

Slides captured during DEC sponsored online training webinar

"Hazardous Algal Blooms Identification Workshop" - June 21, 2022

Cyanobacteria

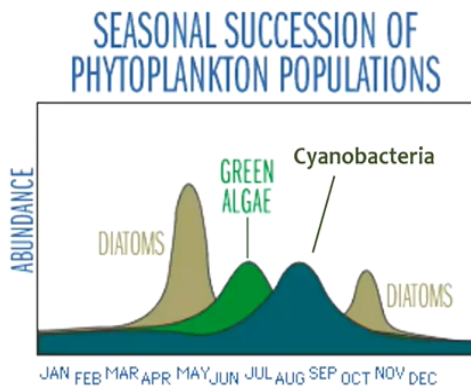
Although commonly referred to as algae, the organisms that form harmful algal blooms are actually **cyanobacteria**.

Cyanobacteria are ancient organisms, dating back **billions** of years.

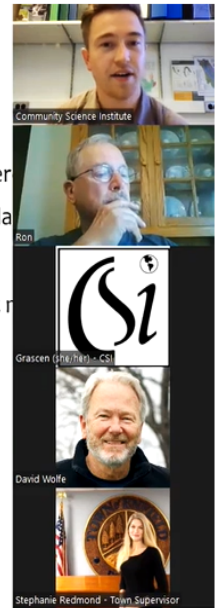
- they are the oldest known **oxygen producing organisms**, responsible for our current oxygen rich atmosphere.

Cyanobacteria are a natural part of the aquatic community in lakes, ponds, and oceans around the world. Small populations of cyanobacteria are **always** present in Cayuga Lake.

Cyanobacteria are the ancient ancestors of plants. Like their multicellular plant descendants, they are **photosynthetic** and use sunlight, CO₂, water, and nutrients (such as phosphorus and nitrogen) to grow.



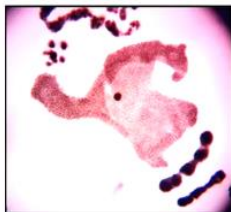
Cyanobacteria grow best in warm water temperatures. Because of this, in freshwater lakes and ponds of temperate climates, cyanobacteria populations naturally increase and decrease seasonally with the warming and cooling of the water.



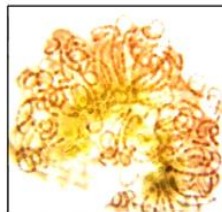
Cyanobacteria

Microscopy/characteristics of different species

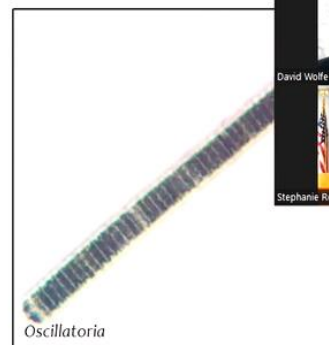
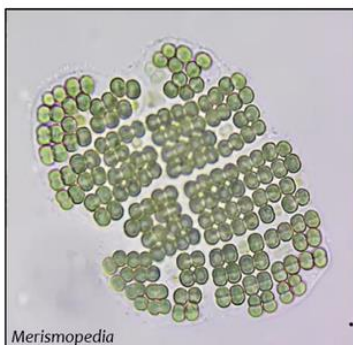
There are many different types of cyanobacteria with unique traits and adaptations. Many can regulate their buoyancy to access suitable conditions within a vertical water column.



Microcystis - Produce the toxin microcystin. Have the highest population growth rates at water temperatures around 25° C and have the highest rate of toxin production at a water temperature of 20° C.



Dolichospermum - Can fix nitrogen from the atmosphere into a bio-available form. Also can produce the microcystin toxin. Studies show increased growth rates when water rises in temperature from 17° C to 21° C.



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Harmful

Blooms of cyanobacteria are considered harmful because...

- **Toxic:** Cyanobacteria produce chemical compounds that are toxic to humans and other animals including liver toxins, neurotoxins, and skin and eye irritants. If a dense concentration or accumulation of cyanobacteria (bloom) these toxins can be present in very high concentrations!
 - Microcystin is the most common cyanotoxin that is found in Cayuga Lake HABs. It is a liver toxin. Cyanobacteria produce many different type of toxins that we are unable to analyze. That is why **we must always avoid exposure to a bloom, regardless** of the reported toxin concentration.
 - When in doubt! Keep out (including pets)!
- **Aesthetically Unpleasing and Limit Recreation:** Cyanobacteria blooms limit our use of lakes and ponds and degrade invaluable natural resources. This can have detrimental economic impacts!
 - This includes the cost of treating water when lakes are used as drinking water sources.
- **Detriment to Aquatic Environments:** Blooms can degrade aquatic environments, outcompeting other essential phytoplankton, harmful wildlife, reducing water clarity, and causing anoxic (low oxygen) “dead zones”.



What do they look like?

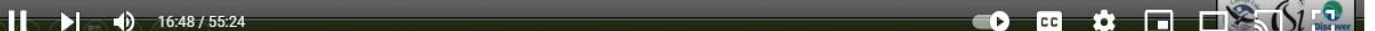


NOT HABs

Filamentous = wet cloth, hair

Duckweed= very small plants

Pollen = In Spring, very yellow, breaks apart



What do they look like?



What do they look like?

Likely to be HABs

- Oily, shiny, sheeny
- Pea soup appearance
- Surface scums, foamy
- Spilled paint on the surface
- Discolored (green or blue green) streaks
- Floating clumps or globs

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This section contains four photographs of algal blooms. Top left: A green, foamy scum on a sandy beach. Top right: A green, pea soup-like water. Bottom left: A blue-green streak in the water. Bottom right: A green clump in the water. To the right of the images is a blue box with the text 'Likely to be HABs' and a list of characteristics. The DEC logo is in the bottom right corner.

What do they look like?

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Test your skills



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23:51 / 55:24

