

Records of leucism in albatrosses and petrels (Procellariiformes) in the South Atlantic Ocean

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Submetido em: 10/08/2009. Aceito em: 19/09/2009.

RESUMO: Registros de leucismo em albatrozes e petréis (Procellariiformes) no Oceano Atlântico Sul. Foram registrados três albatrozes-de-sobrancelha-negra *Thalassarche melanophris* (dois juvenis e um adulto) e três pombas-do-cabo *Daption capense* leucísticos entre dezembro de 2005 e julho-agosto de 2008 em águas ao largo do sul do Brasil, Uruguai e África do Sul, no Oceano Atlântico Sul. Para ambas as espécies, três indivíduos apresentaram plumagem totalmente branca, mas com patas, bico e íris característicos da espécie (dois albatrozes) ou levemente mais clara do que na plumagem normal (uma pomba-do-cabo). O albatroz-de-sobrancelha-negra fotografado na África do Sul tinha somente algumas das coberteiras superiores das asas com coloração branca. As pombas-do-cabo registradas no Uruguai também apresentaram apenas parte das coberteiras superiores brancas. Aparentemente, apenas um registro de leucismo em Procellariiformes havia sido reportado no Brasil, bem como para o Atlântico Sul. Os registros de leucismo em albatroz-de-sobrancelha-negra parecem ser os primeiros para a espécie.

PALAVRAS-CHAVE: leucismo, albatroz-de-sobrancelha-negra, *Thalassarche melanophris*, pomba-do-cabo, *Daption capense*, Oceano Atlântico Sul.

KEY-WORD: leucism, Black-browed Albatross, *Thalassarche melanophris*, Cape Petrel, *Daption capense*, South Atlantic Ocean.

Several kinds of aberrant colorations have been described in terrestrial bird species (e.g. Sage 1963, Nemésio 1999, 2001, Gonçalves-Jr. *et al.* 2008), as well as in procellariiform seabirds (Fischer 1972, Garrett 1990, Bried and Mougéot 1994, Tickell 2000, Ristow and Witte 2004, Bried *et al.* 2005). The most important pigments that determine plumage coloration in birds are melanines and carotenoids. Carotenoids vary in colour from pale-yellow to scarlet-red and they are taken in with food and transformed into colour pigments by enzymes. The deposition of pigments takes place directly at the start of feather growth. Aberrations in this pigmentation are mostly caused by nutritional deficiencies and usually do not have a genetic cause (van Grouw 2006). There are two types of melanin present in birds: eumelanin and phaeomelanin. The eumelanin is responsible for black, grey and dark-brown feathers. In a high concentration, phaeomelanin is responsible for reddish-brown feathers. In lower concentrations, the colour will appear as yellow-brown to almost white. Both melanins together can give combination of colours such as greyish-brown. In the skin and eyes, only eumelanin is present. Melanin formation involves a series

of biochemical reactions and the formation process is determined genetically. Any aberration in the process has a potential influence on the colours of a bird. A mutation in the formation of the enzyme tyrosinase may inhibit the formation of melanin (van Grouw 2006). The most common colour mutation in albatrosses and petrels are albinism and leucism (Bried *et al.* 2005). Albinism is defined as a total lack of both melanins in feathers, eyes and skin as a result of an inherited absence of tyrosinase (van Grouw 2006), while leucism is defined as a partial or total lack of eumelanin and phaeomelanin in the feathers as a result of an inherited disorder in the deposition of these pigments in the feathers. In certain forms, only feathers become colourless while eyes, skin and horny bare parts are normally colored. Leucistic birds always have colored eyes which distinguish them from albinos. The reason for this is that only the pigments of the iris are missing and the pigments in the back of the eyeball remain present and therefore the eyes look dark (Nemésio 1999, 2001, van Grouw 2006). In this study we reported leucism in three Black-browed Albatrosses *Thalassarche melanophris* and three Cape Petrels *Daption capense* from the South Atlantic Ocean.



FIGURE 1: Leucistic Black-browed Albatross, *Thalassarche melanophris*, among two other individuals of the same species (left). Detail picture above shows the bill colour, characteristic of juveniles. At right a picture with better resolution of a juvenile of the same species with normal plumage. Photos: Sandro de Mello Terroso (left) and Demétrio Carvalho/Projeto Albatroz (right).

