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Notes on Myrmecophilous Aleocharines (Insecta, Coleoptera, Staphylinidae) from Canada, with a Description of a New Species of *Myrmoecia*

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Abstract Notes on Canadian species of myrmecophilous aleocharines are presented. *Goniusa alperti* Kistner, *G. caseyi* Gusarov, *G. carrorum* Maruyama & Klimaszewski, *Paragoniusa myrmicae* Maruyama & Klimaszewski of the tribe Athetini are recorded and discussed. *Goniusa caseyi* is recorded from Canada for the first time. Ants of *Formica dakotensis* Emery, *F. ravida* Creighton and *F. subnitens* Creighton are reported as new hosts for *Goniusa carrorum*. The male of *Paragoniusa myrmicae* is newly recorded and described. *Myrmoecia canadensis* of the tribe Lomechusini is described as new to science. The key to the Nearctic species of *Myrmoecia* is modified.

Key words : Aleocharinae, Athetini, Lomechusini, *Goniusa*, *Paragoniusa*, Formicidae, *Formica*, *Myrmica*.

Canadian species of myrmecophilous aleocharines have been poorly investigated, with the exception of a few recent contributions (Maruyama & Klimaszewski, 2004a, 2004b; Klimaszewski *et al.*, 2005). In these works, a new genus and species of the tribe Athetini, *Paragoniusa myrmicae*, associated with ants of *Myrmica* were described (Maruyama & Klimaszewski, 2004a); a new species of *Goniusa* Casey, 1906, of the tribe Athetini, associated with ants of *Formica* was added to the Canadian fauna (Maruyama & Klimaszewski, 2004b); and the *Zyras* group of genera of the tribe Lomechusini associated with miscellaneous ants was reviewed (Klimaszewski *et al.*, 2005). In this contribution, we have examined several additional specimens of myrmecophilous aleocharines collected in Canada, and these included the hitherto undescribed male of *Paragoniusa myrmicae*, which was described on female specimens, and a new species of *Myrmoecia*, Mulsant & Rey, 1874, belonging to the *Zyras* group genera.

The material used in the present study is housed in the following institutions: Natural Resources Canada, Canadian Forest Service, Laurentian Forestry Centre (LFC), and Department of Zoology, National Science Museum, Tokyo (NSMT). Ant hosts were identified by the first author mainly based on Creighton (1950).

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Genus *Goniusa* Casey, 1906

Goniusa Casey, 1906: 348 (original description); Gusarov, 2003: 2 (revision); Maruyama & Klimaszewski, 2004b: 316 (notes on diagnosis).

Goniusa alperti Kistner, 1976

Goniusa alperti Kistner, 1976: 89 (original description); Gusarov, 2003: 14 (redescription); Maruyama & Klimaszewski, 2004b: 318 (new record from Canada, host records).

Additional records. ALBERTA: 1♂, "TP. 12 Rge. 1 w. 5 Mer. Alberta 11. IV 1976, Lot5, BF & JL Carr" (NSMT).

Comments and bionomics. This specimen was collected from a nest of *Formica ravida* Creighton, 1940, that is a known host.

Goniusa caseyi Gusarov, 2003

Goniusa caseyi Gusarov, 2003: 9 (original description).

New record. ALBERTA: 1♂, "Tp. 20 Rge. 3 w. 5. Mer Alberta, 19. IV. 1964, Lot 1, BF & JL Carr" (LFC). BRITISH COLUMBIA: 1♀, "Gleneden B.C., 24 III 78, Lot 4, BF & JL Carr" (LFC).

Comments and bionomics. The male specimen was collected from a nest of *Formica* cf. *coloradensis* Creighton, 1940. New record from Canada.

Goniusa carrorum Maruyama & Klimaszewski, 2004

(Fig. 1)

Goniusa carrorum Maruyama & Klimaszewski, 2004b: 316 (original description).

Additional records. ALBERTA: 1♂, 1♀, "Tp. 13 Rge. 14 w. 4 Mer Alberta, 27. III. 1982, Lot 2, BF & JL Carr" (LFC, NSMT); 1♀, "Calgary, Alberta, 15. IX 1955, Lot 1, BF & JL Carr" (LFC); 1♂, same data but "14 IV 1957" (LFC).

Comments and bionomics. The first pair was collected from a nest of *Formica dakotensis* Emery, 1893, the next female was collected from *F. ravida* Creighton, 1940, and the last male was captured from the nest of *Formica subnitens* Creighton, 1940. All these ants belong to the *Fornica rufa* species group, and are new hosts for *Goniusa carrorum*.

