

# Hairy Vetch (*Vicia villosa*) Toxicosis in a Purebred Angus Herd

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## Abstract

Four mature, purebred Angus cattle from a herd of 460 were presented for examination with a history of weight loss and alopecia that began one to seven days prior to examination. Five unexplained deaths of other members of this group, within the same pasture, had occurred on the ranch during the previous two weeks. Clinical findings common to all four animals presented included skin lesions that ranged from mild alopecia with moderate hyperkeratosis, to severe folding and thickening of the skin with excoriation and edema. Lesions were distributed bilaterally on the face, neck, topline, perineum, distal limbs, udder and thorax. Increased salivation, clear ocular discharge and lymphadenopathy were also observed in all four animals. Skin biopsy histopathologic examination, serum biochemical findings and hematology results were consistent with hairy vetch (*Vicia villosa*) poisoning. Cattle were removed from this pasture and the other affected animals were isolated for observation and supplemental feeding.

**Keywords:** bovine, cattle, hairy vetch, dermatitis, toxicity

## Résumé

Quatre bovins adultes Angus de race pure provenant d'un troupeau de 460 têtes ont été admis avec des symptômes incluant perte de poids et alopecie remontant de un à sept jours avant l'admission. Cinq bovins de ce même troupeau utilisant le même pâturage étaient morts mystérieusement durant les deux semaines précédentes. Les résultats cliniques communs à chacun des quatre cas incluaient des lésions de la peau allant de l'alopecie légère avec hyperkératinisation modérée jusqu'au repli sévère et à l'épaississement de la peau avec excoriation et œdème. Les lésions étaient distribuées bilatéralement au niveau de la face, du cou, du dos, du périnée, des membres postérieurs, du pis et

du thorax. On a aussi observé une salivation accrue, un écoulement oculaire clair et la lymphadénopathie chez les quatre sujets. L'examen histopathologique d'un prélèvement de peau, les résultats de l'analyse biochimique du sérum et les résultats hématologiques suggéraient tous un cas d'empoisonnement à la vesce hirsute (*Vicia villosa*). Les bovins ont été retirés du pâturage et les autres animaux affectés ont été isolés pour observation et alimentation supplémentaire.

## Introduction

Many species of vetch (*Vicia* spp) have been reported to produce intoxication in horses and cattle. In cattle specifically, the two types of disease manifestation associated with the *Vicia* genus include a neurologic form from ingestion of the seeds, and a dermatopathy as a result of foliage consumption.<sup>3,4</sup> Hairy vetch (*Vicia villosa*), in particular, most consistently produces a syndrome of dermatitis and visceral granulomatous disease occurring primarily during periods of vigorous plant growth.<sup>5</sup> The following report describes an "outbreak" of hairy vetch toxicosis in a purebred Angus herd in central Texas.

## History

Four adult, purebred Angus cattle (three cows and one bull) were presented to the Texas Veterinary Medical Center (TVMC) at Texas A&M University in late April for evaluation of weight loss and alopecia with wrinkling, crusting and excoriation of the skin beneath. Clinical signs were reportedly apparent one to seven days prior to presentation. Ages ranged from four to nine years. One cow had a calf at her side, while the other two cows had recently weaned calves. The bull had only been noted to have skin lesions the day before presentation.

These animals were from a group of 460 head purchased from east Texas in February of the same year.

Approximately one-half of these cattle were placed on pasture consisting primarily of coastal bermuda grass and oats, while the other half were placed on 800 acres of native grasses that had been previously ungrazed by cattle for five years. The affected animals were all grazing the native grass pasture. Starting in February, all cattle on the ranch were supplemented with 40% protein range cubes every other day. The cattle were supplemented with the range cubes less often over the three weeks prior to presentation because pasture conditions had improved. A commercial mineral mix was available *ad libitum*, and water was provided by stock ponds. The ranch utilized a standard vaccination and deworming protocol, including vibriosis and leptospirosis vaccines and injectable ivermectin,<sup>a</sup> prior to turnout in their new environment.

Over the course of the 14 days prior to presentation, five unexplained deaths occurred in the cattle grazing the native grass pasture. The only clinical signs noted by the owner were skin lesions that appeared approximately four to five days prior to finding them dead. Two additional animals from this group with similar skin lesions were not presented to TVMC for examination. None of the affected animals had been treated prior to presentation. No herbicide, pesticide or other potentially hazardous materials had been applied to the pasture or animals, respectively. The native cattle on other pastures and the other group of recently purchased animals grazing the bermuda grass/oat pastures were reportedly normal.

