

AVIAN BOTULISM

How Can You Prevent Botulism Epidemics?

Remove and dispose of dead birds and other carcasses immediately to slow further spread of the disease.

- Stabilize water levels
- Prevent seasonal flooding and water draw downs
- Control flies and insect breeding

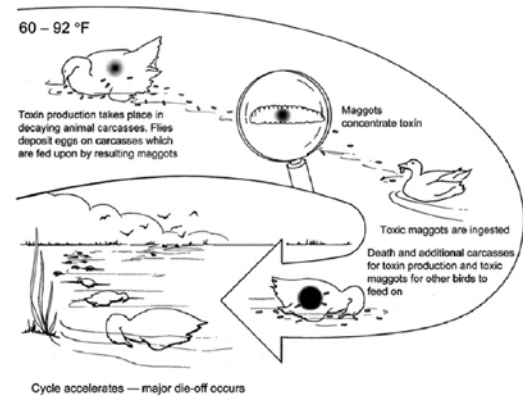
Control exotic Muscovy duck populations

- Locate nests and vigorously shake the eggs to make them inviable to control flock size. Return the shaken eggs to the nest so that the hen will continue to attempt to incubate them instead of re-nesting.
- Another method is to remove viable eggs from the nest and replace with plastic eggs to keep the hen occupied with incubating and hatching these instead of re-nesting and laying another round of eggs.

These methods are only legal for Muscovy ducks as they are a non-native exotic species, not for Mallard ducks or other native bird species.

Also Known as Limberneck Disease: Its Causes, Symptoms and Prevention

Avian Botulism is a paralytic, often fatal disease of wild and domestic birds resulting from the ingestion of a toxin produced by the bacterium *Clostridium*. Environmental studies have found seven toxins produced by botulinum bacterium; two of which, Types C & E, commonly cause mortality. Type C toxin occurs in the western United States and Canada. It is a recurring problem, known to affect all waterfowl, including geese and swans. Since pelicans, gulls, shorebirds, raptors, and upland birds are also susceptible, this places Florida birds at high risk. Understanding the etiology and occurrence of this disease will aid in the early detection and prevention of bird die-off. While the source of the poisoning is believed to be well known, ways of effectively controlling botulism outbreaks still remain uncertain.



Outbreaks of *C. botulinum* can be found in wetlands and lakes and often exists in a spore form that is resistant to heat and drying. The "disease environment" is typical of Florida's warm water lakes and canals especially during the hot months from May through October. In some instances the bacteria may remain viable for years. Bacteria spores are present in the organic soils and can withstand severe adverse climates. The vegetative form requires dead organic matter and anaerobic conditions to grow and produce the toxin. During the decomposition of dead animals and fish, the spores germinate as bacteria that then release botulism toxins.

Important environmental factors common to Florida that contribute to the initiation of Avian botulism outbreaks include, low and fluctuating water levels; the presence of vertebrate carcasses, rotting vegetation and high ambient temperatures. The decomposition of the rotting fish, birds and other carcasses produce an environment suitable for toxin production. Especially potent toxin is produced in bird and mammal carcasses since these substrates provide large amounts of protein for toxin production. In addition, the presence of vertebrate carcasses and elevated temperatures are conducive to the build-up of fly populations. The flies provide eggs required in the bird-maggot cycle for the propagation of Avian Botulism.





THE AVIAN BOTULISM CYCLE

As human development has expanded and encroached on wetlands, more and more waterfowl have been forced into less and less habitat. The resulting crowding can promote the spread of infectious diseases. Unfortunately, the number of waterfowl diseases as well as disease breeding conditions are on the increase. All wildlife disease outbreaks consist of 3 main parts: (1) a susceptible animal population (2) a disease agent (3) environmental conditions that facilitate the disease transmission. This results in healthy, sick and dead birds being found together during a botulism outbreak. As the dead birds decompose they become host for maggots that carry the toxin. New birds arriving to the area feed on the maggots that have developed on the dead birds. The new birds are then affected with the toxin and a new botulism cycle begins. This method of transfer affects a wide variety of bird species.

Avian Botulism affects the peripheral nerves of the bird and results in paralysis of the voluntary muscles. This results in an inability of the bird to sustain flight that is observed in the early stages of botulism. Once this has occurred, birds suffering from botulism are commonly observed propelling themselves across the water with just their wings. The next effect to occur is paralysis of the inner eyelid membrane followed by paralysis of the neck muscles. This results in an inability of the bird to hold its head erect causing "limp neck". Loss of flight and limp neck is the most recognizable signs of Avian Botulism. Once birds reach this stage, death from drowning often occurs before they reach the next stage or respiratory failure.

In dealing with Avian Botulism, emphasis should be placed on early detection and prevention, rather than on treatment of poisoned birds. With increased awareness and prompt action, the loss of bird populations will be avoided.

A concern for homeowners may be whether humans can acquire this disease. Avian Botulism is caused by C or E type toxin while people are susceptible to type A or B toxin. People, dogs & cats are generally resistant to type C toxin, but there have been a few



* Botulism: acute food poisoning caused by botulin in food

** Bacterium: a class of microscopic plants living in soil, water, organic matter or the bodies of plants and animals

*** Botulinum: A spore forming bacterium that secretes the toxin botulin

† Etiology: A science concerned with the cause and origins of diseases

‡ Spores: A durable reproductive body produced by plants and other organisms

SOURCES: Milton E. Kennelly J. National Wildlife Laboratory • National Park Service • Fish and Wildlife Services • Department of the Interior • IFAS-University of Florida National Wildlife Health Research Center