

Introduced Staphylinidae (Coleoptera) in the Maritime Provinces of Canada

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Abstract—The fauna of introduced rove beetles (Staphylinidae) in the Maritime Provinces of Canada is surveyed. Seventy-nine species have now been recorded. Of these, 73 have been found in Nova Scotia, 29 on Prince Edward Island, and 54 in New Brunswick. Twenty-five species are newly recorded in Nova Scotia, 16 on Prince Edward Island, and 10 in New Brunswick, for a total of 51 new provincial records. Of these, 15 species, *Tachinus corticinus* Gravenhorst, *Mycetoporus lepidus* (Gravenhorst), *Habrocerus capillaricornis* (Gravenhorst), *Aleochara (Xenochara) lanuginosa* Gravenhorst, *Gnypeta caerulea* (C.R. Sahlberg), *Atheta (Microdota) amicula* (Stephens), *Cordalia obscura* (Gravenhorst), *Drusilla canaliculata* (Fabricius), *Deleaster dichrous* (Gravenhorst), *Coprophilus striatulus* (Fabricius), *Carpelimus subtilis* (Erichson), *Leptacinus intermedius* Donisthorpe, *Tasgius (Rayacheila) melanarius* (Heer), *Neobisnius villosulus* (Stephens), and *Philonthus discoideus* (Gravenhorst), are newly recorded in the Maritime Provinces. Two of these, *Atheta (Microdota) amicula* and *Carpelimus subtilis*, are newly recorded in Canada. *Leptacinus intermedius* is removed from the faunal list of New Brunswick and *Philhygra botanicarum* Muona, a Holarctic species previously regarded as introduced in North America, is recorded for the first time in the Maritime Provinces. An examination of when species were first detected in the region reveals that, on average, it was substantially later than comparable dates for other, better known families of Coleoptera — an apparent indication of the comparative lack of attention this family has received. Some introduced species appear to be associated with the dry-ballast mechanism of introduction to the continent, while others are synanthropic and may have been inadvertently introduced in connection with agriculture, horticulture, or other processes associated with human activities. A substantial number are now established and well distributed, seemingly indicative of an early introduction into the region, the ability to successfully colonize a habitat and disperse within it, or a combination of these factors. Other species appear to be local in distribution, perhaps indicative of more recent introductions, more restricted ecological tolerances, a lesser ability to disperse, or a combination of these factors. These recent discoveries are discussed briefly in the context of the importance of taxonomic research and ongoing monitoring in order to detect and identify exotic species and monitor for new introductions and changes in existing native or introduced populations — all important in terms of assessing the risk of introductions to, and their impact on, native faunas and habitats.

Résumé—La faune des staphylins (Staphylinidae) introduits dans les Provinces Maritimes du Canada est étudiée. Soixante-dix-neuf espèces ont maintenant été enregistrées. Parmi celles-ci, 73 ont été trouvées en Nouvelle-Écosse, 29 à l'Île-du-Prince-Édouard, et 54 au Nouveau Brunswick. Vingt-cinq espèces sont de nouvelles mentions en Nouvelle-Écosse, 16 à l'Île-du-Prince-Édouard, et 10 au Nouveau Brunswick pour un total de 51 nouvelles mentions provinciales. Parmi celles-ci, 15 espèces, *Tachinus corticinus* Gravenhorst, *Mycetoporus lepidus* (Gravenhorst), *Habrocerus capillaricornis* (Gravenhorst), *Aleochara (Xenochara) lanuginosa* Gravenhorst, *Gnypeta caerulea* (C.R. Sahlberg), *Atheta (Microdota) amicula* (Stephens), *Cordalia obscura* (Gravenhorst), *Drusilla canaliculata* (Fabricius), *Deleaster dichrous* (Gravenhorst), *Coprophilus striatulus* (Fabricius), *Carpelimus subtilis* (Erichson), *Leptacinus intermedius* Donisthorpe, *Tasgius (Rayacheila) melanarius* (Heer), *Neobisnius villosulus* (Stephens), and *Philonthus discoideus* (Gravenhorst), sont de nouvelles mentions pour les Provinces Maritimes. Deux, *Atheta (Microdota) amicula* et *Carpelimus subtilis*, sont nouvelle mention au Canada. *Leptacinus intermedius* est retirée de la liste faunique du

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Nouveau Brunswick et *Philhygra botanicarum* Muona, une espèce Holarctique autrefois considérée comme étant introduite en Amérique du Nord, est mentionnée pour la première fois dans les Provinces Maritimes. Une étude portant sur le moment de leur première observation dans la région révèle que, celle-ci était en moyenne substantiellement plus tardive que les dates comparables pour d'autres familles mieux connues de Coléoptères — une indication apparente d'un manque de considération pour cette famille. Quelques espèces semblent avoir été introduites en cale sèche alors que d'autres sont synanthropiques et pourraient avoir été introduites par inadvertance au moyen de l'agriculture, l'horticulture, ou d'autres procédés associés à l'activité humaine. Une population substantielle est maintenant établie et bien distribuée, indiquant selon toute apparence soit une introduction précoce dans la région, ou soit une habileté à coloniser des habitats efficacement et de s'y disperser, ou une combinaison de ces facteurs. D'autres espèces sont distribuées localement, indiquant peut-être une introduction plus récente, une tolérance écologique plus restreinte, une moins bonne habileté à se disperser, ou encore une combinaison de ces facteurs. Ces découvertes récentes sont brièvement discutées dans un contexte qui considère l'importance des recherches taxonomiques et d'une surveillance continue, de façon à pouvoir détecter et identifier les espèces exotiques, surveiller les nouvelles introductions et les changements dans les populations indigènes existantes ou introduites — tous important pour permettre d'évaluer les risques et les impacts des introductions sur la faune et les habitats d'origine.

Introduction

For many years entomologists have been drawing attention to the large number of introduced species of Coleoptera found in Atlantic Canada. In the first paper on Coleoptera from Nova Scotia, Kirby (1837) listed five introduced species. Jones (1870) recorded nine Palearctic species in the province, Harrington (1891) reported four introduced weevils, and Evans (1899) recorded eight species of introduced beetles. Subsequently Brown (1940, 1950, 1967) and Lindroth (1957, 1963) developed the theory that transport of dry ballast (bulky rock, sand, and soil) in trans-Atlantic shipping was responsible for many such introductions. Brown (1950) noted that large quantities of ballast were unloaded at ports in the Maritime Provinces during the Napoleonic Wars (1799–1815) by British vessels in search of lumber. Lindroth (1957) conducted vegetational and faunal surveys at sites in Great Britain known to have been sources of ballast in the trans-Atlantic shipping trade and found many species that had been introduced to North America.

Hoebeker and Wheeler (1996a, 1996b, 2000, 2003), Wheeler and Hoebeker (1994), Johnson (1990), Bousquet (1992), Majka and Klimaszewski (2004), and other studies have reported many additional introduced species in many families of Coleoptera. Knowledge of the Staphylinidae in the region has lagged behind that of other groups; however, some introduced species have been noted. Kirby (1837) noted the presence of the Palearctic *Philonthus politus* (Linnaeus) and *Creophilus maxillosus* (Linnaeus) (from collections made in 1827–1828 by Captain Basil Hall in Nova

Scotia). Subsequently, Lindroth (1957), Campbell (1976), Smetana (1982, 1995), Hoebeker (1995a, 1995b), Klimaszewski (1984), Klimaszewski *et al.* (2006, 2007), Majka and Klimaszewski (2004), Majka *et al.* (2006), Majka and Smetana (2007), and Majka (2007) have added records of 38 introduced rove beetles. Gouix and Klimaszewski (2007), in their catalogue of Aleocharinae of Canada and Alaska, provide a useful checklist of 38 introduced species.

Recent fieldwork and examination of existing specimens in collections, many of which had been hitherto unidentified, have made it apparent that there are unreported species of introduced staphylinids in the region, and that many previously known species have a wider distribution than has been hitherto documented. The present study adds to the knowledge of introduced Staphylinidae in the Maritime Provinces.

It should be emphasized that the findings presented in this paper are preliminary and hence interpretations of this information (with regard, for example, to distribution or dispersal) should be regarded as provisional. The Staphylinidae (particularly subfamilies such as the Aleocharinae) are amongst the most species-rich and poorly known of coleopteran families in Canada. The systematics and taxonomy of the group are still in the process of development and many species have received very little attention from the standpoint of taxonomy, ecology, biogeography, or distribution. Although some of the larger, more prominent species were amongst the earliest species to be recorded in the Maritime Provinces, many of the smaller, more obscure, and taxonomically problematic groups have only very recently

received attention from biologists. Hence, knowledge of the group in this region is on an even more preliminary footing than that of many other families of Coleoptera.

Methods and conventions

A total of 2481 specimens of introduced Staphylinidae from the Maritime Provinces were examined: 633 from New Brunswick, 1566 from Nova Scotia, and 282 from Prince Edward Island. Codens (following Evenhuis 2007) of collections referred to in this study are as follows:

ACNS	Agriculture and Agri-food Canada, Kentville, Nova Scotia
ACPE	Agriculture and Agri-Food Canada, Charlottetown, Prince Edward Island
CBU	Cape Breton University, Sydney, Nova Scotia
CGMC	Christopher G. Majka collection, Halifax, Nova Scotia
CNC	Canadian National Collection of Insects, Arachnids, and Nematodes, Ottawa, Ontario
CUIC	Cornell University Insect Collection, Ithaca, New York, United States of America
DHWC	David H. Webster collection, Kentville, Nova Scotia
JCC	Joyce Cook collection, North Augusta, Ontario
JOC	Jeffrey Ogden collection, Truro, Nova Scotia
NBM	New Brunswick Museum, Saint John, New Brunswick
NSAC	Nova Scotia Agricultural College, Bible Hill, Nova Scotia
NSMC	Nova Scotia Museum, Halifax, Nova Scotia
NSNR	Nova Scotia Department of Natural Resources, Shubenacadie, Nova Scotia
RPWC	Reginald P. Webster collection, Charters Settlement, New Brunswick
SMU	Saint Mary's University, Halifax, Nova Scotia
STFX	Saint Francis Xavier University, Antigonish, Nova Scotia
UMNB	Université de Moncton, Moncton, New Brunswick
UPEI	University of Prince Edward Island, Charlottetown, Prince Edward Island

The number of specimens is given in parentheses. Where the number of specimens is not

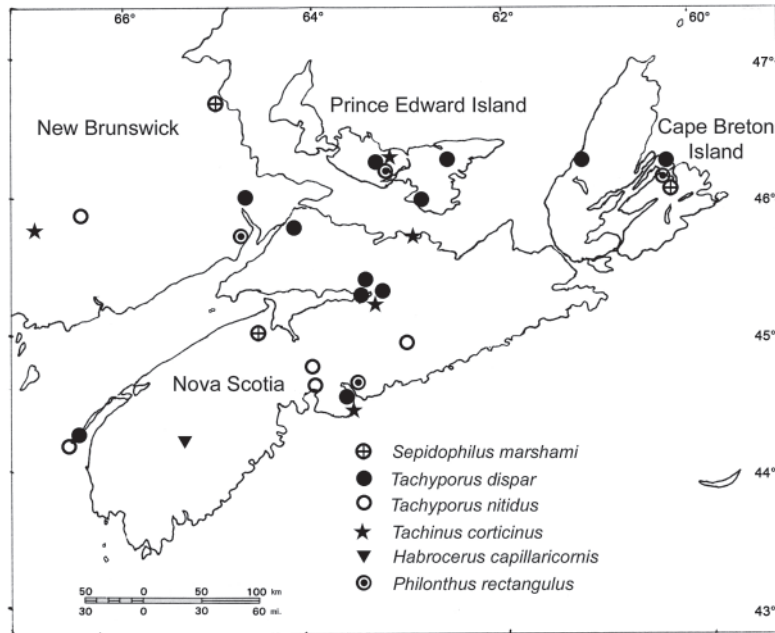
specified, it is assumed to be 1. Where there are fewer than 20 records, all are reported. Where there are more than 20, a summary of specimens examined is given and the earliest collections are noted. The systematics follow Newton *et al.* (2001); the aleocharine systematics follow Gouix and Klimaszewski (2007).

