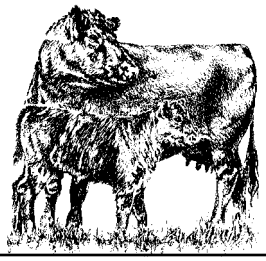

Western Beef Resource Committee *Fourth Edition*

Cattle Producer's Handbook

Animal Health Section 655

Bacillary Hemoglobinuria (Redwater Disease) in Cattle

David P. Olson, Professor and Pathologist
University of Idaho

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

laboratory methods including bacteriology, serology, and fluorescent antibody techniques. Other diseases that might be confused with bacillary hemoglobinuria include black disease, leptospirosis, other anemias, anthrax, and blackleg.

Because of the rapid onset and short clinical course of the disease, prompt treatment with large doses of antitoxin is essential. In addition, large doses of penicillin or broad-spectrum antibiotics should be injected at 12-hour intervals. Replacement fluid therapy is also helpful. Sick animals should be protected from inclement weather, rested, and given adequate feed and water. Handling and restraint of sick animals should be restricted to avoid the chance of sudden death from overexertion. Carcasses should either be burned or deeply buried to avoid spread of spore forms of the organisms to other cattle.

Prevention

Effective methods to prevent the disease in infected areas include vaccination of susceptible cattle and control of liver flukes. Commercial bacterins usually confer a protective immunity from infection for about 6 months. In areas where the disease occurs throughout the year, 2 to 3 vaccinations are required annually for all cattle older than 6 months. In areas where the disease occurs seasonally, a single injection of bacterin given to all cattle 6 months of age and older 3 to 4 weeks before they are turned out onto infected areas is usually sufficient. All cattle transported from a noninfected into an infected area must be vaccinated as soon after arrival as possible. Similarly, all cattle in contact with other cattle from infected areas should be vaccinated.

Research Needs

Research is needed to develop a vaccine that will confer a higher level of immunity for a longer period of time than is now available.

Liver fluke infection is apparently the most important aspect that predisposes the development of bacillary hemoglobinuria in cattle. More effective methods for treatment and prevention of liver fluke disease in cattle could also help reduce the incidence and severity of bacillary hemoglobinuria.

Issued in furtherance of cooperative extension work in agriculture and home economics, Acts of May 8 and June 30, 1914, by the Cooperative Extension Systems at the University of Arizona, University of California, Colorado State University, University of Hawaii, University of Idaho, Montana State University, University of Nevada/Reno, New Mexico State University, Oregon State University, Utah State University, Washington State University and University of Wyoming, and the U.S. Department of Agriculture cooperating. The Cooperative Extension System provides equal opportunity in education and employment on the basis of race, color, religion, national origin, gender, age, disability, or status as a Vietnam-era veteran, as required by state and federal laws.

Fourth edition; December 2016 Reprint