THERYA NOTES 2025, Vol. 6: 55-60 DOI: 10.12933/therya_notes-24-199 ISSN 2954-3614

First records of hypopigmentation of Tayra *Eira barbara* in Colombia
Primeros registros de hipopigmentación en la taira *Eira barbara* en Colombia

Carlos A. Aya-Cuero[1,2*], Brayan A. Molina-Vargas[3], Diana C. Stasiukynas[1], Mónica Páez-Vásquez[3], Gabriel Pantoja-Peña[4], Carlos H. Cáceres-Martínez[5], and Lain E. Pardo[1]

[1]Panthera. 8 West 40th Street, 18 55 th Floor. New York, EE.UU. E-mail: lepardov@gmail.com (LEP), dstasiukynas@panthera.org (DCS).
[2]Fundación Kurupira. Diagonal 16B No. 106-65, Fontibón. Bogotá, Colombia. E-mail: ekatenkes24@gmail.com (CAA-C).
[3]Fundación Omacha. Cra. 20 No.133-32. Bogotá, Colombia. E-mail: brayanbio119@gmail.com (BAM-V); m.paez@omacha.org (MP).
[4]Universidad del Trópico Americano-Unitrópico. Cra. 19 No. 39-40. Yopal, Colombia. E-mail: gabrielpantoja@unitropico.edu.co (GP-P).
[5]Grupo de Investigación en Ecología y Biogeografía, Departamento de Biología, Facultad de Ciencias Básicas, Universidad de Pamplona, 760042, Pamplona. Norte de Santander, Colombia. E-mail: carloscaceres@unipamplona.edu.co (CHC-M).
* Corresponding author

Leucism, xanthism, and piebaldism are genetic conditions that generate deficiency in animal melanin deposits or hypopigmentation, which can manifest in the total or partial absence of pigmentation in the integumentary tissue. In Colombia, there are few records of this condition in mammals such as bats and rodents. Nevertheless, this condition also occurs in mustelids, and the information is scarce for any biogeographic region of Colombia. We used data derived from different surveys with camera trap studies across 5 departments in 2 biogeographic regions in Colombia (Andean and Orinoco). The species was identified by external characteristics and the color aberrations following specialized literature. With a sampling effort of 11,015 camera/days, and one ad libitum observation, we described 10 independent records of hypopigmentation in tayras which might be related to leucism, xanthism, and piebaldism. In addition, other abnormalities such as taillessness and light gray coloration were found. Our records constitute the first documented cases of hypopigmentation of tayras in Colombia and analyzed evidence of potential anomalies in wild populations living in transformed habitats. We intended to highlight these particular colors of the phenotypes in the species as a possible consequence of genetic mutations and environmental pressures. Finally, we also complement some aspects of their natural history.

Key words: Andean; camera traps; color aberration; Neotropical mammals; Orinoco.

El leucismo, xantismo y piebaldismo son condiciones genéticas que generan deficiencia en el depósito de melanina o hipopigmentación en animales, manifestándose en la ausencia total o parcial de pigmentación en el tejido tegumentario. En Colombia hay pocos registros de esta condición en especies de mamíferos como murciélagos y roedores. Sin embargo, esta condición también se presenta en mustélidos, y la información es escasa para cualquier región biogeográfica de Colombia. Usamos datos derivados de diferentes muestreos con cámaras trampa en 5 departamentos de 2 regiones biogeográficas de Colombia (Andes y Orinoquia). La especie fue identificada por características externas y las aberraciones de color siguiendo literatura especializada. Con un esfuerzo de muestreo de 11,015 días/cámara y una observación *ad libitum*, describimos 10 registros independientes de hipogimentación en tayras relacionadas con leucismo, xantismo y piebaldismo. Adicionalmente, fueron encontradas otras anormalidades como la cola corta y coloración gris clara. Estos registros constituyen los primeros casos documentados de hipopigmentación en Colombia y analiza evidencias de potenciales anomalías de poblaciones silvestres en hábitats transformados. Se destacan estas coloraciones particulares en los fenotipos de la especie como consecuencia de mutaciones genéticas y presiones ambientales. Por último, se complementan algunos aspectos sobre su historia natural.

