BOTULISM ASSOCIATED WITH HAY CROPS

Kenneth L. Thomazin, D.V.M.[1]

ABSTRACT

Recent outbreaks of botulism in the Central Valley of California resulted in the death of 580 cows on two dairies. These outbreaks were apparently caused by feeding old, poor quality hay in large bales which included parts of animal carcasses in total mixed rations. Clinical signs included difficulty in chewing and swallowing, inability to retract the tongue and close eyelids, general muscle weakness and inability to rise because of muscle paralysis. Affected cows did not respond to treatment and, those that stayed ambulatory, slowly recovered. Human health was not affected by these outbreaks.

BACKGROUND

Botulism occurs worldwide and is a rapidly fatal, motor paralysis which affects all species of animals. The bacteria that causes botulism proliferates in decomposing animal and plant materials. Grass eaters, such as cattle and horses, are the most susceptible animals. Animals such as dogs, cats, mice and chickens are less susceptible to the disease. Botulism in livestock is invariably fatal and can cause major economic losses for producers.

BOTULISM

Etiology: Botulism is caused by a neurotoxin produced by several types of the anaerobic, spore-forming bacterium, *Clostridium botulinum* and may affect humans and animals. Botulism is an intoxication, not an infection, and results from ingestion of the toxin in food. The usual sources of the toxin are decaying carcasses or vegetable materials, such as grass, hay, grain, and spoiled silage.

Clinical Signs: Signs of botulism are caused by progressive muscle paralysis and include drooling, weakness, disturbed vision, difficulty in chewing, and inability to swallow, urinate or rise. Signs may appear anywhere from one to fourteen days after exposure to the toxin, depending on the amount of toxin ingested. Affected cows initially appear to be an alert "downer" or have milk fever, but they do not respond to calcium therapy. Clinical signs may progress to paralysis of the diaphragm and suffocation leading to death.

Diagnosis: Diagnosis may be aided in cattle by checking the muscle tone of their tongue and eyelids. Affected cattle will have difficulty retracting their tongue and closing their eyelids. It is very difficult to find the toxin in animal tissues, body fluids or in the suspect feed. A diagnosis is usually made by eliminating other causes of paralysis or by feeding suspect material to susceptible animals, such as mice, and observing them for clinical signs or death.

---

[1] Chief, Animal Health Branch, Animal Health and Food Safety Services, California Department of Food and Agriculture, 1220 N Street, Room A107, Sacramento, California 95814

Treatment: Therapy and care for affected cattle are supportive and often not very rewarding. Botulism antitoxin has been used with varying amounts of success in cattle and is rarely used because of high cost and limited availability. Some therapeutic agents have been used with limited success.

Association with Hay: Two recent outbreaks of botulism in dairy cattle in the Central Valley of California have been linked to feeding contaminated hay:

> **1998** - A Modesto dairy experienced a rapid onset of botulism in several pens which resulted in the loss of 430 cows. A cat carcass was found on the top of a hay stack. Some of this hay was fed with a mixer wagon as part of a total mixed ration. Milk from the dairy was held immediately.
>
> **1999** - A Turlock dairy experienced a slow onset of botulism in the herd that lasted for two weeks. Three of four milk strings were affected and 150 cows died. Old, rain damaged hay fed as part of a total mixed ration was suspected, but the toxin was never found. Clinical signs were consistent with signs associated with botulism. The California Department of Food and Agriculture was not notified for one week after onset. Consequently, milk from the dairy was commingled with 700,000 pounds of butter, 3.5 million pounds of powder and placed in distribution channels. Some of the butter was distributed in multiple states. However, human health was not affected.

In both cases, old, rain damaged hay was added to total mixed rations, and carcasses or parts of animal carcasses, were found in the hay or mixed ration. Total mixed rations may increase the severity of an outbreak. Cattle may avoid a decaying carcass in loose hay. However, they cannot avoid ingesting the toxin when a contaminated carcass is thoroughly mixed in a total mixed ration and spread throughout the feed.

Prevention: Hay growers or dealers and livestock producers may be able to prevent or reduce the severity of botulism by implementing the following procedures:

> Remove any animal carcasses from hay before it is baled.
> Do not bale hay before it has completely cured.
> Store hay in barns or cover it with water repellant materials to prevent rain damage and decay.
> Examine hay, especially on the top of stacks, and remove any carcasses from the hay.
> Dispose of any bales that contain carcasses or have been contaminated by carcasses.
> Feed only high quality feedstuffs.
> Do not feed old, rain damaged hay or spoiled feed stuffs.
> Vaccines have been used in cattle with some degree of success in areas of the world where the disease is prevalent.
> Discuss botulism with a veterinarian to learn what to look for and what to do if he/she suspects the disease.