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Gennadota canadensis (Casey) (Staphylinidae: Aleocharinae): New Records, a Range Extension, and Bionomic Notes

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Abstract

Gennadota canadensis Casey is newly recorded from Nova Scotia, Canada, extending its known range by 500 km to the east. In Nova Scotia it has been recorded in both cave and non-cave environments. The taxonomic history of the genus is briefly recounted, and the bionomics of the species is discussed within the context of that of cave-inhabiting beetles. Its presence in the Maritime Provinces in noted a region where caves are still in an active phase of post-glacial reinvasion and re-colonization.

The genus *Gennadota* has a tangled systematic history. It was described by Casey (1906) to accommodate *Gennadota canadensis*, described from an unspecified locality in Canada. Later this species along with *G. puberula* (Casey), the only other species in this genus, were transferred to *Ilyobates* by Seevers (1978), and then to *Pyroglossa* by Assing (1999) before being moved back to the reinstated *Gennadota* by Klimaszewski and Pelletier (2004). The latter authors discussed the taxonomic position of the species and the genus *Gennadota* in the *Ocalea* group of genera.

Little is known about the members of this genus. Previously all but one specimen had been captured in caves (Klimaszewski and Peck 1986). At the time of Klimaszewski and Pelletier's (2004) review there were only three known specimens of *G. canadensis* (from Pennsylvania, Québec, and "Canada"). Recently additional specimens have been collected in Nova Scotia, Canada, which extend the known range of the species in North America 500 km east and add to the knowledge of its bionomics.

Results and Discussion

In April 1998 a specimen of *G. canadensis* was collected by one of us (M. Moseley) in the Woodville Ice Cave, Hants County, Nova Scotia in a baited pitfall trap left over the duration of the winter (Figure 1). It was placed amongst broken rock with vegetation litter and leaf mould in the cave threshold. The cave is formed in a gypsum-anhydrite deposit and the entrance, situated at the head of a steep-sided karst valley, opens into a blind-ended chamber with a downward sloping floor which acts as a cold air trap. Ice and snow, which accumulate in the

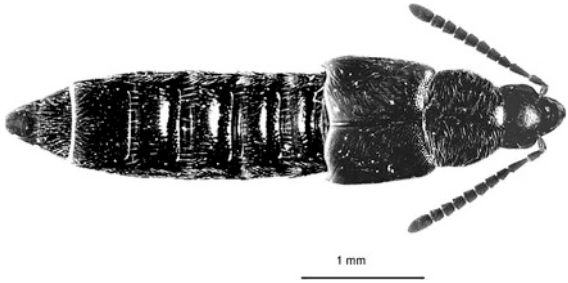

Fig. 1. Dorsal habitus of *Gennadota canadensis* Casey.

chamber during the winter, can survive there until late summer. Air temperatures below 3°C have been recorded in the cave in mid-summer.

Other cave-dwelling invertebrates collected together with *G. canadensis* were *Trichocera* sp. (Diptera: Trichoceridae), *Circurina brevis* (Emerton) (Aranea: Agelenidae), and *Oligolophus tridens* (Koch) (Opiliones: Phalagidae) while other invertebrates found in the cave include *Oniscus asellus* (Linné) (Isopoda: Oniscidae); *Willemia scandinavia* Stach, *Folsomia stella* Christiansen and Tucker, and *Onychiurus pseudarmatus* (Folsom) (Insecta: Collembola); *Ceuthophilus maculatus* (Harris) (Orthoptera: Rhaphidophoridae); *Amoebaleria* sp. and Sciaridae (gen. indet.) (Diptera), as well as unidentified mites (Acari) of the families Rhagidiidae, Parasitidae, Uropodidae, Histiostomatidae, and Pygmephoridae. The only other species of Coleoptera found in the cave is the troglophile, *Quedius s. spelaeus* Horn (Staphylinidae: Staphylininae) (Moseley *et al.* 2006).

On 29 October 2003, two specimens of *G. canadensis* were collected in Burnside, Halifax County, Nova Scotia by C. Cormier on dead pigs buried in a mixed forest as part of a forensic entomology study. Other invertebrates collected include 64 species of Coleoptera associated with decomposition processes in the families Cleridae, Dermestidae, Geotrupidae, Histeridae, Hydrophilidae, Leiodidae, Nitidulidae, Ptiliidae, Scarabaeidae, Silphidae, Staphylinidae, and Trogidae.

On 4 September 2003 another specimen of *G. canadensis* was collected at George's River, Cape Breton County, Nova Scotia in a decomposing gill fungus growing in a mixed forest/old farm-field habitat by C. W. D'Orsay.