Palabras clave: Andes; aberración cromática; cámara trampa; mamíferos neotropicales; Orinoquia.

Despite the hypopigmentation disorders are considered rare, the information on pigmentation anomalies in Neotropical mammals has increased considerably (García *et al.* 2020). According to Olson (2019), after birds, mammals are the vertebrate class with the highest number of leucism records reported, within this class, the orders Eulipotyphla and Carnivora have the most reported cases. Among carnivores, most of the records come from the Mustelidae family and within this family, the tayra (*Eira barbara*) predominates with cases reported in Bolivia (Tarifa *et al.* 2001), Guyana (Presley 2000; Villafañe-Trujillo *et al.* 2018), and Brazil (Tortato and Althoff 2007; Aximoff and Rocha 2016; Sobroza *et al.* 2016; Talamoni *et al.* 2017; Scrich *et al.* 2019).

The tayra is a medium-sized mustelid with a weight ranging from 2.7 to 7 kg. It has an elongated and slender body of 559-712 mm with a long tail of 365-460 mm, strong claws, and small-rounded ears. Its coat is short and smooth, the back, limbs, and tail are brown or black contrasting with the light coloration of the head and neck which is grayish

to yellow (Presley 2000). On the underside of the neck, it has a light-colored irregular spot (yellowish-whitish) that even has potential for identification of individuals (Villafañe-Trujillo *et al.* 2018). According to Presley (2000) the albinism and melanism in *E. barbara* is more common than in other mustelid species.

Chromatic diversity is mainly caused by pigments such as melanin, which, based on their body presence, quantity, and locations determine the color of structures such as the skin, coat, and eyes (Eizirik and Trindade 2021). Abnormalities in coloration occur when complex biological factors such as genetic mutations alter the production and availability of melanin, causing changes in the coloration of the individual. These abnormalities include melanism, albinism, piebaldism, xanthism, and leucism (Cotts *et al.* 2023; Tenorio-Rodríguez *et al.* 2024). Melanism is an excess of dark pigmentation, while albinism implies a reduction or total absence of pigment, including the skin and eyes. Piebaldism is an absence of melanocytes in one or more parts of the body that causes white spots on the skin and hair of the affected individual (Lucati and López-Baucells 2017). On the other hand, xanthism or xanthochromism is a condition that causes yellow or orange-yellow colorations due to increased fixation of pigments such as xanthine and pheomelanin in tissues. Finally, leucism causes white or yellowish-white colorations in its carrier, except in its eyes, claws, and skin (Cotts *et al.* 2023; Hernández-Aguilar 2023). Reporting the presence of chromatic anomalies in wildlife species contributes to the understanding of this phenomenon, including possible causes that provoke it and its effects on the carrier individuals (Leandro-Silva *et al.* 2022; Hernández-Aguilar 2023). The objective of this study is to document the first cases of chromatic aberrations in tayras in Colombia.

During 2018, 2022, 2023, and 2024, we conducted 6 different camera trap surveys with a total sampling effort of 11,015 days/camera in 3 localities of the Orinoco region and 2 localities of the Andean region of Colombia. Cameras were primarily targeted at medium and large mammals, not only focused on *E. barbara*. The study area encompasses 5 departments, two of this at Andean region such as Antioquia (Buriticá) and Norte de Santander (Área Natural Única Los Estoraques), and other three in Orinoco region such as Meta (Puerto Gaitán), Casanare (Mani and Tauramena), and

