen, in which the apical segments are dark reddish brown to black and the basal ones are yellow-brown to pale reddish brown, will separate this species from most of the other species of the group. It can be separated from *bellicus*, which has a similarly colored abdomen, by the bidentate mandibles of the males (fig. 258) and the weaker pro-

notal ground sculpture of the females. The weaker ground sculpture results in a more shining pronotal surface. The tergal pubescence of the abdomen of *notialis* (fig. 257) is usually denser than that of *bellicus*. Other characters useful for recognition of *notialis* are the generally rectangulate basal angle of the pronotum (figs. 255, 256), absence of a well-developed pronotal midlongitudinal groove, and in the male, presence of large clypeal tubercles and bituberculate head (fig. 253).

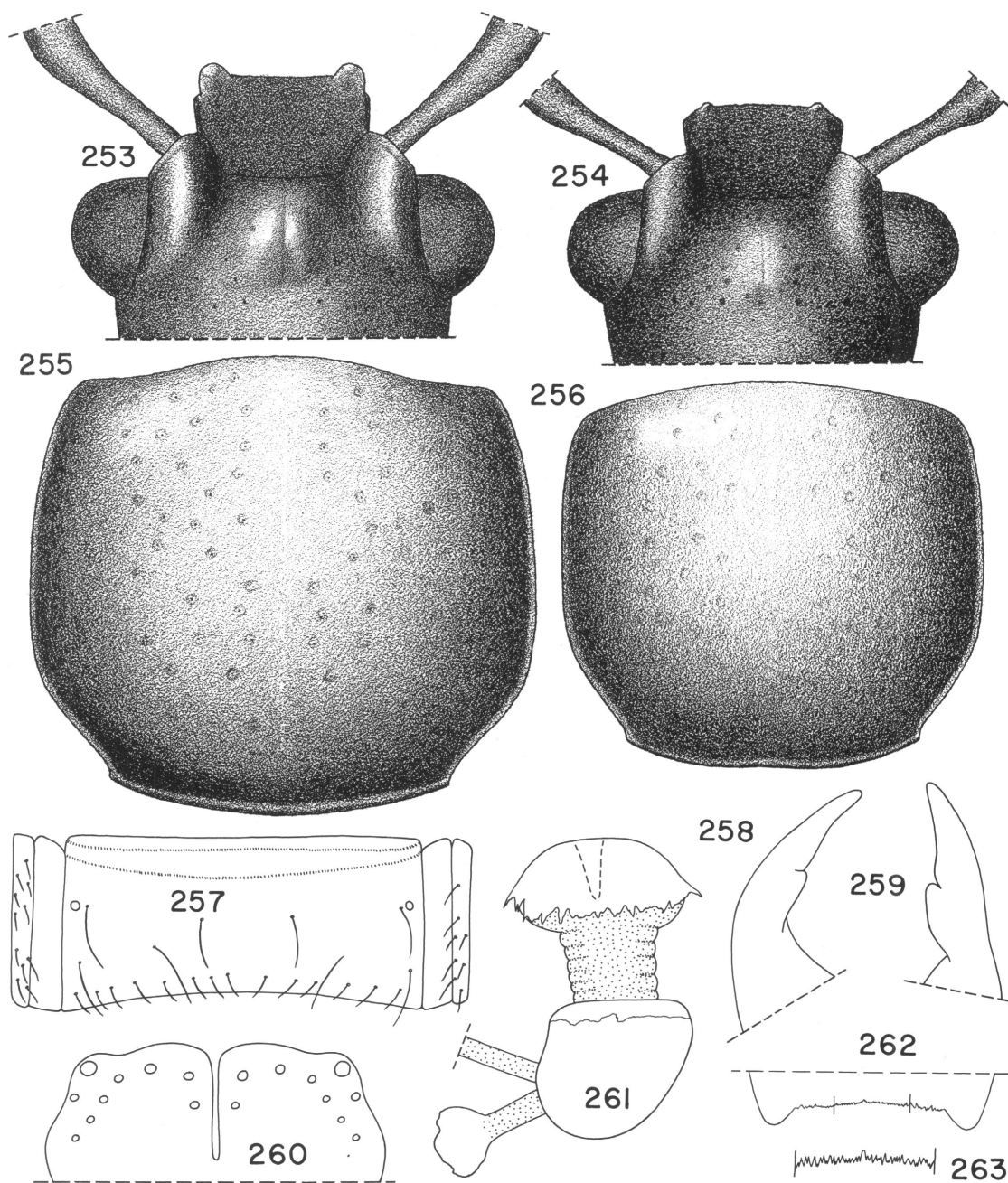
*Description*. *armatus* group.

Length 4.5 to 7.0 mm.

Color pale reddish brown with black to dark reddish brown head, elytra paler than pronotum or abdomen.

Dorsum of head, clypeus, and labrum dark reddish brown to reddish brown, occasionally dorsum black. Venter of head, submentum, labium, maxilla, and antenna reddish brown to pale reddish brown. Mandibles reddish brown. Pronotum, prohypomeron, and prosternum reddish brown to pale reddish brown, at times yellowish brown. Elytron reddish brown to yellowish brown; sutural ridge black to reddish brown; region adjacent to suture often reddish brown; epipleuron concolorous with disk. Pterothoracic sterna and pleura dark reddish brown to reddish brown to yellowish brown. Legs reddish brown to yellowish brown. Abdomen reddish brown to yellowish brown and segments VII to X darker reddish brown.

Dorsum of head, supra-antennal ridge, epistomal suture, clypeus, labrum, and antennomeres as described for *episcopalis* with following exceptions: middorsal region of dorsum of head of male bituberculate (fig. 253); tubercles widely or narrowly separated; female with middorsal tumescence (fig. 254) of variable height; tumescence of female with midlongitudinal groove that terminates at median fovea behind tumescence. Supra-antennal ridge of male moderately high (fig. 253), that of female low but distinct (fig. 254); groove of anterior and lateral portion poorly developed. Dorsum of head at times with poorly developed postocular groove. Clypeal tubercle of male large and robust (fig. 253); tubercle slightly curved posteromedially; clypeal tubercle of female represented by small, low, transverse ridge or rounded tumescence but size



FIGS. 253-263. *Bledius notialis*. 253. Head, male. 254. Head, female. 255. Pronotum, male. 256. Pronotum, female. 257. Tergum VI, pubescence. 258. Mandible, left, dorsal view. 259. Mandible, right, anterolateral view. 260. Labrum, dorsal view, setae and epipharyngeal lobes removed. 261. Spermatheca. 262. Tergum VIII, apex. 263. Tergum VIII, enlargement of posterior margin.

variable (fig. 254). Eye large. Width of head 0.75 to 0.97 mm.; interocular width 0.44 to 0.60 mm.; head width/interocular width 1.54 to 1.72. Labrum with shallow, narrow, median, V-shaped emargination (fig. 260). Mandible of male and female bidentate (figs. 258, 259); base of second denticle at times with slight tumescence.

Pronotum, elytra, metathoracic wings, metasternum and protibia as described for *episcopalis* except as follows: pronotum 0.78 to 1.07 mm. long; 0.86 to 1.19 mm. wide; pronotal width/pronotal length 1.05 to 1.13; surface strongly convex, that of male (fig. 255) slightly more so than female (fig. 256); basal angles distinctly developed and rectangulate to moderately rounded; anterior two-thirds of lateral margin broadly rounded, male more strongly so than female and female with lateral margins nearly parallel to one another; basal third of lateral margin sinuate to basal angle. Pronotal surface usually shining strongly and often with polished spots near middle, usually with less strongly shining spots near margins; microgranulate sculpturing absent from polished spots, weak or obsolete at strongly shining spots and well developed at less shining spots; pubescence moderately long; midlongitudinal groove absent; at times obsoletely present; midlongitudinal line evident as dark stripe. Protergosternal suture absent; procoxal fissure closed. Elytra 0.96 to 1.25 mm. long; elytral length/pronotal length 1.11 to 1.30.

Abdomen as described for *episcopalis* with following exceptions: terga V and VI sparsely pubescent, with four long setae on disk and row along posterior margin (fig. 257). Tergum VIII with weakly serrulate posterior margin (figs. 262, 263).

Spermatheca as shown in figure 261.

*Sexual Dimorphism.* The males have large, robust, and prominent clypeal tubercles, high supra-antennal ridges, a bituberculate head (fig. 253) and a robust prothorax with strongly rounded lateral margins (fig. 255).

The females have small clypeal tubercles, low supra-antennal ridges, a head with a median tumescence that has a midlongitudinal groove (fig. 254), and a less robust prothorax with more nearly straight and parallel lateral margins (fig. 256).

*Habitat and Distribution. United States:* Arkansas, Iowa, Kansas, Missouri, Oklahoma, Wisconsin, Texas (fig. 252; see Appendix for localities).

At the Arkansas River at Ponca City, Oklahoma, the species was collected on sand flats and at the Mississippi River near West Memphis, Arkansas, on a sloping, vegetated, moist bank.

*Discussion.* I have studied three males and four females from Aweme, Manitoba, and a male and female from Onah, Manitoba, that both resemble and differ from *notialis*. They have the same mandibular denticulation, tuberculation of the head and clypeus and form, sculpturing, and punctuation of the pronotum. The Manitoban specimens differ, however, by the smaller eyes (head width/interocular width 1.45 to 1.58, see table 2), shorter elytra (elytral length/pronotal length 1.03 to 1.19) and unicolorous abdomen. In the Manitoban samples the width of the head is 0.69 to 0.78 mm.; the interocular width 0.44 to 0.51 mm.; the pronotal length 0.69 to 0.86 mm.; the pronotal width 0.77 to 0.95 mm.; the elytral length 0.75 to 0.95 mm.; and the ratio pronotal width/pronotal length is 1.05 to 1.12. These measurements are slightly smaller than those given for the species in the Description.

The similarity of the Manitoban population to *notialis* is sufficiently great that I consider them conspecific, but the slight differences cast some doubt on this decision. Since unquestionable specimens of *notialis* are known only as far north as southern Wisconsin the conspecificity is in further question.

Until additional collections are made that close the geographic and anatomical gaps I am only tentatively considering the Manitoban population to be *notialis*.

*Etymology.* From the Latin, *notialis*, meaning southern, applied to this species because it is found commonly in the south central part of the United States.

#### 16. *Bledius bellicus* Blackwelder Figures 264-275, 370, 371; Table 2

*Bledius bellicus* Blackwelder, 1944, p. 106 (proposed as a new name for *B. armatus* Say, 1823, which is preoccupied by *B. armatus*

Panzer, 1799). Smith and Hein, 1971 (cited in error as *Bledius bellicosus*). *Bledius armatus* Say, 1823, p. 155, 156 (not Panzer, 1799). Erichson, 1840, p. 779. Fall, 1910, pp. 102-103 (other references to *B. armatus* Say are misidentifications of *B. strenuus*). (Type locality was not given in original description and the holotype is apparently lost or destroyed.)

**Diagnosis.** The reddish brown to yellowish brown body with a black or dark reddish brown head and dark abdominal tip, rectangulate basal angles of the pronotum (figs. 267, 272), tridentate mandibles of the male (fig. 272), bidentate mandibles of the females (fig. 270), presence of a midlongitudinal pronotal groove, and strongly granulate ground sculpturing of the pronotum will separate the species from others of the group. Some females of *bellicus* and *notialis* are similar but can be separated by the presence of stronger pronotal granulate ground sculpturing of *bellicus*.

**Description.** *armatus* group.

Length 4.7 to 7.0 mm.

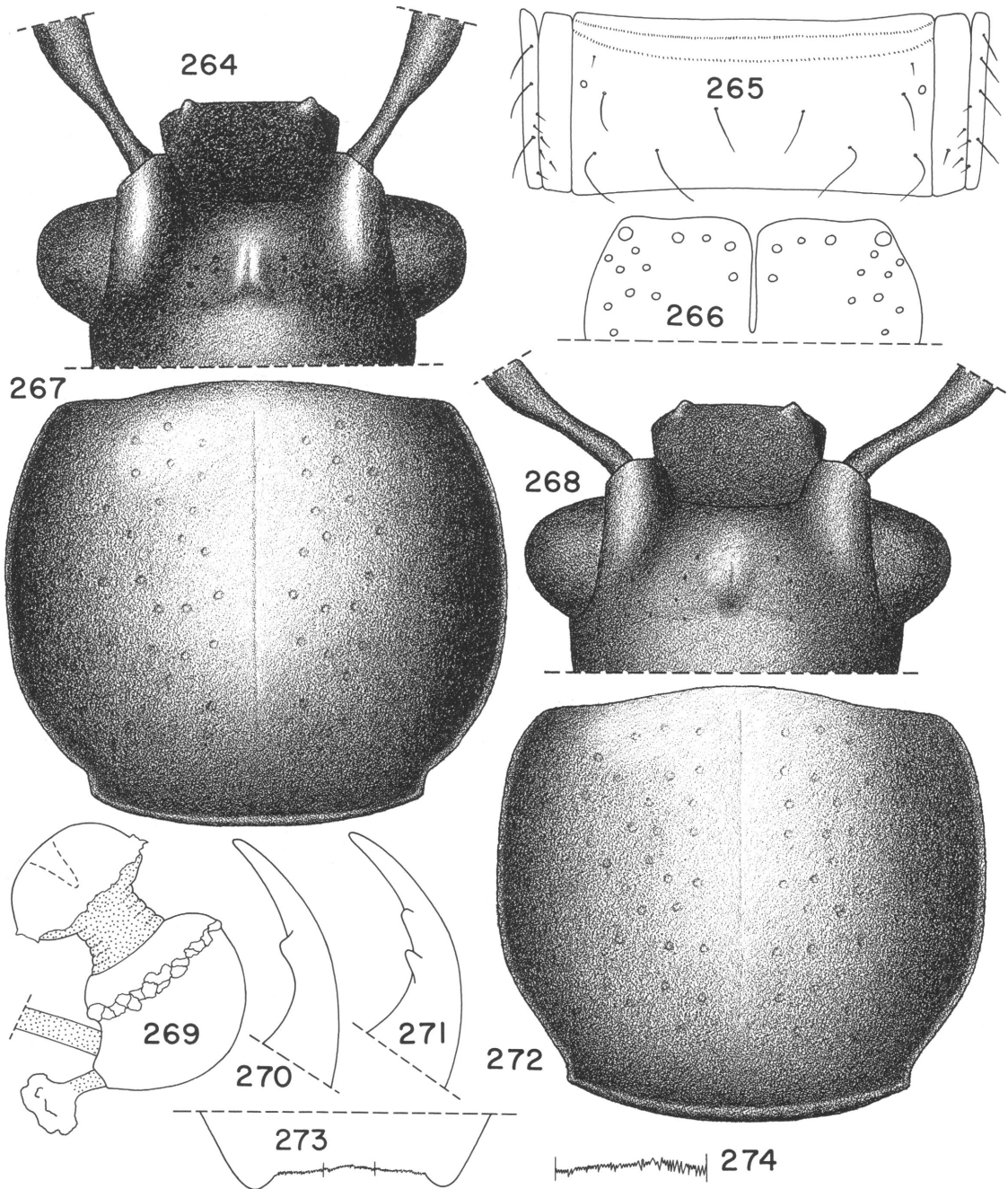
Color dark reddish brown to reddish brown to yellowish brown with black or dark reddish brown head and with apical segments of abdomen reddish brown to black; elytra paler than prothorax or abdomen.

Dorsum of head, clypeus, and labrum dark reddish brown to black. Venter of head, mentum, submentum dark reddish brown to reddish brown, occasionally mentum and submentum yellowish brown. Maxilla, labial palpus, and antenna pale reddish brown. Mandible reddish brown with black base, and at times black infusions on remainder. Pronotum pale reddish brown to dark reddish brown, median region frequently with blackish infusions and midlongitudinal groove often evident as dark line, lateral regions often yellowish brown. Prohypomeron and prosternum reddish brown to yellowish brown. Elytron yellowish brown or pale reddish brown, occasionally reddish brown; sutural ridge black to dark reddish brown, occasionally with a narrow reddish brown sutural stripe; epipleuron concolorous with disk. Pterothoracic sterna and pleura dark reddish brown to pale reddish brown. Legs yellowish brown. Abdomen reddish brown to pale reddish brown to yellowish brown; seg-

ments VII, VIII, IX, and X darker, reddish brown to black; abdomen usually bicolored, rarely nearly concolorous.

Dorsum of head, supra-antennal ridge, epistomal suture, clypeus, labrum, and antennomeres as described for *episcopalis* except as follows: dorsum of head with short pubescence; middorsal region of male (fig. 264) with rounded tumescence; tumescence with midlongitudinal groove; groove strongly to weakly developed; middorsal region of female (fig. 268) with low tumescence; tumescence with shallow midlongitudinal groove moderately well developed to absent; median fovea present behind tumescence of male and female; tumescence of male larger and groove more distinct than on female. Supra-antennal ridge of male moderately high, that of female lower; transverse groove of anterior portion moderately well to poorly developed and portion extending onto lateral side obsolete. Dorsum of head with postocular groove extending from median fovea; groove moderately well developed to poorly developed. Tubercles of clypeus of male slender, moderately large, and slightly curved at apex; tubercle of female low, rounded, small, and poorly developed. Eyes large (figs. 264, 268). Width of head 0.78 to 0.94 mm.; interocular width 0.48 to 0.58 mm.; head width/interocular width 1.58 to 1.68. Labrum with shallow, narrow median V-shaped emargination. Mandibles of female bidentate (fig. 270); mandibles of male tridentate with basal and middle denticles separated (fig. 271).

Pronotum, protergosternal suture, procoxal fissure, elytra, metasternum, metathorax, and protibia as described for *episcopalis* with following exceptions: pronotum 0.75 to 0.99 mm. long; 0.88 to 1.16 mm. wide; pronotal width/pronotal length 1.11 to 1.19; surface of male (fig. 267) strongly convex and that of female moderately strongly convex (fig. 272); basal angles distinctly developed and rectangulate; anterior two-thirds of lateral margin of male broadly arcuate, basal third more strongly arcuate to basal angle; lateral margin of female less strongly arcuate (fig. 272) than that of male (fig. 267); pronotum of male more robust than that of female. Pronotum with surface shining dully, not polished, with dense microgranulate ground sculpturing; pubescence moderately long; mid-



FIGS. 264-274. *Bledius bellicus*. 264. Head, male. 265. Tergum VI, pubescence. 266. Labrum, dorsal view, setae and epipharyngeal lobes removed. 267. Pronotum, male. 268. Head, female. 269. Spermatheca. 270. Mandible, female, right, dorsal view. 271. Mandible, male, right, dorsal view. 272. Pronotum, female. 273. Tergum VIII, apex. 274. Tergum VIII, enlargement of posterior margin.

longitudinal groove shallow, but distinct, at times poorly developed. Protergosternal suture absent. Elytra 1.04 to 1.37 mm. long; elytral length/pronotal length 1.21 to 1.47.

Abdomen as described for *episcopalis* with following exceptions: terga V and VI sparsely pubescent, with four long setae on disk, with row along posterior margin present or absent (fig. 265). Tergum VIII with finely serrulate posterior margin (figs. 273, 274).

Spermatheca as shown in figure 269.

**Sexual Dimorphism.** The male has tridentate mandibles (fig. 271), prominent clypeal tubercles (fig. 264), a large tumescence of the dorsum of the head (fig. 264), large supra-antennal ridge, and a robust, strongly convex pronotum with strongly rounded lateral margins (fig. 267).

The female has bidentate mandibles (fig. 270), small clypeal tubercles (fig. 268), a moderately large tumescence on the dorsum of the head, moderately large supra-antennal ridges, and a moderately convex pronotum with moderately rounded lateral margins (fig. 272).

**Habitat and Distribution.** *United States:* Colorado, Kansas, Nebraska, South Dakota (fig. 275; see Appendix for localities).

*Bledius bellicus* has been collected on moist, unvegetated sand flats in Nebraska at Oshkosh, and near Wahoo on the Platte River, and near Niobrara on Verdigre Creek. At Oshkosh the species was also on sand flats that are slightly vegetated. The species is abundant on the Platte River and is attracted to black lights.

**Discussion.** With the exceptions of a paper by Fall (1910) and Smith and Hein<sup>1</sup> (1971) the species now called *Bledius bellicus* has been misidentified in the literature. The descriptions by Le Conte (1863, 1877) and Casey (1889), the note by Fall (1901), and the key by Notman (1920) all refer to what is now *Bledius strenuus*.

The species called *Bledius armatus* was included in Say's descriptions of insects collected on the Long Expedition to the Rocky Mountains in 1819 and 1820. Say traveled west of the Mississippi River in what is now Missouri, Iowa, Nebraska, Colorado, Kansas, Oklahoma, and Arkansas (Bell, 1957; James, 1905; Weins and

Ziegler, 1931). Along his route, Say could have encountered two species that fit his description of *armatus* (a homonym now replaced by *bellicus*), one in the north on the Platte River, the other in the south on the Arkansas River (Bell, 1957, pp. 183-284). As the type locality was not included with the original description and the holotype is lost, there is no way to be sure to which of the two species (the "northern" or "southern") Say (1823) referred.

Fall (1910) considered a species from Nebraska to be Say's *armatus*. While identifying material for the paper by Smith and Hein (1971), I considered the Nebraskan species to be *bellicus* (Say's *armatus*). Neither Fall nor I were aware of a similar southern species. Without contrary evidence, and since other considerations are equal, I will continue to regard *bellicus* as the northern species because it has been considered so in the past (Fall, 1910; Smith and Hein, 1971).

#### 17. *Bledius eximius* Casey

Figures 275-285, 364, 365, 390, 391; Table 2

*Bledius eximius* Casey, 1889, p. 47. Fall, 1910, p. 105. Notman, 1920, p. 696. (Type locality: California, San Diego. Holotype in the Na-

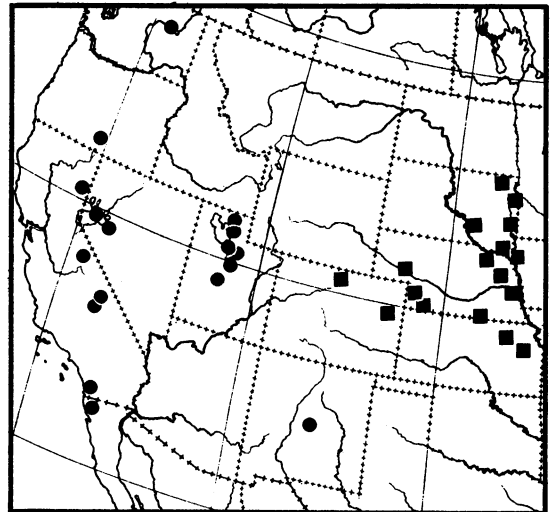


FIG. 275. Distribution of *Bledius bellicus* (squares) and *Bledius eximius* (dots) in western United States.

