J. Acad. Entomol. Soc. 7: 25-31 (2011)

The Trogossitidae (Coleoptera) of Atlantic Canada

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ABSTRACT

The Trogossitidae (bark gnawing beetles) of Atlantic Canada are surveyed. Nine new provincial records are reported, including four species – *Grynocharis quadrilineata*, *Calitys scabra, Airora cylindrica,* and *Tenebroides corticalis* – that are recorded for the first time in the region. A key to the identification of species found in the region is provided, as are distribution maps and colour habitus photographs. The distribution, bionomics, and phenology of all species are briefly discussed. The members of this saproxylic family require further investigation to better determine their distribution, abundance, and bionomics in Atlantic Canada.

RÉSUMÉ

Les Trogossitidae (Trogossitidés) du Canada Atlantique sont recensés. Neuf additions à la faune provinciale sont rapportées, incluant quatre espèces – *Grynocharis quadrilineata*, *Calitys scabra*, *Airora cylindrica* et *Tenebroides corticalis* – décrites pour la première fois dans la région. Une clé d'identification des espèces retrouvées dans la région est fournie, de même que des cartes de distribution et des photographies couleurs de l'habitus. La distribution, la bionomie et la phénologie de toutes les espèces sont brièvement discutées. Les membres de cette famille saproxylique nécessitent des recherches plus approfondies afin de cerner leur distribution, leur abondance et leur bionomie au Canada Atlantique.

INTRODUCTION

The Trogossitidae (bark gnawing beetles) are a diverse assemblage of beetles consisting of five subfamilies and 59 North American species (Leschen 2002; Kolibáč and Leschen 2010). The higher classification of the group is still far from settled and it is unclear whether the family is monophyletic within the Cleroidea (Leschen 2002; Kolibáč and Leschen 2010). Bousquet (1991) recorded 22 species in Canada, four of which were recorded in the Atlantic Provinces (New Brunswick, Newfoundland and Labrador, Nova Scotia, and Prince Edward Island). Most species in the Trogossitinae are predaceous and are found under bark in the galleries of bark beetles. Species in the Peltinae, Lophocaterinae, and Calitinae feed on fungi and are typically found under bark or associated with various polypore fungi (Leschen 2002; Kolibáč and Leschen 2010). The present study, based on an examination of specimens in collections in Atlantic Canada, surveys the Trogossitidae fauna of the region.

IDENTIFICATION

A key to species of Trogossitidae found in Atlantic Canada (modified from Barron 1971 and Leschen 2002) is provided below.

Received 7 March 2011. Accepted for publication 18 April 2011. Published on the Acadian Entomological Society website at www.acadianes.ca/journal.html on 19 May 2011.

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1. Procoxal cavities externally open.....2
– Procoxal cavities externally closed 5

2(1). Protobia with a single spur; antennal club asymmetrical (Fig. 1a) .....
..... *Grynocharis quadrilineata*
– Protobia with two unequal spurs; antennal club symmetrical 3

3(2). Body dorso-ventrally compressed; dorsal surfaces with a weak vestiture of setae; elytra with well developed costae (*Ostoma*).....4
– Body convex; dorsal surfaces with a well-developed vestiture of setae; elytra without well developed costae (Fig. 1b)..... *Thymalus marginicollis*

4(3). Pronotum with margins strongly reflexed, forming shallow, broad concavity between disk and margin; pronotum narrower; apex between anterior angles narrow, strongly reflexed (Fig. 1c)
..... *Ostoma septentrionalis*
– Pronotum with margins not or scarcely reflexed, not forming concavity between disk and margin; pronotum broader; apex between anterior angles broad, strongly convex (Fig. 1d)
..... *Ostoma fraterna*

5(1). Antennal club symmetrical; dorsal surface of elytra with costae and tubercles (Calitinae) (Fig. 1e) ....*Calitys scabra*
– Antennal club asymmetrical; dorsal surface of elytra smooth (Trogossitinae).....6

6(5). All tibia on outer margin with spines; antennae extending only to level of anterior 1/4 of prosternum (Fig. 1f) ..... *Airora cylindrica*
– All tibia lacking spines or present only on outer margin of protibiae; antennae extending to middle of prosternum or further (*Tenebroides*) 7

7(6). Antennae with eighth antennomere asymmetrical and globose similar to antennomeres 9–11 (Fig. 1g)..... *Tenebroides mauritanicus*
– Antennae with eighth antennomere much smaller than ninth, cylindrical, similar to antennomeres 2–7 (Fig. 1h).....*Tenebroides corticalis*

