



NEW RECORDS

New predaceous diving beetle (Coleoptera: Dytiscidae) records for New Brunswick and Canada with new distribution information on some rarely collected species

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ABSTRACT

Eighteen species of Dytiscidae are reported as new to New Brunswick, Canada. *Hydrocolus filiulus* (Fall) is reported for the first time for Canada. This brings the total number of species of Dytiscidae known from New Brunswick to 104. Bionomic and new distributional data is presented for several rarely collected species previously known for New Brunswick. A list of the species known to occur in New Brunswick is presented.

RÉSUMÉ

Le manuscrit fait état de la présence de dix espèces de la famille Dytiscidae nouvellement répertoriées pour le Nouveau-Brunswick, Canada. *Hydrocolus filiulus* (Fall) est répertorié pour la première fois au Canada. Ces ajouts augmentent le nombre de Dytiscidae pour la province du Nouveau-Brunswick à 104 espèces. Des données sur la bionomique et la distribution de plusieurs espèces rarement capturées mais répertoriées au Nouveau-Brunswick sont également présentées. La liste des espèces de Dytiscidae présentes au Nouveau-Brunswick est fournie.

INTRODUCTION

The family Dytiscidae (predaceous diving beetles) of Canada and Alaska was recently reviewed by Larson et al. (2000). As a result of this study we have a reasonably good understanding of the overall distribution and composition of the Canadian fauna. Eighty-six species of Dytiscidae were reported as occurring in New Brunswick in Larson et al. (2000). However, the dytiscid fauna of the Maritime Provinces has received little attention compared to the rest of Canada (Danks and Rosenberg 1987). In view of this and our general lack of knowledge of the overall Coleoptera fauna in this region, a general inventory of the Coleoptera of New Brunswick was initiated in 2003. During this inventory a number of species of Dytiscidae not previously recorded from New Brunswick were discovered. The objective of this paper is to report on these new discoveries and present habitat information on these species. Bionomic and new distributional information is also presented for several uncommonly or rarely collected species previously known from New Brunswick, but for which little bionomic data was previously available.

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METHODS

Dytiscidae were sampled from a variety of aquatic and semi-aquatic habitats in New Brunswick, Canada. GPS coordinates and descriptions of the habitats were recorded at all sites that were sampled.

Most aquatic habitats were sampled using heavy duty aquatic nets (150 micron mesh size) or a homemade net (rectangular 40 cm x 22 cm hoop (6-mm-diameter wire) with convergent base) equipped with a 45-cm-diameter aerial (butterfly) net bag with 24 per inch x 20 per inch mesh size. This net design was superior to the commercially available aquatic nets. Very small aquatic and semi-aquatic habitats such as moss-lined pools in forested bogs and fens, and spring-fed seepages were sampled by removing saturated moss and debris and placing it over a cloth sheet to drain water away. The moss and debris were then sifted and specimens were collected as they became active. This method was effective for collecting *Hydrocolus* sp. and other aquatic and semi-aquatic species of Coleoptera that occurred in these kinds of habitats. A few specimens of Dytiscidae (mostly *Hydrocolus* sp.) were collected later in the summer by sifting leaves and moss (*Sphagnum*) from completely dried vernal pools and depressions in forested bogs and fens.

Dytiscidae were determined using keys in Larson et al. (2000). Males of some species were dissected to confirm their identity. The genitalia were either glued to a card or mounted in balsam on acetate plates, and then pinned with the specimen they originated.

Specimens reported below with acronyms are contained in the New Brunswick Museum, Saint John, New Brunswick (NBM) and the Reginald Webster Collection, Charters Settlement, New Brunswick (RWC).

RESULTS

Species with an * are newly recorded for New Brunswick. Species are listed in the taxonomic order followed in Larson et al. (2000).

Laccophilinae

Laccophilus biguttatus Kirby, 1837*

Records: Kings Co., Hampton Marsh, 45.4776°N, 65.8992°W, 13.VII.2005, R. Webster, fresh water marsh, in shallow pool with emergent vegetation (1♀, RWC). Queens Co., Grand Lake near Scotchtown, 45.8760°N, 66.1815°W, 19.V.2003, V. Webster, M.A. Giguère and R. Webster, shallow lake margin among grasses (1♂, RWC); W of Jemseg near "Trout Creek", 45.8231°N, 66.1245°W,

7.VI.2003, R. Webster, silver maple swamp, in shallow water with dense emergent vegetation (1♂ RWC); same locality data, silver maple swamp, sifted from leaf litter in crotch of large silver maple, 3.IV.2006, R. Webster (1♀, RWC).

