



NOTE

Cafius aguayoi (Coleoptera: Staphylinidae): A coastal rove beetle new for the Canadian fauna

Christopher G. Majka

Beetles characteristic of marine coastal environments form a distinctive suite of Coleoptera. They are taxonomically diverse and include species found in salt marshes, sand dunes, ocean beaches, beach drift environments, tidal mud flats, and even rocky intertidal habitats. Until recently, scant attention had been paid to this ensemble of Coleoptera in Atlantic Canada. In the past five years, however, a number of studies have described new species of Staphylinidae from such biotopes (Klimaszewski et al. 2006; Klimaszewski and Majka 2007), have reported new distributional records from the region (Majka and Ogden 2006; Klimaszewski et al. 2008; Majka et al. 2008), and have surveyed the distribution, bionomics, and ecology of the coastal Staphylinidae (Majka et al. 2008). Majka et al. (2008) identified 33 species of halobionts (obligate inhabitants of coastal habitats), halophiles (facultative inhabitants of coastal habitats), haloxenes (halo-tolerant species), and incidental species of Staphylinidae (found in coastal and other environments) in Atlantic Canada.

Other faunistic studies have treated species in other families found in coastal environments in Atlantic Canada including *Rypobius marinus* LeConte (Corylophidae) (Majka and Cline 2006); *Corticarina longipennis* (LeConte) and *Melanophthalma picta* (LeConte) (Latriidiidae) (Majka et al. 2009); *Blapstinus metallicus* (Fabricius) (Tenebrionidae) (Majka et al. 2008); *Nacerderdes melanura* (Linnaeus) (Oedemeridae) (Majka and Langor 2011); *Naemia seriata seriata* Melsheimer (Coccinellidae) (Majka and McCorquodale 2010); and 11 species in the genera *Amblylyderus*, *Anthicus*, *Omonadus*, *Sapintus*, and *Malporus* (Anthicidae) (Majka 2011).

One characteristic halobiont genus is *Cafius* Curtis (Staphylinidae). Frank and Ahn (2011) enumerated 44 species in this genus worldwide, 13 of which are found in North America, and five of which are found on the eastern coasts of the continent (Orth and Moore 1980). Only one of these five species has previously been recorded in eastern Canada, *Cafius bistratus* (Erichson, 1840), from New Brunswick, Nova Scotia, Québec, and insular Newfoundland (Frank et al. 1986; Majka et al. 2008). The present study reports the discovery of a second species in Atlantic Canada.

IDENTIFICATION AND TAXONOMY

Orth and Moore's (1980) key to species of eastern North American species of *Cafius* separates *Cafius bistratus* and *Cafius aguayoi* according to the following characters:

1. Ground sculpture of gula granulose.....*Cafius bistratus*
– Ground sculpture of gula fine wavy lines..... *Cafius aguayoi*

The two species are, however, markedly different in appearance. In *Cafius bistratus* (5.0–7.0 mm) (Figure 1a) the wide impunctate median line of the pronotum is bordered on each side with a longitudinal row of coarse punctures, which is narrowly separated by impunctate sub-median channels from the lateral areas of coarse, widely separated punctures. In *Cafius aguayoi* (3.4–4.0 mm) (Figure 1b) the median impunctate line is narrower, the pronotum lacks a longitudinal row of

Received 13 December 2011. Accepted for publication 6 January 2012. Published on the Acadian Entomological Society website at www.acadianes.ca/journal.html on 14 January 2012.

Christopher G. Majka: Research Associate, Nova Scotia Museum, 1747 Summer Street, Halifax, Nova Scotia, Canada.

Corresponding author (email c.majka@ns.sympatico.ca).

Figure 1: Dorsal habitus photograph of *Cafius bistriatus* (a) and *Cafius aguayoi* (b). **Photo credit:** Christopher Majka.



punctures, and the median line is bordered by a contiguous region of finer and more closely-separated punctures that extends to the lateral margins of the pronotum.

