What are the potential implications of a *Gloeotrichia* bloom?

There are several important impacts that a *Gloeo* bloom can have on a lake's ecosystem.

First, *Gloeo* may negatively impact human health. Swimming in a *Gloeo* bloom can irritate skin and create a rash. *Gloeo* does contain a low level of toxins, so drinking water containing lots of *Gloeo* colonies may be harmful. However, Lake Sunapee has never experienced a bloom with high enough *Gloeo* concentrations to impact the lake's pristine water quality.

Second, *Gloeo* may disrupt existing food webs in a lake. It can potentially outcompete other algae for resources, thus negatively affecting species dependent on those algae for food.

All of these potential implications are being examined and thoroughly studied by researchers at the Lake Sunapee Protective Association and Dartmouth College.

A *Gloeo* colony dividing into two new colonies in the water column.

Want to know more about *Gloeotrichia echinulata*?

Contact the Lake Sunapee Protective Association to ask more questions about this intriguing cyanobacterium!

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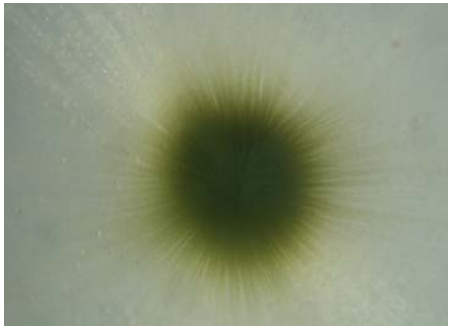
Photos & Text by Cayelan Carey, 2006



Gloeotrichia echinulata: an alga blooming in Lake Sunapee

Gloeotrichia echinulata, a blue-green alga, has recently been blooming in Lake Sunapee. This pamphlet describes some of *Gloeotrichia*'s characteristics and details the alga's life cycle within a lake.

Gloeotrichia echinulata, or "*Gloeo*," is a blue-green alga, or cyanobacterium (see LSPA's Cyanobacteria brochure) that has recently started appearing in oligotrophic (high water quality and low nutrient) lakes throughout northern New England, including Lake Sunapee. Because *Gloeo* is a recent arrival in oligotrophic lakes, much of what we know about this organism comes from research conducted in eutrophic (low water quality and high nutrient) Scandinavian lakes, where *Gloeo* is very prevalent and well-studied.

Gloeo forms large spherical colonies (see front cover for picture) that grow to approximately $1/16^{th}$ of an inch in diameter and resemble tapioca on the lake surface. A *Gloeo* colony has a yellow-green center, with hundreds of surrounding filaments radiating from its core.

There are three major 'ingredients' that are necessary in a lake for *Gloeo* to bloom: nutrients, high light levels, and warm temperatures. Understanding *Gloeo*'s nutritional requirements, a focus of current research, will enable better management of its blooms.

Gloeo is a very complex organism (in comparison to most algal species) and has several stages in its yearly life cycle. It most often blooms in lakes during late August or early September.

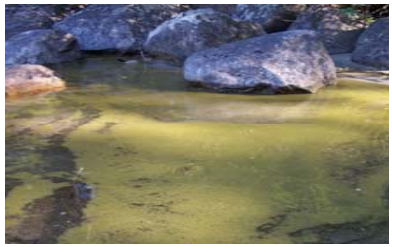
***Winter*:** Throughout the long cold months of winter, the akinetes are protected within the dead parent colony on the lake sediment. During this time, the akinetes are in a dormant-like stage.

***Spring*:** With increasing light and temperatures, the akinetes start to germinate and spend several weeks on the lake sediment absorbing nutrients and growing. The akinetes undergo a high level of cellular division and develop into new *Gloeo* colonies.

***Summer*:** When the new *Gloeo* colonies are fully mature, they float to the lake's surface using gas bubbles stored within the colony. An algal bloom is observed when millions of *Gloeo* colonies simultaneously migrate to the lake surface. Because *Gloeo* colonies are very buoyant, wind often pushes colonies inshore from deep water. Occasionally, *Gloeo* colonies will wash up on land during a bloom, and can resemble pollen. They will typically spend a few weeks at the lake's surface during a bloom and will divide into new colonies until their internal nutrient reserves dwindle and they start producing akinetes.

The arrows are pointing to a few of the many rod-like akinetes germinating from a dead parent colony under a microscope.

***Autumn*:** As light and warm temperatures decrease in September, a *Gloeo* colony on the lake surface will produce special cells called akinetes before dying. One parent colony can typically produce one to 500 akinetes. These akinetes remain within the parent colony after it dies and sinks to the lake bottom. Akinetes are able to withstand periods of extreme temperatures as well as desiccation, and are an evolved trait that allows *Gloeo* to survive in a lake year to year



Cyanobaterial bloom, Lake Sunapee, September 2005