Results

As a result of the present investigations, 79 species of introduced Staphylinidae are now known to occur in the Maritime Provinces. Of these, 73 are known to occur in Nova Scotia, 29 on Prince Edward Island, and 54 in New Brunswick (Table A1). Twenty-five species are newly recorded in Nova Scotia, 16 on Prince Edward Island, and 10 in New Brunswick, for a total of 51 new provincial records. Of these, 15 species, *Tachinus corticinus* Gravenhorst, *Mycetoporus lepidus* (Gravenhorst), *Habrocerus capillaricornis* (Gravenhorst), *Aleochara (Xenochara) lanuginosa* Gravenhorst, *Gnypeta caerulea* (C.R. Sahlberg), *Atheta (Microdota) amicula* (Stephens), *Cordalia obscura* (Gravenhorst), *Drusilla canaliculata* (Fabricius), *Deleaster dichrous* (Gravenhorst), *Coprophilus striatulus* (Fabricius), *Carpelimus subtilis* (Erichson), *Leptacinus intermedius* Donisthorpe, *Tasgius (Rayacheila) melanarius* (Heer), *Neobisnius villosulus* (Stephens), and *Philonthus discoideus* (Gravenhorst), are newly recorded in the Maritime Provinces. Two of these, *A. (M.) amicula* and *Carpelimus subtilis*, are newly recorded in Canada. *Leptacinus intermedius* is removed from the faunal list of New Brunswick. Additionally, *Philhygra botanicarum* Muona, a Holarctic species previously regarded as introduced in North America, is recorded for the first time in the Maritime Provinces. Five of the species found in the region, *Gnypeta caerulea* (C.R. Sahlberg), *Atheta (Datomicra) dadopora* Thomson, *Placusa incompleta* Sjöberg, *Placusa tachyporoides* (Waltl), and *Ochtheophilum fracticorne* (Paykull), are provisionally included as introduced species. Future research on their zoogeographic status is needed and might reveal that they are native species with a Holarctic distribution.

To facilitate an understanding of the status and dispersal of these species in the region and on the continent in general, dates of the earliest known records in each province and in North America as a whole are given in Table A1. For North American records the jurisdiction where the earliest known specimens were collected is

Fig. 1. Distribution of *Sepidophilus marshami*, *Tachyporus dispar*, *Tachyporus nitidulus*, *Tachinus corticinus*, *Habrocerus capillaricornis*, and *Philonthus rectangularis* in the Maritime Provinces of Canada.



indicated, as is the source of the information. Dates for specimens collected in the Maritime Provinces are derived from the specimens examined in the present study. Specific details follow.

Tachyporinae

Sepidophilus marshami (Stephens, 1832).

NEW BRUNSWICK. Kent Co.: Kouchibouguac National Park, 24.vi.1977, D.M. Wood, CNC; Kouchibouguac National Park, 20.ix.1977, D.M. Wood, J.M. Campbell, and A. Smetana, CNC.

Newly recorded in New Brunswick (Fig. 1). Recorded in Quebec and Nova Scotia since 1959 (Campbell 1976). Collected under bark, on bracket fungi, in decaying logs and leaves, on the forest floor, in leaf litter, moss, hay, and straw refuse, at plant roots, under stones, and in many other similar habitats (Campbell 1976). Found throughout much of Europe (including the Azores), Russia, and east to Korea (Herman 2001).

Tachinus corticinus Gravenhorst, 1802.

NEW BRUNSWICK. York Co.: New Maryland, 11.iv.2004, R.P. Webster, mixed forest, RPWC; New Maryland, 15.iv.2004, R.P. Webster, compost, (4), RPWC. **NOVA SCOTIA. Colchester Co:** Bible Hill, 26–28.v.2004, D.B.

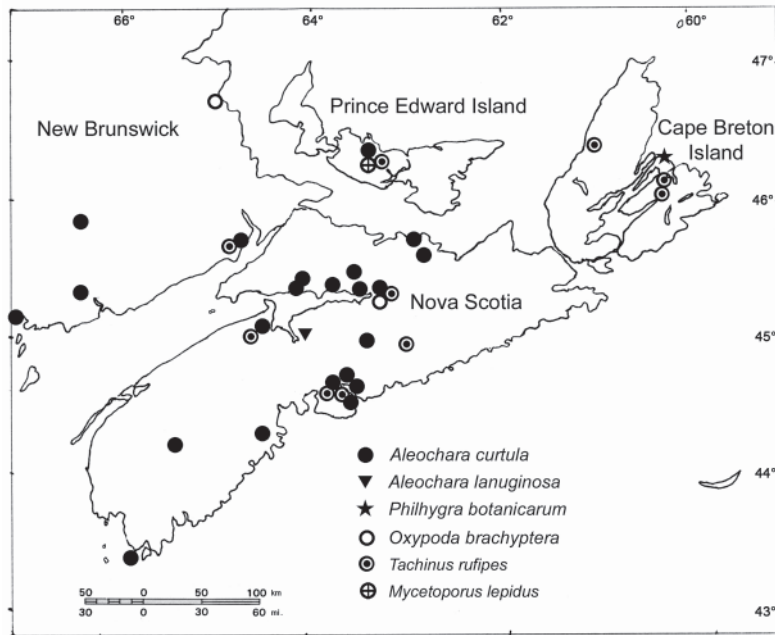
McCorquodale, pasture, (4), CBU; Bible Hill, 12.v.2004, C.W. D'Orsay and K.R. Aikens, pasture, CBU; Bible Hill, 16–23.v.2005, K.R. Aikens, pasture, pitfall trap, CBU; Bible Hill, 21.vii.2005, S.M. Townsend, pasture, CBU; **Halifax Co.:** 28.vii.2002, coastal barren, C.G. Majka, CGMC. **PRINCE EDWARD ISLAND. Queens Co.:** Harrington, 12.vii.2004, C. Noronha, barley field, ACPE; Harrington, 23.v.2005, C. Noronha, agricultural field, ACPE.

Newly recorded in New Brunswick, Nova Scotia, Prince Edward Island, and the Maritime Provinces as a whole (Fig. 1). Recorded from Quebec since 1967 (Campbell 1988). Found throughout Europe (including Iceland) and Russia south to Turkey and the Caucasus and east to Japan (Herman 2001). In Europe, found in both lowland and mountainous areas, mainly in moist mixed and deciduous forests. Collected under fallen leaves, in mosses, in compost and rotting hay and straw, and in mountains under stones in moist places (Burakowski *et al.* 1980).

Tachinus rufipes (DeGeer, 1767).

PRINCE EDWARD ISLAND. Queens Co.: Harrington, vi.2006, C. Noronha, potato field, (2), ACPE; Harrington, 11.vii.2006, C. Noronha, potato field, pitfall trap, (2), ACPE; Harrington,

Fig. 2. Distribution of *Aleochara curtula*, *Aleochara lanuginosa*, *Philhygra botanicarum*, *Oxypoda brachyptera*, *Tachinus rufipes*, and *Mycetoporus lepidus* in the Maritime Provinces of Canada.



24.vii.2006, C. Noronha, potato field, pitfall trap, (2), ACPE.

Newly recorded on Prince Edward Island (Fig. 2). Recorded in North America from New England, the Atlantic provinces, Quebec, and British Columbia (Campbell and Davies 1991). In the Old World, widely distributed across Europe, North Africa, the Caucasus, and east across Siberia (Campbell 1973). Found in various kinds of plant debris, leaf litter, and rotting mushrooms (Campbell 1973).

Tachyporus dispar (Paykull, 1789).

PRINCE EDWARD ISLAND. No locality data, 1974–1983, (3), UPEI; **Kings Co.:** Upton, 10.viii.1953, F.M. Cannon, ACPE; **Queens Co.:** Harrington, 26.vii.2004, C. Noronha, soybean field, ACPE; Harrington, 9.viii.2004, C. Noronha, barley field, ACPE; Harrington, 30.v.2006–11.vii.2006, C. Noronha, potato field, pitfall trap, (10), ACPE; Pinette, 24.vi.2003, C.G. Majka, coastal field, CGMC.

Newly recorded on Prince Edward Island (Fig. 1). Recorded in the northeast from Newfoundland, Nova Scotia, New Brunswick, Quebec, and Ontario south to Massachusetts; on the west coast from British Columbia, Washington, and Oregon (Campbell 1979, as *T. chrysomelinus*). Found throughout Europe, including Britain and Ireland (Herman 2001).

Found in decaying leaf litter, in compost, under moss, and in floating river debris (Campbell 1979).

Tachyporus nitidulus (Fabricius, 1781).

NOVA SCOTIA. Digby Co.: Brier Island, Big Meadow, 24.vi.2003, J. Ogden and K. Goodwin, raised bog, NSNR; **Halifax Co.:** Big Indian Lake, 23.vi.2003, P. Dollin, red spruce forest, (2), NSMC; Big St. Margaret's Bay, 14.v–2.vi.1997, D.J. Bishop, old-growth red spruce forest, NSMC; Grassy Lake, 15–30.vi. and 1–16.vii.1997, red spruce forest, (2), NSMC.

Newly recorded in Nova Scotia (Fig. 1). Recorded from most of North America south to Mexico (Campbell 1979). Found throughout Europe (including Iceland, the Canary Islands, and the Azores), Russia, North Africa, the Middle East, and east to Afghanistan, Pakistan, and Uzbekistan (Herman 2001). Often found in moist habitats such as river debris and swampy areas, along streams and lakes or in wet seepages. Common in all kinds of rotting materials; found in leaf litter, decaying material in hollow logs and stumps, and in mammal nests; swept from flowers and bushes. Found at high and low elevations; adults present throughout the year but more abundant in late summer and early fall (Campbell 1979).

Mycetoporus lepidus (Gravenhorst, 1806).

PRINCE EDWARD ISLAND. Queens Co.: Harrington, 17.viii.2000, M.E. Smith, potato field, ACPE; Harrington, 10.v.2006, vi.2006, early viii.2006, C. Noronha, potato field, pitfall trap, (3) ACPE.

Newly recorded in Prince Edward Island and in the Maritime Provinces as a whole (Fig. 2). In North America previously recorded from British Columbia and Alberta (Campbell and Davies 1991). Found throughout Europe, Russia, North Africa, and the Caucasus (Herman 2001). In Europe, found in moist forests, in peat bogs and heaths, in leaf litter and rotting fungi, occasionally in meadows and fields under rotting plants, rarely in pine forests on sandy soils (Burakowski *et al.* 1980). This species was formerly incorrectly referred to as *Mycetoporus brunneus* (Marsham).

Habrocerinae

Habrocerus capillaricornis (Gravenhorst, 1806).

NOVA SCOTIA. Queens Co.: Kejimikujik National Park, 2.x.1994, B. Wright, leaf litter: beech forest, NSMC.

Newly recorded in Nova Scotia and the Maritime Provinces as a whole (Fig. 1). In Canada, recorded from British Columbia, Ontario, Quebec, and Newfoundland (Campbell and Davies 1991); widespread in North America (Newton *et al.* 2001). Widely distributed in the western Palearctic region, including most of Europe (including the British Isles), North Africa, and the Caucasus (Assing and Wunderle 1995). Found in all kinds of detritus (leaf litter, fungi, under bark, *etc.*) especially in woodland at lower altitudes (Assing and Wunderle 1995). The discovery of this species in Kejimikujik National Park is somewhat surprising given that this is a relatively undisturbed forested area. A recent study of forest-floor Coleoptera (C.G. Majka and T. Rossolimo, unpublished data) revealed that only 3% of species were introduced taxa.

