

## Toxic Algae: Potential in Drought Limited Water Supplies

*By Gene Surber  
Natural Resources Specialist  
MSU Extension Service*

The dry conditions throughout much of Montana may be ideal for algae growth to appear on the limited stock water supplies. Algae growth usually occurs in late summer during the hottest times of year. Of greatest concern is that which is toxic to livestock.

There are many groups of algae in Montana, but only three members have species that produce lethal poisons to livestock. Only three poisonous microscopic species of the blue-green algae group are found throughout Montana (only one documented in Montana) and our neighboring states and provinces.

The most common visible signs will be water that is dark-green to blue-green and may even be greenish-brown to red, hence the name Blue-Green Algae. In order for these algae to bloom the right conditions of temperature, nutrients and light must be present. Lower water levels in ponds and reservoirs allow light to penetrate closer to the bottom of the water thereby providing the sunlight for photosynthesis necessary for growth. During dry conditions when the water levels are low there is bare soil around and above the water, which provides a solar collection area that increases soil temperature, which in turn increases the temperature of the water in the pond or reservoir. Water temperature around 72-80 degrees F for several days are adequate to stimulate growth. The low level of water increases the concentration of nutrients in these water sources, which also combines to provide the nutrients necessary for the algae to grow.

Toxic Blue-Green Algae blooms are toxic to all warm-blooded animals, including humans. Fish kills associated with Blue-Green Algae blooms are most likely from the depletion of oxygen in the water and not as a result of the toxin produced. The Montana Department of Environmental Quality indicated that fish taken from waters infested with toxic algae are not likely to cause secondary poisons if eaten in moderation, they may taste "weedy."

There is no known antidote to be effective at counteracting the effects of the toxin once it has been ingested. There are two types of toxins produced. A peptide

type, which causes liver damage, but is rarely fatal. Symptoms are diarrhea, nausea, cramps or general lethargic and unthrifty animals. The other type is an alkaloid, which causes death in a relatively short time. Early symptoms from the alkaloid include staggering, muscle spasms, labored breathing and/or convulsions. Death is caused from respiratory failure and a very rigid neck observed at death.

Not all algae blooms are toxic. To determine if an algae bloom is of the toxic nature, look at several items. Mats of algae floating on or below the surface of the water, having a stringy texture that can be picked up are probably a harmless green algae. All toxic or potentially toxic blue-green algae present themselves as surface scums. These algae scums are not stringy or easily picked up. They are slippery, clotted masses of cells that readily fall apart when attempting to pick them up. Look for scum mats on the down wind side of the pond or reservoir. Observe all animals, including gophers, waterfowl, and others that rely on the water for survival. If there is a toxic bloom any animals making use of the water where the scum is present will show the effects.

### **Suggested management alternatives:**

The best way to prevent algae poisoning is to be aware of the conditions that can produce the poisonous bloom and to prevent animals from drinking the surface scum when present. Producers should check all livestock watering areas in hot, dry weather for light to heavy green coloration of the water. If a surface scum is present, manage it as if it were a toxic bloom.

Keep livestock, wildlife and pets away from the bloom scum: use an alternate water source. If no other source of water is available, the next best thing is to allow animals to drink only on the upwind side of the reservoir or pond where wind and water currents float the scums away from the shoreline. It is also possible to construct a floating barrier that sinks into at least the top 4 inches of water which will keep the surface scum away from the area where animals drink. This type of barrier can be built of logs, Styrofoam, or other floating materials. It must isolate the drinking area completely and not allow the surface scum to leak into the area. The barriers should be large enough and over deep enough water so animals will not be able to drink beyond it. Once scum has formed it is not practical to build an effective barrier to clear the scum away. If conditions are likely to favor a bloom, it is best to build the barrier before the scum develops.

Another option is to pump water via a waterline from a subsurface location in a deeper part of the reservoir to a water tank. Transferring the water to the tank can be done by one of several methods, gravity, solar, wind, electric or motorized pumps.

Chemical control with herbicides is an option and can be directly applied to lakes and ponds to control most algae growths of the colonial, filamentous, and single cell types. However, some are highly toxic to aquatic animals and should be avoided or used with extreme caution and use may require a special license. There are two basic herbicides used in ponds and lakes to control algae, copper sulfate products, and diquat.

Chelated copper complexes and copper sulfate (Bluestone) are the most effective at controlling algae. However, copper is a toxic metal that is long-lived (persistent) in the environment. Copper sulfate can be toxic to fish and aquatic animals at concentrations near levels used to control algae, especially in soft water. Copper toxicity increases as water hardness decreases. Copper sulfate is not as safe to use as chelated copper compounds and it should not be used in soft waters (alkalinity values less than 50 mg/L, but most of Montana surface waters are higher). No water-use restrictions are associated with copper compounds.