<sup>1</sup>These authors cited *bellicus* in error as *bellicosus*. I supplied the identification but mistakenly transmitted an incorrect name.



tional Museum of Natural History, Washington, D.C. Type examined.)

*Bledius gradatus* Fall, 1910, p. 104. Notman, 1920, p. 696. (Type locality: California, desert region near Keeler. Holotype in the Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts. Type examined.) NEW SYNONYM.

*Bledius boddyi* Hatch, 1957, p. 102. (Type locality: Oregon, Abert Lake. Holotype in the collection of the University of Washington, Seattle, Washington. Paratype examined.) NEW SYNONYM.

**Diagnosis.** The bidentate mandibles (fig. 281), strongly rounded basal angles (which may be absent) of the pronotum, the rectangulate anterior angles of the pronotum (figs. 279, 284), the coarse, well-developed pronotal midlongitudinal groove, and the abdominal punctulation will enable (fig. 390) separation of *eximius* from the other species of the group.

**Description.** *armatus* group.

Length 4.0 to 7.5 mm.

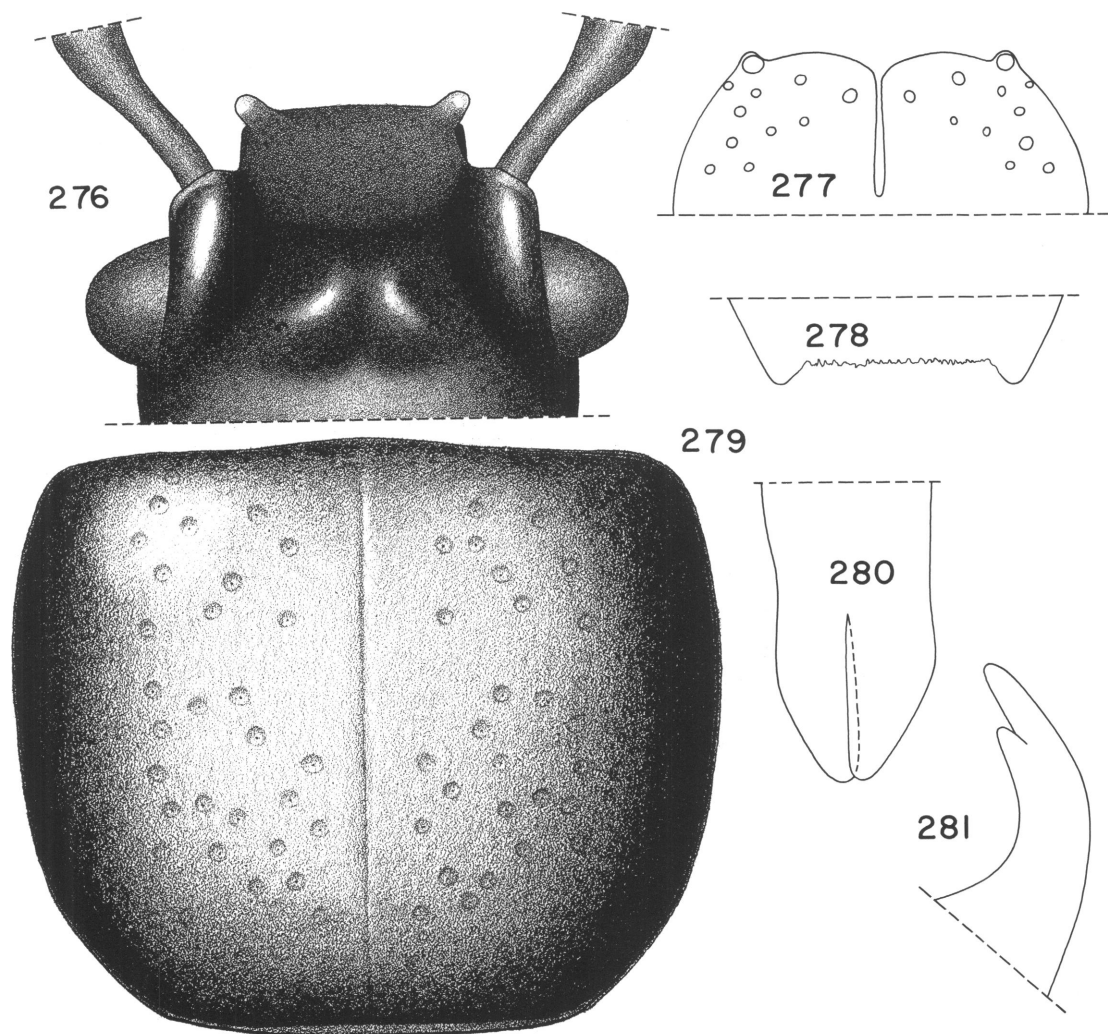
Color black to reddish brown with dark reddish brown elytra on females, orange elytra on males.

Dorsum of head, clypeus, labrum, and venter of head black to dark reddish brown. Mentum, submentum, maxilla, and labial palpus orangish brown to yellowish brown. Antenna dark reddish brown. Mandibles reddish brown. Pronotum reddish brown to dark reddish brown, occasionally black. Prohypomeron and prosternum reddish brown to dark reddish brown. Elytron of female dark reddish brown with infusions of black, sometimes black or dark orangish brown. Elytron of male orangish, occasionally yellowish brown or dark orangish brown. Elytral epipleura of both sexes concolorous with disk. Pterothoracic sterna and pleura black to reddish brown, at times pale reddish brown. Legs dark reddish brown to reddish brown, at times yellowish brown. Abdomen black to reddish brown.

Dorsum of head, epistomal suture, clypeus, and labrum as described for *episcopalis* except as follows: dorsum of head shining dully, and not polished except on the apex of tubercle of dorsum; surface with sparse, moderately deep, setigerous punctation; middorsal region of male bituberculate (fig. 276); tubercles very large and

high and curved or simply conical; tubercles widely separated; middorsal region of female broadly tumescent (fig. 282); tumescence low and with shallow, midlongitudinal groove. Supra-antennal ridge of male extremely high and robust (fig. 276), that of female moderately high and less prominent or robust (fig. 282); anterior portion of supra-antennal ridge on male with large, prominent transverse ridge that extends on to lateral side; anterior portion on female smaller and less prominent but similar in other respects; surface of males usually with polished spots and weak microgranulate ground sculpturing; surface of female shining dully and with moderately strong microgranulate ground sculpturing. Epistomal suture broadly and moderately deeply arcuate medially. Clypeus of male (fig. 276) very strongly depressed at epistomal suture with surface at much lower level than dorsum; clypeus of female (fig. 282) less strongly depressed; anterior margin of male with large, stout tubercle near lateral margin; anterior margin of female with small, more slender but prominent tubercle near lateral margin; tubercle of male with nearly flat apex, that of female with rounded apex. Eyes of moderate size. Width of head 0.65 to 1.04 mm.; interocular width 0.46 to 0.71 mm.; head width/interocular width 1.37 to 1.55. Labrum with moderately deep and broad median emargination (fig. 277). Mandibles bidentate (fig. 281) in both sexes. Antennomeres 3 to 7 without ridge or carina encircling apex.

Pronotum and protibia as described for *episcopalis* except as follows: pronotum 0.64 to 1.17 mm. long; 0.71 to 1.37 mm. wide; pronotal width/pronotal length 1.03 to 1.23; surface of male moderately strongly convex and with lateral sides strongly convex and median region nearly flat (fig. 279); surface of female moderately convex and more evenly curved from middle to sides (fig. 284) than that of male; basal angles (figs. 279, 284) poorly developed and strongly rounded to obsolete or absent; anterior two-thirds of lateral margins of male broadly and shallowly arcuate to nearly parallel, occasionally slightly divergent anteriorly (fig. 279); anterior two-thirds of lateral margins of female parallel or slightly divergent anteriorly (fig. 284); basal third of lateral margin broadly rounded to at times nearly straight to basal margin; pronotum of



FIGS. 276-281. *Bledius eximius*. 276. Head, male. 277. Labrum, dorsal view, setae and epipharyngeal lobes removed. 278. Tergum VIII, apex. 279. Pronotum, male. 280. Median lobe of aedeagus, apical portion. 281. Mandible, dorsal view.

male more robust than that of female. Anterior angles moderately (fig. 279) to strongly distinct and more or less rectangulate (fig. 284); rectangulation more evident in females. Pronotum of male shining dully with median region more strongly polished and with microgranulate ground sculpturing on sides more poorly developed than on median region; female with surface shining dully and with dense microgranulate ground sculpturing; setigerous puncta-

tion present and moderately dense on lateral and basal areas and more sparse on anterior and medial portions; punctation coarse; pubescence moderately long; midlongitudinal groove deep, prominent and well defined, but groove more strongly developed on male (fig. 279) than female. Protergosternal suture absent to obsolete to present but poorly developed; procoxal fissure usually closed, at times narrowly open but procochantin more or less concealed. Elytra 0.75 to

1.47 mm. long; elytral length/pronotal length 1.05 to 1.49; surface polished and with dense, moderately deep, setigerous punctation; pubescence moderately long. Metathoracic wings fully developed. Metasternum moderately densely pubescent and densely punctulate (fig. 391); surface shining dully.

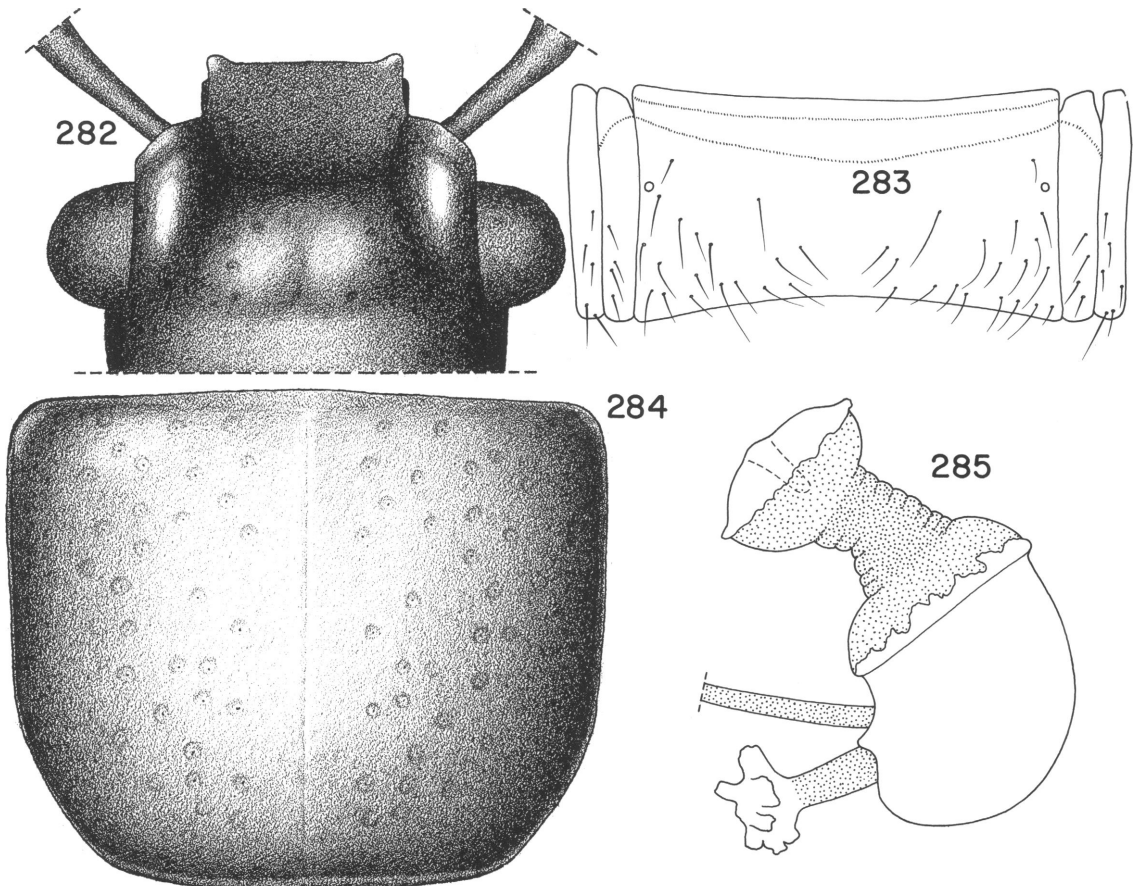
Abdomen as described for *episcopalis* except as follows: terga V and VI moderately densely pubescent (fig. 283); tergum VIII with moderately coarsely serrate posterior margin (fig. 278). Sterna with dense punctulation (fig. 390) and surface shining dully.

Spermatheca as shown in figure 285.

*Sexual Dimorphism.* The dorsum of the head of the male has a pair of large tubercles (fig.

276), the supra-antennal ridge is large and high, the clypeal tubercles are large with the apices flattened (fig. 276) and the pronotum is robust and strongly convex (fig. 279). The elytra of the males are orangish.

The dorsum of the head of the female has a broad, low tumescence with a midlongitudinal groove (fig. 282), the clypeal tubercles are shorter and more slender than those of the male, and the apex of each tubercle is more rounded. The pronotum of the female (fig. 284) is less robust, and less convex, the lateral sides more apt to be parallel to one another and the anterior angles are more rectangular than in the male. The elytra of the female are dark reddish or reddish brown and often have blackish infusions.



FIGS. 282-285. *Bledius eximius*. 282. Head, female. 283. Tergum VI, pubescence. 284. Pronotum, female. 285. Spermatheca.

*Synonymy.* Casey described *eximius* from the female but thought he had both sexes represented in his series. Fall described the male of *eximius* as *B. gradatus*.

Hatch described *B. boddyi* and did not compare his populations with either *eximius* or *gradatus*, both of which were described from southern California. The populations from Oregon and Washington have no characters not found in *eximius* and I therefore synonymize *boddyi* and *eximius*.

*Habitat and Distribution.* Mexico: Baja California. United States: California, New Mexico, Nevada, Oregon, Utah, Washington (fig. 275; see Appendix for localities).

*Bledius eximius* is associated with saline and alkali lakes in the mountainous regions of the western United States. It has been collected on Mono Lake, Owens Lake, Honey Lake (near Amedee, California), Utah Lake, the Great Salt Lake, Laguna del Perro, New Mexico, and Lake Abert.

At Lake Abert, Oregon, the species was collected on the associated alkali flats. The species lives on drier parts of salt flats, often near clumps of vegetation, at Laguna del Perro, near Willard, New Mexico, and near the Great Salt Lake. At the localities in Oregon and Utah the species is abundant, but in New Mexico the population is very small and individuals uncommon.

*Discussion.* In New Mexico and on the northern part of the Great Salt Lake, Utah, the individuals of the populations are notably smaller than in other regions. These smaller individuals have no feature other than size that distinguishes them and are therefore considered to be conspecific with the larger animals.

#### 18. *Bledius monstratus* Casey

Figures 286-298; 382, 383; Table 2

*Bledius monstratus* Casey, 1889, p. 46. Fall, 1901, p. 76. Notman, 1920, p. 695. Blackwelder, 1936, p. 60 (illustration of mandible). Hatch, 1957, p. 105 (listed as *B. monstrosus* Casey, but is obviously an error of spelling, since the description is of *B. monstratus*.) (Type locality: California, San Francisco. Holotype in the National Museum of Natural History, Smithsonian Institution, Washington, D.C. Type examined.)

*Diagnosis.* This species is readily distinguished from all other species except *fenyesi* by the coarse punctation that produces a honeycomb effect on the surface of the pronotum (fig. 291) and by the expanded protibiae that lack long setae between the shorter, blunt, spinelike setae (fig. 295). This species and *fenyesi* possess other unique characters, but the pronotal and protibial features suffice for recognition. *Bledius monstratus* can be separated from *fenyesi* by the shorter elytra.

*Description.* *armatus* group.

Length 3.7 to 5.1 mm.

Color variable but generally head and abdomen dark reddish brown; prothorax reddish brown; elytra yellowish brown; body at times entirely black.

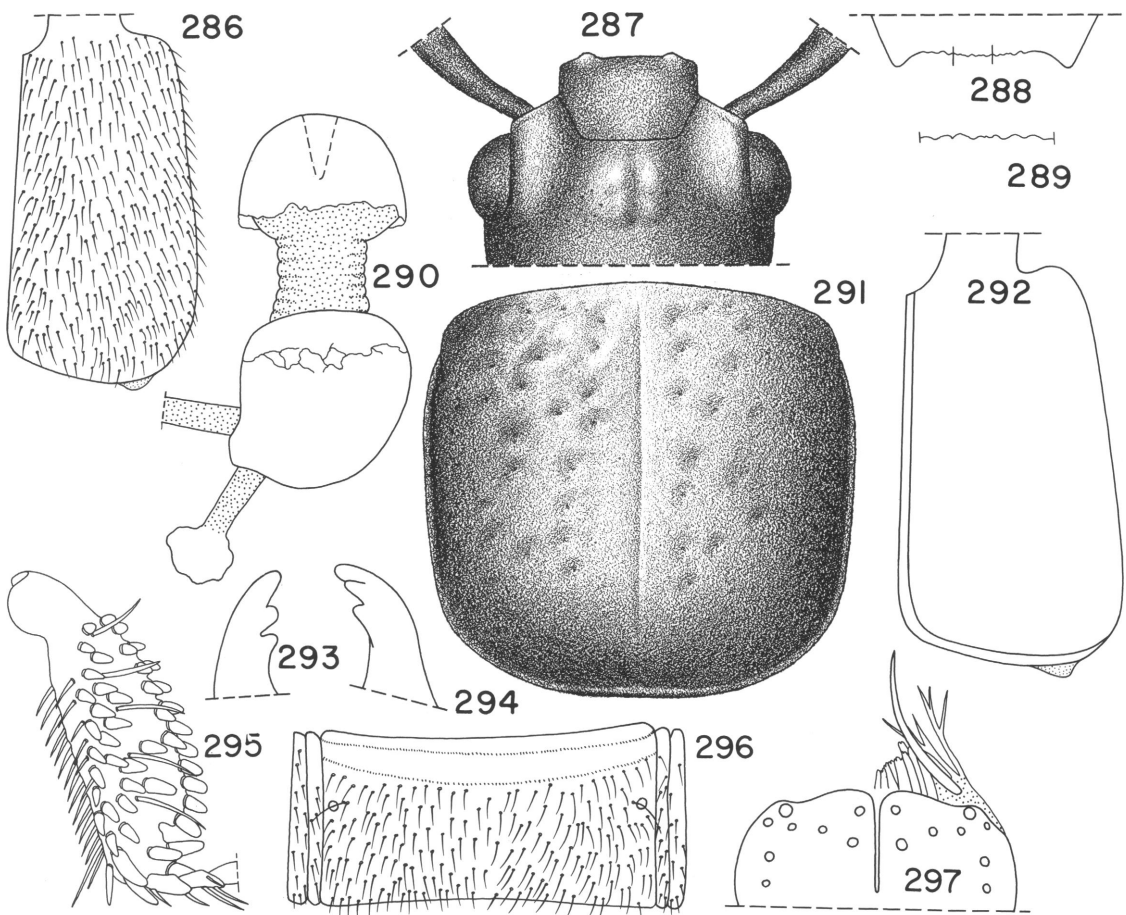
Dorsum and venter of head and clypeus dark reddish brown to reddish brown, at times nearly black. Labium, maxilla, labrum, and antenna pale reddish brown to reddish brown. Mandibles reddish brown. Pronotum, prohypomeron, and prosternum pale reddish brown to dark reddish brown, at times with infusions of black producing nearly black appearance. Elytron yellowish brown, at times black or transversely bicolored with base black and apex yellowish brown. Pterothoracic sterna and pleura pale reddish brown to reddish brown, at times black. Legs pale reddish brown to reddish brown. Abdomen pale reddish brown to dark reddish brown, at times black.

Dorsum of head shining dully, not polished but with surface of tubercles polished; surface with dense microgranulate ground sculpturing and shallow, sparse, fine setigerous punctation; pubescence and punctation absent from mid-longitudinal strip; pubescence moderately long; middorsal region bituberculate (fig. 287); tubercles low to moderately high and often with transverse impression (fig. 287); tubercles of male larger than those of females; median fovea present behind tubercles. Supra-antennal ridge (fig. 287) low to moderately high; ridge of male higher than that of female; anterior portion with poorly developed to obsolete transverse groove that extends onto lateral side; surface shining dully to strongly with some polished spots. Epistomal suture broadly and shallowly arcuate and sharply angulate at juncture with supra-antennal ridge. Clypeus slightly depressed at epistomal su-

ture with clypeus and dorsum at nearly same level; surface shining dully, with microgranulate ground sculpturing and sparse, fine, setigerous punctation; pubescence absent from midlongitudinal strip; anterior margin with small to moderately large, rounded tubercle near lateral margin (fig. 287); tubercle of male larger than that of female. Eye moderately large. Width of head 0.63 to 0.74 mm.; interocular width 0.44 to 0.53 mm.; head width/interocular width 1.35 to 1.49. Labrum with microgranulate ground sculpturing and shallow setigerous punctation; an-

terior margin not or only slightly reflexed and with small, shallow, V-shaped, median emargination (fig. 297). Mandibles tridentate with denticles rounded and separated (figs. 293, 294). Antennomeres three to seven without ridge encircling apex; nine to eleven more strongly enlarged forming poorly developed club (as in fig. 306).

