

Wildlife Health in Australia



Newsletter of the Australian Wildlife Health Network

Volume 9, Issue 1

March 2011



Message from the Chair

DR. LYNDEL POST,
Office of the Chief Veterinary Officer

Welcome to the Volume 9, Issue 1 edition of "Wildlife Health in Australia", the newsletter of those agencies, organisation and individuals with an interest in diseases with wildlife as part of their ecology around Australia.

It has been another busy quarter. Foremost in our minds are our colleagues tackling the recent Hendra Virus spillover events in QLD and NSW and the many people who have been impacted. Tiggy Grillo, the AWHN Projects Coordinator, has been working hard to keep AWHN subscribers up to date by circulating information that has been provided by the QLD, NSW, and Australian governments. The Australian Animal Health Laboratories, the Queensland Centre for Emerging Infectious Diseases (QCEID), epidemiology units at DAFF, DEEDI and NSW DPI and many others have been in the thick of the response providing rapid and timely access to information to improve decision making and guide priorities for risk assessment, management and to underpin research. The Hendra event, including seroconversion of a dog, reminds us of the need to keep an open mind, and a One Health-type paradigm, when dealing with diseases with wildlife as part of their ecology. Bats, bat viral diseases and ecology is an important and growing area not just in Australia, but worldwide.

It is timely then that this edition of WHiA also includes an update on the activities of the ABLV and Bat Health Focus Group. The Group met recently in Brisbane and discussed a range of topics including testing for Hendra Virus in bats. However, it was discussion of the management of bat health data and datasets in general, which was of most importance for wildlife health, biosecurity and Australia. The Group was briefed on an interoperability project being considered by the Australian Biosecurity Information Network (ABIN) examining linkage of the Biosecurity Surveillance Incident Response and Tracing (BioSIRT) software, the AWHN general wildlife health surveillance database (eWHIS) and local laboratory information management systems (LIMS) including the Taronga Zoo Australian Registry of Wildlife Health pathology database. If funding can be found the project would aim to develop a template and a mechanism for sharing ABLV data from the jurisdictions and Biosecurity and Health agencies as a model for how wildlife health data can be shared across jurisdictions and agencies using BioSIRT. It was agreed that this project was worth considering and that AWHN would

liaise with ABIN and keep the group informed of any developments. Hendra has reiterated the need for further development of this capability in Australia. Safe and appropriate information management is one of the AWHN's strengths. The AWHN is one of the few organisations in Australia with experience managing national animal health datasets across different jurisdictions and agencies. We will keep you informed of any developments.

Also in this edition is an overview and update on the current activities of the National Avian Influenza Wild Bird Surveillance Steering Group. Information is also provided on the National Significant Disease Investigation (NSDI) Program, which along with the zoo surveillance trial, is being very ably managed by AWHN Project Officer, Keren Cox-Witton, to support Animal Health Australia, the NAHIS and the Zoo and Aquarium Association. I commend this edition of WHiA to you and remind all our readers of the need to remember the lessons of Hendra Virus.