Genus ***Paragoniusa*** Maruyama & Klimaszewski, 2004

Paragoniusa Maruyama & Klimaszewski, 2004a: 242 (original description).

Addition to diagnosis. Median lobe of aedeagus with dorsal bridge absent; paramere with hinge zone flexible and apical lobe able to be folded towards the inner side of paramerite.

Additional description. Male. Median lobe of aedeagus (Figs. 6, 7) with dorsal bridge absent, compressor plate projected apicad; paramere (Fig. 8) with hinge zone flexible and apical lobe able to be folded towards the inner side of paramerite (in Fig. 8 apical lobe is fully exposed).

Comments. This genus and the type species (monotypy) were described based on female material, but the new material including male specimens allowed us to provide additional diagnostic characters.

Paragoniusa myrmicae Maruyama & Klimaszewski, 2004

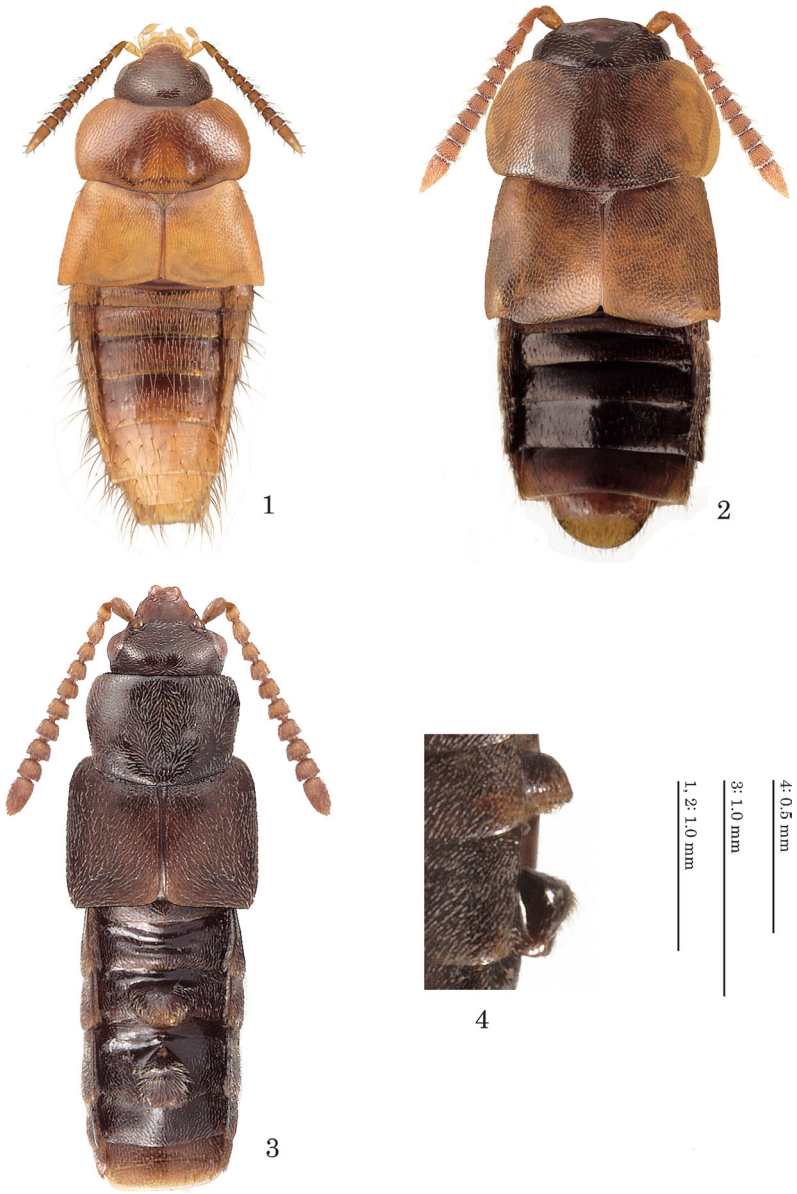
(Figs. 2, 5–9)

Paragoniusa Maruyama & Klimaszewski, 2004a: 244 (original description).