METHODS AND CONVENTIONS

Specimens of Trogossitidae originating from Atlantic Canada, in a variety of collections, were examined and identified. These collections yielded 76 specimens, 60 from Nova Scotia, 10 from New Brunswick, 2 from Prince Edward Island, and 4 from Newfoundland and Labrador. Abbreviations of collections (largely following Evenhuis 2011) referred to below are:

ACNS	Agriculture and Agri-Food Canada, Kentville, Nova Scotia, Canada
CFNL	Canadian Forest Service, Corner Brook, Newfoundland and Labrador, Canada
CGMC	Christopher G. Majka collection, Halifax, Nova Scotia, Canada
DHWC	David H. Webster collection, Kentville, Nova Scotia, Canada
NBM	New Brunswick Museum, Saint John, New Brunswick, Canada
NSMC	Nova Scotia Museum, Halifax, Nova Scotia, Canada
NSNR	Nova Scotia Department of Natural Resources, Shubenacadie, Nova Scotia, Canada

RESULTS

As a result of an examination of specimens of Trogossitidae in collections in Atlantic Canada, nine new provincial records are reported below including four species newly recorded in the region (Table 1).

Peltinae

Ostoma fraterna (Randall, 1838)

NEWFOUNDLAND & LABRADOR: Newfoundland: Adies Lake, 25 May 1963, collector not recorded, balsam fir (1, CFNL). **NEW BRUNSWICK**: **Saint John County**: Saint John, 14 June 1902, June 190x, May 190x, W. McIntosh (6, NBM).

Ostoma fraterna is newly recorded in New Brunswick. It was reported from Boisdale, Cape Breton in Nova Scotia by Barron (1971) and from insular Newfoundland by Bousquet (1991) on the basis of the above record (Figure 1.). This species was formerly grouped together with the Palaearctic *Ostoma ferruginea* (Linnaeus, 1758) as a single Holarctic species (Barron 1996). Barron (1971, 1996) reported it from under the bark of dead spruce (*Picea* sp.), and on the polypores *Spongiporus leucospongia* (Cke. & Hark.) Murr. , *Piptoporus betulinus* (Fr.) Kar., and *Tyromyces fragilis* (Fr.) Donk (Polyporaceae).

Ostoma septentrionalis (Randall, 1838)

Ostoma septentrionalis was reported from Tabusintac, New Brunswick, and Goose Bay, Labrador by Barron (1971) (Figure 1). These are the only records of this species in the region. This species was formerly known as *Ostoma columbiana* Casey, 1924, now treated as a junior synonym of *Ostoma septentrionalis* (Barron 1996). Barron (1971) reported it from under the bark of dead white spruce (*Picea glauca* (Moench) Voss) (Pinaceae), and on the polypore *Pycnoporellus alboluteus* (Ell. & Ev.) Kotl. & Pouz. (Polyporaceae).

Thymalus marginicollis Chevrolat, 1842

NEW BRUNSWICK: **Charlotte County**: Todd's Island, June 2000, D.F. McAlpine (1, NBM). **PRINCE EDWARD ISLAND**: **Queens County**: St. Patricks, August 2003, red spruce forest, on *Piptoporus betulinus* growing on white birch (1, CGMC).

Thymalus marginicollis is newly recorded in New Brunswick and Prince Edward Island. It was reported from Dartmouth, Nova Scotia by Barron (1971). It is the most abundant trogossitid in the region and occurs widely throughout Nova Scotia (Figure 1), on both the mainland and on Cape Breton Island. Adults (n = 35) have been recorded between 2 June and 27 September with variable numbers having been found throughout this time period.

Barron (1971) reported it on the polypores *Piptoporus betulinus* (Fr.) Kar., *Trametes versicolor* (Fr.) Pil., *Daedaleopsis confragosa* (Fr.) Schroet., and *Cerrena unicolor* (Fr.) Murr. In Nova Scotia and Prince Edward Island, specimens have been collected in deciduous, coniferous, and mixed forests, frequently on *Piptoporus betulinus* growing on *Betula papyrifera* Marshall. It has frequently been collected with flight-intercept traps.

Lophocaterinae

Grynocharis quadrilineata (Melsheimer, 1844)

NOVA SCOTIA: **Hants County**: Stanley, 4 June 1992, M. LeBlanc, stovepipe trap (1, NSNR).

Grynocharis quadrilineata is newly recorded in Nova Scotia, the first record of the species in the Maritime Provinces (Figure 1). Barron (1971) reported it from under the bark of dead poplar (*Populus* sp.).

