The effect temperature and nutrient addition on invertebrate life-cycles in streams

Elísabet Ragna Hannesdóttir*, Gísli Már Gíslason* and Jón S. Ólafsson**

*Institute of Biology, University of Iceland, Askja, Natural Science Building, Reykjavík
**Freshwater Fisheries Institute, Reykjavík.
e-mail: erh@hi.is

The aim of this project is to determine the effect of nutrient addition (eutrophication) and temperature on invertebrate life-cycle strategies in streams. An increase of 2-4 °C in temperature is predicted in the next century. Nutrient load will consequently increase in freshwater ecosystems. Invertebrate life-cycles are dependant upon the conditions each species is adopted to and lives in and therefore is dependant upon changes in temperature. Several factors affect the length of the life-cycles, such as food, temperature, photoperiod, concentration of oxygen in the water and other factors. Insects are differently resistant to pollution and thus their reaction to nutrient addition differs.

The study area, Hengladalir (SW Iceland), is a high temperature geothermal area with warm and cold streams that run into the river Hengladalsá. Experiments will be performed in four warm (15-20 °C) and four cold (5-10 °C) streams. Discharge, substrate and chemical composition of the water are similar in both types of streams. Nutrients (nitrate and phosphate) will be added in the streams to enhance the concentration 3-5 fold. Samples will be taken above (control region) and below (treatment region). Sampling will be performed every month during the summer, when the invertebrates are in growing phase, but every alternate month during the winter. Water samples will be taken on every sampling occasion to measure the concentration of nutrients in the water.

Preliminary results show that *Lymnaea peregra* is the dominating species in warm streams (45%) followed by Acarina (14%) and Simuliidae (12%). Ostracoda are the dominating taxa in cold streams (63%) followed by chironomid larvae (13%) and Oligochaeta (12%). Considerable amounts of Tardigrada were found in cold streams (7%) but few in warm streams. Simuliidae larvae were more common in warm streams but chironomid larvae in cold streams. To be able to compare the life-cycle strategies of certain species they must be found both in warm and cold streams. *Lymnaea peregra* can mostly be found in warm streams and Ostracoda mostly in cold streams. Chironomid larvae (unidentified) can be found both in warm and cold streams but identification will reveal if the same species can be found in both types of streams.

This project is part of Euro-limpacs a integrated project to evaluate the effect of climate change on freshwater ecosystems in Europe (www.eurolimpacs.ucl.ac.uk/).