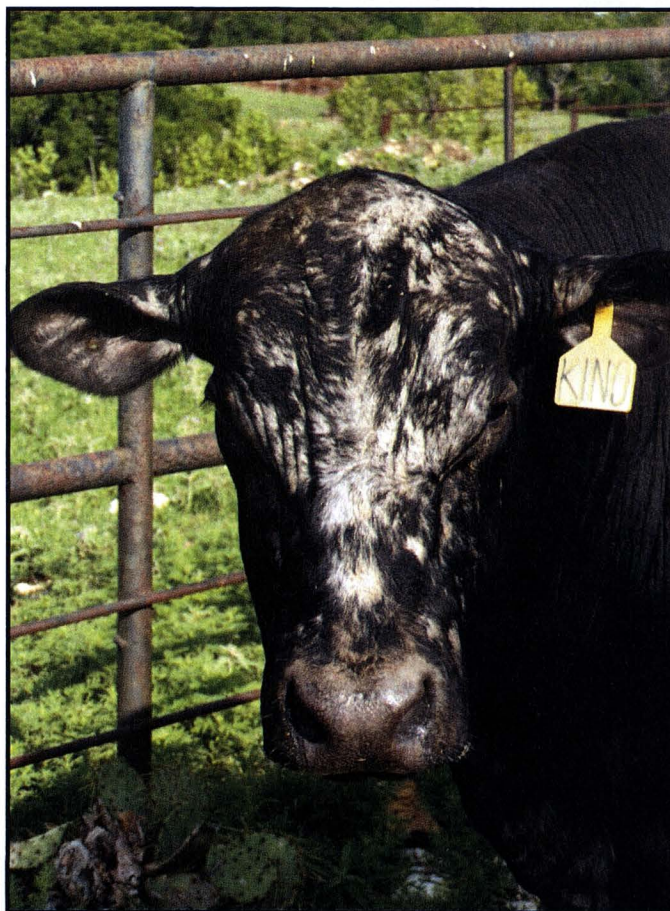
### Clinical Findings

Physical examinations were performed on the four animals presented to the TVMC. Body condition scores ranged from 3 to 6 (1=emaciated, 9=extremely obese) and were reported to be indicative of the ranges observed in the rest of the herd. Consistently, temperature and heart rates were within normal limits, while respiratory rates were mildly elevated in all four animals. Additional clinical findings present in all four cattle included excessive salivation, mild, clear bilateral nasal discharge, mild, clear ocular discharge and generalized lymphadenopathy (Figure 1).

Skin lesions were present in all four cattle that ranged from moderate alopecia with dry, crusting skin beneath that was distributed bilaterally on the neck, face and back to extensive, patchy alopecia with folding of the skin, evidence of excoriation, plaque-like exudative lesions and edema of the subcutis distributed over the entire body, including the limbs (Figures 1-4). Two of the affected animals displayed edema in the skin of the submandibular space and the muzzle underlying the alopecia, as well as thickened skin. In addition, two of the three cows had similar lesions in the perineum ex-



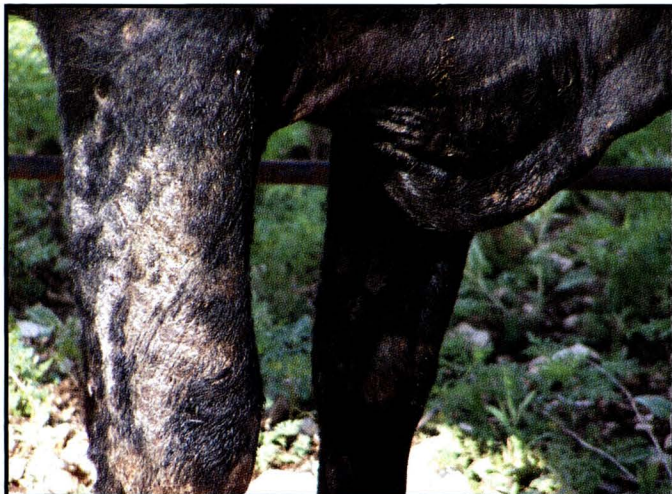
**Figure 1.** Adult Angus cow affected with hairy vetch toxicosis displaying folding of the skin, thickened plaques, excoriation of the face, increased salivation and ocular discharge. (Photo courtesy of Dr. Travis Respondek)



**Figure 2.** Angus bull affected with early skin lesions consistent with hairy vetch toxicosis. Alopecia is present with thickened, crusty skin. (Photo courtesy of Dr. Travis Respondek)



**Figure 3.** Two cows displaying diffuse lesions of alopecia, thickened, folded skin, evidence of excoriation and weight loss consistent with hairy vetch toxicosis. (Photo courtesy of Dr. Travis Respondek)



**Figure 4.** Thickened areas of alopecia on the distal limbs and brisket of a cow affected with hairy vetch poisoning. (Photo courtesy of Dr. Travis Respondek)

tending down to involve the udder. Areas of excoriation were most commonly noted on the tailhead, sides of the face and distal forelimbs, indicative of a potentially pruritic lesion (Figure 4). Severity of skin lesions was positively correlated with the length of time clinical signs had been observed.

