

Tenebrionidae (Coleoptera) of the Maritime Provinces of Canada

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Abstract—The Tenebrionidae of the Maritime Provinces of Canada are surveyed. Forty-eight species have been reported from the region. Eleven of these species (ten Palearctic and one Nearctic) have been introduced to the region, five of which are apparently now extirpated. Dates of first detection of these species are provided for each province and North America. Thirteen species are newly recorded in New Brunswick, 25 in Nova Scotia, and 15 on Prince Edward Island, for a total of 53 new provincial records. Of these, 18 species including *Bolitophagus corticola* Say, *Neatus tenebrioides* (Palisot de Beauvois), *Helops gracilis* Bland, *Blapstinus substriatus* Champion, *Hymenorus obesus* Casey, *Hymenorus picipennis* Casey, *Hymenorus pilosus* (Melsheimer), *Mycetochara bicolor* (Couper), *Mycetochara binotata* (Say), *Mycetochara fraterna* (Say), *Platydemus excavatum* (Say), *Platydemus teleops* Triplehorn, *Corticeus praetermissus* (Fall), *Alobates pennsylvanicus* (DeGeer), *Hapladrus fulvipes* (Herbst), *Xylopinus saperdioides* (Olivier), an undescribed species of *Paratenetus* Spinola, and an undescribed species of *Neatus* LeConte are newly recorded for the Maritime Provinces as a whole. One of these, *Helops gracilis*, is recorded for the first time in Canada. The fauna is discussed from the perspective of the patterns of distribution of species in the region and their possible underlying causes. Island faunas are discussed, as is the saproxylic component of the fauna, with a brief consideration of the importance of this trophic group in the dynamics of forest ecosystems in the region.

Résumé—Nous présentons une synthèse de la faune des coléoptères de la famille Tenebrionidae provenant des Provinces Maritimes du Canada. Quarante-huit espèces sont représentées dans la région. Des onze espèces envahissantes enregistrées auparavant dans la région (dont dix native de la région Paléarctique et une autre de l'Amérique du Nord), nous devons en soustraire cinq espèces qui n'ont pas été échantillonnées récemment. Une estimation des dates de premières introductions de ces espèces envahissantes dans chacune des Provinces Maritimes et en Amérique du Nord sont données. Un total de 53 nouvelles mentions provinciales sont présentées (13 pour le Nouveau-Brunswick, 25 pour la Nouvelle-Ecosse, et 15 pour l'Île-du-Prince-Édouard). Les espèces suivantes sont reportées dans les Provinces Maritimes pour la première fois : *Bolitophagus corticola* Say, *Neatus tenebrioides* (Palisot de Beauvois), *Helops gracilis* Bland, *Blapstinus substriatus* Champion, *Hymenorus obesus* Casey, *Hymenorus picipennis* Casey, *Hymenorus pilosus* (Melsheimer), *Mycetochara bicolor* (Couper), *Mycetochara binotata* (Say), *Mycetochara fraterna* (Say), *Platydemus excavatum* (Say), *Platydemus teleops* Triplehorn, *Corticeus praetermissus* (Fall), *Alobates pennsylvanicus* (DeGeer), *Hapladrus fulvipes* (Herbst), *Xylopinus saperdioides* (Olivier), une espèce nouvelle du genre *Paratenetus* Spinola et une espèce nouvelle du genre *Neatus* LeConte. *Helops gracilis* est reportée pour la première fois au Canada. Les causes possibles pour expliquer la répartition géographique des espèces dans la région sont explorées. La faune saproxylique et la faune des îles de la région sont discutées plus spécifiquement. L'importance de la faune saproxylique dans les écosystèmes forestiers de la région est étudiée brièvement.

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Introduction

The family Tenebrionidae is a diverse assemblage of beetles with a complicated taxonomic history. With 1184 species known in North America (Marske and Ivie 2003), the Tenebrionidae is the sixth most species-rich family of Coleoptera on the continent. In Canada, 141 species of tenebrionids were recorded by Bousquet and Campbell (1991) and Campbell (1991). In the Maritime Provinces (New Brunswick, Nova Scotia, and Prince Edward Island), however, relatively little attention has been paid to these beetles. Bousquet and Campbell (1991) and Campbell (1991) recorded only 28 species in the region: 17 from New Brunswick, 15 from Nova Scotia, and 5 from Prince Edward Island.

Although the adventive species in the subfamily Tenebrioninae are primarily found as pests on various dried stored products, most of the native tenebrionids found in this region are saproxylic, *i.e.*, dependent during some portion of their life cycle upon the dead or dying wood of senescent or dead trees (standing or fallen), wood-inhabiting fungi, or the presence of other saproxylic species (Speight 1989). Majka (2007) drew attention to the fact that many groups of saproxylic beetles have been little investigated in the Maritime Provinces. With this in mind, collections of Tenebrionidae originating in the Maritime Provinces were examined in order to gain a better understanding of this fauna in the region, and the results of this study are reported herein.

Materials and methods

The following are the codens (following Evenhuis 2007) of collections consulted in this study:

- ACNS Agriculture and Agri-food Canada, Kentville, Nova Scotia, Canada
- ACPE Agriculture and Agri-food Canada, Charlottetown, Prince Edward Island, Canada
- CBU Cape Breton University, Sydney, Nova Scotia, Canada
- CGMC Christopher G. Majka collection, Halifax, Nova Scotia, Canada
- CNC Canadian National Collection of Insects, Arachnids, and Nematodes, Ottawa, Ontario, Canada

- DAL Dalhousie University, Halifax, Nova Scotia, Canada
- DHWC David H. Webster collection, Kentville, Nova Scotia, Canada
- GHC G. Hilchie Collection, Edmonton, Alberta, Canada
- GSC Gary Selig collection, Bridgewater, Nova Scotia, Canada
- JBWM J.B. Wallis Museum, University of Manitoba, Winnipeg, Manitoba, Canada
- JCC Joyce Cook collection, North Augusta, Ontario, Canada
- JOC Jeffrey Ogden collection, Truro, Nova Scotia, Canada
- LEMQ Lyman Entomological Museum, Ste-Anne-de-Bellevue, Quebec, Canada
- NBM New Brunswick Museum, Saint John, New Brunswick, Canada
- NSAC Nova Scotia Agricultural College, Bible Hill, Nova Scotia, Canada
- NSMC Nova Scotia Museum, Halifax, Nova Scotia, Canada
- NSNR Nova Scotia Department of Natural Resources, Shubenacadie, Nova Scotia, Canada
- RPWC Reginald P. Webster collection, Charters Settlement, New Brunswick, Canada
- SMU Saint Mary's University, Halifax, Nova Scotia, Canada
- STFX Saint Francis Xavier University, Antigonish, Nova Scotia, Canada
- UMNB Université de Moncton, Moncton, New Brunswick, Canada
- UPEI University of Prince Edward Island, Charlottetown, Prince Edward Island, Canada

For each species the number of specimens is indicated in parentheses; where the number of specimens is not specified, it is assumed to be one. 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 classification of higher taxonomic ranks follows that of Bouchard *et al.* (2005).

Results

A total of 2335 tenebrionid specimens were examined: 344 from New Brunswick, 1827 from Nova Scotia, and 164 from Prince Edward Island. As a result of these investigations, 48 species of Tenebrionidae are now recorded in the Maritime Provinces of Canada. Thirteen

Table 1. Tenebrionidae of the Maritime Provinces of Canada, including new records, trophic status, and Maritime and Nearctic distributions (from specimens and data in existing collections and previously published data).

	No. of specimens examined				New record(s)	Trophic group*	Maritime distribution	Distribution in northeastern North America†
	NB	NS	PE	PE				
Tenebrionidae Latreille, 1802								
Lagriinae Latreille, 1825								
Goniaderini Lacordaire, 1859								
<i>Paratenetus</i> Spinola, 1844 (undescribed species)	7	103	7	7	NB, NS, PE, MP	SX	Widespread	ON, QC
Lagrini Latreille, 1825								
<i>Arthromacra aenea</i> (Say, 1824)	48	60	7	7	PE	SX?	Widespread	MA, ME, NH, ON, QC, RI, VT
Tenebrioninae Latreille, 1802								
Palorini Matthews 2003								
<i>Palorus ratzeburgii</i> (Wissman, 1848)†		4				DP	Adventive; extirpated	NY, ON, QC
Bolitophagini Kirby, 1837								
<i>Bolitophagus corticola</i> Say, 1825	1	17	1	1	NB, NS, PE, MP	SX	Widespread	CT, ME, NH, NY, ON, QC
<i>Bolitotherus cornutus</i> (Panzer, 1794)	35	51	3	3	NS, PE	SX	Widespread	CT, MA, ME, NH, NY, ON, QC, RI
<i>Eleates depressus</i> (Randall, 1838)	2					SX	Local; northeastern NB	ME, NH
Tenebrionini Latreille, 1802								
<i>Neatus</i> LeConte, 1862 (undescribed species)	1		1	1	NB, PE, MP	SX	Local; NB and PE?	ON, QC
<i>Neatus tenebrionoides</i> (Palisot de Beauvois, 1805)	1				NB, MP	SX	Local; NB	MA, ME, NH, ON, QC, RI
<i>Tenebrio molitor</i> Linnaeus, 1758†	42	100	49	49	PE	DP	Adventive; widespread	MA, ME, NF, NH, ON, QC, RI
<i>Tenebrio obscurus</i> Fabricius, 1792†		1				DP	Adventive; extirpated	ME, ON, QC, RI
Centronopini Doyen, 1989								
<i>Centronopus calcaratus</i> (Fabricius, 1798)		3				SX	Local; southern NS	CT, NH, NY, ON, QC, RI
Alphitobiini Reitter, 1917								
<i>Alphitobius diaperinus</i> (Panzer, 1797)†	5	19	4	4		DP	Adventive; localized	ME, NF, NH, NY, ON, QC
Triboliini Mulsant, 1854								
<i>Latheticus oryzae</i> Waterhouse, 1880†	1					DP	Adventive; extirpated	QC
<i>Tribolium audax</i> Halstead, 1969	—§	—§			NB, NS	DP	Adventive; extirpated	NB, NH, NS, ON, QC

Table 1. (continued).

	No. of specimens examined				New record(s)	Trophic group*	Maritime distribution	Distribution in northeastern North America†
	NB	NS	PE	NS				
<i>Tribolium castaneum</i> (Herbst, 1797)*	17	17	5	NS	DP	Adventive; localized	NH, ON, QC, RI	
<i>Tribolium confusum</i> Jacquelin du Val, 1868*	17	35	12	NB, NS, PE, MP	DP	Adventive; localized	ME, NF, NH, ON, QC, RI	
<i>Tribolium destructor</i> Uyttenboogart, 1934*	2	102	7	NB	DP	Adventive; localized	NF, ON, QC	
<i>Tribolium madens</i> (Charpentier, 1825)*	8	10			DP	Adventive; localized	NY, ON, QC	
Helopini Latreille, 1802								
<i>Helops gracilis</i> Bland, 1863	2			NB, MP, CA	SX?	Local; northeastern	NB	
Opatrini Brullé, 1832								
<i>Blapstinus metallicus</i> (Fabricius, 1801)	8	113	5	NB, PE	SP	Widespread	MA, ME, NH, NY, ON, QC, RI	
<i>Blapstinus substriatus</i> Champion, 1885		1		NS, MP	SP	Local; southern NS	ON, QC	
<i>Ephalus latimanus</i> (LeConte, 1847)		441			SP	Local; Sable Island	MA, ME, NH, NY, RI	
Alleculinae Laporte, 1840								
Alleculini Laporte, 1840								
<i>Androchirus erythropus</i> (Kirby, 1827)	5	1		NB	SX	Local; NB and NS	ME, NH, NY, ON, QC, RI	
<i>Capnochroa fuliginosa</i> (Melsheimer, 1846)	3	17	1	NS, PE	SX	Widespread	CT, MA, ME, NH, NY, ON, QC, RI	
<i>Hymenorus molestus</i> Fall, 1931	5	26	2	NS, PE	SX	Widespread	ME, NH, ON, QC	
<i>Hymenorus niger</i> (Melsheimer, 1846)	4	18	1	NS, PE	SX	Widespread; not on CB	ME, NH, NY, ON, QC, RI	
<i>Hymenorus obesus</i> Casey, 1891	2	2		NB, NS, MP	SX	Local; NB and NS	MA, ME, NY, ON, QC	
<i>Hymenorus picipennis</i> Casey, 1891		3		NS, MP	SX	Local; southern NS	MA, ME, NH, NY, ON, QC	
<i>Hymenorus pilosus</i> (Melsheimer, 1846)		2		NS, MP	SX	Local; NS	MA, NH, NY, ON, QC, RI	
<i>Isomira quadristriata</i> (Couper, 1865)	77	483	37	PE	SX	Widespread	CT, MA, ME, NH, ON, QC, RI	
<i>Isomira sericea</i> (Say, 1824)		33			SX	Southern NS	MA, ME, NH, NY, ON, QC, RI	
<i>Mycetochara bicolor</i> (Couper, 1865)		27		NS, MP	SX	Mainland NS	MA, ME, NH, NY, ON, QC	
<i>Mycetochara binotata</i> (Say, 1824)		1		NS, MP	SX	Local; southern NS	CT, MA, ME, NH, NY, ON, QC	
<i>Mycetochara fraterna</i> (Say, 1823)	3	7		NB, NS, MP	SX	Widespread; not on PE	MA, ME, NH, NY, ON, QC	
Diaperinae Latreille, 1802								
Diaperini Latreille, 1802								

Table 1. (concluded).

