UNUSUAL INTRACRANIAL LESIONS IN TWO GOULDIAN FINCHES (*Erythrura gouldiae*)

Lee Peacock
Bird and Exotics Veterinarian
DR3 1 Hunter Street
Waterloo, NSW 2017

Rod Reece
NSW Department of Industry and Investment
State Veterinary Diagnostic Laboratory
Elizabeth Macarthur Agricultural Institute
Private Bag 4008, Narellan NSW 2567

PRESENTING PROBLEM

In February 2009 a pair of adult male, red-headed Gouldian finches presented with torticollis and circling. Both birds were underweight and unable to perch. Both were in excellent feather condition and no other physical abnormalities were noted.

The breeder had noticed a single bird spending excessive time on the floor of the aviary for up to a week and decided to investigate the problem when a second bird began to show similar signs. An aviary visit was not made and all information regarding husbandry of the flock is based on information given by the breeder.

FLOCK/AVIARY HISTORY

The aviary itself, located in a suburb in Sydney's south, is enclosed with 10-year-old galvanised wire with a solid roof and wall and concrete flooring. It is hosed clean once or twice weekly and all food and water is replaced daily in ceramic bowls.

The Gouldian flock has been managed as a closed flock for 3 years. The aviary houses 40 to 50 birds, the majority of the flock are of wild-type colouration with an occasional blue morph. Tracheal mites had been diagnosed and treated 4 years ago by another avian veterinarian at which time there had been significant losses prior to treatments. The breeder estimated losses of 3 to 4 birds per year by unknown causes since then (none showing obvious neurological signs similar to the current cases). Ants had infiltrated the aviary 2 years previously and had been eradicated. There had been no other apparent infectious disease outbreaks according to the breeder.

The flock was reported to have bred well, with exceptionally good breeding in the most recent 2 years. No records were kept to confirm the losses or breeding success. Nests are cleaned and sprayed with an Aristopet brand insect spray after each attempt to nest.

A new source of seed had been used in the preceding 2 months, and the inner wall of the aviary had been repainted 4 to 5 months previously. No other changes in the aviary had been instituted or noted by the owner.

CLINICAL ASSESSMENT

The birds' clinical signs suggested vestibular involvement. Starvation was assumed to be contributing to the weight loss based on observations made of the birds' unsuccessful attempts to manipulate food.

Infectious and toxic causes were initially suspected because 2 birds were showing clinical signs. Reported causes of neurological signs in Gouldian finches have included vitamin A deficiency (Gelis, 2003), paramyxovirus (Bauck and Brash, 1999), Trichomonas (Bauck and Brash, 1999).

Toxoplasmosis has been diagnosed in canaries (Lindsay et al., 1995; Williams et al., 2001) and other protozoans in a range of species including boobook owls (*Ninox novaehollandiae*), tawny frogmouths (*Podargus strigoides*), galahs (*Eolophus roseicappilla*), little penguins (*Eudyptula minor*) and emus (*Dromaius novaehollandiae*) (Hartley and Reece, 1997) and can cause clinical signs similar to those seen in the two Gouldians in this case. Other differentials in this case also included head trauma, bacterial/fungal meningitis, encephalitis, toxins including mycotoxins, lead or insecticides, otitis interna, otitis media, head trauma, increased intracranial pressure from bacterial, fungal or parasitic sinusitis or neoplasia. Sources of infections or toxins could have originated either in wild birds or the aviary environment

Flock safety was the breeder's primary concern. The severity of signs suggested a poor prognosis for the affected birds so euthanasia and submission of the bodies for post mortem and histopathology were the actions taken.

RESULTS

Post mortem inspection of both birds was performed immediately after euthanasia by injection of pentobarbitone sodium via left jugular vein. There were no gross abnormalities observed in either of the two birds apart from emaciation. Eyes, ears, oropharynx and nares appeared normal and there were no obvious signs of head trauma. The brain was kept whole and preserved in 10% formalin along with all internal organs from one finch (Gouldian A). The second finch (Gouldian B) was frozen. All samples were sent to Elizabeth Macarthur Agricultural Institute.

The brain of Gouldian A showed a significant lesion in the cerebellar folia. One cerebellar folia had a patch of cortical malacia and a series of yellow chitinous structures (consistent with the exoskeleton of an arthropod); with haemorrhage and a few reactive macrophages (Figure 1). Several cerebellar folia had osteoid spicules protruding into their outer cortex and the ependyma of the fourth ventricle was thickened and had many macrophages.

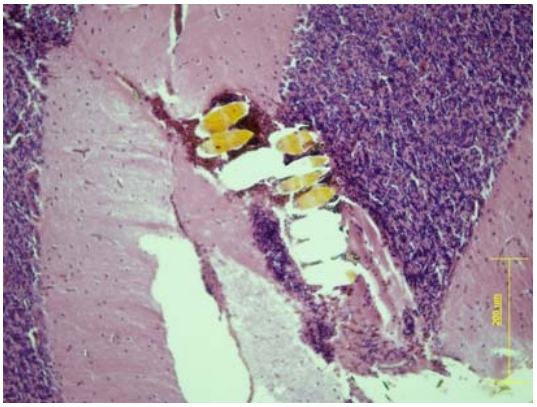

Figure 1. Cerebellum of Gouldian A. Bodies of arthropods in folia with associated inflammation. X200