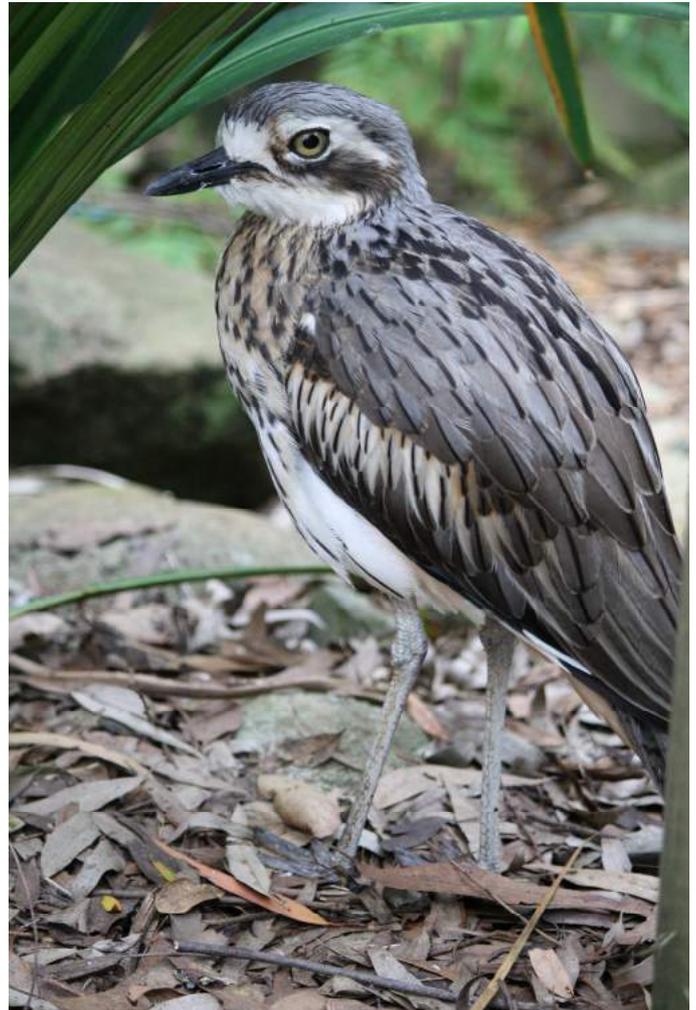


Photo Courtesy of Jane Hall

NEWS

The Australian Bat Lyssavirus (ABLV) and Bat Health Focus Group met for its yearly face to face meeting on the 21st and 22nd of June, 2011 at Brisbane. The meeting was hosted by the Queensland Government Department of Employment, Economic Development and Innovation (DEEDI) on the first day at the Primary Industry Building on Ann Street. On the second day, the group moved out to the Health and Food Sciences Precinct at Cooper's Plains and was hosted by the Queensland Centre for Emerging Infectious Diseases (QCEID) and Queensland Health. A range of topics were discussed including: testing for Hendra Virus (HeV) in bats; management of mass morbidity and mortality events in flying foxes; harmonisation of messages to the public regarding Australian Bat Lyssavirus (ABLV) including bat handling guidelines; the role of universities, priorities and resourcing for ABLV work; review of the Group, and; management of bat health data and datasets.

The group initiated discussion on preparation of guidelines for testing individual bats for HeV where there has been potential for bat/horse contact. This will be developed further in consultation with AWHN Wildlife Coordinators.

The management of Queensland mortality and morbidity events in flying foxes, and the need to better address these events was discussed. These mortality events represent a good one health project, and the need for a collaborative research project between carers, Queensland Government Department of Environment and Resource Management (DERM), and DEEDI was discussed. It was agreed to develop a collaborative project between James Cook University (JCU), Biosecurity Queensland (BQ) and Queensland bat carers investigating bat mortality and morbidity events (The "M&M" project). This would include development of a case definition, the objectives and how to proceed, as part of the project plan. The project would be led by BQ and also involve QCEID.

A list of recommendations for harmonising messages to the public focussing on bat handling guidelines was prepared and will be further developed by the group as agreed guidelines.

The role of universities, priorities and resourcing was discussed. It was agreed that Universities could contribute to research projects, create linkages, and assist with building research capability and data related aspects of bat health work. The Group agreed that preparing a list of research priorities would be beneficial to provide to the Universities, so they can be better directed when applying for Australian Research Council (ARC) and other funding. The group will work on these priorities over the coming months.

The scope, terms of reference, priorities and membership of the Group were discussed. It was agreed that the scope should be broadened as ABLV has become too narrow. It was agreed to expand the terms of reference, with the focus to include

HeV, Rabies, and other bat diseases as well as topics covering bat health, biosecurity, diseases, zoonotic, public health & livestock health, and environmental impacts. As part of the expanded terms of reference, it was agreed that a new name should be considered. Suggestions included Bat Diseases Network and Bat Working Group. It was also agreed to develop a mechanism to "formalise" the Group, possibly under the auspices of the AHC or the Australian Chief Veterinary Officer (ACVO).