Cafius aguayoi can be differentiated from *Cafius (Remus) sericeus* Holme and *Cafius subtilis* Cameron on the basis of the shape and proportions of the median lobe and paramere of the aedeagus as illustrated in Orth and Moore (1980, pp. 210).

Cafius aguayoi was described by Bierig (1934) on the basis of a specimen collected by C. G. Aguayo at Woods Hole, Massachusetts 8 August, 1931 in “beach algae” (FMNH). There has been some confusion in the past about the identity of this species. Orth and Moore (1980) recognized that the species which had previously been referred to in North America as *Cafius sericeus* (Holme) Horn, 1884, was in fact *Cafius aguayoi*. This error was a result of confusion with the Palearctic *Cafius sericeus* Holme, 1837, (now generally placed in the genus *Remus*), a species which does not occur in North America. Frank et al. (1986) did not include *Cafius aguayoi* in their key to eastern North America species of *Cafius* because they hadn’t studied the species, and because of the apparent similarity between *Cafius aguayoi* and *Cafius subtilis* Cameron, 1922. Orth and Moore (1980), however, differentiated the two species in their key and provided

drawings of the aedeagus of both species (and of *Cafius sericeus*). Moreover, *Cafius subtilis* has only been collected in the West Indies and the Dry Tortugas of Florida, whereas *Cafius aguayoi* is found in northeastern North America.

METHODS AND CONVENTIONS

Collection acronyms referred to in this study are:

CGMC	Christopher G. Majka Collection, Halifax, Nova Scotia, Canada
CNC	Canadian National Collection of Insects, Arachnids, and Nematodes, Ottawa, Ontario, Canada
FMNH	Field Museum of Natural History, Chicago, Illinois, USA
SEMC	Snow Entomological Museum Collection, University of Kansas, Lawrence, Kansas, USA (now Division of Entomology of the University of Kansas Biodiversity Institute)
UNHC	University of New Hampshire Collection, Durham, New Hampshire, USA

RESULTS AND DISCUSSION

On 11 October 2011 I had the opportunity to visit two coastal beaches, one in **PRINCE EDWARD ISLAND: Queens County:** Wood Islands, (45.9538 °N; 62.7462 °W), the other in, **NOVA SCOTIA: Pictou County:** Caribou and Munroe’s Island Provincial Park (45.7278 °N; 62.6542 °W). In the former site on Prince Edward

Island, I collected seven specimens of *Cafius aguayoi* Bierig [males: length 3.7, 3.7, 3.7, 4.0 mm; females: length 3.4, 3.9, 4.0 mm] (CGMC); at the latter site in Nova Scotia I collected five specimens [males: length 3.5, 3.6, 3.8 mm; females: length 4.0, 4.0 mm] (CGMC) (Figure 2). The male aedeagus was examined (Figure 3) and its appearance is consistent with that of *Cafius aguayoi* as illustrated in Orth and Moore (1980) and not with that of *Cafius sericeus* or *Cafius subtilis*. The specimens collected in the Maritime Provinces are larger (3.4–4.0 mm) than those from New England (2.2–2.8 mm) as reported by Orth and Moore (1980), however, the type specimen of *Cafius aguayoi* (from Massachusetts) was 4.75 mm (Bierig 1934).

Figure 2: Distribution of *Cafius bistriatus* and *Cafius aguayoi* in Atlantic Canada. Inset map: distribution of *Cafius aguayoi* in eastern North America.