On 10 May 2004 a specimen of *G. canadensis* was collected by C. W. D'Orsay and D. B. McCorquodale at Irish Cove, Richmond County, Nova Scotia in a decaying *Ganoderma* shelf-fungus. This site is adjacent to the Irish Cove EMAN (Ecological Monitoring Assessment Network) monitoring plot and is situated in a late successional hardwood-hemlock forest composed of *Acer saccharum* Marsh, *Tsuga canadensis* (L.) Carr, *Betula alleghaniensis* Britt, and *Fagus grandifolia* (Ehrh.) (D'Orsay 2005). All specimens are deposited with the Nova Scotia Museum collection, Halifax, Nova Scotia.

The collection sites are shown in Figure 2 and indicate that *G. canadensis* appears to be broadly distributed both on the mainland of Nova Scotia and on Cape Breton Island. All sites are decompositional situations, indicating the biology of the species is linked to such processes.

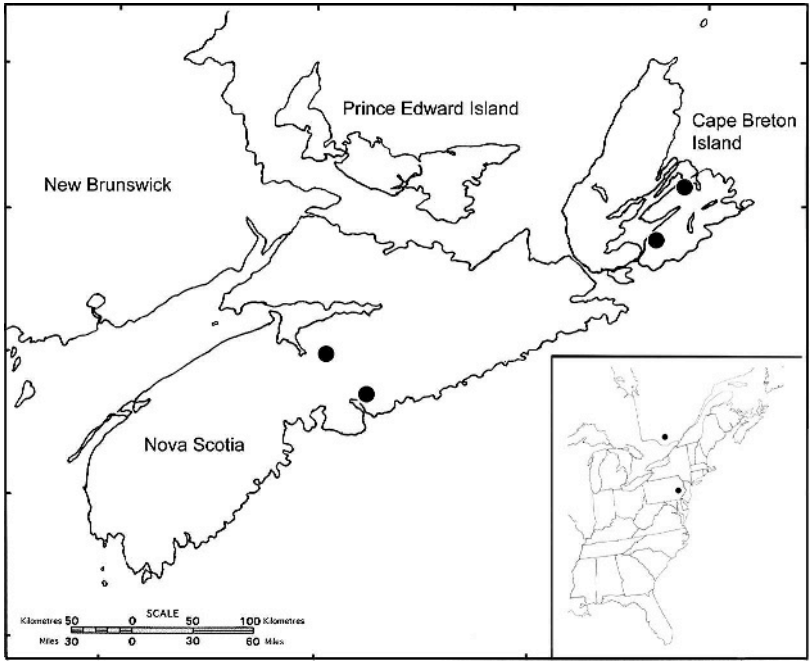

Fig. 2. Collection localities for *Gennadota canadensis* Casey in Nova Scotia, Canada. Inset map shows collection sites in Québec and Pennsylvania.

Only one of the recent Nova Scotia records is from a cave, and this is from a threshold area rather than the cave dark zone. In the absence of evidence that it can complete its life-cycle underground it is not possible to say that *G. canadensis* is a troglophile (*i.e.*, a facultative cavernicole). Nevertheless, the number of subterranean collections must imply that this beetle has some propensity for entering and inhabiting caves. The Staphylinidae, with 46,275+ species (Newton *et al.* 2001) is the largest family of Coleoptera but has only a small number of subterranean species. In eastern North America only circa 25 species of staphylinids are known from cave environments, mostly in the Aleocharinae (Klimaszewski and Peck 1986). Most cavernicolous beetles (92%) belong to two groups, the Carabidae and the Cholevinae (Leiodidae) (Gibert and Deharveng 2002). Consequently the ability of *G. canadensis* to utilize caves is of interest.

Klimaszewski and Pelletier (2004) propose that the strong microsculpture found on members of the *Ocalea* group including *Gennadota* may be associated with a water-repelling mechanism for species that inhabit wet environments. The air in deep cave environments is typically moisture saturated and this constitutes a physiological barrier to colonization: most terrestrial arthropods are adapted to desiccating environments and have difficulty in coping with such conditions (Howarth 1980). In this context it is interesting to note that the *Ocalea* group of genera embraces cold-loving species found predominantly in wet mosses in mountain habitats. All genera of the *Ocalea* group are western in distribution with the exception of *Gennadota*, which is eastern and has frequently been found in cave environments.

Finally, this is an interesting addition to the known cave fauna of the Maritime Provinces, a region where caves are still in an active phase of reinvasion and re-colonization (Moseley 1998) following the melting of the ice sheets which covered the province until 11,000–12,000 years ago. Nova Scotia caves and their biota, while relatively undisturbed to date, are also very sensitive environments which are readily subject to disturbance and destruction. Consequently, developing a baseline understanding of its cave fauna is important in terms of being able to monitor environmental change in such environments and also to understand the evolution and development of cave faunas in glaciated regions.

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