



Know your **ABCs**— Alfalfa, Blister Beetles and Cantharidin

*Everything you wanted to know about this
poisonous insect and the threat it poses to your horse.*

By Lauren Sciba

HOW MANY TIMES HAVE YOU THROWN HAY TO YOUR HORSE without thinking twice? A few flakes of alfalfa over the fence, and dinner is served. But what many horse owners are unaware of is a dangerous type of beetle that can kill a healthy horse in less than 24 hours.

As part of the Meloidae family, blister beetles contain an extremely toxic liquid called cantharidin. There are more than 300 species in this family in the United States and more than 2,500 worldwide. Often found in alfalfa and soybean



Black blister beetles exhibit typical species characteristics like the accentuated neck.

WHITNEY GRANSHAW, COLORADO STATE UNIVERSITY, BUGWOOD.ORG



JOURNAL PHOTO

crops, the blister beetle poses a serious health threat to livestock; however, horses are particularly sensitive to the cantharidin toxin.

What Is a Blister Beetle?

ADULT BLISTER BEETLES RANGE IN SIZE FROM 1/2 TO 1 1/2 INCHES in length.

They are elongated and cylindrical with relatively soft bodies and wing covers. Though they vary in size and color, blister beetles can be identified by their broad necks. The striped blister beetle is the species most commonly associated with equine cantharidin toxicosis.

Other species of the blister beetle tend to be less of a threat than the striped. Size, fewer tendencies to aggregate and lower cantharidin content make other types of blister beetles less of a risk; however, there have been reports of other species being a problem.

According to the Oklahoma State University Cooperative Extension Service, Washington, Oregon, California, Nevada, Idaho, Montana, North Dakota, Wyoming, Utah, Maine, Vermont and New Hampshire have no reports of striped blister beetles. Though the striped blister beetle might not be present, there are other species spread throughout the country that should still be considered a risk.

“As far as I know, there is no place in the United States where you can grow alfalfa and be guaranteed blister beetle-free,” says David Buntin, a professor of entomology at the University of Georgia. “They’re pretty much everywhere. Montana and some of the northwestern or north-central states maybe don’t have a couple of the species, but there are more than one. There are some smaller species – marginated and

Blister beetles can be crushed in the haying process, expelling their toxic fluid throughout.



black, that are kind of a gray color – they're out there and may potentially cause a problem, too.”

Male blister beetles produce the liquid toxin. During mating, males pass this toxin to the females who then use it as a defense mechanism, expelling the liquid around the eggs when they are laid. This toxin causes blisters upon contact with human or animal skin and internal body surfaces.

Alfalfa, soybean and other plants make up the adult blister beetles' diet. As larvae, the species feeds on grasshopper egg pods. Because of this, large blister beetle populations are sometimes associated with a proportional grasshopper population in the year before. Though seasons vary throughout the United States, the poisonous beetles are frequently present during the warmer part of the summer.

How Alfalfa Is Poisoned

THE BLISTER BEETLE PRODUCES AN AGGREGATION PHEROMONE that results in large swarms in small areas of alfalfa fields.

KEY CHARACTERISTICS

- One-half to 1 1/2 inches in length
- Elongated, relatively narrow and cylindrical
- Soft body and wing covers
- Accentuated neck
- Colors and markings vary depending on species; black, gray, orange, margined, spotted or striped. The striped blister beetle is primarily associated with poisoning in horses.



The striped blister beetle is the largest in size and has orange stripes down the back.

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Aggregations of the striped blister beetle, a type that is more prone to this behavior, have been reported as large as 60,000 in small areas of fields.

During the haying process, beetles can be crushed by a crimper, swather or even tractor tires. The beetles secrete cantharidin into the hay as their bodies are crushed. Though beetle fragments might not be visible in the hay after baling, the liquid toxin remains. This presents the problem of deciphering which bales are poisoned.

“When they get into a field near the edge or around weeds, that aggregation pheromone kicks in, and there will be a huge aggregation in an area that's maybe 10 by 10 feet within the field,” David says. “If those beetles were randomly distributed throughout the field and randomly distributed throughout the hay bales, you probably wouldn't have enough to kill a horse.”

While some hay producers think cycle-bar mowers reduce the risk of crushing, extensive research at Kansas State University has shown that is not the case.

