

4/9/2004

Hoary Alyssum: Toxicity to Horses, Forage Quality, and Control

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The possible toxicity of hoary alyssum (*Berteroa incana*) to horses has recently become an issue of local concern. The following summarizes the current knowledge and recommendations concerning this issue.

Clinical Signs and Toxicity

The toxicity of hoary alyssum to any species of animal has not previously been reported. Therefore, our current understanding is based on field reports and recent feeding studies. No cases of hoary alyssum toxicity in ruminants (dairy, beef, sheep or goats) have been reported to date. Some horses, however, have shown a response to hoary alyssum.

Clinical signs

Horses experience depression and a "stocking up," or swelling of the lower legs, 12 to 24 hours following ingestion of hoary alyssum in hay or on pasture. A fever and occasionally short term diarrhea have also been observed. These clinical signs normally subside 2 to 4 days following removal of the alyssum source. In more severe cases, an apparent founder with a stiffness of joints and reluctance of the animal to move has been observed. Recovery of animals with clinical evidence of founder may take several additional days.

In very rare cases, where hoary alyssum comprised extremely high percentages of the hay (30 to 70%), circumstantial evidence exists associating the plant with the death of a few horses. To date, death has not occurred in horses fed hay containing hoary alyssum under experimental conditions.

Toxicity

Definitive statements about the toxicity of hoary alyssum when eaten by horses are difficult to make, considering the fact that many horses do not appear to be affected by it.

In field cases where a large number of horses were known to be involved, only approximately 50% of the animals ingesting hay containing 30 to 70% hoary alyssum demonstrated any of the clinical signs of toxicity. The cases of severe "stocking up," apparent founder, and death have only been observed in horses ingesting hay containing 30 to 70% hoary alyssum. Only mild "stocking up" has been observed in horses on pasture or those ingesting hay with low percentages of alyssum.

Forage Quality and Palatability

Hay quality parameters typically reported are percent crude protein (CP), percent acid detergent fiber (ADF), and percent neutral detergent fiber (NDF). As ADF increases, digestibility decreases. As NDF increases, potential intake decreases in animals getting high forage diets. In vitro digestible dry matter (IVDDM) is a laboratory test that ranks forages for dry matter digestibility, higher values having higher digestibility. For more information about forage quality evaluation, obtain Minnesota Extension Service folder FO-2637, Forage Quality Tests and Interpretation.

Hoary alyssum was evaluated for forage quality and animal palatability (acceptance or rejection by animals when given a choice) with other common perennial weeds at Rosemount in 1981-1983.

Hoary alyssum declined in feeding value as it advanced in maturity. This study showed hoary alyssum analyzed from the vegetative to seed stages of maturity declined in CP from 20 to 7%, and IVDDM declined from 89 to 58%. The calcium to phosphorus ratio was 4:1 (Ca 2.0% : P 0.46%) and other mineral analysis did not identify any typical metabolic disorder potentials. Hoary alyssum forage quality compared with other forages and weeds harvested at early to late maturity ranges is shown in Table 1. Hoary alyssum forage quality showed the greatest range in values in response to maturity at harvest.

Table 1. Early to Late Maturity Forage Quality Comparisons with Hoary Alyssum

	Alfalfa	Smooth Bromegrass	Quack grass	Hoary Alyssum	Canada Thistle
	----- (% of dry weight) -----				
CP	14-27	6.5-16.2	6.8-17.2	7.4-19.9	14.7-17.2
NDF	30-64	49-67	46-66	29-60	41-50
IVDDM	49-79	57-78	59-78	58-89	64-76

Marten et al. 1987. *Agronomy Journal* 79:980-986.

Forage quality of alfalfa hay harvested in 1990 contaminated with 30 to 70% hoary alyssum, which caused the toxicity symptoms described earlier, was similar to advanced maturity hoary alyssum in the Rosemount study (CP 12%, ADF 43.3%, and NDF 57.6%) (See Table 2). High levels of mature hoary alyssum in alfalfa hay decreases CP, digestibility and potential intake.

Table 2. Forage Quality of 1990 Harvested Alfalfa Hay Containing 30 to 70% Hoary Alyssum

	Individual Bale Range	Bale Avg.	Pure Hoary Alyssum ¹	Average Pure Alfalfa ²
	————— (% of dry weight) —————			
CP	10.6-13.1	12.0	10.7	18.0
ADF	41.8-45.0	43.3	40.2	37.8
NDF	55.6-59.6	57.6	53.8	50.5

1 Pure hoary alyssum collected from St. Paul site

2 Average values for pure alfalfa hay tested in Minnesota

Grazing lambs rejected hoary alyssum in three different university free choice grazing trials conducted at the mid-bloom to seed stage of maturity. Cattle, sheep, and horses are commonly observed grazing in pastures where mature hoary alyssum remains, while other available forage species have been overgrazed. Where free choice hay has been available, some horses have rejected hoary alyssum in preference to other forage in the hay, thereby avoiding any toxic effects. However, animals without any desirable forage will eat hoary alyssum and may develop the clinical signs discussed earlier.

Biology and Control

Biology

Hoary alyssum is a weed common throughout Minnesota, the surrounding states, and Canada. It is particularly adapted to dry conditions such as occur on sandy or gravelly soils. Hoary alyssum is a member of the mustard family and is perennial in its growth habit. Hoary alyssum tends to increase in forages following drought or winterkill, regardless of the soil type of the field.

Control

As with any weed control program, proper pasture and hay management is the first consideration. This includes annual fertilization of pastures, seeding adapted species, and controlled grazing to avoid overstressing desirable forages. For hayfields, proper soil testing and seeding to insure adequate forage stands that are vigorously growing and competitive will help to prevent high levels of alyssum developing. Winterkill can open some alfalfa stands to invasion by alyssum, in which case the most appropriate method of control would be to re-establish the hay crop. Remember, adequate alfalfa stands should contain 5-6 plants per square foot in third year or older stands to have adequate populations remaining to merit continued economic hay production.

If herbicides must be used, the most effective in pure alfalfa are

products applied to dormant stands or following first cutting. There are no other good herbicide options for controlling alyssum beyond the first cutting. For grass pastures, of the various broadleaf herbicides available, the most economical approach would be to apply 2,4-D in the spring or fall to suppress hoary alyssum. Retreatment will likely be necessary. No broadleaf herbicides are labeled for use on grass/legume mixed pastures that do not have significant injury potential to the legume as well. Obtain Minnesota Extension Service bulletin BU-3157, Cultural and Chemical Weed Control in Field Crops, for more information on herbicide use.

Recommendations

Hoary alyssum is not a known poisonous plant as we typically think of plants such as hemlock, bracken fern, nightshade and white snakeroot. Considering the widespread distribution of alyssum in Minnesota and the lack of reported toxicity to animals, it is of relatively low toxicity to livestock in that sense. Complete avoidance of hoary alyssum in hay or forage is not an economical or environmentally sound goal.

For ruminants, the buyer should be aware of potential concerns when feeding hay containing hoary alyssum, though horses appear to be at greater risk to date. The buyer should be aware of the clinical signs and monitor ruminants for any indications of toxicity, and remove alyssum-infested hay if problems develop.

For horses, hay producers and horse owners both should be aware of toxicity symptoms and management needs regarding hay that may contain low levels of hoary alyssum. Buyers should be alert for clinical signs of toxicity development and immediately remove alyssum-infested hay if symptoms develop. Hay containing greater than 30% hoary alyssum should not be fed to horses.