Adults of this species generally occurred in seasonally flooded marshes, in pools among emergent sedge (*Carex* sp.) and reeds, and among emergent vegetation in the shallow margin of a lake. One individual was collected from hand-sifted leaf litter from the crotch of a silver maple (*Acer saccharinum* L. (Aceraceae)) with a multiple trunk. This was presumably an over-wintering site as numerous Staphylinidae, normally associated with marsh habitats, were found among the leaf litter. All these sites were in an alluvial bottomland forest with *A. saccharinum*.

Hydroporinae

Liodessus fuscatus (Crotch, 1873)*

Records: Carleton Co., near Juniper Station in the Juniper Barrens, 46.5538°N, 67.1840°W, 21.VI.2005, R. Webster, black spruce bog, in floating mat of green *Sphagnum* (4, RWC). Charlotte Co., near New River, 45.2118°N, 66.6179°W, 22.IX.2006, R. Webster, small pond in floating mat of green *Sphagnum*, (6, RWC).

Adults were found in floating mats of green *Sphagnum* sp. in a black spruce (*Picea mariana* (Mill.) BSP (Pinaceae)/tamarack (*Larix laricina* (Du Roi) K. Koch) (Pinaceae)) bog in small secondary pools, and in a floating mat of green *Sphagnum* on the margin of a small pond and marsh near an old growth eastern white cedar (*Thuja occidentalis* L. (Cupressaceae)) forest.

Uvarus falli (Young, 1940)

Records: Queens Co., Grand Lake near Scotchtown, 45.8762°N, 66.1816°W, 19.V.2003, M.-A. Giguère, V. Webster & R. Webster, shallow lake margin among emergent grasses (4, RWC). Sunbury Co., Sunpoke Lake, 45.7562°N, 66.5557°W, 20.VI.2003, R. Webster, lake margin among emergent grasses (1, RWC). York Co., NW of Magundy at Beaver Br., 45.8386°N, 67.1609°W, 8.VII.2006, D. Sabine & R. Webster, eastern white cedar swamp, margin of flooded brook over gravel road (1, RWC).

Most adults were collected at lake margins in shallow warm water over sand or fine gravel with emergent grasses. This species was reported by Larson et al. (2000) as occurring in New Brunswick, but not shown on the distributional map of the species. Only one occurrence, in southwestern Nova Scotia, is shown on the map.

***Uvarus granarius* (Aubé, 1838)**

Record: York Co., 3 km NW of Blaney Ridge, 45.8178°N, 67.1692°W, 7.IX.2004, D. Sabine, kettle-hole bog, margin of pool in saturated moss (5, RWC).

Adults were collected from saturated moss at the margin of a pool in a kettle-hole bog. This species was reported from similar habitats in Larson et al. (2000). *Uvarus granarius* was shown as occurring at one locality in New Brunswick on the distributional map, but not in the checklist in Larson et al. (2000).

***Hygrotus farctus* (LeConte, 1855)**

Records: Carleton Co., near Juniper Station in the Juniper Barrens, 46.5538°N, 67.1840°W, 21.VI.2005, R. Webster, black spruce/tamarack bog, margin of pond in shallow water over *Sphagnum* and peat (4, RWC). Gloucester Co., off Hwy 8 near Allardville, 47.4303°N, 65.5163°W, 25.VI.2005, R. Webster, black spruce bog, margin of pond in shallow water over firm peat substrate with scattered emergent grasses (3, RWC). Victoria Co., Trafton Barrens, 46.9105°N, 66.9601°W, 27.VI.2005, M.-A. Giguère & R. Webster, black spruce bog, margin of small pond in flooded moss mat (3, RWC).

Hygrotus farctus adults were collected from the margins of small ponds in warm shallow (5–10 cm deep) secondary pools over firm peat and *Sphagnum* moss in black spruce and tamarack bogs. This species was reported from similar habitats in Larson (1975) and Larson et al. (2000). This beetle was previously known from one site in New Brunswick and only a few sites in Canada (Larson et al. 2000).

