

Coelostoma orbiculare (Fabricius) (Coleoptera: Hydrophilidae: Sphaeridiinae): New Records and Distribution in North America

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Source: The Coleopterists Bulletin, 77(3) : 382-385

Published By: The Coleopterists Society

URL: <https://doi.org/10.1649/0010-065X-77.3.382>

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SCIENTIFIC NOTE

***COELOSTOMA ORBICULARE* (FABRICIUS) (COLEOPTERA: HYDROPHILIDAE: SPHAERIDIINAE): NEW RECORDS AND DISTRIBUTION IN NORTH AMERICA**

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DOI.org/10.1649/0010-065X-77.3.382

The Palearctic water scavenger beetle *Coelostoma orbiculare* (Fabricius, 1775) was first reported from the Nearctic by Pentinsaari *et al.* (2019) based on two specimens collected in southern Ontario, Canada (Fig. 1). One larva was found in Cambridge during 2015 and one adult was found in South Frontenac during 2017; these specimens were initially uncovered using DNA barcoding and verified with morphological examination (Pentinsaari *et al.* 2019). Although these were the first known occurrences of the speciose genus *Coelostoma* Brullé, 1835 in the Nearctic, they were around the twentieth known species of Sphaeridiinae introduced to the Nearctic, a number not exactly known due to a history of introductions globally going back centuries and preceding species descriptions (Smetana 1978, 1979; Hansen 1999; Henegouwen 1989).

Pentinsaari *et al.* (2019) provided diagnostic characteristics and discussed how *Coelostoma* fit into existing keys of Nearctic Hydrophilidae, along with the similarity of *Coelostoma* to two other Coelostomatini genera, *Phaenonotum* Sharp, 1882 and *Dactylosternum* Wollaston, 1854. In addition to the characters they discussed, *Coelostoma* can be relatively easily recognized from the known species of Coelostomatini in North America through the lack of distinct elytral striae (Fig. 2A) and their wide, rhombic mesoventral elevation (Fig. 2B), which is similar in *Dactylosternum* but narrow in *Phaenonotum*. The mesoventral elevation in *Phaenonotum* was illustrated by Deler-Hernández *et al.* (2013: figs. 9–11) and Deler-Hernández *et al.* (2018: fig. 7). There are nine punctate striae in *Dactylosternum abdominale* (Fabricius, 1792), the only known species of *Dactylosternum* in eastern North America, but there is considerable variation in species of *Dactylosternum* that occur outside of the Nearctic; see Mai *et al.* (2022) for examples from the eastern Palearctic. *Coelostoma orbiculare* does have sutural striae on the apical half of the elytra (Fig. 2A) which, in combination with its

slightly larger size (4.0–5.0 mm; Hansen 1987; Jia *et al.* 2014), help to distinguish it from the smaller (< 4.0 mm) *Phaenonotum* (Smetana 1978).

During June and August 2022, I collected insects from Huyck Preserve in Albany County, New York. Insects were collected primarily using aquatic nets from habitats across the preserve, but insects were also collected at two black lights (LED at sheet) set up nightly at Lincoln Pond. I collected three *C. orbiculare* with nets at three sites across the preserve during June. These specimens are a **new country record** for the United States and a **new state record** for New York (Fig. 1). The three sites I collected *C. orbiculare* at all had dense vegetation, were relatively shallow (< 20 cm water depth), and were close to the margins of aquatic habitats. No *C. orbiculare* were collected at lights, but two other Sphaeridiinae were collected at lights, with *Cercyon praetextatus* (Say, 1825) being common and *Cercyon herceus* Smetana, 1978 uncommon. I did not identify the specimens of *C. orbiculare* until July, and during August, sampling efforts to collect them again did not produce any more individuals. Most observations of *C. orbiculare* in North America have occurred between late March and mid-June (see supporting data: Pintar 2023).