Pronotum 0.71 to 0.96 mm. long; 0.76 to 1.00 mm. wide; pronotal width/pronotal length 1.02 to 1.10; surface strongly convex (fig. 291); basal angles absent (fig. 291); anterior two-thirds



FIGS. 286-297. *Bledius monstratus*. 286. Elytron, right, pubescence. 287. Head. 288. Tergum VIII, apex. 289. Tergum VIII, enlargement of posterior margin. 290. Spermatheca. 291. Pronotum. 292. Elytron, right. 293. Mandible, left, anterolateral view. 294. Mandible, right, dorsal view. 295. Protibia and base of tarsus. 296. Tergum VI, pubescence. 297. Labrum, dorsal view, setae and left epipharyngeal lobe removed.

of lateral margins straight or nearly so and parallel to one another or slightly convergent anteriorly; basal third of lateral margin gradually rounded and continuous, or nearly so with basal margin; anterior angles moderately distinct. Pronotal surface shining dully, not polished, with dense microgranulate ground sculpturing; surface with moderately dense, large, coarse, and deep setigerous punctation (fig. 291); punctation producing honeycombed appearance on surface; pubescence moderately long; midlongitudinal groove well developed and moderately deep (fig. 291). Protergosternal suture absent but with ridge at same spot at which suture would be if present; ridge produced by strongly concave prohypomeron. Procoxal fissure closed. Elytra 0.74 to 0.99 mm. long; elytral length/pronotal length 0.86 to 1.14; elytra shorter than or slightly longer than pronotum (compare figs. 291, 292); surface polished and with dense, moderately deep setigerous punctation, pubescence moderately long (fig. 286). Metathoracic wings fully developed to present only as reduced pads. Metasternum with sparse pubescence, without punctulation, with dense, granulated ground sculpturing and with surface shining dully. Protibia strongly expanded and compressed; spinelike setae short, stout, and blunt tipped; surface between spine-like setae glabrous, without long setae interspersed (fig. 295).

Abdomen with moderately coarse punctation; terga V and VI with dense pubescence; disk and posterior margin with many setae (fig. 296); tergum VIII with margin of emargination entire, with irregularities of margin (figs. 288, 289) but not resembling serration of other species. Sterna moderately densely pubescent; punctulation absent; surface between punctures shining dully, with coarse, microgranulate ground sculpturing.

Spermatheca as shown in figure 290.

*Sexual Dimorphism.* The sexes are difficult to consistently distinguish externally. The males in contrast to the females tend to have larger clypeal tubercles, and higher tubercles of the dorsum of the head and higher supra-antennal ridges.

*Habitat and Distribution.* *Canada:* British Columbia. *United States:* California, Oregon, Washington (fig. 298; see Appendix for localities).

The species is found only on the sea beaches of the Pacific coast from Queen Charlotte Island, British Columbia, south to Cayucos, California.

The adults are very abundant in moist sand that covers a layer of decayed seaweed. Larvae can be taken in the same situation and they will be described in a separate paper.

*Variation and Discussion.* Among the samples of *monstratus* the elytral length and the ratio elytral length/pronotal length decreases from Queen Charlotte Island (mean 1.08) to Carmel, California (mean 0.91). South of Carmel the means for these measurements increase to the figures calculated for the populations in the San Francisco region. Along with the elytral reduction is a reduction of the metathorax and metathoracic wings. At Queen Charlotte Island the metathoracic wings are nearly fully developed and possibly functional, but are reduced to small pads in the vicinity of Monterey Bay. The length of the membranous wings varies between the two extremes at all other localities and they may be nonfunctional. This clinal gradient changes most rapidly between Rockaway Beach and Lucia, California (fig. 298, table 2).

Although I have collected 719 individuals of *monstratus* between San Francisco and Cayucos, at no localities in this zone did I also find *fenyesi*. On the other hand the two species have seemingly been collected together at three localities: San Francisco, Rockaway Beach, and near Atascadero on the same embayment as Cayucos. At these three localities only a total of five specimens of *fenyesi* are known and for all of them the elytral length/pronotal length ratio is near the mean for the species. I have seen no specimens that suggest an intergradation of the very definite anatomical gap between the two taxa.

The main difference between the two taxa is that *monstratus* is brachypterous to microppterous for the metathoracic wings, *fenyesi* is not. There are numerous examples in the Coleoptera of species that are polymorphic for wing length, e.g., fully winged versus brachyptery or microptery (Darlington, 1943, 1971; Herman, 1972, pp. 124, 126; Herman, 1975). Furthermore, reduction of the metathoracic wings is often accompanied by reduction of the metathorax and in the Staphylinidae by a reduction of the elytral length (Herman, *op. cit.*). The existence of species known to be polymorphic for wing length complicates the decision regarding the taxonomic status of *fenyesi* and *monstratus*.

The two morphs may represent two species or the same polymorphic one. Favoring one poly-

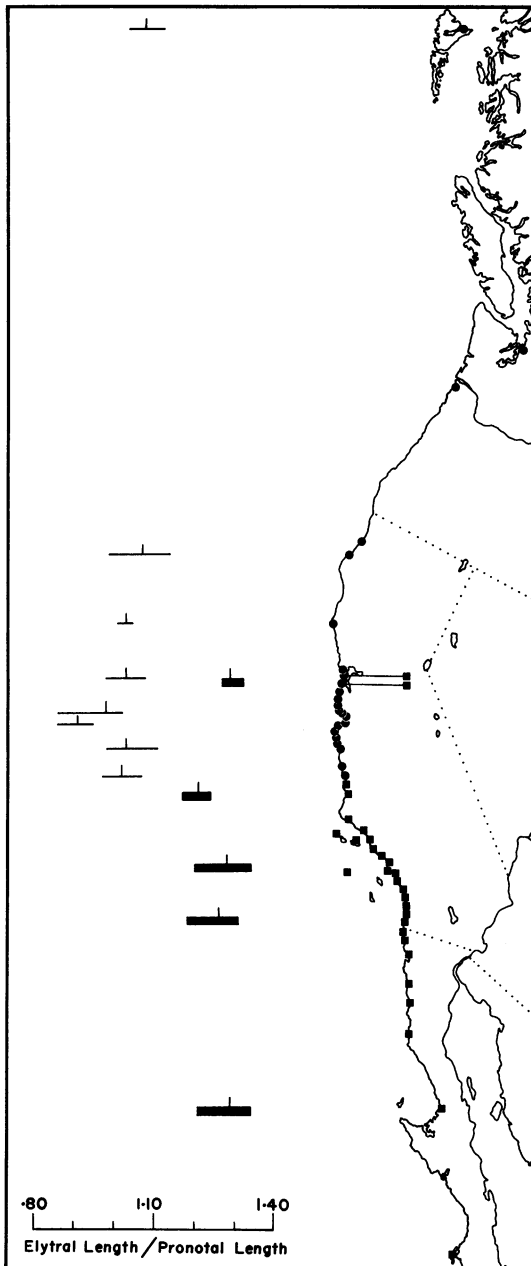


FIG. 298. Distribution of *Bledius monstratus* (dots) and *Bledius fenyesi* (squares) on the Pacific coast of North America.

Graph on left represents the mean (vertical line) and range (horizontal line or bar) of the ratio elytral length/pronotal length for samples of *monstratus* (horizontal line) and *fenyesi* (horizontal bar). Symbol is opposite sample it represents.

morphic species is the frequency of occurrence of species polymorphic for wing length, the lack of additional distinguishing characteristics, and the fact that shortened elytra are often correlated with reduced metathoracic wings in the Staphylinidae. A few of the numerous possible examples of the latter phenomenon are: the species of *Diglossa*, *Pseudopsis montoraria*, *Pseudopsis arrowi*, *Stenopholea reddelli*, *Microbledius playanus*, most species of the Amblyopini, *Thinopinus pictus*, *Bledioschema schweigeri*, some species of *Medon*, or the Euesthetinae.

The one published example of a species of staphylinid polymorphic for wing and elytral length for which I have measurements and field data is *Microbledius playanus*. For this species the seven winged forms were found rarely and only on the shores of a river and all were females; the form with reduced wings was found abundantly on salt flats and less numerous along the river (Herman, 1972, p. 126). The differences of the wing and elytral length of the two morphs do not intergrade.

In support of continued recognition of two species is not only the lack of intergrades, but more importantly, the complete anatomical separation even in part of the range of *monstratus* where the metathoracic wings and elytra are longest. A practical basis for maintaining recognition of two taxa is the differential ecological and biological data that might continue to be collected with two named entities, but not with one. In this way the problem can continue to be considered.

With other things equal, in the absence of additional kinds of data, I recommend that the named forms *monstratus* and *fenyesi* remain as species.

#### 19. *Bledius fenyesi* Bernhauer and Schubert

Figures 298-308, 384, 385; Table 2

*Bledius fenyesi* Bernhauer and Schubert, 1911, p. 129 (proposed to replace *B. cribricollis* Le Conte). Notman, 1920, p. 695.

*Bledius cribricollis* Le Conte, 1877, p. 221 (not *B. cribricollis* Heer, 1838). Casey, 1889, p. 46. Fall, 1901, p. 75. (Type locality: California, San Diego. Holotype in the Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts. Type examined).

*Bledius lecontei* Bernhauer, 1905, p. 14 (proposed to replace *B. cribricollis* Le Conte, but preoccupied by *B. lecontei* Sharp, 1887).

*Diagnosis.* *Bledius fenyesei* can be separated from all the other species of *Bledius*, except *monstratus*, in the same manner as can *monstratus*. The longer elytra of *fenyesei* is the only means of distinguishing it from *monstratus*.

*Description.* *armatus* group.

Length 2.7 to 5.0 mm.

Color variable but generally head and abdomen reddish brown; prothorax pale reddish brown; elytra reddish brown to yellowish brown; entire body nearly black at times.

Dorsum of head and clypeus dark reddish brown to pale reddish brown, at times black. Venter of head, labium, maxilla, labrum, and antenna reddish brown to pale reddish brown. Mandibles reddish brown. Pronotum, prohypomeron, and prosternum dark reddish brown to pale reddish brown, at times nearly black. Elytra dark reddish brown to reddish brown, or yellowish brown, at times black, at times bicolored with apex yellowish brown and base dark reddish brown; epipleuron concolorous with disk. Pterothoracic sterna and pleura black to reddish brown. Legs reddish brown to yellowish brown. Abdomen dark reddish brown to pale reddish brown, at times black.

*Bledius fenyesei* (see figs. 299-308) as described for *monstratus* in all respects except for the following: width of head 0.52 to 0.69 mm.; interocular width 0.36 to 0.50 mm.; head width/interocular width 1.34 to 1.47. Pronotal width 0.63 to 0.89 mm.; pronotal length 0.56 to 0.83 mm.; pronotal width/pronotal length 1.02 to 1.11. Elytral length 0.71 to 1.07 mm., elytral length/pronotal length 1.17 to 1.36; elytral length greater than pronotal length (compare figs. 303, 304).

*Sexual Dimorphism.* The sexes are distinguished externally in the same manner described for *monstratus*.

*Variation.* Among the populations of *fenyesei* there is a slight tendency for decrease of the ratio elytral length/pronotal length and the pronotal length from southern Baja northward, but this trend appears to be reversed when the species overlaps with *monstratus*. The samples for three of the populations are so small that it is not clear that the changes are meaningful (table 2) or that a directional change exists. There is not a clinal change of the elytral length among the populations.

The color of the species is variable but with the specimens I have studied and other data on hand there is no discernible geographical or ecological pattern to the variation. Numerous, large samples made throughout the geographical range of the species with careful notation of the habitat of each color phase may reveal an adaptationally important pattern.

*Habitat and Distribution.* *Mexico:* Baja California, Baja California Sur. *United States:* California (fig. 298; see Appendix for localities).

The species occurs on the Pacific coast from at least Isla Magdalena off the coast of Baja California Sur to as far north as San Francisco, where it is apparently rare. Adults of the species can be found in well-decayed seaweed on sandy beaches.

*Discussion.* See the Discussion under *monstratus*.

## 20. *Bledius strenuus* Casey

Figures 309-333, 380, 381; Table 2

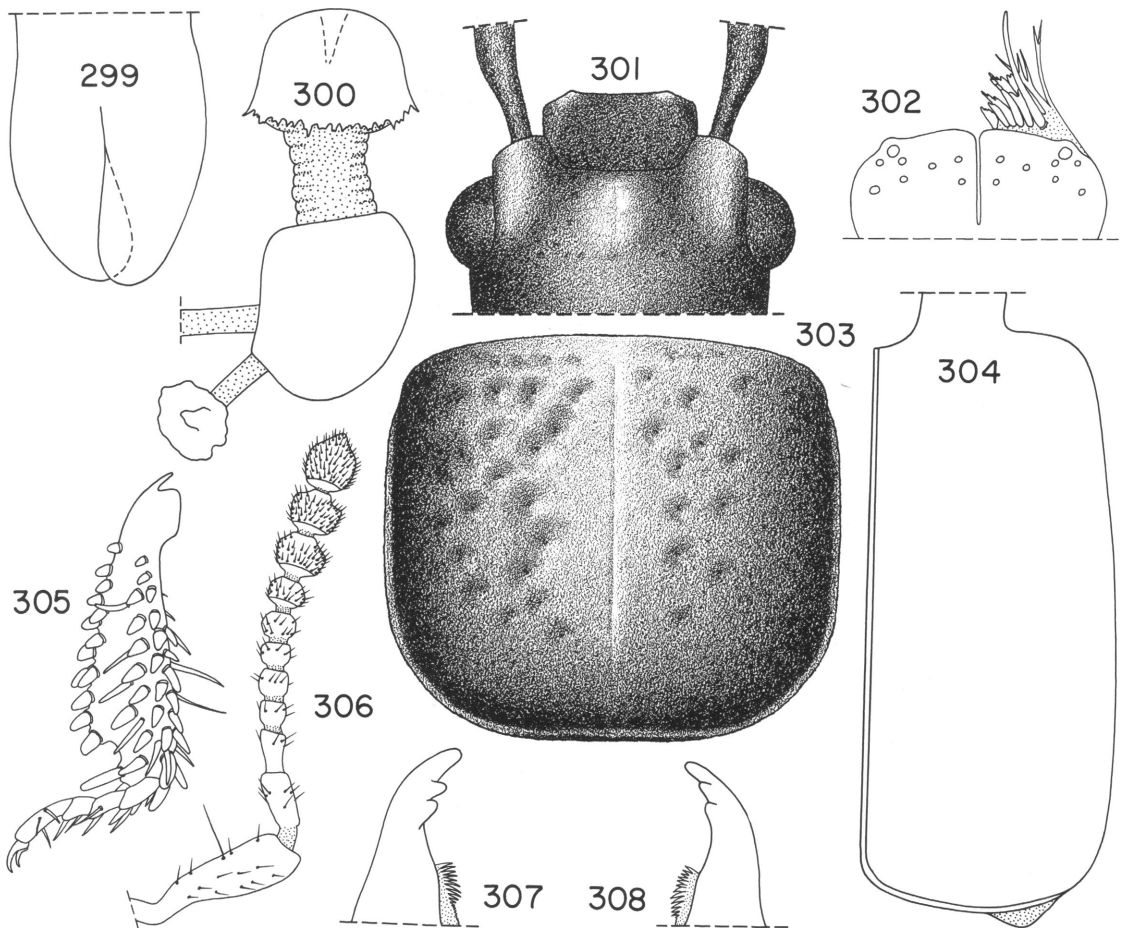
*Bledius strenuus* Casey, 1889, pp. 44, 45. Fall, 1901, p. 76; 1910, pp. 103, 104. Notman, 1920, p. 695. Hatch, 1957, p. 105. The following citations were published as *Bledius armatus* (Say) but are misidentifications and refer to *Bledius strenuus*: Le Conte, 1863, pp. 51, 52; 1877, p. 221. Casey, 1889, pp. 43, 44, 45, 64. Fall, 1901, p. 75. Notman, 1920, p. 695. (Type locality: California, San Francisco, from brackish marsh behind ocean beach. Holotype in the National Museum of Natural History, Smithsonian Institution, Washington, D.C. Type examined.)

*Bledius furtivus* Casey, 1889, p. 45. Notman, 1920, p. 695. Hatch, 1957, p. 105 (listed as a junior synonym of *B. strenuus*). (Type locality: Oregon, The Dalles. Holotype in National Museum of Natural History, Smithsonian Institution, Washington, D.C. Type examined.)

*Bledius arizonensis* Fall, 1910, p. 103. Notman, 1920, p. 695. (Type locality: Arizona, Flagstaff. Holotype in the Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts. Type examined.) NEW SYNONYM.

*Diagnosis.* The species can be separated from others of the group by the large size, prominent tubercles of the dorsum of the head (figs. 310, 316, 324, 325), tridentate mandibles (fig. 311), densely granulate, dully shining pronotum, the lack of or rounded basal angles of the pronotum





FIGS. 299-308. *Bledius fenyesi*. 299. Median lobe of aedeagus, apical half. 300. Spermatheca. 301. Head. 302. Labrum, dorsal view, setae and left epipharyngeal lobe removed. 303. Pronotum. 304. Elytron, right. 305. Protibia and tarsus. 306. Antenna. 307. Mandible, left, dorsal view. 308. Mandible, right, dorsal view.

(figs. 314, 328), and the coarsely serrate posterior margin of tergum VIII (figs. 318, 327).

*Description. armatus* group.

Length 4.0 to 8.0 mm.

Color black to dark reddish brown with reddish elytra.

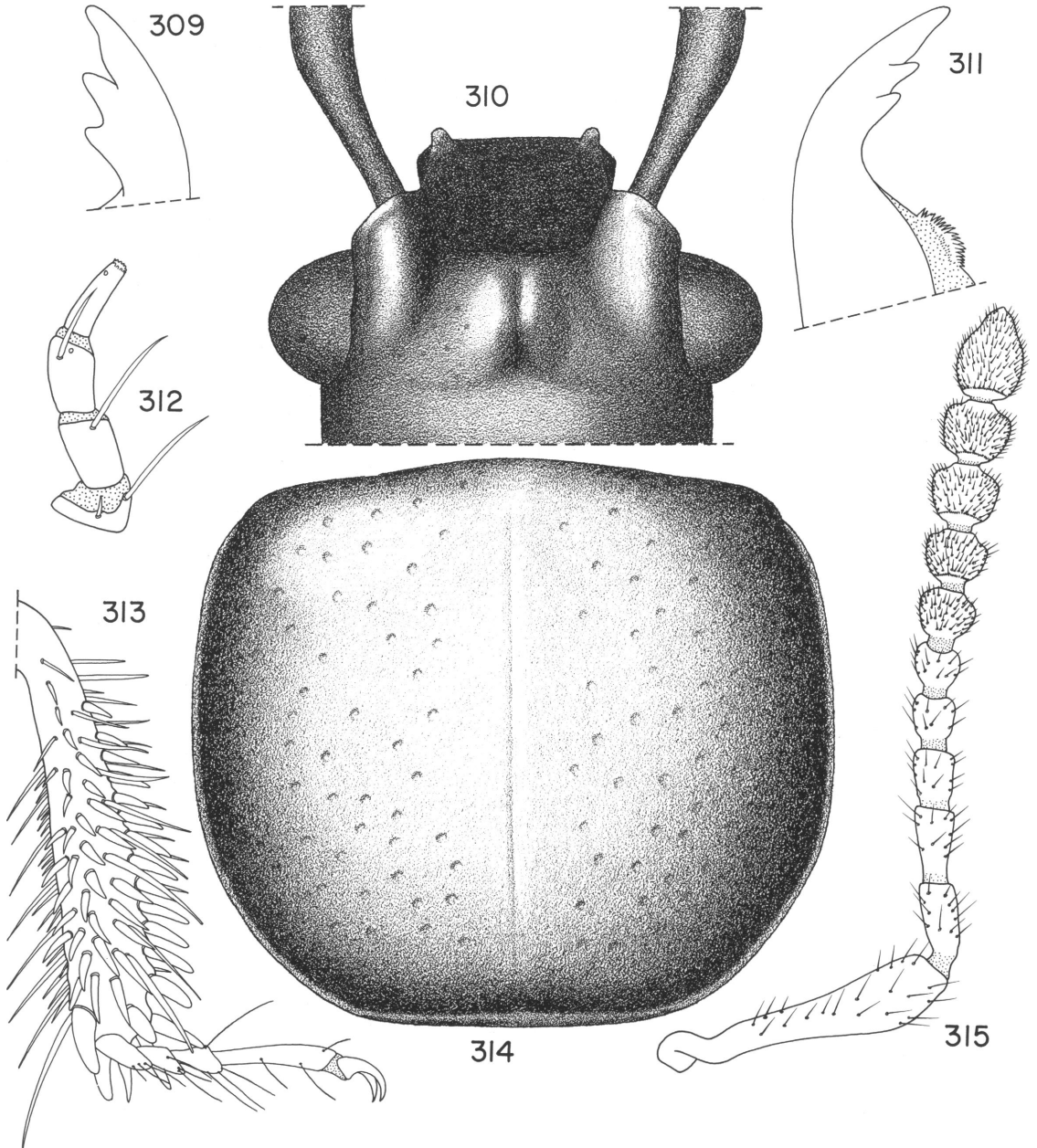
Dorsum of head, clypeus, and labrum black to dark reddish brown. Venter of head dark reddish brown to reddish brown. Maxilla, labium, antenna, and mandibles reddish brown; antenna at times with blackish infusions. Prothorax black to dark reddish brown, at times reddish brown. Elytra reddish; base to suture often with black

infusion; black infusion at times spread over most of elytral surface with resultant blackish red elytra; epipleuron concolorous with disk. Pterothoracic sterna and pleura black. Legs reddish brown. Abdomen black to dark reddish brown.

