Revision and Reclassification of the Genus Goniusa Casey with a Larval Description and Ant Host Records (Coleoptera: Staphylinidae)[1]

by

David H. Kistner[2]

ABSTRACT

The genus Goniusa (Coleoptera, Staphylinidae, Aleocharinae) is redescribed and transferred from the tribe Callicerini to Zyrasini. The type-species, G. obtusa, is redescribed and illustrated. A new species, G. alperti, is described from Washington state. Host records, Formica integra for G. obtusa and F. obscuripes for G. alperti, are presented for the first time. Sexual dimorphic characters, consisting of differences in pronotum shape and sculpture and a sculptured bifurcation of sternite VIII of the male, are described.

INTRODUCTION

The genus Goniusa was originally described by Casey (1906) to contain the species G. obtusa (Le Conte), originally described in the genus Euryusa. The genus was originally placed in the tribe Bolitocharini but was removed to the group Athetae of the tribe Myrmedoniini by Fenyes (1918: 19). This was probably based on his study of the mouthparts (1920: 236) in which he shows the galea as shorter than the lacinia, an incorrect interpretation as can be seen by reference to Fig. 2E. The genus does not belong to the Bolitocharini because of its 4-5-5 tarsal formula. The structure of the maxillae with their setigerous lacinia and galea, place it in the Zyrasini.

Recently, Mr. Gary Alpert, now at Harvard University, sent me a fine series of a new species of this genus. This series had good host records which marked the first definite ant host. Up to this paper, no hosts had been recorded for Goniusa although Fenyes (1920) stated that it was "almost surely" a myrmecophile. Included in Mr. Alpert's material were enough larvae associated with the adults to increase the probability that the association was not accidental. Hence, it is the

[1]This study was supported in part by the National Science Foundation (Grant GB-42727X).

[2]Shinner Institute for the Study of Interrelated Insects, Dept. of Biology, California State University, Chico, CA 95929, U. S. A.

purpose of this paper to redescribe the genus and reclassify it, describe the larvae of G. alperti, and to provide the first host records.

Genus Goniusa Casey

Goniusa Casey 1906: 348, type-species, G. obtusa (Le Conte); Casey 1911: 208 (additional distribution); Fenyes 1918: 19; Fenyes 1920: 235, Fig. 47; Blackwelder 1952: 174, discussion of genotype.

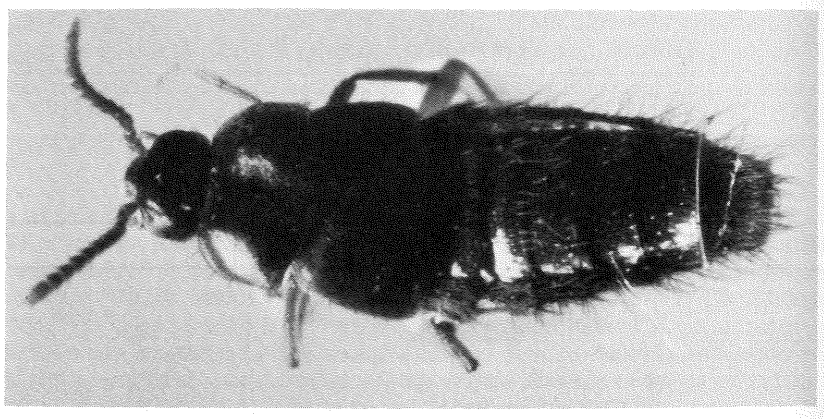


Fig. 1. Goniusa alperti. Dorsal view of intact male beetle

Related to Pella Stephens from which it is distinguished by the characters involved in the sexual dimorphism, by the exact shape of the maxillae, and by the shape of the labium with the elongate lingulae.

Overall appearance as in Fig. 1. Head capsule wider than long, shaped as in Fig. 1 and 3A. Head with a well defined nuchal ridge but without a neck. Gula with the sides slightly divergent from anterior to posterior; fused to the submentum. Mentum distinct from the submentum; maxillary acetabulae margined. Eyes well developed with many anteriorly and laterally directed facets. Antennae inserted between the eyes and the anterior arms of the tentoria. Antennae 11-segmented, shaped as in Fig. 2A. Mandibles nearly symmetrical, shaped as in Figs. 2B and 2C. Maxillae with the galea longer than the lacinia; both of these are fairly long and with the lacinia having many setae; shaped as in Fig. 2E, palpi 4-segmented. Labium shaped as in Fig. 2D, palpi 3-segmented. Labrum shaped as in Fig. 3C.

Pronotum shape somewhat variable by species. The pronotum of the female in dried specimens is much flatter than that of the male; shaped as in Fig. 3A-D. Prosternum much shorter than the pronotum shaped as in Fig. 3A. Coxal cavities closed behind by very short and lightly sclerotized mesothoracic peritremes which are imbedded in membrane. Pronotum of male with the disk shagreened as in Fig. 6, whereas the pronotum of the female has the ground sculpture smooth and shiny as in Fig. 7. Meso- and metanotum shaped as in Fig. 3E. Meso- and metasternum shaped as in Fig. 3D; mesocoxal acetabulae

