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Case report—ergot alkaloid poisoning in weaned beef calves

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Abstract

Twelve of 100 beef calves in central South Dakota had loss of tail switches and tail tips in the summer of 2014. The problem was noticed in July. Many of the calves were being raised to be show calves. All 12 affected calves had tail lesions and 3 were suffering from early lameness. Chemical analysis demonstrating multiple ergopeptine alkaloids in the creep feed suggested ergotism caused by *Claviceps* spp, specifically *C. purpurea*. Rapid identification of the cause of unusual distal extremity lesions is important to reduce suffering of affected animals and financial losses to owners.

Key words: cattle, ergot alkaloids, gangrenous necrosis, tail lesions, creep feed

Résumé

Douze veaux de boucherie dans un groupe de 100 animaux ont perdu le toupillon et le bout de la queue lors de l'été 2014. Le problème avait été noté en juillet. Plusieurs de ces veaux étaient élevés pour l'exposition. Tous les douze veaux affligés avaient des lésions sur la queue et trois d'entre eux avaient aussi des signes précoces de boiterie. L'analyse chimique a démontré la présence de plusieurs alcaloïdes de l'ergot dans la moulée de démarrage suggérant l'ergotisme causé par *Claviceps* spp et plus particulièrement *C. purpurea*. L'identification rapide de la cause de ces lésions inhabituelles qui entrainent des lésions distales des extrémités est importante afin de réduire la souffrance des animaux affligés et les pertes financières encourues par les éleveurs.

Introduction

Ergotism, or ergot toxicosis, is caused by *Claviceps purpurea* (ergot) infection of small grains and grasses.[6] Other *Claviceps* spp can cause identical disease.[4] The fungal ascospores originate from the soil and infect the stigma of the flowering plant resulting in fungal hyphae infecting the ovarian tissue, thus forming ergot bodies (sclerotia) in the mature seed head.[4] *Claviceps purpurea* can infect over 200 species of grasses including rye, triticale, wheat, barley, oats, wild grasses, tall fescue, brome grass, and crested wheat grass.[4,6,9] Ergotism is associated with a variety of disease syndromes, 1 of which is cutaneous or gangrenous ergotism.[4] Affected animals will suffer from loss of extremities such as the tail, ear tips, and feet.[1] Losses in cattle related to ergot toxicosis and hyperthermia have also been observed.[1,6] Ergot alkaloids stimulate adrenergic nerves supplying the smooth muscle of arterioles, resulting in peripheral vasoconstriction. Subsequently, arteriolar spasm and damage to capillary endothelium leads to vascular thrombosis and ischemic necrosis.[5]

Case History

The local veterinarian was called in late July to examine a group of 100 calves demonstrating loss of tail switches and tail tips. The tail lesions ranged from loss of the tail switch to loss of the distal 6 inches (15.2 cm) of the tail (Figure 1).

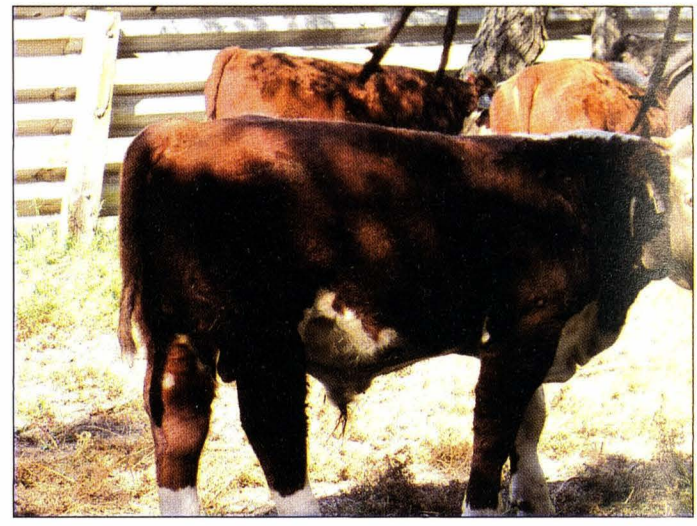

Figure 1. Loss of tail switch due to ergotism.

