

Forage-Related Cattle Disorders

Ergotism

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Ergotism and fescue toxicosis are clinically similar syndromes caused by consuming plants containing ergot alkaloids. The toxic effects and mechanisms of action are similar in both syndromes although the alkaloids are produced by different species of fungi. Ergot is a fungus that grows on the seed head of cereal grains and grasses. The term “ergot” is used in general as a common name for the *Claviceps* fungi or it may be used more specifically when referring to the ergot body of *Claviceps purpurea* when present on rye. These fungi parasitize the ovary of the developing grass flower and prevent development of the seed by sending fungal filaments throughout the tissue. From the tips of these fungal filaments, spores are formed and shed in drops of a sticky sweet matrix known as “honeydew.” Insects feed on the sticky droplets and spread fungal spores to additional grass heads. The filaments ultimately harden into structures which replace the grain or grass seed. This new, hard structure is called a “sclerotium” or “ergot body” and is the poisonous stage of the *Claviceps* life cycle for livestock. The ergot bodies are either harvested with the seed head or drop off and overwinter in the field to produce spores the following spring. *Claviceps purpurea* grows on rye, wheat, barley, triticale, oats, and various grasses. Rye and triticale are more susceptible than other grains because they require a longer period of pollination. Grasses potentially infected include tall fescue, bluegrass, brome, canarygrass, quackgrass, timothy, wild barley, and annual and perennial ryegrass. Shallow cultivation, no-till farming, and lack of crop rotation increase the likelihood of infection of crops. Environmental conditions of a cool, wet spring followed by hot early summer temperatures are ideal for the fungus to grow.



Figure 1. Ergot body in wheat.



Figure 2. Gangrenous ergotism: A sharp line of demarcation is evident between healthy and dead tissue on the hoof pictured on the right; the other hoof has “sloughed” or fallen off.

Cause

The ergot bodies (sclerotia) of *Claviceps purpurea* contain ergot alkaloids which are responsible for the toxic effects observed in livestock including gangrene of the extremities, hyperthermia, decreased performance and the possible (but not proven) reproductive effects of abortions and “agalactia,” or lack of milk production. The concentration of ergot alkaloids in *C. purpurea* sclerotia is highly variable and may range between 0-10,000 mg/kg (ppm). These alkaloids cause vasoconstriction or narrowing of small arteries which leads to poor blood supply (ischemia) and death (necrosis) of the farthest portions of the limbs (especially the hooves), tail, and ear tissues.

Signs

Initial clinical signs of ergotism can appear as pain and lameness (stamping the feet), with affected areas feeling cool to the touch. As the disease progresses, a sharp line of demarcation appears between healthy and dead tissue. Dry gangrene follows with the affected portion sloughing or falling off. This most often occurs in the hind feet with gangrene and sloughing of the hooves. During hot, humid weather, clinical signs include hyperthermia (elevated body temperature) and decreased feed intake. Pronounced depression in serum prolactin levels may cause a drop in milk production. Ergot alkaloids may have a direct oxytocin-like effect on the uterine muscle during the third trimester of pregnancy, possibly causing uterine contractions and increasing the risk of abortion, although this is not proven.

Treatment and Prevention

Removal of feedstuffs contaminated with ergot feeds is the only effective treatment. Providing good bedding for lame animals and antibiotics to control secondary infections may be necessary. Livestock with severe gangrene of the extremities may require euthanasia. Early signs of intoxication including pain and lameness are often reversible if removed from the contaminated source quickly. Sclerotia can be removed from grain by standard seed-cleaning techniques but screenings should not be used in feeds unless blended down with clean feedstuffs to a safe level. Dietary concentrations of 0.3 percent to 1 percent sclerotia have been associated with clinical signs of ergotism in cattle. Pasture clipping and grazing management that prevents seed head consumption will reduce the risk of toxicity.

Ergot is a common plant fungus that grows on the seed head of cereal grains and grasses. The disease is characterized by the formation of brownish black, rough structures, approximately two to four times the size of normal grain, called "sclerotia." At flowering, pink to golden sticky droplets appear on infected flowers. This sugary slime, called "honeydew," attracts flies and insects, which feed on it and spread conidia to healthy flowers. As the infected plants mature, sclerotia develop in place of kernels and form hardened fungal masses. These sclerotia germinate during the next sowing season and are spread by winds, rain, and insects to healthy flowers. Identify affected pastures or hay by inspecting the seed heads for dark brown, purple, or black bodies.



Figure 3. Honeydew stage of the ergot fungus.

Photo credits:

Figure 1. Vivek Gupta, CCS Haryana Agricultural University, Hisar, Haryana, India.

Figure 2. Dr. Steve Ensley and Dr. Grandt Dewell, Iowa State University.

Figure 3. Howard F. Schwartz, Colorado State University-Bugwood.org.

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Issued 4-2014