Aleocharinae

Aleochara (Xenochara) lanuginosa Gravenhorst, 1802.

NOVA SCOTIA. Hants Co.: Smileys Provincial Park, 3.v.2005, J. Ogden, spruce beetle trap, (4), NSNR; Smileys Provincial Park, 13.v.2005 and 3.vi.2005, J. Gordon, spruce-beetle trap, (2), NSNR.

Newly recorded in Nova Scotia and the Maritime Provinces as a whole (Fig. 2). In the east, recorded from Ontario and Quebec south to New Jersey; on the west coast from Alberta and British Columbia south to central California; also in Colorado and Wisconsin (Klimaszewski 1984). In the Palearctic region, known from throughout Europe, east to the Caucasus, Turkestan, and Siberia (Horion 1967). Found on dung, in litter and oak duff, and on a dead horseshoe crab (*Limulus* sp.) (Klimaszewski 1984).

Aleochara (Aleochara) curtula (Goeze, 1777).

PRINCE EDWARD ISLAND. Locality not indicated, 1974–1983, UPEI; **Queens Co.:** Millvale, 21.vi.2001, C.G. Majka, beside old mill pond, CGMC.

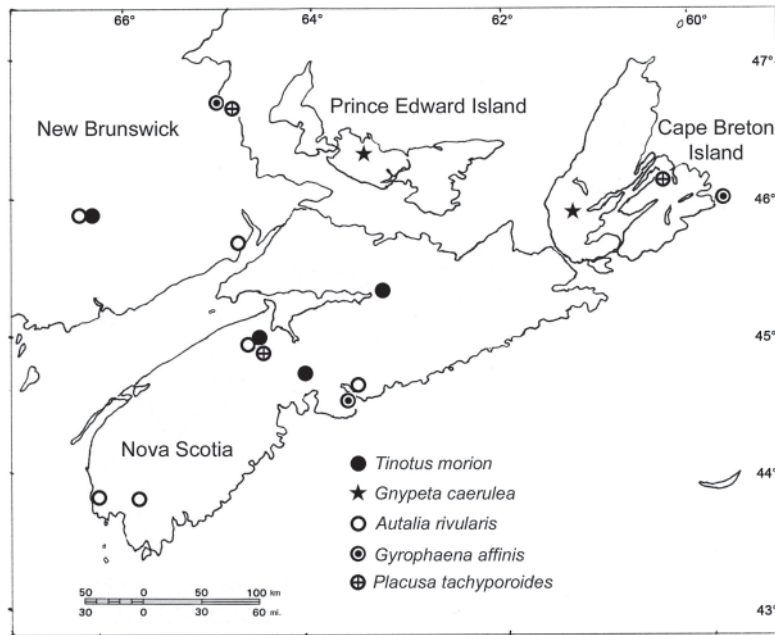
Newly recorded on Prince Edward Island (Fig. 2). Recorded from Ontario east through the Maritime Provinces to Newfoundland and south to Illinois and New Jersey; also from British Columbia (Klimaszewski 1984). In the Palearctic region, known from Europe, North Africa, Tenerife, and Asia (Smetana 2004). Found on feces and carcasses of various animals (Klimaszewski 1984). In the Maritime Provinces, found on dead mammals and birds, on feces, in pastures, and in decaying fungi.

Tinotus morion (Gravenhorst, 1802).

NOVA SCOTIA. Colchester Co.: Bible Hill, 25.vii.2004, K. Aikens, cow pasture, (2), CBU; **Halifax Co.:** Campbell Hill, 2–15.vi.1997, D.J. Bishop, red spruce forest, NSMC; **Kings Co.:** Kentville, 10.viii.2005, D.H. Webster, compost heap: moldy corncocks, DHWC; Kentville, 6.vii.2006, D.H. Webster, wet cat dung, (2), DHWC.

Newly recorded in Nova Scotia (Fig. 3). In North America recorded from New Brunswick, Quebec, Ontario, Alberta, British Columbia, Connecticut, and Nevada (Klimaszewski *et al.* 2002). In the Palearctic region it is found throughout much of Europe and North Africa east to the Caucasus and eastern Siberia (Horion 1967). Found in decaying organic matter, compost, rotting fungi, animal droppings, human feces, and carrion. Found in many different forest environments by employing a wide variety of collection techniques (Klimaszewski *et al.* 2002).

Fig. 3. Distribution of *Tinotus morion*, *Gnypeta caerulea*, *Autalia rivularis*, *Gyrophaena affinis*, and *Placusa tachyporoides* in the Maritime Provinces of Canada.



Oxypoda brachyptera (Stephens, 1832).

NOVA SCOTIA. Colchester Co.: Bible Hill, 7–14.xii.2005, K.R. Aikens, agricultural field, pitfall trap, NSMC.

Newly recorded in Nova Scotia (Fig. 2). In North America, previously recorded from New Brunswick, Quebec, and Ontario (Klimaszewski *et al.* 2006). Widely distributed in western and central Europe to the Far East of Russia (Smetana 2004). Species of *Oxypoda* are usually captured in forest litter and are common in moss, damp leaf mold, and fungi, and may also be found on carrion and dung (Klimaszewski *et al.* 2006).

Gnypeta caerulea (C.R. Sahlberg, 1830).

NOVA SCOTIA. Inverness Co.: 17.v.1996, J. MacMillan, CBU. **PRINCE EDWARD ISLAND. Queens Co.:** St. Patricks, 21.vii.2001, C.G. Majka, along stream, CGMC; St. Patricks, 18.viii.2002, C.G. Majka, along stream, CGMC.

Newly recorded in Nova Scotia, Prince Edward Island, and the Maritime Provinces as a whole (Fig. 3). Previously recorded from Newfoundland by Muona (1984). In the Palearctic region it exhibits a discontinuous distribution in boreoalpine, alpine, and montane habitats in northern and central Europe (Smetana 2004). Frequently found in riparian habitats and in debris along the margins of marshes, ponds, lakes,

and streams (Newton *et al.* 2001). Although treated as an introduced Palearctic species by Muona (1984) and Campbell and Davies (1991), its zoogeographic status is still unclear. It is possible that it could be a Holarctic species. It is provisionally included in this account.

Autalia rivularis (Gravenhorst, 1802).

NOVA SCOTIA. Halifax Co.: Burnside, 2.vi.2004, C. Cormier, on dead pig, SMU; **Kings Co.:** Kentville, 10.v.1956, C.J.S. Fox, ACNS; **Yarmouth Co.:** Coldstream Road east of Quinan, 19.vii.1993, J. and T. Cook, car net, JCC; Wellington, 23.viii.1992, J. Cook, on horse dung, (6), JCC.

Newly recorded in Nova Scotia (Fig. 3). Scattered records from five Canadian provinces and eight states in the United States of America (Hoebeke 1988; Klimaszewski *et al.* 2002). Horion (1967) reports *A. rivularis* from northern and central Europe, from mountains in southern Europe, and from the Caucasus. Smetana (2004) reported it from Europe east across Turkey, Kazakhstan, the Russian Far East, China (Gansu and Sichuan), and Japan (Hokkaido). Found in leaf litter, compost piles, and similar habitats of decomposing organic matter (Newton *et al.* 2001). In North America the species was first reported by Moore and Legner (1975) in their catalogue. Hoebeke

(1988) did not provide dates in his paper and his specimen records have been lost (R. Hoebeke, personal communication) so, at least for the time being, 1956 (above) is the earliest date of detection for this species on the continent.

Gyrophana affinis Mannerheim, 1830.

NOVA SCOTIA. Cape Breton Co.: Scatarie Island: NW Cove, 9.viii.2005, A. MacDonald, coniferous forest: in mushroom, CBU; **Halifax Co.:** Point Pleasant Park, 23.vi.2002, C.G. Majka, gilled fungus in coniferous forest, CGMC.

Newly recorded in Nova Scotia (Fig. 3). Widely distributed in the United States of America (Seevers 1951); in Canada, recorded from British Columbia, Manitoba, Quebec, and New Brunswick (Campbell and Davies 1991). Broadly distributed throughout the Palearctic region (Smetana 2004). Mycetophagous and obligate inhabitants of fleshy gilled fungi (Seevers 1951). The discovery of this species on Scatarie Island is noteworthy. Scatarie is a small (1497 ha) island located 2 km off the eastern shore of Cape Breton Island. Although currently uninhabited, it has been used as a fishing station by European fishers since at least the 15th century, a possible indication of the origin of this species in this remote locale.

Placusa tachyporoides (Waltl, 1838).

NOVA SCOTIA. Cape Breton Co.: George's River, 5.vii.1997, D.B. McCorquodale, CBU; **Kings Co.:** Kentville, 10.viii.2005, D.H. Webster, compost heap: moldy corn cobs, DHWC; North Alton, 17.vi.2004, D.H. Webster, on *Populus* firewood, DHWC; North Alton, 2.vi.2005, D.H. Webster, under *Populus* bark, (13), DHWC.

Newly recorded in Nova Scotia (Fig. 3). Recorded from New Brunswick, Ontario, Quebec, British Columbia, Minnesota, Massachusetts, and California (Moore and Legner 1975; Klimaszewski *et al.* 2001). In the Palearctic region it is found throughout Europe, the Mediterranean and east to the Caucasus, Siberia, and Japan (Horion 1967). Klimaszewski *et al.* (2007) give its status as "uncertain" (introduced Palearctic or Holarctic). Found in deciduous, coniferous, and mixed forests; species of *Placusa* are mycetophagous and are frequently encountered in the galleries of scolytine (Curculionidae) beetles, where they feed on fungal hyphae as well as on the fruiting bodies of *Trichoderma* fungi (Klimaszewski *et al.* 2001).

Mocyta fungi (Gravenhorst, 1806).

NOVA SCOTIA. Cape Breton Co.: George's River, 29.v.2003, D.B. McCorquodale, (2), CBU; Millville, 28.vi.1997, D.B. McCorquodale, CBU; **Colchester Co.:** Bible Hill, 16.v–10.ix.2005, K.R. Aikens, cow pasture, pitfall trap, (17), CBU; Debert, 7.vi.1996, D.B. McCorquodale, CBU; **Cumberland Co.:** Oxford, 14.vi.1989, E. Georgeson, NSNR; Oxford, 26.v.1993, E. Georgeson, NSNR; **Digby Co.:** Brier Island: Pond Cove, 10.viii.2004, J. Ogden and K. Goodwin, rocky shore, pitfall trap, JOC; Brier Island: Pond Cove, 15.ix.2004, J. Ogden and K. Goodwin, sand dunes, pitfall trap, JOC. **PRINCE EDWARD ISLAND: Queens Co.:** Trout River, 28.vi.2003, C.G. Majka, edge of marsh: horse dung, CGMC; Harrington, 9–23.viii.2004, C. Noronha, soybean field, pitfall trap, ACPE; Harrington, 11.vii.2005, 25.vii.2005, and 22.viii.2005, M.E.M. Smith, grain field, pitfall trap, (7), ACPE.

