

ASPERGILLOSIS IN POULTRY

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Infections caused by fungi (molds) are relatively sporadic, but important diseases of poultry and most other species of birds.

By far the most common fungal infection in birds is known as "aspergillosis," which is caused by the mold species *Aspergillus Fumigatus*. Birds appear to be much more susceptible to fungal infections than mammals, probably due to differences in their respiratory and immune systems as well as the unique features of their propagation and housing.

The following are common questions and answers pertaining to aspergillosis in poultry.

• What kind of poultry are affected? Chickens, turkeys and ducks can all be affected, although chickens seem to be the most resistant of the three. Very young birds (less than three weeks of age) are most often affected, but older market turkeys and turkey breeders also tend to develop clinical aspergillosis. As with other respiratory infections, males tend to react more severely than females, which is due to the stress of their faster growth and heavier muscle mass.

• How do birds get infected with *Aspergillus*? Inhalation of large numbers of mold spores appears to be the primary route of exposure. Spores are the propagative stage of the mold and can be likened to small, round microscopic "seeds," each capable of producing new mold growth if "landing" on material or tissue that can support its growth. Moldy litter, grain, feed, dust and contaminated eggs and hatchery equipment are the common sources of the mold. Shavings from hard wood tend to support the growth of *A. Fumigatus* better than those from soft wood (pines).

• What environmental conditions favor the growth of *Aspergillus Fumigatus* in the hatchery and poultry house? Many of the conditions that favor growth of other microorganisms such as bacteria are also good for fungus. *Aspergillus Fumigatus* prefers a relatively humid, warm environment, abundant oxygen and plant-based substrates (wood shavings, feed). In the poultry house, litter and spilled, moist feed are excellent substrates. Although the pelleting process destroys most mold present in feed or feed ingredients, fungal spores can recontaminate the finished feed, particularly if it becomes wet. Fungus can then grow and spread rapidly. Unfortunately, *A. Fumigatus* can also grow inside of eggs that may have been contaminated from the environment in the breeder house. Egg incubation

temperatures and humidity are very favorable for growth of the mold. If these eggs are broken in the hatchery, millions of spores can contaminate the immediate surroundings and newly hatched chicks will likely develop severe aspergillosis.

• What kind of clinical signs are seen in infected birds? Because the fungus primarily affects the respiratory tract, most signs are related to that system. Labored, rapid breathing and gasping with outstretched necks are common symptoms. Decreased activity, increased thirst and stunted growth are additional symptoms. Ascites may develop in meat type birds secondary to lung damage. Less frequently, *Aspergillus Fumigatus* can infect the eye or brain, causing eye swelling and neurologic signs. Total mortality during a flock infection is generally less than 10 percent, but can be as high as 50 percent in complicated cases. The onset of clinical signs is often noticed from one to three weeks of age. Hence, aspergillosis is sometimes called "brooder pneumonia."

• What internal lesions are seen in affected birds? In very young birds, small, yellow caseous nodules or disks can be found in the lungs, adjacent air sacs, and occasionally in the trachea or bronchi where they obstruct air flow into the lungs. Older growing or mature turkeys often have extensive plaques of yellow material in the air sac walls. Occasionally in the air sacs actual blue-green/gray "fuzzy" mold can be seen. In the ocular form, caseous nodules are present in the conjunctival sac in the inside corner of the eye or elsewhere under the eyelids. In the nervous form, portions of the brain contain yellow or red discoloration.

• How is the disease diagnosed?

Clinical signs and lesions described above are good clues in identifying the infection. However, the lesions can resemble those caused by certain bacterial diseases (*E. coli* infections, pullorum disease, etc.), and further testing at a diagnostic laboratory may be necessary to confirm the fungal infection. Fungal cultures and microscopic examination of affected tissues are two common laboratory test methods that are relatively rapid for confirmation of aspergillosis.

• How can aspergillosis be treated? Unfortunately, there is no direct medication against this fungal infection that can be mass-applied. Antibiotics have no effect, except if a concurrent bacterial infection is present. Severely affected birds should be culled, and ventilation should be optimized to decrease ammonia and dust. In pet birds and expensive zoological species of birds, aggressive therapy with injectable, oral, or nebulized antifungal medications can be effective. This is sometimes coupled with surgery to remove obstructive fungal masses from the upper respiratory airways.

• What are some management practices that help prevent aspergillosis? In the breeder house, any techniques employed to ensure clean hatching eggs (clean, dry nests, frequent egg collection, low house humidity) and good shell strength will help keep down fun-

gal contamination. Egg storage facilities should be clean and surfaces dry. Care should be taken during transport of eggs to minimize cracks and breakage. In the hatchery, setting only clean, intact hatching eggs is extremely important. Strict hatchery sanitation procedures including the use of disinfectants and fumigants with known antifungal activity are necessary to decrease numbers of fungal organisms invariably present in the environment.

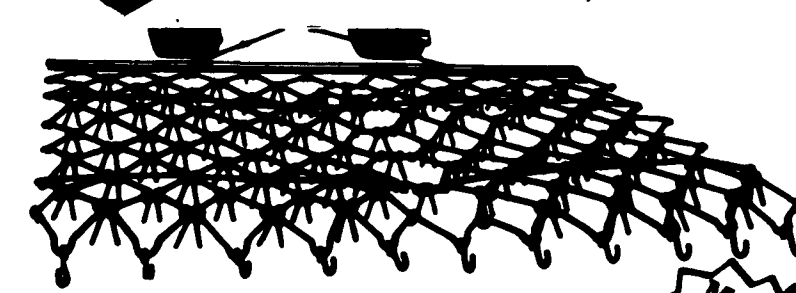
Most hatcheries routinely monitor for fungus and bacteria in the incubators and hatchers. In the poultry house, control measures include thorough cleaning, anti-fungal disinfection and complete drying of the house between flocks, particularly in the brooding areas; use of high quality, clean, dry soft wood shavings as litter; thorough cleaning, disinfection and drying of feed handling equipment (bins, augers, pans); preventing any wet areas caused by water leakage from water lines, drinkers, etc.; optimizing ventilation to decrease relative humidity and remove dust and gasses; and avoiding overcrowding of birds.

As in many poultry diseases, a variety of factors may predispose the onset of aspergillosis. Strict attention to sanitation and eliminating favorable conditions for fungal growth both in the hatchery and at the farm are keys to reducing the risk of aspergillosis in your poultry flocks.

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