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Progressive greying in the groove-billed ani (*Crotophaga sulcirostris*) in Costa Rica

Encanecimiento progresivo en el garrapatero pijuy (*Crotophaga sulcirostris*) en Costa Rica

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Abstract

Plumage color aberrations are common in birds, but often they are difficult or even impossible to identify properly. The pigmentary abnormality with the greatest prevalence among birds is progressive greying, although it is often confused with leucism and albinism. Here we report the first case of progressive greying for the groove-billed ani (*Crotophaga sulcirostris*) based on an individual observed in Costa Rica. This individual had white feathers in various parts of the body, while the rest of the body maintained its black feathers. The individual was observed on a live fence of a pastureland in the Tropical Moist Forest (perhumid transition) on the pacific slope of central Costa Rica.

Keywords: color aberration, genetic mutation, heritable disorders, leucism, Tropical Moist Forest.

Resumen

Las aberraciones del color del plumaje de las aves son comunes, aunque muchas veces son difíciles e incluso imposible de identificar correctamente. La anomalía pigmentaria de mayor incidencia en las aves es el encanecimiento progresivo, que a veces es confundido con leucismo o albinismo. Aquí reportamos el primer caso de encanecimiento progresivo en el garrapatero pijuy (*Crotophaga sulcirostris*) con base en un individuo que observamos en Costa Rica. Este individuo tenía plumas blancas en varias partes del cuerpo, mientras que el resto del cuerpo mantenía sus plumas negras. Lo encontramos en una cerca viva de un potrero en el Bosque Húmedo Tropical (transición perhúmeda) en la vertiente pacífica central de Costa Rica.

Palabras clave: aberración cromática, Bosque Húmedo Tropical, desorden hereditario, leucismo, mutación genética.

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Introduction

Plumage color aberrations are common in birds, but there are confusions in the literature, especially in relation to white birds (Guay et al. 2012). Most of color aberrations in birds are caused by genetic mutations (Van Grouw 2013, Van Grouw 2018). The pigmentary abnormality with the greatest prevalence among birds is progressive greying, although it is often confused with leucism and albinism (Guay et al. 2012, Van Grouw 2013). As a result, at least partially, leucism and albinism are the color aberrations in birds most frequently reported, even though the majority of these cases are in fact none of both (Mahabal et al. 2016). In leucistic birds some feathers are white because they lack melanin (Van Grouw 2013). However, most forms of progressive greying appear not to be heritable and may be environment-related, whilst leucism is always heritable (Van Grouw 2013, Mora and Rodríguez-Ruiz 2019). The extent of white plumage in leucistic birds does not change with time, while in progressive greying individuals will increase the amount of white feathers after every molt due to a continuous loss of pigment cells in all or parts of skin (Mahabal et al. 2016). This anomaly occurs when white feathers suddenly appear on the bird's body, derived from the result of an injury or poor nutrition (Rodríguez-Ruiz et al. 2019). In this situation it is possible that loss of pigment cells of melanin in the plumage be progressive due to changes in molting and age (Van Grouw 2013, Rodríguez-Ruiz et al. 2019). When progressive greying is detected at an early age, it is possible to discern it from leucism (Rodríguez-Ruiz et al. 2019). Progressive greying does not show a white pattern in the plumage, with bilaterally symmetrical patches, it rather exhibits white feathers intermingled randomly in the body (Van Grouw 2012). In progressive greying white feathers are mixed with normal-colored ones. In this case, bill and feet may be affected depending on the type of progressive greying, but these individuals always have normal-colored eyes (Van Grouw 2018). This is the case of the bird we will present in this report.

There are records of chromatic aberration in a large number of bird families (Ayala-Pérez et al. 2016). However, sightings, and especially reports on pigmentary abnormalities in birds are very limited in Costa Rica. Recently, some cases have been documented such as *Pelecanus occidentalis* (Vargas-Masís and Arguedas-Rodríguez 2014), *Turdus grayi* (Mora and López 2019) and *Coragyps atratus* (Mora

and Rodríguez-Ruiz 2019). Other known cases have not been reported in scientific publications (Mora and López 2019). For the groove-billed ani (*Crotophaga sulcirostris*, Cuculidae) we could know about four cases of pigmentary anomalies in Costa Rica, none of these identified as progressive greying.

The groove-billed ani is a completely black bird that measures 30 cm long, and weighs 70 – 80 g (Stiles and Skutch 1995). It inhabits from southwestern USA to the north of Chile, northwestern Argentina and Guyana (Ridgely and Gwynne 1989). The species frequents pastures, savannas, crops, gardens, swamps, and young secondary growth where it feeds on insects and sometimes lizards and fruits (Stiles and Skutch 1995). It moves in small groups up to 15 individuals (Stiles and Skutch 1995). In Costa Rica this species is common and widespread in lowlands and middle elevations to 1,500 m (Garrigues and Dean 2014). This paper reports for the first time progressive greying for *C. sulcirostris* in Costa Rica. Moreover, this pigmentary abnormality has not been reported for this species anywhere of its distribution range.