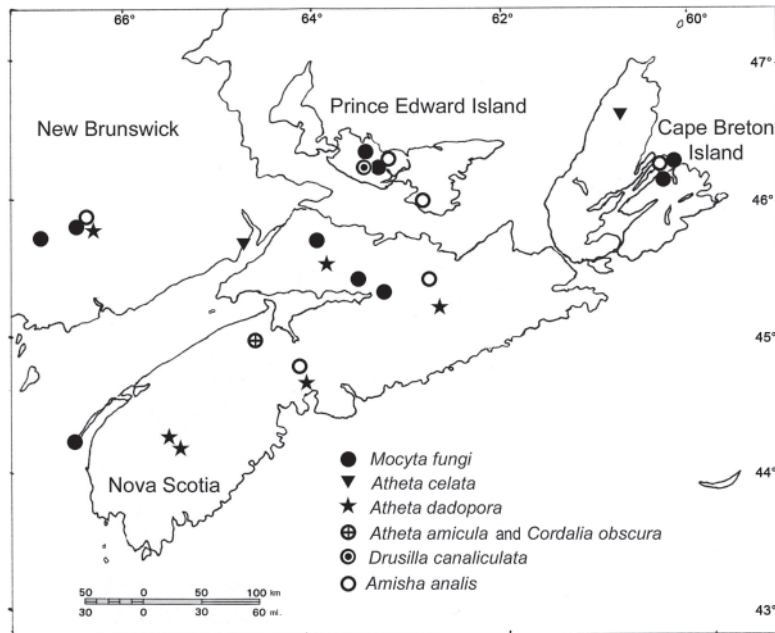
Newly recorded in Nova Scotia and Prince Edward Island (Fig. 4). Recorded from Newfoundland, New Brunswick, Ontario, Quebec, Maine, Massachusetts, Minnesota, New York, Rhode Island, and Oregon (Gusarov 2003). Widely distributed across Europe, North Africa, Asia (Smetana 2004), and New Zealand (Sivasubramaniam *et al.* 1997). Collected in fungi, litter (mainly deciduous), rotten wood, mosses, and decaying plants (Burakowski *et al.* 1981).

Amischa analis (Gravenhorst, 1802).

NOVA SCOTIA. Cape Breton Co.: Millville, 28.vi.1997, D.B. McCorquodale, CBU; **Hants Co.:** 14.v–2.vi.1997, D.J. Bishop, Panuke Lake, red spruce forest, flight-intercept trap, NSMC; **Pictou Co.:** Lorne, 2–15.vi.1997, D.J. Bishop, mature red spruce – hemlock forest, flight-intercept trap, NSMC. **PRINCE EDWARD ISLAND. Queens Co.:** Harrington, 30.v.2005 and 14.vi.2005, M.E.M. Smith, grain field, pitfall trap, (2), ACPE; Pinette, 24.vi.2003, C.G. Majka, coniferous forest: under bark, (2), CGMC.

Newly recorded in Nova Scotia and Prince Edward Island (Fig. 4). Previously recorded from New Brunswick, Newfoundland, and the United States of America (Muona 1984, 1990; Klimaszewski *et al.* 2005). Widely distributed across Europe, North Africa, and Asia (Smetana 2004). In Europe, found inhabiting both lowland and mountainous regions, open areas, and forests. Occurring on soils of different types, among mosses, under litter, and in decaying plant debris.

Fig. 4. Distribution of *Mocyta fungi*, *Atheta celata*, *Atheta dadopora*, *Atheta amicula*, *Cordalia obscura*, *Drusilla canaliculata*, and *Amischa analis* in the Maritime Provinces of Canada.



At some locales in Europe only females are present, probably because of parthenogenetic reproduction (Burakowski *et al.* 1981).

Atheta (Datomicra) celata (Erichson, 1837).

NEW BRUNSWICK. Albert Co.: Crooked Creek, 22.viii.2003, C.G. Majka, along stream: in decaying gill fungus, CGMC.

Newly recorded in New Brunswick (Fig. 4). Previously known in North America from Nova Scotia and Alaska (Majka *et al.* 2006). Widely distributed throughout Europe, east throughout eastern and western Siberia, and south to the North African coast (Smetana 2004). In Nova Scotia, found in owl nests. In Europe, known to inhabit the nests of mammals and birds (Majka *et al.* 2006).

Atheta (Datomicra) dadopora Thomson, 1867.

NOVA SCOTIA. Annapolis Co.: Kejimikujik National Park: Big Dam Lake, 27.vi–7.vii.2004, H. Love, hemlock forest, NSMC; **Cumberland Co.:** Wentworth, 1.viii.1965, B. Wright, sugar maple on hardwood ridge, window trap, NSMC; **Halifax Co.:** Abraham's Lake, 1–16.vii.1997, D.J. Bishop, old red spruce forest, flight-intercept trap, NSMC; Big Indian Lake, 9.viii.2003, P. Dollin, red spruce forest, pitfall trap, NSMC; **Queens Co.:** Kejimikujik National Park: Cobreille Lake, 13–21.viii.2005, R. Ewing, maple–oak–

birch forest, NSMC; Kejimikujik National Park, 28.vii.1994, 28.vi–9.viii.1994, and 24.viii.1994, B. Wright, deciduous forest, (3), NSMC; Kejimikujik National Park, 13–28.vii.1994, B. Wright, hemlock forest, (3), NSMC.

Newly recorded in Nova Scotia (Fig. 4). Previously recorded from Rhode Island, Pennsylvania, New York, Newfoundland, and New Brunswick (Gusarov 2003; Klimaszewski *et al.* 2005). Widely distributed across Europe east to portions of Asia (Smetana 2004). Found in decaying fungi, under cow's dung, and in fallen leaves (Burakowski *et al.* 1981). Although Gusarov (2003) listed this as an introduced Palearctic species newly recorded in North America, its zoogeographic status is still unclear. Possibly Holarctic in distribution. Provisionally included in this account.

Atheta (Microdota) amicula (Stephens, 1832).

NOVA SCOTIA. Kings Co.: Kentville, 10.viii.2005, D.H. Webster, compost heap: moldy corncobs, (2) DHWC.

Newly recorded in Nova Scotia, the Maritime Provinces, and Canada as a whole (Fig. 4). Previously known in North America from Washington State (Moore and Legner 1975). Widely distributed across Europe, North Africa, Asia, and the Neotropical region (Smetana 2004). In Europe, inhabiting both lowland and mountainous

regions. Occurring in decaying fungi, under excrement, in fallen leaves, and in mosses (Burakowski *et al.* 1981).

Philhygra botanicarum Muona, 1983.

NOVA SCOTIA. Cape Breton Co.: Mill Pond, 17.v.2003, D.B. McCorquodale, CBU.

Newly recorded in Nova Scotia and in the Maritime Provinces as a whole (Fig. 2). Although Muona (1984) included this species amongst Palearctic aleocharines occurring in North America, we believe that it is probably a Holarctic species. Although we newly record this species, we exclude it from further analysis of the introduced species of the region.

Cordalia obscura (Gravenhorst, 1802).

NOVA SCOTIA. Kings Co.: Kentville, 9.vi.2006, D.H. Webster, on weathered cat dung, DHWC; Kentville, 9.vii.2006, D.H. Webster, rotting watermelon rind: compost pile, DHWC.

Newly recorded in Nova Scotia and the Maritime Provinces as a whole (Fig. 4). Previously known in Canada from Ontario and Quebec and in the United States of America from Illinois to New Hampshire in the northeast and in Colorado (Hoebeke 1985). Found throughout Europe and North Africa east to Turkey, and on the Azores, Madeira, and the Canary Islands (Horion 1967; Smetana 2004). Common in decaying plant material and also found on carrion and dung (Horion 1967). Found in the nests of several species of birds (Hicks 1959). In North America found in grass clippings, decaying vegetation, compost, rotting bracket fungi, and garden soil (Hoebeke 1985).

Drusilla canaliculata (Fabricius, 1787).

NOVA SCOTIA. Inverness Co.: Wilburn, 19.v.1996, D.B. McCorquodale, CBU. **PRINCE EDWARD ISLAND. Queens Co.:** Harrington, 14.vi.2004, 28.i.2004, 9.viii.2004, and 16.ix.2004, C. Noronha, barley field, pitfall trap, (5), ACPE; Harrington, 9–23.viii.2004, C. Noronha, soybean field, pitfall trap, (2), ACPE; Harrington, 30.v.–5.ix.2006, C. Noronha, potato field, pitfall trap, (18), ACPE.

Newly recorded in Nova Scotia, Prince Edward Island, and the Maritime Provinces as a whole (Fig. 4). In North America, recorded from Ontario, Quebec, New York, Kentucky, and Alaska (Gusarov 2003). Found in disturbed habitats (Gusarov 2003). Widely distributed across Europe east to portions of Asia (Smetana 2004). Found in open areas under vegetation,

stones, mosses, and decomposing materials. A very eurytopic species adapted to a wide range of ground conditions. Found on dry, heathy, and sandy soils; on damp loam and in humic soils; on moorlands, in wet soil, and in sphagnum. Often found in the proximity of ants; a myrmecophage, but not strictly a myrmecophile (Horion 1967).

Oxytelinae

Deleaster dichrous (Gravenhorst, 1802).

NEW BRUNSWICK. Gloucester Co.: Pont-Landry, 12.viii.1979, Y. Chaisson, UMNB; **Kent Co.:** Kouchibouguac National Park, 18.v.1977, 23.v.1977, 30.v.1977, and 27.vi.1977, J.D. Lafontaine, (11), CNC; Kouchibouguac National Park, 30.viii.1977, S.J. Miller, CNC; **Sunbury Co.:** Maugerville, 28.v.1978, Agriculture Canada, (3), NSMC; **Westmorland Co.:** Moncton, 8.ix.1978, S. Chaisson, UMNB; **York Co.:** Canterbury: Browns Mt. fen, 22.vii.2004, D. Sabine, J. Edsall, K. Bredin, and R. Webster, calcareous fen, ultraviolet-light trap, RPWC. **NOVA SCOTIA.** Thirty-five specimens examined from Cumberland, Guysborough, Halifax, Pictou, and Victoria counties. The earliest record is from 1967 (**Victoria Co.:** Middle River, 15.viii.1967, B. Wright, (8), NSMC).

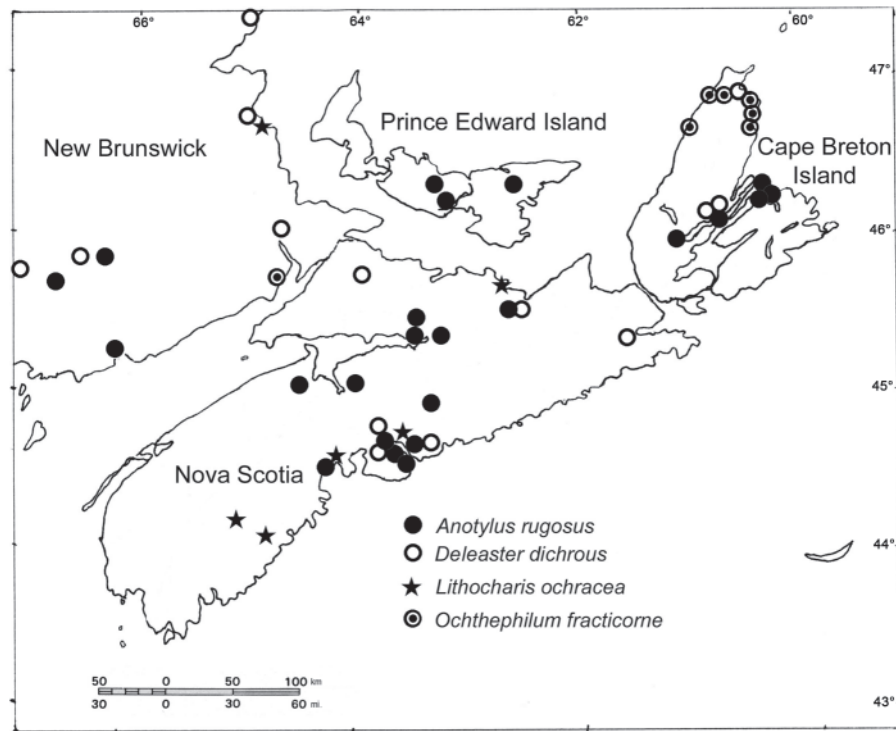
Newly recorded from New Brunswick, Nova Scotia, and the Maritime Provinces as a whole (Fig. 5). In North America, recorded from Ontario, Quebec, Newfoundland, Labrador, New Hampshire, and Maine (Campbell and Davies 1991; Dearborn and Donahue 1993; Chandler 2001). In the Palearctic region, found throughout Europe, Russia, and North Africa east through Turkey to the Caucasus to Iran (Herman 2001). Found in forest litter and wet debris or under rocks near streams, where adults may be predaceous (Newton *et al.* 2001).

