

## COLOR ABERRATIONS IN TWO SPECIES OF NEW WORLD VULTURES (CATHARTIDAE)

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**Abstract** · We present information on two cases of color aberrations in two species of vultures: one individual of Turkey Vulture (*Cathartes aura*) in Mexico and one of Black Vulture (*Coragyps atratus*) in Costa Rica. Both cases were determined to be ino, wherein birds have very pale brown eumelanin. We discuss these two cases and compare them with other cases of abnormally colored vultures from several island and mainland areas in America.

### Resumen · Aberración de color en dos especies de buitres del Nuevo mundo

Presentamos información sobre dos casos de anomalía pigmentaria en dos especies de buitres: un individuo de Zopilote Aura (*Cathartes aura*) en México y otro de Zopilote Negro (*Coragyps atratus*) en Costa Rica. Ambos casos fueron determinados como ino, donde las aves tienen eumelanina café muy pálida. Discutimos estos dos casos y los comparamos con otros casos de buitres de coloración anormal de varias áreas continentales e islas en América.

**Key words:** Albinism · Black Vulture · Brown aberration · *Cathartes aura* · Color aberration · *Coragyps atratus* · Ino · Leucism · Turkey Vulture

### INTRODUCTION

There are several types of color aberrations in birds, most caused by mutations (van Grouw 2013, van Grouw 2018). Leucism and albinism are the terms most frequently used in reports on color aberrations in birds, although the majority of these cases are in fact none of both (Mahabal et al. 2016). In leucistic birds, the affected feathers are without melanin, so they are white (van Grouw 2013). The pigmentary abnormality with the greatest prevalence among birds is progressive greying, but this is often confused with leucism (van Grouw 2013). Most forms of progressive greying, however, appear not to be heritable and may be environment-related, whilst leucism is always heritable (van Grouw 2013). Leucistic birds lack both melanins in all or parts of plumage, and the extent of white plumage does not change with age, while in progressive greying there is a continuous loss of pigment cells in all or parts of skin, so individuals will get a growing amount of white feathers after every molt (Mahabal et al. 2016).

Some cases reported as leucism are more frequently cases of ino aberration (van Grouw 2013). In ino, there is a strong qualitative reduction of melanin resulting in a very pale plumage color and almost colorless skin, and plumage bleaches further over time by exposure to sunlight and can become almost totally white (van Grouw 2013, Mahabal et al. 2016). Albinism is a heritable mutation causing the absence of the enzyme tyrosinase, which is necessary for the production of melanin. Therefore, in albinos both plumage and skin are without any melanin, resulting in white plumage, and pinkish eyes and skin (the latter being the consequence of the color of the blood being visible through the pigmentless tissue), and sometimes a light yellow or pinkish white tarsus, depending on the species (van Grouw 2013, Guay et al. 2012).

There are reports of Turkey Vultures (*Cathartes aura*) being partially or totally white in various mainland localities (Jones 1933, Gross 1965, Voelker 1976, Sheffield 1992, MacKenzie 2002, Tinajero & Rodríguez-Estrella 2010, Molina et al. 2018), as well as on islands, for example Lobos de Tierra island (Peru; Figueroa et al. 2011) and Cuba (Ferrer-Sánchez & Rodríguez-Estrella 2014). Pigmentary anomalies also have been reported in Black Vultures (*Coragyps atratus*) from Ecuador (Hosner & Lebbin 2006) and Jamaica (Zeiger et al. 2017), and in Andean Condors (*Vultur gryphus*) from Bolivia (Méndez-Mojica 2013) and Chile (Pavez 2008). Hardly any (or even none) of these pigmentary abnormalities were albinism or leucism. Most likely, these vultures had ino or brown aberrations, respectively, and in case of the latter often bleached further by the sunlight.

This report details two cases of vultures with pigmentary abnormalities, Black Vulture and Turkey Vulture, which both have



**Figure 1.** Lateral (left) and frontal (right) views of a Turkey Vulture *Cathartes aura* with ino aberration, Tamaulipas, Mexico, on 2 September 2018 (photographed by Julio Cesar Ramirez Galaviz).

a wide distribution in the Americas (Meyer & Phelps 1978, Ridgely & Gwynne 1989, Stiles & Skutch 1995). They are mainly scavengers that inhabit humid lowland forests, wooded pastures, swamps, and altered forests (Meyer & Phelps 1978). They are common and abundant in open areas (Ridgely & Gwynne 1989) and near urban centers, particularly around garbage dumps (Stiles & Skutch 1995).

