

Watch for Blister Beetles in Alfalfa

Alfalfa producers should be on the alert for blister beetles (*Epicauta spp.*) as they prepare for the next cutting. Blister beetles feed on a plant's flowers and leaves, but usually cause little damage. They can create a serious problem, however, for the animals that consume them. Blister beetles contain a lipid (fat) soluble blistering agent called cantharidin, which causes blisters on skin tissue upon contact and can severely irritate an animal's digestive tract, especially horses.

Adult blister beetles vary in size and color but can be recognized by elongated, narrow, cylindrical and soft bodies. When viewed from above, they have a constriction behind the head where it attaches to the narrowed anterior end of the thorax. Several species of blister beetles are common to Nebraska and pose varying degrees of problems. In Nebraska, the gray, black and three-striped blister beetles are most common. The three-striped is long, slender, brown and yellowish-gray with yellowish stripes. The gray is a larger beetle that is 9/16-inch



Gray, black and three-striped blister beetles, all of which are toxic to horses and some other animals to varying degrees. Increased numbers of blister beetles in the second and third cuttings of alfalfa could pose problems for horses and livestock.

to 11/16-inch long. The gray coloring is due to a thick covering of hair. The black blister beetle is the largest of the three species. It is more robust and is 5/8-inch to 7/8-inch long.

Adult blister beetles can generally be found in alfalfa through the second and third cuttings and some years into the fourth cutting. Horses are particularly susceptible to blister beetle poisoning. Part or all of a horse's digestive tract can be severely irritated, leading to secondary infections and bleeding. Cantharidin is absorbed and excreted through the kidneys, thus irritation of the kidneys, ureter, urinary

bladder and urethra could be followed by secondary infections and bleeding. The substance also lowers serum calcium levels and causes damage to heart muscle tissue.

Researchers estimate the minimum lethal dose of cantharidin is about one milligram per kilogram body weight of a horse. The lethal dose for cattle may be as low as 0.5 milligram per kilogram body weight. Consequently, a few beetles with a high cantharidin level would kill a small horse, but quite a few with a low level would be required to kill a larger horse. About 1,700 black blister beetles would be needed to kill an 825-pound horse, but

only 120 three-striped blister beetles. However, only 40 three-striped blister beetles would kill a 275-pound colt. As little as four to six grams of dried beetles can be fatal to a horse.

Management

Toxicosis by blister beetles is related to simultaneous cutting and crimping of hay when beetles are present. If hay is cut with a sickle bar or rotary mower and not crimped, the beetle can leave the hay after it is cut. If the beetles are not allowed to escape, the trapped beetles die and are incorporated into the hay.

Scout fields, particularly in border areas, for the pres-

ence of blister beetles and if found, treat with a short residual insecticide before cutting. Insecticides approved for use on alfalfa can be found on the UNL Department of Entomology Web site.

When selecting a pesticide, read the label to determine harvest restriction intervals. Kansas State University doesn't recommend blister beetle treatment because the dead beetles, which are still toxic, remain in the field. Other recommendations include not using crimpers on hay intended for horses and cutting alfalfa in the bud stage because blooms attract blister beetles.

It is difficult to eliminate the possibility of blister beetles in alfalfa, but carefully examining the hay being fed to horses may help detect their presence.

FOR MORE INFORMATION

University of Nebraska-Lincoln Extension "Insecticide Recommendations for Blister Beetles in Alfalfa" online at <http://entomology.unl.edu/instabs/alfbbetles.shtml>

Use of Copper Compounds to Control Algae in Farm Ponds

Copper has been used for many years as an effective algacide in farm ponds, livestock water tanks and nurse tanks used by farmers as a source of water for mixing pesticides. This article will discuss the use of copper to control algae in farm ponds.

It is vitally important to accurately identify whether the problem is indeed algae when attempting control measures. I often get calls wanting to know how to kill "algae" in a pond, but after a short conversation, I discover the caller actually has aquatic weeds, not algae. Copper, in the concentrations that can be used in a pond will have no effect on higher plants and would be a waste of time and money.

The three most common types of algae are single-celled (planktonic) algae, filamentous algae and higher algae (Chara).

Single celled algae is too small to see individually. They turn the water a uniform green color. Plants most often mistaken for single-celled algae are Duckweed and Water milfoil. These are small multi-celled plants that float on the surface and are pushed from one side of the pond to another by the wind.

Common filamentous algae are: *Spirogyra* spp. — slimy and green; *Cladophora* spp. — cotton mat type; and *Pithophora* spp. — horsehair-clump type.

