

The paradox of *Didymosphenia geminata*

The diatom *Didymosphenia geminata* (Lyngbe) Schmidt is emerging as an organism with an extraordinary capacity to impact stream ecosystems on a global scale. In recent years, streams in New Zealand, North America, Europe, and Asia have been colonized by unprecedented masses of "didymo" and its extra cellular stalks. This diatom is able to dominate the stream benthos by covering up to 100% of substrates with thicknesses of greater than 20 cm, greatly altering physical and biological conditions within streams. This species is expanding its geographic range primarily through human activity, at a rate that nuisance blooms are increasingly reported by the public and local media, yet little scientific investigation of the phenomenon in North America has ensued. In this special session, presentations will address the biology, impacts, and ecosystem roles of didymo.

Didymo causes us to question our fundamental understanding of streams and rivers. First, didymo presents the paradox to limnologists: How is such excessive biomass produced in low nutrient streams and rivers, over short periods of time? Second, didymo produces a mucopolysaccharide stalk that is resistant to biodegradation by bacteria and fungi. What is the unique composition and structure of the stalk and how does the stalk itself play a role in the success of didymo? Third, didymo has direct and indirect impacts across aquatic trophic levels. What is the long-term legacy of stalks that are resistant to decomposition and trap fine sediment past the life span of the organism? Furthermore, macroinvertebrates and fish respond to nuisance levels of didymo with community and population level shifts in composition, abundance, and size class. Finally, has there been a genetically based physiological change in this organism that can be traced to its behavior? Molecular markers present the opportunity to trace the relationships of nuisance outbreaks and those records can be compared with models of predicted global distribution.

Organizers:

Craig Cary
University of Waikato
Private Bag 3105
Hamilton, New Zealand
caryc@waikato.ac.nz

and

University of Delaware
700 Pilottown Rd.
Lewes, DE 19958
302-645-4078 (phone)
302-645-4007 (fax)
caryc@udel.edu

Max Bothwell
Environment Canada
Pacific Biological Station
3190 Hammond Bay Road
Nanaimo, British Columbia
V9T 6N7 Canada
bothwellm@pac.dfo-mpo.gc.ca

Sarah Spaulding
US Geological Survey & EPA Region 8
999 18th Street, Suite 300
Denver, Colorado