New Staphylinidae (Coleoptera) records with new collection data from New Brunswick, Canada: Oxyporinae

Reginald P. Webster¹, Ian DeMerchant¹

¹ Natural Resources Canada, Canadian Forest Service - Atlantic Forestry Centre, 1350 Regent St., P.O. Box 4000, Fredericton, NB, Canada E3B 5P7

Corresponding author: Reginald P. Webster (reginaldwebster@rogers.com)

Academic editor: J. Klimaszewski

| Received 6 December 2011 | Accepted 31 January 2012 | Published 26 April 2012 |

Citation: Webster RP, DeMerchant I (2012) New Staphylinidae (Coleoptera) records with new collection data from New Brunswick, Canada: Oxyporinae. In: Klimaszewski J, Anderson R (Eds) Biosystematics and Ecology of Canadian Staphylinidae (Coleoptera) II. ZooKeys 186: 263–271. doi: 10.3897/zookeys.186.2502

Abstract

Five species of Oxyporinae: Oxyporus occipitalis Fauvel, Oxyporus quinquemaculatus LeConte, Oxyporus major Gravenhorst, Oxyporus rufipennis LeConte, and Oxyporus stygicus Say, are newly recorded from New Brunswick, bringing the number of Oxyporinae known from the province to eight. The first documented records from New Brunswick are provided for Oxyporus kiteleyi reported by Majka et al. (2011). Oxyporus occipitalis and O. major are newly reported for the Maritime provinces of Canada. Collection and habitat data are presented for all these species.

Keywords

Staphylinidae, Oxyporinae, new records, Canada, New Brunswick

Introduction

This paper treats new Staphylinidae records from New Brunswick of the subfamily Oxyporinae. The Oxyporinae of the New World were reviewed by Campbell (1969, 1978). This Subfamily includes only the genus Oxyporus in North America. The biology and larva have been described for a number of the North American species (McCabe and Teale 1982; Leschen and Allen 1988; Hanley and Goodrich 1993, 1994; Goodrich and Hanley 1995b). Members of this genus exhibit an obligate association with mature Agaricales (gilled), Boletales (bolete), and Polyporales (polypore) mushrooms, and both larvae and adults feed on the spore-producing layer of the mushrooms (Hanley and Goodrich 1995b). The host preferences and behavior of the New World
Oxyporus species were reviewed by Hanley and Goodrich (1995b). Members of this genus vary in the range of fungal host genera they use. For example, adults of Oxyporus quinquemaculatus LeConte have a narrow host preference range (Pluteus species), whereas other species, such as Oxyporus vittatus Gravenhorst, use a broad range of host genera of fungi, although the larvae of all species appear to have a narrower range of host species than the adults and are usually found in only one or two host fungi (Hanley and Goodrich 1995a, b). The short duration of the life cycle of only 14–17 days is probably an adaptation related to the ephemeral nature of the host fungi (Hanley and Goodrich 1993, 1994, 1995b; Goodrich and Hanley 1995).

Campbell and Davies (1991) reported eight species of Oxyporus for Canada and two species (Oxyporus lateralis Gravenhorst and O. vittatus) from New Brunswick. Majka et al. (2011) reported Oxyporus kiteleyi Campbell from New Brunswick but did not provide any supporting references or data. Here, five species are added to the faunal list of New Brunswick, and the first documented records from New Brunswick of O. kiteleyi, bringing the number of Oxyporinae known from the province to eight.

Methods and conventions

The following records are based in part on specimens collected as part of a general survey by the first author to document the Coleoptera fauna of New Brunswick.

Collection methods

Oxyporinae were collected from mushrooms. Mushrooms were placed in a plastic box, broken into pieces, and the adults aspirated into a vial. A description of the habitat was recorded for all collections. Locality and habitat data are presented exactly as on labels for each record. This information, as well as additional collecting notes, is summarized in the collection and habitat data section for each species.

Specimen preparation

A few examples of male specimens were dissected to confirm their identity. The genital structures were dehydrated in absolute alcohol and mounted in Canada balsam on celluloid microslides, and pinned with the specimens from which they originated.