Subsequently, I reviewed observations posted to iNaturalist to further document the range of *C. orbiculare* in the Nearctic. Most observations were of individuals that were not collected, but some specimens were collected; I examined specimens from Ottawa, and one from near Quebec City was dissected following communication with the observer. All *Coelostoma* observations are assumed to be *C. orbiculare* given positive dissection of males from three locations here, the work of Pentinsaari *et al.* (2019), and the lack of known occurrences of any other species of *Coelostoma* in the Nearctic. Male genital characteristics (Fig. 2D) were also illustrated by Jia *et al.* (2014). Most definitive *Coelostoma* observations on iNaturalist were from southern

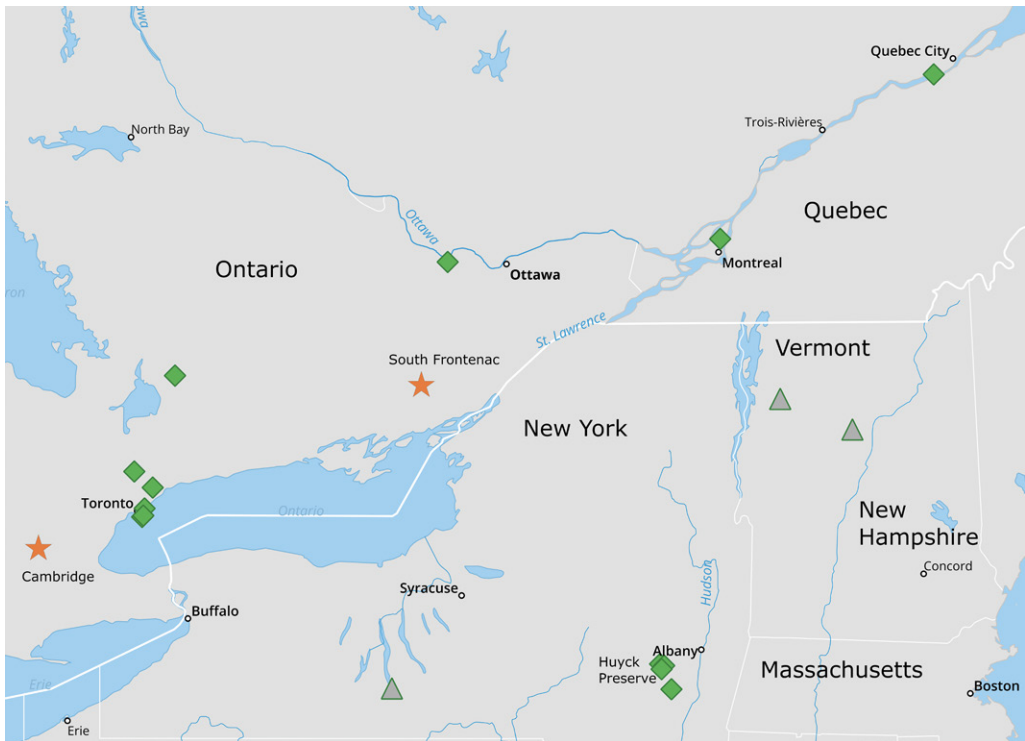


Fig. 1. Map of the distribution of *Coelostoma orbiculare* in North America. Stars indicate the first two records published by Pentinsaari *et al.* (2019); diamonds are new records documented here; triangles indicate potential records from iNaturalist. All data points are in the supplemental dataset.

Canada, ranging along the St. Lawrence/Great Lakes watershed from west of Toronto to Quebec City (Fig. 1; this is also the most populated region of the country, which biases these regions towards having more observations on iNaturalist); the records from Quebec represent a **new provincial record**. One *C. orbiculare* was observed near the Huyck Preserve during July 2020 but not posted to iNaturalist until 2023. Observations of *Coelostoma* that are potentially but not definitively *Coelostoma* were found from western New York and Vermont (Fig. 1; Pintar 2023). The most similar Nearctic species to *C. orbiculare*, *Phaenonotum exstriatum* (Say, 1832), reaches its northern limit in southern Canada and seems to be uncommon in the region where *C. orbiculare* was found (Smetana 1978), and I have not collected it in the northeastern United States. Therefore, I consider these observations preliminary records from Vermont and an indication that *C. orbiculare* is likely present in additional states in the northeastern and potentially midwestern United States (Maine to Michigan).

