Wildlife Health Australia

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Wildlife Health Australia (WHA; formerly the Australian Wildlife Health Network)[3] is the peak body for wildlife health in Australia. WHA was established in 2002 as an Australian Government initiative to coordinate wildlife health surveillance information across Australia, to support Australia's animal health industries, human health, biodiversity, trade and tourism. WHA collates information from a number of sources into a national database — the Wildlife Health Information System (eWHIS)[4] — including submissions by WHA subscribers, state and territory WHA coordinators, researchers and zoo veterinarians. This report details some of the disease and mortality events in free-living wildlife recorded in eWHIS for the July–September 2014 quarter. WHA would like to thank all those who submitted information for this report.

Wild bird mortality events — Newcastle disease and avian influenza exclusions

WHA received 62 reports of wild bird mortality or morbidity from around Australia from July to September 2014. Reports and samples from sick and dead birds are received from members of the public, private practitioners, universities, zoo wildlife clinics and wildlife sanctuaries. Avian influenza (AI) was excluded by PCR for influenza A in 13 of the events as part of Australia's general (sick and dead bird) AI surveillance program. AI exclusion testing was not warranted in the remaining 49 events, based on clinical signs, history, prevailing environmental conditions or other diagnoses. Avian paramyxovirus was excluded in 10 events by PCR specific for Newcastle disease virus and/or pigeon paramyxovirus 1.

Update on the use of fenthion products in Australia

WHA has previously reported on wild bird poisoning events involving fenthion,[5] which is an organophosphate primarily used to control insect pests. Until recently, six products containing fenthion were registered in Australia by the Australian Pesticides and Veterinary Medicines Authority (APVMA), three of which were registered as restricted chemicals for control of exotic bird species (domestic or feral pigeons, *Columba livia*; house sparrows, *Passer domesticus*; European or common starlings, *Sturnus vulgaris*; and Indian or common mynas, *Acridotheres tristis*).

Following concerns about toxicity, occupational health and safety, food residues, and environmental and trade aspects, fenthion was nominated for review by the APVMA through the Chemical Review Program. The APVMA review concluded that 'the use of products containing fenthion may, in most situations, pose undue risks to human health (via dietary and occupational exposure) and the environment'. As a result, the APVMA has cancelled the registration of a number of products, including the three products previously registered for control of exotic bird species.[6] More information is available on the APVMA website.[7]

Avian influenza surveillance

Australia's national AI wild bird surveillance program comprises two sampling components: targeted surveillance by sampling of apparently healthy, live and hunter-killed wild birds; and general surveillance by investigating significant unexplained morbidity and mortality events in wild birds, including captive and wild birds within zoo grounds (with a focus on exclusion testing for influenza subtypes H5 and H7). Samples from sick or dead birds are discussed above. Sources for targeted wild bird surveillance data include state and territory government laboratories, universities, and samples collected through the Northern Australia Quarantine Strategy program.

During the quarter, targeted surveillance of healthy, live wild birds occurred at sites in Western Australia and the Northern Territory. Cloacal, oropharyngeal and/or faecal environmental swabs were collected from 969 waterbirds and waders. No highly pathogenic AI viruses were identified. A number of positive swabs to low pathogenicity AI are undergoing further testing.

Eastern grey kangaroo mass mortality — parasitism

During early September 2014, 30 eastern grey kangaroos (*Macropus giganteus*) were found either dead or moribund

3 www.wildlifehealthaustralia.com.au

4 www.wildlifehealthaustralia.com.au/ProgramsProjects/eWHISWildlifeHealthInformationSystem.aspx

5 Australian Wildlife Health Network (now Wildlife Health Australia) reports in A*nimal Health Surveillance Quarterly* Vol. 19 issue 1, Vol. 18 Issue 1, Vol. 16 Issue 2, Vol. 14 Issues 2 and 4, Vol. 13 Issue 4.

6 Australian Pesticides and Veterinary Medicines Authority (2014). *Commonwealth of Australia Gazette*, Special Gazette, Agricultural and Veterinary Chemicals, Thursday 16 October 2014, http://apvma.gov.au/sites/default/files/fenthion_special_gazette_2.pdf.

7 Australian Pesticides and Veterinary Medicines Authority (2014). *Fenthion chemical review — 8. Regulatory decision,* http://apvma.gov.au/node/1141.

from a high-density population of approximately 1000 animals in Wacol, Queensland.

Two moribund females (one adult and one juvenile) were euthanased and submitted for necropsy to the Biosecurity Sciences Laboratory, Queensland Department of Agriculture, Fisheries and Forestry. Severe hepatopathy attributed to *Fasciola hepatica* was a prominent gross and histological finding in both animals. An impressive array of other parasites, including ticks, lice, tracheal bots, gastric nematodes and coccidia were noted on necropsy and/or histopathology. Fresh organ squash smears and blood smears failed to show evidence of infection with *Babesia* sp.