	No. of specimens examined				New record(s)	Trophic group*	Maritime distribution	Distribution in northeastern North America†
	NB	NS	PE	16				
<i>Diaperis maculata</i> Olivier, 1791	10	19	16		NS, PE	SX	Widespread; not on CB	MA, ME, NH, NY, ON, QC, RI
<i>Gnatoceerus cornutus</i> (Fabricius, 1798)‡		1				SX	Adventive; extirpated?	CT, MA, ON, QC, RI
<i>Neomida bicornis</i> (Fabricius, 1777)		11	1		PE	SX	Widespread; NS and PE	MA, ME, NH, NY, ON, QC, RI
<i>Platydemia americanum</i> Laporte and Brullé, 1831	1	1			NS	SX	Local	NH, NY, ON, QC
<i>Platydemia excavatum</i> (Say, 1824)	1				NB, MP	SX	Local; western NB	MA, NH, NY, ON, QC, RI
<i>Platydemia teleops</i> Triplehorn, 1965		1			NS, MP	SX	Local; southern NS	MA, NH, NY, ON, QC
<i>Hypophloeini</i> Billberg, 1820								
<i>Corticus praetermissus</i> (Fall, 1926)		14			NS, MP	SX	Mainland NS	MA, ME, NH, ON, QC
<i>Corticus tenuis</i> (LeConte, 1878)	3	10			NS	SX	Widespread; mainland	MA, ME, NY, ON, QC
<i>Scaphidemini</i> Reitter, 1922								
<i>Scaphidema aeneolum</i> (LeConte, 1850)	15	28	1		NS, PE	SX	Widespread	CT, LB, MA, ME, NH, NY, ON, QC
<i>Stenochiinae</i> Kirby, 1837								
<i>Chodalomini</i> Gistel, 1856								
<i>Alobates pensylvanicus</i> (DeGeer, 1775)	3	5			NB, NS, MP	SX	Widespread; mainland	MA, ME, NH, ON, QC, RI, VT
<i>Hapladrus fulvipes</i> (Herbst, 1797)		1			NS, MP	SX	Local; southern NS	CT, MA, ME, NH, NY, ON, QC, RI
<i>Iphihiminius opacus</i> (LeConte, 1866)	12	12				SX	Widespread; mainland	CT, ME, NH, NY, ON, QC, RI
<i>Upis cerambooides</i> (Linnaeus, 1758)¶	20	23	3		NS	SX	Widespread	LB, MA, ME, ME, NF, NH, NY, ON, QC, RI, VT
<i>Xylopinus saperdoides</i> (Olivier, 1795)	1	2			NS, MP	SX	Local; southern NS	CT, MA, NH, NY, ON, QC, RI, VT
Subtotal	344	1825	163					

Note: Locations are as follows: CA, Canada; CT, Connecticut; LB, Labrador; MA, Massachusetts; ME, Maine; MP, Maritime Provinces; NB, New Brunswick; NF, Newfoundland; NH, New Hampshire; NS, Nova Scotia; NY, New York; ON, Ontario; PE, Prince Edward Island; QC, Quebec; RI, Rhode Island; VT, Vermont.

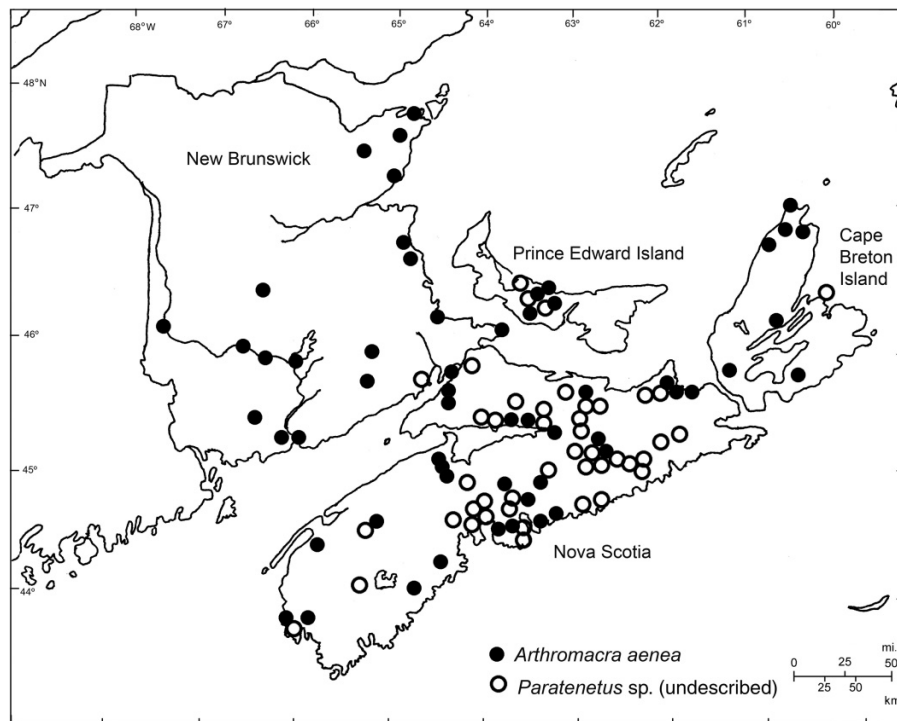
*DP, dried products; SP, saprophytic; SX, saproxylic.
 †Data were compiled from Bousquet and Campbell (1991), Campbell (1991), Chandler (2001), Dearborn and Donahue (1993), Downie and Arnett (1996), Sikes (2004), and the present study.

‡Adventive Palearctic species.

§Published records only.

¶Holarctic species.

Fig. 1. Distributions of *Arthromacra aenea* and *Paratenetus* sp. (undescribed) in the Maritime Provinces of Canada, determined from specimens and data in existing collections and previously published data.



species are newly recorded in New Brunswick, 25 in Nova Scotia, and 15 on Prince Edward Island, for a total of 53 new provincial records (Table 1). Further details of species found in the region follow.

Tenebrionidae Latreille
Lagriinae, Latreille
Goniaderini Lacordaire

Paratenetus Spinola undescribed species

NEW BRUNSWICK. Albert Co.: Mary's Pt., 12.v.2007, C.G. Majka, on *Sambucus racemosa* L. (Caprifoliaceae) in a coastal white spruce, *Picea glauca* (Moench) Voss (Pinaceae), forest, CGMC; **Northumberland Co.:** Tabusintac, 13.vi.1939, 19.vi.1939, 20.vi.1939, 22.vi.1939, W.J. Brown, (5), CNC; **York Co.:** Fredericton, 20.vi.1930, R.E. Balch, CNC. **NOVA SCOTIA.** One hundred and three specimens examined from Annapolis, Antigonish, Cape Breton, Colchester, Cumberland, Guysborough, Halifax, Hants, Kings, Lunenburg, Pictou, Queens, Richmond, and Yarmouth counties. The earliest record is from 1985 (**Halifax Co.:** Queensland, 3.vi.1985, P. Wall, (2), NSMC). **PRINCE EDWARD ISLAND. Kings Co.:** Woodville Mills, 2.xi.2003, C.G. Majka, field, CGMC; **Prince Co.:** Malpeque, 25.viii.2003, C.G.

Majka, coastal dunes, CGMC; **Queens Co.:** Harrington, 28.vi.2004, 16.ix.2004, C. Noronha, barley field, (2), ACPE; St. Patricks, 17.vii.2001, 21.vii.2001, 3.ix.2001, C.G. Majka, old field, (3), CGMC.

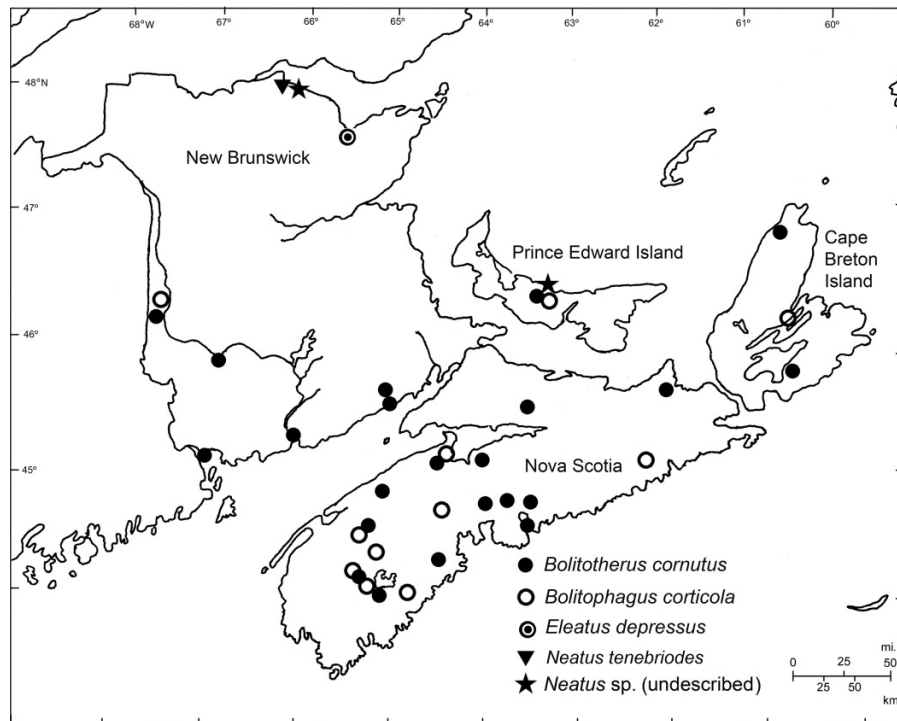
The *Paratenetus* specimens found in the Maritime Provinces represent an undescribed species (previously included in *P. fuscus* LeConte) that is being described as part of a revision of Canadian Tenebrionidae (P. Bouchard and Y. Bousquet, in preparation). It is newly reported herein from New Brunswick, Nova Scotia, and Prince Edward Island (Fig. 1). In the Maritime Provinces this species is found in many open and forested (coniferous and deciduous) habitats. There are many records from red spruce (*Picea rubens* Sarg. (Pinaceae)) forests. Immature stages of *Paratenetus* species develop on the inner surface of rolled dead leaves that are either hanging from the tree or on branches of fallen trees (Steiner 1995).

Lagriini Latreille

Arthromacra aenea (Say)

PRINCE EDWARD ISLAND. Queens Co.: Appin Rd, 6.vii.1982, C. Wenn, UPEI; Brackley

Fig. 2. Distributions of *Bolitophagus corticola*, *Bolitotherus cornutus*, *Eleates depressus*, *Neatus tenebriodes*, and *Neatus* sp. (undescribed) in the Maritime Provinces (for details see Fig. 1).