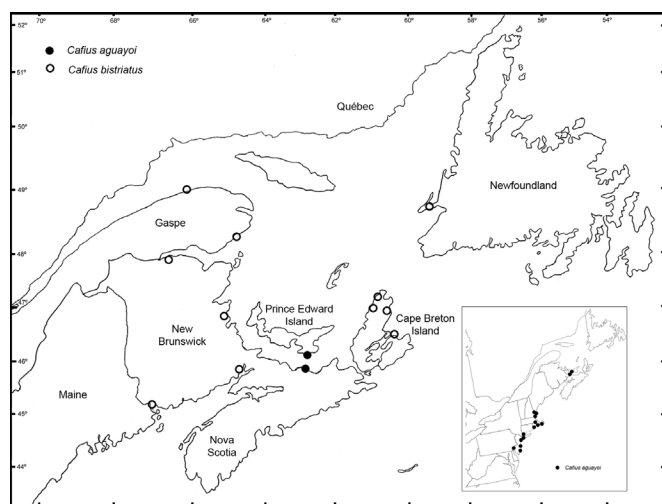
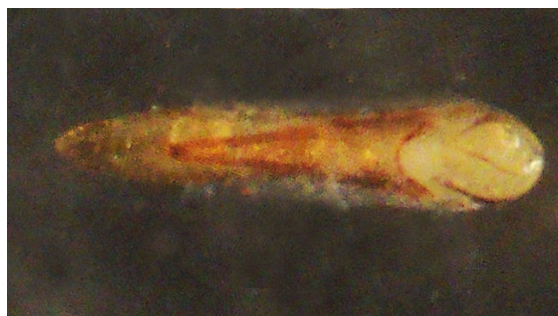


Figure 3: Photograph of aedeagus of *Cafius aguayoi* collected in Wood Islands, Prince Edward Island. **Photo credit:** Christopher Majka.



At both sites, specimens were collected in beach drift material composed of varying quantities of *Fucus vesiculosus* L. (Fucaceae), *Ascophyllum nodosum* (L.) Le

Jolis (Fucaceae), *Zostera marina* L. (Zosteraceae), and other organic and inorganic material concentrated at the high tide strand. In Nova Scotia the specimens were collected together with specimens of *Atheta acadensis* Klimaszewski and Majka (Staphylinidae) and *Omonadus floralis* (Linnaeus) (Anthicidae); in Prince Edward Island both *Atheta acadensis* and *Omonadus floralis* were present as were *Cercyon litoralis* (Gyllenhal) (Hydrophilidae) and *Aleochara verna* Say (Staphylinidae). All these beach drift beetles were found only under detritus at the uppermost end of the splash zone. Beach drift located even a couple of meters lower down the beach was wetter and was dominated by amphipods of the genus *Orchesia* and Coleoptera of all species were absent. The beach drift environment inhabited by *Cafius aguayoi* appears to be very similar to that of *Cafius bistriatus* (Frank et al. 1986) and of all the species of *Cafius* (Orth and Moore 1980).

Previous published records of *Cafius aguayoi* are from Connecticut (Orth and Moore 1980), Massachusetts (as *Cafius sericeus*, Easton 1909; Bierig 1934), New Jersey (as *Cafius sericeus*, Hamilton 1890; Smith 1910), and New York (as *C. sericeus*, Fauvel 1889) (Figure 2). The specimens examined by Horn (1884, pp 238; Hamilton 1889, pp. 113) were “from an uncertain locality, but possibly from Coney Island, near New York.” Additional new records are: **MASSACHUSETTS: Plymouth County:** Onset, 23 April 1983, W.J. Morse (1, UNHC); Marion, no date recorded, F.C. Bowditch (3, SEMC; 4 FMNH); **Barnstable County:** Cape Cod, 6 July 1975, E.J. Kiteley (1, CNC); Cape Cod, 6 June 1985, E.J. Kiteley (4, CNC). **NEW JERSEY: Ocean County:** Barnegat Bay, 4 August 1928, J.W. Green (2, CNC). **NEW HAMPSHIRE: Rockingham County:** Odiorne State Park, 22 September 2007, J. McClarin, sifting wrack deposits along rock coast (3, photographed); Odiorne State Park, 3 June 1984, 21 June 1984, 8 September 1986, 15 September 1986, 16 September 2006, D.S. Chandler, sifting old wrack (5, UNHC); Newcastle Common, 12 May 1982, D.S. Chandler, sifting beach wrack (1, UNHC); Hampton, 10 May 1963, 9 September 1963, F.W. Kenyon (2, UNHC); **Strafford County:** Durham, 15 May 1963, D.I. Nichols (1, UNHC).