Much of day two focussed on management of bat health information. The draft ABLV dataset analysis performed by Hume Field's group on the national dataset was discussed. It was agreed that the report would be modified to indicate the extent of the missing data and then presented to the ACVO. As part of discussing ABLV information management the Group was briefed on an interoperability project being run by the Australian Biosecurity Intelligence Network (ABIN) examining linkage of the Biosecurity Surveillance, Incident Response and Tracing (BioSIRT) software application, the AWHN general wildlife health surveillance database (eWHIS) and local laboratory information management systems (LIMS). A project suggested by ABIN is to develop a template and a mechanism for sharing bat health data such as ABLV test results as a model for how wildlife health data can be shared across jurisdictions and agencies. Concerns were raised that when there is aggregation of data, there may be a loss of information if the software and data fields don't align. However, it was agreed that this project is worth investigating, and AWHN will liaise with ABIN regarding the project and keep the group informed as to any developments.



Photo Courtesy of Jane Hall

The National Avian Influenza in Wild Birds Steering Group

Background:

In 2006, the National Avian Influenza Wild Bird (NAIWB) Steering Group was established to ensure national coordination and collaboration of wild bird surveillance for avian influenza (AI) in both poultry and wild birds. The NAIWB Steering Group oversees the operating plan and surveillance activities for AI in wild birds in Australian States and Territories. The Australian Wildlife Health Network (AWHN) supports the NAIWB Steering Group and coordinates the wild bird surveillance program.

National wild bird surveillance projects are conducted Australia wide, with national funding together with in-kind support from jurisdictional agencies and representative institutes. Surveillance activities target a combination of healthy, live and hunter-killed wild birds and sick or dead wild birds. Samples are collected through various State and Territory government agency programs, research projects and the Northern Australia Quarantine Strategy (NAQS) from birds in NSW, NT, QLD, SA, TAS, WA and VIC. Samples from sick and dead bird events include submissions from members of the public, private practitioners, universities, zoos and sanctuaries as part of Australia's general wildlife disease surveillance program.

Results from the NAIWB surveillance program are provided to Australian governments and industry and are included in Australia's National Animal Health Information System (NAHIS) and Australia's international reports. Results of surveillance and risk assessment data have been published in peer-reviewed journals.

Objectives:

There are six objectives agreed upon by the NAIWB Steering Group in September 2010:

- Targeted risk based active¹ (waterbirds) and general (wild bird mortality events) surveillance by continuing to develop, review and undertake targeted surveillance
- Maintain national laboratory AI testing capacity and capability to detect strains of AIV including H5/H7.
- Provide data on occurrence of AI viruses in wild birds in Australia.
- Use the data for risk analysis management and communication to industry and other stakeholders.
- Contribute to knowledge of the ecology of AI viruses in Australia.

Current Activities:

There has been some discussion about a potential increased risk to poultry of avian influenza virus being introduced in the coming year as a result of widespread increased rainfall in eastern Australia (associated with flooding in many areas).

¹ Priority high-risk areas for avian influenza to the Australian Poultry Industry.



Photo Courtesy of Jane Hall

It is certainly expected that the wet environmental conditions during the first part of this year in eastern Australia will lead to a very successful breeding season for many species of wild birds, as well as increased mixing of wild birds on water bodies and the potential for increased bird movement as birds follow food and move into or out of flooded areas. The flood conditions may also increase opportunities for wild birds to come into closer contact with poultry. Previous outbreaks of highly pathogenic avian influenza in Australian poultry occurred during both periods of higher than average rainfall and during dry periods.

The Avian Influenza Wild Bird Surveillance program continues to find evidence of a wide range of subtypes of low pathogenic avian influenza viruses, including low pathogenic H7 and H5 subtypes. A total of 6,796 waterbirds (e.g. ducks and waders) were sampled this year between Jul 10 – Apr 11). No highly pathogenic AI viruses have been identified. Although data is still being collected, detections of low pathogenic avian influenza in south-eastern Australia this season appear to have increased in number. Poultry producers should therefore remain alert and review biosecurity arrangements at premises to ensure effective risk reduction measures are in place. A detailed analysis of the dataset is currently in progress, which will inform future priorities for avian influenza surveillance in wild birds in Australia. A detailed analysis of the dataset is currently in progress, which will inform future priorities for avian influenza surveillance in wild birds in Australia.

