Surface and subsurface invertebrate communities across a thermal gradient in a natural experiment in Icelandic streams

Daniel Govoni*[1,2], Bjarni Kristjánsson , and Jón ólafsson

[1]University of Alaska Fairbanks (UAF) – United States
[2]Hólar University College – Iceland

Abstract

Macroinvertebrate communities have been thoroughly studied in small streams, but there has been relatively little research done on the linkages between surface and subsurface communities (i.e., within hyporheic habitats). Hyporheic habitats and communities may play a major role in shaping stream processes and are likely very susceptible to warming temperatures. Climate change and resource development will alter the stability of thermal regimes and the linkages between surface and subsurface habitats upon which stream food webs depend. Understanding these linkages better, in the face of increasing land use and climate change, will help inform aquatic resource management. The objective of this study is to determine how temperature and thermal stability influence invertebrate community assemblage, density, and diversity in the surface and subsurface of streams. To address this objective, we conducted two studies. The first study compares thermally stable and thermally variable streams from multiple catchments, and the second study uses thermally stable streams of different temperatures as a result of varying geothermal influence from a single catchment. In both studies, we selected streams that provide a thermal gradient across which to study community differences. We sampled from four stations within each stream. At each station, we collected surface samples and subsurface samples at 25 and 50 cm below the streambed. Preliminary analyses have found that thermal stability, temperature, and conductivity significantly affect community structure.

Keywords: hyporheic zone, geothermal, temperature, spring, fed

*Speaker