RESEARCH

BLACK COCKATOO RESEARCH AT THE WILDLIFE GENETICS LAB

Nicole White

An endangered species that needs your help

White-tailed black-cockatoos are unique to the south-west of Western Australia - not being found anywhere else in the world. There are two different species of white-tails, the Carnaby's (*Calyptorhynchus latirostris*) and the Baudin's (*C. baudinii*) black-cockatoo.

Both species are threatened and are 'rare or likely to become extinct'. Like so many of the world's parrot and cockatoo species, they are threatened due to a range of reasons but the overall population has suffered an estimated 50% reduction in abundance as a result of loss and modification of habitat, nest competition with other birds and feral bees, poaching, and shooting by orchardists. Given such a dramatic population decline, urgent action is required for the conservation, management and protection of these charismatic WA birds.

Why knowledge of genetics is important to conservation

Conservation genetics is a mixture of scientific disciplines including molecular ecology, population genetics, mathematical modelling and evolutionary relationships. The application of conservation genetics for species conservation uses molecular tools to examine the relationships within and between populations of species, and also their mating systems, and attempts to establish the genetic diversity of different groups of animals by comparing their genetic profiles (DNA fingerprints) - exactly the same technology that is used in human forensics. Conservation genetics is used in the management of small or declining populations by defining management units within a species and acquiring a genetic perspective of a species' ecology.

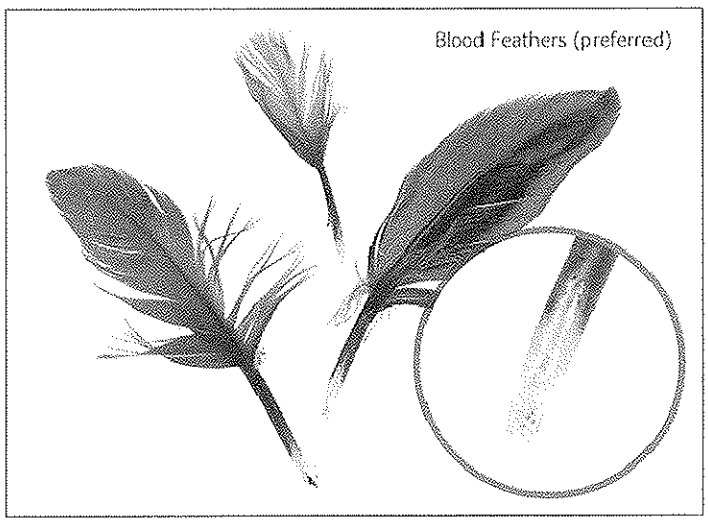
Genetic diversity is seen as important for species to evolve and adapt to new and changing environments. When small populations become smaller they lose much their genetic information because there are not enough individuals to keep all the genetic differences. This leads to an increased risk of extinction because, with fewer individuals around, mating among relatives (inbreeding) may become inevitable.

With the aid of molecular tools, genetic markers can identify populations where genetic issues are likely to affect the prospects of long-term survival. For example, populations of species in different geographical locations may be genetically differentiated and require specific management strategies for their recovery. All this can be summed up as looking at the 'genetic health' of a population.

Conservation genetics of the white-tailed black-cockatoos

Current research at Murdoch University's Wildlife Genetics Lab is focusing on key areas central to the conservation, management, and protection of white-tailed black-cockatoos in WA. Firstly, the conservation genetics of this threatened species is being elucidated, as this will provide wildlife managers with the species' level of genetic health.

The project focuses on the use of 'microsatellites', which are the same pieces of DNA used in human forensics and paternity testing. They are highly variable and can be used to identify individuals with a high degree of confidence - less than one in one million birds will have exactly the same DNA profile. Microsatellites are studied with the polymerase chain reaction (PCR) which requires minute amounts of DNA for analysis. The sensitivity and power of PCR means that the cells at the end of a plucked feather contain sufficient DNA to generate a DNA fingerprint for an individual bird!



Consequently, a microsatellite DNA-marker profiling system for cockatoos is a powerful tool to investigate population differences, movement patterns, evolutionary potential, and genetic breeding systems.

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Black cockies

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White-tailed black-cockatoo feathers – how you can help

To determine whether populations of birds which nest in specific geographical areas are genetically differentiated (i.e. do Moora cockatoos have the same genetic profile as Albany cockatoos?) and to assess which nesting areas are critical to the survival of the species, feathers are being collected and analysed. A critical aspect of this project requires feathers from young birds before they fledge the nest with their parents, as the establishment of a DNA profile database from the entire nesting area (Geraldton to Esperance) is essential. If cockatoos nest on your property and you would like to become involved in this study please contact me for further details. (If you are unsure if these cockatoos nest on your property and would like to have a property assessment, please contact Birds Australia's Project Officer, Dee Stojanovic.)

White-tailed black-cockatoos have numerous feeding and roost sites throughout their yearly migration. If these birds visit your property and happen to shed feathers, they are also a valuable resource for this project. Place the feather(s) in an envelope addressed to me with the following details: (1) location; (2) date collected; and (3) species identification (if possible). Alternatively, I will post prepared bird feather envelopes to you upon request.

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