Process for the Transfer of Biological Specimens to Overseas Laboratories for Infectious and Parasitic Disease Testing

Ensuring an accurate diagnosis for diseases with wildlife as part of their ecology can be challenging and in some cases may warrant sending samples (specimens) overseas for testing. It has been a few years since we reminded Network subscribers of the process for transfer of samples for overseas testing and hope that the following information helps anyone considering sending samples overseas. If you are unsure of the availability of specific tests for wildlife samples please contact your local wildlife coordinator (<http://www.wildlifehealth.org.au/AWHN/ProgramsProjects/Programs.aspx?id=9>) or the Australian Registry of Wildlife Health (krose@zoo.nsw.gov.au).

The agreed process, as endorsed by the Animal Health Committee (September 2010) is:

1. The sender should first ensure that the testing cannot be done in Australia. If the testing could be done in Australia, it should only be done overseas instead if there is a compelling reason to do so.
2. Before any biological specimens are sent overseas for testing, the sender is required to ensure that the relevant State Chief Veterinary Officer (CVO) is satisfied with the reason(s) for having the testing conducted overseas rather than in Australia and has approved the transfer in writing (clearance). Subject to the State CVO's decision, a Material Transfer Agreement between the sender and recipient should be in place before despatch, stating:

2.1 the intended purpose of the submission, including a list of the specimens and the tests to be conducted on each;

2.2 that the only tests conducted will be those specified for each of the specimens listed;

2.3 that the test results will be released only to the sender;

2.4 that none of the specimens will be transferred to another party without the sender's prior consent and until a Material Transfer Agreement between the new recipient and the original sender is in place;

2.5 that the specimens will be destroyed after a specified holding period or, if practical, returned to the sender, and will not be used for any other purpose without prior approval. (Note that this requirement will not apply when the intended purpose is submission to a "type culture collection" or some other library or database, or for taxonomic identification of an agent that has already been tentatively identified and subsequently reported to the State CVO.)

2.6 that unless specified otherwise, all aforementioned requirements can be fulfilled without breaching regulations and other legal obligations pertinent to the recipient's Government.

3. The State CVO will advise the sender in writing of the decision on clearance within a reasonable timeframe that is

clearly understood by the sender at the time of lodging a request for clearance. The consignment must be accompanied by copies of the clearance and if applicable, the signed Material Transfer Agreement.

4. The sender will notify the State CVO in writing, immediately following the despatch of specimens to the overseas recipient, of the details of the specimens despatched.
5. It is the responsibility of the sender to notify the State CVO of any test result that identifies or suggests the presence of an infectious or parasitic disease or agent not known to occur in Australia. In the event that such a result is obtained, the release of the result by the sender is subject to approval by the State CVO.

National Significant Disease Investigation (NSDI) Program— wildlife disease event funding

The NSDI Program subsidises significant livestock and wildlife disease investigations by veterinary practitioners where financial limitations to their investigation exist (e.g. low economic value of individual animals relative to the cost of veterinary services). Subsidies of \$220 (or \$320 for investigations at remote locations) are available for both the initial field and clinical evaluation, and for a follow-up investigation. In return, the practitioner must provide a case report of the investigation.

The NSDI is a program funded by Animal Health Australia (www.animalhealthaustralia.com.au) from livestock industry and government subscriptions. It aims to boost Australia's capacity for the early detection of emerging and emergency animal diseases by recruiting greater participation of veterinary practitioners and subsidising the cost of their disease investigations.

If you are interested in applying for funding through the NSDI, more information on the program is available at <http://www.animalhealthaustralia.com.au/programs/disease-surveillance/national-significant-disease-investigation-program/>. A list of NSDI contacts is available at this site.