Additional records. ALBERTA: 1♂, "CAN: AB: Lac la Biche, 20–30 km E: Touchwood Uk., Rd. UTM 12 4640 60755, J. Hammond, Mod. Window-traps, 01–33.3.2, 19.V–02.VI.95 [1995]" (LFC); 1♀, "Tp. 22 Rge. 9 w. 5 Mer Alberta, 28. V. 1961, Lot 3, BF & JL Carr" (LFC); BRITISH COLUMBIA: 1♂, Wardner B.C., 6. V. 84 [1984], Lot 1, BF & JL Carr" (NSMT).

Additional description. Male (Fig. 2). Eighth tergite (Fig. 5) with posterior margin widely emarginate, and its lateral sides prominent. Median lobe of aedeagus (Figs. 6, 7) oval; distal cresta large and produced ventrally; apical lobe short with a pair of small projections ventrally; copulatory piece of inner sac as in Figs. 6, 7. Paramere (Figs. 8, 9) with velum large; apical lobe of paramerite oval, slightly truncate in lateral view, with five small setae.

Comments and bionomics. The female specimen was collected from a nest of *Myrmica alaskensis* Wheeler, 1917, which is the only known host. The host ant "*Myrmica brevispinosa*" in Maruyama & Klimaszewski (2004a) was misidentification. The first male was collected by



Figs. 1–4. Myrmecophilous aleocharines —— 1, *Goniusa carrorum*, male; 2, *Paragoniusa myrmicae*, male; 3, *Myrmoecia canadensis*, holotype male; 4, ditto, abdominal tubercles, lateral view.

a flight interception trap, and this indicates the flight ability of this species.

Genus *Myrmoecia* Mulsant & Rey, 1874

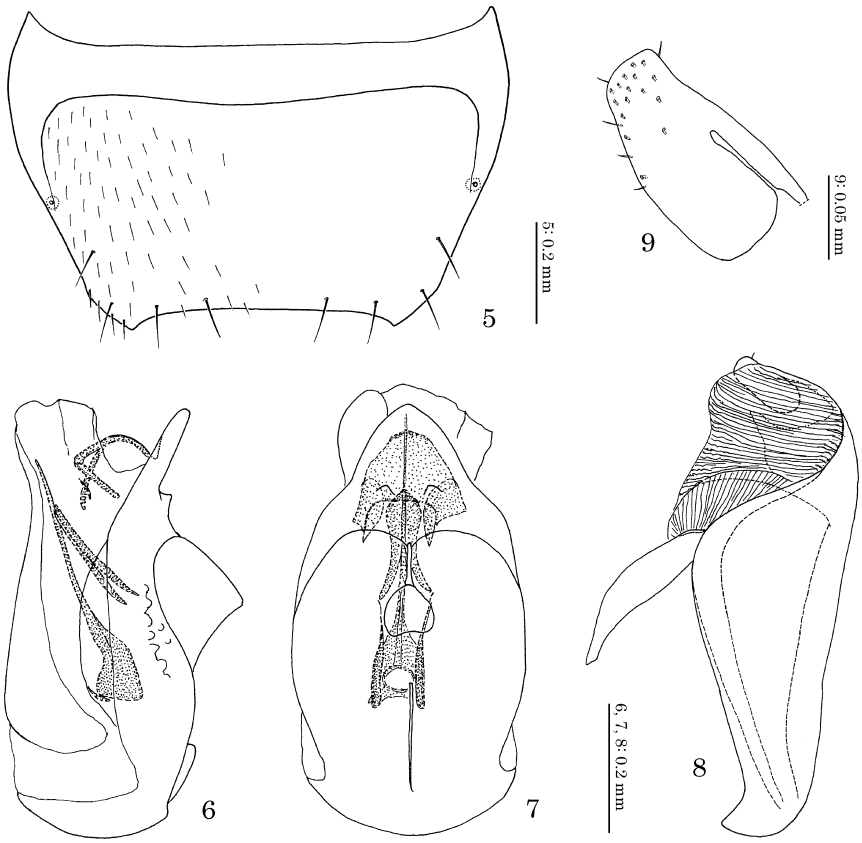
Myrmoecia Mulsant & Rey, 1874: 98 (original description); Klimaszewski *et al.*, 2005: 710 (diagnosis); Maruyama, 2006: 189 (literature, diagnosis).

Myrmoecia canadensis sp. nov.

(Figs. 3, 4, 10–16)

Type material. Holotype: ALBERTA: ♂, "7 mi.S. of Empress Alta. Sask. border, 21. V. 1979, Lot 3, BF & JL Carr" (LFC). Paratype: 1♂, 2♀, same data as holotype (LFC, NSMT).