Hygrotus turbidus* (LeConte, 1855)

Record: Queens Co., W of Jemseg near “Trout Creek”, 45.8237°N, 66.1393°W, 7.VI.2003, 4.VI.2004, R. Webster, silver maple swamp, seasonally flooded marsh in shallow pools with dense emergent vegetation (10, RWC).

Adults occurred among emergent *Carex* and reeds in pools in a seasonally flooded marsh in an alluvial bottomland forest with *A. saccharinum*. This species is known from Prince Edward Island and Nova Scotia (Larson et al. 2000).

Hygrotus patruelis* (LeConte, 1855)

Record: Gloucester Co., Miscou Island, 47.90809°N, 64.59071°W, 31.VII.2005, R. Webster, gravel pit pond in shallow water with emergent grasses and gravel bottom (12♂, 20♀, RWC).

Adults occurred in a shallow (10–15 cm) gravel pit pond with scattered emergent grasses and *Carex* and a gravel bottom. Several specimens of *Hygrotus nubilus* (LeConte) were also found at this site. Most (18 of 20)

females from this site lacked the microreticulation (elytra appear to be shiny) on the elytra typical of more northern populations, and were thus like males. Larson et al. (2000) noted that the geographical pattern observed in the proportion of females exhibiting microreticulation on the elytra of females appeared to be clinal, with a progressive decrease in the proportion from north to south.

Hygrotus falli* (Wallis, 1924)

Record: Gloucester Co., off Hwy 8 near Allardville, 47.4303°N, 65.5163°W, 25.VI.2005, R. Webster, black spruce bog, in pond in shallow water over firm peat substrate with scattered emergent grasses (4♂, 6♀, RWC).

Hygrotus falli adults were collected (with *H. farctus*) in warm shallow (5–10 cm deep) secondary pools on the margin of a small pond with scattered emergent grasses over firm peat and *Sphagnum* moss in a *P. mariana* bog (raised peatland). The closest records for this species are near Quebec City, Quebec (Larson et al. 2000).

Sanfilippodytes pseudovilis* (Young, 1953)

Record: Carleton Co., “Bell Forest”, 46.2208°N, 67.7210°W, 12.VII.2004, 2.VI.2005, K. Bredin, J. Edsall, M.-A. Giguère & R. Webster, rich Appalachian hardwood forest, among small rocks and gravel in small spring-fed brook (10, RWC).

Adults were among small rocks (mostly limestone) and gravel in a small cold spring-fed brook just below the head of a spring in a rich Appalachian hardwood forest. The closest records of this transcontinental species are in southwestern Quebec near Montreal and in southeastern Newfoundland (Larson et al. 2000).

***Heterosternuta cocheconis* (Fall, 1917)**

Record: York Co., Charters Settlement, 45.8380°N, 66.7309°W, 18.VIII.2003, 23.VIII.2003, 14.V.2004, 5.VI.2004, 5.VII.2004, 11.VI.2005, medium sized partially shaded brook, among small stones near margin (18, RWC, NBM); Zealand, at Keswick River, 46.0541°N, 66.9340°W, 28.VI.2005, small river among grasses on clay/sand bottom in slow section near outflow of brook (2, RWC); Fredericton, Nashwaaksis River at Rt. 106, 45.9850°N, 66.6900°W, 6.V.2006, small river among trailing grasses on gravel/sand bottom near outflow of brook (1, RWC).

In Charters Settlement, this species was found among small stones and gravel and in sections with undercut banks near the margin of a shallow (5–30 cm in depth) partially shaded, permanent brook (3–5 m wide). Adults were located by turning stones and gravel and collecting them with a small kitchen strainer. At the other two

sites, adults were found among grasses in eddy areas or trailing vegetation near the outflows of brooks in small sized rivers. This species was reported as occurring at one locality in New Brunswick in the text and map in Larson et al. 2000, but was not included in the checklist.

Hydroporus rufinasus* Mannerheim, 1852

Records: Carleton Co., N. of Lakeville near Two Mile Brook Fen protected area, 46.3641°N, 67.6783°W, 2.VI.2005, 9.VI.2005, R. Webster, tamarack swamp, in shaded mossy pools with emergent *Carex* and herbaceous plants (5♂, 3♀, RWC); Meduxnekeag Valley Nature Preserve near the Meduxnekeag River, 46.1931°N, 67.6825°W, 7.VI.2007, R. Webster, river margin, sweeping foliage (1♀, RWC). York Co., Charters Settlement, 45.8263°N, 66.7350°W, 5.V.2003, V. Webster & R. Webster, Sedge marsh in pools among dense sedges and *Sphagnum* (1♀, RWC).