Nitella spp. and *Chara* spp. (also called muskgrass) are large green algae that are anchored to the bottom but do not extend above the surface. Chara are stem-like, with thin, leaf-like structures, often confused with seed plants. When crushed, Chara produces a musky odor. Higher plants often confused with Chara are pond Naiad and Coontail. See *Aquatic Plants and Their Control* from Kansas State University in the reference list below.

According to: *Managing Iowa Fisheries, Use of Copper Compounds in Aquatic Systems* (see reference list below), only a thin line separates effective algae-treatment levels from

USDA-NRCS PLANTS Database / Britton, N.L. and A. Brown. 1913. An illustrated flora of the northern United States, Canada and the British Possessions. Vol. 1: 448.

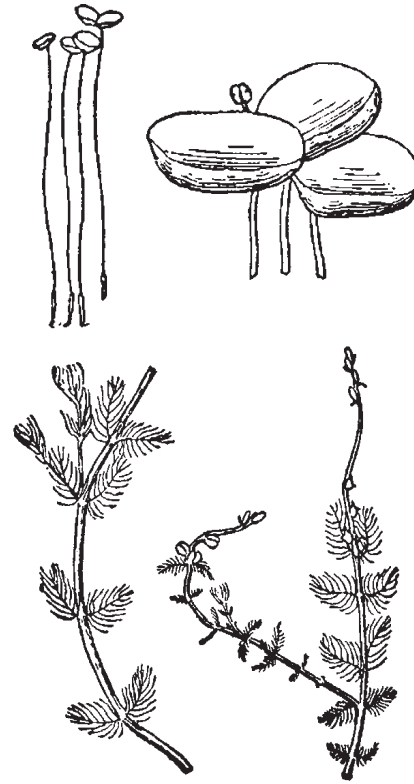


Chara (also called muskgrass) is a higher algae. Copper is an effective algacide.

lethal overdoses to fish. And not all fish are equally tolerant of copper sulfate for example, the compound is highly toxic to salmonoids (trout and salmon). This fact sheet is designed to explain when and how to use copper in aquatic systems and which precautions to take before using it.

Copper comes in several readily water-soluble forms, the cheapest and most commonly used of which is copper sulfate (cupric sulfatepentahydrate). This form is available as either a crystal or a powder and is known as "bluestone" or "powder blue." When copper sulfate is bought from a commercial manufacturer of copper, the percentage of copper in the formula should be carefully noted. The following dosage rates assume 25% metallic copper.

Several companies market copper



Watermeal (above left), Duckweed (above right) and Water milfoil (below) are NOT algae. These floating plants respond poorly to copper algacides.

in chelated liquid and crystal forms. Chelated copper compounds stay in solution longer than copper sulfate does, tend to control algae better and seem safer to fish. Chelated copper compounds will have higher initial costs than copper sulfate. Dosage rates of copper compounds depend upon both manufacturer instructions and chemical type (liquid or granular).

Determination of Dosage Rates

Determine dosage rates before using any type of copper treatment. First, measure the total alkalinity, (NOT the hardness of your water), in parts per million (ppm); and the pH, since the toxicity of copper to fish increases as the total alkalinity and pH decrease.

Dosage rates for copper sulfate are listed below, by alkalinity level:

0-40 ppm	DO NOT USE
40-60 ppm	0.33 ppm
60-90 ppm	0.5 ppm
90-200 ppm	1.0 ppm
Above 200 ppm	2.0 ppm

The maximum copper sulfate dosage rate is 2.0 ppm. One (1.0) ppm equivalencies are as follows:

- 0.0038 grams per gallon,
- 0.0283 grams per cubic foot,
- 0.0000624 pounds per cubic foot,
- 1.0 milligrams per liter, and
- 2.7 pounds per acre-foot.

For example: the maximum dosage rate for a half-acre pond with an average depth of 10 feet, would be calculated as follows.

Volume = 0.5 acre x 10 feet = 5 acre-feet

Maximum dosage = 2.7 pounds/ppm per acre-foot x 2 ppm = 5.4 pounds per acre-foot.

Maximum pounds of copper sulfate = 5.4 pounds/acre-foot x 5 acre-feet = 27 pounds.

If total alkalinity is less than 40 ppm, copper treatments are not recommended because of the risk to fish. Algae control in waters with high alkalinity levels (greater than 250-300 ppm) can be improved by use of chelated copper compounds.

Copper sulfate in waters with high total alkalinity levels will settle before algae is completely controlled. Alkalinity is variable especially in eastern Nebraska, so if you do not know the concentration, find out **before** treating with copper.

Sources: Managing Iowa Fisheries, Use of Copper Compounds in Aquatic Systems — Iowa State University at <http://www.extension.iastate.edu/Publications/PM1352I.pdf> and *Aquatic Plants and Their Control* — Kansas State University at <http://www.oznet.ksu.edu/library/crpls2/c667.pdf>