

*Notornis*, 2023, Vol. 70: 143-146

0029-4470 © The Ornithological Society of New Zealand Inc.

## SHORT NOTE

# Plumage colour aberrations in erect-crested penguins (*Eudyptes sclateri*) on Antipodes Island

JEFF WHITE\*

Department of Biology, University of Miami, Coral Gables, Florida, USA

THOMAS MATTERN

Department of Zoology, University of Otago, Dunedin, New Zealand

Global Penguin Society, Puerto Madryn, Chubut, Argentina

The Tawaki Trust, Dunedin, New Zealand

KLEMENS PÜTZ

Antarctic Research Trust, Bremervörde, Germany

HANNAH MATTERN

Logan Park High School, Dunedin, New Zealand

DAVID HOUSTON

The Tawaki Trust, Dunedin, New Zealand

Department of Conservation, Auckland, New Zealand

ROBIN LONG

Lincoln University, Christchurch, New Zealand

BIANCA C. KEYS

Department of Zoology, University of Otago, Dunedin, New Zealand

URSULA ELLENBERG

Global Penguin Society, Puerto Madryn, Chubut, Argentina

The Tawaki Trust, Dunedin, New Zealand

Department of Marine Science, University of Otago, Dunedin, New Zealand

PABLO GARCIA-BORBOROGLU

Global Penguin Society, Puerto Madryn, Chubut, Argentina

The Tawaki Trust, Dunedin, New Zealand

CONICET (National Research Council), Argentina

---

Received 13 May 2023; accepted 25 June 2023

\*Correspondence: [jwhite61890@gmail.com](mailto:jwhite61890@gmail.com)

Plumage colour aberrations occur due to mutations that alter the production and deposition of pigment cells in the feathers (van Grouw 2006). These mutations are often due to genetic factors, but environmental stressors (e.g. poor nutrition or contaminants) and ontogenetic processes (e.g. senescence) have also been identified as contributing factors (Guay *et al.* 2012; van Grouw 2012; Camacho *et al.* 2022).

The most frequently reported colour mutations in seabirds are melanism, albinism, leucism, and isabellinism (Carpenter-Kling *et al.* 2017). Aberrant plumage colouration has been reported in some form for most species of penguins (Woehler 2023). Melanism results from excess melanin production or deposition and produces black plumage (Sage 1962). On the other hand, albinism stems from a lack of melanin production resulting in white plumage and skin, with red or pink eyes (Sage 1962).

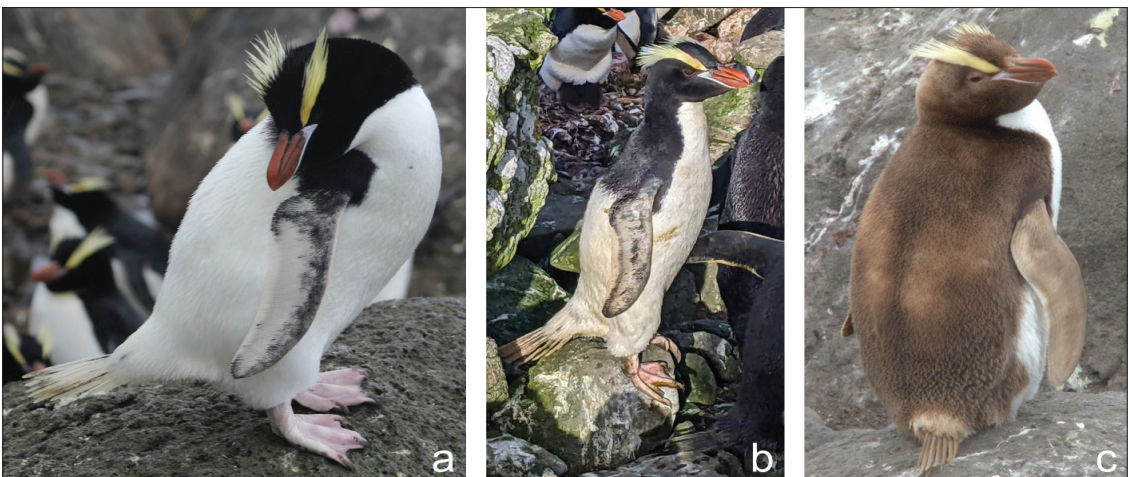
Leucism occurs when the deposition of pigment cells is interrupted resulting in fully or partially white feathers (Forrest & Naveen 2000; van Grouw 2006). Unlike albinism, leucistic individuals do not exhibit the changes in skin and eye colouration (Sage 1962; Noguera & Alves 2011). Interestingly, “albino” as well as leucistic individuals were highly valued by taxidermists in New Zealand and elsewhere for their unique plumage (Crane & Gill 2018). In crested penguins, full or partial leucism has been reported in macaroni penguins (*Eudyptes chrysolophus*) (Carpenter-Kling *et al.* 2017) and royal penguins (*Eudyptes schlegeli*) (Falla 1937).

