



## Horse Care

# How to Prevent Blister Beetle Poisoning

by **HEATHER SMITH THOMAS**

Blister beetle poisoning in horses was first identified in 1969, after a herd of horses in Oklahoma became ill and died. The owner sought help from Oklahoma State University to find the cause of death, and the lethal toxin cantharidin (from bodies of dead blister beetles in alfalfa hay) was discovered. Blister beetles have since been found in all hay growing areas.

### The Poison and Symptoms of Poisoning

Cantharidin is as deadly as both cyanide and strychnine. This defense mechanism makes the beetle unpalatable. If a beetle walks across a human hand or bare foot, it leaves a string of tiny blisters that burn painfully if broken. When a horse eats a beetle, the lining of their digestive tract becomes blistered. The action of digestion ruptures the blisters, causing sores and ulcers and a great deal of tissue damage. Pain in the gut causes colic and the horse goes off feed and is usually treated for colic. Blister beetle poisoning is generally not suspected until several horses get sick from eating the same hay, but should be suspected if the hay was alfalfa.

The horse may survive if he ate only one or two beetles, but if several are eaten, he may die in a few hours. Mild cases may be fatal after several days of misery, or the horse may recover. About 20 percent of horses that show signs of blister beetle poisoning recover with treatment, but a fatal dose can accumulate over several days if the horse eats a beetle or two with each feeding.

Research at Texas A&M University has shown that half a milligram of cantharidin per kilogram of the horse's weight is enough to be fatal. It takes only three to 10 beetles to kill a horse, depending on the type of beetle. The researchers found enough dried beetles in one five pound portion of baled

alfalfa to kill 24 horses. A Kansas team counted as many as 450 beetles in a single bale. The poison is deadly whether a horse eats alfalfa containing live beetles or shredded remains of dead ones in last year's hay—cantharidin is extremely stable and remains deadly for a long time.

Tissue damage in the gut causes shock, dehydration and death. The stomach lining may slough away. The chemical is just as potent in a poisoned horse's urine or manure as when extracted from a live beetle; it does not break down. As cantharidin is absorbed by the horse's system, his temperature rises due to massive inflammation throughout the body, and his gums become purple due to circulatory failure. He may have a foul body odor, caused by failure of the kidneys to remove the offending substance from the blood stream.

Frequent urination is caused by inflammation of the urinary ducts. A burning in the mouth from blistering may make the horse want to cool his mouth with water, but he cannot swallow. He becomes dehydrated. Temperature may rise to 104 degrees along with a pulse rate of 72 or higher, sometimes up to 100. Respiration increases, sometimes with jerking of the abdomen. The horse may tremble or be stiff in his movements. Along with colic symptoms he may be uneasy and depressed and stand with his head down, reluctant to move.

The horse goes into shock as serum oozes from his bloodstream to surround blistered areas in the gut. Fluid accumulates in and around the gut. Stomach, intestines and bladder may hemorrhage. The stomach or intestines may perforate, causing extreme pain and subsequent death in an hour or less. The horse may be so violent in his pain, it is often difficult to handle him or even humanely euthanize him.

### Treatment

Treatment for blister beetle poison-

ing can sometimes save a horse if begun immediately—if the horse has not eaten a large number of beetles. The main problem is that too often the true cause of colic is not recognized in time. Valuable time may be lost while the horse is being treated for spasmodic colic or even undergoing surgery for a suspected twisted gut. Mineral oil given for colic may be of some value, to hasten the elimination of stomach contents that include toxic beetles, but some veterinarians feel the toxin may continue to blister the gut on the way through, in spite of the soothing and lubricating effect of the oil. The best treatment seems to be replenishing fluids intravenously to help keep the horse from going into shock, minimizing pain with drugs, and giving activated charcoal to absorb the poison in the gut.

### The Risk

For a while, horsemen thought blister beetle poisoning was a problem only in the Southwest. But better diagnostic techniques have revealed beetles as the cause of widespread poisonings, and entomologists have found some types of blister beetles are common in northern and eastern regions as well.

Horse deaths are reported infrequently, but poisoning cases are more common than reported. A sheep, cow or inexpensive horse may not be thoroughly examined for cause of death, whereas a valuable race horse or show animal is usually the one where cantharidin is found and diagnosed as the cause. If a horse gets colic and recovers, most owners look no farther, assuming it was colic. Tests for cantharidin are rarely given, and feed areas are generally not examined for beetles.

Poisoning is becoming a bigger problem than in earlier years because alfalfa hay is now shipped more widely across the country and many horsemen feed alfalfa. Many eastern breeders routinely order western alfalfa hay because good quality, well-cured alfalfa has high nutritional value and little mold.

### The Beetles

Blister beetles are small flying insects that feed on blooms of tomatoes, potatoes, soybeans and alfalfa. Though the adults feed on plants, the larvae of many species eat grasshopper eggs. The beetles are often small, ranging from a quarter inch to one and a half inches in length, and are not always easy to see.

Most deadly is the striped blister beetle (yellow brown, with darker stripes). It has been recognized as a serious problem in the Southwest since 1969. Other types have been found deadly (and may be gray, brown or black). The black one is less toxic, but also more widespread across the U.S. The beetles have a broad head, narrow neck, and antennae about one-third the length of their body. They congregate in swarms in alfalfa, where they feed and mate.