Coprophilus striatulus (Fabricius, 1792).

NOVA SCOTIA. Halifax Co.: Point Pleasant Park, 30.iii.2003, C.G. Majka, coniferous forest: under bark of white pine, CGMC.

Newly recorded from Nova Scotia and the Maritime Provinces as a whole (Fig. 6). In North America, recorded from Ontario, Quebec, New York, and New Hampshire (Hoebeke 1995a; Chandler 2001). In the Palearctic region, found throughout Europe (Herman 2001). Commonly found in decomposing plant material, on compost, in haystacks and vegetable refuse, and in cow dung and decaying leaves;

Fig. 5. Distribution of *Anotylus rugosus*, *Deleaster dichrous*, *Lithocharis ochracea*, and *Ochtheophilum fracticorne* in the Maritime Provinces of Canada.



occasionally beneath cadavers, stones, under wet bark of deciduous trees, in sap flows, and in mammal nests in winter. Frequently found on roads, pavements, and masonry walls in the spring (Hoebeke 1995a).

Carpelimus obesus (Kiesenwetter, 1844).

NOVA SCOTIA. Cape Breton Co.: Sydney: CBU campus, 11–14.ix.1998, S. Kavanagh, pan trap, CBU; **Cumberland Co.:** Oxford, 12.vi.1988, 28.vii.1988, 29.vii.1988, 4.viii.1988, 11.viii.1988, 12.viii.1988, and 13.viii.1988, E. Georgeson, ultraviolet-light trap, (7), NSMC; **Halifax Co.:** Long Lake, 25.v.2002, C.G. Majka, coniferous forest, CGMC; Petpeswick, 23.vi.1971, B. Wright, NSMC. **PRINCE EDWARD ISLAND. Queens Co.:** St. Patricks, 21.vii.2001, C.G. Majka, along stream, CGMC.

Newly recorded from Nova Scotia and Prince Edward Island (Fig. 6). In North America, recorded from Quebec, New Brunswick, and Indiana (Klimaszewski *et al.* 2005). In the Palearctic region, found throughout Europe and in North Africa east through Turkey and Iran to Uzbekistan and Mongolia (Herman 2001). Collected on muddy banks of rivers, streams,

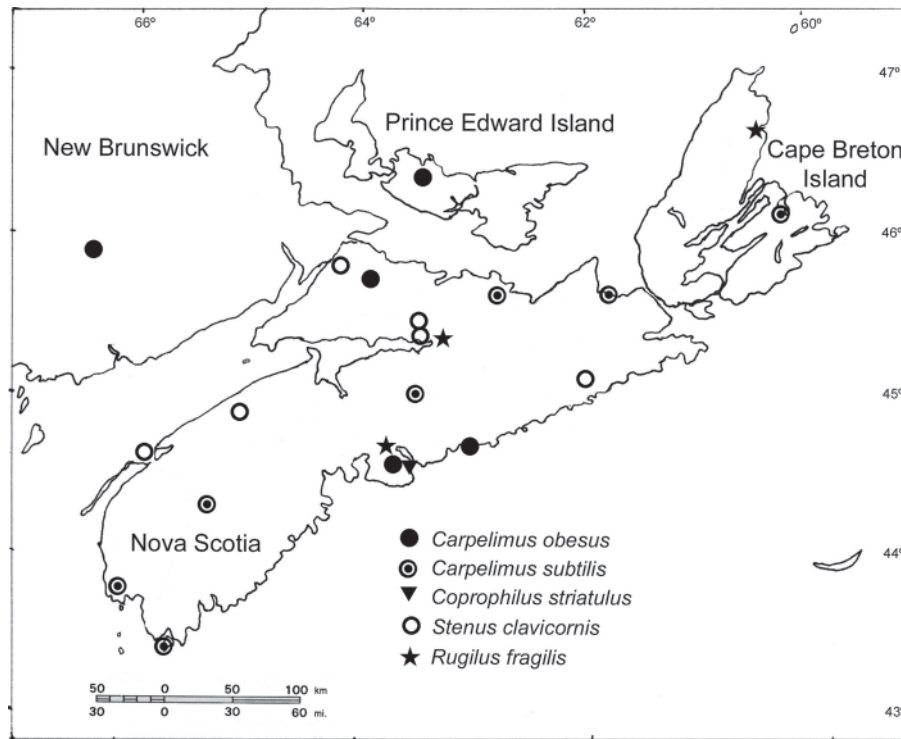
ponds, and puddles, usually under stones and rotten plants (Burakowski *et al.* 1979).

Carpelimus subtilis (Erichson, 1839)

NOVA SCOTIA: Annapolis Co.: Channel Lake, 12–22.viii.2004, H. Love, maple-oak-birch forest, pitfall trap, CGMC; **Antigonish Co.:** Pomquet, iv.1996, R.F. Lauff, leaf litter, (14), STFX; **Colchester Co.:** Shubenacadie, 29.viii.1997, J. Ogden, NSNR; **Pictou Co.:** Lyons Brook, 20.viii.2002, E. Georgeson, flight-intercept trap, NSNR; **Shelburne Co.:** Bon Portage Island, 27.viii.2002, D.B. McCorquodale, CBU; **Yarmouth Co.:** Ellenwood Provincial Park, 26.vi.1995, J. and F. Cook, mixed forest, JCC.

Newly recorded from Nova Scotia and Canada as a whole (Fig. 6). In North America previously recorded from New York, Pennsylvania, and Rhode Island (Notman 1920; Moore and Legner 1975). In the Palearctic region, found throughout Europe (including Great Britain), east to Russia and Mongolia; also in the Azores (Herman 2001). Found on exposed banks of sand, mud, shingle, *etc.*, alongside rivers, as well as in other wet habitats (*e.g.* seepages,

Fig. 6. Distribution of *Carpelimus obesus*, *Carpelimus subtilis*, *Coprophilus striatulus*, *Stenus clavicornis*, and *Rugilus fragilis* in the Maritime Provinces of Canada.



pond margins) where bare sediments are found (Fowles 2004).

Anotylus rugosus (Fabricius, 1775).

PRINCE EDWARD ISLAND. Kings Co.: Upton, 11.vi.1953, F.M. Cannon, ACPE; **Queens Co.:** Charlottetown, 1958, D.C. Read, ACPE; Charlottetown, 9.ix.1979, M.E.M. Smith, field, ACPE; Harrington, 9.vi.1987, J.G. Stewart, potato field, ACPE; Harrington, 27.vii.2000, 5.viii.2000, and 17.viii.2000, M.E.M. Smith, potato field, (4), ACPE; Harrington, 28.vi.2004, 12.vii.2004, and 23.v.2005, C. Noronha, barley field, (3), ACPE; Harrington, 30.v.–24.vii.2006, C. Noronha, potato field, pitfall trap, (7), ACPE.

Newly recorded on Prince Edward Island (Fig. 5). In Canada, recorded from British Columbia, Manitoba, Ontario, Quebec, New Brunswick, Nova Scotia, and Newfoundland (Campbell and Davies 1991); scattered records in the eastern United States of America (Downie and Arnett 1996). In the Palearctic region, recorded throughout Europe (including Iceland), in Algeria, Russia, and east through Turkey and the Caucasus to Mongolia (Herman

2001). Frequently found on dung, carrion, and other decomposing organic matter (Newton *et al.* 2001).

Steninae

Stenus clavicornis (Scopoli, 1763).

NOVA SCOTIA. Annapolis Co.: Melvern Square, 24.vi.1992, E. Georgeson, NSNR; **Colchester Co.:** Debert, 5.vi.1990, M. Leblanc, NSNR; Debert, 3.vi.1993 and 29.viii.1993, E. Georgeson, (2), NSNR; Debert, 10.v.1994, 16.v.1994, 31.v.1994, and 26.v.1996, J. Ogden, (8), NSNR; Masstown, 7.vi.1990, T.D. Smith, (2), NSNR; Masstown, 6.v.1993 and 18.vi.1993, J.C. McPhee, NSNR; **Cumberland Co.:** Amherst, 6.vi.1993, J. Ogden, NSNR; Amherst Marsh, 24.vi.1994, J. Ogden, (2), NSNR; **Digby Co.:** Bayview, 20.vi.1996, J. Ogden, NSNR; **Guysborough Co.:** Malay Lake, 2–15.vi.1997, D.J. Bishop, red spruce forest, flight-intercept trap, NSMC.

Newly recorded in Nova Scotia (Fig. 6). Although Campbell and Davies (1991) recorded this species in New Brunswick, the present authors were unable to locate the specimens that formed the basis of the report. Thus, the

particulars of its occurrence in the province are not presently known. In North America the species has been recorded from Quebec, New Brunswick, Maine, and New Hampshire (Puthz 1975; Campbell and Davies 1991; Chandler 2001). In the Palearctic region, known from across Europe and Russia, east through Turkey and the Caucasus to Mongolia, China, and Korea (Herman 2001). Occurring in forested and open areas, mainly in moist places, under stones, in fallen leaves and other plant debris, among mosses, and in forest litter (Burakowski *et al.* 1979).

Paederinae

Lithocharis ochracea (Gravenhorst, 1802).

NOVA SCOTIA. Halifax Co.: Burnside, 9.vi.2004, C. Cormier, on dead pig, SMU; **Lunenburg Co.:** Chester, 31.vii.1969, 1.viii.1969, and 16.viii.1969, B. Wright, (4), NSMC; **Pictou Co.:** Lyon's Brook, 14.viii.1989, E. Georgeson, NSNR; **Queens Co.:** Medway River, 13.vii.1993, J. Cook, car net, (6), JCC; Ponthook Lake, 13.vii.1993, J. Cook, ultraviolet-light trap, (8), JCC.

Newly recorded in Nova Scotia (Fig. 5). There are scattered records from various states and provinces in the United States of America and Canada, primarily on the Atlantic and Pacific coasts (Moore and Legner 1975; Campbell and Davies 1991). A synanthropic species found in fields, parks, litter, decomposing hay, and compost (Drugmand 1989).

Ochtheophilum fracticorne (Paykull, 1800).

NEW BRUNSWICK. Albert Co.: Mary's Point, 23.viii.2003, C.G. Majka, coastal dunes; under flotsam, CGMC; **York Co.:** New Maryland, 14.iv.2004, R.P. Webster, mixed forest: leaf litter, RPWC.

Newly recorded in New Brunswick (Fig. 5). Previously recorded from British Columbia, Connecticut, Maine, Massachusetts, Michigan, New Hampshire, Nova Scotia, Ontario, and Quebec (Moore and Legner 1975; Campbell and Davies 1991; Downie and Arnett 1996; Pupedis 1997; Chandler 2001). Found throughout much of Europe (Alonso-Zarazaga 2007). Found in litter and moss in boggy or damp areas (Newton *et al.* 2001); a hydrophilic, synanthropic species (Drugmand 1989). Although Campbell and Davies (1991) listed this as a Holarctic species, we provisionally follow

Drugmand (1989), who treats it as a native Palearctic species.

Staphylininae

Gyrophynus fracticornis (O.F. Müller, 1776).

