

ARCTIC CORNER

News about studies of arctic insects

Introduction

Arctic Corner provides a forum for news of particular arctic interest, replacing the Biological Survey's newsletter *Arctic Insect News* (1990–2000). Contributions to *Arctic Corner* are welcomed by the Editor (see inside front cover).

A preliminary assessment of Subarctic black fly diversity (Diptera: Simuliidae) in Norman Wells and environs, Northwest Territories

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Introduction

The Biological Survey of Canada's current Insects of the Arctic project was initiated in 2000 to document entomological diversity in the vast and sparsely surveyed territory between the Mackenzie River and Hudson Bay. Led by Donna Giberson (University of Prince Edward Island) and Doug Currie (Royal Ontario Museum), a total of 4 expeditions have been conducted at strategic localities throughout the Canadian Central Barrens (Currie and Adler 2000, Currie et al. 2000, Currie et al. 2002, Giberson and Currie 2004, Giberson 2005). Although emphasis has been placed on particular target groups of insects — in particular the Ephemeroptera, Plecoptera, Trichoptera, aquatic Coleoptera, and Diptera: Simuliidae — a common pattern has emerged: that current knowledge about the diversity and distribution of Arctic insects is woefully inadequate. For

example, the 43 species of black flies (Simuliidae) collected during just three expeditions nearly doubled the previous estimate for that family (22 species) for all of Arctic Canada east of the Mackenzie River. The current database of Arctic black flies provides a much sounder base from which to interpret biogeographical patterns.

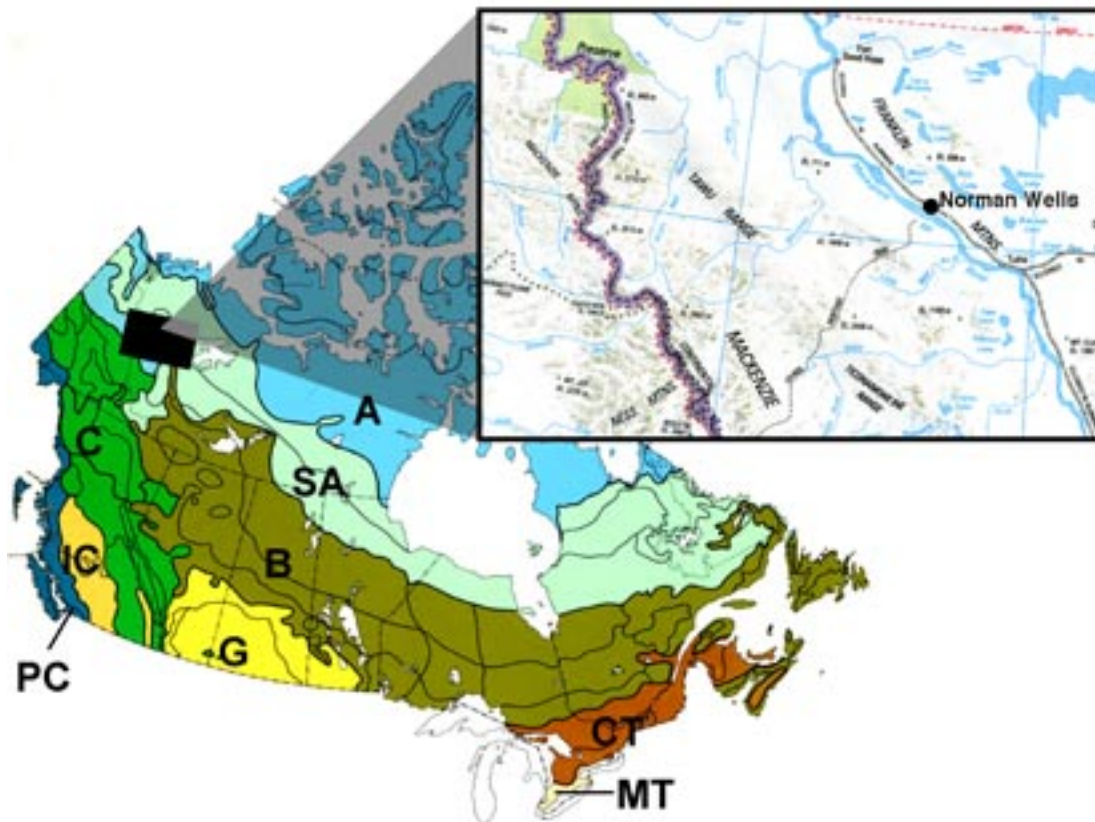
A number of black fly species encountered during our Arctic surveys are exceedingly rare, being represented in North America by just a handful of collections. And one species in particular — *Simulium (Schoenbauria) giganteum* — is currently known in North America from just a single specimen collected near Arviat, Nunavut (Adler et al. 2004). Whether such "Arctic" species are truly rare, or are more abundantly represented in the Subarctic Ecoclimatic Region, is currently not known. Unfortunately, the Subarctic zone of Canada remains largely unsurveyed due to lack of roads and communities — the same problems that have traditionally plagued collecting efforts in Arctic Canada. In this respect, the Subarctic Ecoclimatic Region remains among the last frontiers of Canadian entomology. In this article I reveal what insights can be gained from just a single, brief, collecting trip to the Subarctic zone of the westernmost Northwest Territories.