Calitinae

Calitys scabra (Thunberg, 1784)

NEW BRUNSWICK: **Saint John Count**y: Saint John, July 190x, W. McIntosh (1, NBM). **NOVA SCOTIA**: **Antigonish County**: Beaver Mountain, 28 June 2006, G. Murphy, flight-intercept trap (1, NSNR); **Colchester County**: Five Islands Park, 7 July 1995, J. Ogden, in fire log (1, NSNR); **Kings County**: Kentville, 11 June 1962, D.H. Webster, in house (1, DHRW).

Table 1. The Trogossitidae fauna of Atlantic Canada

	NB	NS	PE	NF	LB	NE North America
Peltinae						
Ostoma fraterna (Randall)	1	1		1		ME, NB, NF, NH, NS, ON, QC
Ostoma septentrionalis (Randall)	1				1	LB, ME, NB, NH, ON, QC, VT
Thymalus marginicollis Chevrolat	1	1	1	1		CT, ME, NB, NF, NH, NS, ON, QC, RI
Lophocaterinae						
Grynocharis quadrilineata (Melsheimer)		1				MA, ME, NH, NS, NY, ON, QC, VT
Calitinae						
Calitys scabra (Thunberg)	1	1				CT, MA, ME, NB, NH, NS, NY, ON, QC, RI
Trogossitinae						
Airora cylindrica (Audinet-Serville)		1				MA, NS, NY, ON
Tenebroides corticalis (Melsheimer)		1				CT, MA, ME, NH, NS, ON, QC, RI
Tenebroides mauritanicus (Linnaeus)	1	1	1	1		CT, ME, NB, NF, NH, NS, ON, PE, QC
Total	5	7	2	3	1	

Notes: NB = New Brunswick; NS = Nova Scotia; PE = Prince Edward Island; NF = insular Newfoundland; LB = Labrador.

Distribution in NE North America: ON = Ontario; QC = Québec; PM = Saint-Pierre et Miquelon; CT = Connecticut; MA = Massachusetts; ME = Maine; NH = New Hampshire; NY = New York; RI = Rhode Island; and VT = Vermont.

Calitys scabra is newly recorded in New Brunswick and Nova Scotia, the first records of the species in the Maritime Provinces (Figure 2). Adults (n = 4) have been recorded between 11 June and 7 July. It is a species with a Holarctic distribution. Barron (1971) reported it from under the bark of a dead pine log (*Pinus* sp.) and on the polypore *Fomes pinicola.*

Trogossitinae

Airora cylindrica (Audinet-Serville, 1833)

NOVA SCOTIA: **Annapolis County**: no locality specified, 22 May 2003, K. Webster, pine weevil trap (1, NSNR); **Hants County**: Smiley's Park, 3 June 2005, J Gordon, spruce beetle trap (1, NSNR); **Kings County**: Coldbrook, June 2003, R. Williams, pine weevil trap (1, NSNR); Kentville, 23 May 1951, R. Sandford, apple tree (1, ACNS); **Lunenburg County**: Bridgewater, 19 June 1965, Q. Wright, window trap in red oak (1, NSMC); **Queens County**: Eight Mile Lake, 9 July 2003, P. Dollin, red spruce forest (40-80 years), funnel trap (1, NSMC); **Yarmouth County**: Ibbitson Mill, 4 July 2002, 28 May 2003, 20 June 2003, D. Gordon, pine weevil trap (5, NSNR).

Airora cylindrica is newly recorded in Nova Scotia, the first record of the species in the Maritime Provinces (Figure 2). Adults (n = 11) have been recorded between 22 May and 9 July. Barron (1971) reported it from under the bark of dead pine (*Pinus* sp.), hickory (*Carya* sp.), and American turkey oak (*Quercus laevis* Walter (Fagaceae)). The discovery of this species in Nova Scotia is noteworthy given that it has, hitherto, only been reported as close as Ontario to the west and Massachusetts to the south of Atlantic Canada. Whether the population in southern Nova Scotia is disjunct from the remainder of the distribution of this species remains to be determined.

Figure 1. Distribution of *Thymalus marginicollis*, *Ostoma fraterna*, *Ostoma septentrionalis*, and *Grynocharis quadrilineata* in Atlantic Canada.

