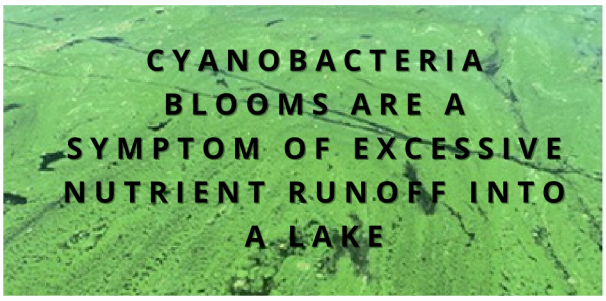
Algaecides and Copper Sulphate

WHAT IS AN ALGAECIDE AND WHY ARE THEY USED?

Copper sulphate/sulfate, algaecides (e.g., Captain XTR, SeClear, Lake Guard Blue, Clearigate, Cutrine-Plus) and other herbicides are chemical treatments used for dealing with unwanted cyanobacteria (commonly known as blue-green algae) blooms and other plants deemed a nuisance. Many government entities, municipalities, and private landowners use them to combat cyanobacteria blooms in their rivers, lakes, ponds, and streams. Cyanobacteria can release toxins into the water making it unfit for human and animal consumption. Though algaecides are excellent at killing the cyanobacteria quickly, they have a wide range of side effects on lake health that scientists are still trying to fully understand.

Here at the MU Limnology Lab, we wish to maintain and maybe even improve the health of all the lakes around Missouri. We hope this sheet gives you some more tools and information to determine how you wish to care for your lake.



Cyanobacteria blooms in Missouri Lakes - Chaumiere and Smithville. Often cyanobacteria blooms appear as though paint were dumped into the lake. Photo credit: MDNR website

RECOMMENDED LAND MANAGEMENT PRACTICES

• Avoid using lawn fertilizers and herbicides (Roundup & Rodeo) as much as possible – especially important in areas heavy with agriculture.

• Promote plant growth around your lake - plants will take in nutrients that would otherwise enter into the lake.

• Monitor residential septic systems to ensure they do not leak causing sewage to enter the lake – human waste is rich in nitrogen and phosphorus.

UNINTENDED CONSEQUENCES OF ALGAECIDE AND HERBICIDE USE

1) Eutrophication – creating a nutrient rich environment which supports only a small group of lake organisms

Eutrophication occurs when excessive nutrients, mainly phosphorus and nitrogen, are brought in by runoff from the surrounding area. Runoff comes from point sources (e.g., outflow from wastewater treatment plants) and non-point sources (e.g., runoff from agricultural and urban land usage). When phosphorus and nitrogen are present, cyanobacteria and other phytoplankton can bloom. Once the phytoplankton die and start to decompose there is a depletion in the oxygen level of the lake, creating a dead zone where fish cannot survive due to a lack of available oxygen.

It's best to assess the landuse around a lake to determine where the nutrients are coming from. Agriculturual areas tend to see large amounts of fertilizer and herbicide runoff into lakes. Urban area runoff can include discharge from wastewater treatment plants, industrial emissions, and suburban fertilizer/herbicide usage. Herbicides and algaecides contain the nutrients necessary for cyanobacteria blooms to occur. These nutrients (phosphorus and nitrogen) remain at the bottom of the lake and fuel future blooms. Nutrients can also come from fertilizers used in lawncare. Glyphosate is a common ingredient in many herbicides (e.g., Roundup and Rodeo) and is used to kill plants, weeds, and phytoplankton. However, it is less effective at inhibiting the growth of cyanobacteria, relative to other phytoplankton. Glyphosate contains 16.57% nitrogen and 18.32% phosphorus, which can fuel future phytoplankton blooms.

2) Potential cyanotoxin release - killing cyanobacteria destroys their cell walls, potentially releasing cyanotoxins into the water

Cyanotoxins, produced by cyanobacteria, are dissolved in the lake water but are also within the cyanobacteria themselves. Adding algaecides to "kill" a bloom will break down the cells of the cyanobacteria. The result is that there is an increase in the amount of toxins (cyanotoxins) released into the water. These toxins can affect organ function and have been shown to promote tumor formation

3) Kills non-target lake organisms – the water flea

Algaecides can have a negative impact on the health of water fleas, an important organism in a lake system that can aid in preventing cyanobacteria blooms through their filter feeding process. In 2022, scientists studied four different algaecides to examine their impact on water fleas. They found that all the algaecides they studied were toxic to water fleas – one brand was shown to cause a 50% decrease in population growth.

We do not know the full extent of organisms harmed with algaecide and herbicide use. These chemicals are a tool that is best used as little as possible or only when necessary to limit the unintended killing of beneficial organisms.

References and Further Information

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