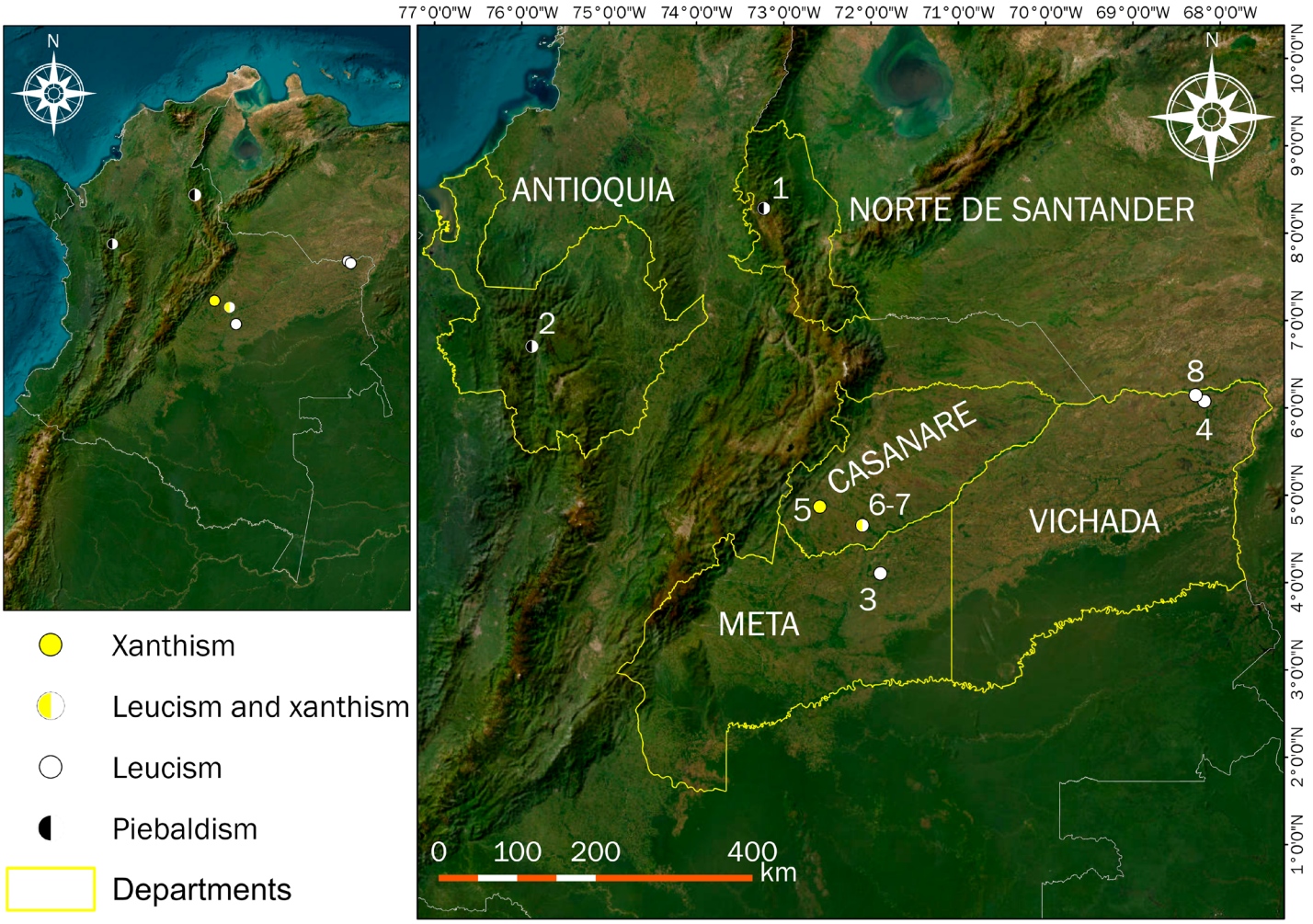

Figure 1. Location of study sites and cases of tayra (*Eira barbara*) with hypopigmentation in the departments of Colombia. Capital letters represent cases in chronological order.

Figure 2. Figure 2. Photographic records of tayra (*Eira barbara*) with hypopigmentation present in the Orinoco and Andes regions, Colombia. (a), (b), and (**d**), represent leucism. (c), (e), and (f) represent xanthism. (g) represent an individual with light coloration. (h) and (i) represent dorsal white spotting or piebaldism.

Vichada (Puerto Carreño). The places in the Orinoco region included productive lands such as cattle ranches, oil palm plantations, and commercial tree plantations. While, in the Andes region, one study site corresponded to a protected area and another to a gold mine area. Nevertheless, all areas have some degree of anthropic intervention (Figure 1).