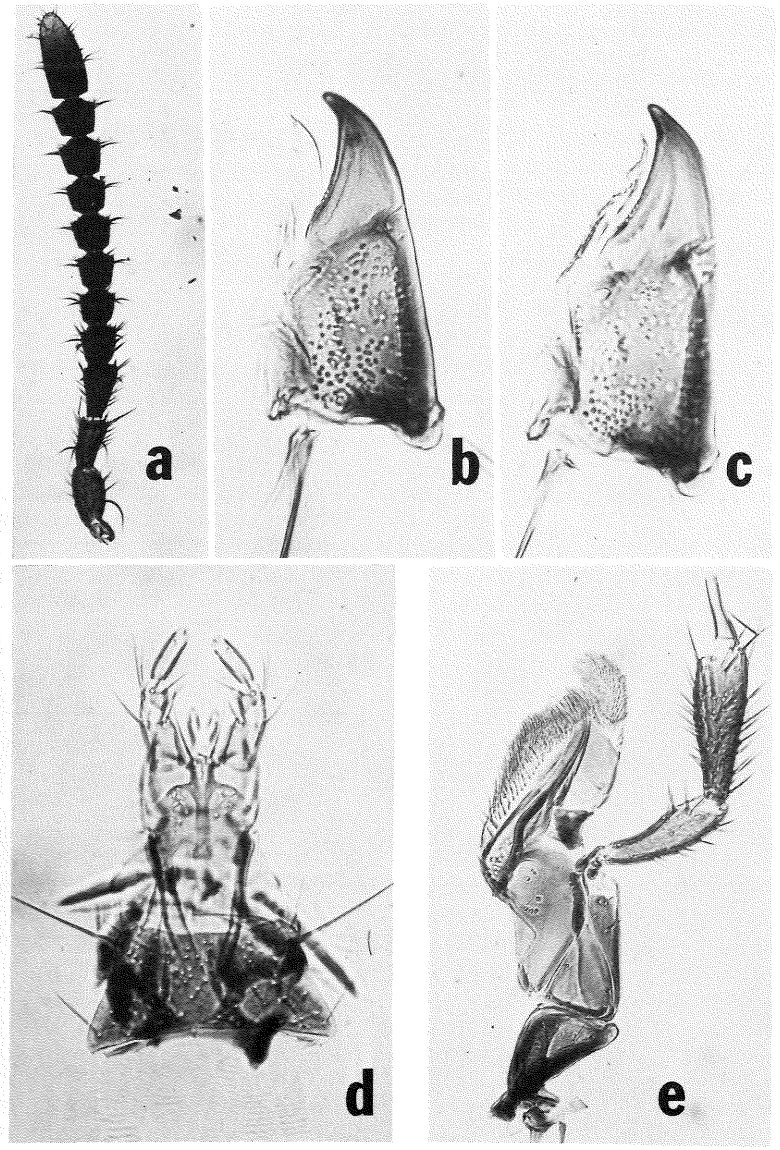


Fig. 2. Goniusa alperti. A, Antenna; B, Left mandible; C, Right mandible; D, Labrum and mentum. G. obtusa. E, Maxilla.

distinctly margined. Elytra without distinction, shaped as in Fig. 3B. Pro-, meso-, and metalegs shaped as in Fig. 4J, I and H respectively; tarsal formula 4-5-5.

Overall shape of abdomen as in Fig. 1. Abdominal segment I represented by the tergite fused to the metanotum, (Fig. 3E). Segment II represented by the tergite alone. Segments III-VI represented by the