Hydroporus rufinasus occurred in mossy pools with emergent *Carex* and various herbaceous plants. One adult was collected by sweeping vegetation near a river. *Hydroporus rufinasus* is known from several sites in Nova Scotia (Larson et al. 2000).

***Hydrocolus rubyae* (Larson, 1975)**

Record: York Co., "Browns Mt. Fen" W of Canterbury, 45.8967°N, 67.6343°W, 8.VI.2004, 9.VI.2005, J. Edsall, M.-A. Giguère, & R. Webster, old growth cedar swamp in small moss-lined pools among hummocks (9♂, 11♀, NBM, RWC).

Adults occurred in small moss-lined pools among hummocks in an old growth *T. occidentalis* swamp. This represents the second record of this species for New Brunswick. There are no records from the other Maritime Provinces (Larson et al. 2000).

Hydrocolus rufiplanulus* (Fall, 1923)

Record: Carleton Co., Meduxnekeag Valley Nature Preserve near the Meduxnekeag River, 46.1886°N, 67.6706°W, 31.V.2005, R. Webster, river margin, sandy bottomed pool in small brook (1♀, RWC).

This individual was collected from a small sand-bottomed pool near the mouth of a small spring-fed brook near the Meduxnekeag River. This is the second record of this species for Canada. At the other Canadian locality (Mt. Sutton, Quebec), adults were collected from a mossy seep near the base of a ski hill (Larson et al. 2000). In a search for additional specimens of this species in mossy seeps at the Meduxnekeag Valley Nature Preserve, the next species, *H. filiulus*, was located.

Hydrocolus filiulus* (Fall, 1923)*

Record: Carleton Co., Meduxnekeag Valley Nature Preserve, 46.1904°N, 67.6706°W, 8-9.VI.2005, R. Webster, small spring-fed seepage in small pools in saturated moss (9♂, 10♀, NBM, RWC).

This is the first record of *H. filiulus* for Canada. Larson et al. (2000) suggested that it might occur in Canada in New Brunswick or southern Quebec as it was known from New Hampshire and New York. In New Brunswick, *H. filiulus* occurred in saturated moss and debris in a small spring-fed seepage in small pools with an underlying rich organic soil substrate on a south facing slope in an old growth mixed hardwood and *T. occidentalis* forest. The species was also found in similar habitats in several other spring-fed seepages near the Meduxnekeag River in the vicinity of the above site.

Colymbetinae

Agabus wasastjerna* (C. R.Sahlberg, 1824)

Records: Gloucester Co., off Hwy 8 in Black spruce bog near Allardville, 47.4303°N, 65.5166°W, 25.VI.2005, R. Webster, forested black spruce bog, in small shaded moss-lined pool (1♂, 1♀, RWC). Queens Co., Gagetown in bog adjacent to Hwy 2, 45.8316°N, 66.2346°W, 4.VI.2005, R. Webster, forested black spruce bog, in small shaded pools covered with saturated *Sphagnum* (1♂, 3♀, RWC). Restigouche Co., Morin Bog, 4.0 km N. of Kedgwick, 47.6813°N, 67.3157°W, 15.V.2003, R. Webster, black spruce bog, in *Sphagnum*-lined pool with scattered emergent sedges (1♂, RWC); 9 km S of Saint Arthur, 47.8177°N, 66.7561°W, 14.VI.2006, R. Webster, Eastern white cedar swamp, in small shaded moss-lined pool (in moss) (1♂, RWC). Victoria Co., near Black Brook, 47.446°N, 67.665°W, 25.VI.2003, A.-S. Bertrand, old growth black spruce forest, pitfall trap (1♀, RWC). York Co., "Browns Mt. Fen" W of Canterbury, 45.8965°N, 67.6345°W, 1.VI.2005, M.-A. Giguère, & R. Webster, Eastern white cedar swamp, in small shaded pool in saturated moss (1♀, RWC).

