

## Blue-Green Algae Poisoning in Domestic Animals

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Blue-green algae (also called cyanobacteria) are common inhabitants of many bodies of stagnant fresh water. There are many different species of blue-green algae: some harmless, others that form toxins that may prove deadly to animals.

The adverse effects of blue-green algae usually only occur under certain specific environmental conditions, which are most common in summer and early fall. In normal conditions, these organisms are not typically noticeable and are suspended and dispersed in the water. Hot, dry, calm days stimulate these organisms to reproduce. These organisms then form colonies that become more visible to the naked eye. In addition, when large numbers of these cells die, gas is produced within each cell, causing the colonies to float to the surface of the pond. When the dead cells break down, any toxin that was produced is now liberated into the water.

Colonies of blue-green algae have the appearance of a soupy scum at or just below the surface of the water. The water may have the appearance of a green “paint”. Winds may serve to blow the scum to one side of the pond, making it more accessible to livestock. Algal cells that dry up on the shoreline may take on a blue color as they die. Rains tend to break up and dilute the colonies of algae, making poisonings less likely.

Blue-green algae stay dispersed within the water, and do not form “mats” on the shoreline. They may be visible upon close inspection as very fine grains of green sand or look like tiny green grass clippings. In most cases, microscopic examination is necessary to visualize distinct blue-green algae cells.

### Blue-green Algae Poisoning of Animals

Nearly all animals—and people--can be poisoned by blue-green algae. In general, ruminants and birds are more susceptible than other species. Exposure to blue-green algae most often occurs when animals drink sufficient quantities of affected water. There tends to be a dose-related response, in that animals may drink close to 90% of a toxic dose before signs of toxicity are noted. Blue-green algae poisoning has also been reported in animals such as dogs that swim in contaminated water and later lick their fur.

Two distinct types of toxins are produced by blue-green algae species, with distinct effects for the animal:

- Nervous system toxins cause signs such as muscle tremors, decreased movement, difficult breathing, and collapse. In many cases, affected animals are simply found dead—sometimes in close proximity to the offending body of water.
- Liver toxins cause animals to show a different set of signs. When the animal’s liver is damaged due to ingestion of these toxins, the animal may appear weak, with pale mucous membranes, behavior changes, bloody diarrhea, and eventually death. It is possible for animals to survive for hours or days before succumbing.

Animals that survive intoxication with liver toxins may show effects of photosensitization in the days to come. This presents as a “sunburn” over non-pigmented areas of the animal’s body, such as the muzzle, udder/teats, vulva/anus, and white-colored hide. The skin becomes hard and leathery in these areas, eventually dry-

ing up and peeling off, leaving fresh skin underneath. These animals typically become “poor-doers” as well.

### Diagnosis in the Animal

Diagnosis of blue green algae poisoning in cattle and other animals is typically done on the basis of history, since lesions in the carcass and clinical signs in the animals may be caused by other conditions. Proximity to a body of water that contains blue-green algae, blue-green staining on the haircoat, or a large amount of blue-green algae colonies in the stomach or rumen contents may be circumstantial pieces of evidence. Animals suspected of death due to blue-green algae poisoning should be necropsied by a veterinarian in order to rule out other causes of disease. There are no specific diagnostic tests that confirm death due to blue-green algae poisoning.

### Detection of Blue-Green Algae in Bodies of Water

Samples of water can be microscopically examined at a veterinary lab for the presence of blue-green algae species that may be implicated in toxicity. Water should be taken from an area of the pond in which the algal colonies are abundant.

Approximately one pint of water should be placed in a clean container and submitted to the laboratory as soon as possible. Samples may be sent to:

**South Dakota Animal Disease  
Research and Diagnostic Laboratory**  
Box 2175, North Campus Drive, SDSU  
Brookings, SD 57007

Care should be taken in order that as fresh a sample as possible is submitted to the laboratory. Please keep in mind that specific submission requirements may vary according to different laboratories. Consult those laboratories prior to submission if sending samples to other laboratories.

### Dealing with Animals Exposed to Blue-Green Algae

Animals exposed to a known source of blue-green algae should be promptly removed from the water source and placed in an area out of direct sunlight if possible. For animals that are clinically affected, treatment is not usually attempted and is rarely successful.

### Prevention and control of Blue-Green Algae Poisoning

Blue-green algae poisoning is more common following hot dry weather. During these times of year, water sources should be monitored for the presence of algal blooms. When these blooms are observed, the best option is to use other water sources if at all possible.

When it is necessary to use these ponds for water, consider:

- Fencing off downwind drinking areas, which forces animals to drink from areas where concentration of blue-green organisms is unlikely.
- Fencing off the entire pond and pumping water from several yards below the surface to a water tank.
- Adding copper sulfate to the water as an algicide. This treatment is most effective prior to the presence of significant concentrations of algae. The recommended maximum concentration in the water is 1 ppm, which is equivalent to 2.7 lb of copper sulfate per acre-foot or 8 lbs per million gallons of water. Livestock –especially sheep should not be allowed to drink from the water for a minimum of 5 days after treatment. Keep in mind that treated water can still hold a substantial number of dead algae cells and therefore sufficient amounts of toxins.

The incidence of blue-green algae poisoning is unpredictable and often sporadic, but a common threat to livestock producers during the summer months on the Great Plains. Awareness of the threats due to this class of organism is the first step in preventing unnecessary animal death loss.



**Blue-green algae.** *Photo Credit: State of Washington, Department of Ecology*