

# Brown plumage aberration records in Kelp Gull (*Larus dominicanus*) and Magellanic Penguin (*Spheniscus magellanicus*) in southern Brazil

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**ABSTRACT:** Plumage aberration records are widely reported for terrestrial bird species, although for seabirds those records are still scarce. The brown mutation is one of the most frequent color aberration in birds, and is defined as a qualitative reduction of eumelanin. Here we describe the first records of brown plumage aberration for two seabird species, in two individuals of *Larus dominicanus* and one individual of *Spheniscus magellanicus*, in coastal southern Brazil, thus contributing to the knowledge on color variations in wild birds.

**KEY-WORDS:** chromatic, coloration, mutation, seabirds, waterbirds.

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Plumage aberrations in wild birds have been widely reported over several decades (*e.g.* Sage 1963, Piacentini 2001, Franz & Fleck 2009, Mancini *et al.* 2010, Crozariol *et al.* 2013, Frainer *et al.* 2015). Those color mutations occur due to the absence or excess of certain pigments in the birds' feathers and skin, which may result in distinct kinds of color variation, diverging from the original plumage pattern of the species. The most commonly reported mutations are cases of albinism, leucism, melanism, progressive greying, dilution and brown (Sage 1963, van Grouw 2006, van Grouw *et al.* 2011, Hume & van Grouw 2014). The brown mutation is a genetically-based plumage abnormality that may be caused by multiple mechanisms, including loci in autossomes or sexual cromossomes. Van Grouw (2006, 2012) suggested that the brown mutation may be caused by a single gene, and that its inheritance is recessively linked to the female sexual chromosome. On the other hand, studies have shown that the activation of the melanocortin-1 receptor (MC1R) gene may increase the synthesis of brown eumelanin (Robbins *et al.* 1993, Mundy 2005). However, most cases of plumage aberrations reported, attributed to the MC1R gene, are different degrees of melanism (Mundy *et al.* 2004, Mundy 2005, Nadeau *et al.* 2006).

In birds, the brown mutation affects qualitatively the eumelanin, which is the pigment responsible to produce black, grey and dark-brown tones. As a result

of the incomplete oxidation of eumelanin, this pigment becomes less expressive, while the brown tones provided by the pheomelanin pigment become more apparent, thus expressing the brown mutation. Additionally, it is known that feathers affected by brown mutation may depigment as a result of continuous sun exposure, becoming white-toned. In some cases, the bird tarsus may present depigmentation as well (van Grouw 2006, 2013).

Brown mutation cases are relatively common in wild birds, and were described for a large number of species, for instance *Agelasticus thilius*, *Columba maculosa* and *Nothura maculosa* (Urcola 2011), *Uria aalge*, *Uria* spp. and *Morus bassanus* (van Grouw *et al.* 2011), *Passer domesticus* (van Grouw 2012), *Megarynchus pitangua* (Crozariol *et al.* 2013), *Corvus monedula* and *Pica pica* (van Grouw 2013), *Ectopistes migratorius* (Hume & van Grouw 2014), *Corvus splendens* (Mahabal *et al.* 2015), *Fulmarus glacialis*, *Larus argentatus* (Flood & van Grouw 2015) and *Procellaria aequinoctialis* (Frainer *et al.* 2015). Although the brown mutation is a commonly reported color variation, caution must be taken in diagnosis of specimens, considering that many authors have erroneously described brown mutation cases as other color mutations, such as dilution or leucism (van Grouw 2012).

