Sea Grant
Pennsylvania
www.seagrant.psu.edu

Didymo

Didymosphenia geminata

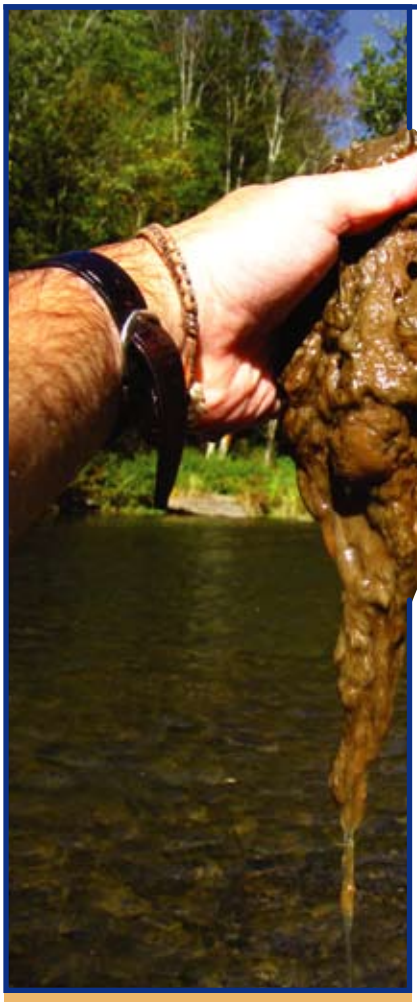

Photo courtesy of Tim Daley, Pennsylvania Department of Environmental Protection.

Didymo, commonly referred to as "rock snot", is a historically uncommon species of freshwater diatom that was found in the cool waters of northern Europe and North America. Since the mid-1980s, it has begun to take on the characteristics of an invasive species, forming massive blooms that choke streams and rivers and have a wide range of adverse effects.

Native & Introduced Ranges

Didymo is thought to be native to the northern regions of Europe, Asia, and other cool water areas in the northern hemisphere; however, in recent years it has expanded in range and habitat tolerance to include streams in warmer climates. Didymo has now spread to diverse areas including British Columbia, Canada, New Zealand, and the south-eastern and western United States. The first report of didymo in the northeastern United States came from the northern reaches of the Connecticut River and the White River in Vermont in June 2007. In October 2007, didymo was discovered in the east and west branches of the upper Delaware River along the New York and Pennsylvania border.

Spread

Until recently, didymo was restricted to colder, low-nutrient waters; blooms are now occurring in nutrient rich streams and rivers at an increasing rate. Humans are the primary vector responsible for the spread of didymo. Anglers, kayakers, canoeists, and boaters can unknowingly spread this microscopic algae, which can cling to fishing gear, waders, boots, and boats. Only one cell is needed for it to spread. Studies indicate that didymo can survive outside of a stream in a cool, dark, damp environment for at least 40 days. Fishing equipment, boots, and other gear all provide sites where cells could cling and remain viable.

Impacts

Threat to Biodiversity

Didymo is an organism with the ability to impact stream ecosystems on a global scale. During nuisance blooms, didymo cells can create large amounts of stalk material that form thick mats of grey, white, or brown cottony material on the bottom of rivers and streams. These mats, which can be over 20 cm thick, are capable of completely covering the substrate, engulfing a stream bottom, smothering aquatic plants, insects and mollusks, and ultimately reducing fish habitat and food. This change in habitat is capable of outcompeting native species of algae many of which are food sources for aquatic insects and fish. Didymo does not appear to affect the safety of drinking water, does not produce an odor, and while aesthetically unappealing, does not appear to be a threat to human health.

Photo courtesy of New Hampshire Department of Environmental Services.

DIDYMO

DIDYMO

Photo courtesy of
John Kinross, Napier University.

Sea Grant
Pennsylvania
www.seagrant.psu.edu

Extension • Education • Research

Sea Grant is a partnership of
The Pennsylvania State University,
The Commonwealth of Pennsylvania,
and NOAA.
Penn State is an affirmative action, equal opportunity university.

Lake Erie Office
814-217-9011
sng121@psu.edu

Delaware Estuary Office
215-806-0894
afaulds@psu.edu

Funded in part by PA DEP Coastal Zone Management

Economic Costs

Didymo's pattern of range expansion has the potential to impact fisheries, tourism, and hydropower. Many people in the western part of the United States rely on canal systems to transport water for hydropower generation, aquaculture, and human consumption. This nuisance algae thrives on the cement substrate of canal systems. System managers must regularly scrape didymo from the concrete surfaces of the canal. In Pennsylvania, didymo has the potential to impact trout fisheries by altering the aquatic invertebrate food base, as well as altering water quality parameters that could be harmful to trout.

Didymo is also a threat to tourism. It is often reported as unsightly and is frequently mistaken for raw sewage. Didymo threatens the opportunity for tourists to experience clean, unimpacted rivers.

Prevention & Control

The only sure way to control the spread of didymo is to check, clean, and dry. Always check your equipment and boots before leaving a stream or river. Remove any obvious clumps of algae, look for hidden clumps, and leave them at the affected site. If algae is found on gear or equipment later, do not wash down drains; dispose of all material in the trash. Soak and scrub all equipment for at least one minute in either hot water (140° F or 60° C), a 2-percent solution of household bleach, a 5-percent solution of salt, antiseptic hand cleaner, or dishwashing detergent. If cleaning is not practical, wait an additional 48 hours before allowing contact in any other waterway. Check thick, absorbent items closely to insure they are dry throughout. Equipment and gear can also be placed in a freezer until all moisture is frozen solid.

Species Description

Didymo is a diatom, which is a type of single-celled algae. Diatoms are found in nearly every freshwater and marine aquatic habitat and are a valuable food source for many organisms. Diatom cells constitute a small portion of a nuisance blooms; it is the extracellular stalk material that forms the thick, nuisance mats. Like strands of toilet paper with the rough texture of wet wool, these mats do not feel slimy like some other species of algae. Blooms appear a pale yellow-brown to white color, but never green because they don't contain chlorophyll.

Habitat & Biology

In the Northern Hemisphere, didymo is exhibiting a much greater tolerance for water nutrient conditions than expected. Didymo is both epilithic (attaching to stones) and epiphytic (attaching to plants) and can thrive in a wide range of physical and chemical conditions within lakes and rivers. It prefers relatively shallow, clear, moderately-flowing, and nutrient-poor streams and rivers with rocky substrates and plenty of sunshine. While didymo can tolerate a wide range of flowing conditions, nuisance blooms are only known to occur in flowing water.

Photo courtesy of Tim Daley, Pennsylvania Department of Environmental Protection.

References:

Elwell, Leah.,Spaulding, Sara. ***Increase in nuisance blooms and geographic expansion of the freshwater diatom Didymosphenia geminate.*** White paper. January, 2007. < http://www.macfff.org/pdf/Scientific KnowledgeofDidymo.pdf> (Accessed October 12, 2007).

Kilroy, Cathy., et al. ***Ecological Studies on Didymosphenia geminate.*** Biosecurity New Zealand. September, 2005.