Complete blood counts with fibrinogen, serum chemistries and urinalysis were performed on all four cattle. On the three cows with the most severe skin lesions, punch biopsies were performed at the lesion margins, primarily harvested from the thickened plaque-like lesions distributed over the face, thorax and the perineum. Due to the history, unexplained deaths in

only one pasture and clinical findings, a plant intoxication was suspected, and the owner was instructed to remove cattle from this pasture and keep affected animals isolated until results of diagnostic tests were available. No specific therapy was prescribed.

### Laboratory Findings

Complete blood counts, serum biochemistries and urinalysis were performed on the four animals presented to the TVMC. Consistent abnormalities included hypostenuria (specific gravity range 1.004-1.020; reference range 1.025-1.045), monocytosis (range 1541-2507  $\mu$ l; reference range 25-840  $\mu$ l) and hypomagnesemia (range 1.3-1.8 mg/dL; reference range 2.0-2.8 mg/dL). Additionally, two of the four animals had neutrophilia (range 4796-7896  $\mu$ l; reference range 600-4000  $\mu$ l); three of the four animals had hypoalbuminemia (range 2.2-2.6 g/dL; reference range 3.0-4.0 g/dL); three of the four animals had significant elevations in aspartate aminotransferase (range 346-678 U/L; reference range 53-173 U/L); and two of the four animals had significant elevations of gamma glutamyltransferase (range 131-757 U/L; reference range 0-100 U/L). Ionized magnesium levels were not evaluated; therefore, the hypomagnesemia observed may have been due to either decreased protein binding associated with hypoalbuminemia or nutritional deficiency.

Histopathologic examination of skin biopsies from three cows revealed moderate, multifocal perivascular and periadnexal histiocytic, eosinophilic and lymphocytic dermatitis with scattered multinucleated giant cells, epidermal hyperplasia and serocellular crusting. Comments by the reviewing pathologist were that the cutaneous changes observed microscopically were highly suggestive of hairy vetch (*Villa villosa*) poisoning.

### Follow-up

A total of eight head, including the four presented for examination, were isolated by the owner pending results of diagnostic testing. The animals were confined to a small dry lot without access to the native grass pasture, with nutritional supplementation as needed. The remainder of the herd that had been in the native grass pasture was moved to an improved bermuda grass pasture that had no history of illness among cattle previously grazing that pasture. Within two-weeks after removal of affected cattle from the native grass pasture, two of the animals initially presented for evaluation and one additional animal died, presumably from hairy vetch toxicosis. The referring veterinarian (TR) removed samples of heart, kidney and skin from both animals for submission for histopathologic examination to confirm suspected hairy vetch toxicosis. The histopatho-

logic findings included moderate to severe chronic granulomatous nephritis, granulomatous and eosinophilic dermatitis, and granulomatous myocarditis. The consulting pathologist commented that these lesions were compatible with hairy vetch toxicosis. No more new cases were reported by the owner. The owner was instructed to allow the pasture to remain unoccupied until at least late June so that the dry summer heat would reduce or eliminate the stands of hairy vetch.

### Discussion

Hairy vetch (*Vicia villosa*) grows predominately from the east coast to as far west as Colorado and New Mexico, and extends from the northern Midwest as far south as south-central Texas.<sup>1</sup> In Texas specifically, hairy vetch can be found in the eastern third of the state extending west to central Texas, north to Oklahoma and south to the coastal regions.<sup>2</sup> Another native species of vetch, *Vicia leavenworthii*, has also been reported to cause similar intoxication in periods following adequate fall and winter rainfall.<sup>2</sup> Hairy vetch is an annual or biennial spreading plant characterized by leaves covered with long, soft hairs, climbing stems and violet and white-to-rose colored flowers (Figures 5, 6). The pod is oblong with a beak-shaped tip (Figure 7). This plant is widely cultivated alone or with small grains, such as rye and wheat, as a cool-season forage, but has escaped into abandoned fields, along roadsides and into waste areas.<sup>2</sup> Intoxication by hairy vetch tends to occur in April through June when large stands are present.<sup>4</sup> The toxic principle remains unknown, although it is thought that the disease may be due to a type IV hypersensitivity reaction with a granulomatous inflammatory response.<sup>5</sup> Skin lesions due to hairy vetch toxicosis involve pigmented areas, therefore, black cattle are most commonly affected.<sup>5</sup> The reason for this phenomenon is unexplained to date. Intoxication may occur in pastures with no history of problems, and may not recur in the same pasture.<sup>1</sup>