Isabellinism is a form of partial albinism resulting in a lightening of black feathers to a light brown colouration (Everitt & Miskelly 2003). The

mutation arises from a single autosomal recessive gene with incomplete dominance and has been observed in king (*Aptenodytes patagonicus*), yellow-eyed (*Megadyptes antipodes*), Adélie (*Pygoscelis adeliae*), gentoo (*Pygoscelis papua*), chinstrap (*Pygoscelis antarcticus*), Magellanic (*Spheniscus magellanicus*), Humboldt (*Spheniscus humboldti*), and African penguins (*Spheniscus demersus*) as reviewed in Everitt & Miskelly (2003). In crested penguins, isabelline plumage has been reported in macaroni, royal, Snares (*Eudyptes robustus*), and Southern rockhopper penguins (*Eudyptes chrysolophus*) (Everitt & Miskelly 2003).

However, the term isabelline has recently come into question as the most appropriate description for this colour mutation (Traisnel *et al.* 2018). True isabellinism results from a lack of pheomelanin, which is a pigment that these penguins do not produce (Traisnel *et al.* 2018). A similar brown colouration in other birds results from incomplete oxidation of eumelanin causing rapid bleaching due to sunlight (van Grouw 2012, 2013). This mutation is sex-linked and is most commonly seen in females (Traisnel *et al.* 2018). The authors suggest the use of the term “brown” to refer to “isabelline” penguins.

Plumage colour aberrations have not yet been formally reported in the erect-crested penguin, with the exception of a melanistic individual photographed on St. Kilda Beach, Dunedin in 1934 (Fall 1935). Interestingly, a melanistic crested penguin illustrated by Buller (1888: plate p. 294) is now thought to represent a melanistic erect-crested penguin (Oliver 1953; Stonehouse 1971). On Antipodes Island, in December 2022, we observed



**Figure 1.** Plumage colour aberrations observed in erect-crested penguins (*Eudyptes sclateri*) on Antipodes Island, December 2022. Three adults were observed including (a) partially leucistic adult male, (b) partially leucistic adult female, and (c) isabelline or “brown” adult female.

three individual erect-crested penguins presenting two different colour aberrations. We encountered a male erect-crested penguin exhibiting partial leucism on the south coast of Antipodes Island on 5 December 2022 in colony SCW-001 (49.7062°S, 178.7482°E; Mattern 2023). The back plumage was uniformly white except a black saddle extending between the base of the wings (Fig. 1a). The wings themselves were mottled with black on the leading edge fading to white on the trailing edge. This individual was seen multiple times in different locations within the colony associating with females of normal plumage colour.

A partially leucistic female was identified in the same colony on 7 December 2022 (Fig. 1b). The overall pattern was very similar to the partially leucistic male, but both individuals were observed in different parts of the colony at the same time. Additionally, the back saddle extended lower on the female and the wings had a heavily mottled appearance encircled by an outline of black feathers. Unlike the male, this female was seen only once walking through the colony and was not observed associating with any males.

On 8 December 2022, an isabelline or “brown” female was spotted preening on the rocks at colony SCW-004 (49.7028°S, 178.7399°E). The plumage pattern mimicked the standard erect-crested pattern, but all black areas were replaced with chocolate brown feathers (Fig. 1c). The coloration appeared to be lighter in areas around the mid-back, top of the head, tail, and on the wings. This colony was only visited once during the expedition.

To our knowledge, these colour aberrations have not been formally reported in erect-crested penguins (Everitt & Miskelly 2003; Woehler 2023). However, an image reproduced on the back-cover of Taylor (2006) appears to depict another isabelline or “brown” female erect-crested penguin. The apparent lack of such observations is likely due to the inaccessibility of their breeding islands and the low frequency of large-scale surveys (Mattern & Wilson 2019; Davis *et al.* 2022).

The underlying cause for these colour aberrations in erect-crested penguins have not been analysed. Poor nutrition seems unlikely given their overall good body condition (Davis *et al.* 2022; Mattern 2023). Progressive greying could not be evaluated with the current observations but has been reported in Adélie (Golubev 2020) and African penguins (Trainsnel *et al.* 2018), as well as in yellow-eyed penguins over the age 20 (UE *pers. obs.*). Therefore, a genetic mechanism appears to be the most likely cause, but further genetic studies and long-term monitoring is needed.

In forthcoming expeditions, we will continue to survey breeding colonies and will record the presence of any other plumage aberrations such as

full leucism or melanism, both of which are reported in other crested penguin species. We will also record any resighting of the reported individuals.

## ACKNOWLEDGEMENTS

We would first like to thank the Vontobel Foundation, Switzerland, and the Antarctic Research Trust, Germany, for the financial support of the Tawaki Project expedition (<https://www.tawaki-trust.org/>). We would also like to thank skipper Steve Kafka and the crew of the research vessel *Evohe* for getting us safely to and from Antipodes Island. Special thanks to Graeme Taylor, Igor Debski, Johannes Fischer, Hendrik Schultz, and Sanjay Thakur (Department of Conservation) for their support in obtaining the research permits for the Tawaki Project expedition. Finally, we would like to thank Sharon Trainor and Janice Kevern for logistical assistance and clearing our gear through DOC biosecurity checks.