Distribution

Distribution maps, created using ArcMap and ArcGIS, are presented for each species in New Brunswick. Every species is cited with current published distribution in
Canada and Alaska, using abbreviations for the state, provinces, and territories. New provincial records are indicated in bold under Distribution in Canada and Alaska. The following abbreviations are used in the text:

| AK  | Alaska       | MB  | Manitoba   |
|-----|--------------|-----|------------|
| YT  | Yukon Territory | ON  | Ontario    |
| NT  | Northwest Territories | QC  | Quebec     |
| NU  | Nunavut      | NB  | New Brunswick |
| BC  | British Columbia | PE  | Prince Edward Island |
| AB  | Alberta      | NS  | Nova Scotia |
| SK  | Saskatchewan | NF & LB | Newfoundland and Labrador |

Acronyms of collections examined and referred to in this study are as follows:

- **AFC** Atlantic Forestry Centre, Natural Resources Canada, Canadian Forest Service, Fredericton, New Brunswick, Canada
- **CNC** Canadian National Collection of Insects, Arachnids and Nematodes, Agriculture and Agri-Food Canada, Ottawa, Ontario, Canada
- **NBM** New Brunswick Museum, Saint John, New Brunswick, Canada
- **RWC** Reginald P. Webster Collection, Charters Settlement, New Brunswick, Canada

**Results**

Five species of Oxyporinae are newly recorded from New Brunswick, and the first documented records from New Brunswick of *O. kiteleyi*, bringing the number of Oxyporinae known from the province to eight (Table 1).

| Family Staphylinidae Latreille | Oxyporus (Oxyporus) kiteleyi Campbell |
|-------------------------------|--------------------------------------|
| Subfamily Oxyporinae Fleming  | Oxyporus (Oxyporus) major Gravenhorst** |
| Oxyporus (Pseudoxyporus) lateralis Gravenhorst | Oxyporus (Oxyporus) rufipennis LeConte* |
| Oxyporus (Pseudoxyporus) occipitalis Fauvel** | Oxyporus (Oxyporus) stygicus Say* |
| Oxyporus (Pseudoxyporus) quinquemaculatus LeConte* | Oxyporus (Oxyporus) vittatus Gravenhorst |

**Notes.** *New to province, **New to Maritime provinces.*

**Species accounts**

All records below are species newly recorded for New Brunswick, Canada, unless noted otherwise (additional records). Species followed by ** are newly recorded from the Maritime provinces (New Brunswick, Nova Scotia, Prince Edward Island) of Canada.

The classification of the Oxyporinae follows Bouchard et al. (2011).
Family Staphylinidae, Latreille, 1802
Subfamily Oxyporinae, Fleming, 1821

Oxyporus (Pseudoxyporus) occipitalis Fauvel, 1864
http://species-id.net/wiki/Oxyporus_occipitalis

Map 1

Material examined. New Brunswick, Carleton Co., Meduxnekeag River Valley Nature Preserve, 46.1907°N, 67.6740°W, 23.VI.2006, R. P. Webster, mixed forest, in gilled mushroom (2 ♂, 5 ♀, RWC); Meduxnekeag River Valley Nature Preserve, 46.1940°N, 67.6800°W, 3.VII.2006, R. P. Webster, mixed forest, in gilled mushroom (1 ♂, 3 ♀, RWC).

Collection and habitat data. The biology, life history, and fungal hosts of Oxyporus occipitalis were reported by Hanley and Goodrich (1993, 1995a, b). This species was reported from 11 genera in seven families of fungi, but most individuals were reported from four genera (Hanley and Goodrich 1993, 1995a, b). In New Brunswick, adults were collected from various species (species not determined) of gilled mushrooms in mixed forests during June and July.

Distribution in Canada and Alaska. YT, BC, AB, SK, MB, ON, QC, NB (Campbell 1969).

Oxyporus (Pseudoxyporus) quinquemaculatus LeConte, 1863
http://species-id.net/wiki/Oxyporus_quinquemaculatus

Map 2

Material examined. New Brunswick, Albert Co., Caledonia Gorge P.N.A., (Protected Natural Area) 45.8257°N, 64.7791°W, 6.VII.2011, R. P. Webster, old hardwood forest (sugar maple and beech), on Polyporus varius (1, RWC). Carleton Co., Meduxnekeag River Valley Nature Preserve, 46.1907°N, 67.6740°W, 23.VI.2006, R. P. Webster, mixed forest, in gilled mushroom (1 ♀, RWC); Meduxnekeag River Valley Nature Preserve, 46.1897°N, 67.6710°W, 25.VI.2007, R. P. Webster, mixed forest, in gilled mushroom (1 ♂, 3 ♀, RWC); Meduxnekeag River Valley Nature Preserve, 46.1898°N, 67.6766°W, 2.VI.2008, R. P. Webster, mixed forest, in small brown gilled mushrooms on side of rotten log (3 ♂, RWC). York Co., Charters Settlement, 45.8286°N, 66.7365°W, 11.VII.2006, 2.VI.2007, R. P. Webster, mature mixed forest, in gilled mushrooms (2 ♂, 1 ♀, RWC).