One albatross and one petrel showing aberrant plumage coloration were photographed by Sandro de Mello Terroso while aboard a fishing vessel operating off southern Brazil during July-August 2008. In waters off Uruguay, Fernando Area photographed one aberrant-plumaged albatross in August 2007, and S. J. photographed two petrels on 15 December 2005 and 16 December 2007. On 26 May 2007, Trevor Hardaker photographed one albatross with aberrant plumage off Cape Town in South Africa.

All the three albatrosses with aberrant plumages were identified as the Black-browed Albatross and the petrels as the Cape Petrel. The albatrosses from Brazil and Uruguay were juveniles, while the South Africa one was an adult. Both juvenile specimens had completely white plumage (Figure 1 and 2), the adult only some white

upper-wing coverts (Figure 2; see also www.hardaker.co.za/blackbrowedalbatross1.htm). The eye and bill colours were normal in all these birds. Among Cape Petrels, individual from Brazil had completely white plumage, but the coloration of the bill was lighter than the normal (black) pattern for the species (Figure 3). Another bird (Figure 4) had mostly white back and wing-coverts, lacking the diagnostic spotted pattern of the species. All these characteristics lead us to conclude the six seabirds were leucistic.

Adult Black-browed Albatrosses are mostly white with black wings and grey tail and have orange bill with reddish-tip. The juveniles are similar, but the olive-brown bills become lighter with age, retaining a dark tip (Figure 1). Adults and juveniles have a dark eye patch and brown iris (Onley and Scofield 2007). The leucistic



FIGURE 2: Leucistic adult Black-browed Albatross, *Thalassarche melanophris*, photographed in May 2007 in South African waters (left). On the right a juvenile of the same species recorded in Uruguayan waters in August 2007. Photos: Trevor Handaker (left) and Fernando Area (right).

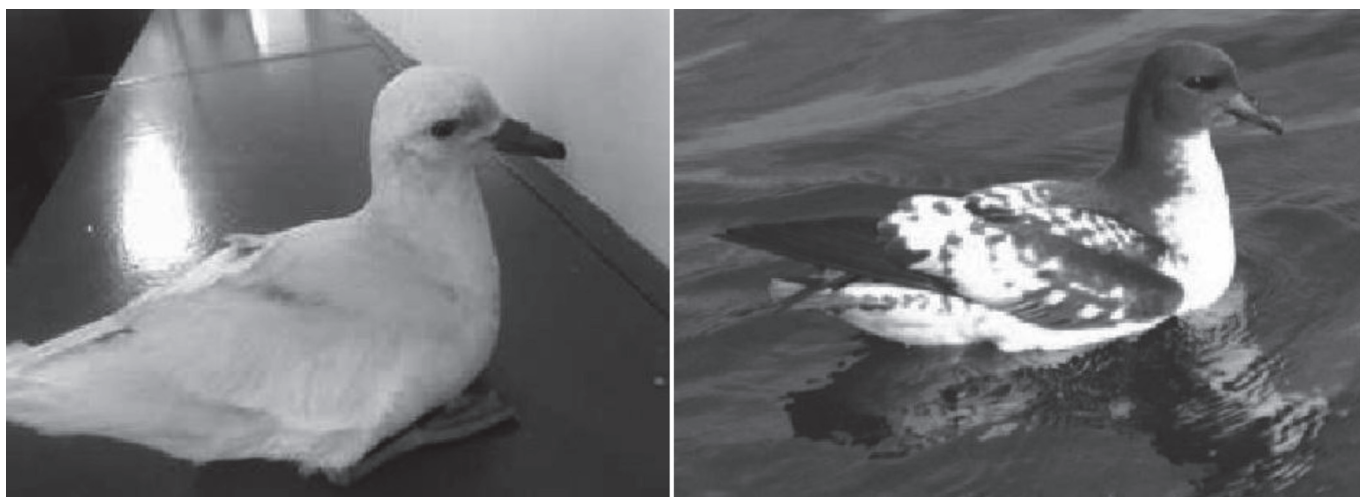


FIGURE 3: Leucistic Cape Petrel, *Daption capense*, with normal eye coloration, but legs and bill lighter (left) than the typical species, as showed in the right picture. Photos: Sandro de Mello Terroso (left) and Leandro Bugoni (right).

Black-browed Albatrosses from Brazil and Uruguay were juveniles, based on the brownish bill with a dark tip. Additionally, it was possible to compare them with birds with normal plumage in the same pictures, making the identification easier. In 2008, albatrosses with similar characteristics were observed off Brazilian coast on two occasions observed, but not photographed (S. M. Terroso, *pers. comm.*).

