

Note

Chilostigma itascae (Trichoptera: Limnephilidae), a globally rare caddisfly new for Canada

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Abstract

Headwater Chilostigman Caddisfly (*Chilostigma itascae*) is an enigmatic winter-active caddisfly previously reported solely from Minnesota. This note reports the first Canadian records from southern Manitoba and northwestern Ontario.

Key words: *Chilostigma itascae*; caddisfly; Trichoptera; peatland; Manitoba; Ontario

Headwater Chilostigman Caddisfly (*Chilostigma itascae* Wiggins; Trichoptera: Limnephilidae) is an enigmatic winter-active caddisfly first discovered between 20 February and 10 March 1974 in Itasca State Park, Minnesota (Wiggins 1975). Adults were encountered on the snow surface on relatively warm, sunny winter days. Additional locations were not found until 21 March 2005, during a snowshoeing trek through the Sand Lake Peatland in northeastern Minnesota (K.E.J. pers. obs.). Between 2011 and 2017, four additional locations were added in northwestern Minnesota (K.E.J. pers. obs.; C. Novak pers. comm. 23 March 2011; Figure 1). Records were from 13 February to 29 March, and all individuals were active from 1100 to 1530 on the snow surface during relatively warm (2–8°C) days with full to partial sun. Most were within, or immediately adjacent to, rich fens and conifer swamps with seepage areas; one individual was found on uplands within 350 m of a sedge meadow/carr.

Larvae have not been positively identified; they probably inhabit streams and seeps (Wiggins 1996). The only other species in the genus, *Chilostigma sieboldi* McLachlan, 1876, occurs in Poland, Sweden, Lapland, Finland (Morse 2023), and Japan (Tanida *et al.* 1999).

On 17 February 2017, K.E.J. collected a single *C.*

itascae specimen from the Manitoba side of the Pine Creek Peatland (49.00093°N, 95.89704°W; Figures 2 and 3a), a large patterned peatland complex spanning the Manitoba–Minnesota border, which is recognized as a “scientific and natural area” on the Minnesota side (MDNR 2023a). The site was a spring fen channel complex—a mosaic of graminoid rich fen channels within a rich conifer swamp. Snow depth was 30–50 cm, but standing water punctuated the snow surface in some spring fen channels. The rich conifer swamp was dominated by Black Spruce (*Picea mariana* (Miller)), with fewer Tamarack (*Larix laricina* (DuRoi) K. Koch) and Eastern White Cedar (*Thuja occidentalis* L.). Sphagnum and feathermosses formed a continuous carpet dominated by ericaceous shrubs (Ericaceae), sedges (Cyperaceae), and various forbs. The channels were composed of a quaking (in the growing season) sedge mat dominated by Woolly-fruited Sedge (*Carex lasiocarpa* Ehrhart) with plentiful Bogbean (*Menyanthes trifoliata* L.) and Pitcher Plant (*Sarracenia purpurea* L.). Low shrubs, including Bog Birch (*Betula pumila* L.) and Shrubby Cinquefoil (*Dasiphora fruticosa* (L.) Rydberg), were common along channel edges.

A.G.H. and L.V.H.S. searched for *C. itascae* in northwestern Ontario by snowshoeing in fen and conifer swamp habitat and searching the surface of

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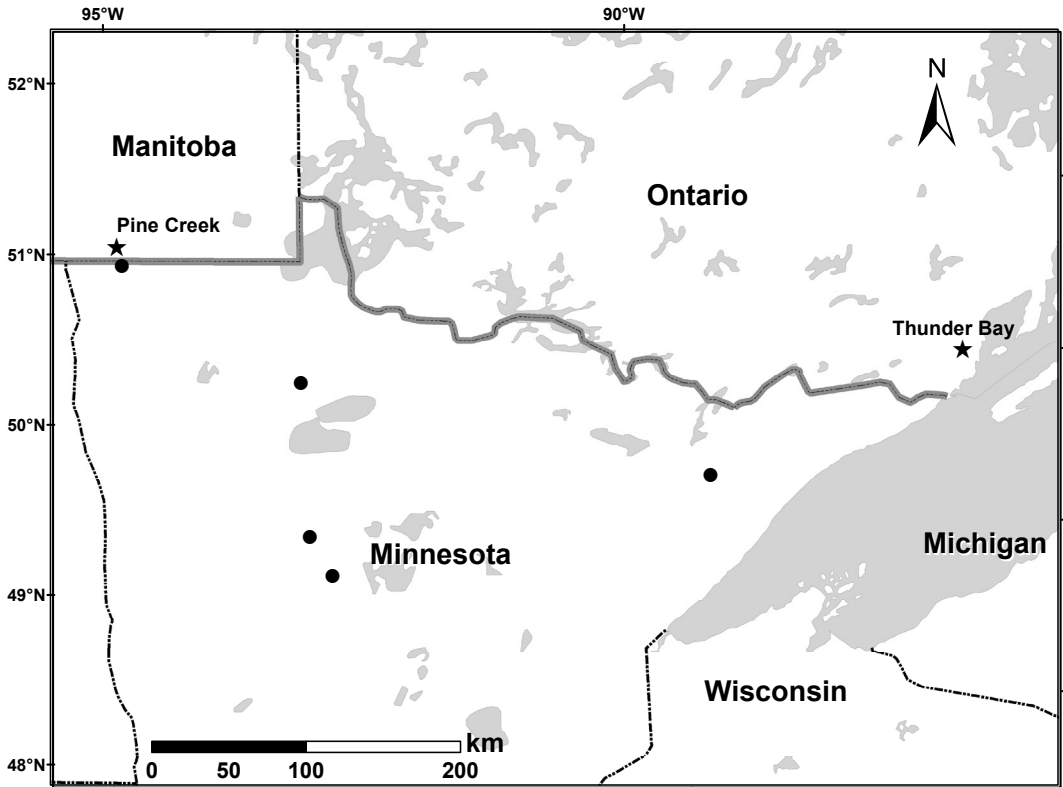