During visits to several collections in 2022 and 2023, I searched for unpublished or misidentified specimens of *Coelostoma* from North America but

did not find any. Newly collected specimens were deposited in the Cornell University Insect Collection (CUIC; Ithaca, New York, USA) and the National Museum of Natural History (USNM; Washington, DC, USA), with several remaining in personal collections (see Specimens Examined). The lack of any specimens in collections potentially suggests that *C. orbiculare* was relatively recently introduced to the Nearctic. Regardless, the current distribution of *C. orbiculare* and its apparent abundance in some locations indicates that it is established and more widespread than previously known. *Coelostoma orbiculare* is the third species of *Coelostoma* recorded from the United States, with *Coelostoma fabricii* (Montrouzier, 1860) and *Coelostoma segne* Balfour-Browne, 1952 previously recorded from Hawaii but not the continental United States (Hansen 1995). Given the long global introduction history of species of Sphaeriidae (Smetana 1978), researchers should remain aware of the need to correctly identify specimens of *Coelostoma* based on male genitalia to detect potential new introductions.

In addition to the repositories above, abbreviations for repositories and sources of material examined below are: iNaturalist (INAT), Matthew R.

Pintar personal collection (MRP), and Ludovic Leclerc personal collection (LLC). All specimens examined, along with original records by Pentinsaari *et al.* (2019), potential records, and links to online observations, are listed in the supplemental dataset (Pintar 2023).

Specimens Examined. CANADA: Ontario: Kawartha Lakes, [44.6319°N, 79.0109°W], 28-iii-2021, D. Riley (INAT: 1); Ottawa, [Nopiming

Game Preserve; 45.43°N, 76.29°W], 19-v-2020, O. Ridgen (INAT: 2); Ottawa, [Nopiming Game Preserve; 45.43°N, 76.29°W], 21-v-2021, O. Ridgen (INAT: 1); Ottawa, [Nopiming Game Preserve; 45.43°N, 76.29°W], 13-vi-2021, O. Ridgen (MRP: 1♀); Ottawa, [Nopiming Game Preserve; 45.43°N, 76.29°W], 28-v-2021, O. Ridgen (CUIC: 1♂, 1♀; MRP: 7♀); Toronto, [Tommy Thompson Park; 43.6294°N, 79.3273°W], 29-iii-2020, O. Strickland

