An unusual eyesore

By Karen Bailey

A rare case of conjunctivitis in a rooster could have significance for some dogs.

FIGURE 1: Eye of rooster showing swollen tissues.

A seven-year-old rooster, who was a resident at an animal rescue centre, developed a swelling around his right eye. The swelling involved the conjunctiva and tissues around the orbit. A veterinarian aspirated 1ml of clear fluid from the lesion after it had been present for approximately two weeks. The lesion failed to resolve with antibiotic and anti-inflammatory treatments, and four weeks after the initial drainage (six weeks after the swelling was first noticed) the bird was presented again. After sedation, the eye was carefully examined (Figure 1). A firm, bumpy swelling in the lower eyelid was aspirated with a fine needle (FNA) and four smears were made for cytological examination. Additionally, a few drops of thick yellowish fluid were obtained from aspiration of the conjunctival region and four smears made from this fluid were submitted for cytological examination.

Cytology

Eight smears were received at the laboratory and stained for cytological examination. The four smears made from the thick fluid aspirated from the conjunctival region had abundant material on them. There was a dense background matrix that was mostly eosinophilic and slightly foamy but with frequent clumps of amorphous basophilic material interpreted as mucin. There was also mild background haemorrhage and a mildly increased population of variably preserved mixed leucocytes, mostly heterophils, consistent with mild local inflammation. Small numbers of macrophages were also noted, along with scant exogenous debris.

The four smears from the FNA of the bumpy lower eyelid swelling were variably cellular, with two being almost acellular and a third having only scant material. However, the fourth smear was moderately cellular with occasional variably sized, densely packed aggregates of mildly pleomorphic spindle cells, mixed inflammatory cells and large vacuolated macrophages. Rare negative-staining rod-shaped structures consistent with non-staining bacilli were seen on careful examination, raising concern for mycobacterial infection.

Subsequent staining with Ziehl Neelson (ZN) stain revealed a low number of acid-fast bacilli with a beaded appearance (Figure 2), confirming a diagnosis of *Mycobacterium sp.* infection (mycobacteriosis).

Results

The most likely cause was an organism belonging to the *Mycobacterium avium* complex (MAC). However, the type of bacteria could not be definitively determined without further investigation. As some mycobacterial species are zoonotic risks to humans, this case was concerning as the bird had been in close contact with humans on the property. There was also a consideration of possible transmission to other birds and animals on the property.

That said, the most compelling concern was for the bird's welfare, as any attempted treatment was likely to be prolonged. It was perceived that he was in some discomfort and had been 'picked on' by the other birds, however long-term separation and individual housing would be stressful and problematic for practical reasons. The rooster was hence euthanased. A full necropsy did not reveal any other lesions. Fresh and fixed tissues from the mass were collected for potential further investigation.

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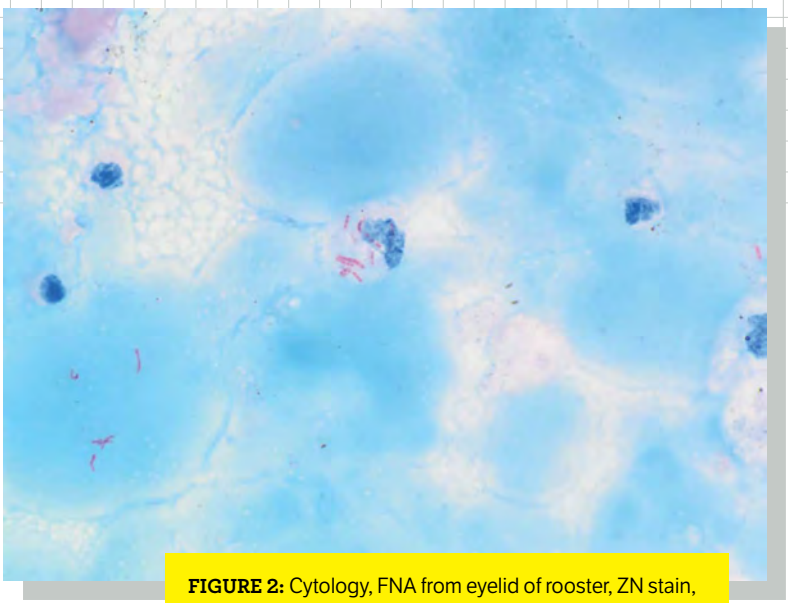

FIGURE 2: Cytology, FNA from eyelid of rooster, ZN stain, 1,000 x magnification, showing pink acid-fast bacilli (presumptive *Mycobacterium* sp.)

Further investigations

After a discussion involving the veterinary pathologist, staff at AgResearch's infectious disease laboratory at the Hopkirk Research Institute in Palmerston North, the veterinarian and the bird's owner, it was decided to pursue identification through molecular methods and sequencing. After homogenate was prepared from the tissue and DNA extracted, both 16S and heat shock protein (HSP) gene PCR products were able to be generated and submitted for Sanger sequencing. The HSP product was clean and 100% identical – with more than 382 contiguous bases – to those from *M. avium* complex bacteria. There was a mixture of 16S products, but the major product was 99% identical – with more than 486 contiguous bases – to those from *M. avium* complex bacteria.

Discussion

Mycobacterium avium complex consists of several nontuberculous mycobacterial species. The two original recognised members of this complex are *M. avium* and *M. intracellulare*. *M. avium* was first isolated in 1933 in chickens with lesions resembling tuberculosis. Human cases were later identified, with *M. avium* complex being the most common cause of nontuberculous mycobacterial infections in humans, usually affecting the respiratory system (Akram, 2023). Humans appear to have low susceptibility unless immunocompromised.

In birds, several mycobacterial species can cause avian tuberculosis, including *M. avium* complex, *M. fortuitum, M. tuberculosis* and *M. bovis*, but *M. avium* is the most common. Susceptibility varies among bird species, with domestic fowl (chickens) and pheasants highly susceptible, geese and ducks moderately resistant and pigeons considered highly resistant. Stress factors appear to increase risk, especially in captive birds.

Organisms can survive for several months in the environment. Ingestion is the most common route of infection, but skin invasion and inhalation are also potential routes. Classically, the disease is slowly progressive with clinical signs of wasting and weakness associated primarily with intestinal and hepatic disease, with dissemination to other organs including lung, air sac, spleen and skin. This case was unusual, apparently localised to the ocular region, suggesting the organism may have gained entry locally, perhaps through injury or foreign body/fomite.

In humans, *M. avium* complex infections are often resistant to antibiotics that are commonly used to treat *M. tuberculosis* and *M. bovis*. A regime of macrolides (clarithromycin or azithromycin) with rifampin and ethambutol is often recommended. Treatment is rarely attempted in birds or other animals due to the high cost and the prolonged treatment time (sometimes 12–18 months) that is required (Dhama, 2011).

Interestingly, although MAC infections are rare in dogs and indeed most mammals (apart from Johne's disease in ruminants ie, *Mycobacterium avium* subspecies *paratuberculosis*, or 'MAP'), Miniature Schnauzers and Basset Hounds appear predisposed. A recessively inherited defect of adaptor protein CARD9 has been documented as associated with increased susceptibility in Miniature Schnauzers (Ghielmetti and Giga, 2020; Mizukami et al., 2024).

In summary, this case was unusual, both for its presentation as localised disease and for the extent of the investigation that was able to be undertaken to confirm the cause. VS

Karen Bailey is a clinical pathologist at Awanui Veterinary

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