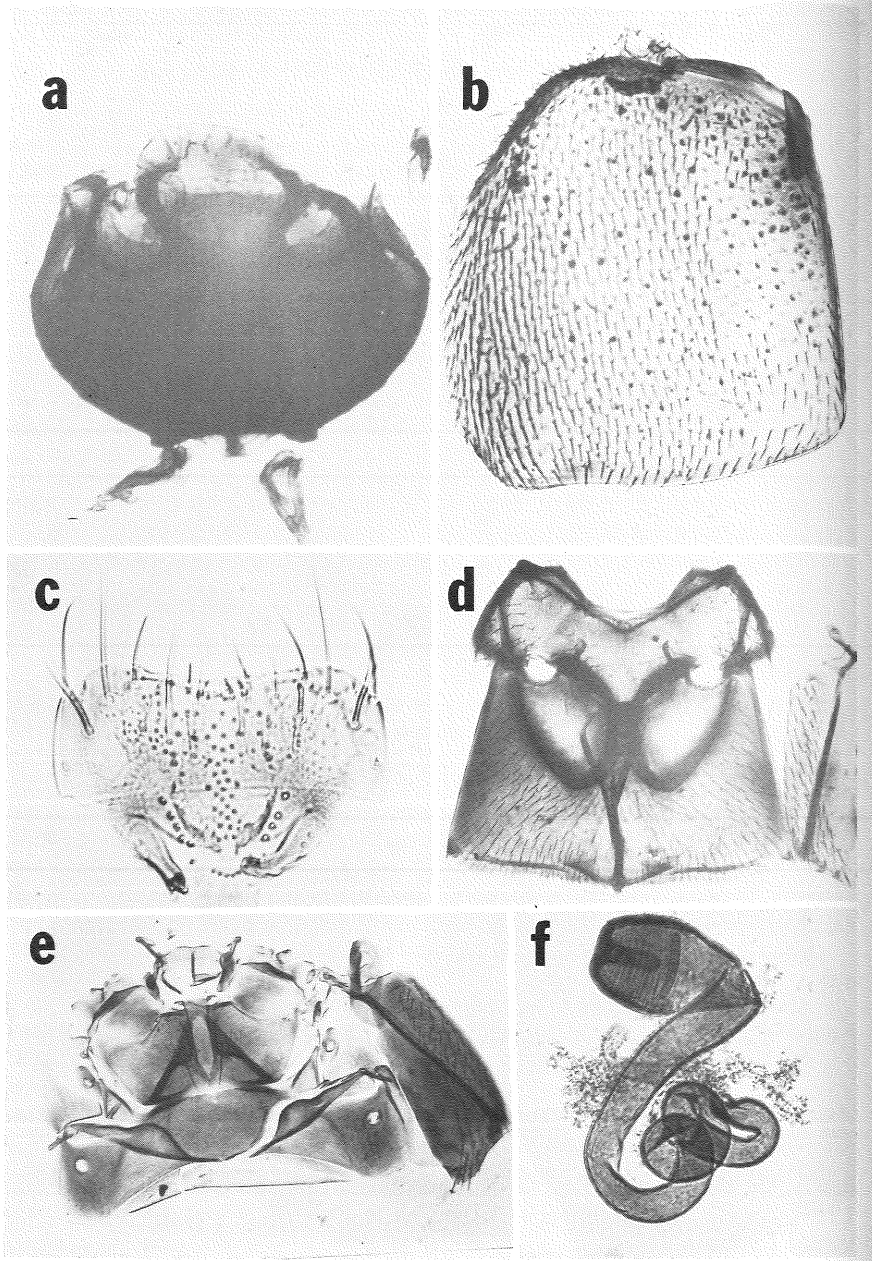


Fig. 3. Goniusa alperti. A, Head capsule, ventral; B, Elytron; C, Labrum; D, Meso- and metasternum; E, Meso- and metanotum. G. obtusa. F, Spermatheca.

tergite, 2 pairs of paratergites, and 1 sternite each. Dorsal rim of the abdomen is between the outer paratergites and the sternites. Segment VII represented by tergite, sternite, and 1 pair of paratergites. Segment VIII represented by the tergite and the sternite alone. Segment IX trivalved, shaped as in Fig. 5A and B; note that the male segment IX has extremely long apodemes and a sternite which are lacking in the female. Segment VII with well-developed fringing setae, shaped as in Fig. 9. Segment VIII of male shaped as in Fig. 8; note that the sternite has a well developed V-shaped cut which is readily apparent in the figure. Male genitalia bulbous; shape variable by species. Lateral lobe of male genitalia shaped as in Fig. 4E. Spermatheca variable in shape by species.

KEY TO SPECIES

Pronotum with 3 black setae along each lateral margin; spermatheca as in Fig. 3F; median lobe of male genitalia as in Fig. 4G; pronotum length 0.65-0.70; elytra length, 0.55-0.60..... obtusa

Pronotum with 6 black setae along each lateral margin; spermatheca as in Fig. 5A; median lobe of male genitalia as in Fig. 4F; pronotum length, 0.51-0.57; elytra length, 0.45-0.51..... alperti

Goniusa obtusa (Le Conte)

Figs. 3F, 4C, D, and G

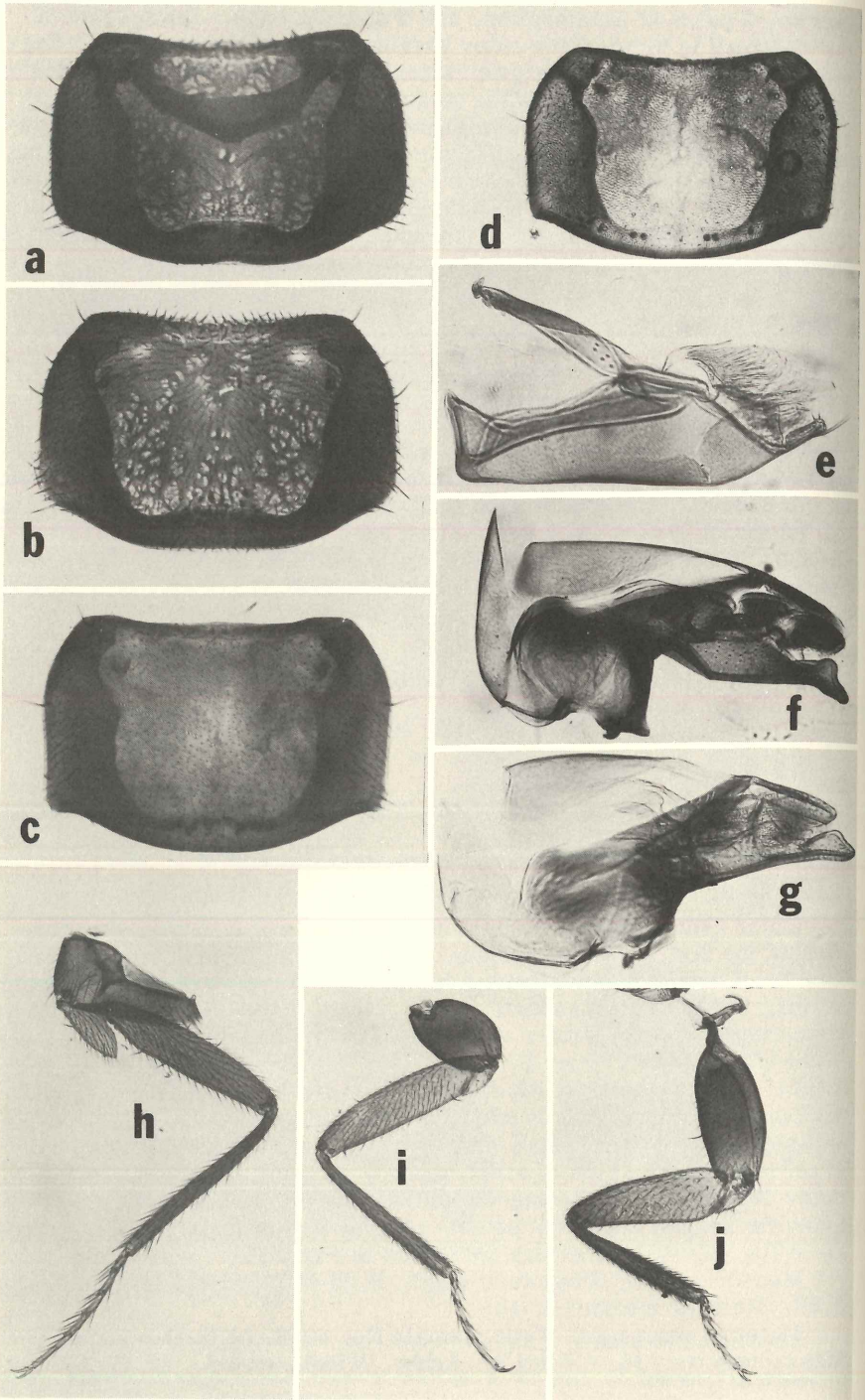
Euryusa obtusa Le Conte 1866: 373, Collection of Museum of Comperative Zoology, Pennsylvania.