Most adults of *A. wasastjerna* were found in small shaded moss-lined pools in forested *P. mariana* bogs and old growth *T. occidentalis* forests, often with *Hydrocolus paugus* (Fall), *H. persimilis* (Crotch), and or *H. stagnalis* (Gemminge & Harold). This species is known from Maine and the eastern Gaspé, Peninsula, Quebec (Larson et al. 2000).

***Agabus opacus* Aubé, 1837**

Record: York Co., Charters Settlement, 45.8342°N, 66.7452°W, 5.V., 3.VI. 2003, R. Webster, vernal pond (5♂, 5♀, RWC).

Adults of *A. opacus* occurred in a vernal pond near the edge of a mature mixed forest. Hardwood leaves covered the bottom and there were scattered grasses along the margin pond which usually has water until mid July. Adults were most common during May, and occurred among leaves along the margin of the pond. This is the second record for New Brunswick for this uncommon species. There are no other records for this beetle in the Maritime Provinces (Larson et al. 2000).

Agabus inscriptus (Crotch, 1873)*

Records: Carleton Co., N. of Lakeville near Two Mile Brook Fen Protected Area, 46.3641°N, 67.6783°W, 9.VI.2005, R. Webster, tamarack swamp in shaded mossy pool with emergent sedges and herbaceous plants (1♂ RWC). **Victoria Co.**, near Traflet Barrens, 46.8857°N, 66.9760°W, 27.VI.2005, M.-A. Giguère & R. Webster, mixed forest, in vernal pond with clay bottom covered with leaves (1♂, 1♀, RWC).

Agabus confinis (Gyllenhal, 1808)*

Records: Restigouche Co., Morin Bog, 4.0 km N. of Kedgwick, 47.6813°N, 67.3157°W, 15.V., 22.V., 6.VI.2003, R. Webster, margin of black spruce bog in *Sphagnum*-lined pools (1♂, 2♀, RWC). **Victoria Co.**, 4.0 km NE of Black Brook, 47.3755°N, 67.0100°W, 27.VIII.2004, D. Sabine & R. Webster, Eastern white cedar swamp, in drainage ditch with *Sphagnum* and sedges (2♂, 1♀). **York Co.**, Charters Settlement, 45.8258°N, 66.7220°W, 5.V.2003, V. Webster & R. Webster, small pond with dense grasses and duckweed (1♀, RWC).

Most adults were collected in small *Sphagnum*-lined pools with *Carex* sp. in a *P. mariana* bog and in a drainage ditch with *Carex* sp. near an old growth *T. occidentalis* swamp.

Ilybius confusus Aubé, 1838*

Record: Kings Co. Westfield-Grand Bay, 45.3005°N, 66.1898°W, 25.VI.2003, 26.VII.2003, V. Webster & R. Webster, small shallow pond among *Typha* sp. (1♂, 4♀, RWC).

Ilybius confusus was found among cattail (*Typha* sp.) along the margin of a small shallow pond near the outflow of a stream into a large lake.

Rhantus sinuatus (LeConte, 1862)

Records: Queens Co. Scotchtown near Grand Lake, 45.8762°N, 66.1816°W, 25.IV.2004, M.-A. Giguère, lake margin in drift material (1♀, RWC); **York Co.**, Charters Settlement, 45.8263°N, 66.7350°W, 4.V.2003, 5.V.2003, V. Webster & R. Webster, sedge marsh in pools among dense sedges and *Sphagnum* (5♂, 3♀, RWC).

Rhantus sinuatus was collected using an aquatic net after treading dense vegetation in a *Carex* marsh. This species can be taken in numbers by use of bottle traps (Aiken and Roughly 1985). *Rhantus sinuatus* was reported as occurring at one locality in New Brunswick on the distribution map in Larson et al. 2000, but was not included in the checklist.

Rhantus consimilis Motschoulsky, 1859*

Record: York Co., 2.2 km S. of Thomaston Corner, 45.6281°N, 67.1044°W, 3.VI.2005, R. Webster, sun-exposed bog pond among leatherleaf (1♀, RWC).

The single adult was collected among dense leatherleaf (*Chamaedaphne calyculata* (L.) Moench (Ericaceae)), and scattered *Carex* near the margin of a shallow sun-exposed bog pond. The closest localities for this species to the Maritimes are in Maine and southern Quebec (Larson et al. 2000).