Beach, 2.viii.1940, G.S. Walley, CNC; Harrington, 27.vii.1987, J.G. Stewart, ACPE; St. Patricks, 17.vii.2001, 13.vii.2002, 27.vi.2003, C.G. Majka, old field, (4), CGMC.

Arthromacra aenea is newly recorded on Prince Edward Island (Fig. 1). Adults are found on plant foliage; larvae feed on plant debris and are found under bark and in stumps (Downie and Arnett 1996).

Tenebrioninae Latreille
Palorini Matthews

Palorus ratzeburgii (Wissman)

NOVA SCOTIA. Halifax Co.: Halifax, 13.ix.1940, R.S. Webber, (4), JBWM.

This adventive Palaearctic species was reported from Nova Scotia in Bousquet and Campbell (1991) on the basis of the above record. There have been no subsequent records of this species in the region and it appears to be extirpated.

Bolitophagini Kirby

Bolitophagus corticola Say

NEW BRUNSWICK. Carleton Co.: Wakefield: Bell Forest Preserve, 22.vii.2004, R.P. Webster, hardwood forest, UV light trap, RPWC. **NOVA**

SCOTIA. Annapolis Co.: Alma Lake, 21.vi.2003, 22.vi.2003, P. Dollin, bracket fungi on eastern hemlock (*Tsuga canadensis* (L.) Carr. (Pinaceae)) stump, (3), NSMC; Durland Lake, 3.viii.2003, P. Dollin, red spruce snag, NSMC; **Guysborough Co.:** Malay Lake, 16-29.viii.1997, D.J. Bishop, red spruce, NSMC; **Kings Co.:** Kentville, 1.vii.1968, D.H. Webster, at light, DHWC; Upper Canard, 21.viii.2002, C. Sheffield, ACNS; **Queens Co.:** Eight Mile Lake, 22.vi.2003, P. Dollin, red spruce forest, NSMC; Lake Kejimkujik, 3.vii.1968, B. Wright, (2), NSMC; Sixth Lake, 4.vi.2003, 20.vi.2003, 4.viii.2003, P. Dollin, bracket fungi on eastern hemlock, (3), NSMC; Tobetic Lake, 3.vi.2003, P. Dollin, bracket fungi, NSMC; **Victoria Co.:** Island Point, 24.ix.1991, B. Wright, (2), NSMC. **PRINCE EDWARD ISLAND. Queens Co.:** St. Patricks, 13.vii.2002, C.G. Majka, on *Piptoporus betulinus* (Fr.) Kar. (Polyporaceae) on white birch, *Betula papyrifera* Marshall (Betulaceae), CGMC.

Bolitophagus corticola is newly recorded in New Brunswick, Nova Scotia, Prince Edward Island, and the Maritime Provinces as a whole (Fig. 2). It is associated with bracket fungi (Polyporaceae), most frequently with species growing on conifers.

Bolitotherus cornutus (Panzer)

NOVA SCOTIA. Fifty-one specimens examined from Annapolis, Antigonish, Colchester, Halifax, Hants, Inverness, Kings, Lunenburg, Queens, Richmond, and Yarmouth counties. The earliest record is from 1949 (**Lunenburg Co.:** Bridgewater, 20.vii.1949, D.C. Ferguson, NSMC). **PRINCE EDWARD ISLAND. Queens Co.:** St. Patricks, 13.vii.2002, C.G. Majka, on *P. betulinus* on *B. papyrifera*, (3), CGMC.

Bolitotherus cornutus is newly recorded in Nova Scotia and Prince Edward Island (Fig. 2). It is associated with Polyporaceae, most frequently with *P. betulinus* growing on *B. papyrifera*.

Eleates depressus (Randall)

Eleates depressus was reported from New Brunswick by Bousquet and Campbell (1991) from specimens collected in Bathurst (CNC) (Fig. 2). It is a saproxylic species that Dearborn and Donahue (1993) reported from under the bark of pine (*Pinus* sp.) logs.

Tenebrionini Latreille

Neatus LeConte undescribed species

NEW BRUNSWICK. Restigouche Co.: Sea Side, CNC. **PRINCE EDWARD ISLAND. Queens Co.:** St. Patricks, 30.vi.2003, C.G. Majka, mixed forest, CGMC.

The specimens of this *Neatus* species (formerly considered conspecific with *N. tenebrioides*) found in the Maritime Provinces represent an undescribed species. It is newly recorded in New Brunswick, Prince Edward Island, and the Maritime Provinces as a whole (Fig. 2). No information is available on the bionomics of this species.

Neatus tenebrioides (Palisot de Beauvois)

NEW BRUNSWICK. Restigouche Co.: Sea Side, CNC.

Neatus tenebrioides is newly recorded in New Brunswick and the Maritime Provinces as a whole (Fig. 2). It is frequently found under the loose bark of ponderosa pine, *Pinus ponderosa* C. Lawson (Pinaceae), in Idaho (Downie and Arnett 1996).

Tenebrio molitor Linnaeus

NEW BRUNSWICK. Saint John Co.: Saint John, 9.vii.1898, W. McIntosh, NBM. **PRINCE EDWARD ISLAND. Kings Co.:** Woodville Mills, viii.2007, C.G. Majka, apple warehouse, (5), CGMC; **Prince Co.:** Conway Narrows, 23.vii.1970, 30.vii.1970, 20.viii.1970, U. Grigg,

(3), NSMC; **Queens Co.:** Charlottetown, 3.xi.1979, M.E. Smith, ACPE; Charlottetown, 9.ix.1982, i.1989, L.S. Thompson, (3), ACPE; Cornwall, summer 1984, M.E. Smith, ACPE; Cornwall, 22.ix.1982, L.S. Thompson, ACPE; Mount Herbert, 1921–1924, R. Mutch, UPEI; New Glasgow, no date or collector indicated, LEMQ; St. Patricks, 21.vii.2001, C.G. Majka, along stream, CGMC.

Tenebrio molitor is newly recorded in Prince Edward Island. It was first detected in the region in Nova Scotia circa 1827 (Kirby 1837), in New Brunswick in 1898, and on Prince Edward Island in 1921–1924 (see above). Adults and larvae feed on a wide variety of animal and vegetable products. They are frequently found in granaries, grain elevators, mills, bakeries, and food stores (Bousquet 1990). In the Maritime Provinces they are occasionally found in natural situations distant from synanthropic environments.

Tenebrio obscurus Fabricius

NOVA SCOTIA. “Not common” (Jones 1870).

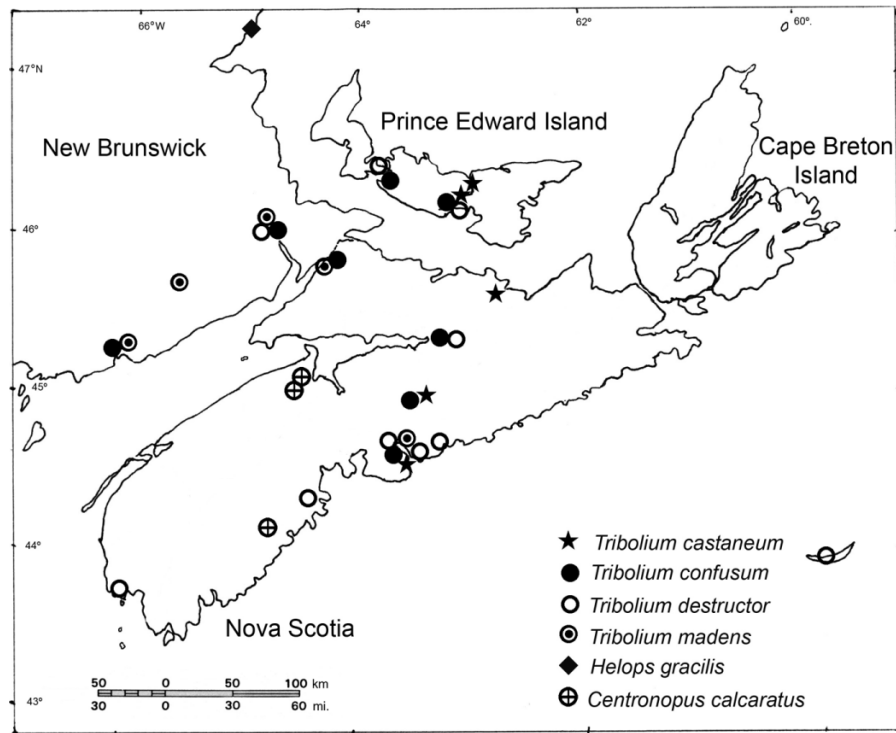
Tenebrio obscurus was recorded in Prince Edward Island by Bousquet and Campbell (1991). We have not been able to locate voucher specimens from the province that would substantiate the record. The species is consequently removed from the list of the Prince Edward Island fauna. It was reliably reported in Nova Scotia by Jones (1870) from specimens identified by Rev. C.J.S. Bethune. There have been no subsequent records of this species in the province and it appears to be extirpated.

Centronopini Doyen

Centronopus calcaratus (Fabricius)

Centronopus calcaratus was reported from Nova Scotia by Bousquet and Campbell (1991). It has only been found in the southern portion of the province (Fig. 3). It is a saproxylic species that Spillman (1962) reported under the bark of many (primarily deciduous) trees, including species of Betulaceae (birch, *Betula* L.), Fagaceae (American beech, *Fagus grandifolia* Ehrh., chestnut, *Castanea* Mill., and white oak, *Quercus alba* L.), Magnoliaceae (tulip-tree, *Liriodendron tulipifera* L.), Pinaceae (red pine, *Pinus resinosa* Ait., and pitch pine, *P. rigida* Mill.), and Salicaceae (largetooth aspen, *Populus grandidentata* Michx.). In Nova Scotia one specimen was collected in a red spruce forest inside a decaying white birch log (unpublished data).

Fig. 3. Distributions of *Tribolium castaneum*, *T. confusum*, *T. destructor*, *T. madens*, *Helops gracilis*, and *Centronopus calcaratus* in the Maritime Provinces (for details see Fig. 1).



Alphitobiini Reitter

Alphitobius diaperinus (Panzer)

NEW BRUNSWICK. Saint John Co.: Saint John, 3.vi.1934, LEMQ. **NOVA SCOTIA. Kings Co.:** Kentville, 1.iv.1964, H.T. Stultz, (3), ACNS. **PRINCE EDWARD ISLAND. Queens Co.:** Mermaid, viii.1975, L.S. Thompson, (2), ACPE and CNC.

This adventive Palearctic species was reported from New Brunswick, Nova Scotia, and Prince Edward Island by Bousquet and Campbell (1991). The above records establish the earliest dates of detection of this species in all three provinces.

Triboliini Mulsant

Latheticus oryzae Waterhouse

NEW BRUNSWICK. Saint John Co.: Saint John, 7.iii.1964, *ex ship*, CNC.

This adventive Palearctic species was reported from New Brunswick by Bousquet and Campbell (1991) on the basis of the above record. This establishes the earliest date of detection of this species in the region. There have been no subsequent records of this species in the region and it appears to be extirpated.

Tribolium audax Halstead

Becker (1982) reported specimens of *Tribolium audax* collected in 1980 from boxcars of flour for export in Halifax, Nova Scotia, and Saint John, New Brunswick. These specimens were originally reported as *Tribolium madens* (Charpentier). Becker (1982) reexamined the specimens and found that although most of them were *T. madens*, specimens of *T. audax* were occasionally also present. Downie and Arnett (1996) subsequently reported *T. audax* from Nova Scotia; however, Bousquet and Campbell (1991) reported only *T. madens* from both provinces. We take this opportunity to draw attention to the records of both species from both provinces reported by Becker (1982). *Tribolium audax*, a native Nearctic species separated by Halstead (1969) from the Palearctic *T. madens*, appears to be extirpated from the region because there are no subsequent records of the species in the Canadian Maritime Provinces.