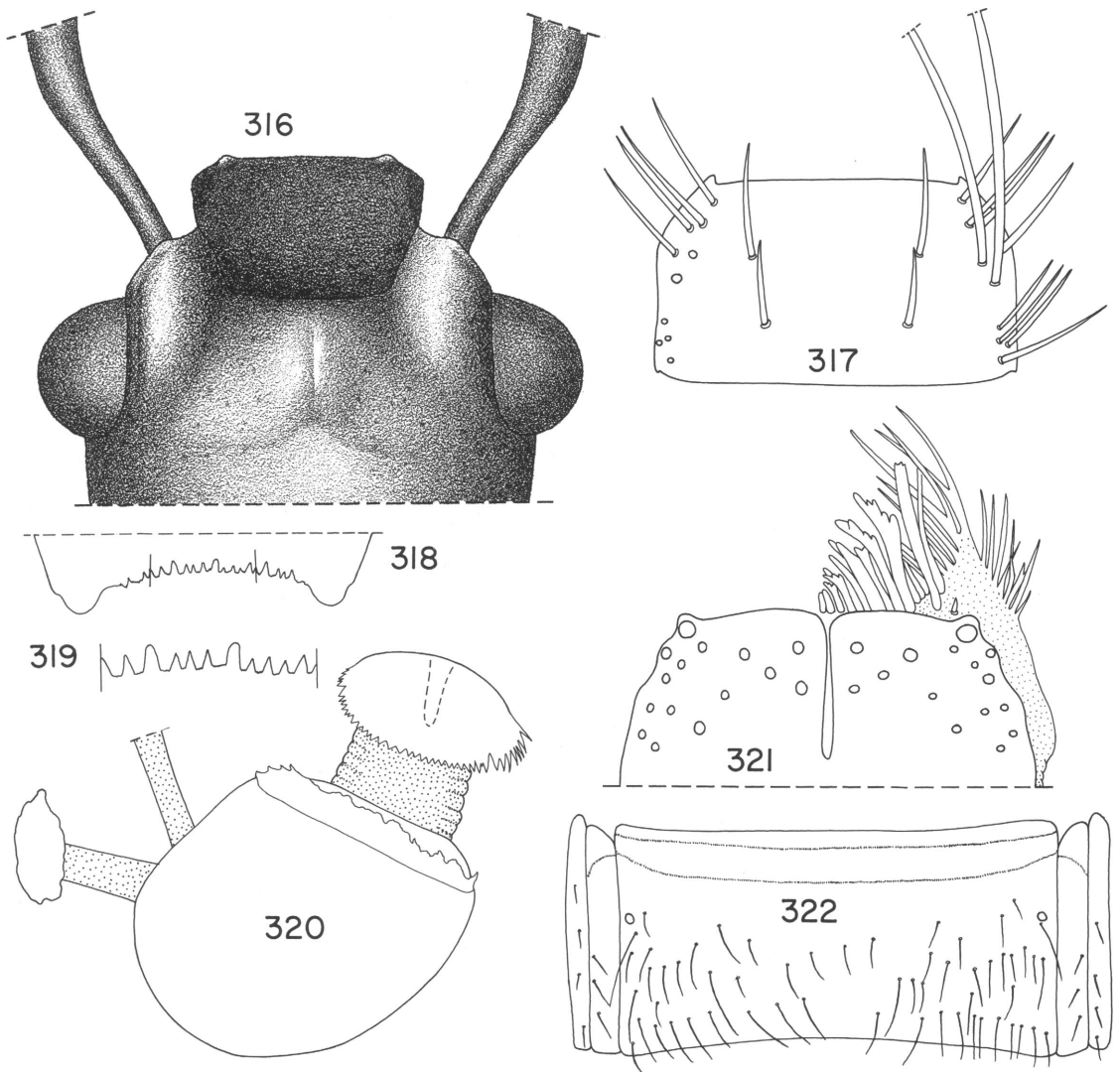
Dorsum of head, supra-antennal ridge, epistomal suture, clypeus, labrum, mandible, and antenna as described for *episcopalis* except as follows: dorsum of head with moderately well-developed postocular groove. Clypeus with large (fig. 310) to moderately large tubercle on anterior margin of male (fig. 324); tubercle of fe-

male (figs. 316, 325) moderately large to small; tubercle of male larger than that of female. Eye large (figs. 310, 316) to moderately large (figs.

324, 325). Width of head 0.76 to 1.13 mm.; interocular width 0.52 to 0.75 mm.; head width/interocular width 1.37 to 1.57. Labrum with



FIGS. 309-315. *Bledius strenuus*. 309. Mandible, right, anterolateral view. 310. Head, male. 311. Mandible, left, dorsal view. 312. Labial palpus. 313. Protibia and tarsus. 314. Pronotum, male. 315. Antenna.



FIGS. 316-322. *Bledius strenuus*. 316. Head, female. 317. Mentum, some setae removed from left side. 318. Tergum VIII, apex. 319. Tergum VIII, enlargement of posterior margin. 320. Spermatheca. 321. Labrum, dorsal view, setae and left epipharyngeal lobe removed. 322. Tergum VI, pubescence.

shallow V-shaped emargination of anterior margin (figs. 321, 329). Mandibles of male and female tridentate (figs. 309, 311, 326), with denticles more or less appressed.

Pronotum, protergosternal suture, elytra, metathorax, and protibia as described for *episcopalus* except as follows: pronotum 0.74 to 1.36 mm. long; 0.82 to 1.46 mm. wide; pronotal width/pronotal length 1.05 to 1.14; surface of male strongly convex (fig. 314), that of female

more weakly convex; basal angles usually absent (fig. 314), rarely present (fig. 328), but then rounded and poorly developed; lateral margin usually broadly and gradually rounded from anterior margin to basal margin producing ovoid pronotum; occasionally basal third of lateral margin straight and convergent to basal margin and producing weak basal angle, at times anterior two-thirds nearly straight and parallel. Pronotal surface shining dully and without polished spots;

surface with dense granulate ground sculpturing, at times more coarse and prominent; midlongitudinal groove well developed and moderately deep to deep. Protergosternal suture usually absent, at times present and entirely or partially complete. Elytra 0.95 to 1.63 mm. long; elytral length/pronotal length 1.04 to 1.35. Metathoracic sternum with dense pubescence and with weak punctulation; surface polished.

Abdomen as described for *episcopalis* except as follows: terga V and VI moderately densely pubescent (fig. 322). Emargination of tergum VIII coarsely serrate (figs. 318, 319, 327). Sterna densely pubescent; punctulation present and weak or absent.

Spermatheca as shown in figures 320, 330.

*Sexual Dimorphism.* The male has larger clypeal denticles (fig. 310), and larger tubercles of the dorsum of the head, the supra-antennal ridge is higher and the prothorax more robust than these features of the female (fig. 316).

*Variation.* In Washington, Oregon, and Canada, and more irregularly in other parts of the continent, some individuals have more prominent microgranulate ground sculpturing. These individuals tend to be smaller, have shorter elytra relative to the pronotal length, and possess a protergosternal suture, but any or all of these characters may be present or absent. Further, the four characters may be found on individuals with the less prominent granulate ground sculpturing.

As the two types of ground sculpturing inter-

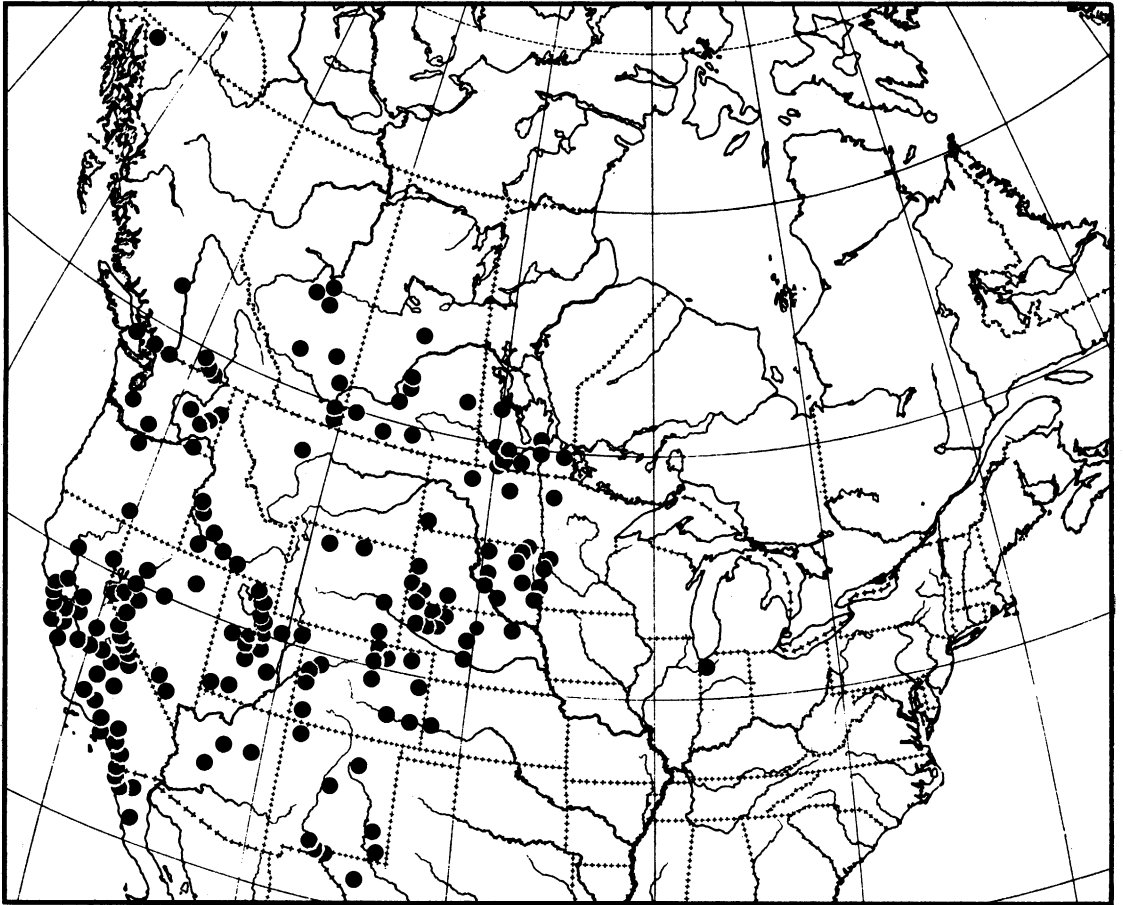


FIG. 323. Distribution of *Bledius strenuus* in North America.

grade, and the prominent sculpturing is found more or less irregularly through the range of the species and is not consistently correlated with other features, there seems to be no valid justification for recognizing two taxa.

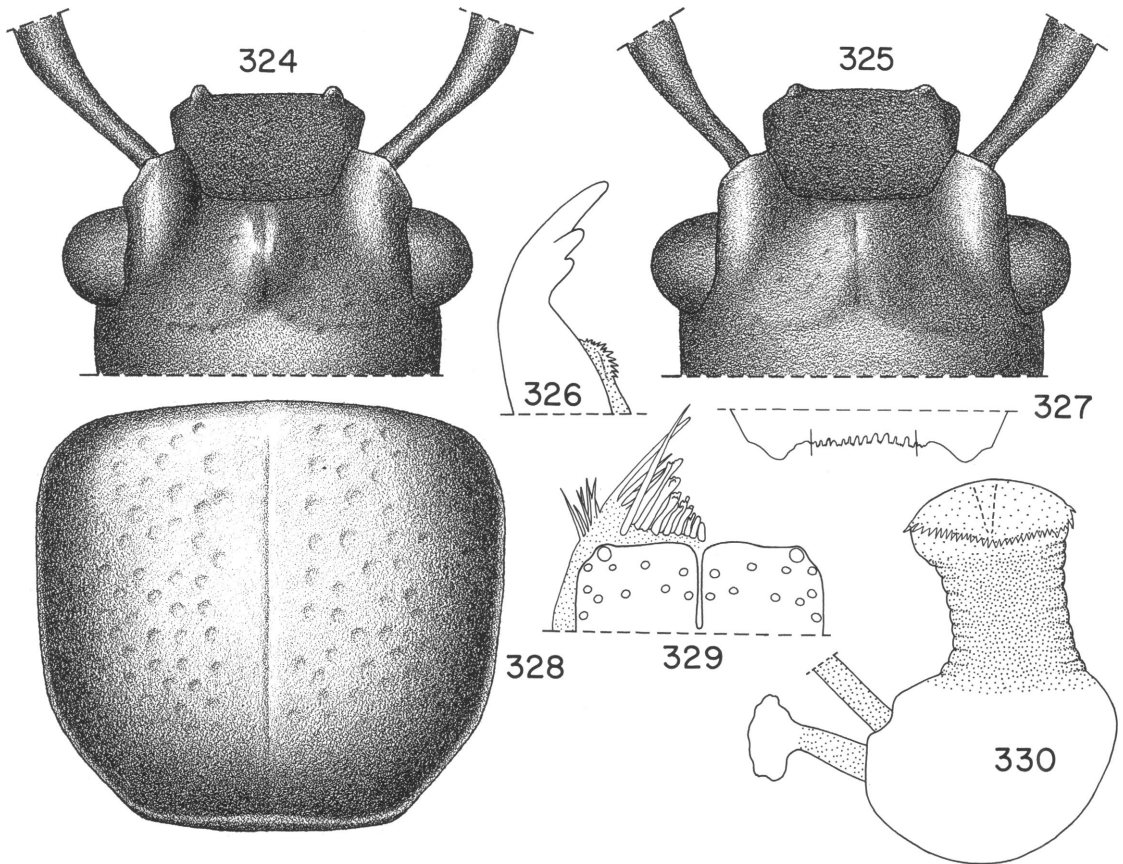
It should be noted that the type of *furtivus* falls into the group of variants with the prominent microgranulate ground sculpturing.

A form (figs. 324, 328) with brachypterous metathoracic wings, reduced metathorax, and shorter elytra has been found in Nunn, Colorado (six specimens), Medicine Hat, Alberta (one specimen), and Saskatoon, Saskatchewan (one specimen). Since wing polymorphism is common in beetles, the two forms are otherwise indistinguishable, and no name has been proposed for

the brachypterous form. I regard them to be conspecific pending evidence to the contrary.

*Synonymy.* Although Hatch (1957) gave no reasons for synonymizing *strenuus* and *furtivus* I concur with his decision to do so. Casey (1889) indicated the glabrous, median stripe on the abdomen, the presence of a protergosternal suture, and the slightly open procoxal fissure would distinguish *furtivus* from *strenuus*. These characters are variable and do not consistently correlate with one another nor with other features such as pronotal shape, eye size or body sculpturing. (See also Variation.)

The specimen described as *arizonensis* was separated from *strenuus* by characters that are individually variable and are more often asso-



FIGS. 324-330. *Bledius strenuus*, brachypterous form. 324. Head, male. 325. Head, female. 326. Mandible, left, dorsal view. 327. Tergum VIII, apex. 328. Pronotum, male. 329. Labrum, dorsal view, setae and epipharyngeal lobe removed. 330. Spermatheca.

ciated with the females or smaller individuals of *strenuus*.

*Habitat and Distribution.* *Canada:* Alberta, British Columbia, Manitoba, Saskatchewan. *Mexico:* Baja California. *United States:* Arizona, California, Colorado, Idaho, Indiana, Kansas, Minnesota, Montana, Nebraska, Nevada, New Mexico, North Dakota, Oregon, South Dakota, Texas, Utah, Washington, Wyoming (fig. 323; see Appendix for localities).

This species is found on the coast and in the San Joaquin Valley of California, in the Great Basin and on the dry central and northern plains east of the Rocky Mountains. A specimen from Indiana may be mislabeled.

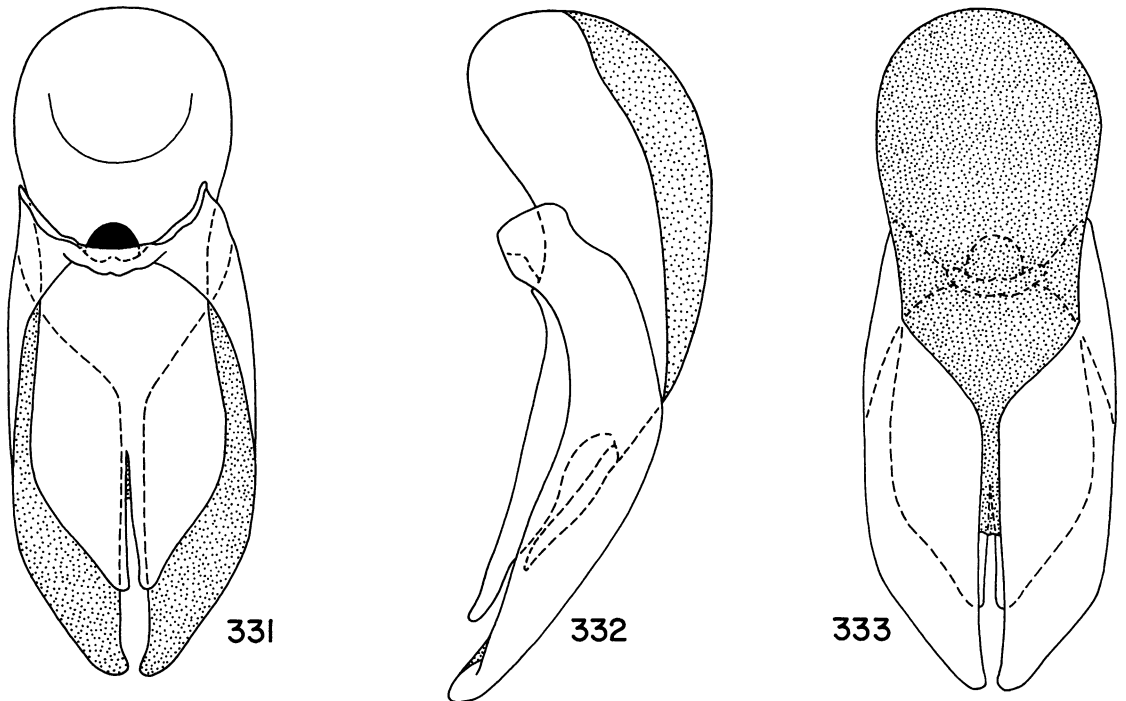
The species seems to be relatively adaptable to different conditions and is found near both fresh and saline streams, near alkali and salt lakes, near the Pacific coast, and at many northern and southern localities.

At Crookston, Minnesota, the species was found in a sparsely vegetated, temporarily wet, sandy field. At Choteau, Montana, Lake Abert,

Oregon, McElroy Lake, Washington, Devil's Lake, North Dakota, and near Sheridan, Nebraska, I found the species on alkali flats or the shores of lakes. The species was found at inland saline habitats near Brigham City, Utah, and Loving, New Mexico. From the labels on specimens I surmise that the species is associated with the coastal salt marshes of California, and Casey (1889) mentioned that the type is from a salt marsh near San Francisco. The species is associated with fresh water at the Verdigre Creek near Niobrara, Nebraska, and the Souris River near Minot, North Dakota, and seems to occur thusly in Canada, eastern South Dakota and the San Joaquin Valley of California.

21. *Bledius nitidiceps* Le Conte  
Figures 334-346, 386, 387; Table 2

*Bledius nitidiceps* Le Conte, 1877, p. 224. Fall, 1901, p. 75. Notman, 1920, p. 697. (Type locality: California, Los Angeles. The original description listed both Los Angeles and Wil-



FIGS. 331-333. *Bledius strenuus*, aedeagus. 331. Ventral view. 332. Lateral view. 333. Dorsal view.

mington as localities for the species, but the type is cryptically labeled so it is impossible to determine certainly which specimen is from which locality. I am arbitrarily designating Los Angeles as the type locality. Holotype in the Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts. Type examined.)

*Diagnosis.* The presence of a ridge encircling the apex of antennomeres 3 to 7 (fig. 337) will distinguish the species from all other *Bledius* in North America. Further, the species can be recognized by the very long pubescence (figs. 334, 346), the large, strongly shining body, the coarsely punctate abdomen, the basal and lateral concentration of the pronotal punctation (fig. 336), and the asymmetrically tridentate mandibles.

*Description.* *armatus* group.

Length 6.0 to 9.0 mm.

Color black; elytra reddish, usually with a triangular black spot on suture.

Dorsum of head, clypeus, and venter of head black to dark reddish brown. Mentum, submentum, labial palpus, maxilla, and antenna reddish brown. Mandibles dark reddish brown. Pronotum black to reddish brown. Prohypomeron and prosternum dark reddish brown to reddish brown. Elytron reddish to orangish, usually with triangular black spot along suture; spot often absent or at times broad, covering most of elytra producing dark elytron; epipleuron concolorous with disk. Pterothoracic sterna and pleura black to reddish brown. Legs reddish brown. Abdomen black to dark reddish brown.

Dorsum of head, supra-antennal ridge, epistomal suture, clypeus, eyes, labrum, and mandibles as described for *episcopalis* with following exceptions: dorsum of head (figs. 335, 341) shining strongly and at times with polished spots; surface with moderately strong microgranulate ground sculpturing but absent on polished spots; punctation moderately dense, and moderately coarse; pubescence long; middorsal region with long, low, broad tumescence; tumescence without midlongitudinal groove; median fovea behind tumescence. Supra-antennal ridge moderately high (figs. 335, 341); groove of anterior and lateral portion moderately to poorly developed;

surface shining strongly and with moderately developed microgranulate ground sculpturing. Dorsum of head with distinct, well-defined transverse postocular groove; groove sinuate and extending from median fovea. Clypeal surface moderately strongly depressed at epistomal suture; surface shining strongly and microgranulate ground sculpturing moderately strong; anterior margin with small rounded tubercle near lateral margin; tubercle of male (fig. 335) often slightly larger than that of female (fig. 341). Width of head 0.96 to 1.31 mm.; interocular width 0.69 to 0.93 mm.; head width/interocular width 1.38 to 1.45. Labrum with broad, shallow emargination of anterior margin (fig. 342). Mandibles tridentate (figs. 338, 339); second and third denticles of left mandibles closer together than those of right mandible. Antennomeres 3 to 7 with ridge circling apex (fig. 337).

Pronotum, procoxal fissure, elytra, pterothorax, and protibia as described for *episcopalis* with the following exceptions: pronotum 1.05 to 1.51 mm. long; 1.06 to 1.58 mm. wide; pronotal width/pronotal length 1.01 to 1.07; surface strongly convex (fig. 336); basal angles moderately developed and rounded; lateral margin broadly and gradually rounded to basal angle. Pronotal surface polished; microgranulate ground sculpturing absent to obsolete; surface with dense, moderately coarse setigerous punctation, density greater basally and laterally than anteriorly and medially (fig. 336); pubescence very long; midlongitudinal groove distinct and well developed (fig. 336). Protergosternal suture present and well developed. Elytra 1.24 to 1.69 mm. long; elytral length/pronotal length 1.08 to 1.23; pubescence very long (fig. 334).