Rhantus suturellus (Harris, 1828)*

Records: Gloucester Co., Black spruce bog off Hwy 8 near Allardville, 47.4303°N, 65.5163°W, 25.VI.2005, R. Webster, black spruce bog, margin of pond in shallow water over firm peat substrate with scattered emergent grasses (1♂, RWC). **Restigouche Co.**, Morin Bog, 4.0 km N. of Kedgwick, 47.6813°N, 67.3157°W, 6.VI.2003, R. Webster, black spruce bog in shallow (2 cm deep) *Sphagnum*-lined pool (1♀, RWC). **York Co.**, Near "Browns Mt. Fen" W of Canterbury, 45.8937°N, 67.6564°W, 8.VI.2004, D. Sabine & R. Webster, black spruce bog, in small *Sphagnum*-lined pools (1♀, RWC); Charters Settlement, 45.8263°N, 66.7350°W, 4.V.2003, V. Webster & R. Webster, Sedge marsh, in pools with *Sphagnum* among sedges (2♂, 4♀, RWC).

Adults were collected from among *Carex* and *Sphagnum* in a *Carex* marsh and in *Sphagnum*-lined pools in *P. mariana* bogs. This species has been reported from Maine and Nova Scotia (Larson et al. 2000).

Dytiscinae

Hydaticus piceus LeConte, 1863*

Records: Kings Co. Westfield-Grand Bay, 45.3005°N, 66.1898°W, 25.VI.2003, 26.VII.2003, V. Webster & R. Webster, mixed forest, margin of partially shaded pond among cattails and sedges near large lake (1♂, 4♀, RWC). **Queens Co.**, Grand Lake near Stony Point, 46.0195°N, 66.0245°W, 20.VIII.2003, A.W. Thomas, D. Sabine, & R. Webster, margin of small pond among emergent vegetation (1♂, RWC). **Sunbury Co.**, about 2.0 km NW of Sunpoke Lake, 45.7575°N, 66.5736°W, 17.V.2003, R. Webster, red maple swamp, margin of slow stream among emergent

vegetation (1♀, RWC); about 0.5 km SE of Sunpoke Lake near the Oromocto River, 45.7562°N, 66.5553°W, 17.V., 31.V.2003 R. Webster, silver maple swamp, margin of oxbow among emergent vegetation (2♂, 3♀, RWC).

Hydaticus piceus was found in shaded ponds, oxbows, and along the margin of a slow stream with dense emergent vegetation in silver (*A. saccharinum*) and red maple (*A. rubrum* L. (Aceraceae)) swamps.

Acilius sylvanus Hilsenhoff, 1975*

Records: **Queens Co.**, W of Jemseg near "Trout Creek", 45.8241°N, 66.1252°W, 7.VI.2003, R. Webster, seasonally flooded marsh in pools with sedges and reeds (1♂, RWC). **Sunbury Co.**, near Sunpoke Lake, 45.7663°N, 66.5526°W, 31.V.2003, 15.V.2004, R. Webster, seasonally flooded marsh in small pools with emergent vegetation (1♂, 1♀, RWC); Portobello Creek N.W.A., 45.8992°N, 66.4248°W, 5.VI.2004, R. Webster, silver maple forest, in small pond with sedges (2♀, RWC). **Restigouche Co.**, near MacFarlane Brook Protected Area, 47.6026°N, 67.6316°W, 25.V.2007, R. Webster, sugar maple and yellow birch forest, in large snow melt pool (1♂, RWC).

This species occurred in seasonally flooded marsh pools surrounded with dense emergent vegetation, partially shaded ponds with emergent vegetation in an *A. saccharinum* swamp, and in a large snow melt pool in a sugar maple (*A. saccharum* Marsh. (Aceraceae))/yellow birch (*Betula alleghaniensis* Britt. (Betulaceae)) forest.

Graphoderus fascicollis (Harris, 1828)*

Records: **Queens Co.**, W of Jemseg near "Trout Creek", 45.8241°N, 66.1252°W, 7.VI.2003, R. Webster, seasonally flooded marsh in pools with sedges and reeds (1♀, RWC). **Sunbury Co.**, Sunpoke Lake, 45.7562°N, 66.5557°W, 20.VI.2003, R. Webster, margin of lake among emergent vegetation (1♀, RWC). **York Co.**, Charters Settlement, 45.8395°N, 66.7391°N, 6.VI.1999, R. Webster, mixed forest, mv. light (1♀, RWC); near "Browns Mt. Fen" W of Canterbury, 45.8841°N, 67.6428°W, 8.VI.2004, D. Sabine & R. Webster, sedge marsh in small pond (1♀, RWC).