The Cape Petrel is a distinctive-looking procellariid due to its unique checkered black and white dorsal plumage. Adult and juveniles have similar plumage patterns (Onley and Scofield 2007). Birds supposed to be leucistic Cape Petrels are likely to be misidentified as the Snow Petrel *Pagodroma nivea*, particularly where the two species occurs in sympatry (Thompson *et al.* 2000). However, this was not the case of the totally white Cape Petrel

observed in this study, because the Snow Petrel is mainly restricted to Antarctic waters up to 300 km from the pack ice (Onley and Scofield 2007). Moreover, the bill size and shape of the bird in question do not match that of the Snow Petrel, which have a shorter and bulkier bill (Onley and Scofield 2007). The observed individual presented lighter colours of the bill than the dark characteristic of the species and there was no doubt about identification.

There are several kinds of colour anomalies in birds, while in procellariiforms, cases of leucism, albinism and melanism have been recorded (Bried *et al.* 2005). Among the albatrosses these anomalies have been reported in at least five species: Wandering *Diomedea exulans*, Shy *Thalassarche cauta*, Laysan *Phoebastria immutabilis*, Black-footed *Phoebastria nigripes* and Light-mantled *Phoebastria palpebrata* Albatrosses (Fischer 1972, Lepschi 1990, Bried



FIGURE 4: Leucistic Cape Petrels, *Daption capense*, recorded in Uruguay in 15 December 2005 (left) and 16 December 2007 (right). Photos: Sebastián Jiménez.

and Mougeot 1994, Tickell 2000). Among petrels, plumage aberrations have been recorded in at least 22 species (Lee and Grant 1986, Garrett 1990, Bried *et al.* 2005).

Some authors have erroneously recorded leucistic birds as albinos or 'partially albinos' (see discussion in van Grouw 2006 and Gonçalves-Jr. *et al.* 2008). Different forms of leucism are known and can vary from only a few white feathers (< 25%), as in the Black-browed Albatross observed in South Africa or the Cape Petrel in Uruguay, to whole white-plumaged individuals. In certain forms, only the feathers become colourless while in others the bill, skin and horny parts can become colourless as well. Leucistic birds rarely represent more than 1% of all specimens in a natural population (Sage 1963, Bensch *et al.* 2000).

Among the procellariiforms, the Southern Giant Petrel *Macronectes giganteus* has a dimorphic plumage, being dark-brown when juveniles and becoming lighter after successive moults. Totally white or white birds with few, scattered brown feathers also occur (Carlos and Voisin 2008). However, this dimorphism, which also appears in many gadfly petrels (*Pterodroma* spp.), is controlled by two autosomic allele genes, where white dominates the dark ones (Shaughnessy 1970). The white plumage represents about 15% of some Southern Giant Petrel populations (Shaughnessy 1971). Nevertheless, the light colour in Southern Giant Petrels is a distinct genetic phenomenon and it is not considered a plumage aberration.

Apparently, the only previous record of colour anomalies in Brazilian procellariiforms was a specimen of Trindade Petrel *Pterodroma arminjoniana* from Trindade Island, which was described as a new species (*Aestrelata chionophara*) by Murphy (1915). Later, Murphy recognized it to be a leucistic individual (Murphy and Pennoyer 1952). This study presents, as long as we know, the first records of leucistic Black-browed Albatrosses, demonstrating that this phenomena also occurs in this species. Furthermore, records of leucistic procellariiforms in wintering areas of the South Atlantic Ocean are scarce or absent, and so this study contributes to a better knowledge of plumage aberrations in this seabird group.

ACKNOWLEDGEMENTS

We are most grateful to the fisherman and Projeto Albatroz partner S. M. Terroso for pictures taken in Brazilian waters and to all the data provided, which encouraged us to prepare this paper. We also thank the observer from Uruguay, F. Area, for the pictures of aberrant plumage of the albatross, Dr. M. Abreu for checking the species identification and to T. Hardaker for allowing the publication of his beautiful picture taken in South Africa and further data on that individual. Thanks also to V. Barquete, F. I. Colabuono and F. Molina for kindly providing literature, to J. D. Stevens for English review and to Programa Petrobras Ambiental, Albatross Task Force/Royal Society for the Protection of Birds, and Fundação O Boticário de Proteção à Natureza for financial support.

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