FIGURE 1. Global range of Headwater Chilostigman Caddisfly (*Chilostigma itascae*). The stars represent the only Canadian records and the black circles represent all other known records of the species.



FIGURE 2. Headwater Chilostigman Caddisfly (*Chilostigma itascae*) at Pine Creek, Manitoba, 17 February 2017. Photo: K.E. Johnson.

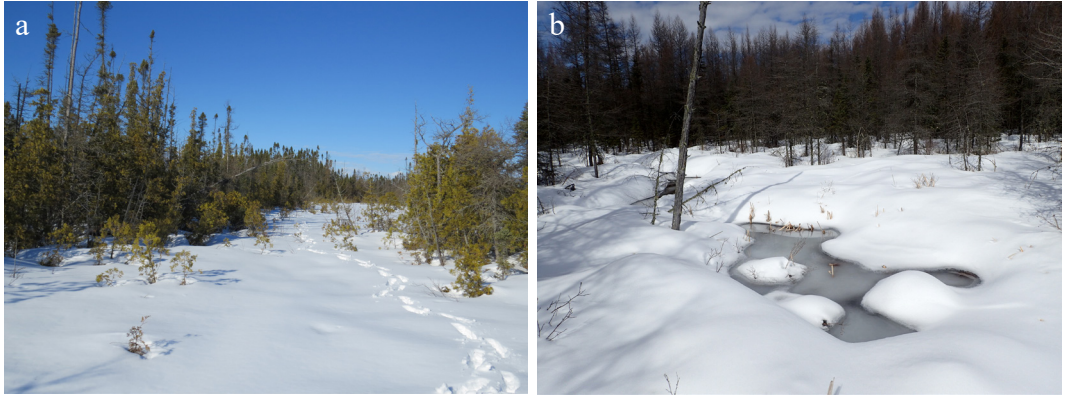


FIGURE 3. Habitat of Headwater Chilostigman Caddisfly (*Chilostigma itascae*) at a. Pine Creek, Manitoba, 17 February 2017 and b. at William Bog, Thunder Bay, Ontario, 22 March 2018. Photo a: K.E. Johnson. Photo b: A.G. Harris.

the snow for invertebrates. Surveys were conducted on 16 days between February 2018 and April 2021 (Table 1). Between April 2018 and May 2019, water temperatures (HOBO UA-001-64 Pendant Temperature Data Logger, Onset Computer Corporation, Bourne, Massachusetts, USA) were recorded in a small stream at the William Bog. The logger recorded water temperature every 2 h, and the mean daily temperature was calculated. Surface water pH and conductivity were measured on 26 February 2021 (Hanna Combo Meter, Hanna Instruments, Woonsocket, Rhode Island, USA).

Most of the survey effort was at William Bog, a peatland covering over 600 ha of predominantly fen and conifer swamp habitat within the city limits of Thunder Bay (Noble *et al.* 1993). Other survey sites with similar habitat included the Trewartha Township, Scotch Lake, and Black Bay fens (Table 1).

Chilostigma itascae was observed on the surface of the snow at William Bog on seven of 12 search dates between 17 February and 19 March (Table 1). None was observed at other sites. A maximum of 10 individuals was seen on 19 March 2019. None was observed on the two search dates in early April.

TABLE 1. Survey effort for Headwater Chilostigman Caddisfly (*Chilostigma itascae*), 2017–2021.