PRINCE EDWARD ISLAND. Queens Co.: Charlottetown, 1952, F.M. Cannon, ACPE; Fredericton, 17.vi.1981, G. Hogan, UPEI.

Newly recorded on Prince Edward Island (Fig. 7). Widely distributed across North America (Smetana 1982). In the Palearctic region, widely distributed in Europe (including Madeira and the Azores) and Russia to eastern Siberia, through Turkey to Kazakhstan and Afghanistan (Herman 2001). Found in decaying organic matter such as compost, grass piles, and rotting plant debris, and is particularly common in mammal (mainly cow and horse) dung (Smetana 1982).

Leptacinus intermedius Donisthorpe, 1936.

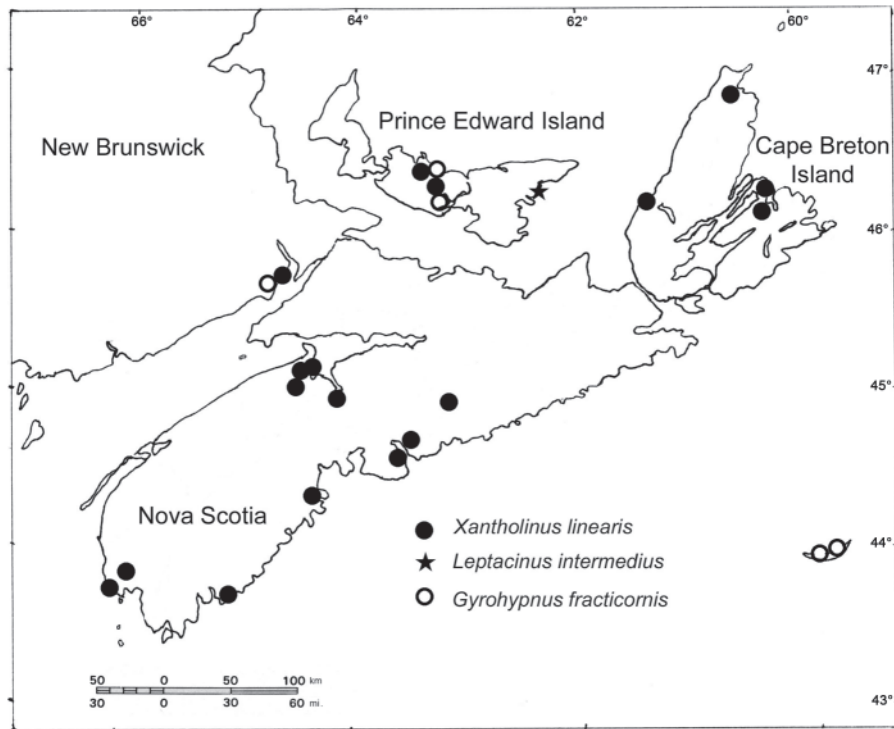
PRINCE EDWARD ISLAND. Kings Co.: Launching, 26.viii.2003, C.G. Majka, seashore: under flotsam, CGMC.

Newly recorded in Prince Edward Island and the Maritime Provinces as a whole (Fig. 7). Majka and Ogden (2006) reported a specimen of *L. intermedius* from Mary's Point, New Brunswick. This record was based on a misidentification (by C.G.M.) and this species is removed from the faunal list of New Brunswick. Widely distributed in North America except for the southeastern portion of the United States of America (Smetana 1982). In the Palearctic region, widely distributed in Europe and found in North Africa and Turkey (Herman 2001). Recorded in a wide variety of decomposing materials including dung, compost, and decaying vegetable matter (Smetana 1982).

Xantholinus (Xantholinus) linearis (Olivier, 1795).

NEW BRUNSWICK. Albert Co.: Mary's Pt., 9.viii.2002, C.G. Majka, coastal field: compost, CGMC; Mary's Pt., 30.xi.2005, D.S. Christie, in house, CGMC; Mary's Pt., 12.v.2007, C.G. Majka, coastal field, CGMC. **PRINCE EDWARD ISLAND. Queens Co.:** St. Patricks, 25.vi.2003, C.G. Majka, coniferous forest, CGMC; Trout River, 28.vi.2003, C.G. Majka, edge of marsh: horse dung, CGMC; Harrington, 14.vi.2004, 12.vii.2004, 16.ix.2004, 23.v.2005, and 15.ix.2005, C. Noronha, barley field, (14), ACPE; Harrington, 30.v–26.vi.2006, C. Noronha, potato field, pitfall trap, (23), ACPE.

Fig. 7. Distribution of *Xantholinus linearis*, *Leptacinus intermedius*, and *Gyroyhypnus fracticornis* in the Maritime Provinces of Canada.



Newly recorded in New Brunswick and Prince Edward Island (Fig. 7). In North America, recorded from Massachusetts, New Hampshire, Nova Scotia, New York, Pennsylvania, and Rhode Island in the east and British Columbia, California, Idaho, Nevada, Oregon, Utah, and Washington in the west (Smetana 1982; Campbell and Davies 1991; Chandler 2001). In the Palearctic region, widely distributed in Europe (including Madeira and the Azores), North Africa, and Russia to eastern Siberia, through Turkey and the Caucasus to Iran and Kazakhstan (Herman 2001). Found in many kinds of decaying organic matter such as animal dung, compost piles, and decaying vegetation; also in leaf litter and debris and amongst low vegetation in moist habitats; often around gardens and farmhouses (Smetana 1982).

Tasgius (Tasgius) ater (Gravenhorst, 1802).

NEW BRUNSWICK. Albert Co.: Mary's Pt., 9.viii.2002, C.G. Majka, seashore: under rock, CGMC; **Gloucester Co.:** St. Simon, 21.viii.1983, P. Mallet, UMNB; **Kings Co.:** Hampton, 15.vi.1978, Y. Bastarache, UMNB; **Madawaska Co.:** 16.viii.1980, G. Grondin, UMNB; **Westmoreland**

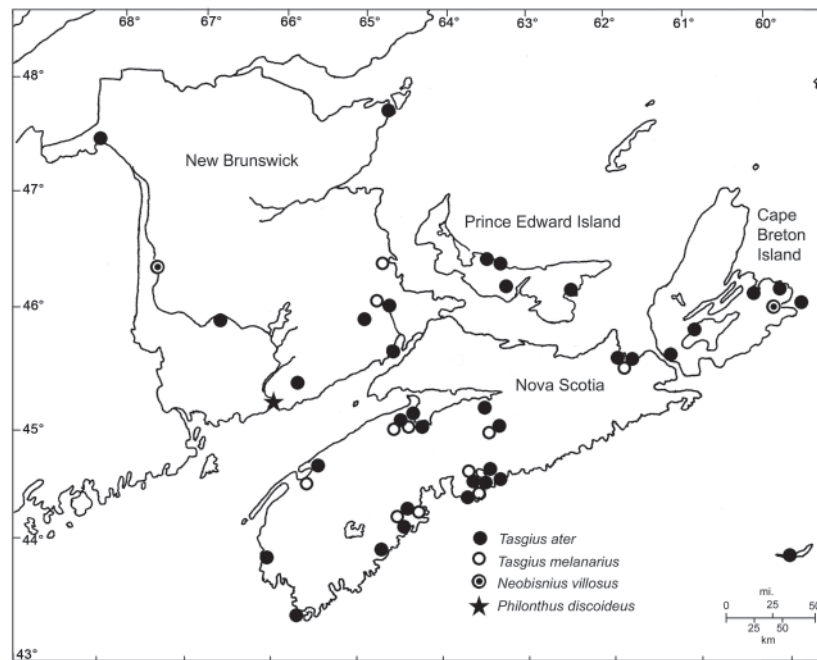
Co.: Moncton, 8.viii.1983, P. Tremblay, UMNB; Moncton, 7.x.1983, A. Ferron, UMNB; Salisbury, 2.viii.1949, E.A. Eagles, NSAC. **PRINCE EDWARD ISLAND. Kings Co.:** Woodville Mills, 6.ix.2001, C.G. Majka, deciduous forest: under rotten log, CGMC; Woodville Mills, 14.viii.2002, C.G. Majka, old field: under log, CGMC; **Queens Co.:** Cavendish, 14.vi.2002, C.G. Majka, coastal lagoon: under rock, CGMC; Cornwall, summer 1990, M.E.M. Smith, ACPE; North Rustico, 13.vii.2001, C.G. Majka, seashore: under rock, CGMC.

Newly recorded in New Brunswick and Prince Edward Island (Fig. 8). In Canada, recorded from British Columbia, Ontario, Quebec, Nova Scotia, and Newfoundland (Campbell and Davies 1991, as *Staphylinus ater*); scattered records in the United States of America except for the southwest (Downie and Arnett 1996). In the Palearctic region, found throughout Europe, Russia, and North Africa east to Syria and Iran (Herman 2001). Found beneath stones and wood near water (Downie and Arnett 1996).

Tasgius (Rayacheila) melanarius (Heer, 1839).

NEW BRUNSWICK. Kent Co.: Buctouche, 26.viii.1999, D. Audet, UMNB; **Westmoreland**

Fig. 8. Distribution of *Tasgius ater*, *Tasgius melanarius*, *Neobisnius villosus*, and *Philonthus discoideus* in the Maritime Provinces of Canada.



Co.: Moncton, 9.x.2001, R. Robichaud, UMN. **NOVA SCOTIA.** Thirty-five specimens examined from Annapolis, Antigonish, Colchester, Halifax, Kings, and Lunenburg counties. The earliest record is from 1991 (**Kings Co.:** New Minas, v.xii.1991, I. Pearsell, neglected apple orchard, (5), NSMC).

Newly recorded in New Brunswick, Nova Scotia, and the Maritime Provinces as a whole (Fig. 8). In Canada, recorded from Ontario and Quebec (Campbell and Davies 1991); in the United States of America there are records from Connecticut, Massachusetts, and Washington (Newton 1987). In the Palearctic region, found throughout Europe and Russia east through Turkey and the Caucasus to Kazakhstan (Herman 2001). Found under debris near water (including marine situations) but also common inland in synanthropic situations, including urban areas (Newton *et al.* 2001).

Neobisnius villosulus (Stephens, 1833),

NEW BRUNSWICK. Carleton Co.: Hartland, 2.viii.2004, R.P. Webster, river margin: moist clay soil, RPWC. **NOVA SCOTIA. Cape Breton Co.:** Mira, 10.vii.1994, T. Nicoll, CBU.

Newly recorded in New Brunswick, Nova Scotia, and the Maritime Provinces as a whole (Fig. 8). In Canada, recorded from Ontario and

Quebec (Campbell and Davies 1991). In the Palearctic region, widely distributed in Europe east to Russia, Ukraine, and the Caucasus (Herman 2001). Found mainly in moist habitats including the margins of rivers, marshes, and lakes (Newton *et al.* 2001).

Philonthus discoideus (Gravenhorst, 1802).

NEW BRUNSWICK. Saint John Co.: Saint John, vi.190?, W. McIntosh, NBM.

Newly recorded in New Brunswick and the Maritime Provinces as a whole (Fig. 8). In Canada, recorded from Ontario and Quebec; in the United States of America there are records from New England, the Gulf of Mexico coast from Florida to Veracruz, Mexico, and in the southwestern United States of America from Wyoming south to Colorado, Arizona, and Baja California in Mexico (Smetana 1995). Widely distributed throughout Europe, Russia, the Middle East, Central Asia, the Far East, Southeast Asia, Australia, many parts of Africa, the West Indies, and Central America south to Venezuela (Herman 2001). A synanthropic species associated with compost, manure, and various other types of organic debris (Smetana 1995).

Philonthus rectangulus Sharp, 1874.

