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Views With Van

The Basics of Blue-green Algae

Many areas of Kansas have been extremely hot for extended periods this summer. Couple the heat with abundant sunlight and conditions are ripe for the development of blue-green algae in farm ponds. Blue-green algae produce toxins that pose a health risk to livestock that use these ponds for drinking water.

Blue-green algae include several different species of photosynthetic cyanobacteria that live in water. Cyanobacteria are bacteria capable of photosynthesis. These cyanobacteria can produce toxins that can sicken or kill livestock. Occasionally, blue-green algae rapidly reproduce and form blooms, or large colonies, that are visible as a scum on the water's surface. They also may change the water color of a pond. Such blooms of toxic cyanobacteria are often referred to as harmful algal blooms, or HABs. These are typically most severe in stagnant areas where wind disturbance of the water surface is minimal and water temperatures are higher. Floating algal scums may accumulate at the downwind shores of lakes and ponds. They are related to increased nitrogen and phosphorus concentrations in water, but the exact relationships between nutrient concentrations and blooms are complex and difficult to predict since temperatures are higher; and during the summertime, there is more sunlight, wind potential, and rain. Although agricultural nutrient runoff is a known risk factor, harmful algal blooms also are found in ponds surrounded by rangeland, where nutrient loading from cropland is rarely an issue. Other environmental factors that may favor the formation of blooms include hot, sunny weather with little wind. Ponds with relatively clear water may be more likely to produce harmful algal blooms due to high sunlight availability, a necessary component for photosynthetic organisms, throughout the water column. The toxins created by blue-green algae species show up as either neurotoxins, or hepatotoxins. Meaning they can damage the nervous system, or affect the liver function of animals.

Most toxins produced during harmful algal blooms are stored within the cyanobacteria until they die. As the cyanobacteria decompose, they release stored toxins into the water. Toxins are not evenly dispersed in a pond. *Mycrocystis* species, which are generally the most problematic blue-green algae in Kansas, self-regulate their position in the water. This means they are often floating at or near the surface to capture the most sunlight for photosynthesis. When the wind blows in a relatively constant direction, these organisms accumulate on the downwind side of the pond, where toxin concentrations may increase. Other blue-green algae species are less buoyant and may be more widely dispersed in the body of water. Toxin concentrations can vary dramatically, even at nearby locations in the same pond. Pockets of water that contain lethal quantities of toxins may be within a few feet of

areas with low concentrations, making it impossible to determine whether or not a water body is toxic by using a single water sample. Generally, when finding measurable toxin levels, it is prudent to suspect the entire pond is toxic; do not use for livestock or human drinking water. A pond containing a harmful algal bloom may be covered with a scum that looks like bright green paint, but other colors are possible. These colors vary from blue-green to grey, and occasionally red or brown. Some types are filamentous and may form slimy strands when many are clinging to each other. You can tell the difference between blue-green algae and duckweed by size. Individual duckweed plants are visible without a microscope.

An excellent brochure to understand blue-green algae is MF 3065 "Identification & Management of Blue-Green Algae in Farm Ponds."