



A RECORD OF “DILUTION” PLUMAGE ABERRATION IN THE RUFESCENT TIGER-HERON (*TIGRISOMA LINEATUM*)

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Abstract · Plumage aberrations are common in wild birds; however, there are few documented records for most Neotropical bird species. Here, we present the first documented record of dilution plumage aberration in Rufescent Tiger-Heron (*Tigrisoma lineatum*). In August 2017, we observed an individual of Rufescent Tiger-Heron with a “diluted” plumage coloration compared to the typical coloration for this species. With yellowish-brown feathers in head and neck, and especially a pale gray coloration in upperparts, the overall appearance seems to be, most likely, a case of “Pastel” dilution aberration. However, the pale gray tones may have been caused by the light conditions during observation which make it difficult to determine the dilution type with certainty. The documentation of these cases can be a valuable source of information to understand chromatic aberrations and variations between different groups of birds.

Resumen · Registro de un caso de “dilución” en el Hocó Colorado (*Tigrisoma lineatum*)

Las aberraciones cromáticas son comunes en aves silvestres, sin embargo, existen pocos registros documentados para la mayoría de las especies Neotropicales. Aquí presentamos el primer registro documentado del Hocó colorado (*Tigrisoma lineatum*) con plumaje aberrante, siendo un caso de “dilución”. En agosto de 2017, observamos un individuo de Hocó colorado con una coloración del plumaje de aspecto “diluido”, en comparación con los colores típicos de esta especie. Plumajes normalmente marrones rojizas poseían un color marrón amarillento y plumas típicamente negras o gris oscuro presentaban tonos pálidos; los tonos grises pálidos podrían deberse a las condiciones de luz al momento de la observación, por lo que es difícil asegurar a cuál tipo de dilución pertenece, pero bien podría ser un caso de dilución “pastel”. La documentación de estos casos puede ser una valiosa fuente de información para entender las aberraciones cromáticas y sus variaciones entre diferentes grupos de aves.

Key words: Eumelanin · Phaeomelanin · Plumage aberration · *Tigrisoma lineatum*

The most common pigments involved in plumage coloration are melanins and carotenoids, with melanins being the most common (Guay et al. 2012, Van Grouw 2013). In many birds, two types of melanins are present: eumelanin and phaeomelanin. Eumelanin is responsible for black, grey, and dark brown colors in feathers, skin, and eyes; and phaeomelanin is responsible for the reddish-brown coloration of the feathers (Van Grouw 2013, Martins-Silva et al. 2016, Van Grouw 2017). However, in some groups of birds, the color of adult plumage is caused by eumelanin only (Van Grouw 2013).

Plumage color aberrations are not uncommon in wild birds. Some forms of white feathering being the most common abnormalities; often as a result of hereditary mutations (i.e. genetic mutations affecting the presence and distribution of pigment cells, melanin synthesis or melanin distribution), but may also be caused by factors such as diet, parasites, disease, injury, and age (Hosner & Lebbin 2006, Guay et al. 2012, Mahabal et al. 2016, Van Grouw 2018).

Individuals exhibiting plumage aberrations often have a weaker feather structure, which causes accelerated wear and affects mobility, finding themselves at a selective disadvantage as they seem conspicuous to predators (Campbell & Lack 1985, Smith 2016). However, some plumage aberrations have the opposite effect; according to Van Grouw (2017) pigment aberrations, such as melanism, often combines with different behavior and physiology and becomes an advantage in some habitats. In this regard, strongly melanistic individuals are known to be more resistant to stress, more aggressive, and differ in metabolism (Roulin & Ducrest 2011, Poelstra 2013, Corbel et al. 2016).

The most commonly inherited aberrations found in wild birds are albino, leucism, brown, ino, melanism, and dilution (Van Grouw 2013). Dilution aberration can be defined as a quantitative reduction of melanins (Mahabal et al. 2016). Nevertheless, the aberration does not change the pigment itself, but it reduces the amount deposited in the feathers, so we see a “diluted” color compared to the original coloration (Urcola 2011, Van Grouw et al. 2011). Depending on which melanin is affected, there are two forms of dilution: “Pastel” and “Isabel” (Urcola 2011, Van Grouw 2013). Pastel dilution consists of a quantitative reduction of both eumelanin and phaeomelanin, in which the pigments reduction degree can differ within a single



Figure 1. Adult individuals of Rufescent Tiger-Heron (*Tigrisoma lineatum*) reported in August 2017 in “Palmar de las Islas”, Paraguayan Dry Chaco. (A) Individual with typical color pattern. (B) Individual with “diluted” plumage. Photo: Camilo Benitez Riveros.

species (Van Grouw 2013). In general, the black feathers turn gray while reddish-brown or yellow-brown feathers turn buff or cream-brown (Urcola 2011).

