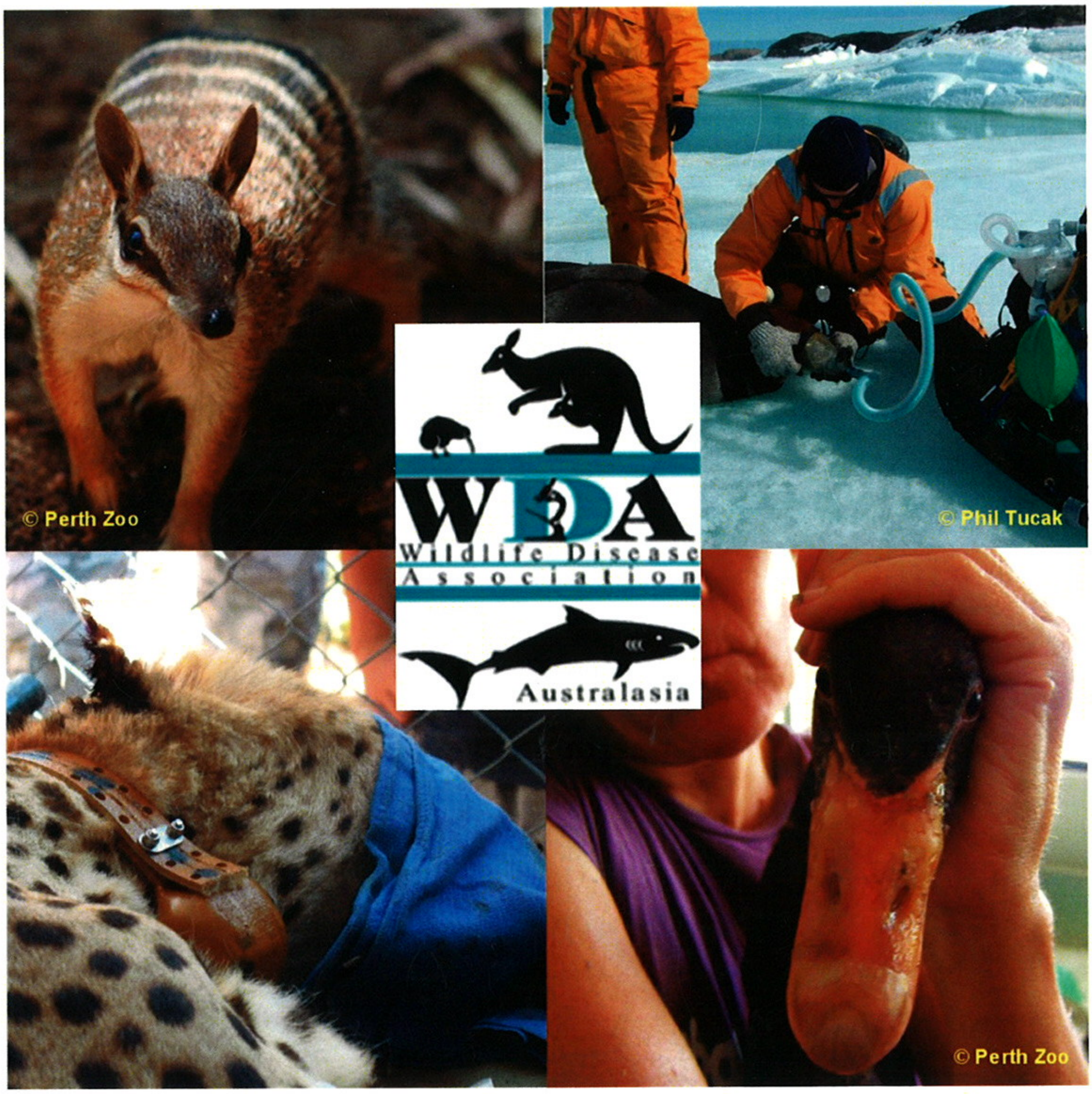

WILDLIFE DISEASE ASSOCIATION (AUSTRALASIAN SECTION)

Annual Conference
September 22nd-28th 2007
Dryandra Woodland, WA

"Health monitoring and disease investigation in population management and species recovery programs"

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Wildlife Disease Association
Australasian Section

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WILDLIFE DISEASE ASSOCIATION (AUSTRALASIAN SECTION)
Annual Conference
September 22nd-28th 2007
Dryandra Woodlands, WA

Conference Information

Welcome to the 2007 annual conference of the Australasian Section of the Wildlife Disease Association Australasian Section. This conference is being held at the Dryandra Lions Village, Western Australia, beginning the evening of Saturday 22nd September (dinner included) and continuing until the morning of Friday 28th September (breakfast included).

Venue Information:
The Dryandra Lions Village is within the Dryandra Woodland, a valuable nature conservation area managed by the Department of Environment and Conservation, Western Australia. This woodland is the largest remnant of original vegetation in the western Wheat belt. It is a site where a number of West Australian endangered and threatened species can be found, including the WA faunal emblem the numbat, as well as woylies, red tailed phascogale and the Carnabys white tail black cockatoo, and is an important conservation and breed-for-release site for some of these species. It is also renowned for its wildflower displays in the Spring.

Food and Accommodation:
Basic accommodation in dormitory style rooms will be available on site in the "Currawong complex". One cabin, sleeping up to 12 people, has also been reserved for student use. This cabin has its own kitchen facilities and can be used by all students to allow for a self catering option. Bunk style beds and mattresses are provided. Attendees will need to provide their own bedding (linen & blankets or sleeping bag, pillow). Accommodation facilities are available for up to 68 people and will be allocated on a first come first served basis. Camping accommodation is available at the Congelin Campground, approximately 10km from the Lions Village. This campground has basic barbecue facilities and drop toilets only. You are encouraged to bring your own water and fees are to be paid directly to the Department of Environment and Conservation (see www.naturebase.com for more information).

For more information on the conference venue visit www.dryandravillage.org.au.

Once again we have secured the fabulous catering services of Shirley and Dennis. Registration will include costs of all of your meals excluding the conference dinner. All main meals will be served at the Currawong complex. A self catering option is available only for students and for family members.

Alternative accommodation options may be organised in Narrogin, the nearest town, approximately 20km from the Dryandra Woodland. For further information, contact the Narrogin Tourist Centre (www.dryandratourism.org.au or www.westernaustralia.com).

Presentations will take place on site in the Lions Village at the Village Hall, a short 50 metre stroll from the Currawong Complex.

Other Activities:
Activities available during the conference period include a spot lighting tour to Barna Mia, the Conference Dinner and a Wine and Cheese Night with a silent auction.

- Barna Mia: This facility is an animal sanctuary with a difference! It is found within the Dryandra Woodland and is a place to discover threatened native marsupials, such as bilbies, boodies (burrowing bettongs), marl (western barred bandicoots) and wurrup (rufus hare-wallabies), in a natural setting. Tour guides take small groups on a spotlighting tour of the facility shortly after the sun has set and use specially placed lights to view these remarkable animals. We have two tours booked, with a total of 50 places available (25 per night) – these will be allocated on a first come first served basis.
- Conference Dinner: The dinner is planned for the night of Monday 24th September and will be held at the Duke of York Hotel, Narrogin.
- Wine and Cheese Night: This function will be held on the night of Tuesday 25th September and will provide an opportunity to sample some well reputed Western Australian wines and cheeses. During the night, we would also like to run a silent auction as a fund raising activity, with the money raised to go to a conservation based project to be determined at the WDA-A AGM. To help with the silent auction, it would be greatly appreciated if conference attendees could donate an item to auction off – it can be as good or bad as you would like it to be!
- Behind the Scenes tours at Perth Zoo: After breakfast (and any last minute presentations) on Friday morning, we will return to Perth, and for those who may be interested, there will be the offer of some tours behind the scenes at Perth Zoo. These tours will visit the Veterinary Department, Native Species Breeding Area and the Reproductive Biology Unit.
- Noongar Welcome: In respect to the traditional owners of the Dryandra Woodland, we are planning to have a presentation/welcoming from members of the local Noongar (Aboriginal) tribe.
- The Great Marsupial Nightstalk: Spring is also the time of year for the national Great Marsupial Nightstalk, one of the largest censusing programs for marsupials around the country. We hope to make some facilities and equipment available for attendees to undertake some night time spotlighting through the park and assist in contributing to this survey.
- Walking Trails: There are numerous walking trails around the Dryandra Woodland which are well signposted. Some pass sites of significance to the Noongar community, whilst others take hikers through some of the different environments within the woodland. A signposted night walk with reflective markers is also in close proximity to the Lions Village.
- Driving Trails: There is a 25km audio drive trail, where you can tune in to commentary on the history and significance of the woodland through your car radio, as well as a 23km interpretive drive trail.
- Other Activities in the local area: The nearest major town, and the main business town for the region, is Narrogin, approximately 20km from the Dryandra Woodlands. Attractions around Narrogin include the Albert Facey Homestead, Narrogin Arts and Crafts and Old Courthouse Museum. There are also a number of wineries in the local region. Go to www.dryandratourism.org.au for more information.

Post-conference options:
The south-west of Western Australia is listed as one of the world's top 25 biodiversity hotspots. There are a large number of other national and regional parks in the region with important conservation significance. The area also includes the Margaret River wine region, renowned around the world for its quality wines as well as its stunning surf beaches and coastal scenery. For more information on these and for more ideas, go to the Tourism Western Australia website, www.westernaustralia.com, or the Department of Environment and Conservation website, www.naturebase.net.

WDA 2007 Conference Program

Day	Author	Title
Sunday		
9.00	Paul Eden	Welcome to conference
9.30	Noongar	Indigenous aspects of Dryandra and surrounding country
10.00	DEC	History, flora and fauna of Dryandra Woodland
10.30	[redacted]	
10.45		
11.00	John Bingham	Immunohistochemical detection of infectious pathogens in wildlife
11.20	Jeff McKee	Multidisciplinary approaches to managing disease risk in wildlife: disease ecology of the Australian white ibis (*Threskiornis molucca*)
11.40	Sam Gibbs	West Nile virus – experiences in North America, lessons for Australia?
12.00	Shan Siah	Analysis of disease risk in a small mammal release - real challenges and practical solutions
12.20	[redacted]	
12.40		
1.00		
1.20		
1.30	Phil Tucak	Studying Weddell Seals in Antarctica
1.50	Mark Bennett	Papillomatosis in a southern brown bandicoot (*Isodon obesulus*) in Western Australia
2.10	Simone Vitali	An outbreak of atypical Mycobacteriosis in Gouldian finches caused by *M. peregrinum*
2.30	Peter Phillips	*Mycobacterium avium* subsp. *paratuberculosis* in Kangaroo Island macropods.
2.50	Kimberley Vinette Herrin	Stifle osteochondritis dissecans in sibling snow leopards (*Uncia uncia*)
3.10	Jasmin Hufschmid	Skin histopathological findings in a mountain brush tail possum (*Trichosurus cunningham*) population with a high prevalence of 'rump wear'
3.30	[redacted]	
3.50		
4.00	Maurice Alley	Outbreaks of Avian Malaria in Threatened New Zealand Endemic Species
4.20	Maurice Alley	What causes oral fistulas in hihi (or stitchbirds) *Notiomystis cincta*?
4.40	Kerri Morgan	Gastrointestinal and renal histopathology of coccidiosis in the North Island brown kiwi
5.00	[redacted]	
Monday		
9.00	Anne Fowler	Treatment of Burnt Wildlife
9.20	Paul Eden	Suspected Annual Ryegrass Toxicity in an adult Southern white rhinoceros (*Ceratotherium simum simum*)
9.40	Teri Bellamy	Cryosurgery as an adjunct to surgical excision of a malignant melanoma in a carpet python
10.00	Teri Bellamy	Endometritis in a rhesus macaque
10.20	[redacted]	
10.40		
11.00	Stephanie Shaw	Mortality and Morbidity in captive New Zealand Native Frogs (*Leiopelma* species)
11.20	Lee Berger	Survey protocol for chytridiomycosis in all Australian frog populations
11.40	Simone Vitali	The use of itraconazole baths in the treatment of chytridiomycosis at Perth Zoo
12.00	Bonnie McMeekin	Apparent cure of chytridiomycosis in four frogs after treatment with oral terbinafine, and toxicity trials of three antifungal medications in tadpoles.
12.20	Lee Skerratt	Comparison of real time PCR with histology for diagnosis of chytridiomycosis in amphibians
12.40	All attendees	Discussion of Amphibian issues
1.00	[redacted]	
1.15		
1.30		
1.45		
2.00	Paul Eden	Ulcerative dermatitis from suspected photosensitisation in black swans (*Cygnus atratus*)
	Ian Smith	Conservation and recovery programs at Monarto Zoo.
2.40	Andrew Li	Presence of Spotted Fever Group rickettsiae in ticks from feral pigs in Western Australia
3.00	Dave Spratt	Succession of small mammal species and their helminth parasites following wildfire
3.20	Pin Needham	A whale of a time!
3.40	Free Time - head in to Narrogin for Conference Dinner	
4.00		
5.00		
7.00	**Conference Dinner - Duke of York Hotel**	