Goniusa obtusa, Casey 1906: 348, transferred species; Fenyes 1920: 235, pl. 5, Fig. 2, stated "almost surely" myrmecophilous.

Color reddish brown throughout; head somewhat darker than the rest of the body. Dorsal surface of the head, pronotum, and elytra shiny and feebly punctate except for the pronotal disk of the male which is shagreened and with shorter setae. Rest of the body clothed with an even visiture of fine yellow setae; the quantity and distribution of these setae can be seen in Fig. 4C. Pronotum with 3 black setae along each lateral margin; their position is best seen on the left side of Fig. 4C. Abdomen with many evenly distributed recumbent yellow setae, with an apical row of erect setae which vary in number and an anteapical erect seta on each side of each tergite. Tergites VII and VIII with many more erect setae anterior to the apical rows. Sternites with many recumbent and erect setae. Median lobe of male genitalia shaped as in Fig. 4G. Spermatheca shaped as in Fig. 3F.

Measurements: Pronotum length, 0.65-0.70; elytra length, 0.55-0.60. Number measured, 12.

Material examined: Type, female No. 6258, no further data. Massachusetts: 14, 4.5 mi W. Ashby, Middlesex Co., 18.IV.1970,



and 6. V. 1971, ex nest under rock, Coll. A. Newton; 2, Westford, Middlesex Co., 27. V. 1973, ex nest under rocks, Coll. A. Newton; 1, Drac., ex Leng Coll., (FMNH); 2, Blue Hills, 12. V. 1912, Coll. W. A. Mann,(FMNH); 1, South Framingham, Coll. S. A. Frost, (FMNH). New Hampshire: 1, Romney, 23. IV. 1925, Stone, Coll. P. Darlington, ant attached, (MCZ); 1, Hanover, 3. IV. 1963, ant attached, Coll. K. W. Cooper,(DK).

Notes: The ant attached to the Romney specimen was identified as Formica sp. of the rufa group by E. O. Wilson. The ants associated with Massachusetts specimens collected by A. Newton were identified as Formica integra Nylander (a member of the rufa group), also by E. O. Wilson. A single male specimen in the Field Museum collection, labelled, "Washington, D. C., Hubbard and Schwarz" from the Bierig Collection does not seem to fit either species described here. Its condition is not good enough to warrant further study but it might indicate that a third species may be in the D. C. area. I have not seen the specimens cited by Casey (1911, p. 208) from Aweme, Manitoba or the District of Columbia.

Goniusa alperti n. sp.

Figs. 1, 2, 3A-E, 4A, B, E, F, H-J, 5-10

Color reddish brown throughout; head somewhat darker than the rest of the body. Dorsal surface of the head, pronotum, and elytra shiny and feebly punctate except for the pronotal disk of the male which is shagreened and with shorter setae. Rest of the body clothed with an even vestiture of fine yellow setae, the quantity and distribution of these setae can be seen in Fig. 4B. Pronotum with 6 black setae along each lateral margin; their position is best seen in Fig. 4B. Abdomen with many recumbent yellow setae but these are far less frequent than in G. obtusa. Each tergite with an apical row of erect black setae which vary in number and with 1 anteapical erect seta near each lateral edge. Tergites VII and VIII with many more erect anteapical setae. Sternites with an apical row of erect black setae; posterior sternite with increasing numbers of anteapical rows. Median lobe of male genitalia shaped as in Fig. 4F. Spermatheca shaped as in Fig. 5A.

Measurements: Pronotum length, 0.51-0.57, elytra length, 0.47-0.51. Number measured, 12.

Holotype: 1 male, No. 15478, Washington, Blaine, 10. V. 1971, ex nest F-58, Coll. G. Alpert, No. 339. In the collection of Kistner.