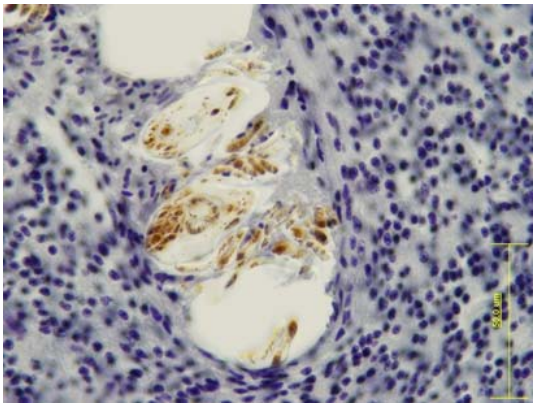

Figure 2. Cerebellum of Gouldian A. Arthropod bodies with rafts of four legs apparent. X1000

Gouldian B was stored frozen and re-examined after intracranial lesions were observed in Gouldian A. There were no obvious external signs suggestive of a point of entry. Eyes, ears and nares all appeared normal. The nasal cavity was kept whole to preserve anatomical and histological integrity and so was not examined.

Histology of Gouldian B showed a mass of plant/foreign material in the internal nares associated with focal haemorrhage and heterophilic infiltration, focal necrosis and direct attachment with the mucosal surface.

There were no significant findings in the viscera of either Gouldian to suggest an alternative aetiology for the torticollis. No obvious point of entry could be determined for the chitinous structures in the brain of Gouldian A.

DISCUSSION

This case demonstrates significant histopathological evidence of an arthropod (or part thereof) associated with lesions suspected to be causing torticollis in a Gouldian finch.

Intracranial lesions associated with the presence of arthropods have not been reported in Gouldian finches.

Although there was no arthropod in Gouldian B, the finding of plant debris within the internal nares associated with some pathology may suggest inhalation as the route of entry. The close association of the infraorbital sinuses and their diverticula with the braincase (Harrison, 1986) may have allowed entry into the brain via the respiratory system.

Arthropods exist in the aviary environment or directly on birds. Those inhabiting the seed mix, nesting substrate or the aviary floor are easily accessible and may be potentially inhaled.

Mites are a common arthropod in aviaries and numerous species of mites have been reported in the literature to inhabit or cause disease in the upper respiratory tract of Australian Finches (Tidemann et al., 1992; Bell 1996a; Bell 1996b; Bauck and Brash, 1999; Ladds, 2009). None are reported to intentionally migrate intracranially, however this does not rule out chance passage deep into sinuses and the cranium. *Laminosioptes cysticola,* a mite known to cause subcutaneous cysts in poultry, has

been found in peripheral nerves of a turkey but there is no evidence that this mite migrates intracranially (Smith et al., 1997). The morphology of the arthropods in this case is consistent with an arachnid by the rafts of four legs observed (Figure 2).

This flock has been previously diagnosed with having tracheal mites *(Sternostoma tracheacolum)* but inconsistencies in morphology between *Sternostoma* and the intracranial arthropod rules these mites out as the identity of the arthropod.

There was no evidence to suggest the two2 deaths in this case were infectious so no treatments were prescribed for the remaining flock. The breeder has not reported any similar cases since.

CONCLUSION

The histological findings in this case were unexpected and the identity of the arthropod remains a mystery as well as how it came to exist in the cerebellar folia. The paucity of similar reported cases in birds and the singular occurrence in this flock suggests the findings are unlikely to recur.

REFERENCES

Bauck, L. Brash, M. 1999. Survey of Diseases of the Lady Gouldian Finch. *Association of Avian Veterinarians* pp. 204-212.

Bell, PJ. 1996a. Survey of the Nasal Mite Fauna (Rynonyssidae and Kytoditidae) of the Gouldian Finch, *Erythrura gouldiae*, and some Co-occurring Birds in the Northern Territory. *Wildlife Research*. **23**: 675-685.

Bell, PJ. 1996b. The life history and transmission biology of Sternostoma tracheacolum Lawrence (Acari: Rhynonyssidae) associated with the Gouldian finch *Erythrura gouldiae*. Experimental and Applied Acarology. **20**: 323-334.

Gelis, S. 2003. The Gouldian Finch (Erythrura gouldiae) in Health and Disease. *Journal of Exotic Pet Medicine*. **12**: 215-227.

Harrison, G. J. (1986). Clinical Anatomy. In G. J. Harrison, *Clinical Avian Medicine and Surgery.* philadelphia: W.B. Saunders.

Hartley, WJ and Reece, RL. 1997. Nervous Diseases of Australian Native and Aviary Birds. *Australian Veterinary Practitioner*. **27**: 91-96.

Ladds, P. 2009. Arthropod and other ectoparasitic diseases in birds. In P. Ladds, *Pathology of Australian Native Wildlife.* Collingwood: CSIRO Publishing.

Lindsay, D. S., Gasser, R. B., Harrigan, K. E., Madill, D. N., Blagburn, B L. 1995. Central nervous system toxoplasmosis in roller canaries. *Avian Diseases* . **39**: 204-207.

Smith, K. E., Quist, C. F., Crum, J M. 1997. Clinical Illness in a Wild Turkey with Laminosioptes cysticola infestation of the Viscera and Peripheral Nerves. *Avian Diseases* . **41**: 484-489.

Tidemann, S. C., McOrist, S., Woinarski, J. C., Freeland, W J. 1992. Parasitism of Wild Gouldian Finches (Erythrura Gouldiae) by the Air-sac Mite Sternostoma tracheacolum. *Journal of Wildlife Diseases* . **28**: 80-84.

Williams, S. M., Fulton, R. M., Render, R. A., Mansfield, L., Bouldin, M. 2001. Ocular and encephalic toxoplasmosis in canaries. *Avian Diseases* , **45**: 262-267.