Adults occurred in a seasonally flooded marsh/fen in pools among emergent *Carex* and reeds, along a shallow margin of a lake among emergent vegetation, and in pools in a *Carex* marsh.

DISCUSSION

This publication includes records of 18 species of Dytiscidae new to New Brunswick, bringing the total number of species known from the Province to 104 (Table

1). *Hydrocolus filiulus* (Fall) is reported for the first time for Canada. Most of the new dytiscid occurrences were scattered throughout New Brunswick from a variety of more generalized lentic habitats such as shallow pond and lake margins, marshes (*Laccophilus biguttatus*, *Uvarus falli*, *Hygrotus patruelis*, *H. turbidus*, *Hydroporus rufinasus*, *Acilus sylvanus*, *Graphoderus fascicollis*), or vernal ponds and pools (*Agabus opacus*, *A. inscriptus*). However, a number of species that are considered uncommon or rare were found in more specialized aquatic habitats. *Liodessus fuscatus* (Crotch) and *Uvarus granarius* (Aubé) were found in floating moss or *Sphagnum* mats in bogs. *Hygrotus falli* (Wallis) and *H. farctus* (LeConte) occurred in *P. mariana* bogs along the margins of small bog ponds in warm shallow water covering firm peat and *Sphagnum* moss. Little was previously known about the usual habitats of *H. falli* (Larson et al. 2000). *Hydrocolus filiulus* occurred in saturated moss and organic debris or in small mossy pools with an underlying rich organic soil substrate in small spring-fed seepages on south facing slopes in an old growth mixed hardwood and *T. occidentalis* forest in a deep river valley in the Meduxnekeag Valley Nature Preserve. To date this species has been found in only a few spring-fed seepages near this site, although it is possible that this species may be more widespread in the region. Additional surveys are required in western New Brunswick and adjacent Maine to confirm this. Another species new to New Brunswick, *Sanfilippodytes pseudovilis*, was found nearby in the Bell Forest among small limestone rocks and gravel in a small spring-fed brook in a rich Appalachian hardwood forest. *Hydrocolus rubyae* and *Agabus wasastjerbae* and other *Hydrocolus* species occurred in small moss-lined pools and depressions in forested *P. mariana* bogs and *T. occidentalis* swamps. The *Hydrocolus* species were often still present in these depressions later in the summer after the pools had completely dried (R.P. Webster, unpublished data).

A single individual of *Hydrocolus rufiplanulus* was collected in a small pool near the mouth of a spring-fed brook near the Meduxnekeag River in the Meduxnekeag Valley Nature Preserve. To date, no additional representatives of this species, known from only one other site in Canada, have been found in New Brunswick. This species was reported from a mossy seep in southern Quebec (Larson et al. 2000). Presumably *H. rufiplanulus* occurs in mossy seeps near the area where this individual was found, possibly in seeps with a different underlying substrate than those occupied by *H. filiulus*.

One hundred of the 104 species known to occur in New Brunswick were found during the general Coleoptera

Table 1. List of the Dytiscidae of New Brunswick, Canada (from Larson et al. 2000). * indicates newly recorded for New Brunswick; ** denotes species newly recorded for Canada.

Laccophilinae

Laccophilus maculosus Say
Laccophilus biguttatus Kirby*

Hydroporinae

Laccornis conoideus (LeConte)
Laccornis latens (Fall)
Desmopachria convexa (Aubé)
Liodesus affinis (Say)
Liodesus fuscatus (Crotch)*
Uvarus falli (Young)
Uvarus granarius (Aubé)
Hygrotus farctus (LeConte)
Hygrotus sayi J. Balfour-Browne
Hygrotus laccophilinus (LeConte)
Hygrotus turbidus (LeConte)*
Hygrotus compar (Fall)
Hygrotus patruelis (LeConte)*
Hygrotus nubilus (LeConte)
Hygrotus falli (Wallis)*
Hygrotus impressopunctatus (Schaller)
Hygrotus picatus (Kirby)
Sanfilippodytes pseudovilis (Young)*
Heterosternuta alleghenianus (Matta & Wolfe)
Heterosternuta cocheconis (Fall)
Heterosternuta pulcher (LeConte)
Neoporus mellitus (LeConte)
Neoporus sulcipennis (Fall)
Neoporus spurius (LeConte)
Neoporus dilatatus (Fall)
Neoporus clypealis (Sharp)
Neoporus carolinus (Fall)
Neoporus undulatus (Say)
Neoporus dimidiatus (Gemminger & Harold)
Hydroporus dentellus Fall
Hydroporus obscurus Sturm
Hydroporus brevicornis Fall
Hydroporus badiellus Fall
Hydroporus notabilis LeConte