Tribolium castaneum (Herbst)

NOVA SCOTIA. Colchester Co.: Shubenacadie, 6.vi.1990, E. Georgeson, NSNR; **Halifax Co.:** Armdale, 14.iv.1950, D.C. Ferguson, in-

doors, NSMC; Halifax, 12.ii.1991, R. Anderson, farina, (2), NSMC; **Pictou Co.:** Lyons Brook, 23.iv.1996, E. Georgeson, in flour, (14), NSNR. **PRINCE EDWARD ISLAND. Queens Co.:** Charlottetown, 6.vi.1960, F.M. Cannon, ACPE.

Tribolium castaneum is newly recorded in Nova Scotia (Fig. 3). It was first detected in the region (in Nova Scotia; see above) in 1950. This species is an important pest of stored grain and oilseeds and their derivatives (Bousquet 1990).

Tribolium confusum Jacquelin du Val

NEW BRUNSWICK. Saint John Co.: Saint John, no date or collector indicated, CNC; **Westmorland Co.:** Moncton, 1.ii.1961, A. Mair, (16), NSAC. **NOVA SCOTIA. Colchester Co.:** Truro, 31.i.1985, D. Moulard, in building, (2), NSNR; **Cumberland Co.:** Amherst, iv.1990, J. Ogden, JOC; **Halifax Co.:** Halifax, 26.iv.1983, M. MacDonald, (2), NSMC; Halifax, 18.x.1983, B. Wright, NSMC; Halifax, 1.xi.1974, B. Wright, (6), NSMC; Halifax, 8.iii.1982, B. Wright, (10), NSMC; Halifax, 10.iii.1982, B. Wright, (9), NSMC; **Hants Co.:** Shubenacadie, 6.vi.1990, E. Georgeson and J. Ogden, in cornmeal, (6), NSNR. **PRINCE EDWARD ISLAND.** (No locality data), 1974–1983, (10), UPEI; **Prince Co.:** Bedeque, 15.iv.1975, L.S. Thompson, ACPE; **Queens Co.:** Charlottetown, 6.vii.1987, M.E.M. Smith, in house, ACPE.

Tribolium confusum is newly recorded in New Brunswick and Nova Scotia (Fig. 3). It was reported from Prince Edward Island by Sinha (1963) but this report was overlooked by Bousquet and Campbell (1991). It was first reported in the region (in Nova Scotia) in 1938 (Brittain and Pickett 1938). This species is probably the most serious pest in the genus *Tribolium* MacLeay, and one of the most economically important beetles. It is notorious as a pest of cereal products, although the adults and larvae also feed on a wide variety of foodstuffs. In Canada this beetle is found most frequently in flour and feed mills, although it also occurs in warehouses, grocery stores, and dwellings (Bousquet 1990).

Tribolium destructor Uyttenboogart

NEW BRUNSWICK. Westmorland Co.: Moncton, 21.ix.1978, G. Pelletier, UMN; Moncton, 19.ix.1978, R. Chenard, UMN. **NOVA SCOTIA. Colchester Co.:** Truro, 25.ii.1959, R. deRuelle, (14), NSAC. **PRINCE EDWARD ISLAND. Prince Co.:** Summerside, 28.xii.1962, L.S. Thompson, (2), CNC, (1), ACPE. **QUEBEC. Montréal,** 5.iii.1937,

P. Beaudoin, *ex* chicken feed from Guelph, Ontario, CNC.

Tribolium destructor is newly recorded in New Brunswick (Fig. 3). It was first detected in the region in 1959 (see above). The time line of establishment of this species in North America has not yet been determined. Good (1936) did not record this species in North America; however, the earliest specimen examined in the present study was from Montréal in 1937 (see above). This species is a pest of seeds, cereals, and their products. In Canada it usually occurs in flour and cereal products found mainly in flour mills, bakeries, and dwellings (Bousquet 1990).

Tribolium madens (Charpentier)

As noted above in the account of *T. audax*, the Palaearctic *T. madens* was first reported in the region by Becker (1982) from specimens collected in Halifax, Nova Scotia, and Saint John, New Brunswick (Fig. 3) in 1980 (the first reports of this species in Canada after specimens collected in 1979 in Winnipeg, Manitoba). Johnson (1897) reported this species in the United States of America; however, because of prior confusion with the Nearctic *T. audax* before the two species were separated by Halstead (1969), early voucher specimens of *T. madens* should be examined to clearly establish early introduction time lines for this species.

Helopini Latreille

Helops gracilis Bland

NEW BRUNSWICK. Northumberland Co.: Tabusintac, 19.vi.1939, W.J. Brown, CNC.

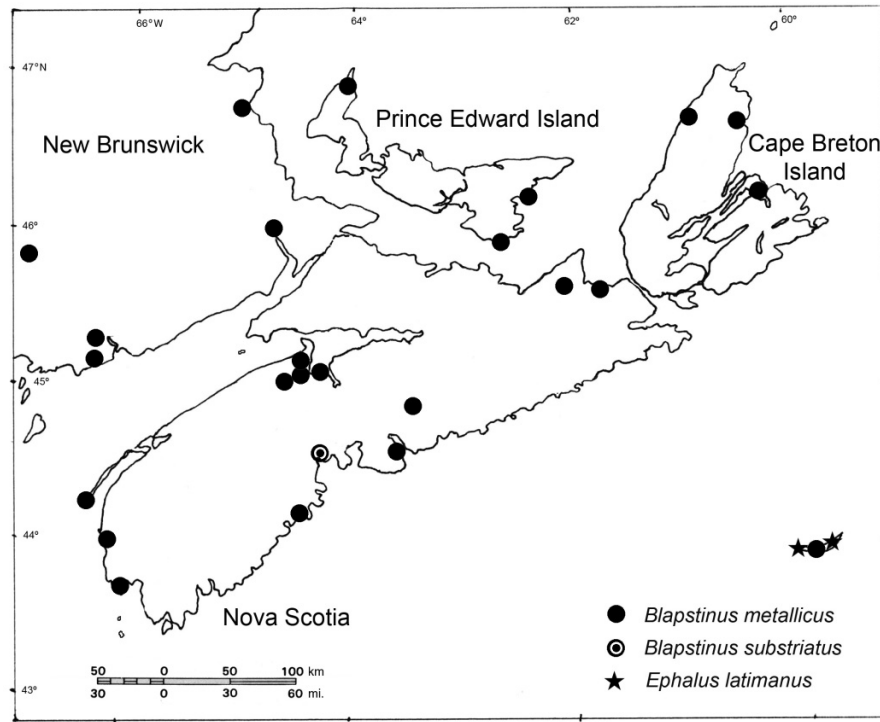
Helops gracilis is newly recorded in New Brunswick and in Canada as a whole (Fig. 3). Species in this genus are found under loose bark (Downie and Arnett 1996). *Helops gracilis* Bland is a junior primary homonym of *Helops gracilis* Fischer von Waldheim, 1823. The placement of the latter taxon is uncertain (M. Nabozhenko, personal communication) and it was included in the genus *Helops* as *incertae sedis* in Löbl *et al.* (2008). We have retained the name *Helops gracilis* Bland to preserve stability here.

Opatrini Brullé

Blapstinus metallicus (Fabricius)

NEW BRUNSWICK. Kent Co.: Kouchibouguac National Park, 14.vi.1977, S.J. Miller, CNC; Kouchibouguac National Park, 2.viii.1977, G.A. Calderwood, CNC; **Kings Co.:** Grand Bay,

Fig. 4. Distributions of *Blapstinus metallicus*, *B. substriatus*, and *Ephalus latimanus* in the Maritime Provinces (for details see Fig. 1).



26.viii.2001, D.F. McAlpine, NBM; **Saint John Co.:** Saint John, 7.vii.1988, Y. Bousquet, (2), CNC; **Westmorland Co.:** Moncton, 17.v.1951, C.H. Lindroth, (2), CNC; **York Co.:** New Maryland, 20.iv.2003, R.P. Webster, mixed forest, RPWC. **PRINCE EDWARD ISLAND. Kings Co.:** Launching, 26.viii.2003, C.G. Majka, seashore: under flotsam, (2), CGMC; **Prince Co.:** Tignish, 2.vi.1996, M.E.M. Smith, blueberry field, ACPE; **Queens Co.:** Wood Islands, 30.vi.2003, C.G. Majka, seashore, under flotsam, (2), CGMC.

Blapstinus metallicus is newly recorded in New Brunswick and on Prince Edward Island (Fig. 4). In Nova Scotia it is frequently encountered in coastal locations under debris accumulated at the upper end of the littoral zone (Klimaszewski and Majka 2007).

Blapstinus substriatus Champion

NOVA SCOTIA. Lunenburg Co.: Chester, 18.vii.1969, B. Wright, NSMC.

Blapstinus substriatus is newly recorded in Nova Scotia (Fig. 4). It has been found in sagebrush habitat in Idaho (Hampton 2005), meadow-steppe prairie environments and agricultural fields in Idaho and Washington (Hatten 2006), and northern mixed-grass prairie in Saskatchewan

(Larson 2007). Bousquet (1990) reported it as occasionally found in granaries and grain elevators. It is unclear whether this record represents a collection of a native species in Nova Scotia, or this specimen was transported to Nova Scotia by anthropogenic means.

Ephalus latimanus (LeConte)

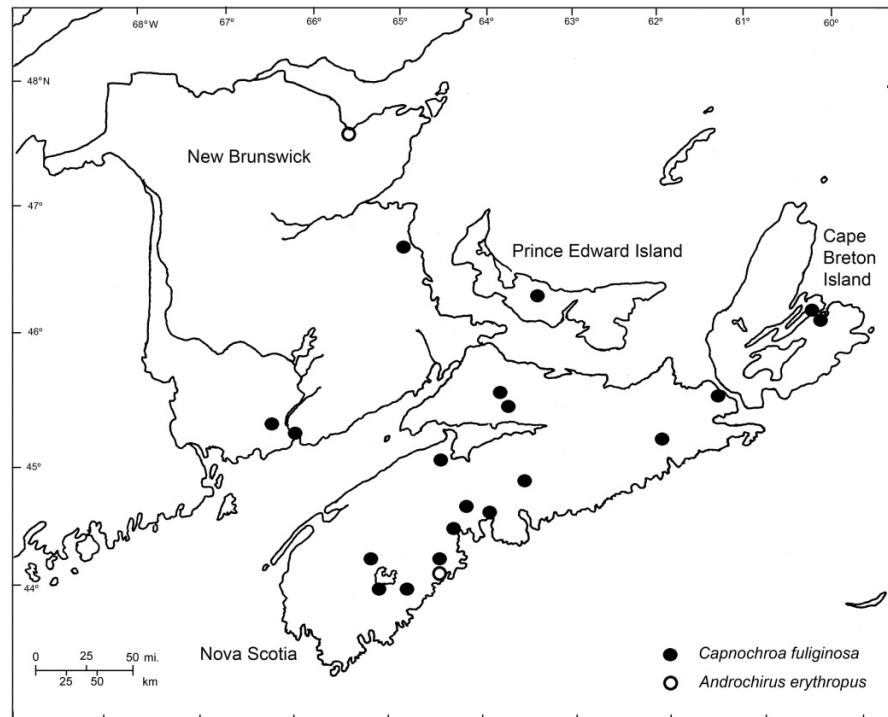
Ephalus latimanus was first recorded in Nova Scotia by Howden (1970) from Sable Island, where it is a common nocturnal species on coastal sand dunes. This is the only site in Canada where the species occurs. This flightless species lives in loose sand and leaf litter around the roots and at the base of plants such as sea rocket, *Cakile edentula* (Bigelow) Hook. (Brassicaceae), and seaside goldenrod, *Solidago sempervirens* L. (Asteraceae) (Sikes 2004).

Alleculinae Laporte
Alleculini Laporte

Androchirus erythropus (Kirby)

NEW BRUNSWICK. Gloucester Co.: Bathurst, vii.1906, vii.1917, vii.1927, vi.1928, J.N. Knull, (4), CNC; Bathurst, 25.vi.1923, M.B. Dunn, CNC.

Fig. 5. Distributions of *Androchirus erythropus* and *Capnochora fuliginosa* in the Maritime Provinces (for details see Fig. 1).