Some years are worse for infestation of hay, because immature beetle larvae feed on grasshopper or locust eggs. When there's a large population of grasshoppers, there is an increase in beetles. Grasshopper numbers are highest in both dry years and dry regions, so western hay is likely to have risk of contamination. Grasshoppers are often numerous on dry rangelands, so beetles can be a problem where alfalfa is grown adjacent to range, as is the case on many western farms and ranches.

There is usually a year's lag time between a large grasshopper population and more beetles, since the beetle larvae feed on grasshopper eggs laid the season before. If an abundance of grasshopper eggs were laid, beetle larvae thrive. A hot or dry year with lots of grasshoppers is often followed by more blister beetles the next haying season.

Beetles can be crushed and killed as alfalfa is swathed, and dead beetles may end up in the bales. Cantharidin can contaminate hay even if the bee-

bles' bodies are no longer in it—if they have been squashed, it may result in the poison leaking out into the hay.

Newer haying methods (conditioners to prevent shattering of the leaves, and the practice of crimping hay as it is cut so it will dry faster) have increased problems with blister beetles. Older ways of harvesting—cutting hay in a flat swath, letting it dry, then raking into windrows—gave beetles a chance to leave the hay, and dead or injured beetles tend to fall out as hay was raked.

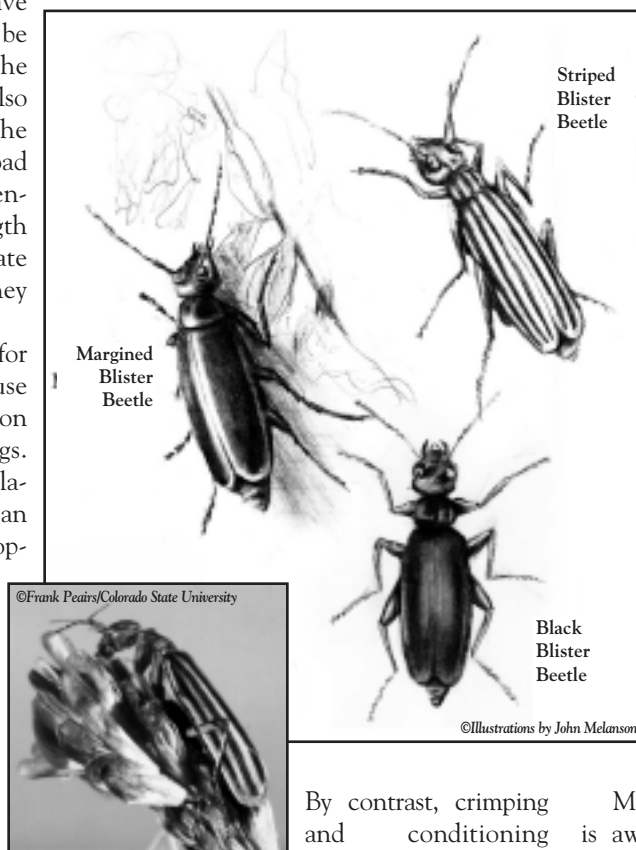
primarily on alfalfa flowers, eating the pollen. Hay cut in late July or August, especially if cut after starting to bloom, is much more susceptible to blister beetle contamination than early hay. Growers should not let alfalfa reach the advanced bloom stage.

Since the beetles travel in swarms, one small portion of a field may contain a high number of beetles while the rest of the field, or neighboring fields, may be free of them. If even one beetle is found in a bale there is a good chance there will be more. Thousands of beetles may be trapped in a few bales that came from part of the field where the insects were feeding when the hay was cut. A swarm may move around the field as haying equipment moves through, but numbers are generally highest around the edges.

### Buying Hay

Blister beetle contamination is unpredictable. Just because a certain field or certain hay supplier has never had a beetle doesn't guarantee there won't be some next season. Because of the mobility of beetle swarms, there is no certainty that any particular crop will always be free of beetles, since beetles are relatively common in all hay producing areas.

Make sure your grower or supplier is aware of blister beetle problems, using grasshopper control and weed control if necessary. Blister beetles are attracted to flowering plants, including weeds that may be growing in the hay or next to it. Grasshoppers are also attracted to weed patches in or next to an alfalfa field. If weeds are controlled and alfalfa is always cut before it blooms, there will be no flowers to attract beetles or grasshoppers. If you buy only first cutting alfalfa, cut before bloom stage, and are cautious about buying hay produced in an area that was dry the year before, you will reduce your chances of having blister beetles.



Blister Beetle on an Alfalfa blossom

By contrast, crimping and conditioning crushes and retains beetles that would otherwise crawl out before baling.

Because of these problems, some farmers try to eradicate beetles by spraying alfalfa with insecticide. But beetles killed by spraying remain in the field and can still contaminate the hay. And new swarms can come in even after the field is sprayed.

The time of cutting is important. The first cutting of alfalfa is often safest for horses, because adults of most blister beetle species do not emerge from the ground until summer. Later cuttings are more apt to contain beetles. They feed