## LITERATURE CITED

- Buller, W.L. 1888. *A history of the birds of New Zealand* (Vol. 1). London, The Author.
- Bruckner, J.H. 1941. Inheritance of white plumage in *Phasianus*. *The Auk* 58(4): 536–542.
- Camacho, C.; Sáez-Gómez, J.; Hidalgo-Rodríguez, P.; Rabadán-González, J.; Molina, C.; Negro, J.J. 2022. Leucistic plumage as a result of progressive greying in a cryptic nocturnal bird. *Scientific Reports* 12(1): 3411.
- Carpenter-Kling, T.; Dyer, B.M.; Makhado, A.B.; Pistorius, P.A. 2017. Plumage aberrations in macaroni penguins *Eudyptes chrysolophus* at sub-Antarctic Marion Island. *Polar Biology* 40: 1907–1911.
- Crane, R.; Gill, B.J. 2018. William Smyth (1838–1913), a commercial taxidermist of Dunedin, New Zealand. *Archives of Natural History* 45(2): 292–308.
- Davis, L.S.; Renner, M.; Houston, D.; Zhu, L.; Finkler, W.; Mattern, T. 2022. The breeding biology of erect-crested penguins, *Eudyptes sclateri*: Hormones, behavior, obligate brood reduction and conservation. *Plos one* 17(10): e0275106.
- Everitt, D.A.; Miskelly, C.M. 2003. A review of isabellinism in penguins. *Notornis* 50: 43–51.
- Falla, R.A. 1935. Notes on penguins of the genera *Megadyptes* and *Eudyptes* in Southern New Zealand. *Records of the Auckland Institute and Museum* 1(6): 319–326.
- Falla, R.A. 1937. Birds. Pp. 100–101 *In*: Series B Report of the B.A.N.Z. Antarctic Research Expedition 1929–1931, Volume II, B.A.N.Z. University of Adelaide, Adelaide, Australia

- Antarctic Research Expedition Committee.  
 Forrest, S.C.; Naveen, R. 2000. Prevalence of leucism in pygoscelid penguins of the Antarctic peninsula. *Waterbirds* 23(2): 283–285.
- Golubev, S.V. 2020. Aberrant and deformed Antarctic penguins and unusual eggs. *Notornis* 67(2): 459–468.
- Guay, P.J.; Potvin, D.A.; Robinson, R.W. 2012. Aberrations in plumage coloration in birds. *Australian Field Ornithology* 29(1): 23–30.
- Mattern, T. 2023. The Tawaki Project: Bounty-Antipodes Expedition 2022, 8 November – 21 December 2022. *Dunedin, New Zealand*. DOI: 10.13140/RG.2.2.16148.78722/1
- Mattern, T.; Wilson, K.J. 2019. New Zealand penguins—current knowledge and research priorities. *A report compiled for Birds New Zealand*. DOI: 10.36617/SoP
- Nogueira, D.M.; Alves, M.A.S. 2011. A case of leucism in the burrowing owl *Athene cunicularia* (Aves: Strigiformes) with confirmation of species identity using cytogenetic analysis. *Zoologia (Curitiba)* 28: 53–57.
- Oliver, W.R.B. 1953. The crested penguins of New Zealand. *Emu* 53(2): 185–187.
- Sage, B.L. 1962. Albinism and melanism in birds. *British Birds* 55(6): 201–225.
- Stonehouse, B. 1971. The Snares Islands Penguin *Eudyptes robustus*. *Ibis* 113(1): 1–7
- Taylor, R.H. 2006. Straight through from London: the Antipodes and Bounty Islands, New Zealand. Christchurch, New Zealand, Heritage Expeditions New Zealand. Pp. 415
- Traisnel, G.; Pichegru, L.; Visser, H.J.; Edwards, L.C. 2018. Colour aberrations in African penguins *Spheniscus demersus*. *Marine Ornithology* 46: 19–22.
- van Grouw, H. 2006. Not every white bird is an albino: sense and nonsense about colour aberrations in birds. *Dutch Birding* 28(2): 79–89.
- van Grouw, H. 2012. Plumage aberrations in Australian birds: a comment on Guay *et al.* (2012) and Frith and Murphy (2012). *Australian Field Ornithology* 29(4): 210–214.
- van Grouw, H. 2013. What colour is that bird. *British Birds* 106: 17–29.
- Woehler, E.J. 2023. Partial melanism in a Royal Penguin *Eudyptes schlegeli*. *Tasmanian Bird Report* 43. In press.

**Keywords:** erect-crested penguin, leucism, isabelline, colour aberration, *Eudyptes scalperi*, Antipodes Island