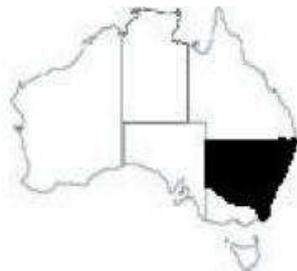
Incorporation of wildlife into the NSDI is available in Victoria, Tasmania, Queensland, Northern Territory, New South Wales and South Australia. Other arrangements are in place for investigation of wildlife disease events in Western Australia. Contact the WA Wildlife Coordinator for details: <http://www.wildlifehealth.org.au/AWHN/ProgramsProjects/Programs.aspx?id=9>

We would be very grateful if you could advise us when you apply for funding via the NSDI, and if you are successful, so that we can maintain a log of requests and which were successful. This will help us work to ensure that the program is effective into the future. We are also happy to discuss your application prior to submission if you consider that would be helpful.

Disease Events

NSW & other States

During the Jan to Mar quarter there were a number of suspected botulism outbreaks in waterbirds. Reports were received from four states, including the Tweed Heads and Newcastle areas, and a site between Albury and Wagga Wagga in New South Wales; an island near Brisbane in Queensland; a location near Alice Springs in the Northern Territory; and in Victoria a lake in Melbourne and a site between Shepparton and Bendigo.



All events involved Anseriformes, with more than one species affected at some sites. Affected species included magpie geese (*Anseranas semipalmata*), Australasian grey teals (*Anas gibberifrons gracilis*), pacific black ducks (*Anas superciliosa*), muscovy ducks (*Cairina moschata*), masked lapwings (*Vanellus miles*) and black swans (*Cygnus atratus*). In most cases birds were found dead, while in some paralysis and an inability to fly were observed. Botulism was suspected based on the environmental conditions and clinical signs. Botulism was confirmed in one event.

QLD

19 flying-foxes were examined between Jan-Mar with 12 presenting with neurological signs. Lyssavirus was excluded in all 19 cases. The number of bats with neurological signs is quite a high number. Two were diagnosed with neuro-angiostrongylosis, and one with myelomalacia, and nine were undiagnosed. There was a case of angiostrongylosis diagnosed late last year, which makes three cases in the last few months. The last case of angiostrongylosis prior to that was diagnosed in 2002, and there have been no positive cases since then. This may be as a result of the wet weather – See the AWHN Fact Sheet “*Angiostrongylus cantonensis* (Angiostrongyliasis): the rat lungworm and Australian wildlife” for further information.



One captive bat, used for education purposes, presented with respiratory signs. Aspiration pneumonia was diagnosed on histology.

There have been four mass mortality events in birds in common urban species, the largest involving 50 birds, which were mostly magpies. Newcastle Disease (ND) and Avian Influenza (AI) were excluded in all four events. Pesticide screens were done in all events, but only returned a result of Diazinon toxicity in one of the smaller events of six birds. This

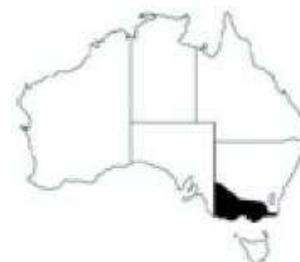
event involved five Australian magpies and one rock (feral) pigeon found dead, one with yellow discharge from its beak. Diazinon was detected at 17 mg/kg in gastrointestinal tract samples.

There have been a couple of illegally imported reptiles found, including a Burmese python and a spotted pond turtle, which were seized and destroyed in March. There was no significant gross or histopathology in either case. Fresh tissues from the turtle were sent to AAHL for a ranavirus PCR test, which was negative. Virus isolation was also negative.

A cane toad was submitted from a property in south east Queensland, where five to six sick toads had been seen recently. All appeared to be suffering from eye conditions. The toad presented in poor condition, and had a unilateral keratitis and uveitis, with evidence of past corneal rupture in one eye. This may account for the poor condition of the toad. This case was inconclusive.

Victoria

During January and February, mortality events involving waterbirds in wetlands of Northern Victoria were reported to DSE and DPI. The history and clinical signs described by the field personnel were characteristic for Botulism. DPI Attwood Veterinary Laboratory received two submissions of dead birds. A total of five birds were examined. Post mortem and histopathological examinations revealed a number of incidental parasitic and bacterial infections, however, no definitive cause of death was determined. AI was also excluded by PCR. Samples of the gastrointestinal contents were negative for Botulinum toxins C and D by ELISA, however, negative ELISA results do not exclude Botulism as a diagnosis.



