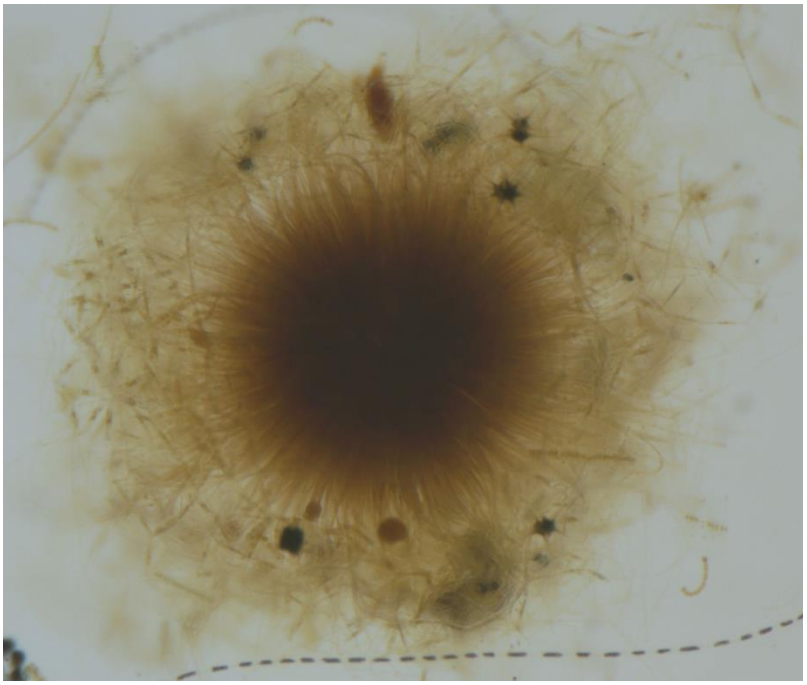
Panther Pond Association Meeting
K. Doughty and H. Ewing, 3 July 2013

OVERALL

- We continue to study Panther Pond, Pleasant Lake, Sebago Lake, and Lake Auburn of Maine, as well as Lake Sunapee of New Hampshire. Our focus is a colonial cyanobacterium, *Gloeotrichia echinulata*, "Gloeo."
- Gloeo looks like a fuzzy, lime green ball in the water column, visible to the naked eye (1-2 mm, or less than 1/10 of an inch). Like other phytoplankton (floating plant-like organisms we usually think of as "algae"), Gloeo requires sunlight and warmth to proliferate, and it has a complex life cycle, where nutrients are acquired from the sediment and atmosphere, likely in addition to within the water column.
- This organism has been causing noticeable blooms in low-nutrient lakes, which is somewhat unusual as cyanobacterial blooms generally occur in high-nutrient lakes.
- Research focus:
    - Gloeo's role in nitrogen and phosphorus cycling
    - Conditions where Gloeo is more or less abundant in space and time—can we know what facilitates or limits its growth?
    - How does it impact the lake ecosystem and our use of it?
- Grant expires at the end of August 2013 – data analysis and writing papers will continue after that.

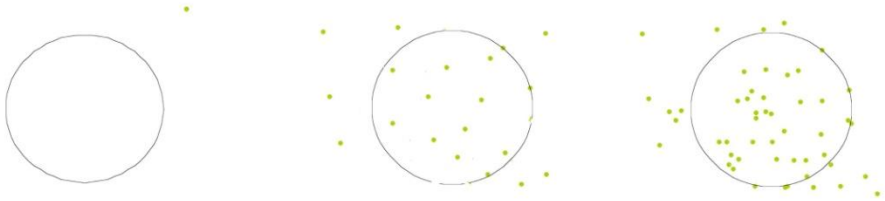


Fully developed *Gloeotrichia echinulata*. Dense spherical center with long, hair-like filaments intact. This Gloeo has other phytoplankton tangled in the filaments. The color in the water column is pale green, but this one looks brown because it is preserved with iodine (112.5X magnification).

PANTHER POND

- At four private docks around the lake, sampling includes:
    - Weekly:
        - Phytoplankton Tows: Here we use a net to collect organisms within the first meter (a little more than 3 ft) of surface water – microscopy used to identify and quantify organisms present, such as Gloeo, other phytoplankton, and zooplankton (tiny floating animals that graze on algae).
        - Chlorophyll *a*: This is the green pigment in plants, and we analyze how much there is in water samples.
        - Abiotic Parameters: These are the nonliving parts of the ecosystem, including the temperature, oxygen levels, pH and conductivity. We measure these at the surface and at 0.5 meter intervals.
        - Cyanotoxins: Volunteers are collecting water samples from the surface near the deepest area of the lake for cyanotoxin analysis.
    - Bi-Weekly:
        - Nutrients: We collect water samples for phosphorus and nitrogen analysis; these two nutrients are important in algal and plant growth.

- Analyses thus far show that Gloeo has been present in Panther Pond historically—indeed for over a century as evidenced by the presence of colonies in lake mud.
- Gloeo at Panther Pond was most abundant mid-August in 2011 and late July – early August in 2012. The largest amount we have ever recorded was over 400 colonies per liter in a sample taken near the north end of the lake on 16 August 2011.
- Lake Sunapee Protective Association (LSPA) app for water quality monitoring—LSPA Recorder—is available through Google Play for Android. We have a very preliminary version available for the iPhone, but it is not yet up on iTunes. The app allows lake volunteers to enter lake parameters, such as temperature, and record dot spacing of noticeable Gloeo and other organisms at various depths. We would love to have any interested people collect data and submit it through the app. The density scale we use for gloeo is on the next page.



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