Twelve animals were affected, and 3 head subsequently became lame with swelling of the feet above the coronary band. The calves were being fed a ration of pelleted creep feed and brome hay. Calf weights ranged from 400 to 600 lb (181 to 272 kg).

Clinical Findings

Diagnostics

Blood was collected from 18 calves for selenium analysis, and levels were normal (range 0.22 to 0.44 ppm). Pelleted creep feed and brome hay were submitted to the Missouri Veterinary Medical Diagnostic Laboratory for analysis in early August. Significant amounts of active ergopeptine alkaloids present in ergot bodies were detected. Creep feed contained 25 ppb ergosine, 30 ppb ergotamine, 20 ppb ergocornine, 35 ppb ergocryptine, and 95 ppb ergocristine for a total of 205 ppb. Adverse effects on livestock performance are generally observed when total dietary concentration of these compounds exceeds 100 to 200 ppb.[3] No ergot bodies or ergopeptines were detected in the brome hay, and ergovaline was not detected in either sample. Skin scrapings were negative for tail mites (*Chorioptes bovis*).

A field investigation was conducted in August by the South Dakota Veterinary Diagnostic Laboratory and the local veterinary practitioner to view affected bull calves still remaining on the farm. Calves were consuming 10 to 15 lb (4.5 to 6.8 kg) of the creep feed/day at the time of the outbreak; the creep feed had been fed since June 1. The brome grass pasture the calves had grazed was examined and no ergot-infected plants were found. The calves were carefully examined for body condition with regular grooming, as is typical with show calves. Breeds included Hereford, Simmental, and Maine Anjou.

Outcome

The ergot-containing feed was removed and no additional cases were observed. Animals showing lameness or having unacceptable cosmetic or functional tail loss were later marketed at a local livestock auction. The remaining calves were given access to shade in a shelter belt.

Discussion

It is important to quickly recognize causes of distal extremity lesions in cattle to limit additional cases, prevent animal suffering, and stop economic losses. Early cases may demonstrate heat intolerance, rough hair coat, and poor growth.[6] Possible causes may include ergot, endophyte-infected tall fescue, trauma, bacterial septicemia, cold injury, tail mites (*Chorioptes bovis*), and selenium toxicosis.[7,10,11] Veterinarians in South Dakota and surrounding states reported sporadic tail lesions in pastured cattle during the summer over the past decade. We suspect that ergot may be responsible for some of these cases.[2] This case was unusual because a commercially prepared pelleted creep feed was involved, and potentially valuable show cattle were affected. Ergot bodies are difficult or impossible to recognize in processed or pelleted feeds.

Most cases of ergotism in South Dakota occur in grazing cattle consuming infected forages. Cases are usually seen in years with cool, damp spring weather followed by a warm growing season. This results in infected and plentiful grass that is grazed and hayed after seed heads are produced. Ergot bodies appear as dark brown to black growths in the seed heads, and vary in size of, to several times the size of, the seed kernels. Groups of cattle grazing ergot-infested pastures should be moved to alternate pastures, or seed heads should be clipped if the animals cannot be moved. Affected feed should be removed or diluted to stop additional cases. There is no treatment for ergotism.

Grain screenings should not be used in animal feeds since gravity tables partially remove ergot bodies and fragments. Screenings contain increased quantities of ergopeptine alkaloids if the grain is contaminated. The United States Department of Agriculture's tolerance levels for ergot contamination in grains is still based on the percentage, by weight, of ergot sclerotia in a given sample of grains. There are currently no tolerances for ergot contamination in the United States based on the total concentrations of various ergot alkaloids. The current USDA tolerance levels are 0.3% ergot sclerotia, by weight, in grain containing a significant amount of rye and 0.1% ergot sclerotia, by weight, for all other mixed grains.[12,13,14] In Canada, it is recommended that feed contain <0.1% ergot sclerotia, by weight, with the tolerances for various grades and classes of wheat ranging between 0.01% and 0.06% ergot sclerotia, by weight, in grains.[a,b]

Endnotes

[a]http://news.gc.ca/web/article-en.do?nid=850799
[b]http://www.agriculture.gov.sk.ca/ergot-of-cereal-grasses

Acknowledgement

The authors declare no conflict of interest.

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