The identification of the species was carried out following the external characteristics mentioned by the field guide of carnivores by Suárez-Castro and Ramírez-Chaves (2015). For record of individual with yellowish-white colorations in its carrier, except in its eyes, claws, and skin we follow the category leucism used by (Cotts *et al.* 2023), for the records of individuals with the predominance of beige and yellow color in the coat, we follow the category xanthochromism used by Cotts *et al.* (2023) and for the records of individuals with white spots in the fur we follow the category piebaldism based on Lamoreux *et al.* (2010).

A total of 97 records of *E. barbara* were obtained in all study sites, of this, 10 records/individuals with anomaly colorations. Of the total number of records, 3 presented colorations that correspond to leucism (*i.e.*, predominantly white color throughout the body), 2 presented xanthochromism with a predominant yellow coloration, 4 presented piebaldism with white spots in the fur, and 1 showed atypical light gray colorations.

The Andean region, presented the total records of piebaldism (4). The Orinoco region presented the total records of leucism (3), xantism (2) and the only one record of light gray

coloration. Each case of non-albinism hypopigmentation in tayras is described below in chronological order and grouped in two biogeographical regions.

Andes region cases. Case 1: 3 different individuals were recorded on August 1, 2018 (14:15 hr), February 2, 2018 (13:25 hr), and April 19, 2018, (13:54 hr) in the forest of Los Estoraques Unique Natural Area (8º 12'41.072" N, 73º.16' 38.15" W), with a sampling effort of 2,770 camera/days, all with white spots or piebaldism represented by a small white portion of the hair in the upper neck and dorsum, this part has an irregular form (Figure 2h).

Case 2: On July 25, 2024 (13:54 hr) in the gold mine of Buriticá, Antioquia (6º 42' 5.544" N, 75º 53' 9.852" W) and with a sampling effort of 2,176 camera/days, one adult individual with white spots or piebaldism was recorded, represented by a small white portion of the hair in the upper neck and dorsum, this part has an irregular form (Figure 2i).

Orinoco region cases. Case 3: On October 6, 2022 (11:45 hr) inside the oil palm plantation cover of Palmera Sillatava S. A., located in the Alto Manacacías, Puerto Gaitán, Meta (4º 6' 19.415" N, O71º.53' 43.216"W), an adult male was observed with leucism, with a predominantly white coloration on the body except in the distal third of the tail, with a light yellow tone, this individual was being chased by a domestic dog that had already caused wounds on his neck, limiting his mobility (Figure 2a).

Case 4: On March 12, 2023 (15:12 hr), in a native forest of the commercial tree plantation Forest First Colombia in department of Vichada (6º 4' 37.366" N, 68º.10' 58.191" W), with a sampling effort of 809 camera/days, an adult female with leucism was recorded, with white coloration throughout her fur (Figure 2b).

Case 5: On October 3, 2023 (09:17 hr) at Hato Ganadero Barley, Tauramena, Casanare (4º 52' 5.04" N, 72º.35' 20.089" W), with a sampling effort of 40 camera/days, an adult female with xanthism was recorded (Figure 2c).

Case 6: On October 07 and 08, 2023 at 17:49 and 8:34 hours respectively, in a native forest of the oil palm plantation and cattle producing property El Corozito, Maní, Casanare (4º 39' 19.19" N, 72º.5' 59.999"W), with a sampling effort of 180 camera/days, a female with leucism was recorded (Figure 2d).

Case 7: On October 29, 2023, at 9:07 and 16:47 hr at the same sampling station and with the same sampling effort as case 6, an adult male with xanthism was recorded, in addition to a reduced tail, which is atypical for the species (Figure 2e and f).

Case 8: On November 21, 2023 (7:08 hr), in a native forest of the commercial tree plantation Forest First Colombia in Puerto Carreño, Vichada (6º 8' 42.9" N, O68º.16' 58.439"W), with a sampling effort of 5040 camera/days, an adult with a clear coloration was recorded, with light gray coloration in the dorsal part of the body from the neck to tail base. The legs and tail with black coloration. This individual was recorded in a social group with another two individuals of the normal coloration (Figure 2g).