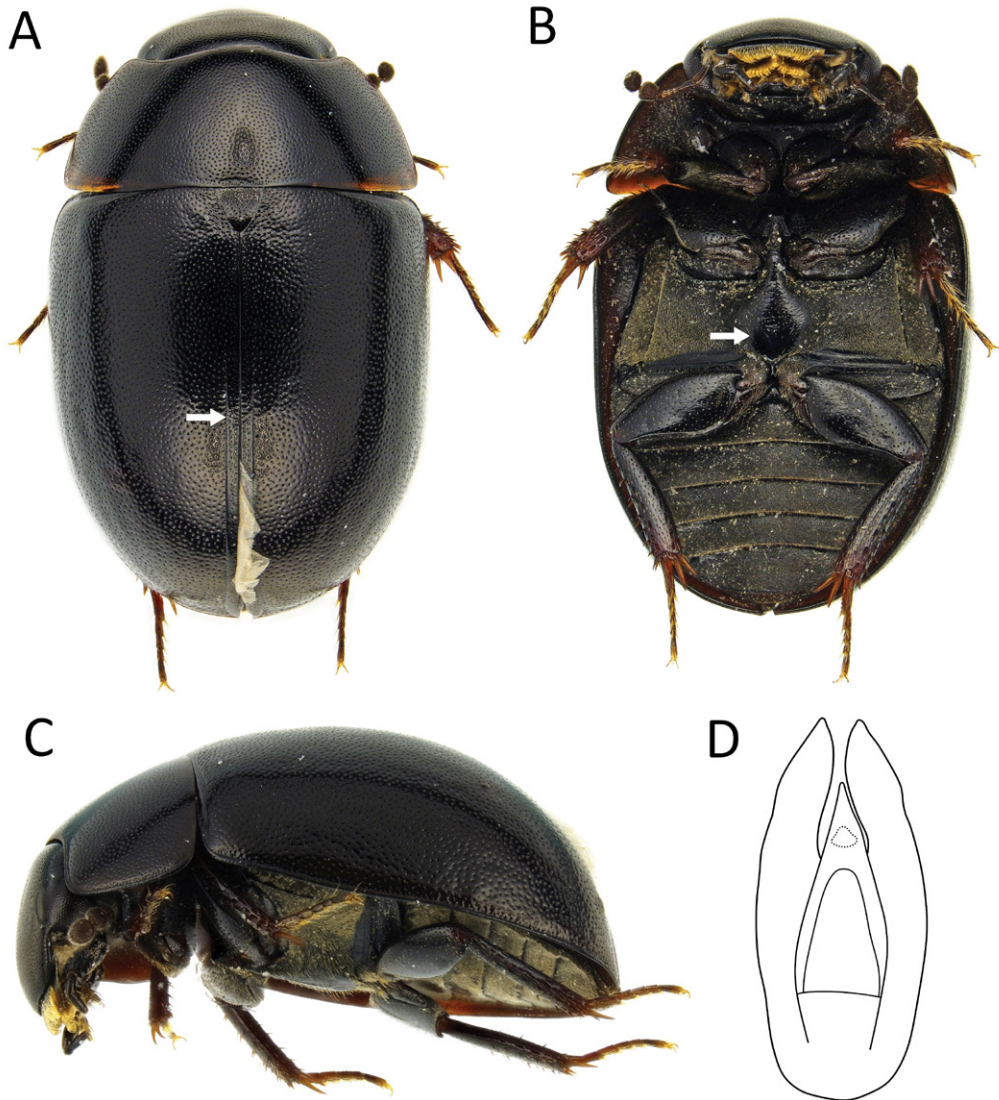


Fig. 2. *Coelostoma orbiculare*. Photographs of a female from Huyck Preserve, Albany County, New York, USA: A) Dorsal, B) Ventral, C) Lateral. Arrow indicates sutural stria in A and rhombic mesoventral elevation in B. All photos are by Salvador Vitanza. D) Illustration of male aedeagus of a specimen from Quebec.

(INAT: 1); Toronto, [Tommy Thompson Park; 43.6198°N, 79.3394°W], 02-v-2021, O. Ridgen (INAT: 1); Toronto, [Tommy Thompson Park; 43.6198°N, 79.3394°W], 05-iv-2020, O. Ridgen (INAT: 1); Toronto, [43.6811°N, 79.3150°W], 24-iv-2020, O. Ridgen (INAT: 1); Toronto, [43.8316°N, 79.2335°W], 05-vi-2021, N. C. Yankech (INAT: 1); York, [43.9472°N, 79.4176°W], 09-iv-2021, S. Luk (INAT: 1). **Quebec:** Montreal, [45.5943°N, 73.5683°W], 23-vii-2022, J.-S. Guénette (INAT: 1); Quebec, [46.7308°N, 71.4375°W], 13-v-2022, Ludovic Leclerc with UV trap (LLC: 1♂, 3 undetermined). **USA: New York:** Albany County, [Rensselaerville, Huyck Preserve; 42.5485°N, 74.1694°W], 11-vi-2022, M. R. Pintar with net (USNM: 1♀); Albany County, [Rensselaerville, Huyck Preserve; 42.5365°N, 74.1281°W], 13-vi-2022, M. R. Pintar with net (CUIC: 1♂); Albany County, [Rensselaerville, Huyck Preserve; 42.5106°N, 74.1539°W], 17-vi-2022, M. R. Pintar with net (USNM: 1♀); Greene County, [west of Freehold; 42.3627°N, 74.0556°W], 23-vii-2020, J. Gorneau (INAT: 1).

ACKNOWLEDGMENTS

Collecting in New York was conducted under Department of Environmental Conservation scientific collecting license #2956 and funded by the Huyck Preserve. Collections access and specimen deposition were facilitated by Jason Dombroskie and Matthew Fox at CUIC, Timothy McCabe at the New York State Museum (NYSM; Albany, New York, USA), and Thomas Henry and Alex Konstantinov at USNM. I appreciate iNaturalist users for making observations that contributed to these records and Owen Ridgen for providing specimens. I also thank Ludovic Leclerc for helping to verify records from Quebec and Salvador Vitanza for photographing one of my specimens.

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(Received 24 January 2023; accepted 26 July 2023. Publication date 29 September 2023.)