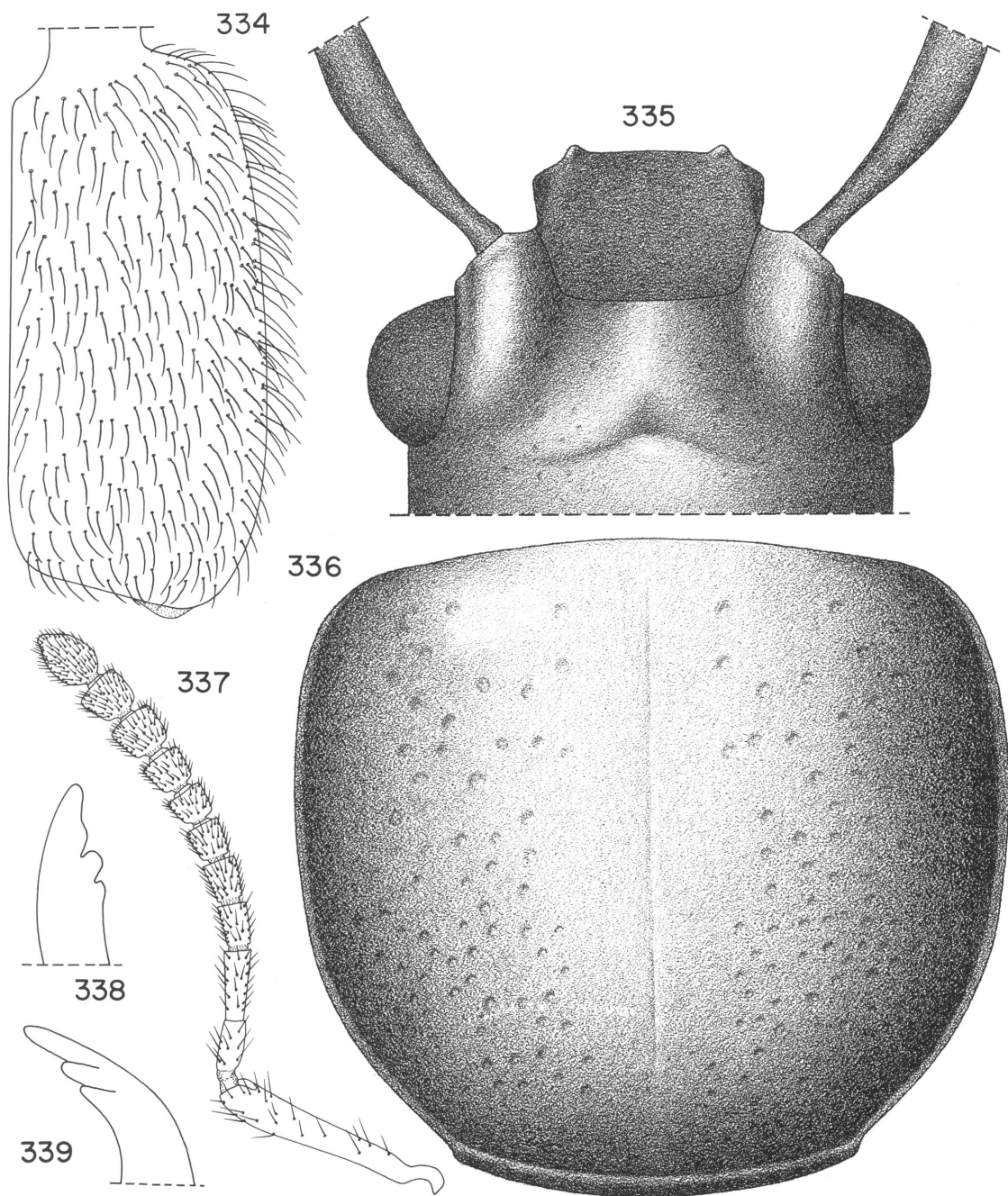
Abdomen as described for *episcopalis* except as follows: abdomen coarsely punctate and densely pubescent (fig. 346); tergum VIII with posterior margin coarsely serrate (fig. 343). Sterna with surface polished.

Spermatheca as shown in figure 345.

*Sexual Dimorphism.* The sexes are distinguished externally only with difficulty because the differences are slight and not constant. The clypeal tubercles of the male are often slightly larger than those of the female. The males tend to be somewhat larger.

*Habitat and Distribution.* *United States:* Cali-





FIGS. 334-339. *Bledius nitidiceps*. 334. Elytron, right, pubescence. 335. Head, male. 336. Pronotum, male. 337. Antenna. 338. Mandible, left, anterolateral view. 339. Mandible, right, dorsal view.



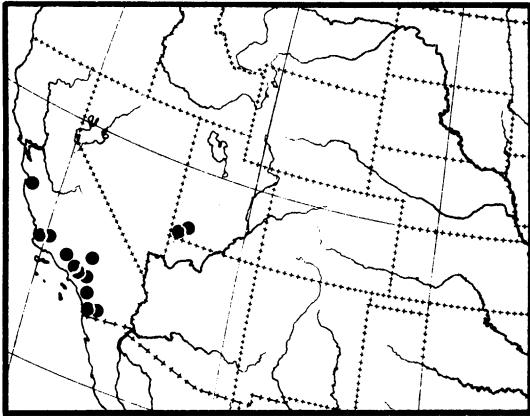


FIG. 340. Distribution of *Bledius nitidiceps* in southwestern United States.

California, Utah (fig. 340; see Appendix for localities).

Near Cedar City, Utah, I collected the species from vegetated, moist, fine-grained sand on an island in a broad river bottom. The species was collected by Fall (1901, p. 75) at Pomona, California, in a drying stream bed.

**Discussion.** All previous workers have included *nitidiceps* in the *semiferrugineus* group because the species has a protergosternal suture and a closed procoxal fissure. Based on the long cuticular processes of the hypopharynx, form of the spermatheca, and presence of a tumescence on the dorsum of the head, *nitidiceps* is transferred to the *armatus* group.

## 22. *Bledius opacifrons* Le Conte

Figures 347-358, 378, 379; Table 2

*Bledius opacifrons* Le Conte, 1877, p. 224. Fall, 1901, p. 75. Notman, 1920, p. 697. Hatch, 1957, p. 99. (Type locality: California, Los Angeles. The original description listed both Los Angeles and Wilmington as localities for the species but the type is cryptically labeled so it is impossible to determine certainly which specimen is from which locality. I am arbitrarily designating Los Angeles as the type locality. Holotype in the Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts. Type examined.)

*Bledius lectus* Casey, 1889, pp. 49, 50, 51. Fall, 1910, p. 76. Notman, 1920, p. 696. (Type

locality: California, Sonoma County. Holotype in the National Museum of Natural History, Smithsonian Institution, Washington, D.C. Type examined.) NEW SYNONYM.

*Bledius piceus* Fall, 1910, pp. 108, 110. Notman, 1920, p. 697. (Type locality: California, Pasadena. Holotype in the Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts. Type examined.) NEW SYNONYM.

*Bledius specularis* Fall, 1910, pp. 109, 110. Notman, 1920, p. 697. (Type locality: California, Point Reyes. Holotype in the Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts. Type examined.) NEW SYNONYM.

*Bledius regularis* Fall, 1910, pp. 109, 110. Notman, 1920, p. 697. Hatch, 1957, p. 98. (Type locality: California, Siskiyou County, Cole. Holotype in the Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts. Type examined.) NEW SYNONYM.

*Bledius condonensis* Hatch, 1957, pp. 98, 99. (Type locality: Oregon, Condon. Holotype in the Burke Museum, University of Washington, Seattle, Washington. Paratypes examined.) NEW SYNONYM.

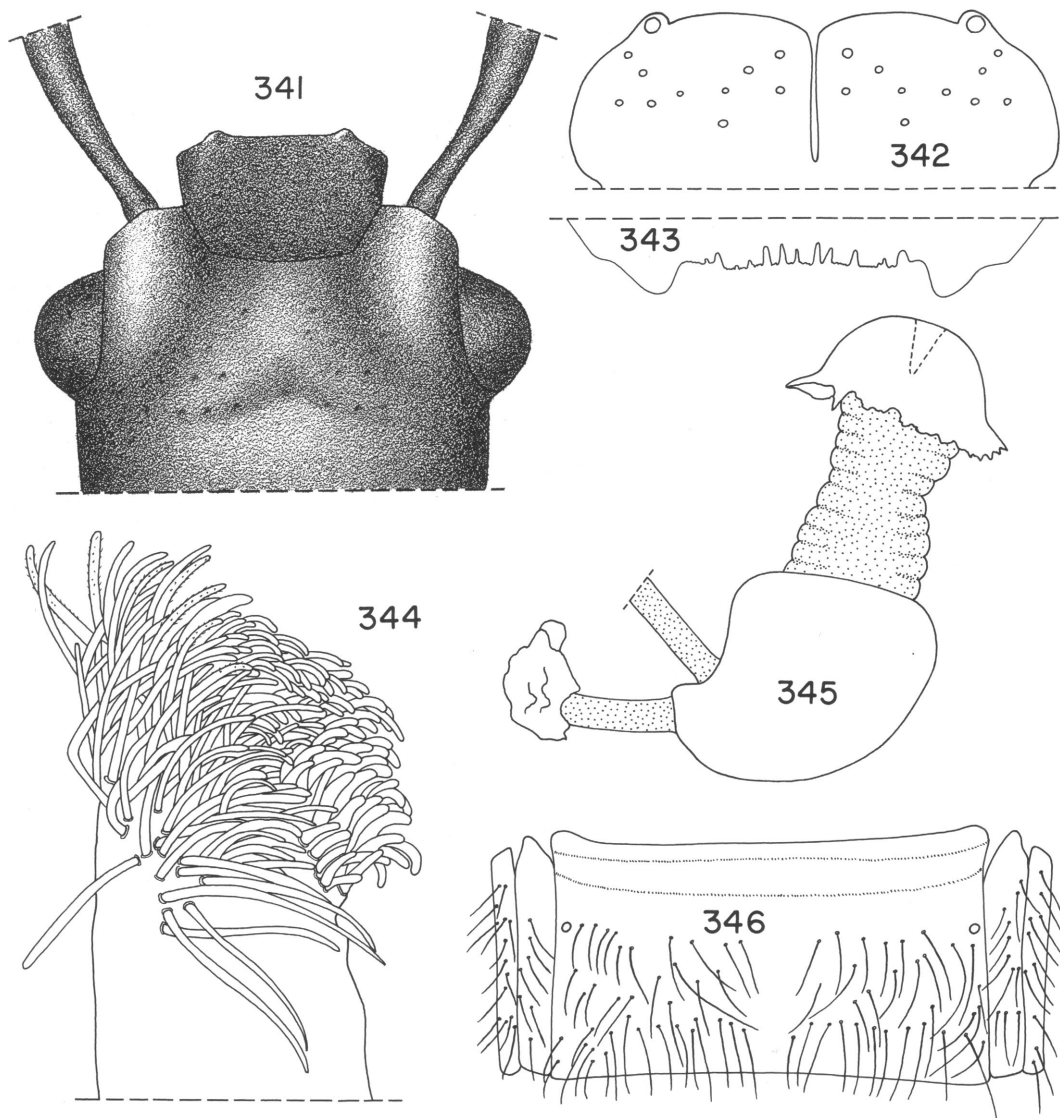
**Diagnosis.** The tridentate mandibles (figs. 349, 350), midlongitudinal pronotal groove (fig. 351), polished elytra, the presence of a protergosternal suture, and a low tumescence on the head (fig. 348) in place of a bituberculation will distinguish *opacifrons* from most species. This species is one of the few in which the pronotal length and width are approximately equal (fig. 351; table 2).

**Description.** *armatus* group.

Length 4.0 to 6.0 mm.

Color variable. Body black to orangish. Head black or dark reddish brown. Elytra with dark sutural stripe present or absent.

Dorsum of head, clypeus, labrum, and venter of head black to dark reddish brown. Maxilla, labium, antenna, and mandible reddish brown. Prothorax black to dark reddish brown to bright reddish brown or orangish. Elytra black to reddish brown to orangish; reddish brown or orangish elytra often with dark reddish brown to black sutural stripe; sutural stripe often absent; epipleuron concolorous with disk. Pterothoracic



FIGS. 341-346. *Bledius nitidiceps*. 341. Head, female. 342. Labrum, dorsal view, setae and epipharyngeal lobes removed. 343. Tergum VIII, apex. 344. Galea, apical portion. 345. Spermatheca. 346. Tergum VI, pubescence.

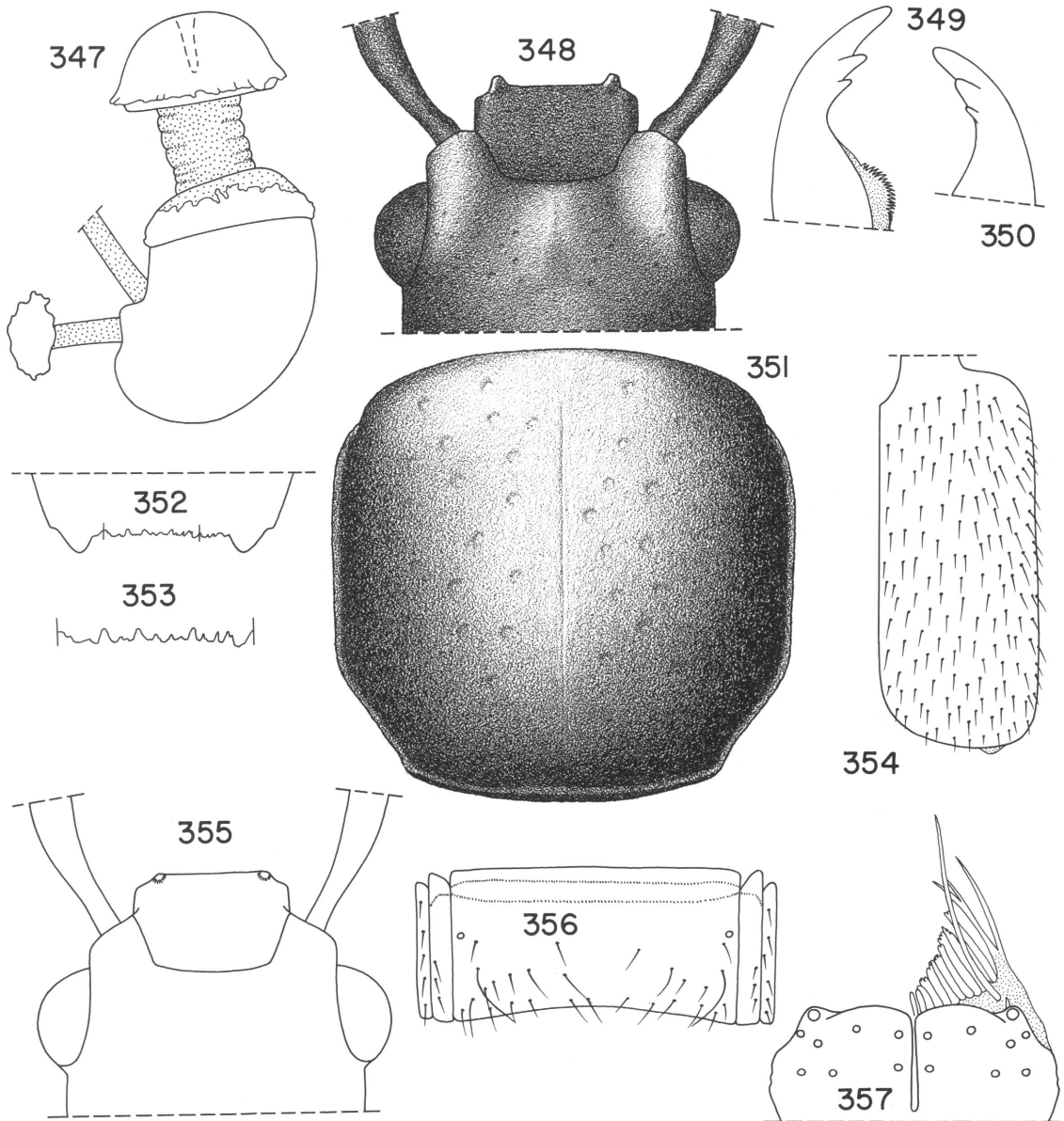
sterna and pleura black to dark reddish brown. Legs dark reddish brown to reddish brown. Abdomen black to dark reddish brown to orangish.

Dorsum of head, supra-antennal ridge, epistomal suture, clypeus, eyes, labrum, mandibles, and antenna as described for *episcopalis* except as follows: dorsum of head (fig. 348) with low middorsal tumescence; tumescence with shallow,

poorly developed midlongitudinal groove, present or absent; fovea behind tumescence. Supra-antennal ridge low, moderately well developed (fig. 348); anterior portion of supra-antennal ridge usually lacking transverse groove that extends on to lateral side; groove present at times but poorly developed. Clypeus weakly depressed at epistomal suture; anterior margin of clypeus of

male (fig. 348) with slender, small, rounded tubercle near lateral margin, female (fig. 355) with rounded, low tumescence in place of tubercle. Eye moderately large (figs. 348, 355). Width of head 0.63 to 0.81 mm.; interocular width 0.44

to 0.54 mm.; head width/interocular width 1.39 to 1.68. Labrum with shallow, V-shaped emargination of anterior margin (fig. 357). Mandibles tridentate (figs. 349, 350); basal denticle small and more or less appressed to second.



FIGS. 347-357. *Bledius opacifrons*. 347. Spermatheca. 348. Head, male. 349. Mandible, left, dorso-lateral view. 350. Mandible, right, dorsal view. 351. Pronotum, male. 352. Tergum VIII, apex. 353. Tergum VIII, enlargement of posterior margin. 354. Elytron, right, pubescence. 355. Head, female. 356. Tergum VI, pubescence. 357. Labrum, dorsal view, setae and epipharyngeal lobes removed.

Pronotum, procoxal fissure, elytra, meta-thorax, protibia as described for *episcopalis* except as follows: pronotum 0.71 to 1.04 mm. long; 0.70 to 0.99 mm. wide; pronotal width/pronotal length 0.95 to 1.06; length approximately equal to width (fig. 351); lateral margin of pronotum of male often slightly more arcuate than that of female; basal angles rounded but distinct (fig. 351); pronotum shining dully to strongly and occasionally polished; surface often with polished spots near center and with lateral and basal regions shining dully; microgranulate ground sculpturing prominent and dense where surface shining dully, absent where polished, and obsolete or poorly developed where shining strongly; surface with sparse to moderately dense, moderately coarse setigerous punctation (fig. 351); pubescence moderately long; mid-longitudinal groove well developed and moderately deep (fig. 351). Protergosternal suture present and well developed to poorly developed. Elytra 0.84 to 1.21 mm. long; elytral length/pronotal length 1.07 to 1.32; surface with sparse to moderately dense setigerous punctation (fig. 354). Metathoracic wings fully developed to slightly reduced; reduction of elytral length correlated with reduction of length of metathoracic wing. Metathoracic sternum with dense pubescence.

Abdomen as described for *episcopalis* except as follows: abdomen with fine punctation. Terga V and VI with moderately dense pubescence (fig. 356). Tergum VIII with moderately coarsely serrate posterior margin (figs. 352, 353).

Spermatheca as shown in figure 347.

*Sexual Dimorphism.* The male (fig. 348) has larger clypeal tubercles than the female (fig. 355) and often the pronotum is a bit more convex and robust.

*Variation.* Short elytra in this species are associated with a slightly reduced metathorax and metathoracic wings.

*Synonyms.* *Bledius piceus*, when described (Fall, 1910), was not compared with *opacifrons* and was thought not to be particularly related to any previously described species. When the two types are compared there is no character by which to separate them.

The elytral length and density of the elytral punctation were used by Fall to separate *piceus* from *specularis* and *regularis*. The density of the

elytral punctation is individually variable. The shorter elytra occur rarely, apparently without a geographical pattern, and are associated with individuals having a somewhat reduced metathorax and metathoracic wings.

*Bledius lectus* was not compared with *opacifrons* nor with the species under one of its other names, *piceus*, *regularis*, or *specularis*.

*Bledius condonensis*, though not compared with *opacifrons*, was compared with *regularis*. The characters used to separate the two are individually variable.

The differences among the types of the six nominal species are the result of individual variation. *Bledius piceus*, *B. lectus*, *B. regularis*, *B. specularis*, and *B. condonensis* should be regarded as junior synonyms of *B. opacifrons*.

*Habitat and Distribution. United States:* California, Colorado, Oregon, Washington (fig. 358; see Appendix for localities).

At Oakhurst, California, I collected the species from a vegetated sand bank on China Creek. On Crooked Creek, north of Lakeview, Oregon, I found the species in moist, vegetated sand.

*Discussion.* The specimen from Garland, Colorado, although apparently conspecific, is out of the range of the other specimens known for the species. Further collecting may close this geographical gap. The specimen is one of those with shortened elytra and metathoracic wings.