Paratypes: Washington: 13, same data as holotype; 3, Pullman, 24. III. 1965, ex nest F-1, Coll. R. D. Akre, No. 592; 1, Colfax, 29. XII. 1967, ex nest F-18, Coll. G. Alpert, No. 619; 4, Walla Walla, 20. II. 1971, ex nest F018, Coll. G. Alpert, No. 158; 1, Waitsburg, 20. II. 1971, ex nest F019, Coll. G. Alpert, No. 173; 7, Pullman, 3 July 1969, ex nest F20, Coll. R. Akre, No. 548; 2, Seattle, 9 August 1969, ex nest F-22, Coll. G. Alpert, No. 561; 7, Sunnyside, 6 March

Fig. 4. Goniusa alperti. A, Male pronotum; B, Female pronotum; E, Lateral lobe of male genitalia; F, Median lobe of male genitalia; H, Metaleg; I, Mesoleg; J, Proleg. G. obtusa. C, Female pronotum; D, Male pronotum; G, Median lobe of male genitalia.

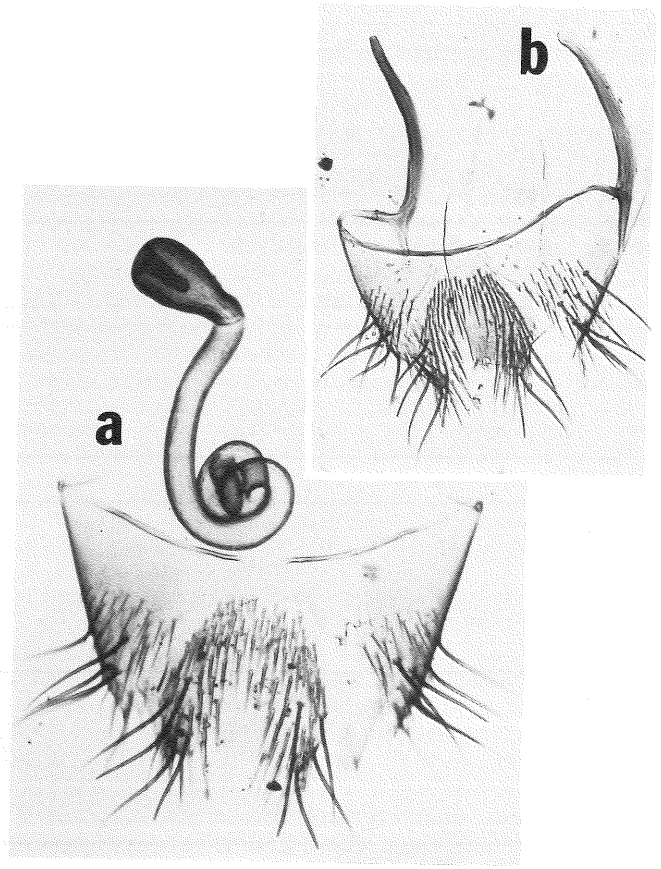


Fig. 5. Goniusa alperti. A, Female abdominal segment IX, and spermatheca; B, Male abdominal segment IX.

1971, ex nest F022, Coll. G. Alpert, No. 192; 2, Sunnyside, 6 March 1971, ex nest F023, Coll. G. Alpert, No. 196; 3, Seattle, 9. VIII. 1969, ex nest F24, Coll. G. Alpert, No. 568; 2, Spokane, 14. III. 1971, ex nest F024, Coll. G. Alpert, No. 198; 10, Spokane, 14. III. 1971, ex nest F026, Coll. G. Alpert, No. 206; 2, Ritzville, 14. III. 1971, ex nest F027, Coll. G. Alpert, No. 210; 2, Ritzville, 14. III. 1971, ex nest F028, Coll. G. Alpert, No. 216; 1, Ritzville, 14. III. 1971, ex nest F029, Coll. G. Alpert, No. 218; 3, Spokane, 20. III. 1971, ex nest F031, Coll. G. Alpert, No. 224; 1, Spokane, 20. III. 1971, ex nest F032, Coll. G. Alpert, No. 227; 1, Coulee City, 27. III. 1971, ex nest F033, Coll. G. Alpert, No. 234; 1, Coulee City, 27. III. 1971, Coll. G. Alpert, No. 241; 2, Asotin, 3. IV. 1971, ex nest F039, Coll. G. Alpert, No. 260; 3, Asotin, 3. IV. 1971, ex nest F040, Coll. G. Alpert, No. 263; 3, Anotone, 3. IV. 1971, ex nest F041, Coll. G. Alpert, No. 267; 2, Cusick,

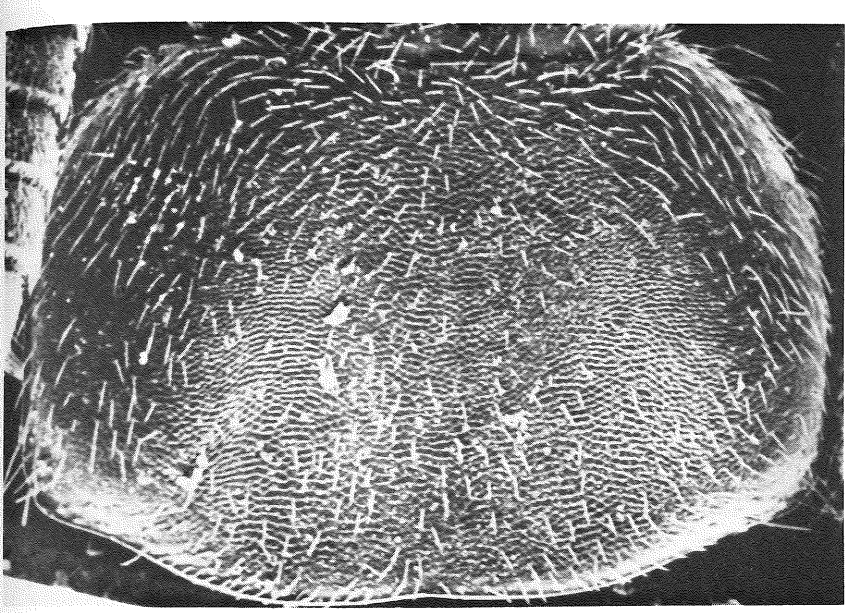


Fig. 6. Goniusa alperti. Pronotum of male. Note the shagreened area in the center of the pronotum and that the setae are shorter than at the edges. X90.