Currently, chromatic anomalies reported in tayras include leucism (Mendes-Pontes *et al.* 2020) in the Guyana Shield, and albinism (Aximoff and da Rocha 2016) in the Atlantic Forest of Brazil. In this study, we report new cases of hypopigmentation for the first time in the Orinoco and Andes regions of Colombia, including leucism and the first known records of xanthism and piebaldism. Although recent records of chromatic anomalies are published in different species and regions of the world, there are still gaps in information about this phenomenon. For instance, the implications it has on its carriers, and even its classification, since most of the records lack biological material that can be analyzed to determine the possible causes of this phenomenon. For these reasons, the classification of chromatic aberrations reported in this study was based only on the external morphological aspects of each individual. Since all the records were obtained by direct and indirect observations, this issue hinders the possibility of establishing a more accurate classification of chromatic aberrations.

Although the implications of leucism and other atypical colorations on the ecology of Tayras are still unknown, some authors suggest that chromatic aberrations such as leucism may promote changes in intraspecific relationships, as well as predation risk, increased difficulty in hunting, anemia, poor eyesight, low fertility, immune deficiency, and sensory or nerve defects (Miller 2005; Acevedo and Aguayo 2008; Sobroza *et al.* 2016; Ortiz-Hoyos *et al.* 2020; Gallo *et al.* 2023; Tenorio-Rodríguez *et al.* 2024). This might be related to the fact that lighter coloration makes camouflage more difficult, making carriers of conditions such as leucism more easily perceived by their prey or predators (*e.g.*, case 3), and consequently less favored by natural selection. This could explain why the records of chromatic aberrations such as leucism are considered unusual (Caro and Mallarino 2020; Hernández-Aguilar 2023). Therefore, intraspecific and interspecific interactions as well as the survival of leucistic tayras may be compromised, since they are not always solitary, and their diet includes other animals. In addition, their distribution overlaps with that of potential predators such as ocelots, pumas, and jaguars (de Oliveira and Pereira 2014), but it is unclear whether a leucistic condition alters that predator-prey relationship (Scrich *et al.* 2019). In our case, we observed domestic dogs attacking a leucistic tayra, and we hypothesize that was caused by its greater exposure compared to normally colored tayras. The impact of dogs as potential competitors of tayras has been suggested before (Lessa *et al.* 2016; Bianchi *et al.* 2021), and recent evidence points to dogs killing tayras in agricultural landscapes (Pereira *et al.* 2019). However, groups of tayras with leucistic members have been recorded performing positive intraspecific interactions, suggesting that leucism does not negatively affect its carriers, which may also benefit from the absence of large carnivores in the area (Sobroza *et al.*

2016; Mendes-Pontes *et al*. 2020). Despite this, the effects of leucism on the ecology of the tayra are still unclear and require more studies that corroborate whether leucism has positive, negative, or no impacts on its carriers (Sobroza *et al*. 2016; Talamoni *et al*. 2017; Scrich *et al*. 2019; Mendes-Pontes *et al*. 2020).

The frequency of hypopigmentation has been related to inbreeding (Olson 2019), but also to environmental factors such as nuclear pollution that may increase mutation rates (Møller and Mousseau 2001). According to Melo-Dias *et al*. (2022) in the Atlantic Forest, Brazil, a high number of cases of hypopigmentation has been reported and it is considered that it could be associated to historical processes of landscape fragmentation. This could also apply to the Llanos in Colombia which has experienced an accelerated growth of different types of agricultural activities (e.g., rice, oil palm, soybean, corn, tree plantations, extensive cattle ranching, among others). The atypical coloration is not the only characteristic found in the phenotype of individuals that live in landscapes with certain anthropogenic interventions. In fact, individuals with congenital short tails and leucism are examples of other conditions. We do not consider the reductions of the tail in the individual of case 7 was caused by mechanical forces and hypothesize that it could be related to the Manx gen, according to Robinson (1993) taillessness is one of the vertebral column mutations occasioned by this gene in domestic cats. Nevertheless, genetic analysis is necessary to confirm this hypothesis. Other explanations for this phenomenon can be related to the development of anthropogenic activities that depend of the intensive and indiscriminate use of pesticides and genetically modified species, which if not properly managed can affect non-target species (Eslava-Mocha 2015), for instance, *E. barbara*. Tayras are known to ingest large amounts of pesticides from various food sources, their omnivorous diet, and this could generate changes in the typical coloration of individuals, since most pesticides are compounds created based on sulfur (Griffith *et al*. 2015), an element that can favor pheomelanogenesis (Galván *et al*. 2019) and therefore, the production of lighter colorations than usual in species such as *E. barbara*.

