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New Province Records of Southern Ontario Caddisflies (Trichoptera)

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Abstract

Thirty-two caddisfly species are reported from Ontario for the first time, including 24 in the family Hydroptilidae, three in the Hydropsychidae, and one each in the Leptoceridae, Limnephilidae, Molannidae, and Polycentropodidae. The known caddisfly richness of the province increases from 309 to 341 species, including a doubling of the known hydroptilid fauna. Many more species undoubtedly remain to be discovered in this large and relatively undisturbed province.

Keywords: Distribution, Hydroptilidae, Hydropsychidae, new records, biodiversity

Despite the importance of caddisflies in aquatic ecosystems, and their utility in the biological assessment of such ecosystems (Barbour et al. 1999, Dohet 2002, Morse et al. 2019), the caddisfly faunas of many areas of the US and, especially, Canada remain poorly known. The known caddisfly species richness of Canada has increased by 16% since 1979, with an estimated 20–30% of the fauna still remaining to be discovered through new species and distribution records (Sheffield et al. 2019). Since several studies have suggested a recent and alarming decline of insect taxonomic richness (Sánchez-Bayo and Wyckhuys 2019, Uhler et al. 2021), thorough sampling of relatively undisturbed areas in Canada is important to establish a baseline record of the aquatic insect fauna against which future changes can be measured.

Despite being the most populated and accessible province of Canada, and the primary location of several landmark taxonomic studies (Nimmo 1986, 1987; Schmid 1998; Wiggins 1996), Ontario has yet to have a comprehensive checklist compiled of its caddisfly fauna. In contrast, the adjacent US states of Michigan (Houghton et al. 2018), Minnesota (Houghton 2012), and Ohio (Armitage et al. 2011) are some of the best-studied areas of North America, with nearly 550 caddisfly species known from the northcentral portion of the US (Houghton et al. 2022). Based on a synthesis of the primary literature, Rasmussen and Morse (2021) list 309 caddisflies known or suspected to occur in Ontario.

We have been investigating the caddisfly fauna of Ontario for >20 years, mostly through piecemeal collections of lakes and streams near the US border. From these investigations, we have discovered 32 species previously unreported from the province. The purpose of this paper is to report these species as a contribution to the knowledge of the Ontario caddisfly fauna.

Materials and Methods

All collections were from the southern portion of the province, and from near the western border with Manitoba to the eastern border with Québec (Table 1, Fig. 1). Sampling dates ranged from 1990–2019. Our primary focus was on Lake Saganaga, with several collections made during the early 2000s. Only collections that yielded new records are in Table 1. Sites varied from designated wilderness (e.g., Lake Saganaga) to primarily agricultural (e.g., Thames River).

All reported adult specimens were collected using 8-watt portable ultraviolet tube lights placed over white pans filled with 80% ethanol (Calor and Mariano 2012). A single trap was deployed at dusk adjacent to an aquatic habitat and retrieved 1–2 h later (Houghton 2004, Wright et al. 2013). Specimens are housed in the Hillsdale College Insect Collection and the University of Tennessee Knoxville Insect Collection.

Results

A total of 32 new caddisfly species records for Ontario are reported herein,

Table 1. The collections that yielded the new caddisfly province records presented herein. Site numbers correspond to Figure 1.

#	Name	Latitude	Longitude	Date	Collector
1	Rainy River	48.62889	-93.83778	12 July 1999	DC Houghton
2	Lake Saganaga	48.24389	-90.89194	08 July 2001	DA Etnier & DC Houghton
3	Lake Saganaga	48.24862	-90.87820	06 July 2007	DA Etnier
4	Lake Saganaga	48.26925	-90.89755	15 June 2007	DA Etnier
5	Lake Saganaga	48.25501	-90.82778	19 July 2006	DA Etnier
6	Lake Saganaga	48.28694	-90.85194	14 July 2006	DA Etnier
7	Arrow River	48.03222	-89.72394	10 July 2001	DC Houghton
8	Thames River	42.70639	-81.61639	22 July 2019	DC Houghton
9	Surprise Lake	45.95667	-79.23461	15 July 2019	DC Houghton
10	St. Lawrence River	44.29036	-76.30815	06 July 2011	DC Houghton

representing 6 families and 11 genera. Twenty-four species were in the family Hydroptilidae, three in the Hydropsychidae, and one each in the Leptoceridae, Limnephilidae, Molannidae, and Polycentropodidae (Table 2). Our new records increase the total species known from Ontario from 309 to 341.

Discussion

There were a few species reported in this study that represented interesting collections or range extensions. *Limnephilus nimmoi* Roy & Harper was previously known

from a few specimens in Alberta, Maine, Manitoba, and Québec (Rasmussen and Morse 2021). We found a single specimen in a secluded bay of Lake Saganaga. *Holocentropus glacialis* Ross is a rarely collected species in the northcentral US, with Canadian records only known from Québec (Rasmussen and Morse 2021). Unlike most uncommon species, *H. glacialis* does not appear particularly sensitive to habitat disturbance, as we have also collected it from degraded rivers in southern Michigan and northern Indiana, in addition to our two specimens from the Thames River. *Oxyethira grisea*