Day	Author	Title
Tuesday		
	Free Time	
10.00	Rupert Woods	AWHN Plenary
10.30	Tom Hollingsworth	Surveillance for Avian Influenza in Wild Birds in South-west W.A.
11.00	[redacted]	
11.30	Adrian Wayne	Diagnosing recent woylie declines in South-Western Australia
12.00	Paul Eden	Clinical aspects of disease investigations in population declines of woylies (*Bettongia penicillata ogilbyi*)
12.15	Graeme Knowles	Results of woylies (*Bettongia penicillata*) submitted for necropsy to Murdoch University, September 2005 to May 2007.
12.30	[redacted]	
1.00		
1.30		
2.00	Carlo Pacioni	Woylie (*Bettongia penicillata ogilbyi*) conservation genetics project
2.20	Susana Averis	Trypanosomes in relation to the diagnosis of woylie declines: prevalence and molecular characterisation
2.40	Andy Thompson	Prevalence and Diversity of Woylie Endoparasites: From Individuals to Populations and Sympatric Species
3.00	Andy Thompson	Toxoplasma in Woylies
3.30	[redacted]	
4.00	Yazid Abdad	Potential bacterial pathogens in Woylies from SW WA
4.20	Halina Burmeij	The biodiversity, ecology and importance of ectoparasites in the woylie (*Bettongia penicillata*) and sympatric species.
4.40	Pam Whiteley	WDA and its activates
5.00	[redacted]	
7.00	**Wine and Cheese/Silent Auction**	
Wednesday		
8.00	Free Time	**AWHN AGM**
9.00		
10.00	[redacted]	
10.30	Judy Clarke	Health and mortality of translocated Western Ringtail possums
10.50	Helen McCutcheon	Infectious disease surveillance in Western Ringtail and Common Brush tail possum populations
11.10	Gillian Bryant	Haematological characteristics of the south-west carpet python (*Morelia spilota imbricata*): factors that affect blood values
11.30	Anna Le Souef	Conservation of Black Cockatoos (*Calyptorhynchus* spp.) in Western Australia: the development of prognostic and conservation value indicators for rehabilitation of debilitated birds
11.50	Lucy Woolford	Frequency, geographical distribution and potential risk factors associated with a papillomatosis and carcinomatosis syndrome in the endangered western barred bandicoot (*Perameles bougainville*) of south-western WA
12.10	Sabrina Trocini	Health assessment of Loggerhead turtles (*Caretta caretta*): nesting females and hatchlings
12.30	Rebecca Vaughan	Epidemiological aspects of health management of the Gilbert's potoroo
1.00	[redacted]	
1.30		
2.00	Karrie Rose	The Australian Registry of Wildlife Health
2.30	Richmond Loh	Musings on the Tasmanian devil facial tumour disease research from the ground up
3.00	Anne Fowler	The Wildlife Health and Conservation Centre
3.30	[redacted]	
4.00	Carlo Pacioni	Wildlife disease passive surveillance: Are wildlife rehabilitation centres a tool? A case study
4.20	Alicia Kasbarian	Developing conceptual frameworks to understand wildlife health in Australia
4.40	Peter Holz	Active surveillance in a passive world
5.00	[redacted]	
6.30	**Barna Mia Tour**	

Thursday		
9.00	Free Time	**WDA AGM**
10.00		
11.00	[redacted]	
11.30	Rupert Woods	Mortality of wild birds in Esperance, WA
11.50	Chris Bunn	Avian Influenza surveillance program in wild birds in Australia
12.10	Jar Siengsanaan	Avian Influenza surveillance in Thailand (poster)
12.30	Mitsuhiko Asakawa	Viral and parasitic disease monitoring program of Japanese avian species performed by the Wild Animal Medical Centre (WAMC), Rakuno Gakuen University
12.50	[redacted]	
1.10		
1.30		
1.45		
2.00	Ian Smith	Mainland Tammar Wallabies (*Macropus eugenii eugenii*), back from beyond the brink.
2.20	Paul Eden	Cheetah Conservation Botswana
2.40	Shan Siah	Veterinary support on capture attempts of the critically endangered Po'ouli (*Melamprosops phaeosoma*, Hawaiian honeycreeper) in the rainforest of Maui as part of the species recovery plan
3.00		
3.20	[redacted]	
3.40		
4.00		
4.30	**Conference Close**	
5.00		
6.30	**Barna Mia Tour**	
Friday		
8.30	**Return to Perth for Zoo BTS's**	
12.30	**End BTS's**	

Immunohistochemical detection of infectious pathogens in wildlife

John Bingham
CSIRO Australian Animal Health Laboratory, Geelong, VIC 3220, Australia
Email: **John.Bingham@csiro.au**

Recent advances in genetic cloning methods have enabled the development of relatively cheap high quality polyclonal antisera against recombinant viral antigens. Such antisera can be used in immunohistochemistry tests to confirm pathogen infections in formalin-fixed tissue sections with a high degree of reliability. Monospecific (monoclonal and recombinant) antibodies can also be used, but they tend to be more expensive to develop and their sensitivity in formalin-fixed tissues is, in many cases, less consistent. The Histopathology Laboratory at CSIRO Australian Animal Health Laboratory has an expanding range of diagnostic tests that can be used in the immunohistochemistry format to identify various infectious pathogens of animals, including those of wildlife. Currently, these include the transmissible spongiform encephalopathies, influenza A viruses, lyssaviruses, West Nile virus, Wallal virus, the Henipaviruses and Newcastle disease virus. As the pathogen-derived antigenic material is visualised in relation to host cell morphology, and in context in histopathalogical lesions, the immunohistochemistry test provides a high degree of value to the diagnostic significance of a staining reaction, and may also give insight into pathogenesis. This presentation will discuss the various applications of immunohistochemical testing and its value for the diagnosis of infectious disease and identification of pathogens of wildlife.

Multidisciplinary approaches to managing disease risk in wildlife: Disease ecology of the Australian white ibis *Threskiornis molucca.*

Jeffrey J McKee[1], Jonathan H Epstein[2] and Phillip P Shaw[1]
[1]Mobile Disease Ecology Unit, Ecosure, 43 Tallebudgera Creek Rd. West Burleigh QLD 4218 Australia; [2]The Consortium for Conservation Medicine, 460 West 34th Street, 17th Floor, New York, NY10001, USA; jmckee@ecosure.com.au

On the east coast of Australia the ecology of Australian White Ibis (Ibis) *Threskiornis molucca* has radically altered over the past twenty years. Ibis have redistributed from drought affected inland waterways into coastal urban habitats and have become urban refuse scavengers. In turn their nesting stringency has relaxed, their breeding season has expanded, their clutch sizes and numbers have increased and their home ranges have contracted. Consequently Ibis numbers have rapidly increased in many metropolitan areas giving rise to fauna displacement, remnant habitat degradation, public nuisance, increased collision risk to air traffic and novel interspecies interactions. Behavioural studies between 1994 and 2000 documented frequent close interactions between Ibis and humans and production animals, graphically highlighting an increased risk for disease transmission between species. Microbiological and serological surveys of Ibis between 1995 and 2007 detected pathogens including Salmonella (5%), Avian Influenza Virus (30-45%), Kunjin Virus (1%) and Newcastle Disease Virus (8-22%). Management is primarily aimed at reducing breeding success and restricting anthropogenic food sources. These measures are supplemented with active dispersal programs and public education programs. Management strategies are coordinated by regional groups comprised of ecologists, veterinarians, landfill managers, state environmental protection agencies, council officers, local conservation groups and aviation safety consultants. However proactive and ecologically targeted disease prevention programs such as this raise difficult questions. Firstly, most significant disease mitigation programs are reactive - funding is hard to get in the absence of catastrophe. Secondly how do we assess effective management when success is measured by the absence of a disease outbreak? Thirdly, do we really have the knowledge and ability to accurately correlate ecological flux to disease risk? Is there a "science" of predictive disease ecology or are we just guessing?

West Nile virus – experiences in North America, lessons for Australia?

Samantha E. J. Gibbs
Australian Animal Health Laboratory, CSIRO Livestock Industries, Geelong, Australia

West Nile virus (WNV) was introduced into North America in 1999. From New York City, it quickly spread to the west coast, Canada, Mexico, Central and South America, as well as the Caribbean. The impact this virus had on wild bird populations, equine and reptile industries, and human health in North America was unprecedented. Little is known about the potential impacts WNV might have if introduced to Australia; the wildlife reservoirs, vectors, and susceptible dead-end hosts of WNV are, however, all found on this continent.

Analysis of disease risk in a small mammal release – Real challenges and practical solutions.

W. Shan Siah
Zoo and Wildlife Veterinarian, Perth, Western Australia.

An analysis of disease risk was required as part of best practice methods being developed for the release of captive bred Eurasian harvest mice (*Micromys minutus)* into fields in North-west England. The major challenge was drawing up a definitive list of diseases to investigate because there was scant published information on diseases of harvest mice and to a lesser extent, in-contact small mammal species at the release site. A risk analysis table and other models helped discussion and subsequent decision on a core list. This list included organisms known to cause severe welfare issues in either the released or wild animal species, or serious threats to public health such as epidemics of infection with *Mycobacterium microti* or the *Mycobacterium tuberculosis* complex, *Salmonella spp.,* antibiotic resistant *Escherichia coli, Campylobacter spp.* and vancomycin resistant enterococci. A further list of other organisms to screen for was based on potential impact on short and long term survivability, or to provide extra information on organisms where the assays were available. This list included Cowpox and Lymphocytic Choriomeningitis viruses, *Bartonella spp.*, external parasites and intestinal helminths. Other challenges were associated with obtaining samples, generating statistically reliable results, conflicts of interest or personal beliefs of stakeholders, and costs, expertise and time required. In a broader context, it has been shown that a logical and collaborative approach such as used in this case, can help evaluate known disease threats and other potential diseases to give increased confidence in deciding to proceed or not with the release. Results can also form the basis for future investigations, monitoring and control programmes.

Studying Weddell Seals in Antarctica

Dr Phil Tucak BSc BVMS CMAVA

Antarctica offers a largely untouched wilderness that is home to a variety of marine-life including Weddell Seals (*Leptonychotes weddelli*). Veterinarian Dr Phil Tucak worked with a field-biology team studying the population numbers and body condition of Weddell Seals in the ice covered fjords of the Vestfold Hills region just north of Australia's Davis Station in Antarctica. Using a portable isoflurane anaesthetic machine, the team caught adult female Weddell Seals and their pups, and weighed and measured them to further assess the seals body condition. As the Murdoch University Veterinary Trusts BJ Lawrence Veterinarian in Residence for 2006, Dr Tucak presents a brief overview of his experiences working with Weddell Seals in Antarctica.

Papillomatosis in a southern brown bandicoot (*Isodon obesulus*) in Western Australia.

Mark D. Bennett[1], Lucy Woolford[1], Tim Oldfield[2], Amanda J. O'Hara[1], Philip K. Nicholls[1], Kristin S. Warren[1]
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An adult male southern brown bandicoot (*Isodon obesulus*) in poor health was found at Lesmurdie, Western Australia in April 2007. During initial examination, multifocal to coalescing irregular, raised, alopecic, erythematous cutaneous lesions were observed over the flanks, face and limbs. Routine skin scraping was performed, but no ectoparasites were identified. Initial treatment included weekly oral Ivomec® and Malaseb baths. During treatment, the bandicoot's weight increased as did his level of activity. There was improvement of the skin condition noted during a follow up visit, but still the lesions persisted. Due to the similar appearance of the skin lesions to those described in western barred bandicoots (*Perameles bougainville)*, papillomatosis was suspected. The bandicoot was subsequently examined at Murdoch University and skin biopsies were collected under general anaesthesia for histopathology, microbiology, electron microscopy and molecular investigations. A small volume of blood was collected from which blood smears were prepared. Routine histopathology revealed locally extensive epidermal hyperplasia of the strata spinosum and granulosum, with moderate anisokaryosis and anisocytosis of keratinocytes. There were also multifocal neutrophilic infiltrates in the superficial dermis and epidermis and mild dermal oedema. Fungal culture failed to demonstrate any significant fungal organisms. No viral particles were seen using transmission electron microscopy. Total DNA was extracted from a skin lesion and an aliquot subjected to multiply primed rolling circle amplification. This technique amplified DNA which upon restriction enzyme analysis indicated a possible circular DNA viral genome of approximately 7.3kb. Using three PCR primer sets specifically designed to amplify regions of the tentatively named *Perameles bougainville* papillomavirus type 1 (PbPV) genome, and one degenerate primer set FAP59/64, amplicons were obtained for DNA sequencing. Sequence analysis revealed that the southern brown bandicoot virus isolate's amplicons using FAP59/64, MBL1, MBL2r and MBsTag primer pairs showed 80%, 79%, 75% and 91% homology with corresponding regions of the PbPV genome respectively. Low numbers of *Hepatozoon* sp. were identified in blood smears. Here we report a case of virus-associated papillomatosis in a southern brown bandicoot.

Acknowledgements
This project is funded by the Australian Research Council in partnership with Murdoch University and the Western Australian Department of Environment and Conservation (DEC) under Linkage Project LP0455050. Special thanks to Kanyana Wildlife Rehabilitation Centre, Peter Fallon for his assistance with electron microscopy, Dr. Phillip Clark and the Murdoch University Clinical Pathology laboratory.