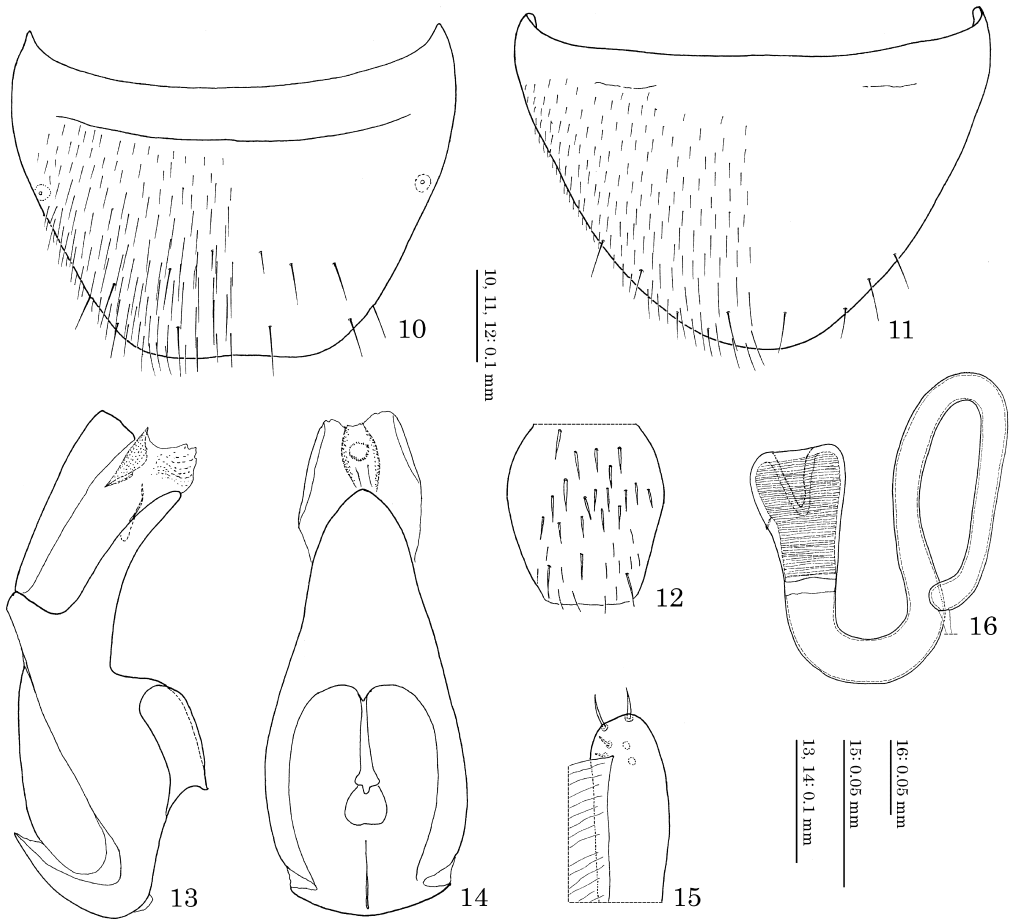
Diagnosis. Two species of *Myrmoecia* were



Figs. 5–9. *Paragoniusa myrmicae*. —— 5, male 8th tergite; 6, median lobe of aedeagus, lateral view; 7, ditto, ventral view; 8, paramere, lateral view; 9, apical lobe of paramerite.

known from the Nearctic region: *M. lugubris* (Casey, 1894) and *M. lauta* (Casey, 1894). The present new species is quite similar to *M. lugubris* in general appearance and colour but may be easily distinguished from it by the tubercle on the 5th abdominal tergite larger than that on the 4th tergite (smaller than that on the 4th in *M. lugubris*), and the spermatheca with the basal part forming a ring (irregularly sinuate in *M. lugubris*). In Canada, only *Myrmoecia lauta* has been known, but *M. canadensis* is easily distinguished from it by its almost unicoloured body.

