



Little fuzzy green balls in the lake?!

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Looking into a lake experiencing a Gloeotrichia bloom.

Photo source: www.ecy.wa.gov

A few Septembers ago, I intercepted this call at NH LAKES

"I have to tell you," began the caller, "the strangest thing happened up here in the bay. The other day it looked like the water was completely covered with a green pollen-like substance, but the next day it was gone, all gone. It just disappeared, just like that."

The flabbergasted caller wanted to know if we at NH LAKES had any idea what the mysterious substance causing the shockingly bright film on top of the water might have been. Knowing that September is not a time we typically see pollen on our lakes, and always enjoying investigating unusual lake phenomena, I eagerly started asking questions. "Did you get a good look at the substance? Did it look like thousands of small greenish-yellow balls or dots? Did it look like green tapioca? Did it look fuzzy? Did it smell? Did you collect a sample?"

After receiving answers to these simple questions, I had a strong hunch as to the identity of the mysterious substance. I called the New Hampshire Department of Environmental Services' Limnology Center to confirm my suspicion—the mysterious substance the caller had seen blooming in the bay was Gloeo.

What is it? *Gloeotrichia echinulata* (pronounced glee-oh-trick'ee-ah e-kin-u-la'ta, and more commonly referred to simply as 'Gloeo') is a cyanobacterium that is naturally found in many lakes. It contains a blue-green pigment and utilizes sunlight to make its energy, so it is often confused with being an alga. However, like bacteria and unlike algae, cyanobacteria cells do not have a nucleus, so it is scientifically classified as a bacterium. It can form large spherical colonies that grow up to approximately 1/16 of an inch in diameter and have been said to look like pollen, tapioca, or fuzzy little balls floating in the top few feet of water. A colony typically has a yellow-green center with hundreds of surrounding filaments protruding out from its core. Under a microscope, it looks like a dandelion head.

Gloeo 'blooms' (conspicuous masses of the organism which develop suddenly) are common in lakes worldwide and are often triggered by warm water temperatures, lots of sunlight, and available nutrients (particularly phosphorus). Blooms most often occur in late summer or early fall. However, while being a natural component in many of our lake ecosystems, and belonging to one of the oldest classes of organisms on Earth, Gloeo has only recently made its presence known in some of Northern New England's relatively healthy and clear lakes.

How does a bloom occur? In order to understand how a Gloeo bloom occurs, it's helpful to understand a little bit about this organism's complex life cycle...

During the winter, the dormant form of Gloeo (scientifically referred to as the 'akinete') rests on the bottom of the lake. As the ice cover on the lake melts away in the spring, the amount of light that penetrates into the lake increases. The water temperature begins to warm and the akinetes begin to grow. They spend several weeks on the lake bottom absorbing nutrients, particularly phosphorus, from the sediment and developing into colonies of bunched cells bound together. The colonies actually acquire more nutrients than they need, so they store the excess amount in their cellular structure to be used later in the summer.

When a colony is fully mature, it forms a gas vesicle (essentially a gas pocket) that allows it to float up towards the surface of the lake. Once in the upper part of the lake, with the aid of the sunlight and warmer water temperatures, the colony continues to grow and multiply. Colonies tend to float in the first couple feet of water, and, as the wind blows, the currents concentrate the colonies in cove areas and along shorelines—resulting in what we call 'blooms.' Suddenly, one day, an area of the lake may look like it is covered with a yellow-green film, and it could be gone the next day, or even later that same day!

At the end of the summer, as the sunlight wanes and water temperature cools, a Gloeo colony will produce akinetes and then it will die. Protected by the dead parent colony, the akinetes will fall down to the lake bottom where they will essentially 'sleep' until the warming water in spring awakes them and they begin to grow.

Cause for concern? Gloeo typically contains toxins that can cause skin irritations and rashes for swimmers. Ingesting a lot of it at one time can cause an upset stomach. While there is more yet to be understood about what the long-term health effects are of routinely drinking water that contains Gloeo, the potential health hazard is a reason to caution people about drinking lake water.

What does its appearance mean? Gloeo blooms seem to be occurring in more and more lakes throughout New England and are cause for alarm. A bloom indicates that the lake bottom contains enough nutrients to

support Gloeo's reproductive cycle. Nutrients resting in the sediment on lake bottoms come from natural processes, as well as from human activities such as: soil being washed into waterbodies from eroding roadway shoulders and construction sites; the washing of improperly or excessively applied fertilizers on the landscape into waterbodies; and from the discharge of untreated waste from failing septic systems and treatment plants into the groundwater and surface waters. Unfortunately, if care isn't taken to minimize the amount of phosphorus flowing off of the landscape and into lakes, ponds, rivers, and streams, the extent, frequency, and severity of Gloeo blooms will likely increase—causing problems for human, plant and animal health.

You can help prevent blooms. Unfortunately, there is no easy way to stop Gloeo blooms from occurring. But, whether you live along a shoreline or miles from the nearest waterbody, you can help prevent Gloeo from becoming an increasing nuisance in your local lake. All you need to do is reduce the amount of phosphorus flowing off of your property. Here's how:

- Refrain from fertilizing your lawn. Unless your lawn is new, chances are that it doesn't need fertilizer. If you must fertilize, use lake water, if possible, since it already contains nutrients. If you purchase fertilizer, be sure to purchase the phosphate-free variety—look for the bag marked with a "0" for the center number in the N-P-K ratio, such as 10-0-10.
- Stabilize eroding camp roads, driveways, and walkways by redirecting runoff water to vegetated areas or areas covered with a thick layer of crushed stone.
- Replant bare soil areas with native plants (ground covers and shrubs are best).
- Plant a vegetated buffer strip. A vegetated buffer strip is an area of dense vegetation planted uphill of a waterbody and below houses, driveways, and other man-made features on the landscape that is intended to slow down and soak up water flowing off the landscape.
- Maintain your septic system properly. Have your tank pumped at least every two to three years. Update or replace your system if you have added bedrooms, bathrooms and water-using appliances to your home.

What to do if you see a bloom. If you see something that resembles a Gloeo bloom, or any other unusual scum on the water, make sure that children and pets do not drink, wade, swim or make contact with the water. Call the New Hampshire Department of Environmental Services' Cyanobacteria hotline at (603) 419-9229 or email beaches@des.nh.gov report the bloom.

NH LAKES is the only statewide, member-supported nonprofit organization working to keep New Hampshire's lakes clean and healthy, now and in the future. The organization works with partners, promotes clean water policies and responsible use, and inspires the public to care for our lakes. For information, visit www.nhlakes.org, email info@nhlakes.org, or call 603.226.0299.

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