



Cattle Producer's Handbook

Animal Health Section

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Bacillary Hemoglobinuria (Redwater Disease) in Cattle

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Bacillary hemoglobinuria is an acute, sporadic, and infectious disease of cattle caused by *Clostridium novyi* type D, a soil-borne, anaerobic spore-forming bacterium. Synonyms for the disease include redwater disease and infectious hemoglobinuria. The disease occurs primarily in cattle, rarely in sheep and hogs, and has been reported most often in the western United States and sporadically in New Zealand, Australia, Great Britain, Mexico, and Canada.

Epidemiology

Bacillary hemoglobinuria poses a constant threat to susceptible cattle, particularly since the spore form of the organism is highly resistant and can survive in the external environment for many years. Bacillary hemoglobinuria is a waterborne disease and occurs most often in cattle that inhabit lowland pastures, intermountain meadows, and valleys, and in poorly drained irrigated lands where the soil and water pH is usually alkaline. It is rarely seen in dry upland ranges where cattle have little or no access to stagnant surface water.

Flood waters can carry the disease organisms from infected to previously noninfected areas. Also, some animals that have had mild attacks of the disease may serve as immune carriers and shed the organisms in the feces. Therefore, the disease is transmitted to susceptible cattle by ingestion of feces, meat and bones of carcasses, surface water, and soil that are contaminated with the disease organisms.

Susceptibility will vary somewhat, especially in herds where the disease is prevalent. Animals from these herds are often immune to the disease because of prolonged exposure to the organism or because of subclinical infection. In noncontaminated areas where cattle are suddenly exposed, the disease often affects animals 6 to 12 months of age. The disease usually occurs during the summer and early fall and less often during other seasons.

Clinical Signs

Clinical signs include rapid onset; sudden cessation of appetite, lactation, and rumen and bowel movements; shallow and labored breathing; elevated temperature (103° to 106°F); increased and weakened pulse; reluctance to move; and extreme physical weakness. Anemia is usually severe. Within 48 to 72 hours, animals will pass a characteristic dark red, clear, foamy urine and blood or bile-stained mucoid feces.

Pregnant cows may be sick for only 10 to 12 hours before they abort or die. Clinical signs may persist for 3 to 4 days before death in nonpregnant cows and in bulls and steers. The expected death rate in untreated sick animals is 95 percent.

The organisms that cause bacillary hemoglobinuria are believed to localize and remain dormant in the liver of cattle, then suddenly begin rapid growth after the liver has been damaged. Liver damage is most often attributed to the effects of liver flukes, although other causes such as abscesses, chemicals, plant toxins, and bacterial or viral infections have also been reported.

The rapidly growing organisms produce and release two potent exotoxins in infected animals — one that causes massive rupture of circulating red blood cells and the other that causes severe damage to liver tissue and blood vessels. At death, from 60 to 80 percent of the red blood cells are destroyed and the hemoglobin escapes through the damaged vessels, resulting in red discoloration of the urine, feces, and tissues of the major internal organs. Other postmortem lesions include an enlarged, discolored liver with necrotic areas, variable-sized hemorrhages in many of the major organs, rapid onset of rigor mortis, and a pungent, disagreeable carcass odor.

Diagnosis

Diagnosis of bacillary hemoglobinuria is based on the history, clinical signs, postmortem lesions, and by