An outbreak of atypical Mycobacteriosis in Gouldian finches caused by *M. peregrinum*

Simone Vitali, Paul Eden, Karen Payne, Rebecca Vaughan
Perth Zoo

An outbreak of Mycobacteriosis was detected in an aviary containing Gouldian finches (*Erythrura gouldiae*) and golden-shouldered parrots (*Psephotus chrysopterygius*). Affected birds developed mild granulomatous lesions, usually of the liver and intestine. *M. peregrinum*, a species of the *M. fortuitum* group, was cultured on pooled samples of intestinal tract from 31 euthanased finches. These rapid-growing mycobacteria are saprophytic organisms, generally not associated with clinical disease in immunocompetent hosts. This is the first report of mycobacteriosis in finches implicating *M.peregrinum* as an aetiological agent. The diagnostic and management implications of this outbreak to the collection will be discussed.

Mycobacterium avium subsp. *paratuberculosis* in Kangaroo Island macropods.

Peter Phillips, Paul Cleland & Debbie Lehmann

A survey to determine the prevalence of *Mycobacterium avium* subsp. *paratuberculosis* (*M.a.ptb*) in the 2 macropod species, the Western Grey kangaroo (*Macropus fuliginosus fuliginosus*) and the Tammar Wallaby (*M. eugenii*), which inhabit Kangaroo Island, S.A., was undertaken in 2 phases. *M.a.ptb* Causes the chronic diarrhoea and wasting condition known as Johne's disease (JD) in domestic livestock. On Kangaroo Island JD is prevalent in sheep.

In phase 1 (2000-2001) 8 of 482 macropods (1.7%) were tissue culture positive for *M.a.ptb*. Intestine and associated lymph nodes were cultured. Two animals that were tissue culture positive also had gross and histopathology lesions consistent with JD. Acid-fast bacilli (AFB) consistent with mycobacteria were detected histologically in 6 tissue culture negative animals. Individual faecal cultures from all animals tissue culture positive and with histologically detected AFB were negative. Pooled faecal cultures (n=20) from the remainder were negative. Phase 2 (2002) focussed on faecal excretion of *M.a.ptb* by the macropods. There were no positive faecal cultures in pools (n=20) from 358 Tammar wallabies. Twenty seven wallabies with JD-suggestive gross pathology were subjected to individual tissue culture, faecal culture and histopathology. Six of these had histopathology consistent with mycobacterial infection, but none were tissue culture or faecal culture positive. Shavings from histological blocks of these 6 animals were subjected to polymerase chain reaction (PCR) analysis. There were no results from 5 animals, with 1 animal returning a PCR result most consistent with *Mycobacterium genavense*. It was shown that *M.a.ptb* can infect and establish pathological lesions in macropods, however given that faecal excretion of the organism was not demonstrated in either phase of the survey, we suggest that ovine JD is unlikely to persist in the macropod population, which is unlikely to act as a source of re-infection for sheep.

Stifle osteochondritis dissecans in sibling snow leopards (Uncia uncia)

Kimberly Vinette Herrin; Graeme Allan; Anthony Black; Rolfe Howlett

Sibling snow leopards (*Uncia uncia*) (1.1) at Taronga Zoo presented with intermittent hind limb lameness at approximately one year of age; the female having displayed an episode of lameness at six months. The female cub had radiographic evidence of osteochondritis dissecans (OCD) of the right lateral femoral condyle. The male had radiographic evidence of osteochondrosis of the right lateral femoral condyle which was radiographed eight weeks later and diagnosed at that time as OCD. Both cubs underwent surgical correction of the OCD lesions via lateral arthrotomy, flap removal and debridement of the defect site. Histopathology confirmed the diagnosis of OCD. Post-operatively, both cubs developed seromas at the incision sites and mild lameness which resolved within a month's time. To date, both cubs have been orthopedically sound for over six months. Osteochondritis dissecans has rarely been reported in domestic felids and to the authors' knowledge; these are the first reported cases of OCD in non-domestic felids.

Skin histopathological findings in a mountain brush tail possum (*Trichosurus cunninghami*) population with a high prevalence of "rump wear"

J Hufschmid[1,2], I Beveridge[1], K Handasyde[2]
[1]School of Veterinary Science, University of Melbourne, Werribee
[2]Department of Zoology, University of Melbourne

The disease "rump wear", which manifests itself by varying degrees of damage to the coat and skin of the rump region, is perhaps the most common disease of brush tail possums (*Trichosurus sp.*). It has been suggested that "rump wear" is an immune-mediated disease associated with the presence of ectoparasites. The results presented here are part of two years of sample collection from a free-ranging population of mountain brush tail possums at Boho South, Strathbogie Ranges, Victoria. Samples collected included 6mm skin punch biopsies from the rump region of a large number of possums with and without rump wear. The biopsies were examined for histopathological changes associated with rump wear, as well as hair follicle activity, and the findings will be presented in this paper.

Outbreaks of avian Malaria in threatened New Zealand endemic species

M.R. Alley
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Avian malaria has been recognised in introduced birds in New Zealand since biologists first used light microscopes to examine blood smears more than 80 years ago. But since that time, there have been few reported clinical cases of *Plasmodium* infection in birds in New Zealand. Recently however, warmer summer temperatures have lead to increased numbers and range of breeding mosquitoes particularly *Culex quinquelasciatus* which are now invading southern parts of the country and are known vectors of *Plasmodium* organisms. Two outbreaks of malaria have recently been seen in South Island saddlebacks (*Philesturnus carunculatus).* These birds disappeared from the mainland of New Zealand were reduced to 36 in number in 1964 necessitating translocation from a remote southern island to several other offshore islands where they have since flourished. During the summer of 2003 the saddleback population on Moturoa island (59 ha) in the Marlborough sounds reached about 150 birds. When Department of Conservation rangers arrived to harvest birds for further translocation, only about 60 remained together with a few decomposing carcasses. Necropsy of a sick bird revealed severe lesions of hepatitis and splenitis associated with intracytoplasmic protozoal organisms resembling *Plasmodium* Earlier this year a similar situation occurred on neighbouring Long Island (172 ha) and the necropsy findings in 2 freshly dead birds that were recovered were consistent with *Plasmodium* infection. Concurrent pox virus infection was also seen in several affected birds. PCR analysis of infected tissue has shown that the *Plasmodium* organism is a new species which may be native to saddlebacks and which has also been recovered from the more numerous, healthy, North Island saddlebacks. Another malaria outbreak occurred during 2004 in yellowheads (mohua, *Mohoua ochrocephala*) wild caught in the South Island Blue Mountains and transported to a captive breeding facility near Christchurch. Five of 8 birds died of *Plasmodium* infection within 2 months and a third survived for another year following treatment with Chloroquine and Doxycycline. Samples collected from blackbirds in the region showed high levels of parasitism by *Plasmodium relictum* suggesting that contact with infected introduced birds was the likely source of this infection.

References

Laird, M. (1950). Some blood parasites of New Zealand Birds. Zoology Publications from Victoria University College. 5: 2-15.
Tompkins, D and Gleeson, DM. (2006). Relationship between avian malaria distribution and an exotic invasive mosquito in New Zealand. *Journal of the Royal Society of New Zealand. 36 (2): 51-62.*

What causes oral fistulas in hihi (or stitchbirds) *Notiomystis cincta* ?

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Oral fistulas have been found in the floor of the oral cavity adjacent to the tongue in many adult hihi (stitchbirds) in New Zealand. The prevalence and cause of the lesions was investigated in a population of birds breeding on Tirritiri matangi Island near Auckland. All birds were the progeny of 40 individuals translocated from Little Barrier Island in 1996 but no fistulas were observed in the birds at the time of translocation. The lesions were found to occur in about 10 -12% of adult hihi examined but were not seen in chicks. The earliest fistulas were observed in < 5% of birds at about 1-2 years of age, took the form of small slits 2-3mm in length parallel and adjacent to the lower mandible and usually located mid way between the tip and base of the lower beak. In some birds the tongue protruded intermittently through the fistula and as the defect then enlarged the tongue protrusion became permanent. In some older birds the defect involved the whole of the ventral oral floor and the tongue protrusion produced erosion of the ventral surface of the mandible.

Small to moderate fistulas had no effect on body condition or productivity but severe fistulas with permanent tongue deviation, affected nectar feeding and in some cases reduced the female's ability to successfully rear fledglings. Histopathology showed that the fistulas occurred in the thinnest region of the floor of the oral cavity near its attachment to the mandible. The discovery of an oral abscess in one bird at this site and the known ability of hihi to ingest large insects, suggests that the defects may arise from injury to the floor of the oral cavity during feeding.

References

Castro, I. and Taylor, J. (2001). Survival and reproductive success of stitchbird (hihi, *Notiomystis cincta)* suffering from a bill abnormality (oral fistula). *Nocturnes 48, 241-244.*
Low, M. Alley, M.R. and Minot, E. (2007). Sublingual oral fistulas in free-living stitchbirds *(Notiomystis cincta). Avian Pathology, 36(2), 101-110.*

Gastrointestinal and renal coccidiosis in the North Island brown kiwi *(Apteryx mantelli)*

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Available data indicates that coccidiosis is the most important parasitic disease in juvenile kiwi, and it is one of the main limiting factors of successful rearing of kiwi in captivity. The initiation of Operation Nest Egg, where wild eggs are hatched and raised in captivity prior to release, has resulted in the marked elevation in density and high turnover of kiwi chicks. This has increased the risk of exposure to and subsequent infection with disease, including coccidia. Renal coccidiosis in the North Island brown kiwi was first reported almost 30 years ago (Thompson and Wright 1978). Since then, there have been scant reports in the literature of both intestinal and extraintestinal forms of coccidiosis (Boardman 1995). One third of all juvenile North Island brown kiwi recorded on the New Zealand Wildlife Pathology database ("Huia") during the period from 1991-2004 showed histopathological evidence of coccidial infection (NZWHC 2006). Some of these were most likely to be incidental, but many were considered to have significantly contributed to death of the bird. Around 80% of all cases of coccidial infections were in juvenile birds, and the majority were from captive institutions (NZWHC 2006). A survey of free-living kiwi found that 81% of cases of coccidiosis were in kiwi less than two years old (Jakob-Hoff, Buchan et al. 1999). Oocyst morphology suggests there are at least two, possibly three, species of coccidia infecting the North Island brown kiwi. Previous work has shown that at least one of these is of the *Eimeria* species (Charleston 2005). This paper will present the results of a retrospective histopathological study of coccidial infections of the gastrointestinal and renal systems of kiwi recorded over the last 15 years. The possible life cycle of the coccidia species infecting the intestinal tract will be hypothesised based on the histopathological findings.

References

Boardman, W. (1995). "Causes of mortality in North Island brown kiwi at Auckland Zoo 1960-1994." Kokako **2**(1): 11-13.
Charleston, W. A. (2005). Personal Communication.
Jakob-Hoff, R., B. Buchan, et al. (1999). "Kiwi coccidia - North Island survey results." Kokako **1**(6): 3-5.
NZWHC (2006). Huia Database, New Zealand Wildlife Health Centre, Massey University.
Thompson, E. J. and I. G. A. Wright (1978). "Coccidiosis in kiwis." New Zealand Veterinary Journal **26**(6): 167.

Treatment of Burnt Wildlife

Anne Fowler BSc (Vet) (Hons), BVSc, MACVSc (Avian Health)

The essential component to treating burnt wildlife is providing adequate rehydration and effective burns treatment. Unlike humans, burnt wildlife may be treated for burns many days after the initial injury. It is important to describe the burn accurately as superficial, superficial partial thickness, deep partial thickness or full-thickness burns as each of these levels carries with it a predictive value for the period of time in care. As has occurred in Victoria over the past years, burnt wildlife may present as either an individual or in the hundreds. A simple, effective and low cost protocol is required that permits wildlife care organizations and veterinarians to source donations ahead of the fire season, and apply treatment that is sound and consistent. Under sedation or anaesthesia, burns must initially be cleaned in saline for 10 minutes to remove soot and debris. Pieces of dead skin may be debrided at this stage as aggressive debridement will hasten the healing process. Wet-to-dry dressings are applied for the first 3 – 5 days until debridement has been achieved and granulation tissue is present. Alternate day dressings with Silvazine cream ® (Smith & Nephew), and a non-adherent semi-occlusive dressing such as Melolin (Smith & Nephew) under a bandage is required until healthy pink skin is seen. Concurrent treatment with antibiotics, such as enrofloxacin (Baytril, Bayer) are chosen for their spectrum against *Pseudomonas aeroginosa* and other faecal coliforms. Pain relief in the hydrated patient with non-steroidal agents such as meloxicam (Metacam, Boehringer-Ingelheim) is also recommended. The supportive care of the patient must not be forgotten as the burns have a systemic effect of the gut, liver and kidney. The metabolic requirement during the treatment of burns is up to three times maintenance requirements.

Suspected Annual Ryegrass Toxicity in an adult Southern white rhinoceros (*Ceratotherium simum simum*)

Paul Eden, Karen Payne, Rebecca Vaughan, Cree Monaghan.
Perth Zoo

In February 2006, Perth Zoo's adult male rhinoceros presented with acute onset neurological signs, with evidence of hyperaesthesia and ataxia in response to stimulation. A suspected diagnosis of Annual Rye Grass Toxicity (ARGT) was made and a full recovery was achieved. This condition is relatively common amongst domestic livestock in southern and western Australia, however this is believed to be the first report of ARGT in a Southern White rhinoceros. This case report will discuss the events of this situation and compare ARGT with Perennial Ryegrass Staggers, previously reported in rhinoceros at Auckland Zoo.