Location	Latitude, °N	Longitude, °W	Date	Time	Air temperature, °C	No. <i>C. itascae</i>
Pine Creek Peatland	49.0009	95.8970	17 February 2017	1430–1500	5–8	1*
William Bog	48.3985	89.3012	28 February 2018	1220–1350	0	4
William Bog	48.3985	89.3012	9 March 2018	1300–1430	–2	7
William Bog	48.3985	89.3012	14 March 2018	1315–1434	4	7
William Bog	48.3985	89.3012	22 March 2018	1700–1840	3	2
William Bog	48.3985	89.3012	25 March 2018	1430–1550	5	2
William Bog	48.3985	89.3012	5 April 2018	1230–1345	2	0
William Bog	48.3985	89.3012	10 April 2018	1730–1825	6	0
William Bog	48.3985	89.3012	13 February 2019	1700–1830	–3	0
William Bog	48.3985	89.3012	19 March 2019	1315–1500	7	10
Scotch Lake	49.2264	91.1359	25 March 2019	0930–1120	–1	0
Trewartha Peatland	49.1657	90.8067	25 March 2019	1220–1340	0	0
Black Bay Peatland	48.8578	88.2851	14 March 2020	1030–1230	–2	0
William Bog	48.3985	89.3012	26 February 2021	1200–1330	5	2
William Bog	48.3985	89.3012	7 March 2021	1200–1320	4	0
William Bog	48.3985	89.3012	17 March 2021	1200–1345	11	0
Sawmill Bay	48.9061	90.3531	4 April 2021	0830–1030	0	0

*Another 12 were observed on the Minnesota side of the peatland.

Weather for all surveys was relatively calm (<3 on the Beaufort Wind Scale) with temperatures between -2° and 7°C . Snow cover was estimated at 30–100 cm on search dates.

On 14 March 2018, four *C. itascae* specimens were collected and deposited at the Royal Ontario Museum (ROM) and Clemson University. Identification was confirmed by Doug Currie (ROM) and John Morse (Clemson University Arthropod Collection). All collected individuals were males. Vouchers are listed below.

All observations were <250 m from a small stream originating in the conifer swamp to the northwest and flowing southeast through the open fen (Figure 3b). The stream's flow is perennial and depth is mainly <50 cm. Between April 2018 and May 2019, mean daily water temperatures were 12°C (Figure 4). On 26 February 2021, stream water pH was 6.52 and conductivity was 837 $\mu\text{S}/\text{cm}$.

Observations of *C. itascae* were on a cleared pipeline right-of-way through a fen and rich conifer swamp with seepy organic soil. Vegetation consisted of sedges (especially Creeping Sedge [*Carex chordeorrhiza* L. f.] and Woolly-fruited Sedge) and scattered low shrubs (honeysuckle [*Lonicera* spp.], Sweet Gale [*Myrica gale* L.]). The conifer swamp on either side of the right-of-way consists of small (<10 m tall) Tamarack, Black Spruce, and Eastern White Cedar.

Individual *C. itascae* walked rapidly on the snow surface at a rate measured at 230 cm/min in one case. No interactions between conspecifics were observed.

Globally, *C. itascae* is ranked as Imperilled (G2) because of its restricted range, narrow environmental

requirements, and unusual phenology (NatureServe 2023). In Minnesota, it is listed as Threatened, based on its restricted range and small number of occurrences (MDNR 2023b). The species is not ranked in Manitoba or Ontario (NatureServe 2023). Despite its imperilled status, the range of *C. itascae* is undoubtedly underrepresented. Entomologists tend to avoid both peatlands and snow-covered habitats (A.G.H. pers. obs.), which readily explains the paucity of records. Fen and conifer swamp cover over 700 000 ha in northwestern Ontario (Riley and Michaud 1989), including some extensive, unsurveyed peatlands within the currently known extent of occurrence of the species. A much broader distribution across the boreal zone cannot be discounted, given the lack of focussed surveys and vast areas of potential habitat.

Habitat loss and degradation, especially pollution, changes to riparian habitat, and warming water temperatures are potential threats to this caddisfly (MDNR 2023b). William Bog formerly covered over 1000 ha but development of housing, commercial land, and highways has reduced the wetland area to less than 600 ha since the 1940s (Noble *et al.* 1993). Although the peatland receives protection as a provincially significant wetland (Land Information Ontario 2023) and portions are held as nature reserves by the Thunder Bay Field Naturalists, changes to hydrology and water quality from highway and residential runoff are ongoing threats to putative larval habitat.

