

Emerging and Reemerging Diseases of Avian Wildlife

Susan J. Pello, VMD, MS^{a,*}, Glenn H. Olsen, DVM, MS, PhD^b

KEYWORDS

- Aspergillosis • Avian influenza • Emerging diseases • Inclusion body disease
- Poxvirus • Wellfleet Bay virus • West Nile virus

KEY POINTS

- Several new and emerging diseases such as inclusion body disease of cranes and Wellfleet Bay virus are documented only in one species or group of species.
- Some established diseases have taken a new focus as more is learned about genomics.
- Some established diseases found in other parts of the world have the potential for deadly spread to North American wildlife populations, such as occurred with West Nile virus, and could occur with inclusion body disease or Old-World strains of avian influenza.
- New techniques in genomics, treatment, reporting of wildlife disease, and wildlife tracking, such as miniature satellite transmitters, are increasing our knowledge of how these diseases act and spread.

ASPERGILLOSIS

Introduction

There are 4 fungal genera: *Aspergillus*, *Fusarium*, *Penicillium*, and *Claviceps*. Aspergillosis, as the name implies, is caused by fungi in the genus *Aspergillus*. *A flavus* and *A fumigatus* commonly affect avian species, specifically raptors, and have been described in captive and wild bird species.¹ Mycotoxins are poisonous secondary metabolites produced by fungi including species of *Aspergillus* and *Fusarium* (**Fig. 1**). Aflatoxins, produced by *A flavus*, are a group of compounds that act as biosynthetic inhibitors, which can cause liver impairment.²

Etiology

Aspergillus fungi are ubiquitous and found in the soil, whereas the fungal organisms causing aflatoxicosis are often linked to corn, cereal, oil seeds, feeds, grains, peanuts, and decomposing vegetables.²⁻⁴ Common species of this genus that cause aspergillosis are *A fumigatus*, *A niger*, *A glaucus*, *A nidulans*, and *A flavus*.^{5,6} *A fumigatus* is the

^a Animal & Bird Health Care Center, Cherry Hill, NJ 08003, USA; ^b USGS Patuxent Wildlife Research Center, 12302 Beech Forest Road, Laurel, MD 20708, USA

* Corresponding author.

E-mail address: PelloVMD@gmail.com

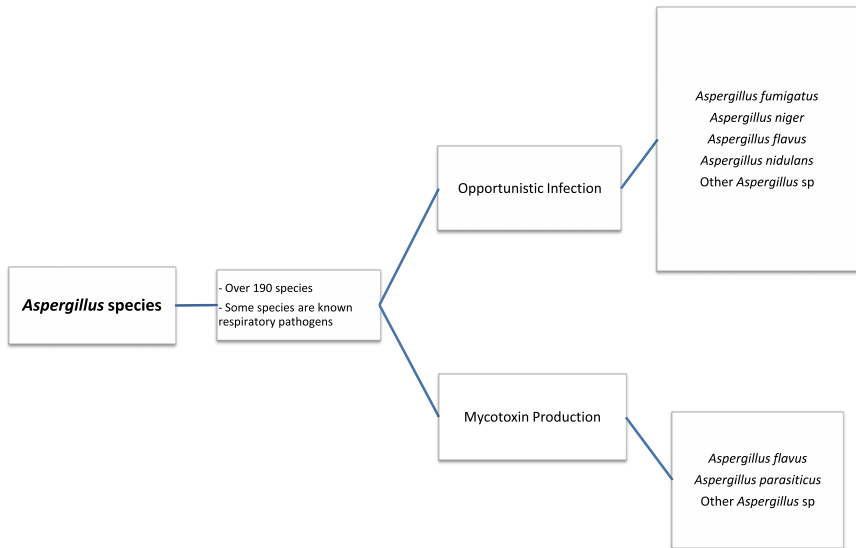


Fig. 1. Overview of *Aspergillus* species.

most pathogenic species to affect wild birds and poultry, which may be attributed to the fact that the spores, also known as conidia, are much smaller than other species of aspergillosis.⁵ *A fumigatus* conidia are 2 to 3 μm in diameter, which is small enough to reach the air capillaries of even a songbird (3 μm).⁷ Aspergillosis is primarily an infection of the respiratory tract caused by inhalation of spores. However, aspergillosis has also been isolated from the skin, gastrointestinal tract, central nervous system (CNS), bone, and eye.^{2,8}

A fumigatus, a saprophytic fungus, has an essential role in recycling carbon and nitrogen in the soil, specifically organic debris.⁸ Culture identification of *A fumigatus* is based on conidia and conidiophore morphology (Fig. 2). The organism is characterized by septate hyphae and asexual fruiting structures that are produced on conidiophores. The conidiophore is produced from the vegetative mycelium and consists of hyphal branches originating from a foot cell. The asexual reproductive units, conidia, arise on flask-shaped phialides on the vesicle of the hyphal foot cell and are produced in chains basipetally.⁹ These conidia may be greenish in color or white, and can measure 6 to 8 by 2 to 3 μm in size.⁸ The color of *Aspergillus*, depending on the species, varies from blue-green, brown, black, to yellow. *A fumigatus* grows within 5 days on Sabouraud dextrose agar, and is velvety or granular with bluish-green color and narrow white peripheries. *A flavus* colonies have a fluffy texture and are yellowish-green in color.¹⁰

Predilection

Factors that may predispose a bird to mycosis infection include immunosuppression, recent vaccination, concurrent viral infection, parasitism, babesiosis,¹¹ lymphoproliferative disorders, starvation, hypovitaminosis A, and overcrowding. Some factors that may increase spore concentration in the environment include poor environmental ventilation, poor sanitation, elevated humidity and temperature, and long-term storage of feed.⁵

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