Crysosurgery as an Adjunct to Surgical Excision of a malignant melanoma in a Carpet Python

Teri Bellamy

A large Coastal Carpet Python was presented with a firm mass 1/3 the way down the body over the dorsal spine. The mass was excised but primary skin closure was not achieved. Histopathology revealed the mass to be a malignant melanoma extending to the surgical margin. Cryosurgery was used to reduce the likelihood of recurrence of the tumour. After six months no recurrence or metastases have been found.

Endometritis in Rhesus Macaque

Teri Bellamy

A 14yr old female Rhesus Macaque was presented with lethargy, anorexia and a distended abdomen. Biopsy indicated severe endometritis and the macaque was treated with synthetic progesterones. She recovered well on medication but relapses when she reuses her medication.

Amphibians At Large

Mortality and Morbidity in Captive New Zealand Native Frogs (Leiopelma species)

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The New Zealand frog fauna currently comprises four extant species of the genus *Leiopelma;* i.e., *L. archeyi* (Archey's frog), *L. hamiltoni* (Stephens Island frog), *L. hochstetteri* (Hochstetter's frog) and *L. pakeka* (Maud Island frog)(Bishop et al 2006), all of which are to some degree threatened (Hitchmough et al 2007). As part of the Department of Conservation's native frog recovery programme, captive populations have been established in a number of localities for all species, except *L. hamiltoni,* to aid research or as captive breeding populations. In the year 2000, a major population decline of *L. archeyi* occurred on the Coromandel peninsula, possibly associated with amphibian chytrid fungus (Bell et al 2004). As a response, a new captive *L. archeyi* population of animals from Whareorino was established at Canterbury University (CU) where, at this time, the majority of native frog holdings from other populations and species were also kept. In late September 2004, a decision was made by the Department of Conservation (DOC) to move all species to separate institutions; this was achieved over the following two years. All living *L. archeyi* from CU were moved to Auckland Zoo (AZ). These consisted of progenies from both Coromandel peninsula and Whareorino populations. All living *L. hochstetteri* from CU were moved to Hamilton Zoo (HZ). Twelve living *L. pakeka* were moved to the University of Otago (OU) for further study and thirty were transferred to Karori Sanctuary in Wellington for release. The aim of this study was to analyze available data on mortality events in captive native frogs that originated in the wild. Specifically, we aimed to examine the data for associations with the following variables: Species, Husbandry, Duration in captivity, Collection site; Sex; Cause of death. This study was based on records from 26th November, 2000 to November 27th, 2006 and therefore excludes data regarding *L archeyi* Whareorino population wild caught late 2006, which are now at both Auckland Zoo and the University of Otago. *L. archeyi* and *L. hochstetteri* had similar overall average mortality but in different yearly patterns. *L. pakeka* had very low mortality. The major cause of mortality for *L. archeyi* and *L. hochstetteri* was bacterial septicaemia and dermatitis thought to be induced by a combination of husbandry factors. Disease syndromes not seen before in amphibians were dermal blisters and rhabdomyolysis.

Survey protocol for Chytridiomycosis in all Australian frog populations

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Spread of the amphibian chytrid fungus *Batrachochytrium dendrobatidis* (Bd) has caused the decline and extinction of frogs worldwide, but the distribution of Bd is incompletely known. This survey protocol provides a simple and standard method for sampling all frog populations in Australia by Polymerase Chain Reaction (PCR). The protocol aims to maximise the chances of detecting chytridiomycosis in frog populations if it is present. It utilizes existing definitions of bioregions to divide areas for sampling, while frog species are grouped into three ecological groups depending on the water bodies they utilize. Sixty individuals per population need to be tested by PCR to be 95% certain of detecting one positive frog, assuming the prevalence is ≥5 % and the test used is perfect (sensitivity and specificity are each 100%). Collection and testing of sick frogs, and tadpoles with abnormal mouthparts, should be done opportunistically to increase the probability of detecting Bd. The appropriate season to sample varies between regions and will ideally incorporate temperatures favourable for chytridiomycosis (eg. < 25°C). Surveying threatened species that have not been sampled previously within infected and surrounding bioregions is a major priority to assist management. The next highest priorities are surveying bioregions surrounding known infected bioregions and groups and species of frogs that have not been sampled in infected bioregions. This protocol can be adapted for use in other countries and a standard protocol will enable comparison among frog populations globally. Accurate information on the distribution of Bd is crucial to implementing appropriate quarantine strategies, preparing for outbreaks of disease due to introduction of *B. dendrobatidis,* and for directing conservation actions towards affected species.

The use of itraconazole baths in the treatment of Chytridiomycosis at Perth Zoo

Simone Vitali and Glen Gaikhorst
Perth Zoo

Itraconazole bathing has been used to treat Chytrid fungus (*Batrachochytrium dendrobatidis*) in two species of frogs at Perth Zoo.

An outbreak of Chytridiomycosis was diagnosed in wild-caught Orange-bellied Frogs (*Geocrinia vitellina*, BWt range 1.3-1.8 grams). Frogs were tested for chytrid using TaqMan real-time PCR. Eight out of the group of nine individuals tested positive, with zoospore equivalents ranging from 1,965 to 193,000. Chytrid was confirmed histopathologically post mortem on the one frog which tested PCR-negative at the start of the treatment.

The frogs were bathed in 0.01% itraconazole (Sporanox® 10mg/ml solution, diluted with 0.6% sodium chloride) for 5 minutes per day for 8 days, in a similar regime to that described by Nichols and Lamirande (2001). Frogs were transferred to individual, disinfected enclosure setups after each bath.

The seven frogs which died during the treatment interval (all between 2 and 4 days into the treatment) were all confirmed to have chytridiomycosis at histopathology. All were systemically ill before treatment was initiated. Of the 2 frogs which completed the 8 day bathing regime, one died shortly afterward. The remaining individual tested negative for chytrid on PCR 10 days after the cessation of treatment, and continues to do well ten months later.

The second case involved three wild-caught Western Green and Gold Bell Frogs (*Litoria moorei*). One tested chytrid positive using TaqMan real-time PCR (4 zoospore equivalents), while the others were PCR-negative. All three frogs appeared clinically healthy. Because they were sharing an enclosure at the time of diagnosis, all three underwent ten days of itraconazole bathing and enclosure changes as previously described. Post-treatment swabs at 1, 7 and 41 days were negative for all three frogs.

Our experience with these cases showed that:

- Itraconazole bathing was effective in clearing chytrid from captive *L.moorei* and *G.vitellina*. Treated frogs returned negative PCR results immediately after the treatment course and did not become reinfected.
- Frequent substrate change during treatment may be an important adjunct to the success of itraconazole bathing in clearing chytrid.
- The itraconazole bathing regime using Sporanox® solution appears to be safe in clinically healthy *L.moorei*. It is unclear whether the bathing regime or other factors contributed to the deaths in *G.vitellina*.

References:

Harkewicz et al (2005). Amphibian chytridiomycosis. Journal of Herpetological Medicine and Surgery 15 (3) 32-44.

Nichols DK and Lamirande EW (2001). Treatment of cutaneous chytridiomycosis in blue-and-yellow poison dart frogs (*Dendrobates tinctorius*). Proceedings, "Getting the Jump on Amphibian Disease. Rainforest CRC, Cairns, Australia: 51.

Apparent cure of Chytridiomycosis in four frogs after treatment with oral Terbinafine, and toxicity trials of three antifungal medications in tadpoles.

Bonnie McMeekin, Helen McCracken, Michael Lynch, Kate Bodley, Alex Hyatt and James Gilkerson

Treatment trial using oral terbinafine in frogs

The chytrid fungus *Batrachochytrium dendrobatidis* was responsible for an outbreak of deaths in frogs housed in three enclosures at Melbourne Zoo during 2005. Chytridiomycosis was suspected, based on the outbreak characteristics and the clinical signs in affected frogs. This was subsequently confirmed via histopathology. During the outbreak seven frogs, four *Mixophyes balbus* and three *Litoria raniformis*, were tested for the presence of *B. dendrobatidis* using TaqMan real-time PCR. Treatment was commenced in these frogs using oral terbinafine. *M. balbus* frogs received 2mg/kg SID while *L. tasmaniensis* received 4mg/kg SID, both groups were treated for 6 weeks. A further three positive frogs were treated in 2006, one *M. balbus*, one *L. raniformis* and one *Litoria peronii*. These frogs received terbinafine orally at 4mg/kg SID for 4 weeks. Of the 10 treated frogs, six died, five during and one after cessation of treatment. All had *B. dendrobatidis* detected at time of death either via TaqMan real-time PCR (n=2) or via histopathological diagnosis of chytridiomycosis (n=4). There were four treated frogs which appear to have cleared infection, one *M. balbus* and one *L. raniformis* treated in 2005 and one *M. balbus* and the *L. peronii* treated in 2006. These four frogs survived and all have been swabbed for the detection of *B. dendrobatidis* via TaqMan real-time PCR at least three times since cessation of treatment with consistently negative results. The *M. balbus* treated in 2005 has since been housed with another *M. balbus* and both have continued to be clinically well and have returned two negative results on Taqman real-time PCR three months post-introduction. All frogs treated with oral terbinafine were housed at or below 24 degrees Celsius. This was a treatment trial instituted in response to an outbreak of disease consequently no controls were available. Furthermore four severely affected frogs were included in the treatment trial (two *M. balbus* and one *L. raniformis* in 2005 and the *L. raniformis* in 2006), these individuals all died soon after commencement of treatment (within 1-3 days).

Toxicity trial in tadpoles

Controlled experiments were designed to assess the safe doses of medications for use as in water treatment in tadpoles infected with *B. dendrobatidis*. Initially toxicity trials were run using terbinafine, fluconazole and F10 on tadpoles of *Limnodynastes tasmaniensis*, *L. raniformis* and *M. balbus* species. Both species and developmental stage appeared to affect the concentration of medication which could be tolerated by tadpoles. *L. tasmaniensis* tadpoles appeared less tolerant to terbinafine with 100% of tadpoles exhibiting toxicity at concentrations of 4mg/L (n=13), 71% at 3mg/L (n=14) and no signs of toxicity seen at 2mg/L (n=13). LD10 was calculated as 2.1mg/L (with 95% Confidence Interval of 2.0-2.2 mg/L) and LD50 was calculated as 2.5mg/L (95% Confidence Interval of 2.5-2.9 mg/L). *M. balbus* tadpoles however appeared more tolerant to terbinafine with 100% showing no signs of toxicity at either 4mg/L (n=5), 5mg/L (n=4) or 6mg/L (n=6). F10 also appeared to affect different species differently with *L. raniformis* not showing any signs of toxicity at dilutions of 1:100,000 or 1:50,000 (n= 3 and n=2 respectively) while both *M. balbus* and *L. tasmaniensis* tadpoles showed signs of toxicity at these concentrations (n=17). Furthermore, while there were not significant numbers available, there appeared to be an effect of developmental stage on tolerance to F10 with *L. tasmaniensis* tadpoles of later developmental stages being more tolerant than tadpoles in earlier stages of development. Fluconazole appeared to be the safest treatment trialled with no sings of toxicity detected at concentrations up to 200 and 400mg/L trialled in *L. tasmaniensis* (n=8 and n=2 respectively) and *M. balbus* (n=2 and n=9 respectively). Treatment trials were not possible due to poor infection rates.

Acknowledgements
Support of MZ staff from Veterinary, Herpetofauna, and Works departments
Novartis for supply of terbinafine hydrochloride
Garry Anderson for statistical analysis
WDA for providing student scholarship

Comparison of real-time PCR with histology for diagnosis of chytridiomycosis in amphibians

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Diagnosis of infection in amphibians with the amphibian chytrid fungus *Batrachochytrium dendrobatidis* (Bd) is a key component in understanding and controlling the emerging disease chytridiomycosis. Initially, diagnosis mainly relied on histological examination of skin. Recently, detection of Bd DNA using polymerase chain reaction (PCR) has widely replaced histology because it is less invasive, more sensitive and provides a quantitative estimate of intensity of infection. Comparison of these diagnostic tests has been conducted on experimentally infected frogs and a small sample of wild frogs (Kriger et al. 2006, Hyatt et al. 2007).This study compared histology with a Taqman PCR test in four species of frogs in the wild at different times of the year at six locations in the Wet Tropics of northern Queensland. Histology was conducted on toe clips and PCR on swabs of ventral skin surfaces. The sensitivity and specificity of each test were estimated using prior estimates from previous studies and Bayesian methods. The Taqman PCR test was much more sensitive than histology but it did not detect all infections. It was less specific compared with histology due to contamination during the testing procedure. Despite some drawbacks the Taqman PCR test for Bd is an extremely useful diagnostic test and is the generally preferred test. However, the sensitivity and specificity of the test should be taken into account when interpreting results. Histology with its high specificity is a useful test when wishing to confirm a diagnosis of infection. It also has the advantage of indicating the severity of infection for the area of skin examined.

Amphibian Diseases – Group Discussion

Ulcerative dermatitis from suspected photosensitisation in black swans (*Cygnus atratus*)

Paul Eden, Simone Vitali, Karen Payne, Rebecca Vaughan, Anna Le Soeuf
Perth Zoo

Annie Coppens, Lyn Manuel
Malubillai

Cleve Main
Department of Agriculture and Food WA

Twenty one swans were presented to the Perth Zoo Veterinary Department in two outbreaks (2005 and 2007) of a severe skin and eye condition. Swans presented with varying degrees of ulcerative dermatitis affecting the non-feathered areas of the body, particularly the upper beak, as well as ocular lesions including conjunctivitis, hyphaema and hypopyon. Investigations into this condition so far have suggested these lesions may be the result of a primary photosensitisation. This presentation will discuss the clinical presentations of swans in these two outbreaks, as well as covering the diagnostic investigations and clinical management of affected swans. It will conclude with a summary of what we have learnt and still need to investigate.