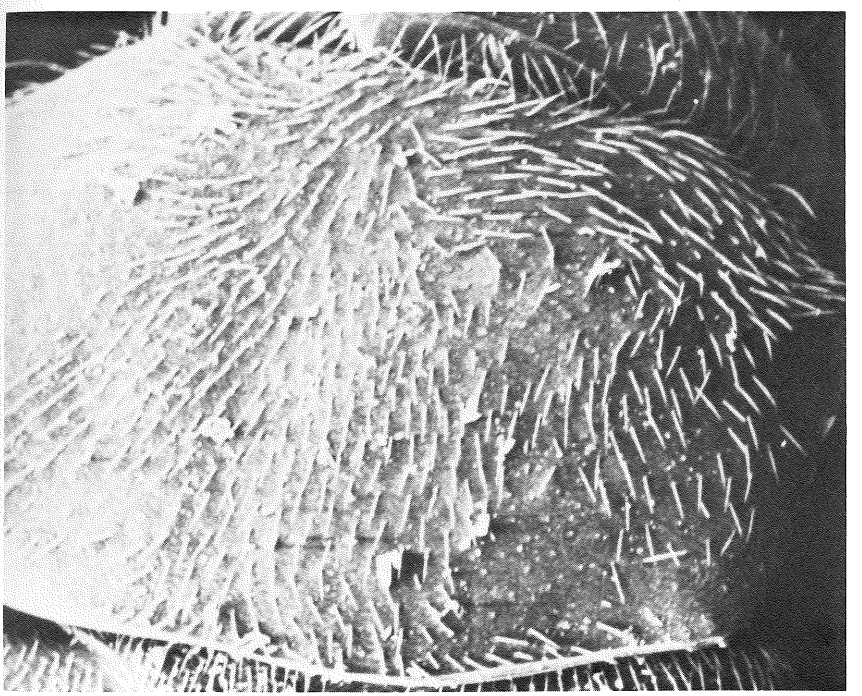


Fig. 7. Goniusa alperti. Pronotum of female. Note that the center of the disk is not shagreened and that the fine setae are uniform in length. X91.

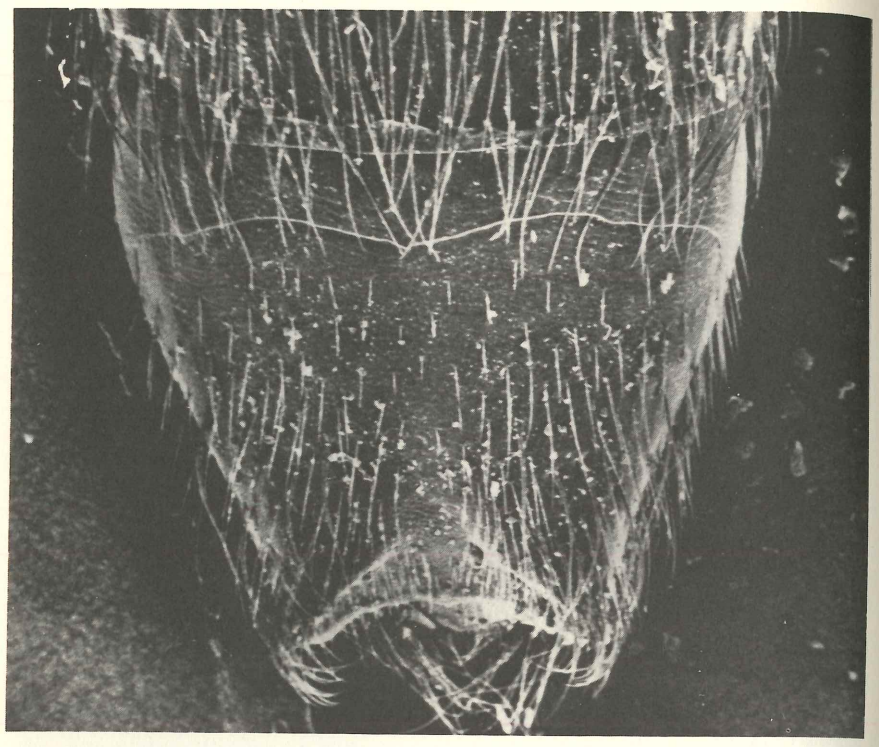


Fig. 8. Goniusa alperti. Abdominal segment VIII of male, ventral. Note the unusual development of the posterior end. Abdominal segment VIII of the female is evenly rounded posteriorly and without the triangular thickening. X90.