Voucher specimens

CANADA, MANITOBA: Pine Creek Peatland, 49.00093°N, 95.89704°W, rich fen, 17 February 2017,

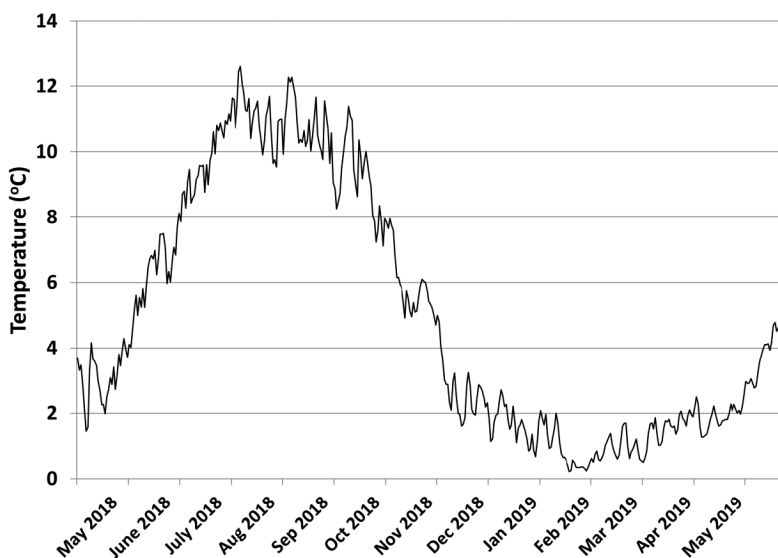


FIGURE 4. Mean daily stream water temperature at William Bog, Thunder Bay, Ontario, Canada, April 2018 to May 2019.

K.E. Johnson N-2017-26. Wisconsin Insect Research Collection (no accession number).

CANADA, ONTARIO: City of Thunder Bay, 48.3985°N, 89.3012°W, rich fen, 14 March 2018, *L.V.H. Spenceley and A.G. Harris 18-011, 18-012* (Royal Ontario Museum accession numbers ROM E206214 to ROME206221).

CANADA, ONTARIO: City of Thunder Bay, 48.3985°N, 89.3012°W, rich fen, 14 March 2018, *L.V.H. Spenceley and A.G. Harris 18-009, 18-010* (Clemson University Arthropod Collection database numbers CUAC000068109 and CUAC000068110).

Author Contributions

Fieldwork: A.G.H., L.V.H.S., and K.E.J.; Writing: A.G.H., L.V.H.S., and K.E.J.

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Literature Cited

Land Information Ontario. 2023. Make a map: natural heritage areas. Ministry of Natural Resources and Forestry, Toronto, Ontario, Canada. Accessed 23 April 2023. https://www.lioapplications.lrc.gov.on.ca/Natural_Heritage/index.html?viewer=Natural_Heritage&locale=en-CA.

MDNR (Minnesota Department of Natural Resources). 2023a. Minnesota scientific and natural areas. MDNR, Saint Paul, Minnesota, USA. Accessed 18 December 2023. <https://www.dnr.state.mn.us/snas/index.html>.

MDNR (Minnesota Department of Natural Resources). 2023b. Rare species guide: *Chilostigma itascae*. Wiggins, 1975: Headwaters Chilostigman Caddisfly. MDNR, Saint Paul, Minnesota, USA. Accessed 23 April 2023. <https://www.dnr.state.mn.us/rsg/profile.html?action=elementDetail&selectedElement=IITRIOF010>.

Morse, J.C. 2023. The Trichoptera world checklist. Clemson University, Clemson, South Carolina, USA. Accessed 28 January 2024. <https://trichopt.app.clemson.edu/search.php>.

NatureServe Explorer. 2023. *Chilostigma itascae*. NatureServe, Arlington, Virginia, USA. Accessed 23 April 2023. https://explorer.natureserve.org/Taxon/ELEMENT_GLOBAL.2.110843/Chilostigma_itascae.

Noble, T., N. Escott, and J. Crowe. 1993. The William Bog. *Nature Northwest* 47: 5–12.

Riley, J.L., and L. Michaud. 1989. Peat and peatland resources of northwestern Ontario. Miscellaneous paper 144. Ontario Ministry of Northern Development and Mines, Mines and Minerals Division, Toronto, Ontario, Canada.

Tanida, K., T. Nozaki, and M. Itou. 1999. The larval stage of *Chilostigma sieboldi* McLachlan (Trichoptera, Limnephilidae), with notes on taxonomy and distribution. *Aquatic Insects* 21: 153–160. <https://doi.org/10.1076/aqin.21.2.153.4536>

Wiggins, G.B. 1975. Contributions to the systematics of the caddisfly family Limnephilidae (Trichoptera) II. *Canadian Entomologist* 107: 325–336. <https://doi.org/10.4039/ent107325-3>

Wiggins, G.B. 1996. Larvae of the North American Caddisfly Genera (Trichoptera). Second Edition. University of Toronto Press, Toronto, Ontario, Canada. <https://doi.org/10.3138/9781442623606>

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