Conservation and recovery programs at Monarto Zoo.

Ian Smith
Monarto Zoo

Most zoos espouse conservation as cornerstone of their core business. While ARAZPA (Australasian Regional Association of Zoological Parks and Aquaria) and the ASMP (Australasian Species Management Program Committee) provide a framework for regional zoos to work collaboratively with each other, there are also partnership opportunities with government and education agencies, NGO's and other private institutions. Monarto Zoo has been active in all these arenas: more than 40% of animals held in the collection are part of conservation programs with few of them on display. Both historical and current programs will be touched upon and the status each program described.

Presence of Spotted Fever Group rickettsiae in ticks from feral pigs in Western Australia

Andrew Li, Peter J Adams, H Owen, Yazid Abdad, Stan Fenwick

Murdoch University

A survey of tick species present on feral pigs trapped within the northern jarrah forest of Western Australia was conducted over six months between December 2005 and May 2006. At necropsy, pigs were examined for ectoparasites, with a total of 596 ticks collected from 102 (49%) pigs. Two species of tick, *Amblyomma triguttatum* and *Ixodes australiensis*, were identified based on morphological characteristics. *Amblyomma triguttatum* comprised 73.7% of ticks identified, with the remaining ticks identified as *I. australiensis*. These results demonstrate that feral pigs in the northern jarrah forest are commonly infested by these two species of tick and one species of louse. Eighty-eight *Amblyomma triguttatum* and 28 *Ixodes australiensis* ticks collected from feral pigs in the south-western parts of Western Australia were screened for *Rickettsia* species using established PCR protocols directed at the conserved genes encoding for citrate synthase (*gltA*) and outer membrane protein A (*ompA*). Rickettsiae belonging to the Spotted Fever Group were detected in 78.4% (69/88) of the sampled *A. triguttatum*, however none of the *I. australiensis* screened were positive for rickettsiae. Sequences obtained from 15 positive rickettsia isolates at the *gltA* and the *ompA* loci were 100% homologous to the newly described species '*Candidatus* Rickettsia gravesii'. The results suggest that *A. triguttatum* has the potential to be a vector/reservoir for this novel species. Furthermore, the high prevalence of '*Candidatus* Rickettsia gravesii' in these ticks across all three sampling areas indicates that this strain of rickettsia is endemic to the south west of Western Australia.

Succession of small mammal species and their helminth parasites following wildfire

Dave Spratt
CSIRO Sustainable Ecosystems GPO Box 284 CANBERRA 2601

Small mammal species and their helminth parasites were monitored for 3.5 years pre-and 11 years post- wildfire in six habitats in south-eastern coastal NSW. This talk will discuss population fluctuations in two antechinus species, two native rat species and the house mouse, the latter not seen pre-fire. It will then compare and contrast helminth species re-colonisation in the different host species in the six habitats. Four habitats were devastated by the wildfire and had the largest and most persistent populations of house mice post-fire. Two habitats were less affected by the fire and had the smallest populations of house mice, reflecting the proximity of unburnt refuges nearby and facilitating competitive re-colonisation by native small mammal species. Helminths with direct life cycles such as trichostrongylid and heterakid nematodes were detected in host animals before helminths with indirect life cycles. Those with life cycles involving winged insect intermediate hosts such as spirurid nematodes were found later in the succession. Helminths with life cycles involving a single gastropod (snails and slugs) intermediate host such as nematode lungworms were later in the succession and those with two gastropod intermediate hosts in their life cycles such as trematodes, were generally the last to appear in hosts post wildfire.

A Whale of a time

Pin Needham
Glenside Veterinary Clinic, Adelaide

The Wild West

THE AUSTRALIAN WILDLIFE HEALTH NETWORK

R. Woods[1] and Chris Bunn[2]

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The Australian Wildlife Health Network (AWHN: The Network) is a national initiative of the Commonwealth government. Establishment was approved by SCARM (Standing Committee on Agriculture and Resource Management) in 2002. Functions of the AWHN agreed at that time included appointment of a national coordinator, development of a website and a national database of wildlife diagnostic and surveillance information. Other functions would comprise development of protocols, coordination of information in an emergency, advancing education and training, and prioritising and promoting survey and research activities related to wildlife. Core funding comes from agriculture (DAFF) through the Wildlife and Exotic Diseases Program (WEDPP), with the understanding that, with other funding, the AWHN could also be involved with biodiversity, human health and environmental issues.

Since that time the AWHN has a general wildlife surveillance system in place including: a system of State and Territory coordinators; reporting of wildlife disease in six dedicated categories; a rapid alert system ("First alert system") e.g. used for avian influenza; weekly electronic digests of wildlife health information of relevance to the Region and; website and databases (eWHIS and WHIS) in place (and alignment with other government systems). Targeted projects have been established: the AWHN brought key stakeholders together in three workshops to facilitate coordinated field research and monitoring for Avian influenza and developed and implemented a targeted surveillance program for influenza viruses in wild birds; a focus group to coordinate all activities involving bat lyssavirus has been formed and; a West Nile virus targeted surveillance program has been designed.

Quarterly and yearly reports are produced and provided to a number of agencies, including the NAHIS and an annual OIE report for the Australian Chief Veterinary Officer.

This presentation will introduce the AWHN, some of its activities and where it would like to be in the future. It is concluded that although many good research and policy initiatives are occurring there is a need for Australia to better integrate wildlife health surveillance activities into national frameworks; better coordinate activities between agencies and recognise the mutual need for sustained direction and focus.

(More information on the AWHN is available at www.wildlifehealth.gov.au.)

Surveillance for Avian Influenza in Wild Birds in South-west W.A.

Tom Hollingsworth BVSc (Hons)
Department of Agriculture and Food, WA

Introduction.

This surveillance work is part of a national project instigated and funded by the Australian government. The aims are:

- to identify the avian influenza (AI) types circulating in the SW of W.A.
- to confirm the expected low prevalence
- to contribute W.A. data to National data
- to contribute to the understanding of the ecology of AI

Highly pathogenic avian influenza (HPAI) is a severe viral disease of poultry with the potential to cause severe disruption to local industry and trade commitments. Some strains of virus may also have public health, or perceived public health concerns, and conservation implications. Wild birds, particularly water birds (waterfowl and waders), are the natural reservoirs of AI viruses. Wild bird migration has contributed to the spread of the highly pathogenic H5N1 strain of AI throughout Asia and recently into Europe and Northern Africa (Sims et al., 2005). Severe disease in wild birds is most often associated with outbreaks of HPAI in poultry (Hurt et al, 2006, De Marco et al, 2003), though significant wild bird mortality unassociated with poultry has occurred (Stallknecht and Shane, 1988). Although HPAI has occurred in Australia on 5 previous occasions, and contact with wild waterfowl has been postulated as a source of the virus, the actual role of wild birds in the transmission, or maintenance, of AI under Australian conditions is not clear. Some researchers (Arzey, 2004) have suggested that other native species, such as emus, may also have a role in maintaining AI infections in Australia. Similarly, although it is thought unlikely that migratory birds will introduce HPAI into Australia, it would be useful to examine the relationship between Australian and international strains of AI viruses to determine the extent to which viral genes are introduced into Australia (Tracey et al., 2004). Currently there is little data on the prevalence of AI infections or the sub-types which are circulating in the south west of Western Australia and whether any circulating strains have the potential to become highly pathogenic AI. Previous surveys undertaken in W.A. found an overall prevalence of 0.6% (McKenzie et al 1984, 1985), with higher isolation rates from ducks, (for example, 5.7% of Pacific Black Duck *(Anas superciliosa)* yielded virus).

The virus

AI is a type A orthomyxovirus with two major surface glycoproteins – haemagglutinin (HA) and neuraminidase (NA). 16 HA types and 9 NA types are recognized (Kishida et al, 2005, Munster et al, 2003) and are used to classify AI, which is further pathotyped into HPAI and low pathogenic avian influenza (LPAI). AI has been isolated from 88 species of 12 orders and most major families of birds (Alexander, 2000).

Hosts

The primary natural reservoir of influenza A virus is wild aquatic birds, from where it has spread to poultry, pigs, horses, marine mammals and humans causing significant disease. (Munster et al, 2003)

LPAI

AI viruses are common, widespread, infect mainly the gut of aquatic birds and are excreted in high concentrations in faeces. Transmission is by the faecal-oral route and infection is normally clinically silent (Munster et al, 2003). The AI genome is divided into eight segments. When a host cell is double infected, these segments can be re assorted (Bragstad et al, 2007, Doerr et al, 2006). In this way, new H and N combinations can be produced.

HPAI

In poultry, all HPAI viruses are either H5 or H7, however, not all H5 and H7 are highly pathogenic. Whereas reassortment commonly occurs in reservoir hosts, mutation arises more commonly in land-based avians, particularly chickens (Gambaryan et al, 2002). LPAI viruses have only two basic amino acids at the HA cleavage site. Cleavage, necessary for entry to the host cell, requires host cell trypsin which is only found in gut and some respiratory tract cells. Mutations creating multiple basic amino acids at the HA cleavage site permit cleavage by a greater range of host cell proteases, including the ubiquitous furans. Virus can then replicate in any organ, causing systemic infection. This is particularly harmful in cells of the capillary system (Doerr et al, 2006).

Prevalence

Prevalence varies with age of bird, time of year, location and species. A five year study in Europe found prevalence of 0 – 60% (Munster et al, 2003). Studies in Victoria showed evidence of AI in 5.53% of water fowl and 0.33% waders (Warner et al, 2006), and 1.4% of anatids (Peroulis and O'Riley, 2004). In W.A., 2.8%-5.7% in anatids and 0.6% overall were shown to be infected (McKenzie et al, 1984, 1985). Of the 27 families known to move between Australia and Asia, AI was suggested to occur commonly in Anatidae, occasionally in Charadridae, Laridae and Scolopacidae, rarely in Ardeidae, Threskiornithidae and Procellaridae and extremely rare in the other 18 families (Tracey et al, 2004)

Water fowl Migration

Australian water fowl are locally vagrant and opportunistic. While some species wander into New Guinea and the eastern Indonesian archaepelago, most water fowl species tend not to cross Wallace's line between Borneo/Bali and Sulawesi/Lombok (Dawkins, 2004, van Oosterzee, 1997).

Wader migration

Every year ~3M birds migrate from the northern hemisphere into Australia using the East Asian- Australian flyway. Approximately 10% of these birds (300,000) travel into the southwest of Western Australia where they feed for 5 -6 months before returning to their breeding grounds in the Northern Hemisphere. Many of these birds come from, or travel through, areas in Asia where highly pathogenic H5N1 AI is currently circulating (Hurt et al, 2006). The possibility exists that these birds could introduce Asian LPAI strains to Australian ducks and geese, from which species virus could spread to poultry (Tracey, 2005).

AI viruses in Australia

HA subtypes found in Australia are: H1, H3, H4, H5, H6, H11, H12, and H15. In addition, H13 and H7 have recently been isolated. Of these, all but H5, H7 and H11 have been found in W.A. Until 2007, no H7 had been found in wild birds in Australia.

HPAI in poultry in Australia

There have been 5 outbreaks: 1997 in NSW (H7N4), 1994 in QLD (H7N3), 1992 in Victoria (H7N3), 1985 in Vic (H7N7) and 1976 in Vic (H7N7). No HPAI of sub type H5 have been reported in Australia.

Surveillance sample sizes

An appropriate number of birds must be sampled to ensure accuracy of the calculated prevalence. Assuming a population of > 3000, and using expected prevalence, Canon and Roe (1982) suggested: n= log (error)/ log (1- disease prevalence).

Number of samples required to detect AI with probability of 95%

Prev%	50	25	20	10	5	3	2	1	0.5	0.1
No.	5	11	14	29	59	98	149	299	596	2995

Birds sampled

Water Fowl	207
Waders	81
Shearwaters	23
Silver Gulls	22
Starlings	50
Emus	5
Total	388

Capture methods

Water Fowl: Trap, mist net, clap net, canon net, landing net
Waders: Mist net
Shearwaters: Landing net
Swans: Landing net

Laboratory diagnosis

Prior to 2002, AI infection was defined by virus isolation in embryonated chicken eggs, and typing by haemagglutination inhibition. This method was effective, but slow and expensive. Since then the Real Time Reverse Transcriptase Polymerase Chain Reaction Assay developed by Spackman et al (2002) for Type A influenza virus and for Avian H5 and H7 haemagglutinin subtypes has been in use for AI diagnosis. This test can detect c. 1000 copies of target M genome antigen, which equates to 0.1 egg infective doses. The H5 and H7 probe sets detect 10^3 to 10^4 target fragments. The M antigen RRT-PCR showed an 89% correlation with isolation in eggs.

PCR results:

W.A.
388 samples 1 pos (0.25%)
Sub typing and isolation of this virus are being undertaken by CSIRO, Geelong
Australia
10,000 samples 106 pos (1%)
Sub typing is in progress.
(5,000 cloacal, 5,000 environmental samples)

Acknowledgements:

Bill Rutherford, Sarah Wylie, Paul Eden, Kris Warren, Leesa Haynes, Rupert Woods and Chris Bunn

References:

Alexander, D.J. (2000) A review of avian influenza in different bird species. Veterinary Microbiology **74**: 3-13

Arzey, G., (2004) The role of wild aquatic birds in the epidemiology of AI in Australia. Aust. Vet. J; 82:36 – 37.