11. IV. 1971, ex nest F044, Coll. G. Alpert, No. 281; 1, 10 mi E. Colville, 11. IV. 1971, ex nest F047, Coll. G. Alpert, No. 296; 3 (+ 9 associated larvae), Woodenville, 24. IV. 1971, ex nest F050, Coll. G. Alpert, No. 307; 9 (+ 2 associated larvae), Blaine, 10. May 1971, ex nest F058, Coll. G. Alpert, No. 339; 1, Bellingham, 11. V. 1971, ex nest F060, Coll. G. Alpert, No. 345; 2, 3 mi N. Morton, 13. V. 1971, ex nest F066, Coll. G. Alpert, No. 370; 6 (+ 1 associated larva), Naselle, 14. V. 1971, ex nest F073, Coll. G. Alpert, No. 399; 1, (callow), South Bend, 14. V. 1971, ex nest F074, Coll. G. Alpert, No. 403; 1, Kingston, 15. V. 1971, ex nest F078, Coll. G. Alpert, No. 418; 2 (+ 1 associated larva), 15 mi W. Omak, 20. VI. 1971, ex nest F087, Coll. G. Alpert, No. 459; 1, (callow), Oak Harbor, 3. VII. 1971, ex nest F094, Coll. G. Alpert, No. 489A. All in collection of Kistner. 2, Washington, Olympia, 12. XII. 1892, Liebeck Collection, (MCZ).

Notes: All of the host ants collected by Alpert were identified as Formica obscuripes Forel by Dr. D. R. Smith of the U.S. Dept. of Agriculture.

LARVA OF G. ALPERTI

A figure of the larva is given in Fig. 10. The setae have been inked in on half of the photograph. The larva has the usual aleocharine features which include the median gland on tergite X, the three segmented antennae with a bifurcation called a sensory appendage of the 2nd segment. Ocelli arranged as in Fig. 10. Labrum, mandibles, and maxillae shaped as in Fig. 10. Urogomphi shaped as in Fig. 10. When more species are known, probably only the chaetotaxy will separate species. Two instars, both larger than egg size, were present among the specimens.

ACKNOWLEDGMENTS

I wish to thank Gary Alpert and Alfred Newton (NC) for providing freshly caught specimens included in this study. I am also grateful to John Lawrence, Museum of Comparative Zoology (MCZ) and Henry Dybas, Field Museum of Natural History (FMNH) for aid in studying

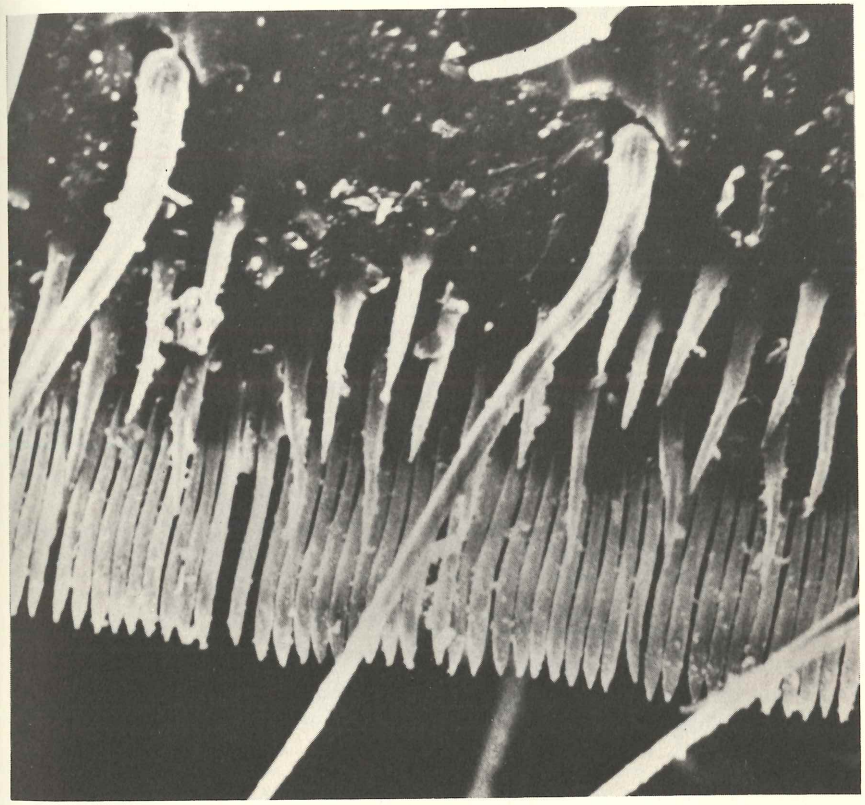


Fig. 9. Goniusa alperti. Fringing setae of abdominal segment VIII. X1750.

