

BLISTER BEETLES IN ALFALFA

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USDA Insect and Plant Disease Slide Set

Several of the common members of this group of beetles contain a chemical that often causes blisters when applied to the skin; thus the name *blister beetles*. The substance can be toxic to animals that eat a sufficient amount. An understanding of the insects and their life cycles allows sound management practices to minimize the chances of trapping beetles in hay. It also gives horse and livestock owners information to consider when making hay purchases.

One major factor that increases potential for blister beetle problems is crimping hay. This crushes the beetles and leaves them in the hay where they can be eaten by animals. The second factor is a large increase in grasshopper numbers. The larval stages of these blister beetles develop on grasshopper egg pods in the soil. This generally results in increased blister beetle numbers, which in turn increases the potential for hay contamination.

Description and Biology

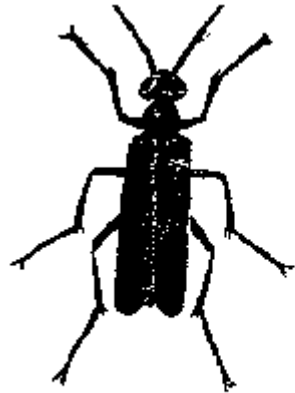
Blister beetles have long (3/4 to 1-1/4 inch), narrow bodies, broad heads, and antennae that are about 1/3 the length of the entire body. The front wings are soft and flexible in contrast to the hard front wings of most beetles.

Three common Kentucky species are:

black blister beetle- *jet black*

striped blister beetle- *with orange and black stripes on the wing covers*

margined blister beetle- *black with thin gray stripe around wing covers*



**BLACK BLISTER
BEETLE**



**STRIPED BLISTER
BEETLE**



**MARGINED BLISTER
BEETLE**

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While common, they have not been found in extremely high numbers in Kentucky. Historically, blister beetles have been most abundant in arid regions of the US where grasshoppers are abundant most every year.

The adults feed on leaves in the tops of a plant but are especially attracted to flowers where they feed on nectar and pollen. They gather in groups, so large numbers can occur in concentrated clusters in a field. These beetles are mid to late summer insects, active in mid-July and early August which translates to the third or fourth cutting.

Female blister beetles lay clusters of eggs in the soil in late summer. The small, active larvae that hatch from these eggs crawl over the soil surface entering cracks in search for grasshopper egg pods which are deposited in the soil. After finding the eggmass, blister beetle larvae become immobile and spend the rest of their developmental time as legless grubs. The following summer they transform into the pupal stage and soon emerge in the adult stage. This is why blister beetle numbers increase dramatically following high grasshopper populations.

Blister Beetle Toxicity

Cantharidin is the poisonous substance in blister beetles. It is comparable to cyanide and strychnine in toxicity. Although horses are considered to be very susceptible, comparable doses can poison cattle or sheep. Very small amounts of cantharidin can cause colic in horses. The substance is very stable and remains toxic in dead beetles. Animals may be poisoned by ingesting beetles in cured hay. There is no sampling method that can detect toxic levels of blister beetles in cured hay.

Cantharidin can cause severe skin inflammation and blisters. It is absorbed through the intestine and can cause symptoms such as inflammation, colic, straining, elevated temperature, depression, increased heart rate and respiration, dehydration, sweating, and diarrhea. There is frequent urination during the first 24 hours after ingestion, accompanied by inflammation of the urinary tract. This irritation may also result in

secondary infection and bleeding. In addition, calcium levels in horses may be drastically lowered and heart muscle tissues destroyed. Since animals can die within 72 hours, it is imperative to contact a veterinarian as soon as blister beetle poisoning is suspected.

How many beetles does it take to kill a horse? It depends. The concentration of cantharidin varies with the species of beetle as well as sex. The chemical is produced by the male, which has the highest content; some is passed to the female during mating. Cantharidin content of the striped blister beetle has been measured to be about 5 times greater than the level found in the black blister beetle. The amount of cantharidin necessary to kill a horse is estimated at 1 milligram of cantharidin per kilogram of horse weight. For example, this translates to about 25 striped blister beetles for a 275 pound horse to over 100 for a 1200 pound animal. About 250 and 1,100 of the less toxic black blister beetles would be needed for the same two animal weights.

Hay Management

The best way to deal with blister beetles is through management practices that will keep fields from being attractive. If practical, use the first cutting hay for horse feed since the beetles are not active then.

The major step is to cut on a schedule that keeps alfalfa and weeds from producing the flowers that attract beetles and keep them in the field. Cut before an advance bloom stage. This means hay with high quality and protein content and keeps attraction of beetles low. Practice good weed management to keep other flowering plants to a minimum.

Other practices are necessary if flowers and beetles are abundant. The worst thing that can be done is to crimp or crush hay if beetles are present. Crushed beetles remain in the hay and can poison animals. **DO NOT** use a hay conditioner when harvesting blister beetle infested alfalfa. Fields with flowered plants can be checked for blister beetles before harvest by using a sweep net as you would to sample for potato leafhoppers. This is not foolproof because large numbers of beetles can be concentrated in very small areas of a field. Collection of 100 sweeps for the field, as would be done for leafhoppers, is not sufficient to be confident that the beetles are not present unless flowering is limited to small areas.

Sickle bar mowers and some of the more modern circular or rotary mowers lay the hay down but do not crush it. Blister beetles have a behavioral characteristic that may be used against them. When plants are disturbed, blister beetles play "possum" and fall to the ground. As the hay dries and cures, the beetles will leave to seek food and moisture.

Horse Owners

Horseowners can reduce the risk of feeding blister beetles to their horses by implementing the following precautions:

- If possible grow your own alfalfa so that you can control all management practices and be sure the crop is beetle free.
- If you do not produce you own hay or need more, buy from a local source and work with that producer to insure that you know what kind of management the hay has had. Develop a good working relationship with your hay producer.
- Set aside or buy hay from the first cutting since it is much less likely to have beetles in it. In Kentucky, remember, we see these beetles in the third and fourth cuttings. There is no efficient way to inspect hay carefully enough to be sure that it is beetle free or to determine that beetles are below damaging levels before it is fed.