Two similar submissions to Attwood Veterinary Laboratory from a lake in suburban Melbourne were investigated during January and February. In these cases, lack of pathological lesions, characteristic clinical signs and history led to a presumptive diagnosis of Botulism. AI was excluded by PCR and samples of gastrointestinal contents and heart blood were negative for Botulinum toxins C and D by ELISA.

In late February, an adult female ringtail possum on Phillip Island was euthanased due to severe ulcerative dermatitis. The veterinarian suspected infection due to *Mycobacterium ulcerans* and fixed samples were submitted to DPI Attwood Veterinary laboratory. The histopathology was characteristic for *Mycobacterium ulcerans*, including the presence of large numbers of acid-fast bacilli within the severe, deeply ulcerated skin lesions.

Australian bat lyssavirus was excluded in two Grey-headed Flying-foxes and one microbat.

TAS

There has been a case of avian pox in a wild magpie.

A few cases of coccidiosis found in captive wallabies and juvenile wombats in care. Salmonella has been diagnosed in a couple of captive birds and also in a wombat in care.

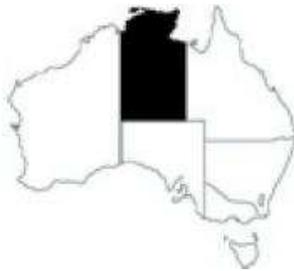


A Eastern barred bandicoot presented with a skin lesion which was diagnosed on histology as asquamous cell carcinoma. The first recorded case of dolphin pox in Tasmania has been found based on histology.

A cane toad was found following a family moving from Brisbane and was euthanased.

NT

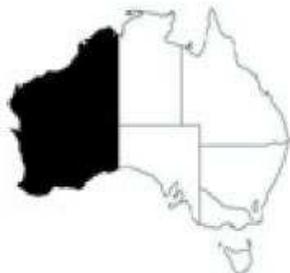
There have been reports of black flying-foxes being found dead on the ground under the trees and under colonies. They are 50-70 day old juveniles, and are emaciated weighing about one-half what they should weigh at that age. It is not a parasite problem, and it appears to be a malnutrition issue associated with the prolonged wet season. Histology results are still pending.



Similar events have occurred in Qld. The Queensland Centre for Emerging Infectious Diseases (QCEID) is going to collate, review and analyse the apparent increasing number of unexplained mass abandonment/morbidity/mortality events in Flying-foxes. QCEID would welcome incident data (via debra.melville@deedi.qld.gov.au) and is currently developing an incident report form which will be available on its website [http://www.dpi.qld.gov.au/4791_18617.htm] in the near future. See previous AWHN Newsletter and the Disease Incident Reports section on our website for further information.

WA

Microfilariasis was diagnosed in a tawny frogmouth showing nervous signs. Microfilaria were found through the body, including the brain, heart, lung, liver and kidney. Further cases will be examined with interest.



‘Swollen paw syndrome’ was suspected in a possum, based on isolation of *Staph aureus* from areas of ulcerative dermatitis on the palmar surface of the paws.

Western ring-tailed possum cases showing neurological signs continue to be submitted. In the most recent case, there were

no significant gross or histological lesions. The Agency responsible opted not to fund external testing for snail bait.

18 silvereyes were found dead in one location. Four sick birds which were unresponsive and showing some twitching were submitted. Organophosphate toxicity was suspected based on a pooled brain cholinesterase level of 5.0 µmol/min/g (testing conducted by Biosecurity Queensland, Department of Employment, Economic Development and Innovation). AI was excluded via PCR.

One case of Avipox was found in a magpie.

SA

There has been one event involving a couple of pigeons found dead at a lead shelter at Port Pirie. Samples were submitted for testing for tissue lead levels, and results came back higher than normal, but not high enough to cause death. Samples were autolysed which has limited further testing. A small colony of Grey-headed Flying-foxes have been seen again in Adelaide this quarter. Unfortunately during a heat wave in January, one pup died. ABLV and Hendra virus exclusion testing was conducted, with negative results.



