

Press release

For immediate release

HKU Ecologists Reveal Key Genetic Insights for the Conservation of Iconic Cockatoo Species

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The photo shows a Sulphur-crested Cockatoo (*Cacatua galerita*), a species that closely resembles the critically endangered Yellow-crested Cockatoo (*Cacatua sulphurea*). Despite their similar appearance, accurate classification is crucial for conservation efforts, as the Yellow-crested Cockatoo is critically endangered and requires targeted protection. Photo credit: Matthew Kwan

Ecologists at the School of Biological Sciences of The University of Hong Kong (HKU) have made valuable discoveries that could transform the conservation of two iconic cockatoo species: the Sulphur-crested cockatoos and the critically endangered Yellow-crested cockatoos – with only 2,000 individuals remaining in the wild for the latter.

Until now, no whole-genome research had been conducted on either species, which were identified solely by subtle morphological differences. Through two innovative studies, the team uncovered new genetic insights, reshaping our understanding of these species and offering fresh hope for their survival amid severe threats from habitat loss and illegal trapping. These findings, recently published in high-impact scientific journals *Molecular Biology and Evolution*, and *Molecular Ecology*, will be highly influential in guiding future conservation efforts.

Triton Cockatoo reconfirmed as a distinct species after a century in obscurity

Although originally believed to be two distinct species, for over a century the Triton Cockatoo (*Cacatua triton*) has been thought to be the same species as the Sulphur-crested Cockatoo (*Cacatua galerita*) due to their similar appearance and with the distribution of the singular species including Australia and New Guinea. However, the study in *Molecular Biology and Evolution*, using cutting-edge genomic analysis, has reconfirmed that the Triton

Cockatoo is, in fact, a distinct species occurring across the majority of New Guinea, with the Sulphur-crested Cockatoo now known to be restricted to just Australia and very small portion of southern New Guinea.

This finding has profound implications for conservation, particularly in New Guinea where both species exist and where programmes led by the Indonesian government and NGOs aim to reintroduce surrendered pet birds into the wild on the western part of the island to counter the effects of climate change, land-use change, and poaching.

Dr Arthur SANDS, an expert on cockatoos from SBS and the main author of the study in *Molecular Biology and Evolution*, emphasised the importance of this distinction, he said, ‘Introducing the wrong species in the wrong place could jeopardise their long-term survival in the wild through hybridisation or competition between the Triton Cockatoo and the Sulphur-crested Cockatoo, potentially even disrupting ecosystems in the long term.’ He stressed that such reintroduction programmes must incorporate genetic data moving forward to avoid this. Recognising the Triton Cockatoo as a distinct species will now also require updates to global legislation, such as the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) which aims to protect these and many other parrot species, and may require new levels of protection being issued given the split.

The other study, in *Molecular Ecology*, focused on the critically endangered Yellow-crested Cockatoo (*Cacatua sulphurea*), native to Indonesia and East Timor, using DNA extracted from 100-year-old museum specimens to elucidate genetic diversity among subspecies. This approach, known as ‘museomics’, involves studying genetic materials from preserved specimens kept in museums, in this case across the USA and Europe. It allows researchers to gather vital biological data without disturbing the remaining endangered individuals in the wild.

This research identified three genetically distinct groups across the Wallacean region, a biogeographical zone that lies between the Asian and Australian continental shelves, simplifying the previous classification of seven subspecies. The findings suggest that the subspecies *C. s. citrinocristata* may not be as distinct as previously thought and raises questions about how the isolated *C. s. abbotti* population ended up on a remote Indonesian island, given that cockatoos are not known for long-distance migration. These discoveries redefine the genetic structure of the Yellow-crested Cockatoo and offer new insights into its evolution and distribution.

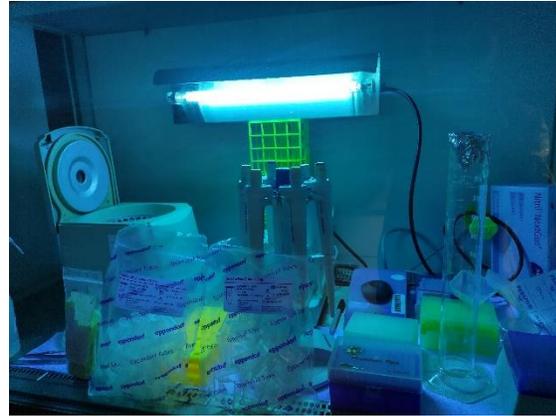
Dr Astrid ANDERSSON, who led the study in *Molecular Ecology* explained, ‘One of the benefits of museomics is the ability to examine genetic data from taxa that are extinct, rare or inaccessible. In this case, it provides valuable information to inform conservation efforts, such as translocation, genetic rescue and breeding—steps that are crucial to avoid global extinction of *C. sulphurea*.’

Professor Juha MERILÄ, Associate Director (Ecology & Biodiversity Research Groups) and Chair Professor of SBS, who leads the research group where Drs SANDS and ANDERSSON are based, stated, ‘Accurate identification of evolutionarily significant units and species is essential for the effective management and conservation of rare and threatened species. Our research highlights the genetic diversity within and among these iconic cockatoo species and underscores the importance of incorporating genetic data into conservation planning.’



A preserved Yellow-crested Cockatoo specimen, collected in 1911 and housed at the Bavarian State Collection, Munich. Specimens like this provide invaluable genetic data for conservation research.

Photo credit: Arthur Sands



Highly sterile laboratory bench used for the extraction of DNA from old museum specimens in Giessen, Germany.

Photo credit: Arthur Sands



Preserved cockatoo specimens stored in wooden drawers at the Bavarian State Collection, Munich. These valuable collections serve as important resources for genetic research and conservation planning. Photo credit: Arthur Sands



A Yellow-crested Cockatoo (*Cacatua sulphurea*) with its chick. Hong Kong is home to around 200 Yellow-crested Cockatoos, about 10% of the remaining global population. Photo credit: Carulus Kwok

For further reference, the full research papers are available as follows:

Sands A.F., Andersson A.A., Reid K., Hains T., Joseph L., Drew A., Mason I.J., Rheindt F.E., Dingle C. and **Merilä J.** 2024. Genomic and Acoustic Biogeography of the Iconic Sulphur-crested Cockatoo Clarifies Species Limits and Patterns of Intraspecific Diversity. *Molecular Biology and Evolution*, 41(11), p.msae222. <https://academic.oup.com/mbe/article/41/11/msae222/7840323>

Andersson A. A., Sands A. F., Reid K., Hains T., Momigliano P., Lee J., Lee G., Rheindt F. E., Dingle C, **Merilä, J.** (2024). Museomic Sheds Light on Evolutionary Diversity in a Critically Endangered Cockatoo Species from Wallacea. *Molecular Ecology*. <https://onlinelibrary.wiley.com/doi/10.1111/mec.17616?af=R>

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