Collection and habitat data. Oxyporus quinquemaculatus has a relatively narrow range of hosts (five genera in three families), with most records from the genus Pluteus (Hanley and Goodrich 1995b). This species was also reported from Laccaria amethystina Murr., Psilocybe spadicea Fries, and Naematoloma sublateritium Karst. by Weiss and West (1920, 1921). In New Brunswick, this species was collected from gilled mushrooms (species not determined) and from Polyporus varius Fr. in mixed forests during June and July.

Distribution in Canada and Alaska. ON, QC, NB, NS (Campbell 1969).
**Oxyporus** (*Oxyporus*) *kiteleyi* Campbell, 1978

http://species-id.net/wiki/Oxyporus_kiteleyi

Map 3

**Material examined.** Additional New Brunswick records, Carleton Co., Meduxnekeag River Valley Nature Preserve, 46.1907°N, 67.6740°W, 19.VIII.2004, 8.VIII.2006, R. P. Webster, mixed forest, in *Boletus* sp. mushrooms (2 ♂, 1 ♀, RWC); Meduxnekeag River Valley Nature Preserve, 46.1896°N, 67.6700°W, 26.IX.2007, R. P. Webster, hardwood forest, on group of *Pholiota* sp. mushrooms at base of dead standing beech (1 ♀, RWC); Meduxnekeag River Valley Nature Preserve, 46.1878°N, 67.6705°W, 18.VIII.2008, R. P. Webster, hardwood forest, in large orange gilled mushrooms [probably *Gymnopilus spectabilis*] near base of dead standing beech tree (5 ♂, 6 ♀, RWC, NBM); same locality and collector, 2.IX.2008, hardwood forest, on large orange gilled mushroom [probably *Gymnopilus spectabilis*] on side of rotten beech log (2 ♂, RWC); Jackson Falls, Bell Forest, 46.2200°N, 67.7231°W, 7.VIII.2009, R. P. Webster, mature hardwood forest, on large orange gilled mushroom [probably *Gymnopilus spectabilis*] on side of rotten beech log (7, NBM, RWC).

**Collection and habitat data.** Hanley and Goodrich (1995b) considered *O. kiteleyi* to have a relatively narrow range of host species. Adults have been reported from *Suillus* sp. (Boletaceae) from Massachusetts and Georgia (Campbell 1978) and *Armillaria mellea* (Tricholomataceae) (Hanley and Goodrich 1995b). In New Brunswick, adults were found on *Boletus* sp. mushrooms (Boletaceae), *Pholiota* sp. (Cortinariaceae) at the base of standing dead American beech (*Fagus grandifolia* Ehrh.), and inside a large orange gilled mushroom species (probably *Gymnopilus spectabilis* (Cortinariaceae)) near bases of dead standing American beech trees or on rotten beech logs. Adults occurred in tunnels within the caps of the orange-gilled mushroom species. This species was collected during August and September.

**Distribution in Canada and Alaska.** QC, NB (Campbell 1978). *Oxyporus kiteleyi* was listed as occurring in New Brunswick by Majka et al. (2011) without any supporting references or data. Here, we provide the first documented records from New Brunswick.

**Oxyporus** (*Oxyporus*) *major* Gravenhorst, 1806**

http://species-id.net/wiki/Oxyporus_major

Map 4

**Material examined.** New Brunswick, Carleton Co., Meduxnekeag River Valley Nature Preserve, 46.1907°N, 67.6740°W, 19.VIII.2004, 7.IX.2004, 14.IX.2005, R. P. Webster, mixed forest, in *Boletus* sp. mushrooms (3 ♂, 2 ♀, RWC).

**Collection and habitat data.** Campbell (1969) reported this species from a *Lactarius* sp. (Russulaceae). The biology, development, and a description of the larva of *O. major* were reported by Goodrich and Hanley (1995b). They reported this species from six families of fungi. Adults were most frequently collected from *Stropharia hardii* Atkinson (Strophariaceae), *Leptiot a acutaesquamosa* (Weinm.) Kummer (Lepiotaceae), and *Armillaria* spp. (Tricholomataceae). The only known larval host is *S. hardii* and *L.*
acutaesquamosa (Goodrich and Hanley 1995a, b). In New Brunswick, \textit{O. major} was collected from \textit{Boletus} sp. (Boletaceae) mushrooms during July, August, and September.