Record

On 26 June 2019 we observed a groove-billed ani at Paso Agres of San Juan de Mata, Turrubares, San José, Costa Rica (9°52'52" N, 84°31'10" W, 167 m). The individual was perched on a barbed wire fence about 1 m high from the ground (Figure 1). The individual presented evidence of progressive greying with white feathers in various parts of the body, while the rest of the body maintained its black feathers. Clearly the individual is not leucistic since this aberration implies symmetry of the white feathers. This ani exhibited white feathers intermingled randomly in the body, white feathers mixed with normal-colored ones. Also, the ani had normal-colored eyes.

The groove-billed ani with progressive greying was part of a flock of 10 individuals that were foraging and moving together. Although the individual with progressive greying seemed to be a bit apart of the rest of the flock, at the end all of them flew away together. We observed the groove-billed ani with progressive greying at a pastureland with some scattered trees. The farm is surrounded by live fences with gumbo-limbo (*Bursera simaruba*) and quickstick (*Gliricidia sepium*) trees, and physic nut (*Jatropha curcas*) interwoven



Figure 1. A groove-billed ani (*Crotophaga sulcirostris*) with progressive greying in the Tropical Moist Forest (perhumid transition) on the Pacific slope of central Costa Rica (photo: Marcos Narón Campos Loría).

among them (Figure 2). The area is located at the Tropical Moist Forest (perhumid transition) after the Holdridge Life Zone System (Holdridge 1967).

Discussion

Progressive greying is more frequent in nature than leucism, and is considered the most common cause of white feathers in birds (Van Grouw 2012, 2013). However, there is not any case of this chromatic aberration reported for any bird species in Costa Rica. The groove-billed ani we observed in Costa Rica is clearly a case of progressive greying (Figure 1). This individual has white feathers spread randomly all over

without any symmetry in their distribution. As a result, in this case the progressive greying was relatively easy to identify and discerned it from leucism. This bird did not show a white pattern in the plumage, with bilaterally symmetrical patches (note for example the uppertail covert feathers of the bird in Figure 1). Besides, this ani exhibited white feathers intermingled randomly in the body, both traits determinants of progressive greying (Van Grouw 2012).

However, individuals with progressive greying in advanced ages are almost impossible to visually differentiate from leucistic birds (Van Grouw et al. 2018, Rodríguez-Ruíz et al. 2019). Aberrant feathers are white in leucism and in progressive greying because the cells are not able to produce melanin (Van Grouw 2018). Heavily bleached plumage is the



Figure 2. Habitat where a groove-billed ani (*Crotophaga sulcirostris*) with progressive greying was observed in Costa Rica. The live fence has gumbo-limbo (*Bursera simaruba*) and quickstick (*Gliricidia sepium*) trees, and physic nut (*Jatropha curcas*) interwoven among them (photo: Marcos Narón Campos Loría).

result of other mutations such as brown, the most common. However, this abnormality has been often attributed, erroneously, to leucism (Van Grouw 2013). In general, to identify color mutations in the field can be extremely difficult and it is not always possible (Van Grouw 2013). The case reported here was determined at a stage when the identification of the aberration was possible even from a distance.

The causes for progressive greying are still unknown and it may or may not be heritable. Some forms may be related solely to age while in others the progressive loss of pigment cells may be due to heritable disorders such as vitiligo or related to habitat (Van Grouw 2013). In general, pigment disturbance can have genetic causes, but it can obey also to non-heritable factors (Van Grouw 2013, Mahabal

et al. 2016). Some of these causes could be injuries, other environmental factors and food deficiency (e.g. Hudon, et al 2013, McGlothlin et al. 2007, Van Grouw 2013). As pointed out before, in progressive greying bill and feet may be affected depending on the type, but these individuals always have normal-colored eyes (Van Grouw 2018).

Possibly the most important aspect of pigmentary abnormalities is their potential negative impact on the survival of individuals. However, individuals with color aberrations can reach adulthood and even be able to reproduce (for example, Espinal et al. 2011, Mora and Rodríguez-Ruiz 2019). In the extreme case of albinism, individuals are affected by their condition, because young albino birds usually do not survive long due to visual impairment, they

have limited visual abilities that interfere with searching for food and resting places (Van Grouw 2012, 2013, 2018). In the House Sparrow (*Passer domesticus*), a high number of individuals with progressive greying survive long in the wild contrary to the common belief that birds with color aberrations are more easily targeted by predators (Van Grouw 2012). The groove-billed ani with progressive graying that we reported here apparently behaved and was treated equally as the other individuals in its flock. However, individuals with pigmentary abnormalities should be followed up in order to establish their condition and long-term reproductive success.

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