The Kelp Gull (*Larus dominicanus*) is a coastal bird widely distributed through the Southern Hemisphere, occurring in coastal environments from the Equator to

the Antarctic continent (BirdLife International 2016a). The original color pattern of adult individuals consists in head, neck, tail, rump and undersides all white, presenting black tones in the back and top of the wings. Immature individuals present back and top of the wings mottled brownish, rump barred brownish and white. The bill-tip is reddish in adult individuals, while blackish in immatures (de la Peña & Rumboll 2001, Couve & Vidal 2003). The Magellanic Penguin (*Spheniscus magellanicus*) is a pelagic seabird distributed through the Pacific and Atlantic Oceans of South America, ranging coastal zones from Argentina, Chile and Falklands Islands. Immature individuals migrate northward during the non-breeding season, reaching the coast of Brazil in winter months (BirdLife International 2016b). The original color pattern of adults consists in white prevailing in the underparts, with a horseshoe-shaped black band on breast extending down the flanks, and another wider band crossing the upper breast. Black predominates in the dorsal region, upper side of the flippers and head, with a white collar descending from the top of the head and joining on the neck. Immatures present greyish plumage instead of black, lacking the bands on head, neck and breast (Williams 1995, de la Peña & Rumboll 2001). Neither

species present apparent sexual dimorphism (Couve & Vidal 2003).

Since the early 1990s, the Laboratory of Ornithology and Marine Animals (LOAM) monitors the vertebrate fauna from the middle coast of the Rio Grande do Sul state, Brazil, between Balneário Pinhal (30°15'S; 50°14'W) and Mostardas (31°11'S; 50°50'W) (Petry *et al.* 2007, 2016). Differences in plumage pattern of coastal and seabirds are observed throughout the seasons, comprising differences between breeding and non-breeding periods of species (*e.g.* *Sterna hirundo*, *Calidris canutus* and *Pluvialis dominica*), age group variations (*e.g.* *S. magellanicus*, *Thalassarche melanophris* and *L. dominicanus*) and diet-driven color variations, such as pink tones in the plumage of some species caused by a carotenoid-rich diet (*e.g.* *Platalea ajaja* and *Phoenicopterus chilensis*). In May 2008 we observed an adult individual of *L. dominicanus* (30°57'18.1"S; 50°39'45.3"W), and in April 2009, we observed a sub-adult individual (30°39'01.9"S; 50°26'33.1"W), both presenting aberrant plumages. In March 2010 (30°55'00.5"S; 50°38'05.3"W) we recorded one immature individual of *S. magellanicus* presenting the same color variation. All three specimens presented plumage depigmentation on originally black parts of the body, described in literature as brown mutation (see van Grouw 2006, 2013) (Fig. 1).



**Figure 1.** Adult individual of *Larus dominicanus* reported in May 2008 (A). Note that this specimen presents almost complete depigmentation in some tail and wing feathers. The other *L. dominicanus*, a sub-adult individual reported in April 2009 (B), also presents depigmentation in some tail and wing feathers, as well as in the tarsus skin. Immature individual of *Spheniscus magellanicus* reported in March 2010 (C–D). All cases described above are brown mutation cases reported in coastal Rio Grande do Sul, Brazil. Photos: LOAM archive.

Documented cases describing plumage aberrations in coastal and seabirds in Brazil are scarce, generally reporting cases of albinism and leucism mutations (Coelho & Alves 1991, Mancini *et al.* 2010, Frainer *et al.* 2015). However, many cases have probably gone unnoticed by researchers due to natural plumage variations presented by this group, such as breeding and non-breeding plumages, as well as immature plumaged individuals. Furthermore, several cases of aberrant plumage may have not been considered relevant for publication by researchers and birdwatchers, thus hiding important information on these cases. Van Grouw (2013) reported that, in some cases, diagnosing the type of mutation in wild specimens may be challenging due to natural variation in the plumage of some species, and due to depigmentation of feathers caused by the incidence of sunlight.

The knowledge on aberrant plumage and other chromatic variations in birds may contribute to future studies regarding population genetics and ecology of species, since chromatic mutations are caused by naturally rare recessive genes. Besides that, aberrant plumaged individuals may be more or less susceptible to predation, sexual selection and illegal wildlife trade, since these individuals are more noticeable than non-mutant ones because they present a different plumage (van Grouw 2006). Records presented in this study are, to our knowledge, the first brown mutation cases reported for both *S. magellanicus* and *L. dominicanus*, thus contributing to the knowledge regarding chromatic variations in wild marine birds.

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