NOVA SCOTIA. Cape Breton Co.: George's River, 7.v.2005, D.B. McCorquodale,

compost, CBU; **Halifax Co.:** Burnside, 12.v.2004 and 14.vi.2004, C. Cormier, on dead pig, (2), NSMC. **PRINCE EDWARD ISLAND. Queens Co.:** Harrington, 18.ix.2006, C. Noronha, potato field, pitfall trap, ACPE.

Newly recorded in Nova Scotia and Prince Edward Island (Fig. 1). Widely distributed throughout southern Canada (north to the Queen Charlotte Islands in the west and Newfoundland in the east) and the United States of America south to southern Mexico (Smetana 1995). It appears to originally have been native to Japan before spreading to China in 1901 and arriving in Europe by 1916 (Smetana 1995). Presently widely distributed across the entire Palearctic region and much of the Far East (Herman 2001). Found in all kinds of decaying organic matter, particularly in synanthropic situations. It is particularly common in animal dung, compost, and rotting plant debris (Smetana 1995).

Discussion

As a result of the present investigations 79 species of introduced Staphylinidae are now known to occur in the Maritime Provinces. Of these, 73 are known to occur in Nova Scotia, 29 on Prince Edward Island, and 54 in New Brunswick (Table A1). Twenty-five species are newly recorded in Nova Scotia, 16 on Prince Edward Island, and 10 in New Brunswick, for a total of 51 new provincial records. Although the staphylinid fauna of the region is not yet completely known, 73 of the 425 species (17.2%) known in Nova Scotia and 29 of 87 species (33.3%) on Prince Edward Island are introduced.

While some species, including *Anotylus rugosus*, *Creophilus maxillosus*, *Philonthus carbonarius* (Gravenhorst), *P. discoideus*, *P. longicornis* Stephens, and *P. politus* were recorded a century or more ago in the Maritime Provinces, the comparative dearth of collecting effort for Staphylinidae in the region means that many species have been detected only recently. The mean years of first detection provide an index of the comparatively recent interest in this family. In the Maritime Provinces as a whole, for the 79 species of introduced Staphylinidae it is 1968. In contrast, the mean year of first detection of the 34 species of introduced Carabidae found in the region is 1948 (Bousquet 1992; Majka *et al.* 2007b) and for the 60 species of introduced Curculionidea it is 1947 (Majka *et al.* 2007a); this is an indication that detailed attention

to Staphylinidae has lagged behind that of other families in the Maritime Provinces. It is instructive to note that 12 of the 79 species (15.2%) were first detected in Atlantic Canada, a finding in accord with the important role of this region as a springboard for the dispersal of introduced species (Brown 1940, 1950, 1967; Lindroth 1957, 1963).

The mean year of first detection in New Brunswick is 1977, in Nova Scotia 1971, and on Prince Edward Island 1985, whereas the mean year of first detection of these species in North America is 1904 (Table A1). Again this does not necessarily indicate that introductions to the Maritime Provinces occurred more recently than in other regions, but rather that a meagre early collecting record for the family makes it difficult to determine how long many species have been present in the region.

Species such as *C. maxillosus* and *P. politus* were recorded in Nova Scotia circa 1827 (Kirby 1837) from specimens collected by Captain Basil Hall in 1827–1828. Archeological studies conducted by Prévost and Bain (2006) in Newfoundland yielded remains of *C. maxillosus* and *Quedius mesomelinus* (Marsham) from circa 1620. Evidence from Bain (1998) and Prévost and Bain (2006) indicates that a substantial number of introduced European beetles were already established in North America in the 17th century, significantly altering our understanding of the introduction history of these species. In many instances evidence from museum and other collections is insufficient to resolve such questions and archeological studies are needed to better understand this history of introduction and dispersal.

Even the fragmentary history we do know is often neither clear nor simple. Maritime Provinces populations of species such as *Atheta (Microdota) amicula* and *Quedius curtippennis* Bernhauer are clearly disjunct from earlier introductions on the Pacific coast and evidently represent separate introduction events. Twelve species of introduced Palearctic staphylinids are found on Sable Island, 160 km from the coast of Nova Scotia (Wright 1989). These may have been introduced directly from Europe or trans-shipped from the mainland of Nova Scotia from populations established there. *Gyrophana affinis* on Scatarie Island may have been established there as early as the 15th century by European fishers.

Of the 79 introduced species of staphylinids found in the region, 16, including *Sepedophilus*

testaceus (Fabricius), *Tachinus rufipes*, *Tachyporus dispar*, *T. nitidulus*, *Mocyta fungi*, *Amischa analis*, *Atheta (Thinobaena) vestita* (Gravenhorst), *Drusilla canaliculata*, *Stenus clavicornis*, *Quedius curtipennis*, *Q. fuliginosus* (Gravenhorst), *Q. molochinus* (Gravenhorst), *Tasgius (Tasgius) ater*, *Philonthus concinnus* (Gravenhorst), *P. cruentatus* (Gmelin), and *P. varians* (Paykull), were found by Lindroth (1957) in quarries in southwestern England where dry ballast destined for Atlantic Canada originated, a suggestive indication that these species may have been introduced to the region via this mechanism.

Many introduced species (*Aleochara* spp., *Tinotus morion*, *Autalia rivularis*, *Anotylus rugosus*, *Lithocharis ochracea*, *Ochtheophilum fracticorne*, *Philonthus* spp., etc.) are associated with decomposing organic matter and are frequently found in synanthropic situations. Many of these species have colonized native habitats as well. *Deleaster dichrous* (Gravenhorst) is frequently found in damp basements of buildings but can also be collected along river courses in relatively undisturbed areas. Species such as *Homalota plana* Gyllenhal, *Placusa tachyporoides*, and *P. incompleta* live in sub-cortical environments and might have been introduced in connection with the importation of tree-nursery stock (Majka and Klimaszewski 2004; Klimaszewski et al. 2007). In Nova Scotia, Majka et al. (2006) found *Phyllodrepa floralis* (Paykull), *Atheta (Datomicra) celata*, *Bisnius cephalotes* (Gravenhorst), *Philonthus carbonarius*, and *Philonthus politus* in boreal and saw-whet owl nests in isolated locales, an indication of the degree to which introduced species have been able to colonize native environments.

An examination of the distribution of species in the Maritime Provinces yields a variety of different patterns. Species such as *Tachyporus dispar* (Fig. 1), *Mocyta fungi* (Fig. 4), *Anotylus rugosus* (Fig. 5), *Deleaster dichrous* (Fig. 5), *Carpelimus obesus* (Fig. 6), *Carpelimus subtilis* (Fig. 6), *Xantholinus linearis* (Fig. 7), *Tasgius ater* (Fig. 8), *Tasgius melanarius* (Fig. 8), *Quedius mesomelinus* (Majka and Smetana 2007), *Philonthus carbonarius*, *Philonthus cognatus* Stephens, *Philonthus concinnus*, *Philonthus cruentatus*, *Philonthus politus*, *Philonthus umbratilis* (Gravenhorst), *Bisnius sordidus* (Gravenhorst) (Smetana 1995), *Sepidophilus littoreus* (Linnaeus), *Gyrophypnus angustatus* Stephens, and *Creophilus maxillosus*

(unpublished data) are widely distributed in the region. This could be indicative of a relatively early introduction into this region, the ability to successfully colonize habitats in the region and disperse within it, or a combination of these factors. The mean year of first detection of these species is 1926 (compared to 1968; see above), an indication that they may have been present in the region for a comparatively longer period of time.

Other species, including *Mycetoporus lepidus* (Fig. 2), *Habrocerus capillaricornis* (Fig. 1), *Aleochara (Xenochara) lanuginosa* (Fig. 2), *Gnypeta caerulea* (Fig. 3), *Atheta (Datomicra) celata* (Fig. 4), *Atheta (Microdota) amicola* (Fig. 4), *Coprophilus striatulus* (Fig. 6), *Neobisnius villosulus* (Fig. 8), *Aleochara (Xenochara) tristis* Gravenhorst (Klimaszewski et al. 2005), *Phyllodrepa floralis* (Majka et al. 2006), *Phloeocharis subtilissima* Mannerheim (Majka and Klimaszewski 2004), *Sepedophilus marshami* (Stephens) (Campbell 1976), *Crataraea suturalis* (Mannerheim) (Klimaszewski et al. 2007), *Oxypoda brachyptera* (Stephens) (Fig. 2), *Oxypoda opaca* (Gravenhorst) (Klimaszewski et al. 2006), *Oxypoda aperta* Sjöberg (Klimaszewski et al. 2006), *Homalota plana* (Majka and Klimaszewski 2004), *Placusa incompleta* (Klimaszewski et al. 2001), *Amischa analis* (Fig. 3), *Atheta (Chaetida) longicornis* (Gravenhorst) (Klimaszewski et al. 2007), *Atheta (Thinobaena) vestita* (Klimaszewski et al. 2007), *Cordalia obscura* (Fig. 4), *Rugilus fragilis* (Gravenhorst) (Fig. 6), *Quedius fuliginosus* (Majka and Smetana 2007), *Quedius molochinus* (Majka 2007), *Leptacinus intermedius* (Fig. 7), *Bisnius cephalotes* (Smetana 1995), *Gabrieus appendiculatus* Sharp (Smetana 1995), *Gabrieus astutoides* (Strand) (Smetana 1995), *Philonthus discoideus* (Gravenhorst) (Fig. 8), *Euplectus karstenii* (Reichenbach) (Wagner 1975), *Omalium rivulare* (Paykull), and *Staphylinus ornaticauda* LeConte (unpublished data) appear to have a very restricted distribution in the region. This could be indicative of a more recent introduction into the region, more restricted ecological tolerances, a lesser ability to disperse, or a combination of these factors. It might also simply be indicative of a lesser collection effort, particularly in relation to the smaller, more inconspicuous species such as those in the Aleocharinae. The mean year of first discovery of these species is 1992, although it would be expected that species with a restricted distribution

would be collected less frequently than those with a widespread distribution.

Some species exhibit other apparent patterns of distribution: *Atheta (Datomicra) dadopora* (Fig. 4), *Trichophya pilicornis* (Gyllenhal), *Lithocharis ochracea* (Fig. 5), and *Oxytelus laqueatus* (Marsham) (unpublished data) are widely distributed on the mainland but not on Prince Edward Island or Cape Breton Island; *Aleochara (Aleochara) curtula* (Goeze) (Fig. 2), *Philonthus debilis* (Gravenhorst) (Smetana 1995), and *Aleochara (Xenochara) fumata*, Gravenhorst (unpublished data) are widespread but are not found on Cape Breton Island; *Stenus clavicornis* (Fig. 6) has a distribution clustered around the Bay of Fundy; *Euplectus karstenii* (Wagner 1975) and *Drusilla canaliculata* (Fig. 4) have been found only on Prince Edward Island; *Phyllodrepa floralis* (Majka *et al.* 2006) and *Oxypoda operata* (Klimaszewski *et al.* 2006) have been recorded only on Cape Breton Island, and until the recent discovery of *Ochtheophilum fracticorne* on the Bay of Fundy, its distribution appeared to be restricted to the northern portions of Cape Breton Island. Further research is required to determine if these apparent distributions have an actual basis, or if they result from insufficient collecting. Many introduced species exhibit an apparent “scattered” distribution. Because data are limited, it is unclear whether they are widely distributed in the region or are clustered around more localized points of introduction. More research is required to determine the extent of the distribution of these species.

Finally, with 51 new provincial records and 15 species that are newly recorded in the Maritime Provinces, the number of introduced exotic species of staphylinids found in the Maritime Provinces and the degree of their dispersion within the region are substantially greater than was hitherto known. Klimaszewski *et al.* (2007) stressed the importance of taxonomic research in order to detect and identify exotic species. Taxonomic expertise is often in short supply and must be developed. It is important to maintain a network of reference collections to allow researchers throughout the country access to materials that can facilitate accurate and rapid identification. Equally important are ongoing monitoring programs to gather baseline information and monitor for new introductions as well as for changes in existing native or introduced populations. In Nova Scotia 354 species of introduced Coleoptera have been recorded

(C.G. Majka, unpublished data). Some of these are well documented as being of concern in terms of their impact on forestry and agriculture; however, the impact of most on native faunas has not been investigated. Consequently, although we are continually discovering that the number of introduced species and the extent of their penetration into native habitats are greater than we had previously supposed, our ability to assess the risk this poses to native faunas and habitats remains very limited.