Bragstadt K, Jorgenson P H, Handberg K J, Fomsgaard A. (2007) Genome characterization of the newly discovered avian influenza A H5N7 subtype combination. Arch. Virol **152**. 585-593

Canon R M and Roe R T. (1982) Livestock disease surveys. A field manual for veterinarians. Australian Government Publishing Service, Bureau of Range Science, Department of Primary Industry, Canberra

Dawkins (2004) The Ancestor's Tale p224 ISBN 0 618 00583-8

De Marco.M A, Foni. E, Campitelli. L, Raffini E, Delogu M and Donatelli I (2003) Long-term Monitoring for Avian Influenza Viruses in Wild Bird Species in Italy. Veterinary Research Communications 27 Suppl.1 107-114

Doerr H W, Varwig V, Allwin R (2006) Will the next human influenza pandemic be caused by the virus of the avian flu A/H5N1? Arguments pro and counter. Med. Microbiol Immunol **195**: 45-47

Gambaryan A, Webster R and Matrosovitch M. (2002) Differences between influenza virus receptors on target cells of duck and chicken. Arch Virol **147**: 1197-1208

A.C.Hurt, P.M.Hansbro, P.Selleck,B. Olsen, C.Minton, A.W. Hampson, I.G.Barr (2006) Isolation of avian influenza viruses from two different transhemispheric migratory shorebird species in Australia. Arch Virol. **151:** 2301-2309

Kishida N, Sakoda Y, Isoda N, Matsuda K, Eto M, Sunaga Y, Umemura T and Kida H. Pathogenicity of H5 influenza viruses for ducks. Arch Virol **150**: 1383-1392

McKenzie, J.S., Britten, D., Hinshaw, V.S., and Wood, J. (1985) Isolation of avian influenza and paramyxoviruses from wild birds in Western Australia. In *Veterinary viral diseases: their significance in south east Asia and the western Pacific. Della Porta, A.J. (Ed). Academic Press, Sydney: pp. 336-339*

McKenzie, JS, Edwards, E.C., Holmes, R.M., and Hinshaw, V.S. (1984) Isolation of ortho- and paramyxoviruses from wild birds in Western Australia and the characterisation of novel influenza A viruses. Australian Journal of Experimental Biology and Medical Science **62: 89-99**

Munster. V, Wallensten. A, Olsen. B, Rimmelzwaan. GF, Osterhaus. ADME, Fouchier. RAM (2003). Influenza A virus surveillance in wild birds. Proceedings of the Frontis Workshop on Avian Influenza Control Waginen, The Netherlands 13-15 Oct 2003

Peroulis I and O'Riley K. (2004) Detection of avian paramyxoviruses and influenza viruses amongst wild bird populations in Victoria. Aust. Vet. J **82**: 79-82

Sims LD., Domenech J., Benigno C., Kahn S., Kamata A., Lubroyh J., Martin V and Roeder P (2005) The origin and evolution of highly pathogenic H5N1 AI in Asia. Vet. Rec. 157:159-164.

Spackman, E., Senne DA., Myers TJ., Bulaga LL., Garber LP., Perdue ML., Lohman K., Daum LT., and Suarez DL., (2002) Development of a Real-Time Reverse Transcriptase PCR Assay for Type A Influenza Virus and the Avian H5 and H7 Haemaglutinin Subtypes. J. Clin. Microbiol. **40:** 3256-3260.

Tracey J. (2005) Targeting surveillance for avian influenza in wild birds: a pilot investigation in New South Wales. Report to the Department of Agriculture, Fisheries and Forestry Australian Government ISBN 0 7347 16672

Tracey J P, Woods R, Roshier D, West P and Saunders G R. The role of wild birds in the transmission of avian influenza for Australia: an ecological perspective. Emu **104**: 109-124

W.L.Stanislawek, C.R.Wilks, J Meers, G.W.Horner, D.J.Alexander, R.J Maxwell, J.A.Katenbelt, and A.R.Gould (2002) Avian paramyxoviruses and influenza viruses isolated from mallard ducks (*Anas platyrhynchos*) in New Zealand. Arch Virol 147: 1287-1302

Tracey JP., Woods R., Rosier D., West P and Saunders GR (2004) The role of wild birds in the transmission of AI for Australia: an ecological perspective. Emu, 104:109-124.

Van Oosterzee P (1997). Where the worlds collide: the Wallace Line.

Warner S, Welsh A, Ainsworth C, Tracey J, Zikesch F, Saunders G, and Lukins B. (2006) Application of rapid diagnostic tests in the targeted surveillance of Avian Influenza Virus within Victorian wild bird population. Final report of the Wildlife and Exotic Disease Preparedness Program. Primary Industries Research Victoria. August 2006.

Diagnosing recent woylie declines in South-Western Australia

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The woylie (*Bettongia penicillata ogilbyi*) had a distribution across much of Australia prior to settlement by Europeans. By the 1960's the woylie was reduced to three isolated remnant populations in south-western Australia (Perup, Tutanning and Dryandra). Fox control and reintroductions began in the 1970's and resulted in a dramatic recovery that culminated in the species being delisted from Commonwealth and State conservation lists (Endangered / Threatened) in 1998. However, since 2001 rapid and substantial declines of woylies have occurred, especially in the largest and most important populations such as the remnant 'natural' populations and the largest, previously most successful reintroduced populations. These extensive declines have so far resulted in the loss of as much as 95% from some populations in a matter of a few years. There are now few moderate density populations remaining in south-western Australia. Collaborative and integrated research is underway to investigate the cause(s) of the woylie declines. A notoriously difficult endeavour, the scientific approach to diagnose the declines is briefly outlined. A meta-analysis of available woylie data from the last 30 years will provide an insight into the temporal, spatial and demographic changes in woylie populations. An intensive population comparison study involving populations at various stages of decline examines in detail woylies (demographics, survival and mortality) as well as the primary putative causes that can be broadly classified as predation, resources, disease and direct human interference. This research provides a living example relevant to local, National and International efforts in modern fauna conservation and overcoming the challenges associated with the diagnosis of decline.

Clinical aspects of disease investigations in population declines of woylies (*Bettongia penicillata ogilbyi*)

Paul Eden, Karen Payne, Rebecca Vaughan, Simone Vitali
Perth Zoo

Adrian Wayne
DEC

Perth Zoo Veterinary Department has been contributing to investigations into disease aspects of population declines in woylies (*Bettongia pencillata ogilbyi*) since April 2006. This has involved contribution at a number of levels, including development and co-ordination of clinical sampling protocols, acting as a responder for veterinary management of sick or injured woylies found in the field, and contribution of clinical knowledge and expertise to research programs investigating health and disease of woylies. Since becoming involved in this program, six woylies have been presented to Perth Zoo Veterinary Department with various injuries. Four of these animals were euthanased and sent to Murdoch University for necropsy examination. Two animals were rehabilitated and returned to their original location. Three orphaned woylies seen at another veterinary practice were also reported to have developed Metabolic Bone Disease, two of which were euthanased. There has not been any conclusive evidence to indicate an underlying disease process based on the limited number of cases assessed through this component of the research program to date, however this process has contributed valuable information in regards to captive management and rehabilitation of woylies as well as providing relevant samples for other investigation projects in this research program.

Results of woylies (*Bettongia penicillata ogilbyi*) submitted for necropsy to Murdoch University, September 2005 to May 2007.

Graeme Knowles, Murdoch University
Paul Eden, Perth Zoo
Adrian Wayne, Department Environment and Conservation, Western Australia

From September 2005 to May 2007 officers from Department of Environment and Conservation and staff from Australian Wildlife Conservancy, submitted woylies found dead in monitored wild populations in southwestern Australia and Karakamia Sanctuary (Chidlow, WA), respectively, to the Murdoch University pathology department. Moribund animals were sent to Perth Zoo. Field data associated with each animal submitted included a site description, weather, evidence of predators (scats, tracks, etc), and state of the remains.

Thirty one woylies were submitted for necropsy at Murdoch University. Thirteen were males, two were unknown (because only limited body parts were found in the field) and 16 females. All animals submitted were adults. One female adult had a pouch young.

At Murdoch University a standard protocol was conducted by all duty pathologists for each post mortem. The causes of death included

- skeletal fractures/ marked haemorrhage (7) (mostly suspected road accidents)
- skeletal fractures/haemorrhage with puncture (bite) wounds (6) (predation)
- cardiomyopathy (2) (suspected exertional cardiomyopathy)

In 11 cases the cause of death could not be determined grossly or by histopathology. All but one of the animals, whose cause of death was unknown, was in good body condition. For this reason, in conjunction with the unremarkable gross and microsopic findings, an acute process rather than chronic disease was the likely cause for the unknown mortalities.

Four animals presented moribund with marked focal dermal lesions and one had septic arthritis. Culture results indicated these we isolated cases which were non-transmissible.

This was a cooperative program between staff from
Department Environment Conservation, Western Australia
Murdoch University
Perth Zoo
Australian Wildlife Conservancy

Woylie (*Bettongia penicillata ogilbyi*) conservation genetics project.

Dr Carlo Pacioni[1], Dr Peter Spencer[2], Dr Adrian Wayne[3]
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The woylie conservation genetics project proposes to characterise woylie genetics directly relevant to conservation and recovery of the species, and to relate these findings to the epidemiology and demographics of declining populations. In so doing, this research will inform the priorities for conservation efforts and anticipate the likely consequences for future species recovery and conservation. We also intend to investigate paternity, social structure, home range and individual's movements between adjacent populations. In addition to improving the knowledge of the ecology of the species, this information is expected to help define the epidemiology of diseases that may be currently threatening declining populations. A description of the approach and primers selection will be presented.

Trypanosomes in relation to the diagnosis of woylie declines: prevalence and molecular characterisation

Phillip Clark, Andrew Thompson, Adrian Wayne, **Susana Averis**
Murdoch University

Parasitic infections are implicated in mammalian population declines in Western Australia. Knowledge of the prevalence, intensity and diversity of parasitic infections will allow us to develop conservation strategies. Protozoan trypanosomes have been reported in many indigenous species including mammals, birds, amphibian and fish. Here we present data on the prevalence of trypanosomes within the various woylie populations, and describe the methods used in detection and characterisation of trypanosomes from a broad range of host species developed as part of a collaborative project between DEC, Murdoch University, Perth Zoo and Australian Wildlife Conservancy.

Prevalence and diversity of woylie endoparasites: from individuals to populations and sympatric species

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2 Department of Environment and Conservation, WA

Numerous endoparasites are known to infect wild animals but little is known of how these infections change over time or across environmental gradients. In addition, most of what is currently known stems from investigations based on the gut flora of a single host or a small population originating from the same location. Here, the availability of 'historical' data reaching back to 1998, covering a range of areas including some that have seen dramatic declines in abundance of some host species, and with current funding provided jointly by the ARC and DEC, it is hoped that it will be possible to shed light on the role of endoparasites in the population dynamics of a range of host species from different geographical areas within Western Australia.

Existing data suggests that there has been little change over time in the endoparasite community of the woylie from both the Manjimup and Batalling areas, whereas first indications suggest that there is a much lower overall endoparasite burden in woylies from a stable population in South Australia. We will also present data that suggests that the parasite burden of woylies within the enclosed and increasing Karakamia population differs in some respects to that found in animals from the Manjimup area where recent declines have been reported. Finally we present an outline of the proposed methods for establishing parasite burden in a range of host species from a diverse range of habitat types and how the resulting data will be interpreted.

Toxoplasma in Woylies

Nevi Parameswaran[1], Ryan O'Handley[1], Adrian Wayne[2], Andy Smith[1], Paul Eden[3], Alan Lymbery[1], Keith Morris[2] and **Andrew Thompson**[1].
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In recent history, Australia has the worst mammal extinction rate in the world. However, in this respect, very little is known about the role of disease and its clinical impacts on native wildlife in Australia. One potentially important aetiological agent is the protozoan parasite *Toxoplasma gondii* which has been proposed as having caused declines of some mammal species in the past, although direct evidence is lacking. The situation is compounded by our lack of knowledge about how *Toxoplasma* is transmitted and maintained in wildlife populations in Australia and its pathogenic potential in nature. These issues are discussed in the context of the recent declines in woylie (*Bettongia penicillata ogilbyi*) populations in the Upper Warren region of Western Australia. A seroprevalence of 6% was detected in 153 woylies during the peak of the decline whereas no evidence of *Toxoplasma* infection has been detected in stable populations of woylies from Karakamia or from limited sampling elsewhere. Interpreting the significance of these results would be premature at this stage, and will depend upon further data on the seroprevalence of *Toxoplasma* in the surviving population in the Upper Warren, as well as information on concurrent infections and environmental factors that may impact on the response of woylies to pathogens such as *Toxoplasma.*

Potential bacterial pathogens in Woylies from SW WA

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As part of a large study to investigate the reasons for declining woylie populations in the South West of Western Australia, faecal and ectoparasite samples were collected from woylies and other co-habiting native species and analysed for the presence of the potential bacterial pathogens *Salmonella* and *Rickettsia*. A total of 233 faecal samples from 512 animals were screened for *Salmonella*, resulting in 19 positives from 4 animal species, namely woylies (5/137), brush tail possums (2/74), chuditch (10/15) and quenda (2/7). The 19 positive isolates consisted of 14 different serovars as well as two unidentified serovars, the most numerous of which was *Salmonella* Bootle. A total of 579 ticks were collected from these animals, and of 11 ticks screened for *Rickettsia* spp. one was found to be positive. This was shown by molecular analysis to belong to the Spotted Fever Group of the genus, all members of which are considered potential human pathogens worldwide, including Australia. The significance of the bacterial isolates will be discussed in relation to both zoonotic infections and the declining woylie population.

