

## INSECT COLLECTIONS FROM POLAR BEAR PROVINCIAL PARK, ONTARIO, WITH NEW RECORDS

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### Abstract

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New records are presented for species of Diptera (18), Coleoptera (10), Lepidoptera (7), Hymenoptera (5), Odonata (3), and Orthoptera (1) collected in 2009 during a 9-day period in Polar Bear Provincial Park, coastal northern Ontario. These include the first Ontario record of *Lucilia magnicornis* (Siebke) (Diptera: Calliphoridae); new northern ranges for *Chrysops sordidus* Osten Sacken and *C. zinzalus* Philip (Diptera: Tabanidae); three other, rarely collected flies: *Protocalliphora spatulata* Sabrosky, Bennett, and Whitworth (Diptera: Calliphoridae), *Helophilus lapponicus* Wahlberg, and *H. groenlandicus* (Fabricius) (Diptera: Syrphidae), and the tiger moth *Grammia quenseli* (Paykull) (Lepidoptera: Erebididae).

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### Introduction

The purpose of this paper is to report on insects caught at Burnt Point Field Station, operated by the Ontario Ministry of Natural Resources (OMNR). This site, accessible only by plane, is located in Polar Bear Provincial Park. Established in 1970, the Park consists of a 2.4 million hectare wilderness-class area along the southern Hudson Bay and northwestern James Bay coasts, 54–56°N and 82–87°W (OMNR 2011). The terrain at Burnt Point is mainly low-lying tundra in the Hudson Plains ecozone. Collections were obtained while conducting a multi-year biting fly trap comparison study being carried out in conjunction with the Far North Information and Knowledge Management Plan initiative of the OMNR Far North Terrestrial Biodiversity project. The Plan's goal is to catalogue the distribution and diversity of species within the various ecosystems of northern Ontario, thus providing data to inform management strategies for both conservation and development.

## Materials and Methods

The OMNR Burnt Point Field Station is 75 km east of the community of Peawanuck at 55°14'29.5"N, 84°19'04"W, in the middle of a 5–10 km flat region of shallow fen pools and gravel ridges between the Hudson Bay coast and the edge of boreal forest. Sampling took place from 7–15 August 2009. Hourly temperatures for the collecting period were recorded using a Thermocron I-button<sup>R</sup> data logger (model DS1921G). The weather throughout the collecting period was cool, windy, often rainy and/or foggy. The mean temperature was 12°C (SD = 5.7), with only two days when temperatures exceeded 25°C. During the study period, there were 110, 65, 29, and 11 accumulated degree days above 0, 5, 10, and 15°C temperature thresholds, respectively. Daily catches were consequently often low. Insects were collected by hand, by net, and from two Nzi traps (specifically designed to collect biting flies), one made of cloth and the other of Coroplast<sup>R</sup> (Mihok 2002; Beresford and Sutcliffe 2006; Mihok and Carlson 2007). An Nzi trap is 125 cm wide and 80 cm high, with a black, central target flanked by blue panels, the whole surmounted by a netted funnel to direct insects into a collecting bottle. Any insects that were not within the collecting bottle at the top of the traps were removed using a modified battery-operated hand-held vacuum (Dust Buster<sup>R</sup>). Collections from both Nzi traps were preserved in vials with 80% ethanol at the end of each day, and stored until pinned for identification in Peterborough. Host-seeking mosquitoes were sampled by placing a vial over any mosquitoes that attempted to bloodfeed from my face or arms. Netted or hand-caught insects were killed with ethyl acetate and then pinned. All pinned specimens and trap collections are stored as vouchers in the Biology Department, Trent University.

The collected insects were identified using relevant taxonomic keys as follows: for Coleoptera, Lindroth (1961–1969) (current Latin names checked using Bousquet and Laroche 1993) (Carabidae), Yanega (1996) (Cerambycidae), Larson et al. (2000) (Dytiscidae), and Anderson and Peck (1985) (Silphidae); for Diptera, Whitworth (2006) and Marshall et al. (2011) (Calliphoridae), Wood et al. (1979) and Thielman and Hunter (2007) (Culicidae), Vockeroth (1992) and Skevington et al. (2006) (Syrphidae), Teskey (1990) and Thomas and Marshall (2009) (Tabanidae); for Hymenoptera, Packer et al. (2007) and Lavery and Harder (1988) (Apidae), Buck et al. 2008 (Vespidae); for Lepidoptera, Layberry et al. 1998 (Hesperiidae, Lycaenidae, Nymphalidae, Pieridae), Schmidt (2009) (Arctiidae); for Odonata, Walker (1953, 1958) and Walker and Corbet (1975); and for Orthoptera, Vickery and Kevan (1985). Identifications were confirmed by other researchers when required (Table 1, footnotes). New range records were based on published range maps found in the literature, or personal communication where indicated.