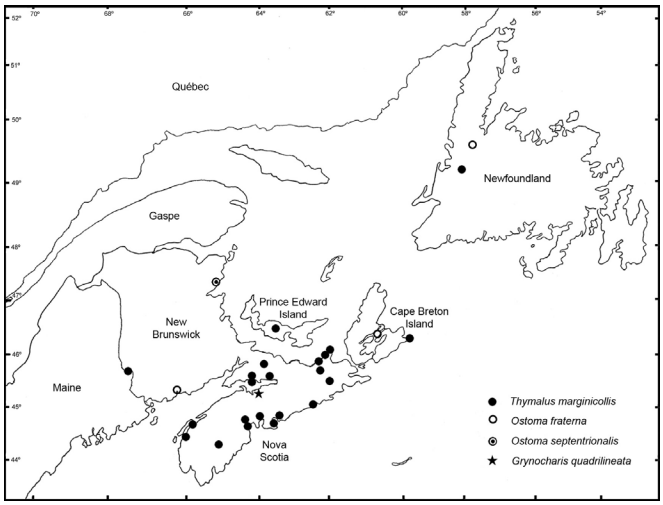
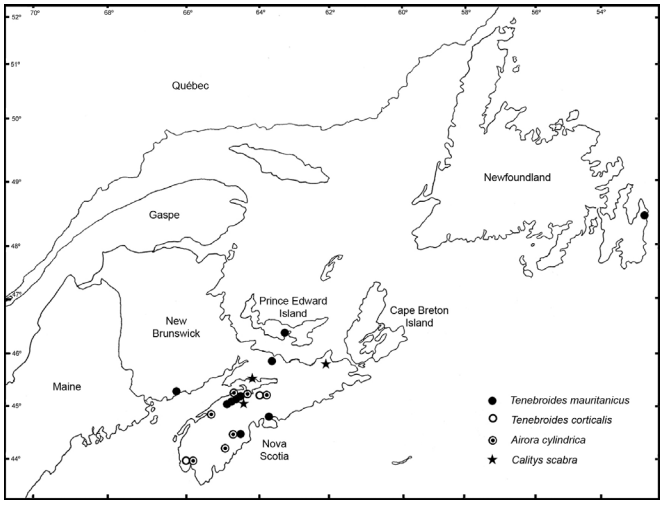


Figure 2. Distribution of *Tenebroides mauritanicus*, *Tenebroides corticalis*, *Airora cylindrica*, and *Calitys scabra* in Atlantic Canada.



Tenebroides corticalis (Melsheimer, 1844)

NOVA SCOTIA: **Hants County**: Smiley's Park, 11 August 2005, J. Ogden, spruce beetle trap (1, NSNR); **Yarmouth County**: Ibbitson Mill, 4 July 2002, D. Gordon, flight intercept trap (5, NSNR).

Tenebroides corticalis is newly recorded in Nova Scotia, the first record of the species in the Maritime Provinces (Figure 2). Barron (1971) reported it from under the bark of locust (*Robinia* sp.), oak (*Quercus* sp.), spruce (*Picea* sp.), apple (*Malus* sp.), balsam poplar (*Populus balsamifera* L. (Salicaceae)), elm (*Ulmus* sp.), hickory (*Carya* sp.), maple (*Acer* sp.), pine (*Pinus* spp.), sycamore (*Platnus* sp.), black willow (*Salix nigra* Marshall (Salicaceae)), sometimes in association with bark beetles (*Dendroctonus* spp.), on fungi and polypores.

Tenebroides mauritanicus (Linnaeus, 1758)

NOVA SCOTIA: **Colchester County**: Balmoral Mills, 19 June 1974, B. Wright (1, NSMC); **Halifax County**: Sackville, 5 November 1993, P. Hyslop (1, NSMC); **Kings County**: Berwick, 6 September 1940, H.T. Stultz, in orchard (2, ACNS); Kentville, 2 June 1948, H.T. Stultz (2, ACNS); Kentville, 8 May 2000, D.H. Webster, on woodpile (1, DHWC); North Alton, 16 October 2000, underside of spruce slab (1, DHWC); Waterville, 8 October 1940, H.T. Stultz, neglected orchard (1, ACNS); **Lunenburg County**: Bridgewater, 19 June 1965, Dept. of Natural Resources (1, NSMC).

Tenebroides mauritanicus is newly recorded in Nova Scotia. It was recorded from New Brunswick and Prince Edward Island by Bousquet (1991) (Figure 2). It is an adventive Palaearctic species. Adults (n = 13) have been recorded between 8 May and 5 November

The "cadelle" is found in grain, flour, meals, nuts, spices, fruits, and biscuits in ships, mills, warehouses, grain elevators, and homes. Adults and larvae both bore into wood (Campbell et al. 1989). It is also found less frequently in the wild (Barron 1971). There is some uncertainty with respect to its bionomics with Barron (1971, 94) writing that "*however, there is evidence that it remains primarily carnivorous, feeding on other insects frequenting these materials.*" In Nova Scotia it has been found in mills, orchards, and on dead wood. The earliest date of detection for the species in New Brunswick is 1900-07, in Nova Scotia in 1940, and in Prince Edward Island in 1984.