Finally, given that all the records of tayras with abnormal colorations corresponded to adult individuals, it is possible that these conditions do not affect intraspecific relationships or the survival of their carriers. According to Acevedo and Aguayo (2008) and Piaguaje *et al*. (2021), publishing records of chromatic aberrations in wildlife species is fundamental to understanding the frequency, genetic, physiological, and ecological implications of hypopigmentation and other coloration phenomena in their carriers. We recommend advancing in the analysis of the genetic variability of the populations mentioned in the study areas. In turn, the occurrence of a polymorphic color phenotype in tayras, its suggested to study the fixation of recessive characteristics and the evaluation of the possible adaptive advantages/disadvantages of these phenotypes at the population level.

Literature cited

Acevedo, J., and M. Aguayo. 2008. Leucistic South American sea lion in Chile, with a review of anomalously color in otariids. Revista de Biología Marina y Oceanografía 43:413–417.

Aximoff, I. A., and C. A. Rocha. 2016. First records of albinism in greyheaded tayra (Carnivora, Mustelidae) and occurrence in high-altitude grassland in Brazil. Oecologia Australis 20:526–531.

Bianchi, R., *et al*. 2021. Tayra (*Eira barbara*) landscape use as a function of cover types, forest protection, and the presence of puma and free-ranging dogs. Biotropica 53:1569-1581.

Caro, T., and R. Mallarino. 2020. Coloration in Mammals. Trends in Ecology and Evolution 35:357–366.

Cotts, L., *et al*. 2023. Multiple colors in anteaters: review and description of chromatic disorders in Tamandua (Xenarthra: Pilosa) with reports of new and rare coat colorations. Zoologia (Curitiba) 40:e22034.

de Oliveira, T. G., and J. A. Pereira. 2014. Intraguild Predation and Interspecific Killing as Structuring Forces of Carnivoran Communities in South America. Journal of Mammalian Evolution 21:427–436.

Eizirik, E., and F. J. Trindade. 2021. Genetics and evolution of mammalian coat pigmentation. Annual Review of Animal Biosciences 9:125–148.

Eslava-Mocha, P. R. 2015. ¿Carecemos de inteligencia territorial para proponer un modelo productivo responsable en la Orinoquia? Orinoquia 19:7–9.

Gallo, J., et al. 2023. Anormalidades cromáticas en armadillos (Xenarthra: Cingulata): registros hallados en la web. Notas sobre Mamíferos Sudamericanos 5: 2-9.

Galván, I., *et al*. 2019. A recent shift in the pigmentation phenotype of a wild Neotropical primate. Mammalian Biology 94:66–68.

García, F. J., *et al*. 2020. Anomalous coloration in Neotropical mammals: New cases of pigmentation disorders in Venezuelan mammals revealed by review of natural history museums. Memoria de la Sociedad Ciencias Naturales La Salle 78:5–20.

Griffith, C. M., J. E. Woodrow, and J. N. Seiber. 2015. Environmental behavior and analysis of agricultural sulfur. Pest Management Science 71:1486–1496.

Hernández-Aguilar, I. 2023. Repercusiones de las anomalías en la pigmentación en las poblaciones de mamíferos. Revista Mexicana de Mastozoología (Nueva Epoca)13.

Lamoreux, M. L., *et al*. 2010. The colors of mice: A model gene-tic network. First edition. Wiley-Blackwell, Bryan. Texas, U.S.A.

Leandro-Silva, V., *et al*. 2022. Leucism in *Callithrix jacchus* (Primates: Callitrichidae) and *Sciurus aestuans* (Rodentia: Sciuridae) in the northeast of Brazil. Mammalogy Notes 8:276-276.