## Results and Discussion

The list of species caught is presented in Table 1. As far as I can determine, most are the first published records for Polar Bear Provincial Park except for the species of Arctiidae and Silphidae. The new records are not surprising as insect diversity in the coastal region of northern Ontario is greatly understudied compared to southern Ontario due to inaccessibility

TABLE 1. Species collected at Burn Point Field Station, Polar Bear Provincial Park, 7–15 August 2009. Identifications confirmed by other researchers are listed in the footnotes.

Order/Family/Species	Date	Collection method	Habitat	Number collected
<b>COLEOPTERA</b>				
<b>Carabidae</b>				
<i>Pterostichus punctatissimus</i> (Randall)	8 August	hand	gravel ridge	1
<i>Stereocerus haematopus</i> (Dejean)	12 August	hand	gravel ridge	1
<b>Cerambycidae</b>				
<i>Monochamus scutellatus scutellatus</i> (Say)	16 August	hand	out building	1
<b>Dytiscidae</b>				
<i>Agabus arcticus</i> (Paykull)	10 August	net	fen pool	1
<i>Carrhydus crassipes</i> Fall	10 August	net	fen pool	1
<i>Hygrotus novemlineatus</i> (Stephens)	10 August	net	fen pool	1
<i>Ilybius discedens</i> Sharp	10 August	net	fen pool	2
<i>Ilybius pleuriticus</i> LeConte	10 August	net	fen pool	2
<i>Ilybius vittiger</i> (Gyllenhal)	10 August	net	fen pool	2
<b>Silphidae</b>				
<i>Thanatophilus lapponicus</i> (Herbst)	8 August	hand	under garbage	10
<b>DIPTERA</b>				
<b>Calliphoridae</b>				
<i>Calliphora terraenovae</i> Macquart	10, 14 August	Nzi traps		3
<i>Cynoma cadaverina</i> (Robineau-Desvoidy)	11–14 August	Nzi traps		4
<i>Lucilia magnicornis</i> (Siebke)	12 August	cloth Nzi trap		1
<i>Protocalliphora spatulata</i> Sabrosky, Bennett, and Whitworth <sup>1</sup>	14 August	cloth Nzi trap		2
<i>Protophormia terraenovae</i> (Robineau-Desvoidy)	8 August	Nzi traps		3
<b>Culicidae</b>				
<i>Aedes abserratus</i> (Felt and Young)	6–16 August	hand		1
<i>Aedes nigripes</i> (Zetterstedt)	6–16 August	hand		17
<b>Syrphidae</b>				
<i>Chamaesyrfus</i> sp.	10 August	cloth Nzi trap		2
<i>Helophilus groenlandicus</i> (Fabricius) <sup>2</sup>	12 August	net	gravel ridge	1
<i>Helophilus lapponicus</i> Wahlberg <sup>2</sup>	8 August	net	gravel ridge	1
<i>Parasyrfus nigritarsus</i> (Zetterstedt)	13 August	net	gravel ridge	1
<i>Parasyrfus tarsatus</i> (Zetterstedt)	13 August	net	gravel ridge	1
<b>Tabanidae</b>				
<i>Chrysops excitans</i> Walker	8–13 August	cloth Nzi trap		1
<i>Chrysops furcatus</i> Walker	8–13 August	Nzi traps and net		10
<i>Chrysops mitis</i> Osten Sacken	8–13 August	cloth Nzi trap		1

TABLE 1 Cont'd...