On several occasions between late June and the end of August I have previously collected in both areas in Nova Scotia and Prince Edward Island where *Cafius aguayoi* was found. Although I found other beach drift Coleoptera, I never previously encountered *Cafius aguayoi*. There is almost no information in the literature on the seasonality of this species, however, based on the limited available data in this study, it appears that *Cafius aguayoi* adults emerge in the early to mid autumn, overwinter as adults,

and reproduce in the spring, so that during the summer months adults may be infrequent. Further fieldwork would assist in better determining their phenology.

These are the first records of *Cafius aguayoi* from Canada and represent a range extension of some 700 km to the northeast from previously recorded sites along the coast of New Hampshire. The above specimens also represent the first published records of this species in the state of New Hampshire. Further fieldwork is required to better determine the extent of its distribution in northeastern North America and whether the Maritime Provinces population is contiguous with those found in southern New England.

ACKNOWLEDGEMENTS

Sincere thanks to Kee-Jeong Ahn (Chungnam National University), Donald Chandler (University of New Hampshire), Anthony Davies (Canadian National Collection of Insects, Arachnids, and Nematodes), James Boone (Field Museum of Natural History), Zachary Falin (Snow Entomological Museum), Howard Frank (University of Florida), and Jim McClarin (Nashua, New Hampshire) for generously providing information and specimen records. Many thanks to Sheilagh Hunt for her assistance in the field. Thanks to David Christianson, Calum Ewing, and Andrew Hebda at the Nova Scotia Museum for continuing support and encouragement, and M. Rudy Haase for his generous support. Thanks also to two reviewers who read an earlier version of the manuscript and contributed many useful suggestions. This work has been supported by the Board of Governors of the Nova Scotia Museum.

REFERENCES

- Bierig, A. 1934. Neues aus der Staphyliniden-Gattung *Cafius* (Col.), nebst Beschreibung neuer Arten aus Kuba und Nordamerika (8. Beitrag zur Kenntnis der Staphyliniden). *Revista de Entomologia* (Rio de Janeiro, Brasil) **4**: 65–70.
- Easton, N.S. 1909. A list of Coleoptera collected within ten miles of Fall River, Massachusetts. *Psyche* **16**: 35–42.
- Frank, J.H., and Ahn, K.-J. 2011. Coastal Staphylinidae (Coleoptera): A worldwide checklist, biogeography and natural history. *ZooKeys* **107**: 1–98. Available from: <http://www.pensoft.net/journals/zookeys/issue/107/> [accessed 28 November 2011]
- Frank, J.H., Carlysle, T.C., and Rey, J.R. 1986. Biogeography of the seashore Staphylinidae *Cafius bistriatus* and *C. rufifrons* (Insecta: Coleoptera). *Florida Scientist* **49**: 148–161.
- Hamilton, J. 1889. Catalogue of the Coleoptera common to North America, northern Asia and Europe, with the distribution and bibliography. *Transactions of the American Entomological Society* **16**: 88–162.
- Hamilton, J. 1890. R beetles on the New Jersey coast. *Entomological News and Proceedings of the Entomological Section of the Academy of Natural Sciences of Philadelphia* **1**:12–13.
- Horn, G.H. 1884. Synopsis of the Philonthi of boreal America. *Transactions of the American Entomological Society and Proceedings of the Entomological Section of the Academy of Natural Sciences* **11**: 177–244.
- Klimaszewski, J., and Majka, C.G. 2007. Two new *Atheta* species (Coleoptera, Staphylinidae, Aleocharinae) from eastern Canada: taxonomy, bionomics and distribution. *The Canadian Entomologist* **139**: 45–53.
- Klimaszewski, J., Majka, C.G., and Langor, D. 2006. Review of the North American *Tarphiota* Casey, with a description of a new seashore-inhabiting *Atheta* species exhibiting convergent characteristics (Coleoptera: Staphylinidae: Aleocharinae). *Entomological Science* **9**: 67–78.
- Klimaszewski, J., Webster, R., Assing, V., and Savard, K. 2008. *Diglotta mersa* (Haliday) and *Halobrecta flavipes* Thomson, two new species for the Canadian fauna (Coleoptera, Staphylinidae, Aleocharinae). In *Biodiversity, Biosystematics, and Ecology of Canadian Coleoptera*. Edited by C.G. Majka, and J. Klimaszewski. *ZooKeys* **2**: 175–188. Available from <http://www.pensoft.net/journals/zookeys/article/18/diglotta-mersa-haliday-and-halobrecta-flavipes-thomson-two-new-species-for-the-canadian-fauna-coleoptera-staphylinidae-a> [accessed 28 November 2011]
- Majka, C.G. 2011. The Anthicidae and Ischaliidae (Coleoptera) of Atlantic Canada. *Journal of the Acadian Entomological Society* **7**: 50–64. Available from http://www.acadianes.ca/journal/papers/anthicid_11-9.pdf [accessed 28 November 2011]
- Majka, C.G., Bouchard, P., and Bousquet, Y. 2008. Tenebrionidae (Coleoptera) of the Maritime Provinces of Canada. *The Canadian Entomologist* **140**: 690–713.
- Majka, C.G., and Cline, A.R. 2006. New records of Corylophidae (Coleoptera) from the Maritime Provinces of Canada. *The Coleopterists Bulletin* **60**: 105–111.
- Majka, C.G., and Langor, D. 2011. The Oedemeridae (Coleoptera) of Atlantic Canada. *Journal of the Acadian Entomological Society* **7**: 1–6. Available from http://www.acadianes.ca/journal/papers/majka_oedemerid_1013.pdf [accessed 28 November 2011]