**Distribution in Canada and Alaska.** QC, NB (Chagnon 1917). Campbell (1969) considered a record from Montreal, Quebec based on specimens in the Fauvel Collection as doubtful unless verified by additional collecting and, therefore, did not report this species from Canada. However, there was a record supported by a specimen from Quebec (Montreal Island) reported by Chagnon (1917) that confirmed the presence of this species for the province of Quebec and Canada. There are also recent specimens from Quebec in the R. Martineau Collection at the Laurentian Forestry Centre’s Insectarium in Quebec City, Quebec and in the CNC.

**\textit{Oxyporus} (\textit{Oxyporus}) \textit{rufipennis} LeConte, 1863**

http://species-id.net/wiki/Oxyporus_rufipennis

Map 5

**Material examined.** New Brunswick, Albert Co., Caledonia Gorge P.N.A., 45.7692°N, 64.8093°W, 12.IX.2011, R. P. Webster, old hardwood forest (sugar maple and yellow birch), on \textit{Pholiota} sp. mushrooms on yellow birch log (1, NBM).

Carleton Co., Meduxnekeag River Valley Nature Preserve, 46.1940°N, 67.6800°W, 23.VI.2006, 3.VII.2006, R. P. Webster, mixed forest, on \textit{Pleurotus} sp. on dead standing trembling aspen (2 ♂, NBM, RWC).

Restigouche Co., Mount Carleton Prov. Park, Mount Bailey, 47.4042°N, 66.9189°W, 3.IX.2006, R. P. Webster, old hardwood forest, on mass of \textit{Pholiota} sp. mushrooms on large dead standing yellow birch (5 ♂, 4 ♀ (over 50 individuals observed), RWC).

**Collection and habitat data.** Hanley and Goodrich (1995b) considered \textit{O. rufipennis} to have a relatively narrow range of host species (\textit{Pholiota} (Cortinariaceae), Polyporus (Polyporaceae), \textit{Omphalotus}, \textit{Pleurotus} (Tricholomataceae)). In New Brunswick, this species was collected from mushrooms on standing trees and a recently fallen tree: \textit{Pleurotus} sp. mushrooms on dead standing trembling aspen (\textit{Populus tremuloides} Michx.), from masses of \textit{Pholiota} sp. mushrooms on a large standing (partially dead) yellow birch (\textit{Betula alleghaniensis} Britt.), and a recently fallen yellow birch. Adults were captured during June, July, and September.

**Distribution in Canada and Alaska.** ON, QC, NB, NS (Campbell 1969; Campbell and Davies 1991).

**\textit{Oxyporus} (\textit{Oxyporus}) \textit{stygicus} Say, 1831**

http://species-id.net/wiki/Oxyporus_stygicus

Map 6

**Material examined.** New Brunswick, Carleton Co., Meduxnekeag River Valley Nature Preserve, 46.1940°N, 67.6800°W, 23.VI.2006, R. P. Webster, mixed forest, in
Boletus sp. mushrooms (2 ♂, 1 ♀, RWC); Becaguimec Island in Saint John River, 46.3106°N, 67.5392°W, 13.IX.2006, R. P. Webster, mature mixed forest, on Pholiota sp. mushrooms on log (1 ♂, 3 ♀, NBM, RWC). **Sunbury Co.,** Lakeville Corner, 45.9007°N, 66.2423°W, 10.IX.2006, R. P. Webster, silver maple forest, on Boletus sp. mushroom (2 ♂, RWC).
Collection and habitat data. The biology, development, and a description of the larval characteristics of *O. stygicus* were reported by Hanley and Goodrich (1994). They reported this species from three families of fungi: Cortinariaceae (*Pholiota*), Polyporaceae (*Grifola, Polyporus*), and Tricholomataceae (*Armillaria, Omphalotus, Pleurotus*). Large series of immatures were collected from *Pholiota aurivella* (Fr.) Kummer, *Pholiota* sp., and *Omphalotus illudens* (Schw.) Bigelow. Weiss and West (1920) reported *O. stygicus* from *Pleurotus ostriatus* Fries. Hanley and Goodrich (1995b) considered *O. stygicus* to have a relatively narrow range of host species compared with other *Oxyporus* sp. This species was collected from *Boletus* and *Pholiota* spp. mushrooms in mixed forests and a silver maple (*Acer saccharum* Marsh) forest in New Brunswick. Adults were collected during June and September.