Androchirus erythropus is newly recorded in New Brunswick (Fig. 5). The closely related species *A. femoralis* (Olivier) has been recorded on stumps and bushes in moist areas (Blatchley 1910). Otherwise, little information on the bionomics of the species is available.

Capnochora fuliginosa (Melsheimer)

NOVA SCOTIA. Cape Breton Co.: George's River, 9.viii.1997, D.B. McCorquodale, CBU; Sydney, 27.vii.2001, C. Oldfort, flight-intercept trap, JOC; **Cumberland Co.:** Wentworth, 17.vii.1994, D. Kehler, deciduous forest, flight intercept trap, NSMC; Westchester, 10.viii.2006, K. Moore, flight-intercept trap, (2), NSNR; **Guysborough Co.:** Borneo, 26.vii.1995, C. Corkum, deciduous forest, flight intercept trap, NSMC; Pirate Harbour, 17.vii.2006, V. Power, NSNR; **Halifax Co.:** Big St. Margarets, 29.vii–13.viii.1997, D.J. Bishop, red spruce forest, flight-intercept trap, NSMC; **Hants Co.:** Mount Uniacke, 12.vii.1995, B. Wright, NSMC; **Kings Co.:** Kentville, 11.vii.2000, D.H. Webster, on *Myrica gale* L. (Myricaceae), DHWC; Kentville, 11.viii.1948, D.C. Eidt, NSAC; **Lunenburg Co.:** Bridgewater, 22.viii.2005, A. Malloy, flight-intercept trap, NSNR; Card Lake, 29.vii–13.viii.1997, D.J. Bishop, red spruce/eastern

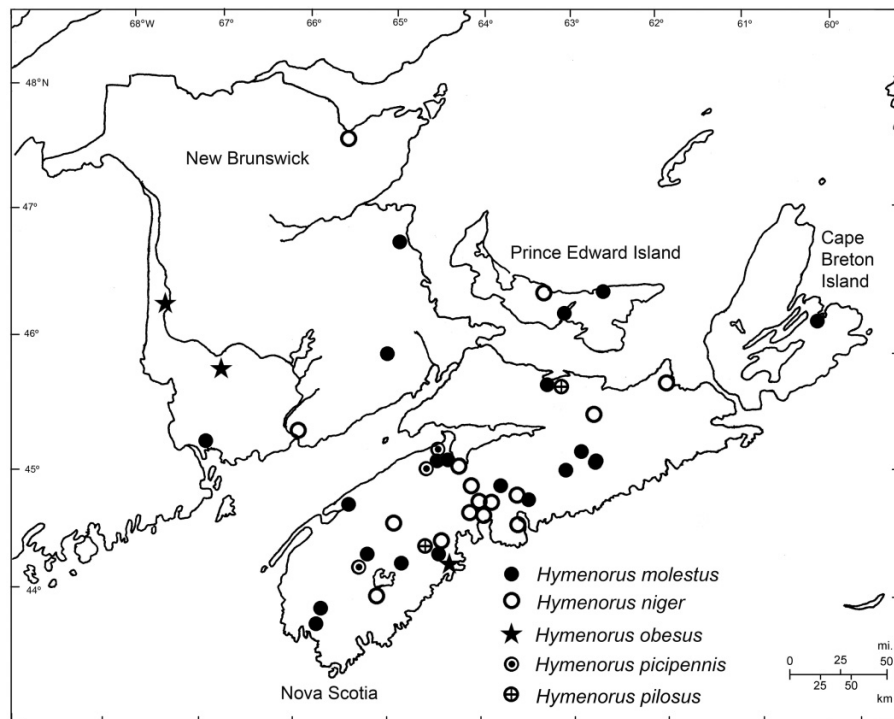
hemlock forest, flight-intercept trap, NSMC; Marriott's Cove, 18.v.2000, M.P. Scott, NSMC; **Queens Co.:** Black Duck Lake, 1.viii.2003, P. Dollin, white pine forest, funnel trap, (2), NSMC; Kejimikujik National Park, Lake Kejimikujik, 15.vii.1961, D.C. Ferguson, NSMC. **PRINCE EDWARD ISLAND. Queens Co.:** St. Patricks, 13.viii.2000, C.G. Majka, on *P. glauca*, CGMC.

Capnochora fuliginosa is newly recorded in Nova Scotia and Prince Edward Island (Fig. 5). In the Maritime Provinces it has been collected in both deciduous and coniferous forests. Larvae of this species have been found living in decaying environments in tree holes (Park and Auerbach 1954).

Hymenorus molestus Fall

NOVA SCOTIA. Twenty-six specimens examined from Annapolis, Cape Breton, Cumberland, Guysborough, Halifax, Hants, Kings, Lunenburg, Queens, and Yarmouth counties. The earliest record is from 1935 (**Annapolis Co.:** Round Hill, 20.vii.1935, F.C. Gilliatt, ACNS). **PRINCE EDWARD ISLAND. Kings Co.:** St. Peters Bay, 2.viii.1997, D.B. McCorquodale, CGMC; **Queens Co.:** Charlottetown, 2.vi.1994, J.G. Stewart, ACPE.

Fig. 6. Distributions of *Hymenorus molestus*, *H. niger*, *H. obesus*, *H. picipennis*, and *H. pilosus* in the Maritime Provinces (for details see Fig. 1).



Hymenorus molestus is newly recorded in Nova Scotia and Prince Edward Island (Fig. 6). In the Maritime Provinces it has only been collected in deciduous forests. Larvae of *Hymenorus* Mulsant infest decaying softwoods and hardwoods and are also found in knots in living trees (White 1983).

Hymenorus niger (Melsheimer)

NOVA SCOTIA. Annapolis Co.: Durland Lake, 3.viii.2003, P. Dollin, eastern hemlock / balsam fir (*Abies balsamea* (L.) Mill.) / black spruce (*Picea mariana* (Mill.) BSP) stand, NSMC; **Antigonish Co.:** Fairmont Tower, 14.viii.1996, M. LeBlanc, NSNR; **Halifax Co.:** Big St. Margarets, 29.vii–13.viii.1997, D.J. Bishop, red spruce forest, flight-intercept trap, (2), NSMC; Campbell Hill, 16–29.vii.1997, 29.vii–13.viii.1997, D.J. Bishop, red spruce forest, flight-intercept trap, (2), NSMC; Pockwok Lake, 29.vii–13.viii.1997, D.J. Bishop, red spruce forest, flight-intercept trap, (2), NSMC; Sandy Lake, 29.vii–13.viii.1997, D.J. Bishop, red spruce forest, flight-intercept trap, NSMC; Point Pleasant Park, 8.viii.2000, C.G. Majka, red spruce forest, CGMC; **Hants Co.:** Panuke Lake, 29.vii–13.viii.1997, D.J. Bishop, red spruce /

eastern hemlock forest, flight-intercept trap, NSMC; **Kings Co.:** Avonport, 20.vii.1994, J. Smith, NSNR; **Lunenburg Co.:** Big Mushamush Lake, 31.viii.1974, B. Wright, NSMC; **Pictou Co.:** Lorne, 29.vii–13.viii.1997, D.J. Bishop, red spruce / eastern hemlock forest, flight-intercept trap, NSMC; **Queens Co.:** Black Duck Lake, 1.viii.2003, P. Dollin, red spruce / eastern white pine (*Pinus strobus* L. (Pinaceae)) forest, funnel trap, NSMC. **PRINCE EDWARD ISLAND. Queens Co.:** Brackley Beach, Prince Edward Island National Park, 26.vii.1940, G. Walley, CNC.

Hymenorus niger is newly recorded in Nova Scotia and Prince Edward Island (Fig. 6). In the Maritime Provinces it has been collected in coniferous forests. Larvae of *Hymenorus* species infest decaying softwoods and hardwoods and are also found in knots in living trees (White 1983).

Hymenorus obesus Casey

NEW BRUNSWICK. Carleton Co.: Wakefield, Bell Forest Preserve, 13.vii.2004, R.P. Webster, hardwood forest, UV light trap, RPWC; **York Co.:** Charters Settlement, 13.viii.2002, mixed forest, at light, RPWC. **NOVA SCOTIA. Lunenburg**

Co.: Bridgewater, 12.vii.1995, G.D. Selig, GSC; Bridgewater, 12.viii.1992, D. McCarthy, NSMC.

Hymenorus obesus is newly recorded in New Brunswick and Nova Scotia (Fig. 6). It is found under loose bark and on dead branches (Fall 1931).

Hymenorus picipennis Casey

NOVA SCOTIA. Kings Co.: Kentville, 24.iv.1955, C.J.S. Fox, reared from red oak, *Quercus rubra* L., ACNS; Sheffield Mills, 22.xi.1966, C.J.S. Fox, ACNS; **Queens Co.:** Kejimikujik National Park, Lake Kejimikujik, 9.viii.1961, D.C. Ferguson, NSMC.

Hymenorus picipennis is newly recorded in Nova Scotia (Fig. 6). It is a saproxylic species associated with decomposing wood; reared from *P. strobus* in Quebec (Fall 1931) and from red oak in Nova Scotia (see above).

Hymenorus pilosus (Melsheimer)

NOVA SCOTIA. Cumberland Co.: Tatamagouche Provincial Park, 20.viii.2004, D. MacDonald, flight-intercept trap, NSNR; **Lunenburg Co.:** Big Mushamush Lake, 4.ix.1974, B. Wright, NSMC.

Hymenorus pilosus is newly recorded in Nova Scotia and the Maritime Provinces as a whole (Fig. 6). Larvae of *Hymenorus* species infest decaying softwoods and hardwoods and are also found in knots in living trees (White 1983).

Isomira quadristriata (Couper)

PRINCE EDWARD ISLAND. Kings Co.: Lakeside Beach, 3.viii.1997, D.B. McCorquodale, CBU; Launching, 23.vii.2001, C.G. Majka, old field, (5), CGMC; Woodville Mills, 23.vii.2001, old field, CGMC; **Queens Co.:** Brackley Beach, 30.vii.1940, G.S. Walley, CNC; Brackley Beach, 22.vii.1967, J.E.H. Martin, CNC; Churchill, 2.vii.1982, L. Drake, UPEI; Prince Edward Island National Park, Dalvey, 19.vii.1940, J. McDunnough, (6), CNC; Green Gables, 22.vii.1967, W.J. Brown, (5), CNC; Pinette, 24.vi.2003, coastal forest, (2), CGMC; St. Patricks, 17.vii.2001, 21.vii.2001, 13.vii.2002, 14.vii.2002, 17.viii.2002, 25.vi.2003, C.G. Majka, old field and coniferous forest, (13), CGMC; Wood Islands, no date indicated, G. Hilchie, GHC.

Isomira quadristriata is newly recorded on Prince Edward Island (Fig. 7). In the Maritime Provinces it has been collected in many different coniferous, deciduous, and open habitats.

Adults are commonly swept from the foliage of many species of trees and shrubs.