Order/Family/Species	Date	Collection method	Habitat	Number collected
<i>Chrysops nigripes</i> Zetterstedt	8–13 August	Nzi traps and net		75
<i>Chrysops sordidus</i> Osten Sacken	8–13 August	Nzi traps and net		10
<i>Chrysops zinzalus</i> Philip	8–13 August	Coroplast Nzi trap		1
<b>HYMENOPTERA</b>				
<b>Apidae</b>				
<i>Bombus borealis</i> Kirby	13 August	net	gravel ridge	1
<i>Bombus polaris</i> Curtis	9–10 August	net	gravel ridge	2
<i>Bombus sylvicola</i> Kirby	8–13 August	net	gravel ridge	7
<i>Bombus terricola</i> Kirby	13 August	net	gravel ridge	1
<b>Vespidae</b>				
<i>Dolichovespula norwegica</i> (Fabricius)	9 August	net	ground nest	2
<b>LEPIDOPTERA</b>				
<b>Erebidae</b>				
<i>Grammia quenseli</i> (Paykull) <sup>3</sup>	11 August	net	gravel ridge	1
<b>Hesperiidae</b>				
<i>Pyrgus centaureae</i> (Rambur) <sup>4</sup>	10 August	net	gravel ridge	1
<b>Lycaenidae</b>				
<i>Lycaena dorcas</i> Kirby <sup>4</sup>	13 August	net	gravel ridge	2
<b>Nymphalidae</b>				
<i>Coenonympha tullia</i> (Müller) <sup>4</sup>	10 August	net	gravel ridge	2
<b>Pieridae</b>				
<i>Colias gigantea</i> Strecker <sup>4</sup>	10, 13 August	net	gravel ridge	3
<i>Colias interior</i> Scudder <sup>4</sup>	10, 13 August	net	gravel ridge	3
<i>Colias palaeno chippewa</i> Edwards <sup>4</sup>	10, 13 August	net	gravel ridge	2
<b>ODONATA</b>				
<b>Aeshnidae</b>				
<i>Aeshna sitchensis</i> Hagen <sup>4</sup>	13 August	net	gravel ridge	2
<b>Libellulidae</b>				
<i>Somatochlora albicincta</i> (Burmeister) <sup>4</sup>	11 August	net	gravel ridge	4
<i>Sympetrum danae</i> (Sulzer) <sup>4</sup>	13 August	net	gravel ridge	2
<b>ORTHOPTERA</b>				
<b>Acrididae</b>				
<i>Melanoplus borealis borealis</i> (Fieber)	11–14 August	net	gravel ridge	4

<sup>1</sup> Terry Whitworth (Washington State University, Pullman, Washington)<sup>2</sup> Jeffrey Skevington (Canadian National Collection of Insects, Ottawa, Ontario)<sup>3</sup> Christian Schmidt (Canadian Food Inspection Agency, Ottawa, Ontario)<sup>4</sup> Colin Jones (Ontario Ministry of Natural Resources, Peterborough)

of much of the northern part of the province. Thus, any reporting on species collected from this area adds to our knowledge of species distributions, contributing important information on the ecology of these regions (Danks 1981). Along the coast of Hudson Bay and James Bay, the nearest other historic collecting sites in Ontario are Fort Severn to the west, Fort Albany and Moosonee to the south and, to the east in Quebec, a few localities from Great Whale River south. Specimens from the Moosonee and Quebec sites were collected mainly by staff from the Canadian National Collection of Insects, Ottawa, during the Northern Insect Survey, conducted from 1947–1958 [maps of collecting sites given in Freeman and Twinn (1954, figure 1), and Hockett (1965, map 1)]. Butterflies have also been collected along the east coast of James Bay (Hess 1993). All the sites are hundreds of kilometres from the current study site and, as far as known, few of the insect records from them have been published—mainly butterflies (Hess 1993; Layberry et al. 1998) and mosquitoes (Wood et al. 1979). Most of the records reported here fill in a large distributional gap, even for species that are known to be widespread in Canada.

Atypical collecting methods can produce surprising results. Nzi traps were designed for catching biting flies, such as horse flies (Tabanidae) and stable flies (Stomoxinae). They generally catch low numbers of non-targeted species such as blow flies (Calliphoridae). One possible explanation for the blow flies reported here is that they were attracted to the warm surface of the traps, which presented a prominent target in the flat landscape of the collecting site.

New Ontario records and range extensions for 17 species are discussed further here.

*Lucilia magnicornis* (Siebke) (Diptera: Calliphoridae) (Marshall et al. 2011) is a rarely collected northern species of blow fly, recorded previously from Alaska to Labrador. This is the first report for Ontario.