Subsequent investigation of an upstream property detected subclinical *F. hepatica* infection in cattle. The cattle had been introduced to the property in early 2014 from northern New South Wales.

F. hepatica is a common parasite of sheep and cattle in Australia. It has also been reported in a number of Australian native free-ranging terrestrial mammal species, including several macropod species.[8,9] In native species, considerable variation in response to *F. hepatica* infection has been reported — effects range from no clinical signs to cachexia and anaemia associated with severe liver pathology.[8]

Hepatopathy associated with fascioliasis, poor nutritional condition, and heavy burdens of internal and external parasites are considered contributing factors in the deaths of the kangaroos in this incident. Since the distribution of *F. hepatica* in south-east Queensland is described as patchy,[10] and the presence of *F. hepatica* is largely influenced by environmental conditions required by both the parasite and the snail (*Lymnaea tomentosa*) intermediate host, the role of the recent introduction of neighboring cattle in this kangaroo mortality event is unclear. A survey in south-eastern Australia found that the prevalence of *F. hepatica* was higher in macropods sharing agricultural pastures with sheep and cattle than in macropods surveyed from forested areas with variable livestock presence.[9]

Brushtail possum — wobbly possum syndrome

In August 2014, a female brushtail possum (*Trichosurus vulpecula*) presented to a wildlife carer in Townsville, Queensland, in an emaciated condition and with neurological signs, including apparent blindness. The carer has previously seen similar cases, often in clusters.

The possum was assessed as unsuitable for rehabilitation and release, and was subsequently euthanased and submitted to the veterinary diagnostic laboratory at James Cook University for investigation. Histopathology revealed a severe nonsuppurative to granulomatous meningoencephalomyelitis, with neuronal necrosis, gliosis and astrocytosis, and a nonsuppurative perineuritis of the optic nerve, with multifocal loss of pigment within the pigmented retinal epithelium. The absence of protozoa (e.g. *Toxoplasma* sp.) and nematodes (*Angiostrongylus* sp.) in the examined tissues ruled out other possible aetiological agents that are known to cause neurological signs in brushtail possums. Australian bat lyssavirus was excluded by lyssavirus immunohistochemistry on a range of formalin-fixed tissues, including brain. Wobbly possum syndrome (WPS) is used to describe a syndrome in brushtail possums that present with blindness and ataxia, and a nonsuppurative meningoencephalitis with optic nerve neuritis of unknown aetiology. This possum was diagnosed with WPS based on histopathology.

WPS was first described in Australia in 1985, and has been seen in brushtail possums from eastern Australian mainland areas and Tasmania.[11] In a recent retrospective review of 31 brushtail possums with neurological signs in the Sydney region, WPS was diagnosed in 21 of the 31 (68%) examined cases.[12] In a similarly described syndrome in Australian brushtail possums in New Zealand, PCR investigation has identified a novel nidovirus, which has been suggested as a possible causative agent.[13] No specific aetiological agents have been identified in cases of WPS in Australia. Subtle differences in histological changes between New Zealand and Australian cases suggest the possibility of a unique viral aetiological agent associated with Australian cases. Tissues from this case have been retained to allow further PCR investigation.

Australian snubfin dolphin — lobomycosis-like disease

Between 2008 and 2010, three Australian snubfin dolphins (*Orcaella heinsohni*)[14] with nodular skin lesions were photographed as part of a photo-identification study of coastal dolphins in Darwin Harbour, Northern

8 P Ladds (2009). *Pathology of Australian native wildlife*, CSIRO Publishing, Collingwood.

9 DM Spratt, PJ Presidente (1981). Prevalence of *Fasciola hepatica* infection in native mammals in southeastern Australia. *Australian Journal of Experimental Biology and Medical Science* 59:713–721.

10 JB Molloy, GR Anderson (2006). The distribution of *Fasciola hepatica* in Queensland, Australia, and the potential impact of introduced snail intermediate hosts. *Veterinary Parasitology* 137(1–2):62–66.

11 Australian Registry of Wildlife Health. Case 1411.1 Non-suppurative meningoencephalitis in a brushtail possum, http://203.41.141.168/sites/default/files/files-uploads/Case%201411.1%20Non-suppurative%20Meningoencephalitis%20in%20a%20Brushtail%20Possum.pdf.

12 G Ma, M Dennis, K Rose, D Spratt, D Spielman (2013). Tawny frogmouths and brushtail possums as sentinels for *Angiostrongylus cantonensis*, the rat lungworm. *Veterinary Parasitology* 192(1):158–165.

