

Forage-Related Cattle Disorders

Slaframine Toxicosis or “Slobbers” in Cattle and Horses

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An exceptionally wet summer weather pattern favors the growth of fungi on plants in the field and increases the risk for production of mycotoxins. Mycotoxins are naturally occurring compounds, some of which are toxic to cattle and horses, produced by fungi invading plant material. In the late 1940s and through the 1950s, beef and dairy producers and horse owners reported outbreaks of excessive salivation (slobbering) in cattle and horses associated with the consumption of second-cutting red clover (*Trifolium pratense*) and occasionally other legumes in the form of hay, pasture, or silage. It was not until the 1960s that “slobbers” was linked to a fungal pathogen, *Rhizoctonia leguminicola*, which is also associated with the forage disease black patch that occurs in pastures containing red clover. Slobbers primarily affects cattle and horses, although goats may also be affected. “Black patch” derives its name from the appearance of dark affected areas in the field and also the characteristic black or dark brown concentric or “target spot” lesions on the leaves of affected plants (See Figure 1). The dead, brown, diseased leaves and stems may be confused with normal maturation of red clover. Growth of the *Rhizoctonia leguminicola* fungus is most prevalent in second-cutting red clover hay or pasture associated with periods of wet weather and high humidity, temperatures between 75°F and 85°F, and a soil pH of 5.9-6.5. In addition to red clover, it has also been reported to infect white clover, soybean, kudzu, cowpea, blue lupine, alsike clover, alfalfa, Korean lespedeza, black medic, cicer milkvetch, and sainfoin; however, infected red clover plants are usually present in the same field. This fungus can overwinter on

infected plants and survive at least two years on infected seed.

Rhizoctonia leguminicola produces a mycotoxin known as “slaframine,” an indolizidine alkaloid that stimulates excessive secretion primarily from salivary glands and the pancreas. Consumption of hay or pasture infected with this mycotoxin by domestic livestock, especially cattle and horses, results in clinical signs within an hour. Excessive salivation is generally the first noticed symptom. Other possible signs include diarrhea, feed refusal, bloat, tear shedding, stiff joints, frequent urination, and decreased milk production. In most cases, exposure results in mild symptoms with no lasting harmful effects. However, in the rare severe case, excess salivation and emphysema in the lungs may result in suffocation and death. Removing cattle and horses from infected pastures or discarding contaminated hay results in

complete cessation of slobbers within 24-48 hours and a full recovery. Slaframine intoxication has been observed in cattle, horses, sheep, goats, swine, poultry, cats, dogs, guinea pigs, rats and mice.

Diagnosis is based on detection of plant lesions, clinical signs shown by the animal, and the full recovery after the suspect forage is removed. Slaframine may be detected by a veterinary diagnostic laboratory from plant or forage samples but the analysis can be expensive. Research is ongoing to develop quick-test procedures for black patch in red clover. Other possible causes of excess salivation such as disorders of the mouth, esophagus, gastrointestinal or neurologic systems should be ruled out through physical examination by a veterinarian. Rabies is always a possibility for any animal with excessive salivation so caution must be exercised before placing one’s hands in an animal’s mouth.



Normal, healthy red clover.

Photo courtesy of Jeff McMillan, USDA-NRCS



Figure 1. Black patch on red clover leaves.

Photo courtesy of the Journal of the British Veterinary Association

Treatment consists of removing the feed source causing the problem. Early removal from the offending forage typically results in rapid resolution of the problem with few, if any, lasting effects. Higher doses and longer exposure times may cause dehydration that leads to a drop in milk production, intestinal disturbances, and rarely abortion or death. Make sure to have adequate water available at all times. Atropine, a prescription drug used by veterinarians, may be given soon after ingestion of slaframine to reduce the clinical signs. However, once salivation becomes very heavy, it is unlikely that atropine will completely reverse the effects.

Prevention is limited because there is no method to detoxify pastures and hay contaminated with this fungus. If mold is evident, a trial feeding to one or two less valuable animals may be warranted to avoid exposure of a large number of animals to slaframine. The following steps may minimize the severity of the problem when a field is infected:

1. Harvest or graze red clover during the late bud to early bloom stage (before 10 percent bloom) and definitely avoid letting summer regrowth mature to the seed setting stage. Delaying hay harvest beyond early bloom also lowers palatability and creates a build-up of the fungus.
2. Mix later cuttings of red clover hay with other hay to dilute the dose of slaframine.
3. Store second-cutting red clover hay until next year's feeding season, or feed it last during the winter following harvest. In one controlled study, the fungus was less prevalent in hay after 10 months of storage and the level of slaframine was found to have decreased during that time by approximately 10 fold.

In summary, although black patch occurs only sporadically, the right temperature, moisture, and soil pH may combine and allow *Rhizoctonia leguminicola* to thrive. Be aware of the possible consequences of this fungus, especially profuse salivation in cattle and horses. Good forage management, especially hay harvest or grazing at late bud to early bloom, will reduce the risk of problems when utilizing this forage.

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