Distribution in Canada and Alaska. QC, NB, NS (Campbell 1969).

Acknowledgments

We thank Caroline Simpson for editing this manuscript. Anthony Davies (Agriculture and Agri-Food Canada (CNC), Ottawa) and an anonymous reviewer are thanked for the helpful suggestions that improved this manuscript. Jon Sweeney (AFC) revised the first draft of this manuscript and provided very useful comments. Serge Laplante (Agriculture and Agri-Food Canada (CNC), Ottawa) is thanked for his help. David Malloch (NBM) is thanked for assistance determining fungi. The New Brunswick Environmental Trust Fund and New Brunswick Wildlife Trust Fund are thanked for funding various insect surveys over the past 7 years. The Meduxnekeag River Association is thanked for permission to sample beetles at the Meduxnekeag Valley Nature Preserve (which includes the Bell Forest). The New Brunswick Department of Natural Resources (Fish and Wildlife Branch) is thanked for providing logistical support and issuing permits for sampling in the Protected Natural Areas. Survey work in the Caledonia Gorge Protected Natural Area was organized through the New Brunswick Museum with external funding from the New Brunswick Environmental Trust Fund, Salamander Foundation, and the New Brunswick Wildlife Trust Fund.

References

Bouchard P, Bousquet Y, Davies AE, Alonso-Zarazaga MA, Lawrence JF, Lyal CHC, Newton AF, Reid CAM, Schmitt M, Ślipiński SA, Smith ABT (2011) Family-group names in Coleoptera (Insecta). ZooKeys 88: 1–972. doi: 10.3897/zookeys.88.807

Campbell JM (1969) A revision of the New World Oxyporinae (Coleoptera: Staphylinidae). The Canadian Entomologist 101: 225–268. doi: 10.4039/Ent101225-3

Campbell JM (1978) New species of *Oxyporus* (Coleoptera: Staphylinidae) from North America. The Canadian Entomologist 110: 805–813. doi: 10.4039/Ent110805-8
Campbell JM, Davies A (1991) Family Staphylinidae rove beetles. [pp. 86–124] In: Bousquet Y (Ed) Checklist of beetles of Canada and Alaska. Research Branch Agriculture Canada Publication 1861/E, vi + 430 pp.

Chagnon G (1917) A preliminary list of the insects of the province of Quebec. Part III. Coleoptera. Supplement to Report of the Quebec Society for the Protection of Plants 1917: 161–277.

Goodrich MA, Hanley RS (1995) Biology, development and larval characters of Oxyporus major (Coleoptera: Staphylinidae). Entomological News 106: 161–168.

Hanley RS, Goodrich MA (1993) Biology, life history and fungal hosts of Oxyporus occipitalis (Coleoptera: Staphylinidae), including a descriptive overview of the genus. Proceedings of the Washington State Entomological Society 55: 1003–1007.

Hanley RS, Goodrich MA (1994) Natural history, development and immature stages of Oxyporus stygicus Say (Coleoptera: Staphylinidae: Oxyporinae). The Coleopterists Bulletin 48: 213–225.

Hanley RS, Goodrich MA (1995a) The Oxyporinae (Coleoptera: Staphylinidae) of Illinois. Journal of the Kansas Entomological Society 67 [1994]: 394–414.

Hanley RS, Goodrich MA (1995b) Review of mycophagy, host relationships and behavior in the New World Oxyporinae (Coleoptera: Staphylinidae). The Coleopterists Bulletin 49: 267–280.

Leschen RAB, Allen RT (1988) Immature stages, life histories and feeding mechanisms of three Oxyporus spp. (Coleoptera: Staphylinidae: Oxyporinae). The Coleopterists Bulletin 42: 321–333.

Majka CG, Chandler DS, Donahue CP (2011) Checklist of the beetles of Maine, USA. Empty Mirrors Press, Halifax, Nova Scotia, 328 pp.

McCabe TL, Teale SA (1982) The biology of Oxyporus lateralis Gravenhorst (Staphylinidae). The Coleopterists Bulletin 35 [1981]: 281–285.

Weiss HB, West E (1920) Fungus insects and their hosts. Proceedings of the Biological Society of Washington 33: 1–20.

Weiss HB, West E (1921) Additional notes on fungous insects. Proceedings of the Biological Society of Washington 34: 167–172.