Isomira sericea (Say)

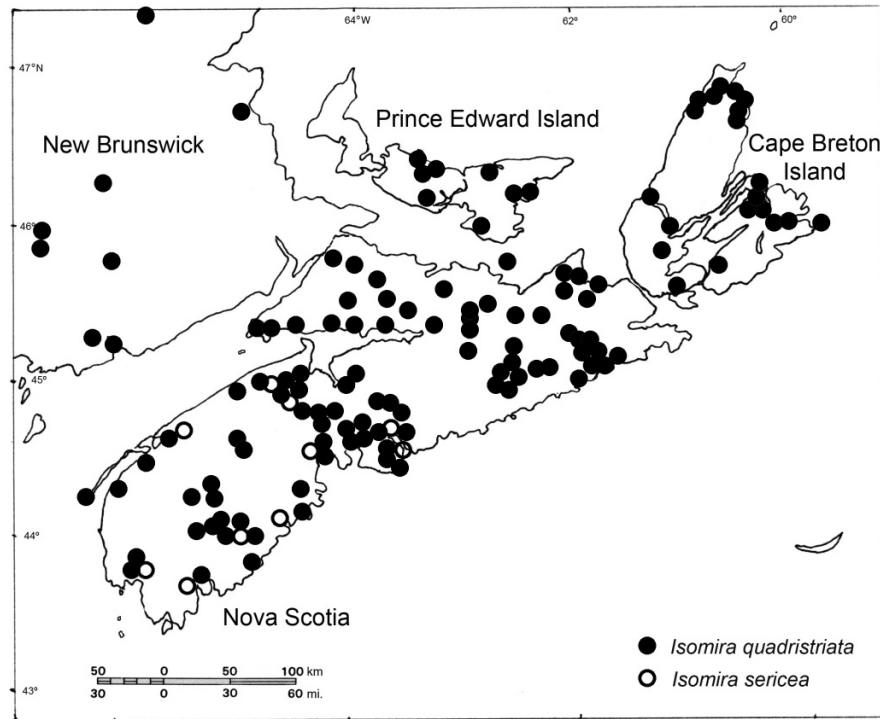
Isomira sericea was reported from Nova Scotia by Bousquet and Campbell (1991). It has only been found in the southern portion of the province (Fig. 7). Commonly found on the flowers of wild hydrangea, *Hydrangea arborescens* L. (Hydrangeaceae), *Spiraea* L. (Rosaceae), and other plants (Downie and Arnett 1996). In Maine, Dearborn and Donahue (1993) reported that it had been collected from spruce, true firs (*Abies* Mill. (Pinaceae)), pine, and oak. In Nova Scotia it has been collected in mixed forests, coastal barrens, and jack pine (*Pinus banksiana* Lamb. (Pinaceae)) forests and on flowers of Virginia rose, *Rosa virginiana* Mill. (Rosaceae), and bush honeysuckle, *Diervilla lonicera* P. Mill. (Caprifoliaceae) (unpublished data).

Mycetochara bicolor (Couper)

NOVA SCOTIA. Colchester Co.: Five Islands, 17.vii.1994, D. Kehler, deciduous forest, NSMC; Upper Bass River, 13.vii.1995, C. Corkum, deciduous forest, (2), NSMC; **Cumberland Co.:** East Leicester, 28.vii.1995, C. Corkum, deciduous forest, NSMC; Harrington River, 29.vii.1995, C. Corkum, deciduous forest, NSMC; **Guysborough Co.:** Borneo, 1995, C. Corkum, deciduous forest, NSMC; Melopseketch Lake, 26.vii.1995, C. Corkum, deciduous forest, NSMC; Melopseketch Lake, 16–29.vii.1997, D.J. Bishop, red spruce forest, flight-intercept trap, NSMC; Stillwater, 26.vii.1995, C. Corkum, deciduous forest; NSMC; **Halifax Co.:** Big St. Margarets Bay, 16–29.vii.1997, D.J. Bishop, red spruce forest, flight-intercept trap, NSMC; Campbell Hill, 1–16.vii.1997, D.J. Bishop, red spruce forest, flight-intercept trap, NSMC; Point Pleasant Park, 15.vii.2001, C.G. Majka, under loose bark of dead red spruce, CGMC; **Hants Co.:** Armstrong Lake, 16–29.vii.1997, D.J. Bishop, red spruce forest, flight-intercept trap, (2), NSMC; **Lunenburg Co.:** Bridgewater, 19.vi.1965, B. Wright, (2), NSMC; Bridgewater, 30.vi.1965, B. Wright, (10), NSMC; **Queens Co.:** Kejimikujik National Park, Lake Kejimikujik, 2.vii.1957, D.C. Ferguson, NSMC; **Yarmouth Co.:** Moses Lake, 17–22.vii.1993, J. and T. Cook, flight-intercept trap, JCC.

Mycetochara bicolor is newly recorded in Nova Scotia and the Maritime Provinces as a whole (Fig. 8). In the Maritime Provinces it is

Fig. 7. Distributions of *Isomira quadristriata* and *I. sericea* in the Maritime Provinces (for details see Fig. 1).



associated with red spruce forests and is found under loose bark on dead trees.

Mycetochara binotata (Say)

NOVA SCOTIA. Digby Co.: Digby, 6.viii.1995, J. Ogden, NSNR.

Mycetochara binotata is newly recorded in Nova Scotia and the Maritime Provinces as a whole (Fig. 8). No information on the bionomics of this species is available.

Mycetochara fraterna (Say)

NEW BRUNSWICK. Carleton Co.: Wakefield, Bell Forest Preserve, 13.vii.2004, K. Bredin, J. Edsall, and R.P. Webster, hardwood forest, UV light trap, (2), RPWC; **York Co.:** Charters Settlement, 27.vi.2001, R.P. Webster, mixed forest, UV light trap, RPWC. **NOVA SCOTIA. Lunenburg Co.:** Big Mushamush Lake, 20.vii.1980, B. Wright, NSMC; **Queens Co.:** Ponhook Lake, 13.vii.1993, J. Cook, UV light trap, (5), JCC; **Victoria Co.:** Baddeck, no date indicated, G. Hilchie, GHC.

Mycetochara fraterna is newly recorded in New Brunswick, Nova Scotia, and the Maritime Provinces as a whole (Fig. 8). Most of the specimens collected in the Maritime Provinces were

collected with UV light traps. Campbell (1978) reports a specimen from beneath the bark of Lombardy poplar, *Populus dilatata* Ait.

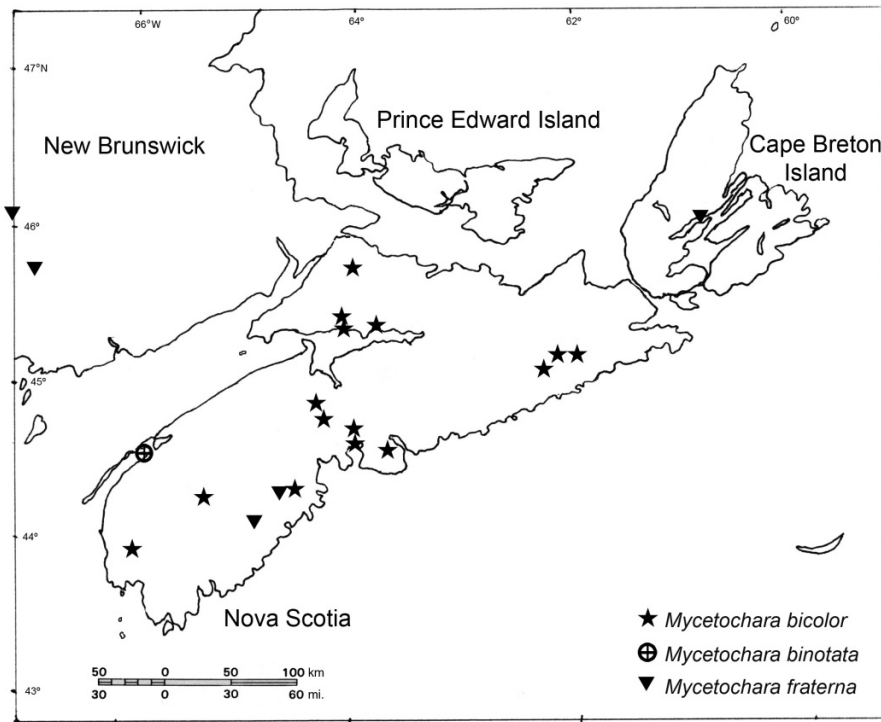
Diaperinae Latreille

Diaperini Latreille

Diaperis maculata Olivier

NOVA SCOTIA. Annapolis Co.: Alma Lake, 21.vi.2003, 3.viii.2003, P. Dollin, bracket fungi on white birch, (2), NSMC; Annapolis Royal, 13.vi.1949, D.C. Ferguson, (2), NSMC; **Colchester Co.:** Debert, 18.vi.1993, J. Ogden, JOC; **Digby Co.:** Big Uniake Lake, 31.vii.2005, G.D. Selig, bracket fungi, GSC; **Halifax Co.:** Halifax, 8.vii.1969, viii.1969, K. Neil, (2), NSMC; Halifax, 3.viii.1964, 1.vii.1965, P.M. Taschereau, (2), NSMC; Point Pleasant Park, 6.x.2002, C.G. Majka on *P. betulinus* on *B. papyrifera*, (4), CGMC; **Kings Co.:** Chipman's Corner, 30.v.2003, D.H. Webster, *Polyporus squamosus* Fr. (4), DHWC; Kentville, 12.vii.1948, V.R. Vickery, NSAC; **Queens Co.:** Lake Kejimkujik, 13.vii.1961, D.C. Ferguson, NSMC; Tobatic Lake, 17.vi.2003, P. Dollin, red spruce forest, NSMC. **PRINCE EDWARD ISLAND. Queens Co.:** St. Patricks, 13.vii.2002, viii.2003,

Fig. 8. Distributions of *Mycetochara bicolor*, *M. binotata*, and *M. fraterna* in the Maritime Provinces (for details see Fig. 1).



C.G. Majka, on *P. betulinus* on *B. papyrifera*, (16), CGMC.

Diaperis maculata is newly recorded in Nova Scotia and Prince Edward Island (Fig. 9). Adults and larvae are found in various fleshy fungi, notably bracket fungi (Triplehorn 1965); in the Maritime Provinces it is associated with bracket fungi, most frequently *P. betulinus* growing on *B. papyrifera*.

Gnatocerus cornutus (Fabricius)

NOVA SCOTIA. Lunenburg Co.: Bridgewater, 4.v.1938, H.E. Gray, CNC.

This adventive Palaearctic species was reported from Nova Scotia by Bousquet and Campbell (1991) on the basis of the above record (Fig. 9). To date, this is the only record of this species in the region.

Neomida bicornis (Fabricius)

PRINCE EDWARD ISLAND. Queens Co.: St. Patricks, 13.vii.2002, C.G. Majka, on *P. betulinus* on *B. papyrifera*, CGMC.

Neomida bicornis is newly recorded on Prince Edward Island (Fig. 9). In the Maritime Provinces it is associated with Polyporaceae growing on

Q. rubra, trembling aspen, *Populus tremuloides* Michx., *P. grandidentata*, horse-chestnut, *Aesculus hippocastanum* L. (Hippocastanaceae), *P. rubens*, and other trees.

Platydema americanum Laporte and Brullé

NOVA SCOTIA. Kings Co.: North Alton, 8.ix.2003, D.H. Webster, on *P. tremuloides*, DHWC.

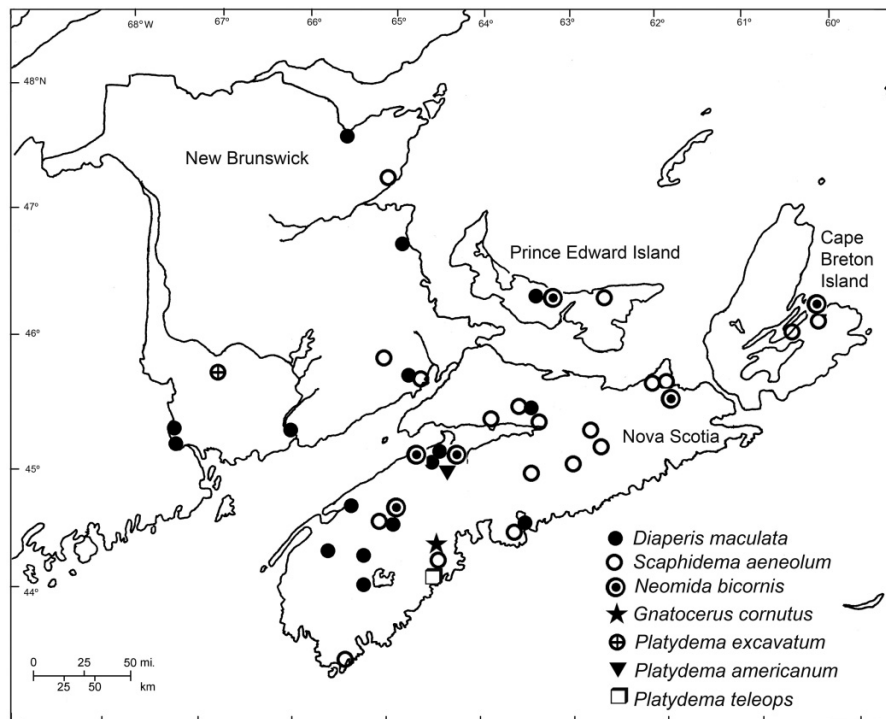
Platydema americanum is newly recorded in Nova Scotia (Fig. 9). *Platydema* species are found on bracket fungi in the genera *Fomes* and *Polyporus*; adults hibernate under bark (Triplehorn 1965). This species was recorded for New Brunswick by Bousquet and Campbell (1991). We have not located a voucher specimen that would substantiate the record, but the species is provisionally retained on the New Brunswick faunal list.

