

A rough field guide for identification of *D. geminata*

This informal guide is intended to be a resource for recognizing *D. geminata* in the field, but does not replace confirmation of species identification. The intent of this guide is to allow field workers/biologists to rule out other species of diatoms that may be confused with *D. geminata*. This guide can be used in association with the images on the EPA website <http://www.epa.gov/region8/water/didymosphenia/>. Confirmation of species identification should be done under a light microscope following a taxonomic resource such as, “Diatoms of the United States” Volume 2 (Patrick and Reimer 1975), or by consulting with an expert.

A) The macroscopic appearance of *D. geminata* can be divided into four stages of colony growth and appearance:

1) **Initial colony growth** – As the diatom cells attach to a rocky (or other) substrate and begin to produce stalks, the colonies appear as small, circular clumps that range from 2 – 10 mm. The growths are visible to the naked eye, and are light tan to brown in color. The clumps are soft and feel like a cotton ball when they are pulled apart. They are not slimy or slippery. This stage is common during the late winter or following periods of high flow, but can occur at any time of year, depending on the region.

2) **Colony expansion** – As the colonies grow, they merge together and may cover the substrate completely. Colonies attached to plant stems form rope-like strands. As several small colonies coalesce and stalk production increases, the clumps become thicker. The colonies are frequently 1-2 cm in thickness, but may be greater. The coverage on the streambed may be patchy, or the substrate across a transect may be completely covered.

3) **Stalk proliferation** - Under periods of low flow or with favorable growth conditions, the colonies have the opportunity to form blooms. The cells produce excessive amounts of stalk many times the length of the microscopic cells. As the stalks lengthen, they form ropy strands and are white in color. Some reports describe the strands as tissue, fiberglass, toilet paper, or sheepskins.

4) **Colony senescence** – Although the cells may die, the stalks persist on the stream substrate or stranded above the stream wetted zone. The stalks may persist for 2 months, or more. Stalks may change in color as they trap fine sediment and dry. The microscopic cells may no longer be living, or present, in the aging stalk masses.

B) In the field, *D. geminata* can be easily confused with other stalk-forming diatom species. In particular, the visual appearance of *D. geminata* is very similar to its closest relatives, *Cymbella mexicana* and *C. mexicana* var. *janischii*. However, *D. geminata* is distinctive to the touch. When *D. geminata* stalks are pulled apart, there is some

resistance and the stalks feel like wet cotton balls. Other diatom species have no such resistance, and they are slimy and slippery when the stalks are pulled apart.

C) At a minimum, a compound microscope with a magnification of at least 400x is needed to discern *D. geminata*. Note that confirmation of the identification requires higher magnification.

General cell morphology:

Cell length 80 -140 μm

Cell width, 25-43 μm

Striae number 8-10 in 10 μm

The shape of the cell resembles an old-fashioned coke bottle. An apical porefield is present at the footpole of the valve. *Cymbella mexicana* and *C. mexicana* var. *janishii* are similar in size, but these species have a strongly arched dorsal margin. The shape resembles a crescent moon.