*Protocalliphora spatulata* Sabrosky, Bennett and Whitworth (Diptera: Calliphoridae) was collected in the Nzi traps. Only two specimens of this species of bird blow fly were obtained. This species is found in the far north or at high elevations, with most records being from western North America. As far as I can determine, only one other Ontario record exists, from the Ogoki region of inland northern Ontario (Sabrosky et al. 1989). The larvae are parasitoids of fledgling birds, and *P. spatulata* has been reported from horned larks, American pipits, rosy finches (Sabrosky et al. 1989), savannah sparrows, and white-crowned sparrows in Alaska (Fair and Miller 1995).

*Calliphora terraenovae* Macquart (Diptera: Calliphoridae) is a widespread, relatively uncommon species (Marshall et al. 2011), previously collected from Labrador and southern Ontario. This is the first record from northern Ontario.

*Protophormia terraenovae* (Robineau-Desvoidy) (Diptera: Calliphoridae) is a Holarctic species. One of the most abundant blow fly species on the Russian tundra (Vinogradova 1993), it is generally less common in Canada (Marshall et al. 2011). The range map from Marshall et al. (2011, University of Guelph Insect Collection database) reflects this, with a record gap between Churchill, Manitoba and mid to southern Ontario.

*Cynoma cadaverina* (Robineau-Desvoidy) (Diptera: Calliphoridae) is a common species, known from Ontario, James Bay and the Manitoba coast. This is a first, but not unexpected, report from the Hudson Bay coast of Ontario.

*Chrysops sordidus* Osten Sacken and *C. zinzalus* Philip (Diptera: Tabanidae) are new range records for northern Ontario. Distribution maps show northern catches from the southern tip of James Bay in Quebec, and previous Ontario records are from the Great Lakes region, particularly around Lake Superior (Thomas and Marshall 2009). The other four deer fly species were expected from Polar Bear Provincial Park.

*Aedes nigripes* (Zetterstedt) (Diptera: Culicidae) is a tundra species. Polar Bear Provincial Park occurs at the southern edge of its distribution in central Canada. The records from Polar Bear Provincial Park fill in a gap between catches reported from the Quebec and Manitoba coastlines (Wood et al. 1979). *Aedes abserratus* (Felt and Young), largely associated with bogs, tends to be a more southern species, with reported catches in northern Ontario previously from the James Bay region and northern Quebec (Wood et al. 1979).

*Helophilus lapponicus* Wahlberg and *H. groenlandicus* (Fabricius) (Diptera: Syrphidae) are rarely caught Holarctic northern species (Skevington et al. 2006). Although generally found in low tundra habitat (Danks 1981), both species have been caught in a black spruce peatland forest 50 kilometres north of Cochrane, Ontario (Deans et al. 2007).

*Dolichovespula norwegica* (Fabricius) (Hymenoptera: Vespidae), a widespread Holarctic species, was caught at a nest located in the ground under a dense thicket of willow shrubs on a gravel ridge, substantiating observations that this species nests underground (Buck et al. 2008).

Among the four bumble bee species (Hymenoptera: Apidae) collected, *Bombus sylvicola* Kirby and *B. polaris* Curtis are commonly found along the Hudson Bay coastal region, whereas *B. borealis* Kirby and *B. terricola* Kirby tend to be more southern species, with previous northern records from the James Bay area (Lavery and Harder 1988).

*Grammia quenseli* (Paykull) (Lepidoptera: Arctiidae) is an arctic/alpine species. I am aware of only two other records from Ontario for this species, one from Cape Henrietta Maria (within Polar Bear Provincial Park) collected in 1948 (Don Sutherland, personal communication), and one from Shagamu River, Kenora District (Robertson 1994).

*Melanoplus borealis borealis* (Fieber) (Orthoptera: Acrididae) was caught along a gravel ridge beside a fen pool, typical habitat for this species (Vickery and Kevan 1985). The species occurs across Canada, with a northern distribution from the Hudson Bay coastline west to Alaska (Vickery and Kevan 1985).

All of the beetles collected have reported ranges that encompass the study region.

## Conclusions

Large-scale changes in habitat such as those associated with a changing climate, land use, or increased accessibility, have the potential to alter species composition and/or bring invasive species into the Hudson Bay lowlands (Fernandez-Triana et al. 2009). The ability to quantify such effects (see for example, Fernandez-Triana et al. 2011) depends on knowing the extent and consistency of current insect species distribution. This paper presents a small sample of the larger insect species caught during the first year of a multi-year biting fly trap survey in Polar Bear Provincial Park, presenting new distribution records—necessary data for assessing future changes in insect diversity within this Park.

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