DEVELOPMENT AND IMPROVEMENT OF CLINICAL TOOLS FOR REHABILITATING ENDANGERED BLACK COCKATOOS (*CALYPTORHYNCHUS* SPP.) BACK TO THE WILD

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This thesis is presented for the degree of Doctor of Philosophy

Murdoch University, 2012
I declare that this thesis is my own account of my research and contains as its main content work which has not previously been submitted for a degree at any tertiary education institution.

........................................

Anna T. Le Souëf

30 November 2012
“Hope” is the thing with feathers –
that perches in the soul –
and sings the tune without the words –
and never stops – at all

- Emily Dickinson
ABSTRACT

Black cockatoos (*Calyptorhynchus* spp.) in the ‘biodiversity hotspot’ of south-west Western Australia are in decline, due to multiple threatening processes that include habitat loss, poaching, competition with other species, vehicle strikes and shootings. The combined efforts of the Perth Zoo Veterinary Department (PZVD) and the Western Australian Department of Environment and Conservation (DEC) have led to a specialised rehabilitation program centred upon the return of injured and debilitating black cockatoos to the wild. This PhD project focused on improving the efficacy of this program and expanding the current knowledge of the health status and biology of black cockatoos.

The medical records of 565 black cockatoos that were admitted to the PZVD from 2000 to 2009 were analysed to determine the effect of the birds’ clinical presentation on survival. Anaemia, superficial and deep soft tissue injuries, fractures, paralysis or paresis and abnormal faecal cytology were identified as significant factors when determining the likelihood of survival of cockatoos undergoing the rehabilitation process. In addition, data on the life histories and origin of admitted cockatoos, post-mortem examination results and post-release information is presented. Haematologic and serum biochemical reference values are also presented for the three species of black cockatoos that are regularly admitted to the PZVD.
The significance of *Chlamydia psittaci* infection to the black cockatoo rehabilitation program was investigated. No wild birds admitted to the PZVD were found to be positive for *C. psittaci* infection, which suggests that this infection either is not present in wild populations, or has a low prevalence. However, the study found that black cockatoos undergoing rehabilitation are at risk of contracting the disease during their stay in captivity through contact with infected birds. These results highlight the importance of disease surveillance to the management of an avian rehabilitation program.

The thesis includes the results of an aviary trial to investigate methods of attaching transmitters to black cockatoos. Mean retention times for the transmitter packages ranged from 44 to 384 days. These results support the potential feasibility of using transmitters on cockatoos post-release, with sufficient retention times to allow for the collection of valuable movement and survival data.

Among the gaps in current knowledge of wild black cockatoos, perhaps the most concerning is that regarding the age structure of wild populations. The thesis encompasses a study that established an aging tool for black cockatoos, based on pentosidine analysis from the skin of 53 black cockatoos of known age. The result is a vital first step towards understanding the population dynamics of wild black cockatoos, and will help provide further information about the life histories of cockatoos admitted to the PZVD following injury or debilitation.
ACKNOWLEDGEMENTS

I would first like to thank my supervisors. My principal supervisor, Kris Warren has been an incredible source of support and inspiration for many years. I have been so grateful for her endless enthusiasm for the project and for guiding me on my first steps on the pathway to a career in conservation medicine. Simone Vitali was always available to me for advice and was a great source of practical and innovative ideas, particularly with respect to the clinical aspects of the project. I am grateful to Carly Holyoake for her help with the epidemiological aspects of my project; Carly's support and friendship during this time will not be forgotten. Stan Fenwick is also thanked gratefully for his input, and for his belief in the project from the early stages.

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To my wonderful family: Mum, Dad, Tim and Kate who have provided lots of support and love over the years. And finally to my husband and best friend Hugh, for being behind me all the way and supporting me through all the ups and downs.
PUBLICATIONS


CONFERENCE AND COMMUNITY PRESENTATIONS


Veterinary rehabilitation of black cockatoos at the PZVD. Carnaby’s Black cockatoo Symposium. Department of Environment and Conservation, Kensington, Western Australia. 1 December 2008.

From pest to plight: Western Australia’s black cockatoos. West Virginia University Wildlife Society meeting. Morgantown, West Virginia, USA. 2 September 2009.

MEDIA REPORTS


AWARDS

Dean’s Prize - Best in Show: A Tool for the Age Estimation of Black cockatoos (*Calyptorhynchus* spp.). School of Veterinary and Biomedical Sciences, Murdoch University Research Poster Day 2011.
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<th>Description</th>
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<tbody>
<tr>
<td>AGE</td>
<td>advanced glycation end-product</td>
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<tr>
<td>ANGIS</td>
<td>Australian National Genomic Information Service</td>
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<td>AST</td>
<td>aspartate aminotransferase</td>
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<tr>
<td>BAWA</td>
<td>Birds Australia (Western Australia)</td>
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<tr>
<td>BFDV</td>
<td>psittacine beak and feather disease virus</td>
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<tr>
<td>BOHB</td>
<td>beta-hydroxybutyrate</td>
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<td>C</td>
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<td>Ca</td>
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<td>CI</td>
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<td>Abbreviation</td>
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<tr>
<td>DNA</td>
<td>deoxyribonucleic acid</td>
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<td>ELISA</td>
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<td>general anaesthesia</td>
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<td>HRM</td>
<td>high resolution melt (curve analysis)</td>
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<td>MCH</td>
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<td>MOMP</td>
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