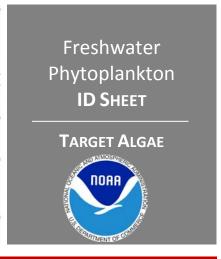
Phytoplankton Monitoring Network





Notes about Aphanizomenon:

Toxin: Saxitoxin N-fixation: Yes

Cyanophyta – Cyanophyceae – Nostocales

4 described species

Trichomes solitary or gathered in small or large fascicles (clusters) with trichomes arranged in parallel layers.







Notes about Anabaena:

Toxin: Anatoxin-a N-fixation: Yes

Cyanophyta - Cyanophyceae - Nostocales

More than 80 known species

Trichomes are straight, curved or coiled, in some species with mucilaginous colorless envelopes, mat forming.







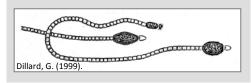
Notes about Cylindrospermopsis:

Toxin: Cylindrospermopsin N-fixation: Yes

Cyanophyta – Cyanophyceae – Nostocales

Around 10 known species

Trichomes are straight, bent or spirally coiled. Cells are cylindrical or barrel-shaped pale bluegreen or yellowish, with aerotypes. Heterocytes and akinetes are terminal.







Notes about Microcystis:

Toxin: Microcystin N-fixation: No

Cyanophyta - Cyanophyceae - Chroococcales

Around 25 known species

Colonies are irregular, cloud-like with hollow spaces and sometimes with a well developed outer margin. Cells are spherical with may









Notes about Oscillatoria:

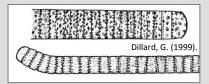
Toxin: None N-fixation: No

Marine version: Trichodesmium

Cyanophyta – Cyanophyceae – Oscillatoriales

More than 70 known species

Trichomes cylindrical, straight or slightly waved, motile with gliding oscillations.



Terminology:

Akinete(s) - thick-walled resting spore, full of reserve material, which enable the alga to survive periods when environmental conditions are not favorable to growth

Heterocyte(s) - special cell with thick several layered cell wall, active in nitrogen fixation

Trichome(s) - a filament (row) of cells, which are connected

Reference: Cronberg, G., and H. Annadotter. 2006. Manual on Aquatic Cyanobacteria. A photo guide and synopsis of their toxicology. ISSHA, Copenhagen, Denmark.

Nitrogen Fixation:

Nitrogen is an essential component in the synthesis of the aerotopes. A deficit of nitrogen may not only affect cell metabolism negatively, but also the buoyancy of the organism. Cyanobacteria can make use of nitrogen as: nitrate, nitrite or ammonium. Some species are also able to perform nitrogen fixation of atmospheric nitrogen (N_2) . Order of preference is ammonium > nitrate > N_2 .

Nitrogen-fixation occurs inside a special transformed, vegetative cell, the heterocyte. Heterocytes are think-walled. The nitrogen-fixing enzyme complex, nitrogenase, is functioning inside the heterocyte. Nitrogenase is inactivated by oxygen, and the heterocytes provide protection by enhanced respiration, and by the barrier of the heterocyte envelope.

During periods when environmental sources of combined inorganic nitrogen have been depleted, the nitrogen-fixing cyanobacteria become most competitive. The common distributed freshwater genera that can fix nitrogen are the heterocyte-bearing, filamentous members of the Nostocales: Anabaena, Anabaenopsis, Aphanizomenon, Cylindrospermopsis and Gloeotrichia. Trichodesmium and Richelia are nitrogen fixing marine genera.

Sampling Procedure:

Wearing gloves dip the 125 mL sample bottle into the water and fill. Cap bottle and return to microscope for slide analysis.

Slide Preparation

First drop: Squeeze pipette and take sample from the lower portion of sample bottle. Place drop onto the middle of the gridded slide.

Second drop: Squeeze pipette and take sample from the top portion of sample bottle. Place drop onto the middle of the gridded slide.

Gently lay cover slip at an angle to avoid air bubbles.

Slide Analysis:

First, focus on phytoplankton with the lowest objective, 4x. Then scan the entire slide using the 10x objective lens, noting what target phytoplankton are found.

Determine the Relative Abundance

Approximate how much of the slide each of the target species found covered. Use the following percentages when entering data:

> 0% = No 1 - 65% = Yes65% - 100% = Elevated

UPS Shipping Instructions:

Fill out and attach a 'Plankton Sample Label' to bottle. Put the 125 mL bottle into a zipped plastic bag and then place in plastic shipping envelope. Ship via **UPS NEXT DAY AIR** (red label) to:

Dr. Steve Morton NOAA Phytoplankton Monitoring Network 219 Fort Johnson Road Charleston, SC 29412

Payment by Recipient, UPS #XXXXXXXXX

Contact PMN for the UPS Acct # or for more shipping labels

FPMN Questions & Needs:

Jen Maucher Fuquay
NOAA/NCCOS
Center for Coastal Environmental Health
and Biomolecular Research
219 Fort Johnson Road
Charleston, SC 29412
Phone: 843-762-8595
Email: jennifer.maucher@noaa.gov
http://www.chbr.noaa.gov/pmn/

Taxonomy Questions:

Dr. Steve Morton NOAA/NCCOS Center for Coastal Environmental Health and Biomolecular Research 219 Fort Johnson Road Charleston, SC 29412 Phone: 843-762-8857 Email: steve.morton@noaa.gov