

# ASPERGILLOSIS

## PART ONE - THE SCIENCE

There are several diseases of parrots that cause headaches and heartaches to veterinarians and parrot keepers, for a number of reasons. These include - difficulties in precise diagnosis, prolonged or expensive treatment, long incubation periods making control and epidemiology uncertain, an often fatal outcome, or all of these factors. Examples of such insidious and often incurable diseases are psittacosis, psittacine beak & feather disease (PBFD), avian bornavirus (ABV or proventricular dilatation disease), and aspergillosis.

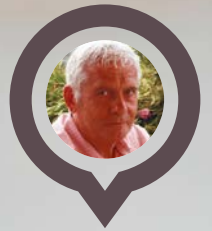
The last of these is caused by the ubiquitous fungus known as *Aspergillus*, the sort of organism that grows on rotting fruit. Its spores are ever-present in the air we all breathe, but especially so in damp, poorly ventilated conditions. In healthy individuals, small numbers of inhaled spores are eliminated by protective white blood cells in the body. Active infection can arise when massive quantities of spores are inhaled, such as when mould grows on food or droppings left around the bird, or if a parrot cracks open an infected stale nut. [This fungus grows commonly inside the shells of peanuts (monkey nuts), so any such nuts fed to parrots should be



baked first] Alternatively, the fungus will gain a hold if the animal's immune system is weakened by malnutrition (poor diet), stress, irritation by inhaled fumes (eg cigarette smoke), or virus infection. Such infection is found in human patients weakened by cancer, HIV, or immune-suppressive drugs; while cases in young

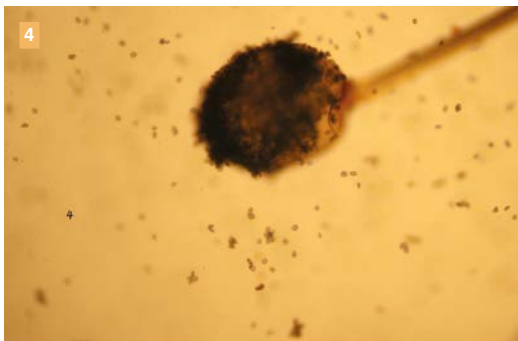


1: Grey and black mould growing on peaches  
2: Black mould filaments growing on wet paper. Each filament bears a round sporophore at its tip



BY ALAN JONES

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- 3: Close up of black filaments and sporophores growing from network of white fungal hyphae in culture
- 4: Microscope view of a fungal sporophore, releasing hundreds of individual spores
- 5: Opened peanut shell showing black mould growth within
- 6: Post-mortem specimen, showing the trachea opened lengthwise, with a fungal granuloma (yellow, irregular mass in the centre of the picture) blocking the airway.

African grey parrots (a common finding) are almost always due to underlying PBFV virus infection. In my clinical experience, African grey parrots, macaws and cockatoos were the parrots most frequently infected, but this may simply be a reflection of their popularity compared with other psittacine species.

Inhaled spores settle and grow inside the bird's respiratory system at three possible sites. The first danger point is at the division of the **trachea** (windpipe) at the **syrix**, the second is in the lungs, and the third in the avian air sac system. This unique facet of birds' respiratory systems is very susceptible to inhaled particles or gases. Once established, the fungus causes disease in two ways. Firstly, the physical

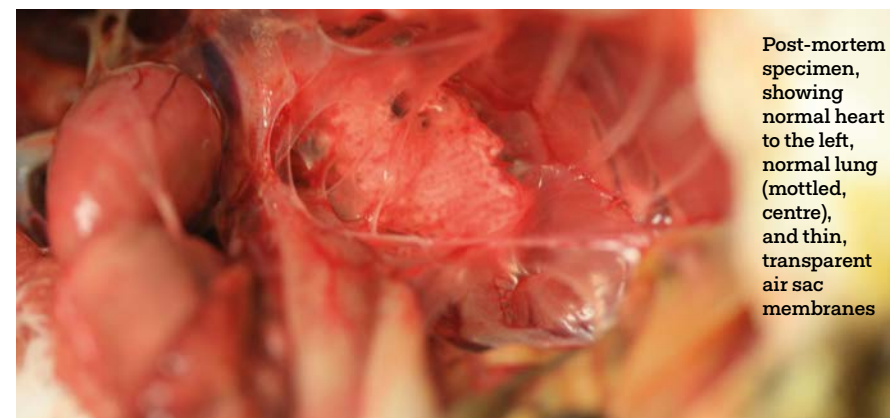
presence of the mould growth will affect the bird's breathing. Plaques developing in the trachea or syrinx will quickly cause an acute, choking problem, while those in the lungs will lead to pneumonia. Air sac infection is the most insidious, with slowly developing signs of breathing difficulty, accompanied by weight loss and general lethargy. Meanwhile the fungus is having its secondary effect by releasing a toxin into the blood stream that attacks the liver, ultimately causing death by toxic hepatitis. [A toxin is also released into peanuts when infected. Known as **aflatoxin**, it can also quickly kill parrots that eat contaminated nuts, but that is a separate issue].