Lessa, E., *et al*. 2016. Domestic dogs in protected areas: a threat to Brazilian mammals? Natureza and Conservação 14:46–56.

Lucati, F., and A. López-Baucells. 2017. Chromatic disorders in bats: a review of pigmentation anomalies and the misuse of terms to describe them. Mammal Review 47:112–123.

Melo-Dias, M., *et al*. 2022. First record of leucism in a crab-eating fox (*Cerdocyon thous*) from the Atlantic Forest hotspot. Brazilian Journal of Mammalogy 91:e91202279.

Mendes-Pontes, A. R., J. A. P. da Silva, and D. Chivers. 2020. The occurrence of leucism in groups of tayras *Eira barbara* Linnaeus 1758 on the Guyana shield. Écoscience 27:295–301.

Miller, J. 2005. All about albinism. Missouri Conservationist Serving Nature and You 66:4–7.

Møller, A. P., and T. A. Mousseau. 2001. Albinism and phenotype of barn swallows (*Hirundo rustica*) from Chernobyl. Evolution 55:2097–2104.

Olson, L. O. 2019. Leucisitic Fisher (*Pekania pennanti*) and the Prevalence of Leucism in Wild Carnivores. American Midland Naturalist 181:133–138.

Ortiz-Hoyos, R., et al. 2020. Primer registro de leucismo en *Didelphis marsupialis* Linnaeus, 1758 (Didelphimorphia: Didelphidae) en Colombia. Galemys 32:64-68.

Pereira, A. D., *et al*. 2019. Mamíferos silvestres predados por cães domésticos em fragmentos de Mata Atlântica no sul do Brasil. Biotemas 32:107–113.

Piaguaje, J., A. Tapia, and D. G. Tirira. 2021. Primer reporte de albinismo en *Dasyprocta fuliginosa* (Rodentia: Dasyproctidae). Mammalia Aequatorialis 3:65–67.

Presley, S. J. 2000. *Eira barbara*. Mammalian Species 636:1–6.

Robinson, R. 1993. Expressivity of the Manx Gene in cats. Journal of Heredity 84:170–172.

Scrich, V. M., *et al*. 2019. Occurrence of tayras (*Eira barbara* Linnaeus, 1758) with anomalous coloration in Cerrado remnants in the state of São Paulo, Brazil. Biota Neotropica 19.

Sobroza, T. V., A. L. Gonçalves, and L. S. Dos Santos. 2016. Predation attempt and abnormal coat coloration of the tayra (*Eira barbara*) in the Brazilian Central Amazon. Studies on Neotropical Fauna and Environment 51:231–234.

Suárez-Castro, A. F., and H. E. Ramírez-Chaves (eds). 2015. Los carnívoros terrestres y semiacuáticos continentales de Colombia. Guía de Campo. Editorial Universidad Nacional de Colombia. Bogotá, Colombia.

Talamoni, S., *et al*. 2017. Occurrence of leucism in *Eira barbara* (Carnivora, Mustelidae) in Brazil. Biota Neotropica 17.

Tarifa, T., *et al*. 2001. Mamíferos del Parque Nacional Madidi. La Paz, Bolivia.

Tenorio-Rodríguez, P. A., L. D. Moreno-Figueroa, and L. Cab-Sulub. 2024. Revelando el secreto de los pelirrojos. Therya ixmana 3:41–42.

Tortato, F. R., and S. L. Althoff. 2007. Variation in coat color of tayras (*Eira barbara* Linnaeus, 1758 - Carnivora, Mustelidae) in the State Biological Reserve of Sassafrás, Santa Catarina, South Brazil. Biota Neotropical 7:365–367.

Villafañe-Trujillo, Á. J., C. Alberto, and J. M. Kolowski. 2018. Throat Patch Variation in Tayra (*Eira barbara*) and the Potential for Individual Identification in the Field. Diversity 10:7.

Associated editor: José Fernando Moreira Ramírez.
Submitted: October 30, 2024; Reviewed: March 21, 2025.
Accepted: April 21, 2025; Published on line: June 3, 2025.