Dilution aberration was described for many species regardless whether it is “Pastel” or “Isabel”. For instance, Blue-footed Booby (*Sula nebouxii*) in Valverde & García (2009); Southern Caracara (*Caracara plancus*), Southern Lapwing (*Vanellus chilensis*), Lark-like Brushrunner (*Coryphistera alaudina*), Firewood-gatherer (*Anumbius annumbi*), Rufous-collared Sparrow (*Zonotrichia capensis*) and Screaming Cowbird (*Molothrus rufoaxillaris*) in Urcola (2011); Common Murre (*Uria aalge*) in Van Grouw et al. (2011); House Sparrow (*Passer domesticus*) in Van Grouw (2012); Glossy Swiftlet (*Collocalia esculenta*) in Fischer & Van Der Kaaden (2016); Little Grebe (*Tachybaptus ruficollis*) in Mahabal et al. (2016); and *Netta rufina* in Rihane (2017). According to Van Grouw (2012), dilution seems to be quite common, but many different mutations can cause a form of quantitative reduction of melanin. Individually, these different mutations are all fairly rare. In this regard, little has been published on those plumage anomalies in Paraguayan birds (Insfrán 1931, Martin et al. 2016, Smith 2016, Smith & Ríos 2017).

The Rufescent Tiger-Heron (*Tigrisoma lineatum*) is a widely distributed bird through central and South America from southern Mexico to northern Argentina, inhabiting wetlands around ponds and lakes, and along forested areas around rivers and streams (Gwynne et al. 2010, Heron Conservation 2018). The typical color of adults consists of rich chestnut upperparts, especially on head and neck. The throat and ventral neck have a wide, vertical, reddish-brown stripe in the center, bordered by white stripes; blackish back and tail, and dark-grey wings while flanks are slate, horizontally striped with thin white lines, variable among individuals; the abdomen is grey with an ochre tinge; black upper bill and light yellow lower bill, and bare-parts colors very variable (Gwynne et al. 2010, Martinez-Vilalta et al. 2019) (Figure 1A).

In all species of *Tigrisoma*, immature individuals show a very similar aspect with a “tiger” pattern and compared with Rufescent Tiger-Heron adults, they present mostly cinnamon-buff coarsely barred with black, with particularly bold buff and black bending on wings; throat median underparts, and whitish belly (Eisenmann 1965, Rigdely & Gwynne 1989).

Since late 2015, Guyra Paraguay works in the

“Ecoregional evaluation and biodiversity vision” project with field campaigns throughout the country as an effort to fulfill the information gaps in the Paraguayan biodiversity database. Palmar de las Islas, located in northern dry Chaco (19° 32'54"S; 60°31'38"W), was one of these, and two field campaigns were carried out there, between July 2016 and August 2017.

On 13 August 2017, during bird monitoring field-work, we observed four normal colored adult individuals of Rufescent Tiger-Heron and one with aberrant plumage (19°32'11"S; 60°31'33"W) (Figure 1B). The aberrant individual has a “diluted” version of the typical plumage colors observed in this species. The typical rich rufous-chestnut in head and neck, was yellowish-brown in the aberrant individual; the brown central stripe in the throat seems affected and had the same yellowish-brown color. The bill and bare skin around the gape colors looked normal (Figure 1B). On the other hand, the dark grey on the back, tail, and wings had a slightly pale grey appearance, but given that fieldwork was carried out during a cloudy day, light conditions could interfere with both the observer capabilities and the photograph quality (Figure 1B). The yellowish-brown color suggests that pheomelanin is affected while the pale grey tones indicate eumelanin may be affected too, thus it may be a case of “Pastel” dilution aberration. However, we are not entirely sure whether there is a real difference between observed aberrant and non-aberrant individuals, in dark grey and pale grey tones (Figure 1). We observed, photographed, and filmed the aberrant individual as he foraged isolated from non-aberrant individuals of the same species.

As far as we know, this contribution represents the first report of dilution aberration in the Rufescent Tiger-Heron. Although the identification of color mutations in the field can be extremely difficult and by no means always possible (Mahabal et al. 2016), according to Gonçalves et al. (2008) plumage aberrations are not particularly rare, but the number of published records greatly underestimate the frequency of their occurrence. In fact, according to Petry et al. (2017) many cases have probably gone unnoticed by researchers or have not been considered relevant for publication.

Reporting the occurrence of plumage aberrations, both by researchers and birdwatchers, contributes to increasing the knowledge about these variations and helps to expand

the taxonomic and geographic inventory of their occurrence (Smith & Ríos 2017), with important implications for future studies regarding natural history, species ecology or even population genetics.

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