

## Botulism

**Other names:** Limberneck, Western duck sickness, bulbar paralysis, alkali disease.

**Cause, transmission, and epidemiology:** Botulism is a type of poisoning caused by ingestion of toxins of the bacterium *Clostridium botulinum*. In birds, botulism occurs frequently in captive pheasants and wild ducks and occasionally in chickens. Except for vultures, most birds are susceptible. Most outbreaks in birds occur in growers or mature birds. In ducks and other waterfowl occurrence is related to shallow water conditions in lakes with alkaline water and much decaying vegetation.

Botulism is caused by ingestion of the preformed toxins of *C. botulinum* in feeds, foods, dead poultry or toxin-containing maggots. The toxin is extremely potent. The minimum lethal dose (MLD) for guinea pigs is 0.00012mg/kg subcutaneously (MLD for cobra venom is 0.002mg/kg). The toxin is relatively heat stable. Of the 8 types of *C. botulinum*, Type C is the most common in poultry outbreaks.

*C. botulinum* is ubiquitous in nature and commonly present in feeds. When ideal conditions for growth occur, large amounts of exotoxin may be formed. If adequate toxin is consumed, botulism will develop. Improperly sterilized canned fruits and vegetables, spoiled animal feed, and decaying poultry carcasses can contain enough exotoxin to be highly lethal, even taken in small amounts.

It is speculated that wild waterfowl contract botulism as follows: the toxin may be consumed in decaying vegetation or dead fish in shallow, alkaline lakes as they dry up or are created by irrigation during the summer. Alternatively, it may be that the toxin is in larvae or crustaceans in the vegetation. Invertebrates killed by the anaerobic conditions contain toxin from growth of *C. botulinum* within them and may be consumed by some waterfowl.

Ducks that die from various causes may be invaded after death by *C. botulinum* type C normally present in their intestines. Toxins are formed in the carcasses. Ducks that feed on bits of the carcasses or on maggots from the carcasses may be poisoned. There is no spread from bird to bird.

**Clinical signs and lesions:** Signs appear within a few hours to a few days. In chickens signs include drowsiness, weakness, and progressive loss of control of the legs, wings, and neck. Paresis soon progresses to paralysis, and the recumbent bird closes its eyes and appears to be in deep coma. Fine tremors of muscles and feathers occur in some birds. Death may occur shortly or may be delayed for a few hours. Most visibly affected birds die.

There are no gross lesions. A few birds might show mild enteritis. The crop may show putrid ingesta or maggots, but is usually empty.

**Differential diagnosis:** Botulism should be differentiated from psuedobotulism (transient paralysis), which is a transient manifestation of Marek's disease.

**Diagnosis:** Saline gizzard or intestinal washings or blood serum from an affected bird can be tested for toxicity. Either can be injected into mice that have been inoculated with protective antiserum and into mice without antiserum. Results should clarify diagnosis.

**Treatment:** Remove spoiled feed or decaying matter. Flush the flock with Epsom salts (1 lb/1000 hens) in water or in wet mash. It has been reported that potassium permanganate (1:3000) in the drinking water is helpful. Affected birds can be treated with botulism antitoxin injections. Treatment of flocks with sodium selenite and vitamin A, D, and E or antibiotics has been reported to reduce mortality.

**Prevention:** The disease can be avoided by preventing access of poultry to any source of toxin. Sick and dead birds should be picked up and incinerated regularly and frequently because they are a common source of toxin. Control flies, and replace suspected feed.

**Recovery:** Cases will re-occur if the conditions under which botulinum toxin is formed remain on the farm. If, however, the cause of the contamination is corrected and/or the source removed, there is no residual risk of botulism although the *C. botulinum* organism will remain.