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Chironomidae (Diptera) larvae of Precambrian Shield headwater streams, Canada

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Abstract

A taxonomic diagnosis of chironomid larvae collected from Precambrian Shield headwater streams, Canada, is provided for 51 species. In addition, the Nearctic distribution is given for each species, including 17 new records, along with and information on their ecology and habitat.

Key words: Diptera, Chironomidae, larvae, taxonomy, distribution, new records, Precambrian Shield, Ontario, Canada

Introduction

The information presented below is the result of a field study of Precambrian Shield headwater streams from April to August of 2010–2011. The Precambrian Shield is a region largely denuded of topsoil by recent glacial activity, and covers much of northeastern Canada. These headwaters occur in remote areas of central Ontario, and are within dense mixed forest, making them difficult to access. As a result, many of these streams have been understudied. Streams in mixed and boreal forests are prone to both anthropogenic and climatic disturbances (Schindler *et al.* 1996) and their study may provide important insights into the response of freshwater communities to such changes.

To understand how community composition may respond to disturbance knowledge is required of the component species tolerance of stress. For many aquatic insect species, this is unknown. This may be partially due to the specialized taxonomic knowledge required by researchers to identify the species within a community. Chironomids are important insects of these studied small headwater streams, and constitute 35 % of the collected benthic fauna and 40% of all insect species collected.

In this paper, we present a taxonomic diagnosis with brief notes on ecology and habitat for the Chironomidae found in first order headwater streams, typically all less than 1m wide and 50 cm deep. All of our collections were obtained from headwater streams that generally resemble each other in both hydrology and taxonomic composition across a large geographical area (Figure 1). We also present records for 17 species of Chironomidae previously unknown in Ontario, of which 11 may be new to Canada, some as possible new species.

Study area, material and methods

Nine headwater streams in six provincial parks, 1 stream in district of Muskoka and 2 streams in district of Parry Sound, Ontario were sampled (Fig. 1). The streams are fed from catchment runoffs (i.e. snow melt and rain) and/or concomitant wetlands. Stream bottoms were predominantly clay in the pools with riffles dominated by cobble and gravel. Organic materials (i.e. wood and leaf) form a secondary layer on top of the stream bottom, and banks often were covered with moss. Stream temperature was monitored April–August for both 2010 and 2011. Monthly readings were made of pH, conductivity and mean July O₂ concentration for all streams (Table 1). Streams were selected based on GIS Data: Ontario Ministry of Natural Resources Enhanced Flow Direction Grid (2007), and Ontario Ministry of Natural Resources Water Virtual Flow (2008). Topographic maps used included: The Adventure Maps Series for Ontario Provincial Parks 1:80000, Canadian Topographic Maps from Natural Resources Canada 1:50000, and Canoe Routes of Ontario Provincial Park 1:26720. The choice to sample was conditional on being able to access a stream from each corridor and at each elevation gradient.