## OBSERVATIONS

On 2 September 2018, at Tamesí River near dam IV, adjacent to the protected natural area Laguna La Vega Escondida, Tampico, Tamaulipas, Mexico (22°19'21.18"N, 97°57'03.14"W; 3 m a.s.l.), we observed an individual of Turkey Vulture with abnormally colored plumage. Vegetation in the area included black mangrove (*Avicennia germinans*, Acanthaceae), white mangrove (*Laguncularia racemosa*, Combretaceae), button mangrove (*Conocarpus erectus*, Combretaceae), ceiba (*Ceiba pentandra*, Malvaceae), cedar (*Cedrela odorata*, Meliaceae), leucaena (*Leucaena leucocephala*, Fabaceae), and grasses (i.e., *Megathyrsus maximus*, Poaceae).

The individual showed normal behavior, and no agonistic interactions were observed with other conspecific individuals with normal color pattern. This individual remained in a social group with 12 conspecific individuals with whom it fed

on viscera of commercially exploited fish. The individual had a dirty white plumage; the soft parts of the body and tarsi were pinkish, the irides had a normal pigmentation (Figure 1). These characteristics suggest that it was an ino aberration based on the dichotomous key proposed by Rodríguez-Ruiz et al. (2017) to identify pigmentary abnormalities, and van Grouw (2013).

On 6 October 2018, in Playa Ostional, Santa Cruz, Guanacaste, Costa Rica (10°00'00.29"N, 85°42'23.71"W, 3 m a.s.l.), we observed an individual of Black Vulture with abnormal coloration for the species. Playa Ostional is part of the Ostional Wildlife Refuge, a location recognized worldwide for the large nesting population of olive Ridley sea turtle (*Lepidochelys olivacea*, Cheloniidae) (López & Mora 2012). The sighting was at a site adjacent to an estuary, which harbored plant species, such as guayabón (*Terminalia oblonga*, Combretaceae), espavel (*Anacardium excelsum*, Anacardiaceae), canelo (*Calycophyllum candidissimum*, Rubiaceae), and cenízaro (*Samanea saman*, Fabaceae). The individual was observed for several days at the location of the first sighting or its vicinity (6–18 October 2018), and was observed even while perching on the fence surrounding the community soccer field of Ostional village. It was always together with normally colored conspecific individuals: at least with one individual while perching, and 3–14 individuals while feeding on olive Ridley turtle eggs on the beach. The



**Figure 2.** Lateral view of *Coragyps atratus* with ino aberration, Ostional, Guanacaste, Costa Rica, on 6 October 2018 (photographed by José Manuel Mora).

individual had a dirty white to light cream plumage; the soft parts of the body and tarsi were pinkish, and the irides had a normal pigmentation (Figure 2), which suggests that it was an ino aberration as well.

## DISCUSSION

Albinism is rarely seen in the wild as young albino birds usually do not survive long due to visual impairment, i.e., their limited visual abilities interfere with searching for food and resting places (van Grouw 2012, 2013, 2018). In contrast, the ino mutation is manifested by an intense qualitative reduction in melanin (van Grouw 2013). Feathers of dark colors change to cream or beige (van Grouw 2013). The plumage becomes lighter over time by exposure to sunlight; the tarsi and irides are pinkish (van Grouw 2018), but despite the latter ino birds have much better eyesight than albino birds (Mahabal et al. 2016). Consequently, we ruled out the possibility that the pigmentary abnormality of the two vultures reported here was albinism due to their normal pigmentation of eyes and the replacement of dark-colored plumage parts by dirty white feathers. In the field, ino aberration can be confused with complete leucism and progressive graying in an advanced stage (van Grouw 2018, Molina et al. 2018).

In 2006, a Black Vulture from Ecuador was reported as leucistic because it had completely white plumage, with only tarsi, tail, and some feathers under its tail, being black (Hosner & Lebbin 2006). However, it was most likely not leucism. Two individuals with completely white plumage, but with head, eyes, beak, legs, and claws of the same color of a normal Turkey Vulture were reported as leucistic on Lobos de Tierra Island, Peru (Figueroa et al. 2011). However, as can be elucidated from the published photographs the pigmentary abnormality of these vultures was “brown,” but totally

bleached further by the sunlight. In addition, those authors listed several cases of leucism or albinism in Turkey and Black Vultures. However, given the lack of an accurate determination of pigmentary abnormalities as well as the lack of quality photographic material, it is difficult to correctly identify the causes of the listed cases, and hence to know whether any of these cases were the result of ino mutations. Our report is therefore the first of definitive ino mutation reported in these two species of American cathartids.

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