Whatever its manifestation, a case of Aspergillosis always carries a poor

prognosis. The acute tracheal form usually presents with a distinctive change of voice and loss of appetite, with gurgling or choking as the disease progresses. Such cases require emergency anaesthesia and examination with an endoscope (in itself a risky procedure to the bird) to identify the **granuloma**, and if necessary, attempt to remove the obstruction. This will be followed by prolonged anti-fungal medication, which will be detailed shortly. Infection in the lungs will result in **pneumonia**, with general signs of illness and depressed appetite, with difficulty breathing (neck extended, beak open) and gurgling or wheezing. The mould growth may be the primary cause, or it may be secondary to bacterial or viral infections. Multiple small fungal colonies are generally found throughout the lung tissue. If mould spores pass through the upper respiratory system and lungs without causing problems, they will settle in the air sacs. Here, the mould will grow, causing localised inflammation, which can

show as breathing difficulties (**dyspnoea**), but may initially be overcome by the bird's immune system, and encapsulated in a **granuloma**. However, the fungus will continue to grow within the granuloma, which also enlarges, causing pressure on other organs and reduced air sac capacity. These more chronic forms of the disease are difficult to cure because the infection is often well established by the time the bird shows any signs of illness. By this time the damage to respiratory system and liver is done. The thick fibrous capsule of the granuloma prevents any medication successfully reaching its target.

**Diagnosis** will depend on the examination and clinical signs of the bird, and endoscopy and/or radiography to reveal lesions in the patient. Other possibilities such as bacterial or viral infections, or tumours, need to be considered, and may in any case co-exist, with the Aspergillosis often being a secondary factor – as previously mentioned, in the case of young grey

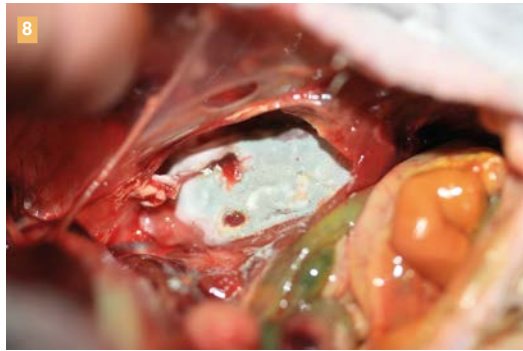


Post-mortem specimen, showing normal heart to the left, normal lung (mottled, centre), and thin, transparent air sac membranes





7: Lungs from a Blue-fronted Amazon parrot, showing multiple granulomata. Histological examination identified these as fungal in origin, rather than tumours or avian tuberculosis.



8: Post-mortem specimen, showing blue/grey fungal growth in air sac.

parrots with Pbfd infection. Blood samples always reveal a massive increase of white cell count to three or four times the normal level.

**Treatment** will involve both specific anti-fungal medication and improvement of diet and environment. Ventilation and dusty or damp conditions must be improved. Air filters or purifiers may be helpful. A good quality balanced diet must be provided, with fresh fruits and vegetables. Parrots on a dry seed mix, high in sunflower seeds and peanuts, are especially vulnerable. Vitamin A supplementation – either naturally in corn, carrots, dark greens, oranges, squashes – or with proprietary avian-specific supplements, will assist healing and repair of damaged respiratory membranes.

**Stress** factors such as over-crowding or aggression, as well as extremes of environmental temperature, should also be addressed.

The slow development of active infection and continued environmental exposure to the spores, coupled with the

difficulty of targeting the organism with appropriate anti-fungal drugs, requires prolonged periods of medication. This in itself becomes stressful on both patient and carer, as these drugs require dosing orally twice or three times daily for many months. The drugs used to treat this infection are expensive, and in themselves have toxic side effects (especially in African grey parrots). Thus – assuming the patient survives the initial stages of the disease – many will still succumb to the chronic inflammatory damage or toxicity, or to the stress and difficulty of prolonged handling and medicating. In some cases, large granulomata in the air sacs may be removed, as can those in the syrinx, but such surgery is risky, and infections often recur.

At the time of writing, several anti-fungal drugs are available.

**Itraconazole** ('Sporanox') is now losing favour, and is not advised for use in African grey parrots, because of several reported cases of adverse reactions (even death) in this species. Medication must be given for

as long as 9 – 12 months in chronic cases.

**Voriconazole** ('V-fend') is preferable and safer, and is thought to be effective in as little as 4 months. Tablets are crushed in suspension in water, and given at the rate of 15 mg/Kg bodyweight by syringe, twice a day. Absorbent foods like biscuit or toast, or liquid forms like baby food, may be a way of disguising the drug, but if patients have reduced appetite, or detect the taste of the medicine, they will refuse it, and then the only alternative is to forcibly dose with syringe and crop tube. This, I repeat, is stressful to bird and handler.

**Terbinafine** ('Lamisil') is usually administered by nebulisation. This involves again crushing tablets in sterile water, and placing a measured dose in the reservoir of a nebuliser. Dose rate is again 15mg/Kg. The machine blows air through the solution, carrying a fine mist of the drug out of its nozzle, and into a confined container in which the bird is placed. A pet carrier or small cage covered with a plastic bag,

towel or blanket is ideal, but this procedure requires carrying out for 20-30 minutes, three times daily, again for many weeks.

All this will demonstrate why aspergillosis is such a distressing and disappointing condition to treat, for veterinarian and owner alike. Onset may be acute and serious, or vague and insidious. Diagnosis is risky, when anaesthesia and endoscopy are involved, and may be inconclusive. Treatment to complete cure is expensive, prolonged, and requires great commitment in terms of time, expertise and dedication from the owner, and major stress to the patient.

In the second part of this article, I shall focus more on the emotional and personal side of this devastating disease.

**Information condensed from:**

- *Keeping parrots – Understanding their care & breeding* (2011) Alan K Jones. Crowood Press
- *BSAVA Manual of Avian Practice* (2018) BSAVA Publications
- *Handbook of Avian Medicine* (2<sup>nd</sup> Edition) (2009) Saunders Elsevier



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