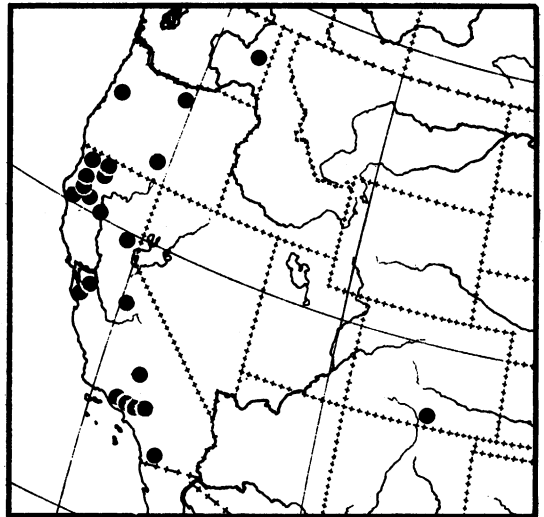
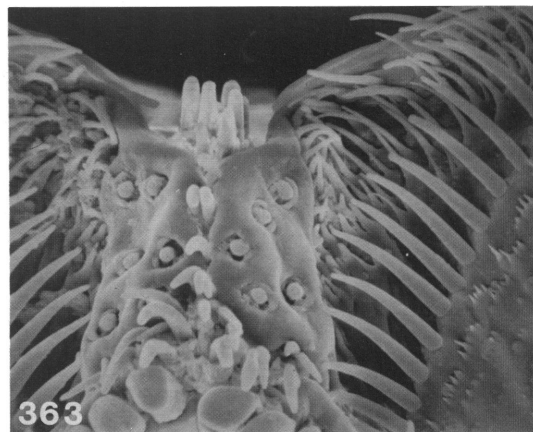
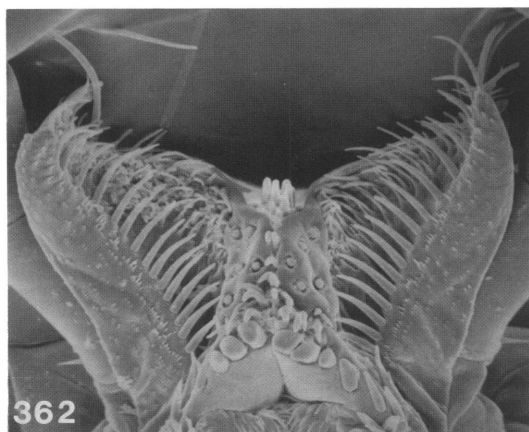
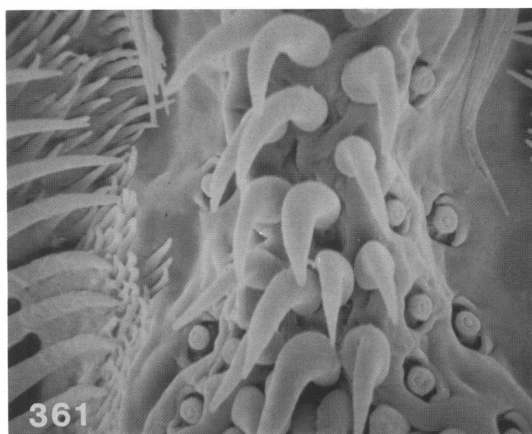
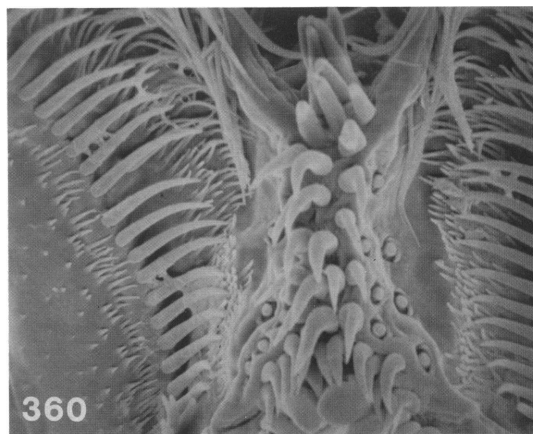
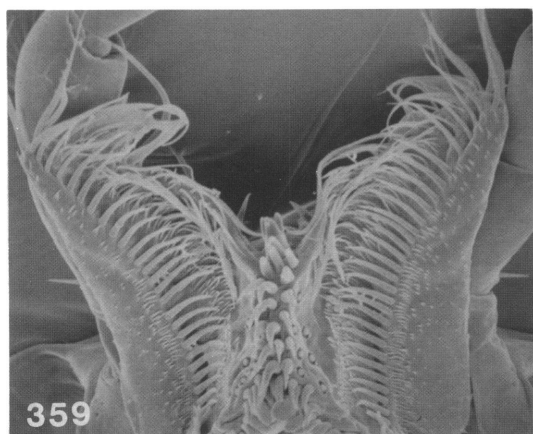
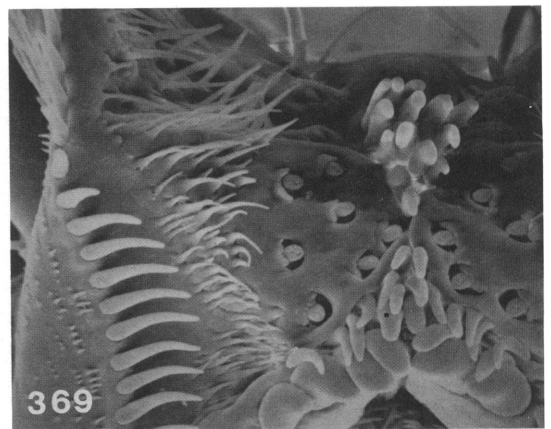
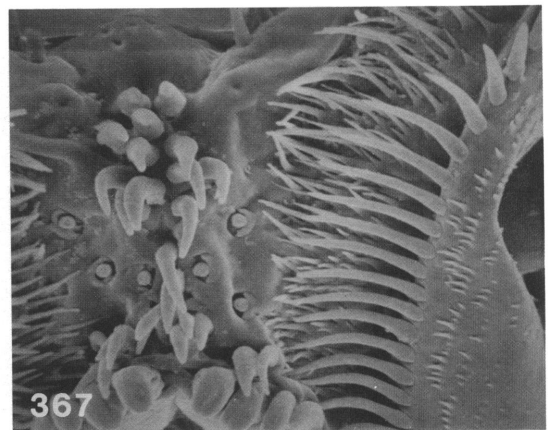
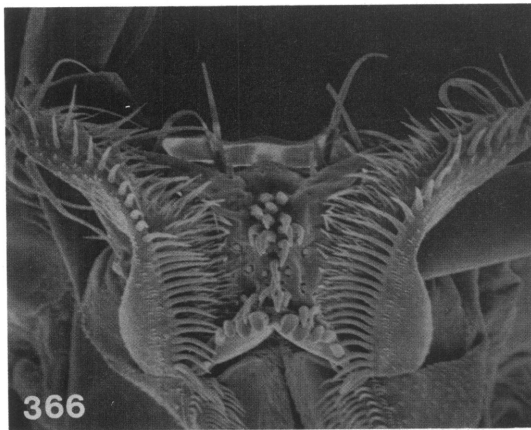
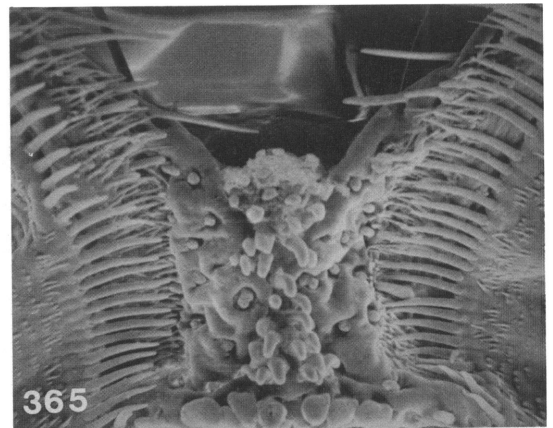
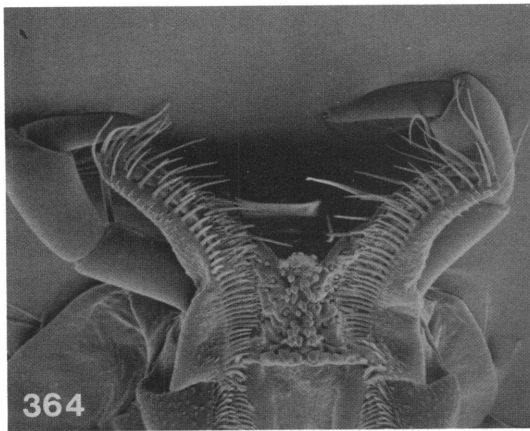


FIG. 358. Distribution of *Bledius opacifrons* in the western United States.



FIGS. 359-361. *Bledius episcopalus*, hypopharynx. 359. General aspect, 500X. 360. Central region, 1000X. 361. Central region, 2000X.

FIGS. 362, 363. *Bledius consimilis*, hypopharynx. 362. General aspect, 500X. 363. Central region, 1000X.

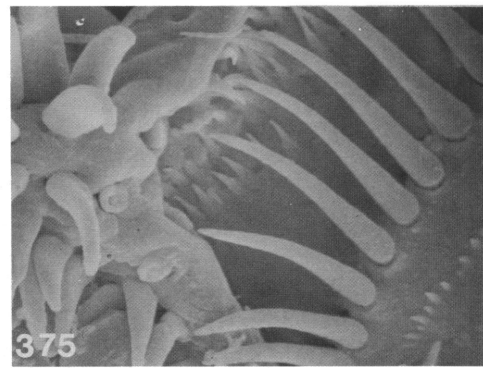
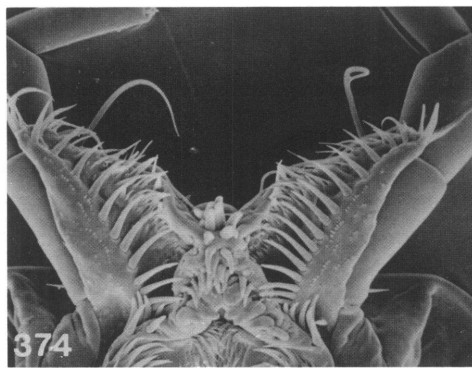
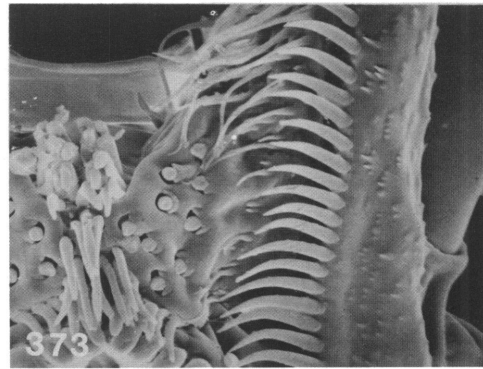
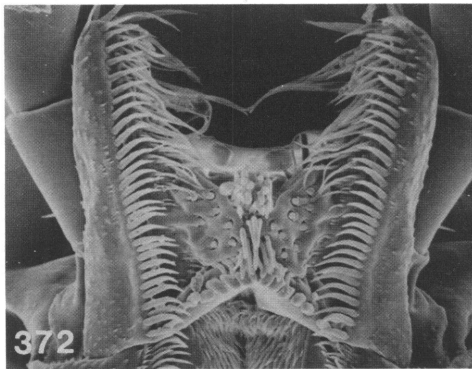
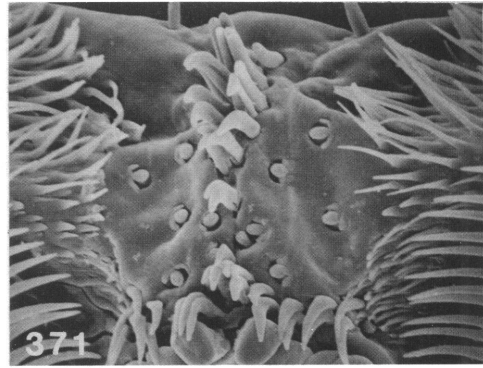
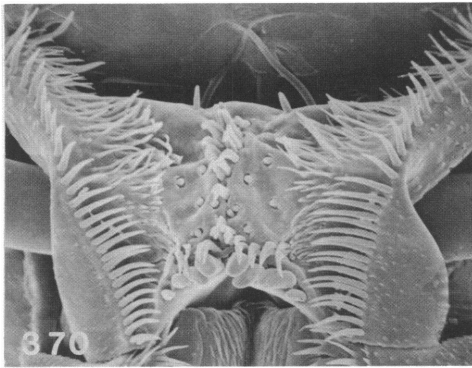


FIGS. 364, 365. *Bledius eximius*, hypopharynx. 364. General aspect, 260X. 365. Central region, 650X.

FIGS. 366, 367. *Bledius flavipennis*, hypopharynx. 366. General aspect, 425X. 367. Central region and right side, 1000X.

FIGS. 368, 369. *Bledius ineptus*, hypopharynx. 368. General aspect, 525X. 369. Central region and left side, 1000X.

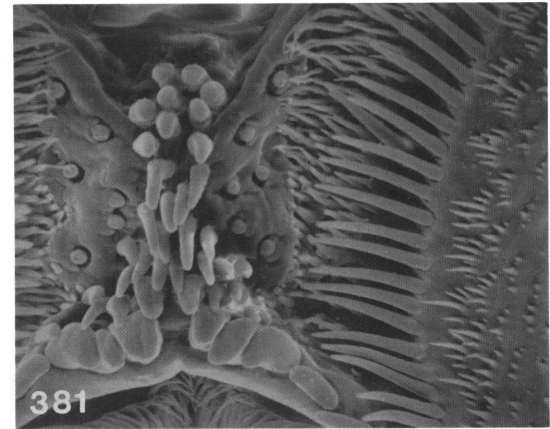
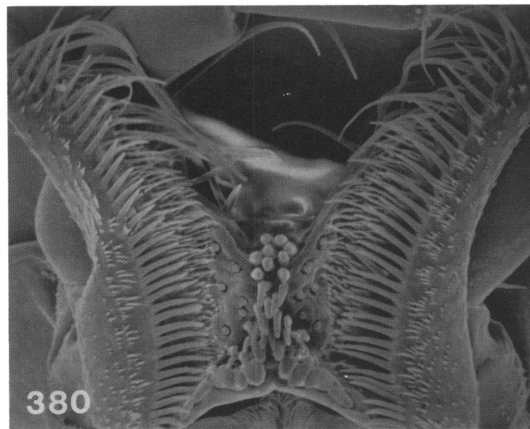
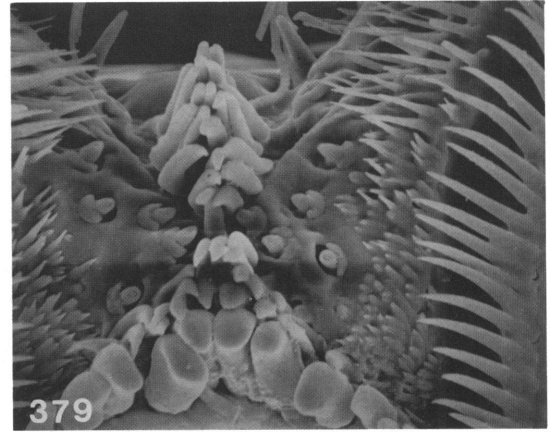
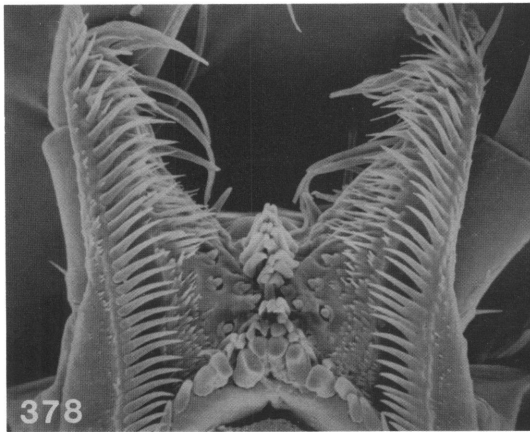
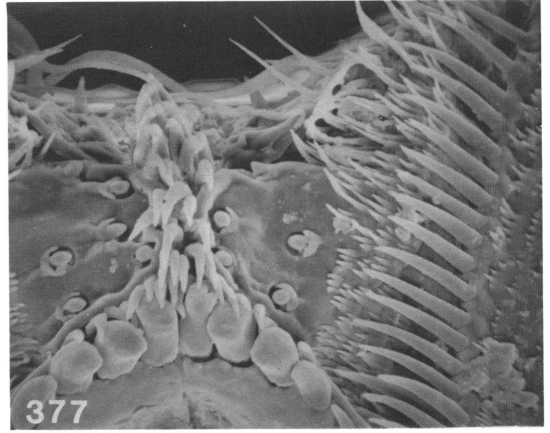
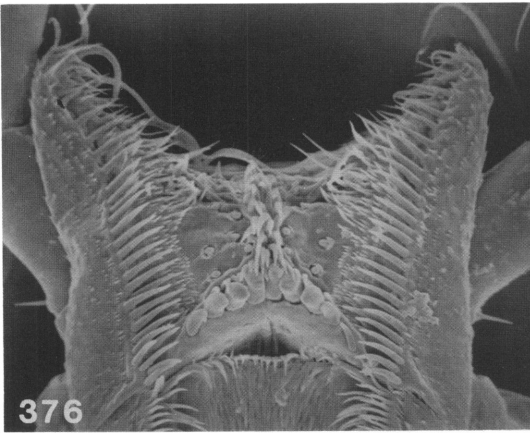




FIGS. 370, 371. *Bledius bellicus*, hypopharynx. 370. General aspect, 425X. 371. Central region, 800X.

FIGS. 372, 373. *Bledius politus*, hypopharynx. 372. General aspect, 460X. 373. Central region and right side, 940X.

FIGS. 374, 375. *Bledius aquilonarius*, hypopharynx. 374. General aspect, 500X. 375. Central region and right side, 2000X.

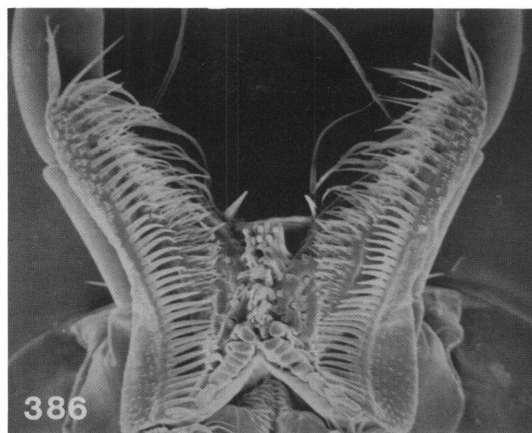
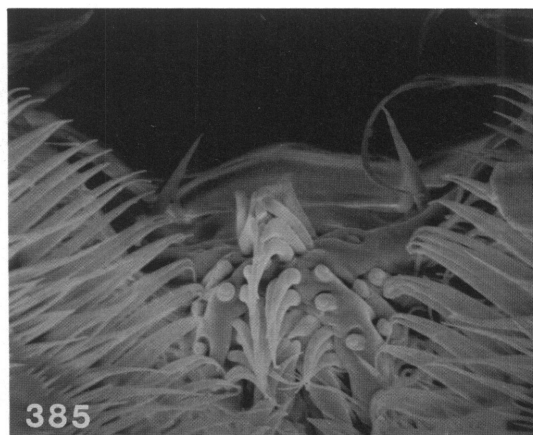
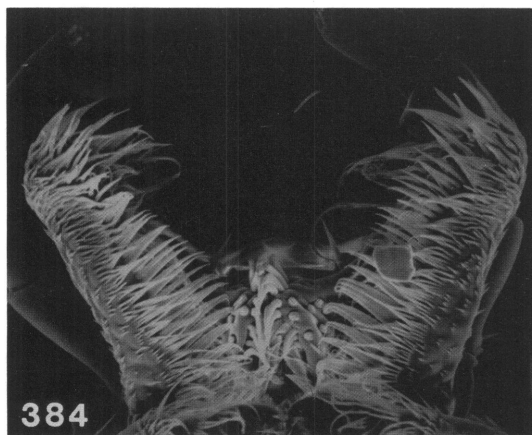
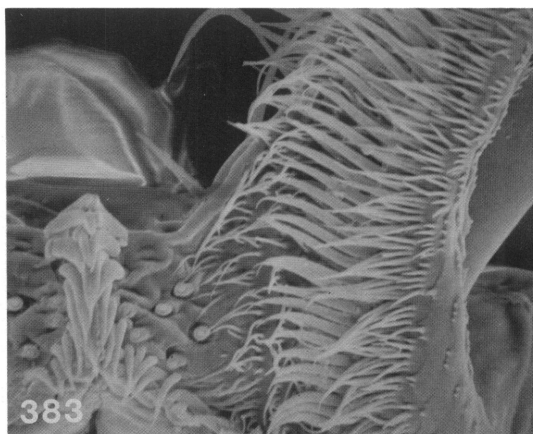
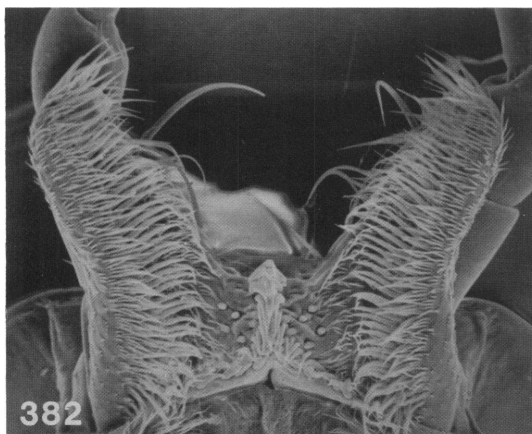


FIGS. 376, 377. *Bledius notialis*, hypopharynx. 376. General aspect, 500X. 377. Central region, 1000X.

FIGS. 378, 379. *Bledius opacifrons*, hypopharynx. 378. General aspect, 560X. 379. Central region and right side, 1120X.

FIGS. 380, 381. *Bledius strenuus*, hypopharynx. 380. General aspect, 425X. 381. Central region and right side, 850X.

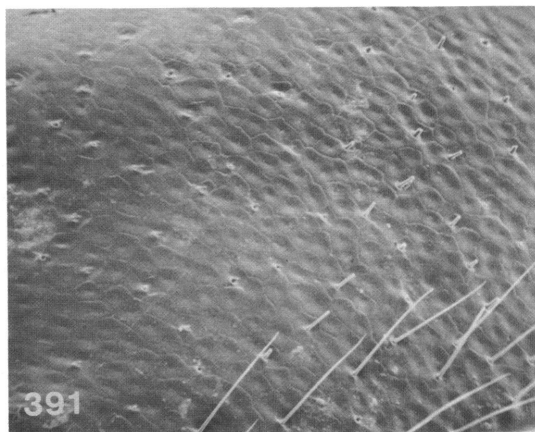
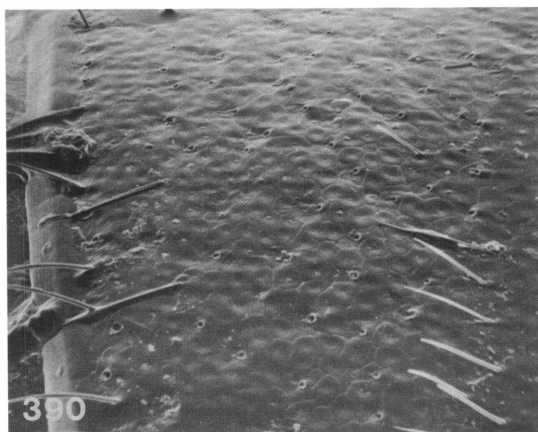
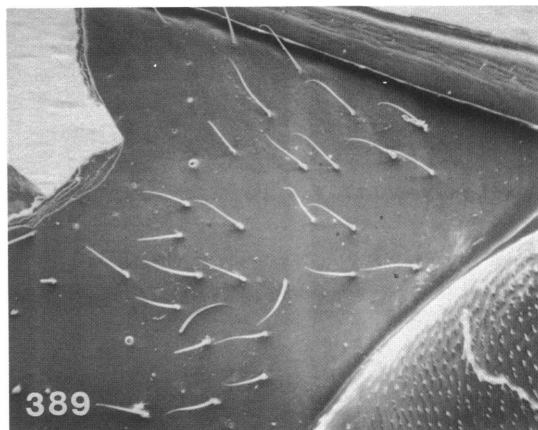
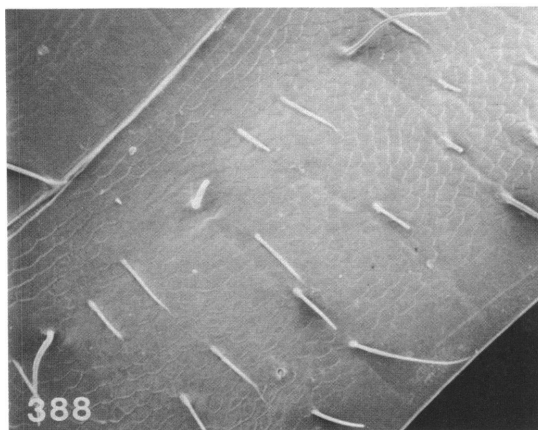




FIGS. 382, 383. *Bledius monstratus*, hypopharynx. 382. General aspect, 500X. 383. Central region and right side, 1000X.