13 M Dunowska, PJ Biggs, T Zheng, MR Perrott (2012). Identification of a novel nidovirus associated with a neurological disease of the Australian brushtail possum (*Trichosurus vulpecula*). *Veterinary Microbiology* 156(3):418–424.

14 Australian Government Department of the Environment (2014). *Orcaella heinsohni* — Australian snubfin dolphin, Species Profile and Threats database, www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=81322.

Territory.[15] The lesions, 1–5 cm in diameter, were multifocal to coalescing raised areas of roughened, irregular, multinodular pale skin, suggestive of lacaziosis-like disease or lobomycosis. This is an infection that is usually attributed, based on histological or cytological morphology of organisms in lesions, to the fungus *Lacazia loboi* (previously *Loboa loboi*). To substantiate a fungal aetiology, histological examination of skin from an affected stranded animal would be required. An alternative option would be to obtain a biopsy of the lesion from a live dolphin; however, this would be a challenge. To determine the prevalence and incidence of these skin lesions in the snubfin dolphin population in Darwin Harbour, the Northern Territory Marine WildWatch Program, in collaboration with Marine Ecosystems (Flora and Fauna Division of the Northern Territory Department of Land Resource Management), undertook a photographic survey.

In September 2014, a biopsy of a lesion was obtained from an affected breaching snubfin dolphin using a biopsy punch mounted on a crossbow. Histopathology undertaken at the Berrimah Veterinary Laboratories revealed numerous globose fungi attached via short, thin strands into branching chains, typical for fungal infection attributed to *L. loboi* organisms, as described in the literature (Figure 1). The fungus has never been cultured, so diagnosis has traditionally been based on morphology, either histologically or cytologically. In this case, pan-fungal PCR testing[16] was performed on an unpreserved portion of the biopsy, and DNA most closely resembling *Paracoccidioides brasiliensis*, the sister taxon to *L. loboi*, was detected.[17] With the availability of molecular fungal identification, some other dolphin cases grossly and histologically resembling lobomycosis have also yielded this fungus.[18,19]

Lobomycosis is a naturally occurring disease in dolphins and humans, and has been documented in other parts of the world, including the Americas and the Indian Ocean.[20] In Australia, there is one previously documented case of lobomycosis in a bottlenose dolphin that was found dead on a beach in south-east Queensland. Histopathology of focal granulomas in the dolphin's skin, liver and spleen were consistent with a tentative diagnosis of *L. loboi* infection.[8] Because a chronic dermatitis occurring in people is grossly and histologically similar to the lesions in dolphins, and contains morphologically similar fungi, lobomycosis has traditionally been considered to have zoonotic potential. However, apart from one documented case, disease occurrence in humans and dolphins seems to be unconnected.[21] Molecular identification of isolates has now led to some doubt about whether the same fungal species causes disease in humans and dolphins.[22] However, appropriate precautions should be taken when handling animals with suspect lesions[15, 21] The organism is thought to be acquired from the environment.[19, 23]

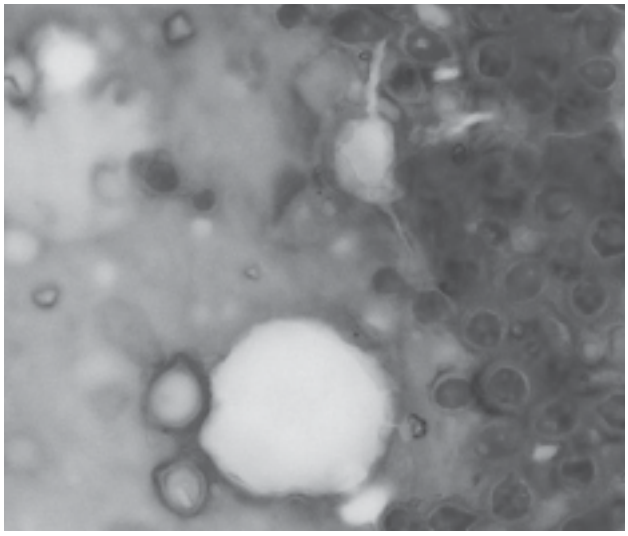

Figure 1 Cytology impression smear of snubfin dolphin skin stained with periodic acid-Schiff, showing numerous globose fungi attached via short, thin strands into branching chains, typical of *Lacazia loboi*. Image courtesy of Cathy Shilton.

Australian bat lyssavirus

Reports to WHA for the July–September quarter included 96 bats tested for Australian bat lyssavirus (ABLV) from the Australian Capital Territory, New South Wales, the Northern Territory, Queensland, South Australia, Victoria and Western Australia. Bat submissions were made for a variety of reasons:

- 20 cases involved contact or suspected contact with the potential for ABLV transmission to humans; of these
  - 4 were also associated with trauma

15 C Palmer, A Peterson (2014). First report of a lacaziosis-like disease (LLD) observed in the Australian snubfin dolphin (*Orcaella heinsohni*) in Darwin Harbour, Northern Territory, Australia. *Northern Territory Naturalist* 25:3–6.

