Pennsylvania Game Commission Wildlife Disease Reference Library

Aspergillosis

Cause

Aspergillosis is an infectious disease of birds and mammals caused by inhalation of the spores of fungi in the *Aspergillus* group. While this disease can affect wild mammals, it is more common in birds, so birds will be the main focus of this disease description. The *Aspergillus* genus was first described in 1729, and it was first recognized to cause disease in wild birds in the early 1800's.

Significance

Aspergillus fungi are everywhere in the environment and can cause disease in wild and domestic animals, as well as humans. However, the disease is not contagious, meaning it cannot be transmitted from animal to animal nor can it be transmitted from infected animals to humans. Most human cases of aspergillosis occur in those who have some deficiency of their immune system (children, the elderly, those taking immune suppressing drugs, and those with diseases that suppress their immune function). The same is true for birds. For example, lead toxicity which suppresses the immune system can predispose Bald Eagles (and other species) to aspergillosis. Outbreaks of aspergillosis in wild birds may be associated with outbreaks in domestic birds if they have access to a common source of the fungus.

In wild populations, outbreaks of aspergillosis can result in high mortality. Hunters should not consume birds with this disease because although the disease cannot be transmitted by eating the meat of an infected bird, hunters can be exposed by inhalation of spores from carcasses. Aspergillosis can also be a problem in wild birds that are kept in captivity.

Species Affected

All species of birds (wild and domestic) are considered susceptible to aspergillosis, although the majority of reported cases occur in waterfowl, raptors, and gulls. Many species of wild mammals have been reported with this disease, but the cases are sporadic so it is not a major concern.

Distribution

Aspergillus fungi are found worldwide, except Antarctica, and is diagnosed frequently in a variety of avian species in Pennsylvania. Its habitat is soil and decaying plant and animal material.

Transmission

Aspergillosis is primarily transmitted via inhalation of fungal spores. Normal, healthy birds and mammals can inhale a certain number of spores without becoming ill. For example, studies show that day old chicks must inhale about 6 million spores to become fatally sick, while adult birds must inhale 17 million spores to produce fatal illness. Some more susceptible species may require a lower dose to produce fatal illness. Oral ingestion of spores is unlikely to cause serious disease, but aspergillosis can be transmitted when spores are introduced to the body in puncture wounds. *Aspergillus* spores are capable of penetrating eggshells and can result in embryonic death or hatching of infected chicks.

Outbreaks are more likely to occur when populations that flock together in high densities are exposed to a common source of *Aspergillus*. Sporadic cases of individuals with aspergillosis also occur in the wild, but are more likely to go unnoticed. Most outbreaks in waterfowl occur in the fall and early winter. All birds are more susceptible to aspergillosis in times of stress or reduced immune function. For example, birds that are malnourished, oiled, captured and placed in captivity, or suffering from another disease condition are more likely to develop clinical aspergillosis.

Clinical Signs

Aspergillosis can cause acute or chronic illness. Birds that are acutely infected will die quickly from respiratory distress. These birds may exhibit lethargy, dehydration, loss of appetite, diarrhea, and may be gasping for breath before they die. Some birds may be found dead without observation of clinical signs. Acute infections are more common in younger birds, while older birds are more prone to chronic, slowly progressive disease. Chronically infected birds may exhibit loss of body condition, lethargy, difficulty flying and breathing, vomiting, and diarrhea. They may also show signs of neurological disease.

Photograph courtesy of the Michigan Department of Natural Resources

Many organ systems can be affected, but aspergillosis usually targets the respiratory system. At necropsy, chronically infected birds will have cheese-like yellow or white plaques or nodules in their lungs and air sacs.

They may also have fungus growing on respiratory tissues that resembles bread mold. Acutely infected birds are more likely to have firm, dark red lungs with small yellow nodules scattered throughout.

Diagnosis

Several laboratory tests can be used to identify the *Aspergillus* fungus.

Treatment

Treatment of aspergillosis is often not effective, but anti-fungal drugs can be used to treat captive domestic or wild birds. Treatment of free-ranging wild birds is not feasible.

Management/Prevention

Aspergillus occurs naturally in soil everywhere, so it cannot be eliminated from the environment. However, wild bird populations often experience aspergillosis outbreaks as a result of discarded moldy grain, rice, or corn from agricultural areas. Such sources of moldy agricultural waste should be removed. Bird feeders can also be a potential source of aspergillosis exposure for wild birds, so it is important to ensure that seed in feeders is fresh and free of mold. People working with dense colonies of wild or domestic birds should wear facemasks especially in the presence of wet feed, litter, or feces. People should also wear facemasks when conducting necropsies of birds and aspergillosis is suspected.

Suggested Reading

Aspergillosis. 2011. The Merck Veterinary Manual. <http://www.merckvetmanual.com/mvm/index.jsp?cfile=htm/bc/51102.htm>.

Aspergillosis. Pages 129- 134 *in* M. Friend, and J. C. Franson, technical editors. Field Manual of Wildlife Diseases: Birds. United States Geological Survey.

Converse, K. A. 2007. Aspergillosis. Pages 360-374 *in* N. J. Thomas, D. B. Hunter, and C. T. Atkinson, editors. Infectious disease of wild birds. Blackwell Publishing, Ames, Iowa, USA.

Michigan Department of Natural Resources. Wildlife Disease. Aspergillosis. <http://www.michigan.gov/dnr/0,1607,7-153-10370_12150_12220-26360--,00.html>.