The biodiversity, ecology and importance of ectoparasites in the woylie (*Bettongia penicillata*) and sympatric species.

Halina Burmej[1], Andrew Smith[1], Alan Lymbery[1], Adrian Wayne[2], Keith Morris[3], Stanley Fenwick[1], and Andrew Thompson[1]

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This paper reports the preliminary findings of a project that aims to describe the biodiversity, ecology and importance of ectoparasites in the woylie (*Bettongia penicillata)* and its sympatric species including quenda (*Isoodon obesulus),* brush-tailed possum (*Trichosurus vulpecula),* and chuditch (*Dasyurus geoffroii),* in WA. This work forms part of a larger investigation which is examining the biodiversity and impact of parasites from a broad range of host species and locations throughout WA. Such features as the effects of climate and vegetation, host density and variety of sympatric species on the composition of parasite communities are being examined. Regular monitoring of populations allows temporal variation in parasite density or prevalence to be examined. Molecular techniques are being used to survey the prevalence of trypanosomes and a proposed sub-project will examine their modes of transmission and parasite-host dynamics in the woylie.

Wildlife Disease Association and its activities

Pam Whiteley

Health and mortality of translocated western ringtail possums

Judy Clarke[1,2], Helen McCutcheon[1,2], Kris Warren[1] and Paul de Tores[2]
[1]Murdoch University and [2]WA Department of Environment and Conservation

Translocation of the western ringtail possum (*Pseudocheirus occidentalis*) is currently undertaken as a management strategy in the face of habitat destruction. Translocation success has been variable for this species over the past decade, influenced by factors such as habitat quality, predation pressure and possibly disease. The health status of possums is presently under investigation, with sampling taking place both prior and subsequent to translocation. Causes of mortality among the natural and translocated populations are described in relation to health, disease status and ecological factors.

Infectious disease surveillance in Western Ringtail and Common Brush tail possum populations of southwestern WA

Helen McCutcheon[1,2], Judy Clarke[1,2], Kris Warren[1] and Paul de Tores[2]
[1]Murdoch University and [2]WA Department of Environment and Conservation

Investigation into the incidence of selected infectious diseases of arboreal possums is currently underway as part of research focusing on the conservation management of the threatened Western Ringtail Possum (*Pseudocheirus occidentalis*). Selected populations of *P. occidentalis* and the Common Brush tail Possum (*Trichosurus vulpecula*) on the coastal plain between Mandurah and Dunsborough are being sampled in the course of the research. Samples are tested using serology and PCR assay for evidence of infection by *Cryptococcus neoformans*, *Chlamydophila* spp., *Leptospira interrogans* serovars, and *Toxoplasma gondii*. These pathogens are discussed with regards to the potential infection of possums in the south west, and results to date are presented.

Haematological characteristics of the south-west carpet python (*Morelia spilota imbricata*): factors that affect blood values

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Haematological investigation is an important part of disease diagnosis and evaluation in reptiles and consideration must be given to the morphological characteristics of reptilian blood cells as they are markedly heterogeneous even within a single order. Variations to the normal haematological values of reptiles may be strongly influenced by differences in environment, habitat conditions, age, sex, physiological status, nutrition and administration of anaesthetic agents. However, for most species, the influence of these factors on haematological values is not fully understood. The purpose of this study was to investigate haematology characteristics in the south-west carpet python (*Morelia spilota imbricata*) in relation to time spent in captivity, season, sex, method of blood collection and whether the blood sample was collected during captivity or after release. Blood samples from 24 wild-caught pythons were drawn from the ventral coccygeal vein and collected into lithium heparin tubes. A complete blood count and biochemistry analysis was conducted using standard methods. Multiple regression analyses were performed for season, sex, habitat condition (captive or wild), and length of time in captivity. Haemoglobin, packed cell volume (PCV), white blood cell count (lymphocytes and heterophils), globulin and the albumin/globulin ratio were all affected by season and white blood cell count (monocyte and lymphocyte counts) was influenced by habitat condition (captive or wild). We conclude that haematological parameters for *M. s. imbricata* do vary, and an understanding of habitat conditions and time of year should therefore be taken into account when investigating and evaluating disease in this species.

Conservation of Black Cockatoos (*Calyptorhynchus* spp.) in Western Australia: the development of prognostic and conservation value indicators for rehabilitation of debilitated birds

Anna Le Souëf
Perth Zoo/Murdoch University

The Perth Zoo Veterinary Department has collaborated with the Department of Environment and Conservation (DEC) since 2000 in an effort to provide specialised care for endangered wild Black Cockatoos requiring rehabilitation. The species involved in the programme include Carnaby's White-tailed Black Cockatoo (*Calyptorhynchus latirostris*), Baudin's White-tailed Black Cockatoo (*Calyptorhynchus baudinii*) and the Red-tailed Black Cockatoo (*Calyptorhynchus banksii*). Since 2003 this has been formalised and DEC now provides financial resources to the PZ Veterinary Department to contribute to the management and care of these wild cockatoos. Each year approximately 60 injured wild cockatoos are presented to the PZ Veterinary Department by DEC for assessment and treatment.

Since 2003 each Black Cockatoo admitted to the Perth Zoo Veterinary Department has been given a conservation score and a prognosis score. The conservation score ranks the value of the individual bird in terms of its species, age and sex, while the prognosis score evaluates the likelihood of success of veterinary treatment, based upon factors such as body condition, injuries and clinical signs. This scoring system has allowed more effective triage of cases, as well as proving a valuable tool for re-evaluation of cases as they progress, however the current system is based on relatively subjective information and requires refinement to include more objective inputs.

The aims of this Masters project are to refine and develop conservation and prognostic scoring indices by:

- Performing an epidemiological study of past, present and future records until 2009 of wild Black Cockatoos admitted to the PZ Veterinary Department
- Determining the sex and degree of activity of the gonads of each wild Black Cockatoo admitted until 2009
- Developing ultrasonographic procedures for determining the sex of Black Cockatoos
- Investigating the prevalence of Chlamydiosis and Aspergillosis in wild Black Cockatoos treated at the PZ Veterinary Department

Frequency, geographical distribution and potential risk factors associated with a papillomatosis and carcinomatosis syndrome in the endangered western barred bandicoot (*Perameles bougainville*)

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Once widespread across western and southern Australia, wild populations of the western barred bandicoot (*Perameles bougainville*) are currently only found on Bernier and Dorre Islands, Shark Bay, Western Australia. A debilitating skin disease is hindering conservation efforts to prevent the extinction of this endangered Australian marsupial. Affected animals develop multicentric proliferative lesions involving cutaneous and muco-cutaneous epithelia, which progress to form large masses that demonstrate malignant transformation into carcinomas. A novel virus, tentatively designated the *Perameles bougainville* papillomavirus type 1 (PbPV1), has recently been detected in association with these skin lesions. *P. bougainville* expressing skin lesions associated with PbPV1 have been detected on Bernier Island and in captive breeding facilities comprising all or a proportion of founder animals from Bernier Island. No evidence of skin disease or PbPV1 has been found in *P. bougainville* on Dorre Island nor captive breeding facilities involving founder animals purely from Dorre Island. The development of malignancy involves complex interactions between multiple factors both exogenous and endogenous to the host. In this study, frequency of the PbPV1 associated papillomatosis and carcinomatosis syndrome in geographically isolated wild and captive *P. bougainville* populations are examined to aid in determination of the origin of this disease. In addition, potential risk factors are explored in order to investigate a multifactorial aetiology. Some discussion is dedicated to methods for the screening of disease during selection of captive breeding colony founder animals, as well as to the control and prevention of this virally associated debilitating syndrome. Results and conclusions from this study will provide guidance for the future management and conservation of *P. bougainville*.

Health assessment of Loggerhead turtles (*Caretta caretta*): nesting females and hatchlings

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Most of the existing sea turtle populations world wide are in decline. This has been largely attributed to anthropogenic factors such as coastal development, poaching, fisheries by-catch, climate change and pollution. Loggerhead turtles (*Caretta caretta*) are listed as endangered (IUCN, 2006). The loggerhead nesting population in Western Australia is estimated to consist of about 1500 females, and is consequently the largest nesting population in Australia and one of the largest in the Indian Ocean (Baldwin et al. 2003). However, no long-term census data is available for any Western Australian index beach. Similarly, there is an amazing deficit of information on the causes of mortality in hatchlings in the nest, in particular on embryonic death due to infection by bacteria, fungi or viruses. The purpose of this study was to collect critical baseline data and establish a health database on two important loggerhead turtle nesting populations in Western Australia, Dirk Hartog Island (Shark Bay) and Bungelup beach in Cape Range National Park (Ningaloo region). Nesting female loggerheads from Western Australia were examined and their barnacle load, haematology, plasma biochemistry and blood toxin levels were recorded. To examine the causes of hatchling mortality, the embryos from unhatched eggs were evaluated for developmental stage and deformities were classified and recorded. Egg content was frozen for future toxin examination and both embryos and dead full-term hatchlings were placed in 10% buffered formalin for histopathological examination. The general clinical condition of the 69 turtles examined in this study was rated as good. A range of deformities were identified and the trends have been correlated with several nest and clutch parameters. To conclude, the results of this study enhance general knowledge with regards to health and reproduction of loggerhead sea turtles in Western Australia; and provide fundamental information for management policies and conservation initiatives aimed at conserving these sea turtle populations.

References:

Baldwin R, Hughes GR, Prince RIT, 2003, Loggerhead turtles in the Indian Ocean. In: Bolten AB, Witherington BE (Eds) *Loggerhead sea turtles*. Smithsonian Books, Washington, DC, p 218–232.

IUCN 2006. *2006 IUCN Red List of Threatened Species*. www.iucnredlist.org. Downloaded on 27 June 2006.

Epidemiological aspects of health management of the Gilbert's potoroo

Rebecca Vaughan
Murdoch University/Perth Zoo

The Australian Registry of Wildlife Health

Karrie Rose

Musings on the Tasmanian devil facial tumour disease research from the ground up.

Richmond Loh BSc BVMS MPhil (Pathol) MACVSc (Aquatics) CMAVA DipPM

How did we stumble across such a major disease in a native animal like the Tasmanian devil (*Sarcophilus harrisii*)? How did we know that it really was having an affect on the population? Then how did we raise enough awareness to kick start what we now know as the Devil Facial Tumour Disease (DFTD) Project with multiple teams, interstate and international collaborations and even plush toys! I will be giving you a first hand account of devil facial tumour disease from the very beginning.

Wildlife Health & Conservation Centre

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The WHCC has been 10 years in the making. It was finished last year as a result of input from Federal Government Regional Sustainability Funding sought by the Vet Science Foundation and the University of Sydney. The WHCC encompasses not only the veterinary hospital on the Camden Campus, but also over 20 wildlife researchers at Sydney University.
The missions of the WHCC are listed below and summarise the directions and goals of the centre.

1. Provide referral and primary care to non-traditional pet species including birds, reptiles, ferrets, rabbits, rodents, fish and zoo animals.
2. Work with local rehabilitation organizations to provide primary and referral care to injured and diseased wildlife.
3. In combination with courses provided in the veterinary students' curriculum, use the clinical service to provide a foundation in wildlife and exotic animal medicine and conservation biology to the veterinary students at the University of Sydney.
4. Develop and facilitate a wide ranging set of research programs using the diverse talents of the Veterinary Science Faculty and other Faculties at the University of Sydney, in collaboration with other governmental and nongovernmental national and international institutions that identify and seek to reduce threats to biodiversity.
5. Continue ongoing research into health issues of exotic pets.
6. Through the above programs, provide postgraduate education at both the Masters and PhD level.
7. Actively engage and involve the community in the activities of the WHCC.

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Wildlife disease passive surveillance: Are wildlife rehabilitation centres a tool? A case study.

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Wildlife rehabilitation centre records are an often unexploited source of crucial information on species morbidity and mortality. Analysis of these records can be used to assess and improve rehabilitation techniques. Moreover, it has been suggested that wildlife admitted to wildlife rehabilitation centres may act as sentinels of ecosystem health (Aguirre and Else 2001, Burton and Doblar 2004). In this study, records of birds, reptiles and amphibians admitted to Kanyana Wildlife Rehabilitation Centre Inc. (KWRC) between 1997 and 2005 have been analysed, in order to determine the most common causes of morbidity and mortality, and to compare the results with those obtained from other studies. The data collected by KWRC, which is located near Perth (Western Australia), provides valuable information about the free-ranging populations of wild animals in the Perth metropolitan area. Risk factors for these populations are described and compared with data from other wildlife rehabilitation centres reported in the literature. A significant proportion of the admissions are caused by direct or indirect human interaction, including attacks by introduced animals. Additionally, the data highlights interesting trends that are species-specific. Enhanced standardization of record keeping and health screening with the help of ancillary diagnostic tests or regular post-mortem examination may enormously improve the quality of wildlife rehabilitation databases and the information obtained may be easily integrated in wildlife disease assessment programs. The knowledge gained from database analysis is not only extremely useful for the specific wildlife rehabilitation centre, but it can also be evaluated in a broader context. The possibility of increased participation of wildlife rehabilitation institutions in national wildlife disease surveillance programs is contemplated and discussed. In conclusion, this study provided insight into the possible effects of certain risks factors on wildlife populations and species distribution, and at the same time raised important questions on rehabilitation management practices.

