

First case of albinism in *Uroderma bilobatum* and its implications in the evolution of coat color patterns among Vampyressine bats

El primer caso de albinismo en *Uroderma bilobatum* y sus implicaciones en la evolución de los patrones de color del pelaje de los murciélagos Vampyressine

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Abstract

We present the first case of albinism reported for the frugivorous bat *Uroderma bilobatum* (Stenodermatinae: Vampyressini), also representing the largest number of albino bats collected in a single night. Additionally, we briefly discuss on the evolutionary implications of this finding regarding evolution of aberrant color patterns in the tribe Vampyressini.

Keywords: Albinism; Color patterns; *Uroderma bilobatum*; Vampyressini.

Resumen

Se presenta el primer caso registrado de albinismo para el murciélago frugívoro *Uroderma bilobatum* (Stenodermatinae: Vampyressini), y el mayor número de murciélagos albinos colectados en una sola noche. Asimismo, se discutió brevemente sobre las implicaciones evolutivas de este hallazgo en relación con la evolución de patrones de color aberrantes de los murciélagos de la tribu Vampyressini.

Palabras clave: Albinismo; Patrones de color; *Uroderma bilobatum*; Vampyressini.

Introduction

Genetic abnormalities of the melanin pigment system in which the synthesis of melanin is reduced or absent in the skin, hair follicle, and/or eye are called albinism (King and Summers 1988). Color patterns in mammals, particularly those associated with coat, participate in camouflaging and courtship, and are thought to have selective implications. In the order Chiroptera only two monophyletic arrangements include species characterized with a white coat color: bats in the tribe Diclidurini, genus *Diclidurus* (*D. albus*, *D. ingens*, *D. isabella*, and *D. scutatus*) family Emballonuridae (Hood and Gardner 2007) and bats in the tribe Vampyressini (Baker *et al.* 2003) (*Ectophylla alba*, *Mesophylla macconnelli*) in the family Phyllostomidae. Little is known on the way in which aberrant coat

colorations such as the lack of pigments have been fixed in natural populations. In this work, we describe the first case of albinism for the Vampyressine bat *Uroderma bilobatum* exemplified by three individuals collected in the Salamaca Island in the Colombian Caribbean and representing the largest number of albino bats caught in a single night. We discuss on the implications of coat color variation among Vampyressine bats under the light of this unusual finding.

Results

Taxonomy. The three reported albino individuals correspond to two female skin vouchers (ICN 3623 & ICN 3625), and one male skin and skull vouchers (ICN 3624) collected on Cangarú, kilómetro 16, at the Salamanca Island (10°58'0N;

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Figure 1. Voucher specimens representing albino *Uroderma bilobatum* (ICN-3622,3623,3624), from Kangarú km 26, Isla de Salamanca, Magdalena, Colombia.



Figure 2. Collecting locality of albino individuals of *Uroderma bilobatum convexum* (ICN-3622, 3623,3624), from Kangarú km 26, Isla de Salamanca, Magdalena, Colombia.

74°30'0W), department of Magdalena in the Colombian Caribbean by E. Barriga on January 26, 1971 and deposited at the Instituto de Ciencias Naturales of the Universidad Nacional de Colombia (ICN) (Figures 1, 2).

The three reported albino individuals were originally marked on tags as *Uroderma cf. bilobatum*. However, female specimen (ICN 3624) was later corrected as *U. magnirostrum*. The only skull available (ICN-3622) has the bilobed inner incisors and shallow rostrum typical of *U. bilobatum* that differentiate this species from *U. magnirostrum* (deep rostrum) (Davis 1968). The three albino individuals, share following external characters mentioned by Peters (1866) in *U. bilobatum* description including: wing skin not reaching the middle of the tibia, interfemoral membrane notched and naked with few short hairs on the notch, body hair that reaches the middle of the forearm, tibia and the middle part of the thigh naked, and a short calcar; as well as the horse-shoe structure on the nose-leaf. In addition, specimen ICN 3622, has the

depressed rostrum, relative small skull (GSL= 22.30 mm) arched alignment of the tooth-row and relatively enlarged hypoconal basin on the second upper molar (Figure 1), typical of *U. b. convexum* (Lyon 1902). The Salamanca Island is located on the Colombian Caribbean on the western side of the Eastern Andes (Figure 2). Based on chromosomal and molecular evidence Hofmann *et al* (2003) restricted the presence of *U. b. convexum* to the western side of the Andes. The easternmost known specimen having a diploid number of 38 was collected on the western side of the Eastern cordillera of the Colombian Andes in Melgar (Baker and López 1970).

Albino Uroderma bilobatum from Salamanca Island. The three albino individuals share the same color pattern with albinism taking place mainly on the hair follicles and less manifested on the nose-leaf, the wing membranes, uropatagium, plagiopatagium, ears, and naked skin on the forearm, fingers, tibia and toes including claws. The typical *Uroderma* horse-shoe structure behind the nose-leaf has a paler color with respect to the spear structure of the nose-leaf and has a faded yellowish coloration. Borders of the ears and the tragus are white in all voucher skins and probably they were uncolored in the three animals when alive. The fur on the head, shoulders and back are white to creamed white, with three thirds of the bases of individual hairs cream and one third of the total hair longitude white. The three skin specimens presented the typical stripes of the face of *U. bilobatum*. Stripes on the face are constituted by completely white hairs.

Discussion

Evolutionary implications of this finding. Neotropical bats are considered cryptic creatures and there is validity for the hypothesis that the presence of an aberrant color pattern can affect

individual's life expectancy and/or fitness, explaining the low frequency of albino individuals among natural populations. The agouti color has been proposed as the ancestral character from where all color modifications in mammals have been derived including the white color or lack of pigmentation (Hershkovitz). Uieda (2000) listed complete albinism in bats for eight families, 38 species and at least 64 individuals. Twelve of the cases of albinism reported by this author correspond to four genera in the family Phyllostomidae (*Artibeus*, *Desmodus*, *Glossophaga*, and *Macrotus*) with just one case associated with an island population (*D. rotundus* from Trinidad). Herein, we reported the first case of albinism for the Vampyrissine bat *Uroderma bilobatum convexum*, exemplified by three individuals collected at the Salamanca Island in the Colombian Caribbean coast which also represents the maximum number of albino individuals collected in single night. This data is interesting since as it was mentioned above, among phyllostomid bats members of the genera *Ectophylla*, *Mesophylla* and *Vampyressa* are characterized by pale to white coat colorations. It has been proposed that a white coat color has been favored among tent making bats, since it reduces the contrast of individuals against the leaves (Timm and Mortimer 1976). Bats in the genus *Uroderma* share this roosting behavior and a strong social structure has been suggested for the species which use to live in groups (harems) of several females thought to be genetically related, with an also hypothesize male dispersion. We hypothesize that the herein reported albino individuals belong to a single group foraging together as indicated by their capture at the same night, in the same net. We suggest that the fixation of genes responsible for white and pale colorations present in other vampyrissine bats, such as *Ectophylla* and *Mesophylla*, is likely to have occurred in a similar scenario of the one exemplified by the *Uroderma* albino individuals from Salamanca Island. A more detailed analysis

of this aspect is also recommended. We propose that a similar mechanism should participate in the fixation of the mutations responsible for coat coloration in other Vampyrissines such as *Ectophylla* and *Mesophylla*.

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