The first clinical signs of affected animals with hairy vetch poisoning are similar to photosensitization, however, the lesions are on black skin. Additional clinical signs may include inflamed skin, thickening and sloughing of the skin, diarrhea, anorexia, weight loss and death.<sup>2</sup> The mortality rate of intoxicated animals is high due to the granulomatous inflammation in the kidneys and subsequent renal failure, with similar lesions and organ failure possible in other organs. Clinical signs usually appear three to four weeks or more after grazing on vetch begins, and deaths may occur as long as two weeks following removal from the pasture.<sup>1</sup> Management and prevention are difficult because hairy vetch is a palatable, nutritious forage; however, cattle grazing vetch should be observed frequently, and black



**Figure 5.** *Vicia villosa* (hairy vetch). (File photo courtesy of *Toxic Plants of Texas*; Texas Cooperative Extension 2003)



**Figure 6.** Flowers of *Vicia villosa* (hairy vetch). (File photo courtesy of *Toxic Plants of Texas*; Texas Cooperative Extension 2003)



**Figure 7.** Seed pod of *Vicia villosa* (hairy vetch). (File photo courtesy of *Toxic Plants of Texas*; Texas Cooperative Extension 2003)

cattle should be removed at the first signs of weight loss or skin lesions.<sup>1</sup>

Other differentials considered in this case included external parasite infestation (lice, mites) and liver flukes (weight loss, unthriftiness, rough hair coat, crusty skin). Lice were considered unlikely due to the history of avermectin use, progression and distribution of the lesions, and time of year. It was also considered unlikely for such large numbers of the herd to be infested with mites, and lesions associated with mange should have been apparent on the skin biopsies. Because the cattle purchased (from east Texas) were likely exposed to liver flukes, we assumed that the cattle had a certain degree of native immunity and, therefore, unlikely to have clinical disease in their new environment. Further, manifestations of disease associated with liver fluke infestations are more common in late fall and early winter. It should be noted that a clinically similar syndrome is observed in cattle consuming citrus pulp, however, cattle in this region had no such exposure. Given the time of year during which the disease occurred, the high incidence within the herd exposed to the native pasture, the characteristic skin lesions, signalment, and fatalities observed, hairy vetch intoxication was suspected to be the top differential diagnosis and was subsequently confirmed with diagnostic tests, including histopathology of representative lesions. Treatment of affected cattle is generally supportive and not likely to significantly alter the prognosis. Efforts were made to identify the plant on the ranch. High quality photos of the plant were sent with the ranch hand back to the owners. Upon long-term follow up, the owner reported that they had only searched portions of the pasture several

weeks after the last reported death, and were not sure if they had identified the plant in the photos. Because this time period corresponded to mid-June, we suspect that many, if not all, stands of vetch had died out, or at least lost the characteristic flowers, therefore making identification more difficult.

### Conclusion

When the habitat is suitable for hairy vetch, toxicosis should be suspected if black cattle display signs of weight loss; thickened, folded, plaque-like skin lesions; and subsequent death.

### Endnote

<sup>a</sup> Ivomec 1% Injection for Cattle, Merial Limited, Iselin, NJ

### References

1. Burrows GE, Tyrl RJ: Fabaceae Lindl, in Burrows GE, Tyrl RJ (eds): *Toxic Plants of North America*. Ames, Iowa State University Press, 2001, pp 500-684.
2. Hart CR, Garland T, Barr AC, Carpenter BB, Reagor JC: *Vicia villosa*, in *Toxic Plants of Texas*, Texas Cooperative Extension, 2003, pp 222-223.
3. Panciera RJ, Johnson L, Osburn BI: A disease of cattle grazing hairy vetch pasture. *J Am Vet Med Assoc* 148:804-808, 1966.
4. Panciera RJ: Hairy vetch (*Vicia villosa* Roth) poisoning in cattle, in Keeler RF, Van Kampen KR, James LF (eds): *Effects of Poisonous Plants on Livestock*. New York, Academic Press, 1978, pp 555-563.
5. Panciera RJ, Mosier DA, Ritchey JW: Hairy vetch (*Vicia villosa* Roth) poisoning in cattle: update and experimental induction of disease. *J Vet Diagn Invest* 4:318-325, 1992.



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