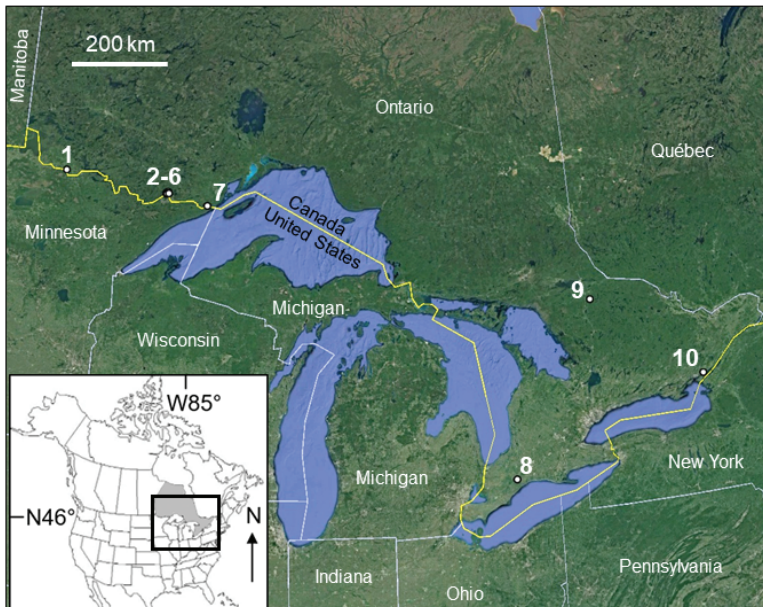


Figure 1. Southern Ontario and nearby states and provinces, showing the 10 collecting sites that yielded the new province species records presented herein. Site numbers correspond to Table 1. Base map © Google, NOAA.

Table 2. The 32 new province species records presented herein for Ontario. Site numbers correspond to Table 1 and Figure 1.

Taxon	Site number									
	1	2	3	4	5	6	7	8	9	10
HYDROPSYCHIDAE										
<i>Cheumatopsyche aphantia</i> Ross 1938	X									
<i>Hydropsyche orris</i> Ross 1938						X				
<i>Hydropsyche vesa</i> Ross 1938							X			
HYDROPTILIDAE										
<i>Hydroptila amoena</i> Ross 1938			X				X			X
<i>Hydroptila ampoda</i> Ross 1941			X			X				
<i>Hydroptila angusta</i> Ross 1938								X		X
<i>Hydroptila antennopodia</i> Sykora & Harris 1994		X			X					
<i>Hydroptila delineata</i> Morton 1905							X			
<i>Hydroptila grandiosa</i> Ross 1938								X		X
<i>Hydroptila jackmanni</i> Blickle 1963	X									
<i>Hydroptila novicola</i> Blickle & Morse 1954							X			
<i>Hydroptila salmo</i> Ross 1941		X			X					
<i>Hydroptila valhalla</i> Denning 1947		X								
<i>Hydroptila wyomia</i> Denning 1947	X									
<i>Neotrichia halia</i> Denning 1948							X			
<i>Neotrichia minutisimella</i> (Chambers) 1873	X									
<i>Neotrichia vibrans</i> Ross 1938	X									
<i>Orthotrichia baldufi</i> Kingsolver & Ross 1961	X									
<i>Orthotrichia curta</i> Kingsolver & Ross 1961							X			
<i>Oxyethira coercens</i> Morton 1905	X			X	X					
<i>Oxyethira grisea</i> Betten 1834						X				
<i>Oxyethira michiganensis</i> Mosely 1934						X				
<i>Oxyethira obtatus</i> Denning 1947	X									
<i>Oxyethira pallida</i> (Banks) 1904								X		
<i>Oxyethira rivicola</i> Blickle & Morse 1954							X			
<i>Oxyethira serrata</i> Ross 1938								X		
<i>Oxyethira sida</i> Blickle & Morse 1954						X				
<i>Stactobiella delira</i> (Ross) 1938							X			
LEPTOCERIDAE										
<i>Ceraclea arielles</i> (Denning) 1942	X									
LIMNEPHILIDAE										
<i>Limnephilus nimmoi</i> Ray & Harper 1975			X							
MOLANNIDAE										
<i>Molanna tryphena</i> Betten 1934										X
POLYCENTROPODIDAE										
<i>Holocentropus glacialis</i> Ross 1938								X		

Betten is primarily found in the eastern US (Rasmussen and Morse 2021), and our single specimen from Lake Saganaga constitutes a known range extension of nearly 600 km.

Due to their small size, knowledge of the Hydroptilidae, or ‘micro caddisflies’, frequently lags behind that of other caddisfly taxa. Thus, it is not surprising that the known hydroptilid fauna of Ontario nearly doubles with the records reported herein (Rasmussen and Morse 2021). Several of our records, such as *Hydroptila grandiosa* Ross, *Orthotrichia baldufi* Kingsolver & Ross, and *Oxyethira pallida* (Banks) are not only common and abundant throughout the northcentral US, but are also habitat

generalists that are tolerant of disturbed conditions (Houghton 2012, Houghton et al. 2022). Thus, they are likely to be found throughout Ontario.

Most of the species reported herein are relatively common throughout the north-central US (Houghton et al. 2022) and most have also been reported from Québec (Roy and Harper 1979). Thus, it is likely that their newly-discovered presence in southern Ontario mostly reflects a lack of previous rigorous collecting effort in the province. Given the lack of road accessibility of most aquatic habitats, the caddisflies of northern Ontario and other parts of northern Canada are probably even less known. Considering that

our limited collecting increased the known caddisfly fauna of Ontario by >10%, there are undoubtedly many additional species records still to be found in this large and relatively undisturbed province.

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Dedication

This paper, perhaps the last in an extremely illustrious career, is dedicated to the memory of David A. Etnier, who tragically passed away after its submission. In an age of ultra-specialization, Ets was an old-school naturalist, publishing on many different taxa and ecological regions. His knowledge and zeal for biology will be greatly missed.

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