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Appendix A

Appendix appears on the following pages.

Table A1. Introduced Staphylinidae in the Maritime Provinces of Canada.

	Year of first detection			North America		
	N.B.	N.S.	P.E.I.	First detected	State or province	Source(s)
Omalini						
Omalini						
<i>Omalium rivulare</i> (Paykull)	1999	2001		1878	Calif.	Fauvel 1878
<i>Phyllodrepa floralis</i> (Paykull)		1963		1860	Que.	Bain 1999
Pselaphinae						
Euplectidae						
Euplectini			1987	<1894	Iowa	Wagner 1975
<i>Euplectus karstenii</i> (Reichenbach)						
Phloeocharinae						
<i>Phloeocharis subtilissima</i> Mannerheim		2001		2001	N.S.	Majka and Klimaszewski 2004
Tachyporinae						
Tachyporini						
<i>Sepedophilus litoreus</i> (Linnaeus)	No data	1965		1866	Pa.	Campbell 1976
<i>Sepedophilus marshami</i> (Stephens)	1977*	1965		1959	Que.	Campbell 1976
<i>Sepedophilus testaceus</i> (Fabricius)	1978	1929		1884	N.Y.	Campbell 1976
<i>Tachinus corticinus</i> Gravenhorst	2004*	2002*	2004*	1967	Que.	Campbell 1988
<i>Tachinus rufipes</i> (Linnaeus)	1977	1965	2006*	1949	N.L.	Campbell 1973, 1988
<i>Tachyporus dispar</i> (Paykull)	1964	1951	1953*	1928	Wash.	Hatch 1953
<i>Tachyporus nitidulus</i> (Fabricius)	1999	1997*		1834	Ind.	Campbell 1979
Mycetoporini						
<i>Mycetoporus lepidus</i> (Gravenhorst)			2000*	~1991	B.C.	Campbell and Davies 1991
Trichophyinae						
<i>Trichophya pilicornis</i> (Gyllenhal)	1999	1983		1933	Wash.	Hatch 1953
Habrocerinae						
<i>Habrocerus capillaricornis</i> (Gravenhorst)		1994*		1931	Mass.	Assing and Wunderle 1995
Aleocharinae						
Aleocharini						
Subtribe Aleocharina						
<i>Aleochara bilineata</i> Gyllenhal	1999	1918	1958	<1870	Mass.	Klimaszewski 1984
<i>Aleochara fumata</i> Gravenhorst	1978	1910	1967	<1906	B.C.	Klimaszewski 1984

Table A1 (continued).

	Year of first detection			North America		
	N.B.	N.S.	P.E.I.	First detected	State or province	Source(s)
<i>Aleochara lanuginosa</i> Gravenhorst		2005*		1930	Wash.	Hatch 1953
<i>Aleochara tristis</i> Gravenhorst	1999			1966	Que.	Klimaszewski 1984
<i>Aleochara curtula</i> (Goeze)	1978	1927	1974–1983*	?	?	
<i>Tinotus morion</i> (Gravenhorst)	1999	1997*		1929	Que.	Klimaszewski <i>et al.</i> 2002
Oxypodini						
Subtribe Oxypodina						
<i>Crataraea suturalis</i> (Mannerheim)		1967		1956	B.C.	Klimaszewski <i>et al.</i> 2007
<i>Oxyпода brachyptera</i> (Stephens)	1977	2005*		1977	N.B.	Klimaszewski <i>et al.</i> 2006
<i>Oxyпода opaca</i> (Gravenhorst)		2002		1936	N.C.	Hoebcke 1990
<i>Oxyпода aperta</i> Sjöberg		1984		1970	Que.	Klimaszewski <i>et al.</i> 2006
<i>Gnypeta caerulea</i> (C.R. Sahlberg)		1996*	2001*	1949	N.L.	Muona 1984
Autaliini						
<i>Autalia rivularis</i> (Gravenhorst)	1999	1956*		1956?	N.S.?	This study
Homalotini						
Subtribe Gyrophaenina						
<i>Gyrophaena affinis</i> Mannerheim	1977	2002*		1910	Mass.	Seevers 1951
Subtribe Homalotina						
<i>Homalota plana</i> Gyllenhal	2005	2002		<1975	?	Moore and Legner 1975
Placusini						
<i>Placusa incompleta</i> Sjöberg		1983		1968	Wash.	Klimaszewski <i>et al.</i> 2001
<i>Placusa tachyporooides</i> (Waltl)	1977	1997*		<1911	B.C.	Klimaszewski <i>et al.</i> 2001
Athetini						
Subtribe Acrotonina						
<i>Mocyta fungi</i> (Gravenhorst)	1999	1989*	2003*	<1893	N.Y.	Gusarov 2003
Subtribe Athetina						
<i>Amischa analis</i> (Gravenhorst)	1999	1997*	2003*	1949	N.L.	Muona 1990
<i>Atheta longicornis</i> (Gravenhorst)		1995		1979, 1980	Ore., Calif.	J. Muona, personal communication
<i>Atheta celata</i> (Erichson)	2003*	2003		1910	Ark.	Majka <i>et al.</i> 2006
<i>Atheta dadopora</i> Thomson	1999	1965*		<1910	N.Y.	Gusarov 2003
<i>Atheta amiculata</i> (Stephens)		2005*		1978	Calif.	J. Muona, personal communication

Table A1 (continued).

	Year of first detection			North America		
	N.B.	N.S.	P.E.I.	First detected	State or province	Source(s)
<i>Atheta vestita</i> (Gravenhorst)	2004	2003		2003	N.S.	Klimaszewski <i>et al.</i> 2007
<i>Dinaraea angustula</i> (Gyllenhal)		2002	2000	<1975	N.Y.	Moore and Legner 1975
<i>Nehemitropia lividipennis</i> (Mannerheim)	1977	1988	2003	1919	Ont.	Klimaszewski <i>et al.</i> 2007
Falagrini						
<i>Cordulia obscura</i> (Gravenhorst)		2006*		<1975	N.Y. and Pa.	Moore and Legner 1975
Lomechusini						
Subtribe Myrmedoniina						
<i>Drusilla canaliculata</i> (Fabricius)		1996*	2004*	<1906	Ark.	Gusarov 2003
Oxytelinae						
Deleasterini						
<i>Deleaster dichrous</i> (Gravenhorst)	1977*	1967*		1934	Que.	Brown 1940
<i>Coprophilus striatulus</i> (Fabricius)		2003*		1974	N.Y.	Hoebeke 1995a
Thinobiini						
<i>Carpelimus obesus</i> (Kiesenwetter)	1999	1971*	2001*	~1670	Mass.	Bain 1998
<i>Carpelimus subtilis</i> (Erichson)		1995*		1918	N.Y.	Notman 1920
Oxytelini						
<i>Anotylus rugosus</i> (Fabricius)	1900–1907	1945	1953*	~1670	Mass.	Bain 1998
<i>Oxytelus laqueatus</i> (Marsham)	1999	1931		1918	N.Y.	Notman 1920
Steninae						
<i>Stenus clavicornis</i> (Scopoli)	No data	1990*		1968	Que.	Puthz 1975
Paederinae						
Paederini						
<i>Lithocharis ochracea</i> (Gravenhorst)	1977	1969*		<1905	?	Casey 1905
<i>Rugilus fragilis</i> (Gravenhorst)		1984		1950	Ont.	Hoebeke 1995b
<i>Ochtheophilum fracticorne</i> (Paykull)	2003*	1983		<1975	Mass.?	Moore and Legner 1975
Staphylininae						
Xantholinini						
<i>Gyrophypnus angustatus</i> Stephens	1926	1913		1860	Que.	Bain 1999
<i>Gyrophypnus fracticornis</i> (O.F. Müller)	1977	1972	1952*	1846	Pa.	Smetana 1982
<i>Leptacinus intermedius</i> Donisthorpe			2003*	1903	Que.	Smetana 1982
<i>Xantholinus linearis</i> (Olivier)	2002*	1949	2003*	1930	Wash.	Smetana 1982
Staphylinini						

Table A1 (concluded).

	Year of first detection			North America		
	N.B.	N.S.	P.E.I.	State or province	First detected	Source(s)
Quediina						
<i>Quedius curtipennis</i> Bernhauer	2002	1997		Wash.	1939	Smetana 1971
<i>Quedius fuliginosus</i> (Gravenhorst)		1996		N.S.	1996	Majka and Smetana 2007
<i>Quedius mesomelinus</i> (Marshall)	1907	1950		N.L.	~1620	Prévost and Bain 2006
<i>Quedius molochinus</i> (Gravenhorst)		2002		N.L.	1949	Smetana 1971; Majka 2007
Staphylinina						
<i>Creophilus maxillosus</i> (Linnaeus)	1900–1907	1827	1921–1924	N.L.	~1620	Prévost and Bain 2006
<i>Staphylinus ornaticauda</i> LeConte		1981		Canada	1863	LeConte 1863
<i>Tasgius ater</i> (Gravenhorst)	1978*	1938	1990*	?	<1802	Newton 1987
<i>Tasgius melanarius</i> (Heer)	1999*	1991*		Que.	1935	Brown 1940
Philonthina						
<i>Bisnius cephalotes</i> (Gravenhorst)		1972		Que.	1860	Bain 1999
<i>Bisnius sordidus</i> (Gravenhorst)	1977	1976		Que.	1860	Bain 1999
<i>Gabrius appendiculatus</i> Sharp	1999			Que.	1978	Smetana 1995
<i>Gabrius astutoides</i> (Strand)	1999	1983		Pa.	<1936	Smetana 1995
<i>Neobisnius villosulus</i> (Stephens)	2004*	1994*		Que.	1860	Bain 1999
<i>Philonthus carbonarius</i> (Gravenhorst)	1977	1909	1981	Wash.	1922	Smetana 1995
<i>Philonthus cognatus</i> Stephens	1977	1951	1952	N.C.	1884	Smetana 1995
<i>Philonthus concinnus</i> (Gravenhorst)	1977	1948	1986	Ore.	1930	Hatch 1953
<i>Philonthus cruentatus</i> (Gmelin)	1977	1977	1986	N.Y.	1924	Smetana 1995
<i>Philonthus debilis</i> (Gravenhorst)	1977	1929	<1995	Mass.?	1857	Smetana 1995
<i>Philonthus discoideus</i> (Gravenhorst)	~ 1900*			Pa.	1846	Smetana 1995
<i>Philonthus longicornis</i> Stephens		1910		Pa.	1840	Smetana 1995
<i>Philonthus politus</i> (Linnaeus)	1900–1907	1827		Mass.	~1670	Bain 1998
<i>Philonthus rectangularis</i> Sharp	1977	2004*	2006*	Ore.	1908	Smetana 1995
<i>Philonthus umbratilis</i> (Gravenhorst)	1926	1951	1988	Que.	1860	Bain 1999
<i>Philonthus varians</i> (Paykull)	1900–1907	1965	1974–1983	Que. and Ont.	1920	Smetana 1995
Total number of species	54	72	29			
Number of species newly recorded	10	24	16			
Mean year of first detection	1977	1971	1985		1904	

Note: An entry in boldface type is the earliest record in the Maritime Provinces (<, prior to; ~, approximately). An asterisk indicates that the species is newly recorded in this jurisdiction in the present study.