Hydroporus niger Say
Hydroporus signatus Mannerheim
Hydroporus columbianus Fall
Hydroporus rufinasus Mannerheim*
Hydroporus puberulus LeConte
Hydroporus tristis (Paykull)
Hydroporus fuscipennis Schaum
Hydroporus striola Gyllenhal
Hydroporus nigellus Mannerheim
Hydroporus tenebrosus LeConte
Hydroporus rectus Fall
Hydroporus gossei Larson & Roughley
Hydrocolus paugus (Fall)
Hydrocolus persimilis (Crotch)
Hydrocolus rubyae (Larson)
Hydrocolus rufiplanulus (Fall)*
Hydrocolus filiulus (Fall)**
Hydrocolus stagnalis (Gemminger & Harold)
Stictotarsus griseostriatus (DeGeer)
Nebrioporus rotundatus (LeConte)
Oreodytes scitulus (LeConte)

Colymbetinae

Agabus erichsoni Gemminger & Harold
Agabus larsoni Fery & Nilsson
Agabus wasastjerna (C.R. Sahlberg)*
Agabus opacus Aubé
Agabus seriatus (Say)
Agabus obtusatus (Say)
Agabus bifarius (Kirby)
Agabus semipunctatus (Kirby)
Agabus punctulatus Aubé
Agabus ambiguus (Say)
Agabus erythropterus (Say)
Agabus leptapsis (LeConte)
Agabus anthracinus Mannerheim
Agabus phaeopterus (Kirby)
Agabus immaturus Larson
Agabus subfuscatus Sharp
Agabus discolor (Harris)

Agabus inscriptus (Crotch)*
Agabus confinis (Gyllenhal)*
Ilybius discedens Sharp
Ilybius biguttulus (Germar)
Ilybius confusus Aubé*
Ilybius angustior (Gyllenhal)
Ilybius pleuriticus LeConte
Coptotomus longulus lenticus Hilsenhoff
Neoscutopterus angustus (LeConte)
Neoscutopterus hornii (Crotch)
Rhantus sinuatus (LeConte)
Rhantus consimilis Motschoulsky*
Rhantus binotatus (Harris)
Rhantus wallisi Hatch
Rhantus suturellus (Harris)*
Colymbetes paykulli Erichson
Colymbetes sculptilis Harris

Dytiscinae

Dytiscus verticalis Say
Dytiscus harrisii Kirby
Dytiscus fasciventris Say
Dytiscus cordieri Aubé
Dytiscus dauricus Gebler
Hydaticus aruspex Clark
Hydaticus piceus LeConte*
Acilius mediatu (Say)
Acilius semisulcatus Aubé
Acilius sylvanus Hilsenhoff*
Graphoderus liberus (Say)
Graphoderus perplexus Sharp
Graphoderus fascicollis (Harris)*

inventory. Four species (*Neoporus dilatatus* (Fall), *Hydroporus gossei* Larson & Roughley, *Agabus leptapsis* (LeConte), *Agabus immaturus* Larson) previously recorded from the province (Larson et al. 2000), were not found. Additional surveys are required to relocate these species, especially *N. dilatatus* and *A. immaturus*, which are both

known from only one site in Canada (Larson et al. 2000). A number of species, e.g., *Copelatus glypticus* (Say), *Agabetes acuductus*, *Liodesus noviaffinis*, *Hydroporus morio* Aubé, *H. despectus* Sharp, *Agabus bicolor* (Kirby), and *Ilybius ignarus* (LeConte), known from adjacent jurisdictions, are likely to be found in the Province with further sampling.

Although the predaceous diving beetle fauna of New Brunswick is now better known, more studies are required to better understand the overall distribution and habitat association of each of the species that occur in the Province.

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