“If you drive over the hay with the tires, that crushes the beetles just as effectively,” David says. “Ideally, what you want is to keep the beetles alive through the haymaking process so that they disperse on their own. That is the objective – it's very difficult to do.”

There are many opinions on insecticides to eliminate the beetles. While the chemicals might kill the blister beetle, the problem lies in that the beetles will still be present in the hay. The only real solution is to keep the beetles alive and let them vacate on their own.

The Dangers

THOUGH SHEEP AND CATTLE CAN BE AFFECTED BY THE DANGEROUS poison, horses are most susceptible. Symptoms include colic, diarrhea, bloody stool and urine, and even shedding of the intestinal lining.

“It's a blistering agent. It basically rots through the tissue,” David explains.

Sometimes a horse poisoned by cantharidin will soak or splash its muzzle in water without drinking, and act anxious or depressed. Shock, lowered calcium levels resulting in body tremors and periodic jerking contractions of the diaphragm can also be indications of poisoning. There also can be frequent discharge of small amounts of blood-tinted urine. Poisoned horses may also suffer from increased pulse rate,

REDUCING RISK

- Concentrate scouting for blister beetles along field borders; immediately cut and spray infested areas if found.
- Avoid harvesting field borders.
- Spray border areas when spraying fields for control of other insects to reduce beetle migration.
- Cut hay without using crimpers and avoid wheel traffic on freshly cut alfalfa.
- Spray entire fields and borders with a short residual insecticide just before harvesting.
- Purchase alfalfa hay harvested before May or after September.

Source: P. Mulder, R. Shawley, and J. Caddel. Oklahoma State University Cooperative Extension Service

dehydration and elevated temperature.

Pregnant mares are especially sensitive. Abortion can occur within 24 hours of eating poisoned hay with a lower dose than the amount needed to cause mortality. Death could result in all horses exposed to contaminated hay.

There are a number of unknowns concerning the blister beetle. What many people want to know is how many it takes to kill a horse. Because the toxicity levels of cantharidin to horses have not been clearly determined, there is no real answer. In general, it is estimated that the minimum lethal dose is 0.5 to 1 milligram per kilogram of body weight. Regardless, it only takes relatively few to cause colic and other symptoms that could eventually lead to serious illness or death.

“People think that one beetle is going to kill their horse – that’s not true,” David says. “Generally, it takes a number of beetles to have that effect. The problem is when you cut with a crimper and the beetles are crushed in the hay, thousands and thousands of those beetles end up in three or four bales. That’s the reason they’re such a problem.”

Minimizing Risk

UNFORTUNATELY, THERE IS NO ANSWER TO THE THREAT THAT blister beetles pose. As horse owners, all we can do is be edu-



The margined blister beetle.

Estimated number of blister beetles per horse weight needed to provide a lethal dose of cantharidin (assuming 1 mg/kg of body weight)

CANTHARIDIN CONTENT PER BEETLE

HORSE WEIGHT	250 LBS	500 LBS	800 LBS	1,200 LBS
0.5 mg	227	450	719	1,090
1 mg	114	225	359	545
3 mg	37	75	119	182
5 mg	23	45	72	109

Source: G.D. Buntin and D.W. Hancock, University of Georgia

Factors such as horse’s age, size, breed and general health can affect sensitivity to dosage.

cated and vigilant. Buy hay from a reputable dealer or grower and build a working relationship with that dealer. If possible, try to obtain bales of alfalfa that come from fields that are scouted for blister beetles before the haymaking process begins.

Many hay producers nationwide attempt to make the first spring cut of alfalfa blister beetle-free. While seasons and harvest times vary, early cuts are often less likely to have blister beetles in them – there is no guarantee, though.

“The question I always get is, ‘How do I produce certified blister beetle-free hay?’ ” David says. “Well, the answer is, ‘You can’t.’ You can reduce the risk, but you can’t totally eliminate it.”

When horse owners flake hay, they should inspect it for blister beetles. Haying equipment can crush the insects into fragmented pieces. Inspection might seem like looking for the proverbial needle in a haystack, but it could reduce the danger of poisoning. If infested hay is discovered, destroy it by burning or burying it.

Resources are available to keep yourself informed. Talk to your hay provider. Find out what types of beetles are in your area and when they are most prevalent. Most importantly, watch your horse. If you suspect cantharidin ingestion, contact your veterinarian immediately. ☑

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Blister beetles come in a variety of sizes and colors. They all contain the toxic liquid cantharidin.

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