- Majka, C.G., Langor, D., and Rücker, W. 2009. Latridiidae (Coleoptera) of Atlantic Canada: new records, keys to identification, new synonyms, distribution, and zoogeography. *The Canadian Entomologist* **141**: 317–370.
- Majka C.G., and McCorquodale D.B. 2010. Ladybird Beetles (Coleoptera: Coccinellidae) of the Atlantic Maritime Ecozone. *In* Assessment of Species Diversity in the Atlantic Maritime Ecozone. *Edited by* D.F. McAlpine, and I.M. Smith. NRC Research Press. Ottawa, Ontario. pp. 439–452.
- Majka C.G., and Ogden J. 2006. *Brachygluta abdominalis* (Aubé) (Coleoptera: Staphylinidae) newly recorded in Canada with notes on other beach-drift beetles. *Proceedings of the Entomological Society of Washington* **108**: 761–764.
- Majka C.G., Klimaszewski J., and Lauff R.F. 2008. The coastal rove beetles (Coleoptera, Staphylinidae) of Atlantic Canada: a survey and new records. *In* Biodiversity, Biosystematics, and Ecology of Canadian Coleoptera. *Edited by* C.G. Majka, and J. Klimaszewski. *ZooKeys* **2**: 115–150. Available from <http://www.pensoft.net/journals/zookeys/article/2/the-coastal-rove-beetles-coleoptera-staphylinidae-of-atlantic-canada-a-survey-and-new-records> [accessed 28 November 2011]
- Orth, R.E., Moore, I. 1980. A revision of the species of *Cafius* Curtis from the west coast of North America with notes of the east coast species (Coleoptera: Staphylinidae). *Transactions of the San Diego Society of Natural History* **19**: 181–211.
- Smith, J.B. 1910. The Insects of New Jersey. *In* Annual Report of the New Jersey State Museum. *Edited by* S.R. Morse. MacCrellish & Quigly, Trenton, New Jersey. pp. 14–888. Available from <http://www.archive.org/details/insectsnewjerseosmitgoog> [accessed 28 November 2011]