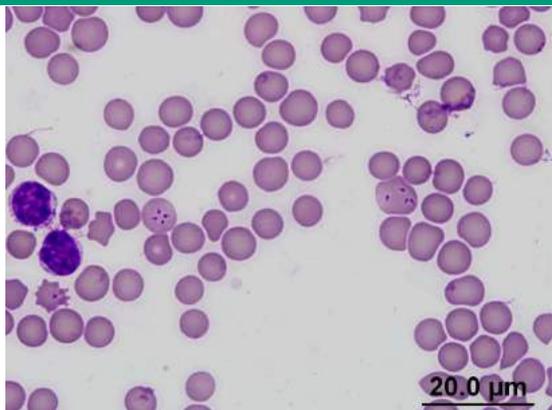
A number of neurological cases in horses are continuing to be investigated. Horses have tested positive for flavivirus, and Australian Kunjin virus was isolated from one horse’s brain. There have been no cases of neurological symptoms in wildlife in South Australia.



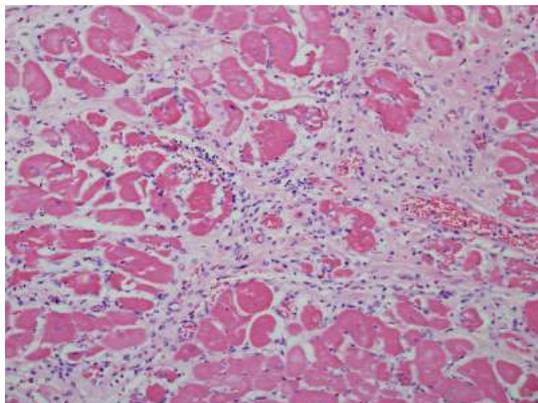
Photo Courtesy of Jane Hall

INTERESTING CASES

The Australian Registry of Wildlife Health



Blood film, Diff Quik stain, 100x oil magnification. *Theileria* within red blood cells of a platypus (*Ornithorhynchus anatinus*). Image courtesy of the Australian Registry of Wildlife Health.



Heart muscle stained with H&E at 20x magnification. Severe changes to heart tissue including necrosis, fibrosis and inflammation. Image courtesy of the Australian Registry of Wildlife Health.

Platypus – wild, NSW

A subadult male in poor body condition was presented after several days in care. Blood work revealed a moderate to marked infection of red blood cells with a parasite (*Theileria*) not uncommonly found in these animals. The animal was treated for the parasite and nursed diligently for approximately one week before deteriorating in condition and dying. Based on histological and bacteriological findings, the animal was suffering from acute enteritis and appeared to have developed a terminal septicaemia with *Staphylococcus* sp. Additional findings included adrenal cortical hyperplasia and splenic histiocytic proliferation. The former indicates this animal was physiologically stressed. The latter is interesting given the ante mortem diagnosis of *Theileriosis*. It is speculated that increased phagocytic cells demonstrating erythrophagocytosis in the spleen were removing infected erythrocytes (7962.1).

Theileria infections have been previously identified in both platypus and bandicoots but have not been related to disease in these species. *Theileria* in platypus have commonly been identified as *Theileria ornithorhynchi* but infection densities have generally been low (Ladds 2009). For immunosuppressed and young individuals however, infection may be more significant (Vogelnest & Woods 2008).

Southern hairy-nosed wombat – captive, NSW

Adult female found in respiratory distress in enclosure mid-morning, but had appeared fine a few hours earlier. No significant changes on gross examination. On microscopic examination, inflammation and degeneration was noted in the heart. Cause of death was acute heart failure as a result of infection with Encephalomyocarditis virus (EMC). Infection was confirmed by virus isolation on three tissues. This virus has been previously reported as the cause of death in common wombats with similar gross and histological changes. In this case, the wombat was possibly exposed through excreta of pest rodents within the enclosure (8021.1).

Historically, EMC Virus has been identified as causing mortality in a number of species, some of which include: tammar wallaby, common wombat, ring tailed lemur, squirrel monkey, mandrill, chimpanzee, pygmy hippopotamus, Goodfellow's tree kangaroo, African elephant, rhinoceros, sloth, llama, orang-utan, baboon and various antelope species. Clinical signs are generally acute to sub-acute death due to cardiovascular insufficiency with pulmonary oedema and a frothy respiratory tract transudate. Gross findings are commonly pale lesions of the heart muscle however definitive diagnosis requires virus isolation from multiple fresh or frozen tissues.