16 Clinical Mycology Reference Laboratory, Centre for Infectious Diseases and Microbiology Laboratory Services, Pathology West.

17 A Lau, S Chen, T Sorrell, D Carter, R Malik, P Martin, C Halliday (2007). Development and clinical application of a panfungal PCR assay to detect and identify fungal DNA in tissue specimens. *Journal of Clinical Microbiology* 45(2):380–385.

18 F Esperón, D García-Párraga, EN Bellière, JM Sánchez-Vizcaíno (2012). Molecular diagnosis of lobomycosis-like disease in a bottlenose dolphin in captivity. *Medical Mycology* 50(1):106–109.

19 K Ueda, A Sano, J Yamate, E Itano Nakagawa, M Kuwamura, T Izawa et al. (2013). Two cases of lacaziosis in bottlenose dolphins (*Tursiops truncatus*) in Japan. *Case Reports in Veterinary Medicine* 2013:article 318548.

20 International Whaling Commission (2009). Report of the Workshop on Cetacean Skin Diseases. *Journal of Cetacean Research and Management* 11(Suppl):503–514.

21 JS Reif, AM Schaefer, GD Bossart (2013). Lobomycosis: risk of zoonotic transmission from dolphins to humans. *Vector-Borne and Zoonotic Diseases* 13(10):689–693.

22 EM Haubold, CR Cooper, JW Wen, MR McGinnis, DF Cowan (2000). Comparative morphology of *Lacazia loboi* (syn. *Loboa loboi*) in dolphins and humans. *Medical Mycology* 38(1):9–14.

23 MF Van Bressem, MC de Oliveira Santos, JE de Faria Oshima (2009). Skin diseases in Guiana dolphins (*Sotalia guianensis*) from the Paranaguá estuary, Brazil: a possible indicator of a compromised marine environment. *Marine Environmental Research* 67(2):63–68.

  - 2 displayed neurological signs or aggressive behaviour
  - 3 displayed other clinical signs (e.g. weight loss, weakness, dehydration, oedema)
  - 1 also involved contact with a pet dog
  - the remainder had no further history reported
- 52 cases involved contact with a pet dog (50 bats) or cat (2 bats); of these
  - 2 were also associated with other forms of trauma
  - 1 displayed other clinical signs (starvation)
- 11 bats displayed neurological signs, including aggression, self-mutilation, star-gazing, foaming at the nose and mouth, inability to fly, paralysis, tremors and unusual vocalisation
- 4 cases were associated with trauma (e.g. fence, barbed wire or netting entanglement)
- 5 bats were found dead
- 3 bats displayed other clinical signs (e.g. dehydration, hypothermia, found on the ground)
- 1 bat had no further history reported.

During the quarter, 11 flying foxes were confirmed positive for ABLV by PCR for pteropid ABLV RNA; of these, 1 black flying fox (*Pteropus alecto*) was from south-east Queensland, 1 black flying fox was from Katherine in the Northern Territory, and 2 black flying foxes and 7 little red flying foxes (*Pteropus scapulatus*) were from Broome in Western Australia. This is only the second time that an ABLV-positive bat has been detected in the Northern Territory; the first case was in 1997. The Northern Territory case is discussed further on page 15.

Of the 11 ABLV-positive flying foxes, 10 presented with neurological signs; the remaining flying fox had been mauled by a pet dog. Necropsy and histopathology findings in the ABLV-positive flying foxes included mild nonsuppurative meningoencephalitis, with the exception of the bat from the Northern Territory, which had no lesions detected on histological examination of the brain. Potentially dangerous human contact was reported in one case, and an experienced public health official provided appropriate counselling and information.

This quarter, three bats that displayed neurological signs or aggressive behaviour were found to be ABLV negative. One was a pregnant female black flying fox from Queensland that showed no significant findings on either gross necropsy or histopathology to explain the neurological signs. The bat was in very poor nutritional condition, and metabolic disease was suspected. The fetus also tested negative to ABLV. Two Gould's wattled bats (*Chalinolobus gouldii*) from Western Australia — one a juvenile — were found on the ground and tested negative for ABLV. One had a moderate ulcerative dermatitis, but there was no further diagnostic examination.

More information on ABLV testing of bats in Australia is available in *ABLV Bat Stats*.[24]

Photo: iStock

24 www.wildlifehealthaustralia.org.au/ProgramsProjects/BatHealthFocusGroup.aspx