Platydema excavatum (Say)

NEW BRUNSWICK. York Co.: New Maryland, 5.vi.2003, R.P. Webster, mixed forest, RPWC.

Platydema excavatum is newly recorded in New Brunswick (Fig. 9). Biology is as above;

Fig. 9. Distributions of *Diaperis maculata*, *Scaphidema aeneolum*, *Neomida bicornis*, *Gnatocerus cornutus*, *Platydema excavatum*, *P. americanum*, and *P. teleops* in the Maritime Provinces (for details see Fig. 1).



occasionally found hibernating in large numbers under bark (Triplehorn 1965).

Platydema teleops Triplehorn

NOVA SCOTIA. Queens Co.: Crescent Beach, 19.v.1951, C.H. Lindroth, CNC.

Platydema teleops is newly recorded in Nova Scotia and the Maritime Provinces as a whole (Fig. 9). Very similar to *P. excavatum*, differing from the former species by the widely separated eyes.

Hypophloeini Billberg

Corticeus praetermissus (Fall)

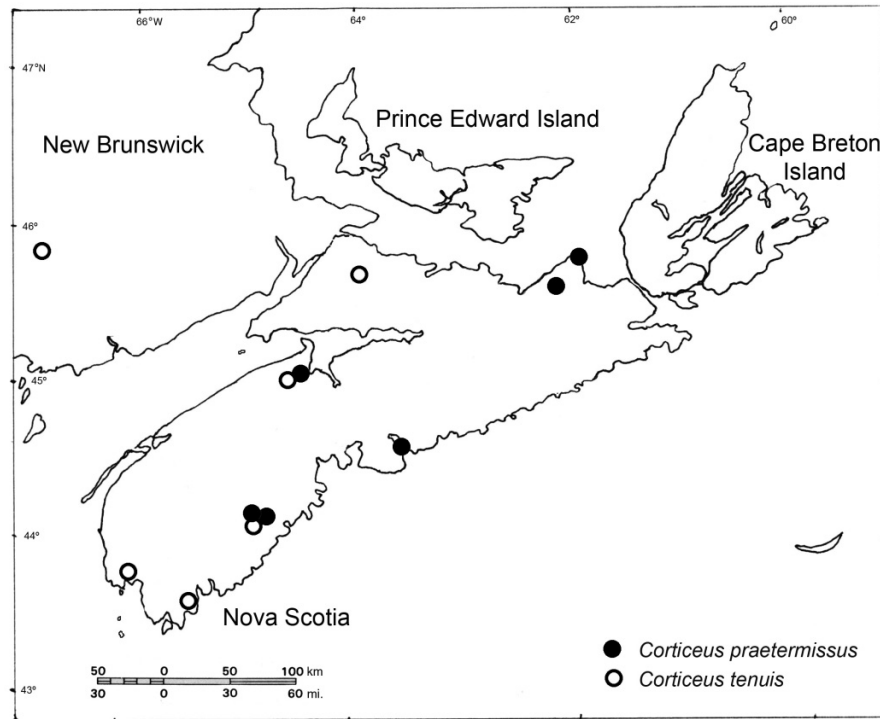
NOVA SCOTIA. Antigonish Co.: Cape George, 5.vii.1993, M. LeBlanc, NSNR; **Halifax Co.:** Point Pleasant Park, 14.iii.2002, 18.vi.2002, C.G. Majka, under bark of *P. rubens*, (2), CGMC; Point Pleasant Park, 3.iv.2002, 13.iv.2002, 27.iv.2002, 5.v.2002, C.G. Majka, under bark of *P. strobus* L., (5), CGMC; **Kings Co.:** Kentville, 10.ix.2002, D.H. Webster, at light, (2), DHWC; **Pictou Co.:** Marshy Hope, 29.vi.1995, M. LeBlanc, NSNR; **Queens Co.:** Eight Mile Lake, 22.vi.2003, P. Dollin, red spruce snag, NSMC; Ponthook Lake, 13.vii.1993, J. Cook, UV-light trap, JCC.

Corticeus praetermissus is newly recorded in Nova Scotia and the Maritime Provinces as a whole (Fig. 10). In the Maritime Provinces it has been found under the bark of dead and dying conifers in tunnels excavated by bark beetles (Curculionidae: Scolytinae) in the genera *Ips* De Geer and *Dendroctonus* Erichson. Some species of the genus *Corticeus* Piller and Mitterpacher are predators of Scolytinae and also feed on bluestain fungus (*Ophiostoma* sp.) (Triplehorn 1990).

Corticeus tenuis (LeConte)

NOVA SCOTIA. Cumberland Co.: Oxford, 15.iv.1999, K. Black, on *P. glauca*, (2), NSNR; **Kings Co.:** Kentville, 12.vi.2004, D.H. Webster, on *P. tremuloides*, (3), DHWC; North Alton, 17.vi.2004, D.H. Webster, on *P. tremuloides*, DHWC; **Queens Co.:** Medway River, 13.vi.1993, J. and T. Cook, car net, JCC; Ponthook Lake, 13.vi.1993, J. Cook, UV-light trap, JCC; **Shelburne Co.:** Clyde River Rd., 16.vii.1992, S. and J. Peck, forest, car net, JCC; **Yarmouth Co.:** Moses Lake, 17–22.vii.1993, J. and T. Cook, mixed forest, flight-intercept trap, JCC.

Corticeus tenuis is newly recorded in Nova Scotia (Fig. 10). In the Maritime Provinces it

Fig. 10. Distributions of *Corticeus praetermissus* and *C. tenuis* in the Maritime Provinces (for details see Fig. 1).

has been found associated with both coniferous and deciduous trees. In eastern North America most records are from *P. strobus*. One specimen was collected in the subcortical gallery of *Pityogenes hopkinsi* Swaine (Curculionidae: Scolytinae) (Triplehorn 1990).

Scaphidemini Reitter

Scaphidema aeneolum (LeConte)

NOVA SCOTIA. Twenty-eight specimens examined from Annapolis, Antigonish, Cape Breton, Colchester, Halifax, Lunenburg, Queens, and Shelburne counties. The earliest record is from 1983 (**Colchester Co.:** Five Islands Park, 27.vi.1983, D.S. Davis, NSMC). **PRINCE EDWARD ISLAND. Kings Co.:** Dundee, 26.vi.1985, L. LeSage and R. Rochon, CNC.

Scaphidema aeneolum is newly recorded in Nova Scotia and Prince Edward Island (Fig. 9). In Nova Scotia it is primarily associated with coniferous trees; however, there is one record of it in association with *Q. rubra*. It has been found on bracket fungi, including *Pycnoporus cinnabarinus*. Triplehorn (1965) reported the species from under the bark of *P. ponderosa* and *P. glauca*.

Stenochiinae Kirby Cnodalonini Gistel

Alobates pennsylvanicus (DeGeer)

NEW BRUNSWICK. Gloucester Co.: Tracadie, 14.vii.1978, L. Basque and B. Jones, UMNB; **Westmorland Co.:** Moncton, 9.ix.1978, G. Chouinard, UMNB; Moncton, 11.ix.1978, A. Chenard, UMNB; **NOVA SCOTIA. Antigonish Co.:** North Grant, 14.ix.2001, W.J. Sofan, STFX; **Inverness Co.:** Judique, 14.ix.1950, A.G.M., LEMQ; **Kings Co.:** Cambridge Station, 29.viii.2002, D.H. Webster, on *P. strobus* wood, DHWC; **Queens Co.:** Kejimikujik National Park, 13–30.ix.2002, C. McCarthy, light trap, JOC; Kejimikujik National Park, Lake Kejimikujik, 19.vii.1957, D.C. Ferguson, NSMC.

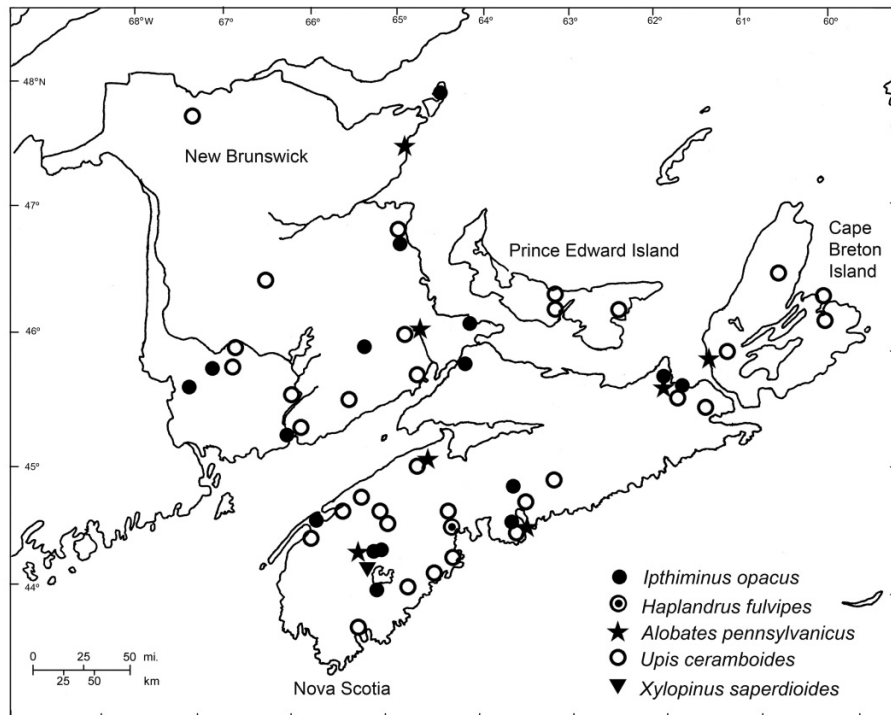
Alobates pennsylvanicus is newly recorded in New Brunswick, Nova Scotia, and the Maritime Provinces as a whole (Fig. 11). It has been found under loose bark of hardwoods (Downie and Arnett 1996) and, in Nova Scotia, on *P. strobus*.

Hapladrus fulvipes (Herbst)

NOVA SCOTIA. Lunenburg Co.: Chester, 18.vii.1969, B. Wright, NSMC.

Hapladrus fulvipes is newly recorded in Nova Scotia and the Maritime Provinces as a whole

Fig. 11. Distributions of *Ipthiminius opacus*, *Hapladrus fulvipes*, *Alobates pennsylvanicus*, *Upis ceramboides*, and *Xylopinus saperdioides* in the Maritime Provinces (for details see Fig. 1).



(Fig. 11). It has been found under tree bark and on dead limbs (Downie and Arnett 1996).

Ipthiminius opacus (LeConte)

Ipthiminius opacus was first reported in the region from Nova Scotia (Jones 1870) and is widely distributed in New Brunswick and Nova Scotia (Fig. 11). This saproxylic species has been reported on balsam fir and on a bracket fungus (Dearborn and Donahue 1993). One specimen in Nova Scotia was collected under the bark of a decaying *B. papyrifera* log in an old-growth eastern hemlock (*Tsuga canadensis* (L.) Carr. (Pinaceae)) forest (unpublished data).

Upis ceramboides (L.)