DISEASE WATCH HOTLINE

1800 675 888

The Disease Watch Hotline is a toll-free number that connects callers to the relevant state or

Wildlife Health in Australia is the newsletter of the Australian Wildlife Health Network. The newsletter aims to facilitate communication between people with an interest in Australian wildlife health issues. It is distributed to approximately 500 professionals and others around the country and overseas. We encourage you to show it to others and give us critical feedback on its contents.

If you wish to contribute to a future addition of the newsletter please send (in word format) articles to the AWHN email or postal address with your name and contact details supplied.

Send to: Karen Magee
Australian Wildlife Health Network
PO BOX 20

Phone: (02) 9932 4368
Fax: (02) 9932 4376
Email: kmagee@zoo.nsw.gov.au



WILDLIFE COORDINATORS*

GOT SOMETHING TO REPORT?

We are interested in receiving reports of unusual or mass wildlife mortalities. If you see anything suspicious, please download and complete the submission form (endorsed by Animal

State or Territory	Coordinators	Notes	Address	Contact details
AAD (Australian Antarctic Division)	LESLIE FROST	Government Rep Appointed by the Director, Australian Antarctic Division (DEWR)	Australian Antarctic Division Channel Highway Kingston TAS 7050	leslie.frost@aad.gov.au W: 03 6232 3414 F: 03 6232 3828 M: 0438 624 871
ACT	WILL ANDREW	Government Vet	ACT Veterinary Services Parks Conservation & Lands (Athlon) P.O. Box 158 Canberra ACT 2601	will.andrew@act.gov.au W: 02 6207 2357 F: 02 6207 2093 M: 0419 239 073
NSW	GREG CURRAN	Government rep Appointed by CVO NSW	NSW Industry and Investment PO Box 789 Broken Hill, NSW 2880	greg.curran@industry.nsw.gov.au W: 08 8088 9336 F: 08 8087 3488
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SA	CELIA DICKASON	Government rep Appointed by CVO SA	Disease Surveillance, PIRSA Animal Health Flaxley Agricultural Centre P.O. Box 1571 Flaxley SA 5153	celia.dickason@sa.gov.au W: 08 8391 7125 F: 08 8388 8455
VIC	MARK HAWES	Government rep/ Appointed by CVO VIC	Department of Primary Industries Primary Industries Research Victo- ria 475 Mickleham Rd, Attwood VIC 3049	mark.hawes@dpi.vic.gov.au W: 03 9217 4209 F: 03 9217 4399
WA	TOM HOLLINGSWORTH	Government rep Appointed by CVO WA	Animal Health Laboratory Department of Agriculture, WA Locked Bag 4 Bentley Delivery Service WA 6983	thollingsworth@agric.wa.gov.au W: 08 9780 6280 F: 08 9780 6136
CSIRO	JOHN BINGHAM	Veterinary Research Scientist	AAHL Private Bag 24 5 Portalington Rd Geelong VIC 3220	John.bingham@csiro.au W: 03 5227 5008 F: 03 5227 5565
Other Useful Contacts				
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Australian Wildlife Health Network	TIGGY GRILLO	Projects Coordinator	AWHN P.O. Box 20 Mosman NSW 2088	tgrillo@zoo.nsw.gov.au W: 02 9978 4788 F: 02 9932 4376
Australian Wildlife Health Network	KEREN COX-WITTON	Projects Officer	AWHN P.O. Box 20 Mosman NSW 2088	kcox-witton@zoo.nsw.gov.au W: 02 9978 4579 F: 02 9932 4376
Australian Wildlife Health Network	KAREN MAGEE	Administrative Assistant	AWHN P.O. Box 20 Mosman NSW 2088	kmagee@zoo.nsw.gov.au W: 02 9932 4368 F: 02 9932 4376

*AWHN Coordinators are funded by Animal Health Australia as part of Australia's National Animal Health Information System. We are extremely grateful for their ongoing support.