DISCUSSION

As noted in the Introduction, species of Trogossitidae fall into two ecological categories; those in the subfamilies Peltinae, Lophocaterinae, and Calitinae that feed on fungi and are typically found under bark or associated with various polypore fungi; and those in the subfamily Trogossitinae that are predaceous and found under bark in the galleries of bark beetles. An exception to this is the adventive *Tenebroides mauritanicus*, a trogossitine which is principally found as a pest of dried stored products in a variety of indoor facilities, and occasionally in wild environments.

Records for most trogossitids in Atlantic Canada are

sparse. With the exception of *Thymalus marginicollis*, which appears to be common and widely distributed throughout Atlantic Canada (Figure 1), the other polypore feeding species (*Ostoma fraterna, Ostoma septentrionalis, Grynocharis quadrilineata,* and *Calitys scabra*) have been seldom encountered by investigators and collections are rare and local in the region (Figures 1 & 2). Whether this is due to an actual scarcity of these saproxylic species, in keeping with other apparently rare species such as those discussed in Majka (2007), or whether these species are poorly represented by most collection techniques that have been employed by investigators in the region, remains to be determined. *Thymalus marginicollis* and *Calitys scabra* have been collected in flight intercept traps, an indication that they disperse aerially. The other polypore feeding species found in Atlantic Canada have not been collected in flight intercept traps.

Of the predaceous subcortical species, both *Airora cylindrica* and *Tenebroides corticalis* have only been recorded in southern Nova Scotia (Figure 2). However, records of Trogossitidae in New Brunswick are very meager, and *Tenebroides corticalis* might well be expected to occur there, given its presence in both neighbouring jurisdictions of Québec and Maine (Table 1). Both species have been collected almost exclusively with various kinds of flight intercept traps. The adventive *Tenebroides mauritanicus* appears to be widely distributed in Atlantic Canada (Figure 2) and there are records of it in both indoor and wild habitats. It has been present in the region for at least a century.

Although the present survey doubles the number of provincial records for Atlantic Canada from nine to 18, and doubles the known fauna of the region from four species to eight, this family of beetles still remains poorly documented in the region. The discovery of *Airora cylindrica* in Nova Scotia is a particularly noteworthy, one that warrants further investigation. In general more fieldwork and research is required to better understand the distribution, abundance, and bionomics of this family of saproxylic beetles in the region.

ACKNOWLEDGEMENTS

Sincere thanks to Søren Bondrup-Nielsen (Acadia University), Susan Westby (formerly with Agriculture and Agri-Food Canada, Kentville), Christine Noronha and Mary Smith (Agriculture and Agri-Food Canada, Charlottetown), David Langor (Canadian Forest Service, Northern Forestry Centre), Yves Bousquet (Canadian National Collection of Insects, Arachnids, and Nematodes), DeLancey Bishop (Carleton University), Andrew MacDonald and David McCorquodale (Cape Breton University), Philana Dollin (Dalhousie University), Donald McAlpine (New Brunswick Museum), Jeff Ogden (Nova Scotia Department of Natural Resources), and David H. Webster for making specimens, records, and information available. Sincere thanks to Stephen Creswell, Buckhannon, West Virginia; Joyce Gross, University of California, Berkeley, California; Tom Murray, Groton, Massachusetts; Mike Quinn, Austin, Texas; Lynette Schimming Puyallup, Washington; and, Michael Thomas, Florida State Collection of Arthropods, Gainesville, Florida for contributing photographs of trogossitids. This work has been assisted by the Board of Governors of the Nova Scotia Museum.

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Figure 1. Habitus photographs of *Grynocharis quadrilineata* (a); *Thymalus marginicollis* (b); *Ostoma septentrionalis* (c); *Ostoma fraterna* (d); *Calitys scabra* (e); *Airora cylindrica* (f); *Tenebroides mauritanicus* (g); *Tenebroides corticalis* (h). **Photo Credit**: Tom Murray (a); Christopher Majka (b, d); Lynette Schimming (c); Joyce Gross (e); Stephen Creswell (f); Michael Thomas (g); Mike Quinn (h).