Description. Body (Fig. 3) slender. Black in colour; antenna, mouthparts, and legs reddish brown to brown. Head widest at eye level; surface smooth, densely covered with setae; setae moderate in length, as long as those on pronotum and elytra; length of eyes about 0.32 times as long as head width. Antennae slightly shorter than head, pronotum and elytra combined, moniliform; 1st segment large, as long as 2nd and 3rd combined, constricted near base; 2nd segment, bulbous at apex; 3rd segment conical; 4th to 10th segments slightly wider than long; 11th oval. Pronotum 1.31–1.40 times as wide as long, widest around anterior 1/5, evidently constricted posteriorly; lateral margins subparallel-sided near base; posterior margin rounded; surface finely punctured, densely covered with setae. Scutellum with surface finely punctured, and densely covered with setae. Elytra subparallel-sided; surface finely punctured, and densely covered with setae. Legs long; hind tibia almost as long as elytra. Abdomen narrowly subparallel-sided, widest around 3rd segment; surface smooth, densely covered with setae; 4th tergite (Fig. 4) with tu-



Figs. 10–16. *Myrmoecia canadensis*. —— 10, eighth tergite, 11, 8th sternite; 12, 9th tergite; 13, median lobe of aedeagus, lateral view, 14, ditto, ventral view; 15, apical lobe of paramerite, lateral view; 16, spermatheca.

bercle prominent and somewhat pointed at apex; 5th tergite with posterior margin roundly produced, with tubercle well developed larger than that on 4th tergite; 8th to 10th abdominal segments with macrosetae poorly differentiated from microsetae.

Male: Eighth tergite (Fig. 10) with posterior margin slightly emarginate, with 7 or 8 macrosetae; 8th sternite (Fig. 11) with four macrosetae; 10th tergite (Fig. 12) sparsely covered with thick setae. Median lobe of aedeagus (Figs. 13, 14) oblong-oval in ventral view; apical lobe curved ventrad and pointed at apex in lateral view; basal ridge weakly convex, slightly visible in lateral view; copulatory piece of inner sac (Figs. 13, 14) simplified, barrel-shaped in ventral view. Apical lobe of paramerite (Fig. 15) parallel-sided, and rounded at apex.

Female: Eighth tergite and 8th sternite almost the same as in male. Spermatheca (Fig. 16) with basal part curved twice, dilated apicad; apical part straight widened and truncated at apex, its inner wall densely wrinkled from base to apex.

Measurements (*in millimetres*). Body length, 2.7–2.8; forebody length, 1.30–1.41; head length, 0.424–0.431; head width, 0.567–0.575; eye length, 0.1839–0.1859; antennal length, 1.135–1.237; pronotal length, 0.486–0.492; pronotal width, 0.643–0.685; elytral length, 0.687–0.692; elytral width, 0.888–0.895; hind tibial length, 0.673–0.695.

Comments and bionomics. The type series

were collected from a nest of *Tapinoma sessile* (Say, 1836) ant (Dolichoderinae). All the known symbiotic hosts of *Myrmoecia* in Europe belong to *Tapinoma*. Therefore, this ant species is most probably a symbiotic host of the present new species, and this is the first host record of the Nearctic species of *Myrmoecia*.

Two species of *Tapinoma* have been known from the possible distributional ranges of the Nearctic *Myrmoecia*, and one of them, *T. melanocephalum* (Fabricius, 1793) distributed in Florida, is considered as an introduced species from the Asian tropics (Smith, 1965, etc.). Probably all the Nearctic *Myrmoecia* species use *Tapinoma sessile* as their host. Only a few specimens of *Myrmoecia* have been collected, but a search focusing on *Tapinoma sessile* will help us to discover additional records.

The monophyly of *Myrmoecia* is not documented but all the Nearctic *Myrmoecia* species are characterized by their extremely small body size (body length: ca. 2.5–3.0 mm), in contrast to the larger size of the Palearctic species (body length: ca. 4.0–6.0 mm). This characteristic is considered to be related to the body size of their host ant because *Myrmoecia* beetles live inside of their hosts' nests. While *Tapinoma erraticum* Latreille, 1789, the known host of the Palearctic *Myrmoecia* species, is 3.0–4.0 mm in body length, *T. sessile* is only 2.0–2.5 mm long.

Key to the Species of the Nearctic Species of *Myrmoecia*

(Modified from Klimaszewski *et al.*, 2005: 708)

1. Body bicoloured; head, elytra and apical half of abdomen dark brown; appendages, pronotum and basal half of abdomen yellowish brown . . . . . *M. lauta*.
—. Body almost unicoloured; except for reddish brown appendages and elytra, uniformly dark brown . . . . . 2.
2. Tubercle on 5th abdominal tergite smaller than that on 4th tergite; spermatheca sinuate . . . . . *M. lugubris*.
—. Tubercle on 5th abdominal tergite larger than that on 4th tergite; spermatheca with basal part forming a ring . . . . . *M. canadensis*.

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