Guidelines for Volunteer Lake Monitors for Identifying and Estimating the Abundance of Gloeotrichia echinulata in Maine Lakes

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Gloeotrichia echinulata is a planktonic (floating in the water) blue-green alga or cyanobacteria. While "Gloeo" *(often pronounced Gleeo)* is known to have existed historically in many lakes throughout the state, it has typically occurred in late summer at relatively low densities and most lake users have been unaware of its presence. In recent years, however, Gloeo has become measurably more abundant in some Maine lakes causing interest in this alga to grow.

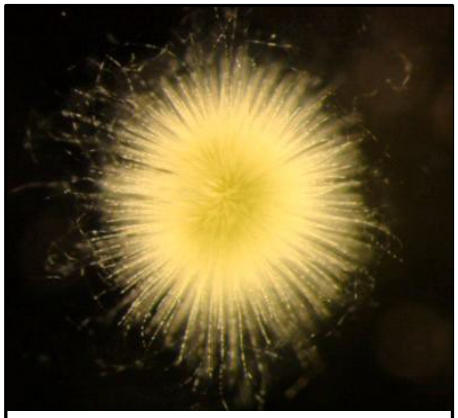
Gloeo has reached nuisance bloom levels in a few New England lakes during the past decade resulting in ongoing research to learn more about 1) why this may be happening, 2) which lakes may be more vulnerable to this phenomenon, and 3) what options exist for managing/controlling Gloeo blooms. Volunteer lake monitors can play an important role in the process of gathering information about Gloeo by making and recording a simple observation when taking a Secchi disk reading. The following material provides guidelines for accurately identifying *Gloeotrichia echinulata* and estimating its abundance.

Identification of *Gloeotrichia echinulata:*

Size: Gloeo cells form colonies that are visible without magnification. The colonies measure about 1-2 millimeters in diameter – about the size of the head of a small metal common pin.

Color: Gloeo colonies vary from light to bright green, but may also appear as "off-white". Gloeo colonies have been described by some as looking like tapioca.

Shape & Texture: Upon close inspection, Gloeo colonies are distinctly spherical (round). Gloeo colonies look "fuzzy", both to the naked eye and under low level magnification. Gloeo is never stringy, but it can be sticky.



Magnified Gloeotrichia Colony
Photo: J. Dufresne, Univ. of New Hampshire

Timing: Gloeo blooms occur most typically between June and August, and late summer is more common than early in the season. However, blooms have been documented as early as May and later in the fall.

Look-alikes: Gloeo looks a lot like *Conochilus* (a colonial zooplankton) early on. If someone scoops up a sample into a cup, *Conochilus* will be more golden-brown, rather than green. *Conochilus* also spins in the water. If some are caught in a white cup, a careful observer will be able to see them spin around. Gloeo doesn't do that!

Position in the Water: Gloeo abundance in the open lake is often, but not always, in the top few meters. This varies from one lake to the next, but also depends on time of day and other factors.

Identification Aid: A small 10x-20x lens (available through LSM) is a great addition to any citizen scientist's toolbox and will help with questionable Gloeo identifications. Be sure to do the inspection in a drop of water, otherwise all you will see is an indistinct glob. *Anabaena,* another colonial cyanobacterium, can look like a ball, but on closer inspection it looks like a plate of spaghetti, not like a ball with hairs sticking out.

If you are confident that you have Gloeo in the lake, proceed to the next steps in documenting your observation. If you are uncertain, please seek assistance before recording information on your field form. *Photos can be sent to stewards@lakestewardsme.org.*

***Gloeotrichia echinulata* Abundance Estimation Guidelines & Procedures**:

1. Begin making observations by early June. Continue the observation program at least through the end of August, or as long as you are able to continue to go out on your lake.
2. Make your observations at the monitoring station where you take a Secchi disk reading to record an accurate measure of the overall abundance of Gloeo in your lake. If you observe Gloeo accumulation near the shoreline as a result of wind/wave action, you may also note this in the comments section of your data sheet.
3. You may have better luck seeing Gloeo if the observations are made when the water is relatively calm and the sky is relatively bright.
4. In order for the information that you document to be useful, you must be confident that you are observing Gloeo. Many other plant and animal species float in the lake water column. Refer to the identification characteristics. If you are uncertain, please do not record your observation. Feel free to contact LSM staff with any questions that you have concerning identification.
5. Make your observation by looking through your Secchi viewing scope. Compare the density of the Gloeotrichia in your 3 foot circle of vision with the numbered circles on the Density Scale.
6. Refer to the *Gloeotrichia* density scale: Categories span from 0 to 6, and it is fine to record a value in between two that you see (e.g., 1.5). Note that this scale collapses what you see in three dimensions down to two dimensions, so imagine that all the Gloeo in the top 1-2 meters of the water column is in a flat layer (closing one eye can help).
7. If you observe a dense bloom (3 or greater on the density scale), please call or email the LSM to report your observation. If you are able to take a representative digital photo, please include it with your email. You may be asked to collect a sample. We will provide you with information about how to do this when you call.
8. If you do not see any Gloeo at the monitoring station, please record your observation as: 0. NOTE: The absence of Gloeo in the lake that you monitor is valuable information so please take the time to record the zero!
9. The presence of Gloeo in your lake may or may not significantly affect your Secchi readings. Unless a dense bloom occurs, the distribution of the relatively large Gloeo colonies will probably not reduce Secchi transparency in the same way as a typical algal bloom.
10. Record your observation (0 - 6) in the appropriate column on a Secchi field sheet, or in the appropriate box in the top section of a DO/Temp field sheet. Refer to scale for density.
11. If you have an Android phone and are willing to enter the data you collect into a lake monitoring app, we would like to add you to our group of citizen scientists submitting Gloeo data electronically. The app will allow you to enter the information you recorded above and will key it to your GPS coordinates and your lake. If you are an iPhone user, we hope to have an app for you by the end of the summer. Please indicate your interest by email to Holly Ewing and Laurie Griesinger at hewing@bates.edu and lgriesin@bates.edu.

Thank you! Feel free to contact us with questions!

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