FIGS. 384, 385. *Bledius fenyesi*, hypopharynx. 384. General aspect, 600X. 385. Central region, 1200X.

FIGS. 386, 387. *Bledius nitidiceps*, hypopharynx. 386. General aspect, 300X. 387. Central region and right side, 725X.



FIGS. 388, 389. *Bledius politus*, surface sculpturing. 388. Abdominal sternum V, 200X.  
389. Metasternum, 200X.

FIGS. 390, 391. *Bledius eximius*, surface sculpturing. 390. Abdominal sternum V, 200X.  
391. Metasternum, 200X.

## APPENDIX

### MATERIAL EXAMINED

For convenience, the species as well as the countries, states, and counties under each species, are listed alphabetically. The collectors and places of deposition of specimens are omitted, but the information is on file at the American Museum of Natural History.

#### *Bledius aquilonarius*, new species

Figure 206

Specimens: 91.

Canada: NORTHWEST TERRITORIES: [*District of Mackenzie*] 8 mi. SE Fort Simpson,

June. ONTARIO: Dirleton, October; Galetta, October; La Rose Forest, near Bourget, June. *Prince Edward Co.*, June. QUEBEC: Hull, October. YUKON TERRITORY: Ross River, 132° 30' W, 61° 56' N, June (3000 ft.)

United States: ALASKA: Alaska Highway, at mile 1259, July.

*Bledius basalis* Le Conte

Figure 89

Specimens: 431.

United States: FLORIDA: *Broward Co.*: Everglades, Andytown, March. *Charlotte Co.*: 2 mi. SW Englewood, Punta Gorda Beach, March (vegetated, moderately moist sand). *Duval Co.*: Pablo Beach, November. *Franklin Co.*: St. George Island, March (vegetated, slightly moist sand). *Indian River Co.*: Capron. *Nanotee Co.*: Palmetto, Tampa Bay, March. *Okeechobee Co.*: Okeechobee, April. *Pinellas Co.*: Dunedin, February, April; 7 mi. S St. Petersburg, March (beach flats). *Wakulla Co.*: 10 mi. S Panacea, Alligator Point, March (beach flats). GEORGIA: *Chatham Co.*: Tyhee Island, July. *Liberty Co.*: St. Catherine's Island, April. MARYLAND: *Worcester Co.*: Assateague Island, June (slightly moist sand). MASSACHUSETTS. NEW JERSEY: *Atlantic Co.*: Chelsea, August; Ocean City, June, July. *Cape May Co.*: Anglesea. NEW YORK: *Kings Co.*: Rockaway Beach, May. Long Island. NORTH CAROLINA: *Dare Co.*: Cape Hatteras, July; Cape Hatteras National Seashore, at Oregon Inlet, July. RHODE ISLAND. TEXAS: *Aransas Co.*: 9 mi. NW Rockport, Goose Island State Park, May, June. *Galveston Co.*: Galveston, May (beach sand).

I examined a specimen labeled as being from Illinois; this is probably an error because all other specimens are from coastal localities.

*Bledius bellicus* Blackwelder

Figure 275

Specimens: 144

United States: COLORADO: *Larimer Co.*: Fort Collins, June. *Yuma Co.*: 32 mi. S Wray, south fork Republican River, September (black light). KANSAS: *Riley Co.*: Manhattan, June. *Shawnee Co.*: Topeka, June. NEBRASKA: *Chase Co.*: Imperial, May. *Cuming Co.*: West Point, June. *Douglas Co.*: Platte River, near Venice, June; 14 mi. E Wahoo, Platte River, June (black light and unvegetated sand). *Garden Co.*: Osh-

kosh, North Platte River, September (in unvegetated and slightly to heavily vegetated sand). *Hitchcock Co.*: Trenton, Republican River, September (unvegetated sand flats). *Knox Co.*: 6 mi. S Niobrara, Verdigre Creek, June (unvegetated sand flats and black light). *Nuckolls Co.*: Superior. SOUTH DAKOTA: *Brookings Co.*: Brookings, June, July, August (light trap). *Brown Co.*: Hecla, July (light trap). *Brule Co.*: Chamberlain, June. *Clay Co.*: Vermillion, June. *Grant Co.*: Big Stone [City], August. *Union Co.*: Elk Point, June, July (light trap).

*Bledius consimilis* Fall

Figure 137

Specimens: 178.

United States: ARIZONA: *Apache Co.*: Chin Lee, July. COLORADO: *Bent Co.*: 1 mi. SE Las Animas, Purgatoire River, September. *Larimer Co.*: 6 mi. N Loveland, September (shore of alkalai lake). *Otero Co.*: 4 mi. E. Fowler, Apishapa River, September (unvegetated sand flat). *Pueblo Co.*: Pueblo, August (at light); 20 mi. E Pueblo, Huerfano River, September (unvegetated sand flats). *Weld Co.*: 7 mi. E Greeley, South Platte River, September (heavily vegetated sand). *Yuma Co.*: 32 mi. S Wray, South Fork Republican River, September (black light). KANSAS: *Logan Co.*: Logan Co. State Park, at lake, August (black light). MONTANA: *Musselshell Co.*: 38 mi. E Roundup, Musselshell River, August (vegetated, salt encrusted sand). NEW MEXICO: *Sandoval Co.*: 15 mi. NE San Ysidro, July. *Socorro Co.*: 17 mi. S Belen, Rio Grande River, August (moist sand flats). *Torrance Co.*: Clines Cors, July; Gran Quivira, August (6500 ft., black light). OKLAHOMA: *Alfalfa Co.*: Cherokee, June (salt plains); 8 mi. N Jet, Great Salt Plains State Park, Salt Fork of Arkansas River, June (black light). *Cimarron Co.*: 25 mi. NW Boise City, Lake Carl Etling, Black Mesa State Park, August. *Cleveland Co.*: South Canadian River, September. *Major Co.*: 2.5 mi. S Cleo, Cimarron River, June (sand flats). *Woods Co.*: Freedom, Cimarron River, June (sand flats). TEXAS: *Oldham Co.*: 42 mi. S Dalhart, Canadian River, September (sand flats).

*Bledius cordatus* (Say)

Figure 17

Specimens: 274.

United States: FLORIDA: *Charlotte Co.*: 6

mi. SSE Grove City, March (unvegetated sand flat, leeward side of peninsula). *Collier Co.*: Marco, March, April. *Pinellas Co.*: 7 mi. S St. Petersburg, March (on beach flats). GEORGIA: *Liberty Co.*: Saint Catherine's Island, April. MARYLAND: *Worcester Co.*: Assateague Island, June (sand flat on leeward side of island). MISSISSIPPI: *Jackson Co.*: Horn Island, May. NEW JERSEY: *Atlantic Co.*: Atlantic City; Chelsea, August. *Cape May Co.*: Sea Isle City. NEW YORK: Long Island. NORTH CAROLINA: *Dare Co.*: Cape Hatteras National Seashore, at Oregon Inlet, July (unvegetated, moderately moist sand flat). SOUTH CAROLINA: *Charleston Co.*: Charleston, March (at light). TEXAS: *Arkansas Co.*: 9 mi. NW Rockport, Goose Island State Park, June (black light near sea beach). *Kenedy Co.*: Padre Island. *San Patricio Co.*: Welder Wildlife Sanctuary, November (ultraviolet light).

*Bledius dimidiatus* Le Conte

Figure 17

Specimens: 65.

United States: FLORIDA: *Brevard Co.*: Enterprise, October; Sand Point. *Broward Co.*: Everglade Park, Andytown, March. *Highlands Co.*: 1 mi. W Brighton, March; Lake Placid, April; Sebring, March. *Orange Co.* *Putnam Co.*: Crescent City. GEORGIA: *Clinch Co.*: Fargo, March.

*Bledius episcopalis* Fall

Figure 137

Specimens: 46.

United States: CALIFORNIA: *San Bernardino Co.*: Saratoga Springs, Death Valley, May. *Inyo Co.*: Bishop, June; Furnace Creek, Death Valley, May (under rock at fountain). NEVADA: *Nye Co.*: Fairbanks Springs, August.

*Bledius eximius* Casey

Figure 275

Specimens: 236.

Mexico: BAJA CALIFORNIA: La Mision de San Miguel, May.

United States: CALIFORNIA: *Inyo Co.*: Buckhorn Springs, January (under rocks near spring); Keeler, June; Owens Lake, July, August; Owens Valley, May. *Lassen Co.*: Amedee, July (4200 ft.). *Mono Co.*: Mono Lake, SW corner, August (on shore, 6420 ft.). *San Diego Co.*: San Diego. NEVADA: *Churchill Co.*: Stillwater,

August. *Lyon Co.*: 4 mi. NE Fernley, May. NEW MEXICO: *Torrance Co.*: 6.5 mi. E Willard, August (salt flat, near hammock, in slightly moist sand). OREGON: *Lake Co.*: 41 mi. N Lakeview, north shore Lake Abert, August (from moist salt flats). UTAH: Salt Lake. *Box Elder Co.*: at mouth Bear River, June (light trap); 10 mi. W Brigham City, north of Great Salt Lake, August (salt flats). *Davis Co.*: Kaysville, April. *Salt Lake Co.*: Saltair, July (4000 ft.). *Sevier Co.*: Richfield, June, July (light trap). *Utah Co.*: Salem, July; Vineyard, July. *Weber Co.*: Great Salt Lake, near Plain City, July; Roy, July. WASHINGTON: *Grant Co.*: Grand Coulee, June.

*Bledius fenyesi* Bernhauer and Schubert

Figure 298

Specimens: 262.

Mexico: BAJA CALIFORNIA: Colonia Guerrerera, August; Descanso Bay, October; Ensenada, July; La Mision de San Miguel, May, August; La Salina (under decaying seaweed); 1 mi. W Miller's Landing, July; Rosarito, May, October; 15 mi. N. Rosario, August; Santa Maria, September; 12 mi. S Tijuana, October ("under washup"). BAJA CALIFORNIA SUR: Bahia Santa Maria, Isla Magdalena, May.

United States: CALIFORNIA: San Juan, January (in kelp). *Los Angeles Co.*: El Segundo sand dunes, July; Long Beach, July, August, December; Los Angeles, July; Malibu, October; Pacific Palisades, September; Point Dume, August; Redondo, March, April, July; San Pedro, March; Tapia, September. *Orange Co.*: Huntington Beach, September; Newport Beach, July; San Clemente State Park, July ("under washup"); Seal Beach, March. *San Diego Co.*: Cardiff, July, August; Coronado, April, July (kelp); La Jolla, April (kelp), Mission Bay, March; Ocean Beach, September; Oceanside, August; Pacific Beach, February; San Diego, August; San Diego Bay, September; San Elijo Lagoon, April; Sunset Cliffs, August, October; Torrey Pines, May, July. *San Francisco Co.*: San Francisco. *San Mateo Co.*: Rockaway Beach. *San Luis Obispo Co.*: Atascadero, April; Avila, September; Pismo, July. *Santa Barbara Co.*: Gaviota, October; Gaviota Pass, February; San Miguel Island, June, August; Santa Barbara, June; Santa Cruz Island, July. *Ventura Co.*: Dulah, September; Rincon, July; Rincon Beach, October; San Nicolas Island, December.

*Bledius flavipennis* Le Conte

Figure 178

Specimens: 745.

Canada: ALBERTA: Kananaskis, June; One-four, June; Scandia, July. BRITISH COLUMBIA: 13 mi. W Osoyoos, June. MANITOBA: Aweme, May, July. SASKATCHEWAN: Elbow, June; Val Marie, June.

Mexico: BAJA CALIFORNIA: 17 mi. S Ensenada, June; Rio San Telmo, June.

United States: ARIZONA: *Yuma Co.*: Yuma, March. CALIFORNIA: *Contra Costa Co.*: Antioch, August. *Imperial Co.*: 15 mi. E Calexico, June; Laguna Lake, June. *Inyo Co.*: Furnace Creek, Death Valley, May; Goose Lake, April (under debris at edge of lake); Independence, May, June; Tecopa Hot Springs, March. *Lassen Co.*: 10 mi. NE Janesville off highway 395, Honey Lake Waterfowl Management area (at light; near stream). *Los Angeles Co.*: July. *Riverside Co.*: Riverside, Santa Ana River, September (at light). *San Bernardino Co.*: Saratoga Springs, Death Valley, May. *San Diego Co.*: Buena Vista Lagoon, April; Coronado Beach; San Diego; Sentanac Canyon Gaging Station, May (1800-1900 ft.). *San Luis Obispo Co.*: 1 mi. S Cholame, April. IDAHO: *Owyhee Co.*: Hot Creek Falls, near Bruneau Canyon, June. *Twin Falls Co.*: Twin Falls, July (3700 ft.). NEBRASKA: *Sheridan Co.*: 15 mi. ESE Alliance, September (on alkali flat); 16 mi. E Alliance, September (shore of alkali lake). NEVADA: *Churchill Co.*: Humboldt Lake, June; Stillwater, August. *Eureka Co.*: 27.5 mi. W Carlin, 0.5 mi. W intersection US rt. 40 and Humboldt, July. *Nye Co.*: Ash Meadow, August. *Ormsby Co.*: Carson City, July. *Pershing Co.*: Lovelock, August. NEW MEXICO: *Chaves Co.*: 10 mi. E Roswell, Bottomless Lake State Park, June. *Eddy Co.*: Carlsbad Cavern, May; 4 mi. E Loving, May; 5 mi. E Loving, May (from shore of salt lake); 9 mi. E Loving, May (at light amongst tamarix). *Otero Co.*: 12 mi. W Alamogordo, May (shore of salt lake); White Sands, July. *Torrance Co.*: east of Estancia, August (shore of saline lake); 6.5 mi. E Willard, August (from salt flat). NORTH DAKOTA: *Adams Co.*: 2 mi. E Hettinger, August (shore of drying alkali pond). *Cass Co.*: University of North Dakota, June. *Ramsey Co.*: Devils Lake, July (shore of temporary pond). OREGON: *Harney Co.*: Burns, July. SOUTH DAKOTA: Larive Lake, June. *Bennett Co.*: Martin, June. *Brookings Co.*: Brookings, June, July;

Volga. *Brule Co.*: Chamberlain, June. *Buffalo Co.*: Fort Thompson, August. TEXAS: *Reeves Co.*: 4 mi. N Orla, May (near drying stream). UTAH: *Box Elder Co.*: mouth of Bear River, July, August; 10 mi. W Brigham City, August (black light). *Juab Co.*: 20 mi. SSW Nephi, at turnoff to Mills, August (shore of pond). *Millard Co.*: Clear Lake, July. *Salt Lake Co.*: Saltair; Salt Lake. *Sevier Co.*: Richfield, May. *Utah Co.*: Benjamin, August (black light); Orem, June; Provo, June; Salem, July, August (black light); Vineyard, July. *Weber Co.*: Great Salt Lake, near Plain City, July (salt flats); Logan, July. WASHINGTON: *Adams Co.*: Lake McElroy, Paha, May; Lake McElroy, 8 mi. S Ritzville, July (shore of saline lake); Ritzville, June. *Spokane Co.*: Deep Lake, May. *Whitman Co.*: Pullman, June. WYOMING: *Albany Co.*: Laramie.

*Bledius ineptus* Casey

Figure 206

Specimens: 708.

Canada: ALBERTA: Lost River Ranch, Milk River, latitude 49° 00' 15" N, longitude 110° 38' 42" W, June. MANITOBA: Brandon, June, August; Ninette, May; Winnipeg, May. SASKATCHEWAN: Rockglen, August.

Mexico: CHIHUAHUA: Valle de Olivos, July. PUEBLA: Tehuacan, July.

United States: ARIZONA: *Apache Co.*: Chin Lee, July. White Mountains, September. *Cochise Co.*: Fairbanks, San Pedro River, September; Sierra Vista, October; Texas Pass, Dragoon Mountains, July; Willcox, August; 10 mi. W Willcox Playa, May (edge of mud flat). *Graham Co.*: Safford, Gila River, August. *Greenlee Co.*: Guthrie, Gila River, August (sandy shore). *Maricopa Co.*: Phoenix, August; Wickenburg, August. *Pima Co.*: St. Xavier Monastery, Tucson, July; Tucson, July, August. *Santa Cruz Co.*: Nogales, August; Patagonia, July; Peña Blanca, Pajarito Mountains, July. *Yavapai Co.*: Camp Verde, August; Red Rock Camp, August. COLORADO: *Fremont Co.*: Cañon City. *Larimer Co.*: 6 mi. N Loveland, September (shore of alkali stream). *Mesa Co.*: Grand Junction. *Moffat Co.*: 2 mi. E Maybell, Deception Creek, July (5910 ft.). *Otero Co.*: 4 mi. E Fowler, Apishapa River, September (unvegetated sand flat). *Sedgewick Co.*: Julesburg, September. *Weld Co.*: Greeley; 7 mi. E Greeley, South Platte River, September (in heavily vegetated sand). ILLINOIS: *Cook Co.*: Chicago, July. INDIANA: *Porter Co.*: Indiana Dunes State

Park, August (from moist sand near marshy woodland). *Tippecanoe Co.*: Lafayette, May. KANSAS: *Logan Co.*: Logan Co. State Park, August (black light). LOUISIANA: *Vermilion Parish*: Gueydan, July (at light). MICHIGAN: *Midland Co.*, July. MINNESOTA: *Polk Co.*: 10 mi. E Crookston, July (temporarily wet soil near road). MONTANA: *Musselshell Co.*: 38 mi. E Roundup Musselshell River, August (vegetated soil on shore with salt deposits on surface). *Rosebud Co.*: Forsyth, Yellowstone River, August. NEBRASKA: *Brown Co.*: 22 mi. S. Ainsworth, July. *Douglas Co.*: 14 mi. E Wahoo, Platte River, June (black light). *Garden Co.*: Oshkosh, North Platte River, September (from slightly vegetated sand). *Hitchcock Co.*: Trenton, Republican River, September (unvegetated sand). *Knox Co.*: 6 mi. S Niobrara, Verdigre Creek, June. *Sheridan Co.*: 14 mi. S Hay Spring, Niobrara River, September (vegetated sand). *Thomas Co.*: 2.5 mi. W Halsey, Nebraska National Forest, July. NEW MEXICO: *Bernalillo Co.*: Albuquerque. *Catron Co.*: Quemado, Largo River, August (on sandy shore). *Sandoval Co.*: Jemez Mountains, August. *Socorro Co.*: 17 mi. S Belen, August (in mud and sand bank). NORTH DAKOTA: *Ward Co.*: 2 mi. SE Minot, Souris River, July. OHIO: *Erie Co.*: Arlington Road, Berlin Township, "Sandy Ridge." *Summit Co.*: August. OKLAHOMA: *Major Co.*: 2.5 mi. S Cleo, Cimarron River, June. *Woods Co.*: Freedom, Cimarron River, June. SOUTH DAKOTA: *Brookings Co.*: Brookings, June, July, August (black light). *Brown Co.*: Hecla, May, August. *Buffalo Co.*: Fort Thompson, September. *Grant Co.*: Big Stone [City], August. *Slope Co.*: Little Missouri River at intersection with U.S. rt. 12, August (sand flat). TEXAS: *Aransas Co.*: 9 mi. N Rockport, Goose Island State Park, June (black light on beach). *Cameron Co.*: Brownsville, March, May. *Chamber Co.*: Anahuac. *Dimmit Co.*: El Paso. *Hidalgo Co.*: Houston, February. *Hidalgo Co.*: Kenedy. *Kenedy Co.*: Armstrong King Ranch, September. *Nolan Co.*: Sweetwater, July. *Val Verde Co.*: Del Rio, Devil's River, May. *Victoria Co.*: Victoria, September. UTAH: *Iron Co.*: 5 mi. SE Cedar City, August (unvegetated and vegetated sand). *Utah Co.*: Provo, June; Salem, July; Vineyard, July. *Wayne Co.*: Hanksville, August (at light); 14 mi. S Hanksville, August (at light, sand-oak area); Hanksville, base of Henry Mountains, June. *Weber Co.*: Ogden, April. WYOMING: *Natrona Co.*: 1 mi. NW Midwest, September (shore of Salt Creek).

*Bledius melanocephalus* (Say)

Figure 107

Specimens: 376.

Canada: MANITOBA: Victoria Beach, August.