Developing conceptual frameworks to understand wildlife health in Australia

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Zoonotic emerging infectious diseases are increasingly becoming a problem in the developed world with the potential to have both indirect and direct impacts upon wildlife, domestic animals and humans. Due to anthropogenic changes in the landscape such as changes in human demography, urbanization, habitat fragmentation and/or destruction in conjunction with human encroachment upon natural wildlife habitats, these factors are considered to have significantly contributed to a sharp increase in the number of new emerging infectious diseases over the last 30 years. Of those infectious pathogens identified 75% are considered zoonoses and have been found to have direct relationships to wildlife health with the agents being derived from or transmitted via wildlife species. The focus of research has been upon the immediate needs associated with an incident rather than the development of methods for effective monitoring of wildlife health in general. Thus while past research has specifically focussed upon investigating individual disease incidences a gap exists in the overall reporting system. The research aim is to develop a model of the current situation of zoonotic emerging infectious disease in Australia based on validated and credible published literature in addition to the perspectives and experience of industry professionals. The information provided will facilitate the development of a holistic integrated system for monitoring wildlife populations aimed at reducing zoonotic impacts on the wildlife-human-domestic livestock interface. It is expected that this research will provide the foundations for industry stakeholders to more effectively manage and monitor emerging infectious diseases from a better understanding of the current situation within Australia.

Active Surveillance in a Passive World

Peter Holz
Healesville Sanctuary

In 2000 a dead superb lyrebird from Sherbrooke Forest was presented to Healesville Sanctuary, having died of chlamydophilosis. A second dead lyrebird was presented in 2001 and a third bird came from Mt Toolebewong in 2006, approximately 60 km from the first site. The first two cases prompted concern that the lyrebird population may be at risk from the disease. Regular surveillance up to that time had shown a steady increase in the population from 1986 to 2000. In 2005 lyrebird nestlings were sampled using Clearview and Immunocomb tests to determine their exposure to the organism. Results are in Table 1.

Table 1. Results of chlamydophila testing in superb lyrebirds.

Bird	Date	Clearview	I-comb	Date	Clearview	I-comb
18692	6/09/2005	Negative	Negative			
18693	6/09/2005	Faint +ve	Negative			
18694	6/09/2005	Faint +ve	Negative			
18695	6/09/2005	Faint +ve	Negative			
18700	6/09/2005	Faint +ve	Negative			
18696	8/09/2005	Faint +ve	Negative			
18697	8/09/2005	Faint +ve	Negative			
18698	8/09/2005	Faint Darker +ve	Negative			
18699	8/09/2005	Negative	Negative			
27801	8/09/2005	Faint Darker +ve	Negative			
27802	8/09/2005	Faint +ve	Negative			
27803	8/09/2005	Faint +ve	Negative			
27804	13/09/2005	Negative	Negative	27/9/05	Faint +ve	Negative
27805	13/09/2005	Faint +ve	Negative	27/9/05	Faint +ve	Negative
27806	13/09/2005	Negative	Negative			
27807	13/09/2005	Faint +ve	Negative			
28810	13/09/2005	Negative	Negative			
A50703	15/09/2005	Faint +ve	Negative			

Crimson rosellas are the birds most commonly presented to Healesville Sanctuary suffering chlamydophilosis. As large numbers of rosellas are present in Sherbrooke Forest, especially around feed tables, concern was expressed that the rosellas may be a potential source of infection for the lyrebirds. A total of 82 rosellas have been tested since 2001. Of these 43 birds were tested by Clearview only, four birds were tested by Immunocomb only and 35 birds were tested with both. Results are presented in Table 2.

Table 2. Results of chlamydophila testing in crimson rosellas.

Test	Total tests	False result
Clearview only Positive	22	1
Clearview only Negative	21	0
Immunocomb only Positive	2	2
Immunocomb only Negative	2	0
Clearview Positive/Immunocomb Positive	2	1
Clearview Negative/Immunocomb Negative	25	0
Clearview Positive/Immunocomb Negative	0	0
Clearview Negative/Immunocomb Positive	8	8

Based on these results lyrebirds are not commonly exposed to chlamydophila and rosellas are unlikely to be carriers of the organism.

ESPERANCE WILD BIRD MORTALITY EVENT

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In late December 2006, early January 2007 and March 2007 a large number of wild birds of mixed species died at Esperance in Western Australia. Exotic and emergency diseases were ruled out and the cause of death was subsequently confirmed as intoxication with lead. The Western Australian Department of Environment and Conservation (DEC) is working to identify the pathway from the source of the lead to its ingestion by birds. A full investigation by the Environmental Enforcement Unit (EEU) is in progress and a comprehensive health and ecological risk assessment was proposed in June 2007.

This event has raised a number of issues associated with the diagnosis, investigation and response to wildlife mortalities in Australia. It is concluded that to better manage wildlife mortality events, an integrated response plan, where roles and responsibilities are clearly outlined, is required in each of Australia's States and Territories (including Departments of Agriculture, Health and Conservation). Laboratory issues particularly associated with funding need to be addressed to allow the confirmation of a diagnosis. The National wildlife health information system (WHIS and eWHIS) is a useful tool for assisting in communications and management of information during these events.

AVIAN INFLUENZA AND WILD BIRD SURVEILLANCE GLOBALLY AND IN AUSTRALIA 2006/07 – UPDATE

Chris Bunn,[1] Leesa Haynes and R. Woods[2]

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Avian influenza is not a new disease; however the widespread infection of production birds around the world has emerged as a significant and increasing problem. This has been highlighted by the most recent outbreaks of highly pathogenic avian influenza (HPAI) throughout South East Asia, Europe and Africa from 2003-7. This panzootic is unprecedented in terms of the size of the area affected, the high pathogenicity and the length of time it has persisted.

It is known that many migratory waders travel to or pass through countries currently infected with H5N1 on their southerly migration from breeding grounds in the northern hemisphere to their wintering grounds in Australia. Recent studies have detected low pathogenic avian influenza subtypes in some of these transhemispheric species (such as Red-necked Stint and Sharp-tailed Sandpiper) within Australia, highlighting the potential for these birds to introduce more pathogenic subtypes of avian influenza. Avian influenza (H3 and H4) has also recently been detected in ducks within Australia. Subtype H7 (HPAI), which has been responsible for five Australian outbreaks in commercial flocks, has not been isolated in wild birds or ducks to date.

In 2005, Australian officials recognised the need for a more systematic and targeted approach to pathogen surveillance for avian influenza in wild birds. To facilitate collaboration between State and Territory programs the National Avian Influenza Wild Bird Steering Group was established in January 2006. During the period July 2006 to June 2007, cloacal and faecal swabs and blood samples were collected from approximately 10 800 wild birds in Australia. Sampling occurred at sites in NSW, Victoria, South Australia, Tasmania, Queensland, Northern Territory and Western Australia. The majority of samples were collected from shorebirds (e.g. ducks, magpie geese, waders), with a smaller number from emus, gulls and shearwaters. No pathogenic avian influenza viruses were isolated. Investigation of wild bird mortality events is also a crucial component of the surveillance plan and avian influenza virus was excluded as a cause of 30 wild bird mortality events recorded in the national database (eWHIS) in Australia, between July 2006 to June 2007.

The Primary Industries Ministerial Council has also now finalised the policy for 'Response to detection in wild birds' and the AUSVETPLAN has been revised to reflect responses to detection of LPASI and HPAI in wild and zoo birds.

(More information on the avian influenza wild bird surveillance program is available from Leesa Haynes lhaynes@zoo.nsw.gov.au. We would encourage anyone planning influenza work in wild birds in Australia to contact Leesa as part of their planning.)

HPAI in wild birds in Thailand

Jarunee Siengsanaan
Murdoch University

A surveillance program for H5N1 avian influenza virus in wild birds in Thailand was performed between February 2004 and December 2006. The overall prevalence of avian influenza H5N1 virus in wild bird species was 0.8% (42 positive from 5,246 pooled samples) in 5.9% (12 of 203) of the species tested.

Viral and parasitic disease monitoring program of Japanese avian species performed by the Wild Animal Medical Centre (WAMC), Rakuno Gakuen University

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It has been suspected that outbreaks of mass mortality of birds occurring within the Japanese territory are possibly due to West Nile virus (WNV) infection from the Far Eastern Region of Russia. These epidemic events have been considered as one of the major factors responsible for the extinction and endangerment of avian species in Japan. Hence, our co-operative project will assess the risk of infection using screening test with application of a commercial WNV kit (VecTest) for Japanese avian species. Materials derived from 276 individuals of 76 avian species were examined using this particular kit. Real-time polymerase chain reaction (PCR) was also applied for a definitive diagnosis. In general, the application of the kit for the monitoring of WNV infection in the Japanese avian species was valuable, although some false-positive results were detected. After the confirmation of each negative result, each body was dissected for pathological, toxicological and parasitological examinations, because protozoan, helminth and/or arthropod parasites can become highly pathogenic agents for wild avian species. In this presentation, we will show not only the outline of the WNV infection monitoring project performed by the Wild Animal Medical Centre (WAMC), Rakuno Gakuen University, but also most recent parasitological results obtained there. The present survey was supported in part by a Global Environment Research Fund (F-062, 2006-2008) of the Ministry of the Environment and a Grant-in-Aid (No. 18510205) of the Ministry of the Education, Science and Culture, Japan.

Mainland Tammar Wallabies (*Macropus eugenii eugenii*), back from beyond the brink.

Ian Smith
Monarto Zoo

There were at least three extent sub-species of Tammar Wallabies at the time of European settlement but the introduction of novel predators and changes in land management practices are thought to have led to the extinction of the Mainland Tammar wallaby (*Macropus eugenii eugenii*) over its' endemic range of South Australia by the 1920's. Providential identification of a naturalised population in New Zealand as the Mainland sub-species provided an opportunity to repatriate them and reintroduce them to their historical range. The next fifteen minutes will be a whirl-wind tour of the program so far, from their ancestors' initial emigration and settlement in foreign lands, the discovery and confirmation of their identity to preparation for their return. Their arrival and captive management is briefly described, as is their ensuing release(s). Of course their have been hiccups, some of which have not been fully explained, but the measures put in place, the investigations conducted and the lessons learnt can be readily applied to other re-introduction programs and captive breeding programs that support them.

Cheetah Conservation Botswana

Paul Eden and Kathy Starr

In this presentation, Paul and Kathy will discuss interesting aspects and show photos from their trip to Botswana in November 2006 to work with the NGO Cheetah Conservation Botswana. Some of the conservation issues facing cheetah in this region will be discussed

Veterinary support on capture attempts of the critically endangered Po'ouli (*Melamprosops phaeosoma,* Hawaiian honeycreeper) in the rainforest of Maui as part of the species recovery plan

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Hawaiian island ecosystems have relatively low levels of diversity and high levels of endemism similar to other isolated islands. Typically, few ancestor species, which managed to cross the large expanse of ocean, evolved on the islands with adaptive radiation into highly niche-specialised species. This specialisation, together with the introduction of alien species of flora and fauna, diseases such as avipox and avian malaria and the destruction of natural habitats by humans have contributed to the decline and extinction of numerous species of birds on the Hawaiian islands. The Po'ouli was one such species endemic to Maui and threatened with extinction. Discovered only in 1973, its numbers were estimated at just 140 in 1980 based on a few sightings. The only nesting was recorded in 1986 and subsequently, only 10 birds were recorded in 1994 and finally three in 1997, each in separate areas of the Hanawi Natural Area Reserve. Recovery efforts included habitat protection, alien species management, capture for banding and attempted DNA sexing, then translocation and finally, after much deliberation, capture of the remaining birds for captive breeding.
I joined the recovery team as field veterinarian in July 2004 for three 10-day trips. There were detailed protocols relating to capture, assessment, translocation to base and helicopter lifting to the breeding facility, and also should the Po'ouli die in the process. This presentation aims to provide a personal insight into my role, the habitat of the Po'ouli and the enormous efforts made to recover this species from the brink of extinction.

Thank you

Hopefully you enjoyed attending this conference, whether it was for a day or for the week. There is a lot of work that goes into organising these events, and without the support of the following people and organisations, this conference probably would not have got off the ground. So a **HUGE** thank you goes out to:

Kathy Starr – for taking on organising the dinner and wine and cheese night, and for you general support and tolerance!
WDA Executive Committee (Pam Whitely, Dave Spratt, Rupert Baker, Maria Cardoso)
Maria Cardoso – a special mention for compiling these proceedings and driving the bus!
Perth Zoo
Murdoch University School of Veterinary and Biomedical Sciences
Department of Environment and Conservation (particularly Tricia Sprigg and Eleatha Gibbon)
Dryandra Lions Village – particularly John and Lisa, for being such great hosts
Murdoch University Wildlife Association
Australian Wildlife Health Network

Here's to WDA-A 2008!

Cheers!

Paul Eden
Conference Convenor 2007