

Sweet Clover Poisoning: SEARCHING FOR NEW ANSWERS TO AN OLD PROBLEM

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Sweet clover is a high-yielding, nutritious forage, one that North Dakota cattlemen have used in considerable quantities for many years. But this extensive utilization is not without problems. Sweet clover poisoning has been recognized as a problem in the state since the 1920s and causes losses to an estimated 200 herds a year in North Dakota.

According to Dr. Howard Casper and Dr. A.D. Alstad of the Department of Veterinary Science, although sweet clover poisoning has been recognized for almost 60 years, not that much is known about the levels of toxicity in sweet clover hay. To help fill this information gap, the two researchers are heading a project, funded by the North Dakota Beef Commission, to determine methods of reducing sweet clover poisoning.

The culprit that causes sweet clover poisoning is a substance called dicumarol. Dicumarol is formed from an ingredient in sweet clover called coumarin as a result of molding. Dr. Dwain Meyer, forage researcher with the Department of Agronomy, says there are low coumarin varieties of sweet clover, but they have not been generally accepted. They tend to yield less than the common varieties and seed may not be readily available.

Why not just forget about sweet clover and grow other legumes instead? Sweet clover does have some advantages, says Meyer. It is probably the most drought-tolerant legume, for one thing. Some farmers use sweet clover to manage variation in forage production. Sweet clover is one of the best legumes to plow down for green manure. So, the producer seeds sweet clover and waits to see how his forage production looks. If he has plenty of other hay, he plows down the sweet clover. If forage production is low, he cuts the sweet clover for hay.

Sweet clover is very widespread in the state. In addition to cultivated acreage, there is considerable volunteer sweet clover in places like road ditches and pastures. (Alstad says sweet clover should be North Dakota's state flower!) The fact is, there is a lot of sweet clover out there. If it has potential for causing problems, cattlemen need to know how to prevent them.

One aspect of the research is to determine levels of dicumarol in spoiled sweet clover hay toxic to cattle and develop guidelines for predicting the toxicity of sweet clover hay. Steers were fed sweet clover hay with known levels of dicumarol. Feeding hay with 10 to 20 parts per million (ppm) dicumarol produced no signs of toxicity. Toxicity did appear when hay with 30 ppm was fed for a long period — 140 days. At 60 to 70 ppm, toxic effects appeared within 30 days.

Methods of treating sweet clover poisoning are also being studied. This portion of the project involved feeding cattle toxic levels of dicumarol and treating with vitamin K. Vitamin K is effective for treating sweet clover poisoning. Continued work with the vitamin K therapy will determine dosage levels and the best method of administration.

Treating hay to prevent molding and the formation of dicumarol is another approach. Anhydrous ammonia and propionic acid were evaluated as preservatives, first in the laboratory and then in the field with large round bales. Injection of anhydrous ammonia into sweet clover bales did prevent molding, even at moisture levels as high as 30 percent. In addition, the addition of ammonia greatly increased the protein content and forage quality. Propionic acid was effective in the laboratory but not in the field, which may indicate a problem with the application technique.

Other management methods, such as feeding sweet clover in rotation with other feeds, are also being evaluated.

The NDSU research is providing some answers to avoiding sweet clover poisoning. "At least 80 percent of our work is of direct use to the rancher," Casper says. As with any research, it will take a long time to answer all the questions — if all the questions can ever be answered. But, North Dakota ranchers have more information about feeding sweet clover than they did before, and the store of knowledge will continue to grow.