NOVA SCOTIA. Annapolis Co.: Alma Lake, 22.v.2003, P. Dollin, red spruce / white pine / balsam fir forest, NSMC; Durland Lake, 12.vii.2003, P. Dollin, eastern hemlock / balsam fir / black spruce forest, under bark of white birch log, NSMC; Lawrencetown, 14.vii.1945, D.C. Ferguson, NSMC; Lequille, 29.vii.1946, D.C. Ferguson, NSMC; **Antigonish Co.:** Dagger Woods, 23.vi.1997, R.F. Lauff, (2), STFX; **Cape Breton Co.:** Florence, 19.ix.1993, J.M. Francis, CBU; Sydney River, 29.xii.1997, M. Kerr, CBU;

Digby Co.: Hillgrove, 15.vii.1951, J.D. Roope, NSAC; **Guysborough Co.:** Lesterdale, 17.ix.2000, K.A. Long, STFX; **Halifax Co.:** Armdale, 5.viii.1955, D.C. Ferguson, NSMC; Big Indian Lake, 11.vi.2003, 23.vi.2003, P. Dollin, eastern hemlock / red spruce forest, white birch log, (2), NSMC; Chaswood, 14.viii.1955, A. Blades, LEMQ; Waverley, 15.vi.1947, collector not recorded, NSMC; **Inverness Co.:** Melford, 21.viii.1995, D.B. McCorquodale, CBU; **Kings Co.:** Cambridge Station, 9.iv.1960, D.H. Webster, white pine log, DHWC; **Lunenburg Co.:** Lunenburg, 2.ix.1982, B. Wright, NSMC; Petite Rivière, 5.ix.1953, D.C. Ferguson, NSMC; **Queens Co.:** Eight Mile Lake, 9.vii.2003, P. Dollin, red spruce forest, under bark of white birch log, NSMC; **Shelburne Co.:** Shelburne, 22.vii.1965, P.M. Taschereau, NSMC; **Victoria Co.:** Cape Breton Highlands, 10.vii.2005, J. Ogdén and K. Goodwin, on red spruce, NSNR.

Upis ceramboides is newly recorded in Nova Scotia (Fig. 11). This species was reported in Nova Scotia by Jones (1870). However, subsequent compilers, including Bousquet and Campbell (1991), were apparently unaware of this report. This species has been found on fallen white birch (Downie and Arnett 1996). In the

Maritime Provinces it is associated with dead conifers (*P. strobus*, *P. rubens*) and white birch.

Xylopinus saperdioides (Olivier)

NOVA SCOTIA. “Nova Scotia” (no further information recorded), NSMC; **Queens Co.:** Kejimikujik, Kejimikujik National Park, 10.viii.1961, D.C. Ferguson, NSMC.

Xylopinus saperdioides is newly recorded in Nova Scotia and the Maritime Provinces as a whole (Fig. 11). It has been found under bark and has been beaten from dead limbs of oak (Downie and Arnett 1996).

Discussion

New records

Thirteen species are newly recorded in New Brunswick, 25 in Nova Scotia, and 15 on Prince Edward Island, for a total of 53 new provincial records. Of these, 18 species, including *Bolitophagus corticola*, *Neatus tenebrioides*, *Helops gracilis*, *Blapstinus substriatus*, *Hymenorus obesus*, *Hymenorus picipennis*, *Hymenorus pilosus*, *Mycetochara bicolor*, *Mycetochara binotata*, *Mycetochara fraterna*, *Platydema excavatum*, *Platydema teleops*, *Corticeus praetermissus*, *Alobates pennsylvanicus*, *Haplandrus fulvipes*, *Xylopinus saperdioides*, an undescribed *Paratenetus* species, and an undescribed *Neatus* species, are newly recorded for the Maritime Provinces as a whole. One of these, *H. gracilis*, is newly recorded in Canada. The discovery of *H. gracilis* in New Brunswick is noteworthy, given the scant information available about this species. *Tenebrio obscurus*, previously reported from Prince Edward Island, is removed from the faunal list of that province because no valid records or voucher specimens could be found. Eleven non-native species (10 Palearctic and 1 Nearctic) have been recorded in the region, 5 of which have apparently become extirpated. As a result of these investigations, 48 species of Tenebrionidae are now recorded in the Maritime Provinces, 31 in New Brunswick, 42 in Nova Scotia, and 19 on Prince Edward Island.

Distribution and biogeography

An examination of the distribution of these tenebrionids (Figs. 1–11, Table 1) in the region reveals five patterns. (1) Widespread species in the Maritime Provinces: *Paratenetus* sp. (undescribed), *Arthromacra aenea*, *Bolitophagus corticola*, *Bolitotherus cornutus*, *Blapstinus*

metallicus, *Hymenorus molestus*, *Capnochroa fuliginosa*, *Isomira quadristriata*, *Scaphidema aeneolum*, and *Upis ceramboides* are widespread throughout the region. It is probable that *Neomida bicornis* also falls into this category but has been missed in New Brunswick to date because of insufficient collecting. (2) Widespread species missing from the islands: *Diaperis maculata* and *Hymenorus niger* have not been found on Cape Breton Island; *Alobates pennsylvanicus* is widespread on the mainland but has not been found on Prince Edward Island; and *Ipthiminus opacus* is widespread on the mainland but has not been collected on either Cape Breton Island or Prince Edward Island. Further fieldwork may determine whether these distributions are real or the result of insufficient collecting. (3) Southern Nova Scotia species: *Isomira sericea* has been found at various sites in the southern portions of Nova Scotia; other species such as *Blapstinus substriatus*, *Centronopus calcaratus*, *Hymenorus picipennis*, *Mycetochara binotata*, *Platydema teleops*, *Haplandrus fulvipes*, and *Xylopinus saperdioides* have been found in a small number of sites (three or fewer, *i.e.*, “locally” distributed) in the southern portions of Nova Scotia. Such “localized” species may have been either inadequately sampled or genuinely scarce (see below). However, these species may be confined to this portion of the province because of specific habitat preferences or environmental tolerances (this area has some of the mildest winter conditions in the region), or may have originally colonized southern Nova Scotia via postglacial island and land bridges from glacial refugia on George’s Bank (for discussion of this topic see Klimaszewski *et al.* 2006; Majka *et al.* 2007a). This also appears to be the case with *Ephalus latimanus* (see below). (4) “Localized” species: In addition to the “localized” species in southern Nova Scotia (see above), there are a number of species, including *Eleates depressus*, *Neatus tenebrioides*, *Neatus* sp. (undescribed), *Helops gracilis*, *Hymenorus obesus*, *Hymenorus pilosus*, *Androchirus erythropus*, *Mycetochara fraterna*, *Platydema americanum*, and *Platydema excavatum*, that have very “localized” distributions (*i.e.*, have been found at three or fewer sites in the Maritime Provinces). These distributions may result from inadequate collecting of such forest species or genuine rarity. Majka (2007) drew attention to 59 species of apparently “rare” (*i.e.*, representing $\leq 0.005\%$ of specimens examined in the region) saproxylic

Table 2. Dates of first detection of adventive Tenebrionidae in the Maritime Provinces.

	NB	NS	PE	NA	Source
Tenebrioninae Latreille					
Palorini Matthews					
<i>Palorus ratzeburgii</i> (Wissman)		1940		<1910	Blatchley 1910
Tenebrionini Latreille					
<i>Tenebrio molitor</i> Linnaeus	1898	~1827	1921–1924	~1827	Kirby 1837
<i>Tenebrio obscurus</i> Fabricius		1869		1860	Bain 1999
Alphitobiini Reitter					
<i>Alphitobius diaperinus</i> (Panzer)	1934	1964	1975	<1910	Blatchley 1910
Triboliini Mulsant					
<i>Latheticus oryzae</i> Waterhouse	1964			1870	Bain 1999
<i>Tribolium audax</i> Halstead	1980	1980		Nearctic	Becker 1982
<i>Tribolium castaneum</i> (Herbst)		1950	1960	1860	Bain 1999
<i>Tribolium confusum</i> Jacquelin du Val	1961	1938	<1963	1860	Bain 1999
<i>Tribolium destructor</i> Uyttenboogart	1978	1959	1962	1937	This study
<i>Tribolium madens</i> (Charpentier)	1980	1980		<1897?	Johnson 1897
Diaperinae Latreille					
Diaperini Latreille					
<i>Gnatocerus cornutus</i> (Fabricius)		1938		~1670	Bain 1998

Note: NB, New Brunswick; NS, Nova Scotia; PE, Prince Edward Island; NA, North America.

beetles and proposed that their apparent scarcity was indicative of habitat loss resulting from the long history of forest-management practices in the region. (5) Sable Island fauna: Sable Island, a 35 km long sandbar near the edge of the continental shelf, 160 km from the nearest point of land, is a special case. Three tenebrionid species are found on the island — the adventive *Tribolium destructor* and the native species *Blapstinus metallicus* and *Ephalus latimanus* (Wright 1989). Of particular interest is the last species, a flightless tenebrionid found nowhere else in Canada. It may have dispersed to the region from glacial refugia on George's Bank along offshore emergent island chains and land bridges following deglaciation (for discussion of this topic see Klimaszewski *et al.* 2006; Majka *et al.* 2007).

Adventive species

Almost all of the adventive species have rather localized synanthropic distributions, often associated with dried stored food products. Most are found in port cities or locales where other adventive species occur. Except for *Tenebrio molitor*, which is widespread, there is no evidence that these species survive in natural habitats. The lack of recent records of *Gnatocerus cornutus*, *Latheticus oryzae*, *Palorus ratzeburgii*, *Tenebrio obscurus*, and *Tribolium*

audax in the region may indicate that populations of these species did not establish, and have become extirpated in the region. The year of first detection of these adventive species in each province is provided in Table 2 to assist in tracking their regional history. Additionally, individuals of *Zophobas rugiceps* Kirsch have been found in pet stores and in *T. molitor* cultures both in Nova Scotia and on Prince Edward Island. However, there is no evidence that this species has become established in the region.

Island faunas

As is typically the case with island faunas, the number of native tenebrionids on Prince Edward Island (14 species) is small (38%) compared with the mainland fauna. Cape Breton Island, which is about twice the size of Prince Edward Island (10 311 vs. 5660 km²) and separated from the mainland by only 1.5 km (vs. 13 km for Prince Edward Island), has a comparable proportion of native tenebrionids (12 species, *i.e.*, 32%). These proportions may represent island-associated diminutions, area effects, insufficient collecting, or a combination of these factors. It is noteworthy that the proportions are similar to the proportions of native coccinellids found on Prince Edward Island (39%) and Cape Breton Island (41%) by Majka and McCorquodale (2006). The proportions of

Table 3. Comparison of data on forest-dwelling Coleoptera (all beetles, saproxylic species only, and tenebrionid species only) from four studies in Nova Scotia.

	Kehler <i>et al.</i> 1996	Bishop <i>et al.</i> (unpublished data)	Dollin <i>et al.</i> 2008	C.G. Majka (unpublished data)
Total no. of beetle species	292	387	346	405
No. of saproxylic species	203	302	263	254
Percentage of saproxylic species	69.5	78.0	76.0	62.7
No. of species of Tenebrionidae	4	7	14	10
Tenebrionids as a percentage of saproxylic species	2.0	2.3	5.3	3.9

native carabids found on Prince Edward Island (47%) and Cape Breton Island (57%) by Majka *et al.* (2007b) seem to be greater and may reflect more thorough surveying for carabids.

Saproxylic species

Of the 47 species of tenebrionids found in this region, 35 are saproxylic (Table 1). Many recent studies have highlighted the importance of saproxylic insects in the dynamics of forest ecosystems (*e.g.*, Swift 1977; Speight 1989; Langor *et al.* 2006, 2008). Numbers of species in three groups of Coleoptera — all beetles, saproxylic beetles only, and tenebrionid beetles only — found in four studies of forest beetle communities in Nova Scotia are compared in Table 3. Although the scale of the studies and their sampling methodologies vary, the results indicate that saproxylic beetles form a sizeable component (63%–78%) of forest beetle communities in the province and that tenebrionids make up 2.0%–5.3% of the saproxylic species present in forest stands.

Grove (2002) and Dudley and Vallauri (2004) summarized the impact of contemporary forest-management practices on saproxylic beetles. In this context, further research on saproxylic beetles such as the species discussed here is needed in order to assess the impact of forest-management practices on them, as well as to identify mechanisms that might lessen or ameliorate habitat fragmentation, the disappearance of old-growth forests, the diminution of coarse woody debris, and other forest parameters that are of importance to saproxylic insects.

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