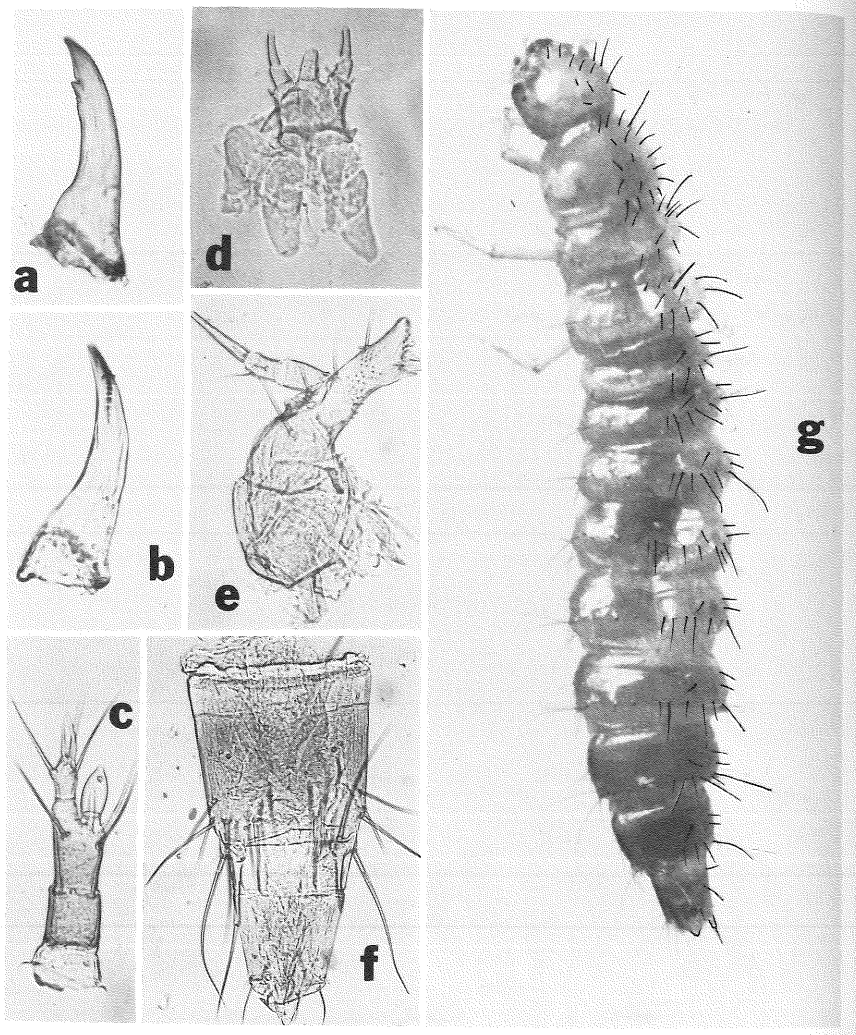


Fig. 10. Larva of Goniusa alperti: A, Right mandible; B, Left mandible; C, Antenna; D, Labium; E, Maxilla; F, Terminal segments of the abdomen; G, Entire larva, dorsal, setae are inked in on the right half.

collections under their supervision. I thank E. O. Wilson and D. R. Smith for the host ant identifications credited to them in the text. The initials given in parentheses above indicate the deposition of specimens cited in the text. Specimens in the Kistner collection are indicated (DK).

Olga Nicolayeff, Harvey Moyer, William Wade, and Daniela Griffin, all of California State University, Chico, provided technical assistance.

REFERENCES

Blackwelder, R. E. 1952. The generic names of the beetle family Staphylinidae with an essay on genotypy. U. S. Nat. Mus. Bull. 200, IV + 483p.

Casey, T. L. 1906. Observations on the staphylinid groups Aleocharinae and Xantholinini chiefly of America. Trans. Acad. Sci. St. Louis 16: 125-435.

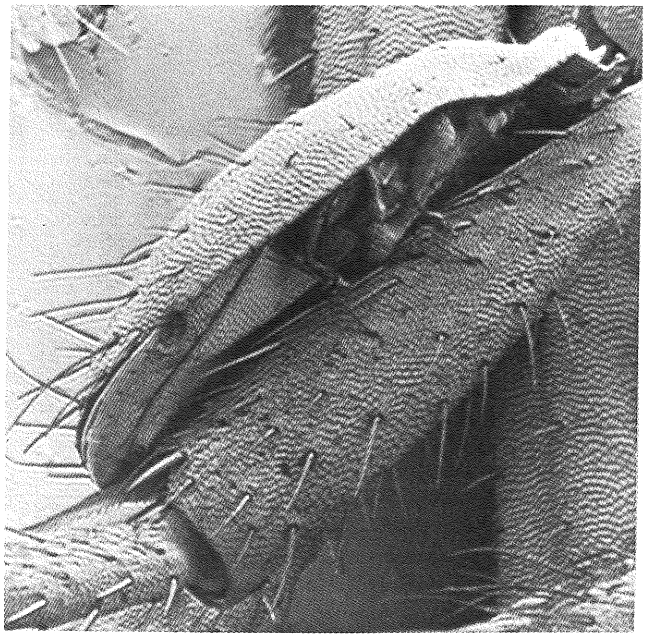
1911. New American Species of Aleocharinae and Myllaeninae. Mem. Coleopt. 2: 1-245.

Fenyes, Adalbert 1918. Coleoptera: Fam. Staphylinidae, subfam. Aleocharinae. Genera Insectorum 173a: 1-110.

1920. Coleoptera: Fam. Staphylinidae, subfam. Aleocharinae. Genera Insectorum 173b: 111-414.

Le Conte, J. L. 1866. Additions to the coleopterous fauna of the United States. No. 1. Proc. Acad. Sci. Philadelphia 18: 361-394.

FEATURE PHOTOGRAPH



Mite (Planodiscus sp.) clinging to tibia of Eciton hamatum (Fabricius). Note how the mite clings by grasping the tibial setae. The sculpture and setae pattern of the mite is very similar to the sculpture of the tibia. Thus when the ant grooms her leg a similar sensory input would be achieved. Since the mite would then be groomed at that time, it would move the setae it was grasping in a manner similar to actual grooming movements of the ant thus permitting a grooming sensory input via the setae. SEM photo (X40) of an ant-mite preparation made in Tikal, Guatemala, January 1974. Photo and prep made by D. H. Kistner.

OCIOBIOLOGY
VOL. 2, NO. 1
1976