Norman Wells and Logistics

Situated on the east bank of the Mackenzie River between the Mackenzie and Franklin Mountains, the town of Norman Wells is a hub for oil drilling and exploration in the western Northwest Territories. There is no road access except for a winter road that connects the community with Wrigley to the south. For most visitors, access is available year-round by regularly scheduled flights from Edmonton. Accommodations are rather limited with only 3 hotels and a Bed and Breakfast listed for Norman Wells. It is recommended that you make your reservations well in advance as rooms can become scarce during the summer. The community has a small road network that extends for a short distance north and south along the bank of the Mackenzie River; and a longer road that extends some 10 kilometers east to Jackfish Lake in the Franklin Mountains. A ru-

dimentary campground is situated at the terminus of the road, but its distance from Norman Wells perhaps renders this option untenable for the long run. To explore the region fully one must be prepared for backcountry travel, which requires either the assistance of a licensed outfitter, or the support of local government officials. I was fortunate enough to receive the latter through the generous support of Alastair Veitch, a wildlife biologist with the Northwest Territories Department of Environment and Natural Resources, Sahtu Region. In fact, it was Alastair who contacted me after having found a previous Arctic Corner article by me on the web. Although his main responsibility is to monitor wildlife populations and health in the Sahtu Region, he maintains a keen interest in all aspects of the ecology of the region. In fact, he has already started collaborations with other entomologists including Ross Layberry



The Ecoclimatic Regions of Canada, with an inset map of Norman Wells and environs. Abbreviations: A = Arctic; SA = Subarctic; B = Boreal; G = Grassland; CT = Cool Temperate; MT = Moderate Temperate; C = Cordilleran; IC = Interior Cordilleran; and PC = Pacific Cordilleran

(Lepidoptera) and Paul Catling (Odonata). At his invitation I visited Norman Wells twice in 2005 to survey black flies: once in late May to set up a Malaise trap and to collect immatures, and once again in late September to retrieve Malaise-trap samples and to give a series of presentations to students at the Mackenzie Mountain School.

Collecting

Although my Spring visit to Norman Wells was relatively short (3 days), I was able to maximize my collecting efforts by using various means of transportation. I easily surveyed most of the local streams — the breeding sites of black flies — by using a truck to navigate the drivable portions of the road network. Equally effective was the use of a boat to ply the Mackenzie River. The main channel was far too deep and swiftly flowing to make collections from the river itself, but the boat made it possible to visit a variety of smaller-sized tributaries at their confluence with the Mackenzie. Getting helicopter time was fortuitous as I was able to take advantage of an empty seat on a government-sponsored flight to the site of a fuel spill. The helicopter stopped at several sites along the affected waterway, and I was able to make collections of immature black flies at each stop. In addition to making collections of immature black flies, I set a Malaise trap along the margin of the Mackenzie River to capture adults of species that were inaccessible as larvae. A local student was hired to monitor the trap and to change the head once a week from late May until late September.

Preliminary results

Results presented here pertain only to the Spring collections as the May - September Malaise trap samples have yet to be analyzed. Eighteen collections of immature black flies were taken over a 3-day period in Norman Wells and vicinity. Morphological examination yielded 19 species or species-complexes divided among 6 genera as follows: *Helodon* (1), *Prosimulium* (1), *Greniera* (1), *Stegopterna* (1),



Sampling black fly larvae at the outlet of Jackfish Lake. (D.C. Currie)

Metacnephia (1), *Simulium* s.l. (14). Although most of the species or species-complexes could reasonably be expected in the Norman Wells area based on current knowledge of black fly distributions, at least two records stand out. *Simulium* (*Nevermannia*) *fionae* was previously known from New Brunswick to eastern Saskatchewan, south to Michigan, Pennsylvania and New Jersey. Its presence in Norman Wells indicates that *S. fionae* is much more widely distributed than previously supposed. Equally remarkable was the discovery of *Simulium* (*Psilozia*) *argus*, a species that was previously known to occur abundantly in western North America from southern British Columbia to southern Mexico. That such a widely distributed species could escape detection in the intensively surveyed area between southern British Columbia and northern Northwest Territories seems remarkable.

Discussion

The Canadian Subarctic zone is so sparsely surveyed that even a short, 3-day, collecting trip can provide dramatic new insights into the distribution and diversity of northern black flies. It is intriguing to ponder what might be revealed by a more intensive collecting effort, or by subjecting the known sibling-species complexes to cytological scrutiny. It is clear that much work remains to be done — not only in Norman Wells, but across



the entire Subarctic zone of Canada. The unsorted Malaise-trap samples will no doubt hold additional surprises, and they will also provide valuable new insights about the phenology and succession of large-river species of black flies. But the available collections represent only a fraction of the potential simuliid fauna from the western Northwest Territories. The Mackenzie Mountains, which rise directly across the river from Norman Wells, have never been subjected to a rigorous collecting program. This chain represents the easternmost boundary of Beringia, and unquestionably supports Beringian endemics that have yet to be recorded from the Northwest Territories. This fact alone is sufficient inducement to plan a return visit to Norman Wells in the near future.

Epilogue

Recent studies confirm that the rate of warming in the Arctic is twice the global average. Profound, and perhaps irreversible, changes are beginning to be documented as a change from arctic to subarctic conditions is underway, with a concomitant shift of more temperate-adapted organisms to the north (e.g., Grebmeier et al. 2006; Sturm et al. 2001). Insects have unparalleled potential to track ecological changes due to their reproductive capacity and sensitivity to changes in temperature; however, the current state of knowledge is



Thick layers of ice persist along the banks of the Mackenzie River after spring break-up. (D.C. Currie)

so inadequate that it is difficult to assess what represents a 'change' and what represents the status quo. Additional baseline data on the Subarctic entomofauna are needed in order to track the changes that will inevitably influence the Arctic landscape. Anyone interested in conducting entomological research in the Norman Wells area is encouraged to contact Alasdair Veitch and his colleagues in the Department of Environment and Natural Resources. Their hospitality and generous assistance make any visit to the region worthwhile.

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