United States: ARKANSAS: *Crittenden Co.*: 8 mi. E of West Memphis, Mississippi River, September (sand flats). *Franklin Co.*: Ozark, Arkansas River, September (sand flats). *Jefferson Co.*: 8 mi. N Pine Bluff, Arkansas River, September (sand flats). *Lafayette Co.*: Lewisville, June (black light). *Sebastian Co.*: Forth Smith, Arkansas River, September (sand flats). IOWA: *Des Moines Co.*: Burlington. MONTANA: *Rosebud Co.*: Forsyth, Yellowstone River, August. NEBRASKA: *Cuming Co.*: West Point, Elkhorn River, June. *Knox Co.*: 6 mi. S Niobrara, Verdigre Creek, June (low, moist sand bank near water on sand flat). *Douglas Co.*: 14 mi. E Wahoo, Platte River, June (black light). *Sheridan Co.*: 14 mi. S Hay Springs, Niobrara River, September (sand flats). NEW MEXICO: *Socorro Co.*: 17 mi. S Belen, Rio Grande, August (sand flats). OKLAHOMA: *Choctaw Co.*: 7 mi. S Hugo, Red River, September. SOUTH DAKOTA: *Union Co.*: Elk Point, July (light trap).

*Bledius monstratus* Casey

Figure 298

Specimens 839.

Canada: BRITISH COLUMBIA: Massett, Queen Charlotte Island.

United States: CALIFORNIA: *Humboldt Co.*: Samoa, May; Samoa Beach, June; Trinidad, June. *Marin Co.*: Bolinas, February. *Mendocino Co.*: Haven's Neck. *Monterey Co.*: Asilomar, May; Big Sur, Big Sur-Pfeiffer Beach, October (under decaying seaweed); 8 mi. NW Big Sur, Point Sur, October (under decaying seaweed); Carmel, March, April, May, August, September, December (under decaying seaweed); 4 mi. S Lucia, Kirk Creek, September (under decaying seaweed); 9 mi. S Lucia, Plaskett Campground, September (under decaying seaweed); 13 mi. S Monterey, September (under decaying seaweed); Moss Landing, September (under decaying seaweed). *San Francisco Co.*: San Francisco, March, June, July, August. *San Luis Obispo Co.*: 18 mi. N Cambria, September (under decaying seaweed); Cayucos, August, September (under decaying seaweed); Morro Bay State Park, June; 6 mi. SW Los Osos, June (under decaying seaweed). *San Mateo Co.*: Pescadero, August; Rock-

away Beach, October; San Gregorio Beach, September. *Santa Cruz Co.*: Aptos, April, June; 8 mi. NW Davenport, at Waddel Creek, October (under decaying seaweed); Santa Cruz, October; Watsonville, May; 4 mi. SW Watsonville, September (under decaying seaweed). OREGON: *Clatsop Co.*: Cannon Beach, June. WASHINGTON: *King Co.*: Seattle, August.

*Bledius neglectus* Casey  
Figure 66

Specimens: 305.

Canada: NEWFOUNDLAND: Fogo, Tilting, June; Grand Bank, August; Lomond, June; Piccadilly, July; Port aux Basques, June (collected with *Dyschirius sphaericollis* Say); Saint David's, July; Saint John Bay, Saint John Island, August; Stephenville Crossing, July. NOVA SCOTIA: Bridgewater, Crescent Beach, May (collected with *Dyschirius pallipennis* Say). SAINT PIERRE and MIQUELON: Miquelon, August (Territory of France offshore of Newfoundland).

United States: GEORGIA: *Liberty Co.*: Saint Catherines Island, April. MAINE: *Cumberland Co.*: Portland, July. MARYLAND: *Worcester Co.*: Assateague Island, June (unvegetated sand flat on leeward side of island). MASSACHUSETTS: *Barnstable Co.*: Mashee Island, nr. Bourne, August (intertidal sand, with *Spartina alternifolia*). *Plymouth Co.*: Marion, June, July. NEW JERSEY: *Atlantic Co.*: Chelsea, August. *Cape May Co.*: Wildwood, August. *Middlesex Co.*: Laurence Harbor, May. *Monmouth Co.*: Sandy Hook State Park, April, May (unvegetated sand flats on leeward side of island). *Ocean Co.*: Mystic Island, 3 mi. SE Tuckertown, May; Ocean City, June, July. NEW YORK: *Kings Co.*: Rockaway Beach. NORTH CAROLINA: *Dare Co.*: Cape Hatteras National Seashore, at Oregon Inlet, July (unvegetated, moderately moist sand flats).

*Bledius nitidiceps* Le Conte  
Figure 340

Specimens: 140.

United States: CALIFORNIA: *Kern Co.*: Cuyama Valley, March. *Los Angeles Co.*: Pasadena; Rivera; Saugus, April. *Monterey Co.*: Carmel, February. *Riverside Co.*: Riverside, March. *San Bernardino Co.*: Victorville. *San Diego Co.*: Green Valley Falls, May; La Jolla; Mission Valley, April, May; Oceanside; San Diego, *Santa Barbara Co.*: 10 mi. E Santa Maria, Cuyama

River, July. UTAH: *Iron Co.*: 5 mi. SE Cedar City, August (in vegetated sand along stream). *Washington Co.*: Chad's Ranch, July.

I have examined two other specimens with the label "Tenino, W.T.," They are deposited in the National Museum of Natural History.

*Bledius notialis*, new species  
Figure 252

Specimens: 123.

United States: ARKANSAS: *Crittenden Co.*: 8 mi. E West Memphis, Mississippi River, September. *Franklin Co.*: Ozark, Arkansas River, September (on sand flats). *Jefferson Co.*: 8 mi. NE Pine Bluff, Arkansas River. *Lafayette Co.*: Lewisville, June (black light). *Pulaski Co.*: Little Rock, May. IOWA: *Pottawattamie Co.*: Oakland, August (at light). KANSAS: *Clay Co.*: 1 mi. S Clay Center, Republican River, August (black light). MISSOURI: *St. Louis Co.*: Howard Bend, June. OKLAHOMA: *Choctaw Co.*: Hugo, Red River. *Kay Co.*: 1 mi. E Ponca City, Arkansas River, June. TEXAS: *Colorado Co.*: Columbus, March. WISCONSIN: *Grant Co.*: Boscobel, July (black light at State Nursery).

*Bledius opacifrons* Le Conte  
Figure 358

Specimens: 290.

United States: CALIFORNIA: *Alameda Co.*: Sunol, September. *Humboldt Co.*: Weott, South Eel River, August (alt. 155 ft.). *Kern Co.*: *Lake Co.*: 1.7 mi. W Kelseyville, Kelsey Creek at Gross Ford, October; Middletown, May. *Los Angeles Co.*: Pasadena, February; Van Nuys. *Madera Co.*: Oakhurst, China Creek, July (in vegetated sandy bank). *Marin Co.*: Point Reyes, June. *Mendocino Co.*: 12.5 mi. W Willits, James Creek and Highway 20, October; 2 mi. S Yorkville, Rancheria Creek, July. *Plumas Co.*: Clover Valley, June. *San Diego Co.*: Campo Creek, April. *Santa Cruz Co.*: Ben Lomond. *Siskiyou Co.*: 1.1 mi. from Callahan-Etna Road, Sugar Creek, July; Cole, July; 5 mi. NE Forks of Salmon, North Fork Salmon River, July; 3.7 mi. NW Forks of Salmon, Somes Bar-Callahan Rd., Nordheimer Creek, July; 0.7 mi. W Seiad, Klamath River, August. *Sonoma Co.*: Ducan Mills, June, July; Guerneville, May; 2 mi. below Guerneville, June; Rio Nido, July. *Tehama Co.*: Red Bluff, July ("on mud"). *Trinity Co.*: Douglas City, Trinity River, June; 0.5 mi. E Hyampom, Hayfork Creek, July. *Ventura Co.*: Wheeler Gorge Public

Camp, July (2275 ft.). COLORADO: *Costilla Co.*: Garland. OREGON: *Gilliam Co.*: Rock Creek at Highway 206, July. *Lake Co.*: Chandler State Park, June; 17 mi. N Lakeview, Crooked Creek, August (in vegetated sand bank). *Lane Co.*: Eugene. WASHINGTON: *Spokane Co.*: Spokane, August.

*Bledius opaculus* Le Conte

Figure 34

Specimens: 158.

Canada: NEWFOUNDLAND: Stephenville Crossing, July; Stephenville, St. George Bay. NOVA SCOTIA: Sable Island, June, July, September. PRINCE EDWARD ISLAND: Green Gables, Cavendish Beach, July.

United States: MARYLAND: *Worcester Co.*: Assateague, June (moderately moist sand, near edge of water, leeward side of island). MASSACHUSETTS: *Barnstable Co.*: Provincetown, June. NEW JERSEY: *Cape May Co.*: Anglesea, May, August; Sea Isle City. NORTH CAROLINA: *Dare Co.*: Cape Hatteras National Seashore, at Oregon Inlet, July (unvegetated, moist sand flats); Cape Hatteras, July (in fine, algae covered sand).

*Bledius politus* Erichson

Figure 252

Specimens: 703.

United States: FLORIDA: *Brevard Co.*: Titusville, March (at light). *Broward Co.*: Everglades, Andytown, March. *Charlotte Co.*: Charlotte Harbor; El Jobean, March; 2 mi. SW Englewood, Punta Gorda Beach, March (in slightly moist, vegetated sand); Punta Gorda, April. *Collier Co.*: Marco, March. *Dade Co.*: Coconut Grove. *Duval Co.*: Jacksonville, August. *Franklin Co.*: St. George Island, March (in sparsely vegetated, moist sand). *Harde Co.*: Highlands Hammock State Park, April. *Hendry Co.*: La Belle, July. *Highlands Co.*: 1 mi. W Brighton, March; 7 mi. W Brighton, March; Lake Placid, March, April; Lake Placid, Archbold Biological Station, January, March, April; 6 mi. S Lake Placid, Archbold Biological Station, March; Lake Istokpoga, near Lake Placid, March. *Hillsborough Co.*: Tampa; Tampa, McDill Field, April, May. *Lee Co.*: Fort Myers, March. *Martin Co.*: Port Mayaca, March. *Nassau Co.*: 12 mi. E. Callahan, May (black light). *Orange Co.*: Winter Park. *Osceola Co.*: 3 mi. SW Lake Marian, March (light); *Sarasota Co.*: Sarasota, March. GEORGIA: *Chatham Co.*: Sa-

vannah. MARYLAND: *Worcester Co.*: Assateague Island, June (in sand flat, near water on leeward side of island). MISSISSIPPI: *Jackson Co.*: Horn Island, April. NEW JERSEY: *Cape May Co.*: Anglesea. NEW YORK: Long Island. NORTH CAROLINA: *Dare Co.*: Cape Hatteras, July (from vegetated, moist sand); Cape Hatteras National Seashore, at Oregon Inlet, July (from heavily vegetated, moist sand); Cape Hatteras National Seashore, 1 mi. N Rodanthe, July (from vegetated, moderately moist sand on roadside). SOUTH CAROLINA: *Charleston Co.*: Charleston, May (at light). *Georgetown Co.*: Litchfield Beach, June. *Horry Co.*: Arrowhead Lake, Myrtle Beach, August (ultraviolet light). TEXAS: *Aranas Co.*: 9 mi. NW Rockport, Goose Island State Park, June (black light at marsh near beach). *Cameron Co.*: Brownsville, November; Harlington, March. *Galveston Co.*: Galveston, March, May. *Kenedy Co.*: Armstrong King Ranch, September.

*Bledius strenuus* Casey

Figure 323

Specimens: 1644.

Canada: ALBERTA: Edmonton, June; Elkwater, latitude 49° 12' N, longitude 110° 16' W, May (brachypterous form); Hanna, July; Jenner, May; Medicine Hat, April (brachypterous form), June, September; Morrin; Onefour, June; Soda Lake, May; Tofield, October. BRITISH COLUMBIA: Atlin, June (2200 ft.); Chilcotin, May; Huntingdon, April; Okanagan Falls, May (1000 ft.); Oliver, White Lake, May; 10 mi. NW Oliver, June; Osoyoos, Spotted Lake, May; Royston, June; Summerland, May; Vancouver. MANITOBA: Aweme, May, August; Boulder, May; Brandon, June, July; International Peace Gardens, Turtle Mountain Forest Reserve, August; Ninette, April, May; Reynolds, June; Riverton, June; Rosebank; 5 mi. SW Shilo, July; Stonewall, April; Stony Mountain, October; Winnipeg, April; Winnipegosis, July. SASKATCHEWAN: Assiniboia, June; Burgis, June; Dundurn; Elbow, May; Maple Creek, May; Saskatoon, May, July, September (one brachypterous form); Val Marie, June; Waskesiu Lake, July.

Mexico: BAJA CALIFORNIA: 17 mi. S Ensenada, June; Hamilton Ranch, August; La Mision San Miguel, May; Ojos Negros, May.

United States: ARIZONA: *Coconino Co.*: Flagstaff. *Navajo Co.*: Ramah, August. *Yavapai Co.*: Kirkland Junction, May. CALIFORNIA: *Contra Costa Co.*: Brentwood, July. *Fresno Co.*:



Fresno. *Inyo Co.*: Big Pine, June, July; 3 mi. E Big Pine, July; Bishop, June, July; Goose Lake, April (edge of lake); Independence, May, June, September; Independence, Gilbert Lake, July; Lone Pine, June; 3 mi. W Lone Pine, June; Olancho, April, May, June, July; Owens Lake, March, June, July. *Kern Co.*: Bakersfield, May; 4 mi. N Bakersfield, July (at light); Breckenridge, May; Cuyama Valley, March; Fort Tejon; 5 mi. NW Kernville, June; Wofford Heights, June (2300 feet). *Lassen Co.*: Amedee, July (4200 ft.). *Los Angeles Co.*: Chatsworth, March; Hynes, August; Pasadena, June; Redondo, March; Riviera, December. *Marin Co.*: Bolinas, February. *Mariposa Co.*: Bear Valley, June. *Merced Co.*: Los Banos, May. *Mono Co.*: Benton Hot Springs, June (edge of spring); Benton Station; Owens Valley, June; Fish Slough, January; Hot Creek, May. *Monterey Co.*: Carmel, March. *Napa Co.*: Calistoga, August. *Riverside Co.*: Elsinore, September; Elsinore Lake, September; Riverside (at light); Temecula Canyon, Santa Margarita River, June (750-1800 ft.). *San Bernardino Co.*: Loma Lima, April, May, July (at light). *San Diego Co.*: Poway; San Diego, May, June. *San Francisco Co.*: San Francisco, March, April, May, August. *San Joaquin Co.*: Lodi, April, July, August; Stockton, April; Weston. *San Mateo Co.*: Ano Nuevo Beach, January (under seaweed on beach). *Santa Clara Co.*: Milpitas. *Tehama Co.*: Red Bluff, May. *Tulare Co.*: Kaweah, April; Woodlake, June. *Yolo Co.*: Woodland, May. COLORADO: *Adams Co.*: Watkins, July. *Bent Co.*: Hasty, John Martin Dam, August. *Garfield Co.*: 4 mi. W Rifle, Colorado River, July. *Larimer Co.*: 6 mi. N Loveland, September (shore of alkali stream). *Logan Co.*: Sterling. *Mesa Co.*: 5 mi. N Glade Park, Black Ridge, July; Grand Junction. *Montezuma Co.*: 6 mi. W Cortez, McElmo Creek, July. *Otero Co.*: 4 mi. E Fowler, Apishapa River, September (unvegetated sand flat). *Weld Co.*: 7 mi. E Greeley, South Platte River, September (heavily vegetated sand); Nunn (brachypterous form); Pawnee National Grassland, May, June, July, August. *Yuma Co.*: 32 mi. S Wray, South Fork Republican River, September (black light). IDAHO: *Canyon Co.*: Caldwell, July (2375 ft.). *Elmore Co.*: Glenns Ferry, June (2562 ft.). *Gem Co.*: Emmett, June. *Gooding Co.*: Hagerman, Snake River, May. *Minidoka Co.*: Heyburn. *Owyhee Co.*: Hot Creek Falls, near Bruneau Canyon, June. *Payette Co.*: Payette, July (2154 ft.). INDIANA: *Lake Co.*: East Gary, June. KANSAS: *Hamilton Co.* MINNESOTA: *Big Stone Co.*: Artichoke,

September. *Polk Co.*: 10 mi. E Crookston, July (from temporarily moist soil near roadside). MONTANA: *Teton Co.*: 8 mi. SE Choteau, September (from alkali flat). NEBRASKA: *Box Butte Co.*: Alliance, July. *Brown Co.*: 22 mi. S Ainsworth, July. *Cherry Co.*: Cottonwood Lake, near Merriman, August (3000 ft.). *Knox Co.*: 6 mi. S Niobrara, Verdigre Creek, June (black light). *Lincoln Co.*: North Platte, July. *Sheridan Co.*: 16 mi. E Alliance, September (shore of alkali lake). 23 mi. E Alliance, September (shore of alkali lake). 5 mi. SE Hays Spring, Walgreen Lake State Park, June (black light). *Thomas Co.*: 2.5 mi. W Halsey, July. NEVADA: *Churchill Co.*: Humboldt Lake, June; Stillwater, August. *Elko Co.*: Elko. *Lander Co.*: Reese River, May. *Mineral Co.*: Walker Lake, July. *Nye Co.*: Fairbanks Springs, August; 1.6 mi. S Springdale, May. *Ormsby Co.*: Carson City, June; Lake Tahoe. *Pershing Co.*: Lovelock, July, August. NEW MEXICO: *Bernalillo Co.*: Albuquerque, July. *Chaves Co.*: 10 mi. E Roswell, Bottomless Lakes State Park, June (black light). *Dona Ana Co.*: Mesilla Park, May; Mesquite, near Mesilla Park, July. *Eddy Co.*: 4 mi. NE Loving, May (black light). *San Juan Co.*: Farmington, July. *San Miguel Co.*: Las Vegas. NORTH DAKOTA: Vermillion, August. *Ramsey Co.*: Devils Lake, July (near temporary pond). *Slope Co.*: Little Missouri River at U.S. route 12, August (sand flat). *Ward Co.*: 2 mi. SE Minot, near Souris River, July (near temporary pond in vegetated soil). OREGON: *Lake Co.*: 41 mi. N Lakeview, north shore Lake Abert, August (on sand flats). *Wasco Co.*: The Dalles. SOUTH DAKOTA: *Beadle Co.*: Huron, May. *Bennett Co.*: Martin, June. *Brookings Co.*: Brookings, June, July; Volga. *Brown Co.*: Columbia, July; Hecla, May, June, July; Stratford, June, July. *Brule Co.*: Chamberlain, June, July. *Buffalo Co.*: Fort Thompson, July, August, September. *Fall River Co.*: Angostura Dam, south of Hot Springs, July; Ardmore, August; Hot Springs, June; 5 mi. S Hot Springs, July. *Grant Co.*: Big Stone [City], August. *Hyde Co.*: Highmore, May, June, July, August. *Lake Co.*: Chester, June. *Lawrence Co.*: Spearfish, July, August. *McPhearson Co.*: Eureka, June. *Pennington Co.*: Hill City, July, August. TEXAS: *Culberson Co.*: Van Horn, July. *El Paso Co.*: El Paso, April. UTAH: Green River, April. *Box Elder Co.*: mouth of Bear River, July; 10 mi. W Brigham City, August (black light). *Cache Co.*: Logan, April, May, July. *Duchesne Co.*: Duchesne, July. *Emery Co.*: San Rafael Swell (5000 ft.). *Juab Co.*: Eureka, June; 21 mi.

WSW Nephi, Sevier River, August. *Kane Co.*: Long Valley Junction, August. *Millard Co.*: Delta, July. *Salt Lake Co.*: Salt Lake City, April. *Sanpete Co.*: Manti, April. *Sevier Co.*: Richfield, June. *Uintah Co.*: Green River, April; Vernal, April, July. *Utah Co.*: Benjamin, August (black light); Orem, June; Provo, June; Salem, July (black light); Vineyard, July. *Washington Co.*: *Weber Co.*: Great Salt Lake, near Plain City, July (salt flats); Roy, April, July. WASHINGTON: *Adams Co.*: Lind, May; Paha, Lake McElroy, April; 11 mi. SE Ritzville, Cow Creek, July; 8 mi. S Ritzville, Lake McElroy, July (from salt encrusted soil near lake). *Grant Co.*: Coulee City, September; Dry Falls, June; Grand Coulee, June. *Klickitat Co.*: Spearfish, July. *Lincoln Co.*: Sprague Valley, July. *Spokane Co.*: Spokane. *Thurston Co.*, May. *Walla Walla Co.*: College Place, April. WYOMING: *Albany Co.*: Laramie. *Converse Co.*: Douglas, July (at light). *Park Co.*: Cody, July. *Sheridan Co.*: Sheridan, July.

***Bledius thinopus*, new species**

Figure 34

Specimens: 108.

United States: ALABAMA: *Baldwin Co.*: Foley, September; Gulf Shores, July (at light). FLORIDA: *Charlotte Co.*: 2 mi. SW Englewood, Punta Gorda Beach, March (on beach). *Collier Co.*: Marco, March (black light). *Franklin Co.*: St. George Island, March. *Pinellas Co.*: Dunedin, April; 7 mi. S St. Petersburg, March (beach flats). *Wakulla Co.*: 10 mi. S Panacea, Alligator Point,

March (beach flats). TEXAS: Padre Island, July, December.

***Bledius turbulentus* Casey**

Figure 66

Specimens: 183.

Mexico: QUINTANA ROO: Puerto Juarez, April (sea beach). YUCATAN: Progreso, April (sea beach).

United States: FLORIDA: *Brevard Co.*: Cocoa, March; Enterprise, May; Sand Point. *Charlotte Co.*: El Jobean, March; 2 mi. SW Englewood, March (moist sand near water). *Dade Co.*: Biscayne Bay. *Indian River Co.*: Capron. *Manatee Co.*: Palmetto, Tampa Bay, March (sand flats). *Martin Co.*: Stuart, March. *Monroe Co.*: Lower Matecumbe Key, December (near high-tide mark). *Orange Co.*: *Osceola Co.*: Kissimmee. *Palm Beach Co.*: Lake Worth. *Pinellas Co.*: Dunedin; St. Petersburg, March; 7 mi. S St. Petersburg, March. *Seminole Co.*: Lake Harney, May. MISSISSIPPI: *Jackson Co.*: Horn Island.

I have also examined four specimens labeled as being from "New York." They were collected by Beutenmuller and are deposited in the American Museum of Natural History. These specimens are far north of the known range, and although several other species have been collected between New York and Florida by many different collectors, *turbulentus* has not been. I suspect that the specimens are mislabeled.

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