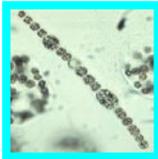


Fact Sheet on Toxic Blue-green Algae

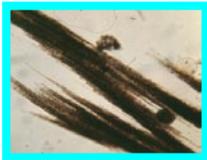
Carole A. Lembi
Department of Botany and Plant Pathology
Purdue University
lembi@purdue.edu

What are blue-green algae? Blue-greens are very primitive organisms that are not really algae. They photosynthesize like algae, but they are actually bacteria. Scientists refer to them as “cyanobacteria” to acknowledge that they are bacteria. “Cyan” means “blue”, which refers to the fact that these organisms often appear blue-green in color.

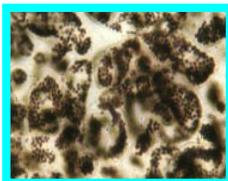
Where do the blue-green algae live? The blue-greens split into two major groups, the planktonics and the mat-formers.



Anabaena



Aphanizomenon



Microcystis

The planktonic blue-greens are microscopic and cause the typical pea-soup green color to water. The most common of the planktonic blue-greens are *Anabaena*, *Aphanizomenon*, and *Microcystis* (commonly referred to as Annie, Fannie, and Mike!). In addition to causing water to turn green, they can rise to the surface of calm or static waters and form surface scums. This yellowish-green scum formation is typical of most planktonic blue-greens. The formation of surface scums tends to block the light to the other types of algae and aquatic plants that live deeper in the water column. By shading out their competitors, blue-greens can completely dominate a body of water.

Heavy infestations (blooms) of blue-greens are stimulated by inputs of phosphorus and nitrogen. Runoff of fertilizers, organic wastes, and other sources of N and P into surface waters should always be reduced or eliminated.

The mat-forming blue-greens form dark green or black slimy mats. These mats start growth on the bottom but eventually float to the surface where they can be quite smelly and noxious looking.

What about toxic blue-greens? Toxicity among blue-greens in general is well known and characterized. The toxins have been known to kill cattle and other animals that drink infested waters. Most of the toxicity is associated with the planktonic species, and particularly with *Anabaena*, *Aphanizomenon*, and *Microcystis*.

Is toxicity common? No! Even though *Anabaena*, *Aphanizomenon*, and *Microcystis* are very common in our waters, it is extremely rare for them to cause toxicity. We do not know why this is. Perhaps toxins are released

only from certain very rare strains; perhaps the environmental conditions for toxin production do not often occur. Because we do not know what causes a blue-green to become toxic, it is impossible to predict when toxicity might occur. The safest bet is to prevent livestock from drinking and to restrict swimming activities when water turns pea-soup green.

What's this about a new toxic blue-green in Indiana? In 2001, a new planktonic blue-green alga, *Cylindrospermopsis*, was identified in several reservoirs and lakes in Indiana. This organism can probably be considered invasive, as it was first described in India in the early 1900s, had spread to Australia by the 1980s, and appeared in Florida lakes in the 1990s. This organism is thought to produce toxin continuously, not sporadically like our native blue-greens.

Is *Cylindrospermopsis* causing problems? So far, no. Efforts to reduce its abundance at intakes of drinking water reservoirs (usually with copper treatments and filtration) have been successful. To date, there are no reports of adverse effects on humans or animals. Even in Florida, where many lakes are infested with extremely large populations of *Cylindrospermopsis*, no confirmed cases of animal death or human illness have been reported.

How would I tell if my pond has *Cylindrospermopsis*? So far, we have not found this organism in ponds, only in lakes and reservoirs. Furthermore, it does not form a surface scum like other blue-greens. Instead, it is found at about the 3 foot depth (depending on conditions), so it would be extremely difficult to determine whether it is present.

The main thing is to realize that this organism is not widespread and that it has not turned out to be as bad as people first thought it might be.

If I hear of an animal death from drinking pondwater, should I suspect *Cylindrospermopsis*? There are many potential causes for animal mortality. Blue-green toxicity is extremely rare. The only way to pinpoint the causative organism is to send a water sample to Purdue for a microscopic examination.

Who should I contact if I suspect a toxic blue-green problem?

Carole Lembi, Department of Botany and Plant Pathology, Purdue University, W. Lafayette, IN 47907; phone 1-765-494-7887 or 1-888-398-4636

OR Stephen Hooser, Animal Disease Diagnostic Laboratory, Purdue University, W. Lafayette, IN 47907; phone 1-765-494-7440.



Cylindrospermopsis