

First record of anomalous coloration for *Eptesicus taddeii* (Vespertilionidae) in the Atlantic Forest, South Brazil*

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Abstract

Piebaldism is characterized by the absence of melanin in certain areas of the body due the lack of melanocytes as a result of genetic mutations, and which occurs only locally. This study reports the first record of piebaldism for *Eptesicus taddeii*, a species of bat, endemic to the Atlantic Forest in the South Region of Brazil.

Key words: Aberrant coloration, Atlantic Forest, Chiroptera, Piebaldism, Vespertilionidae.

Primer registro de coloración anómala de *Eptesicus taddeii* (Vespertilionidae) en Mata Atlántica, Sur de Brasil


Resumen

El piebaldismo se caracteriza por la ausencia de melanina en regiones del cuerpo, debido a la falta de melanocitos como resultado de mutaciones genéticas, y que ocurre sólo localmente. El presente trabajo reporta el primer registro de piebaldismo para *Eptesicus taddeii*, una especie de murciélago endémica de la Mata Atlántica en la Región Sur de Brasil.


Palabras clave: Chiroptera, Coloración aberrante, Mata atlántica.

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Anomalous coloration in mammals can occur due to an excess or deficit in melanin production in certain areas or throughout the entire body (Acevedo and Aguayo, 2008; Caro, 2005; Ortolani, 1999; Zortéa & Silva, 2018).

There are still disagreements regarding the correct terminology to describe these disorders, especially for those related to hypopigmentation (Zalapa et al., 2016), which has generated incompatibility among published data.

Piebaldism has recently been classified as the absence of melanin in certain areas of the body caused by the lack of melanocytes as a result of genetic mutations affecting the follicles of the skin and hair (Abreu et al., 2013; Lucati & López-Baucells, 2016). Individuals with this anomaly have a variable distribution of white spots on the body, however, the eyes are not affected. Piebaldism is similar to leucism but differs in that the development of melanocytes is interrupted only locally (Lucati & López-Baucells, 2016).

Cases of chromatic disorders have been reported in different groups of mammals in different regions of the world (Abreu et al., 2013; Lucati & López-Baucells, 2016; Mahabal et al., 2019; Velandia-Perilla et al., 2013). In bats, most cases of pigmentation disorders have been documented mainly in the families Vespertilionidae and Phyllostomidae (Lucati & López-Baucells, 2016; Velandia-Perilla et al., 2013; Zortéa & Silva, 2018), probably because they are the largest and best studied families (Hernández-Aguilar & Santos-Moreno, 2018). In Brazil there are cases of anomalous coloring for the families of Molossidae, Vespertilionidae and Phyllostomidae (Uieda, 2000; Geiger and Pacheco, 2006; Lucati and López-Baucells, 2016; Miranda et al., 2010; Rocha et al., 2013; Souza et al., 2013; Treitler et al., 2013) and these data are growing (Borloti et al., 2019).

Anomalous coloration has been previously reported for the genus *Eptesicus* Rafinesque. Trapido and Crowe (1942) reported the case of three individuals of *Eptesicus fuscus* (Palisot de Beauvois, 1796) with white spots on the body, gray-colored fur and irregular spots of three different shades.

Here we report the first record of piebaldism in the species *Eptesicus taddeii* Miranda, Bernardi & Passos 2006, observed in an bat captured in the Atlantic Forest in the South Region of Brazil.

The bat was captured during sampling for an inventory at Estação Ecológica Municipal Capivara I, in the municipality of Campina do Simão, state of Paraná, Brazil (-25°04'30.3"S; -51°49'37.9"W), in February 2020 (Figure 1).



Figura 1. Map showing the location of the collection site for the specimen in Estação Ecológica Municipal Capivara I, municipality of Campina do Simão, state of Paraná, Brazil.

The climate of the region is of the Cfb type - temperate climate, according to the Köppen classification, with an average temperature in the coldest month below 18°C (mesothermal) with cool summers, and an average temperature in the hottest month below 22°C and without a defined dry season (Wrege et al., 2012).

The vegetation is characterized as Araucaria Pine Forest, a phytophysiology of the Atlantic Forest found in the Southern Brazilian Plateau (states of Rio Grande do Sul, Santa Catarina and Paraná) at altitudes above 500–600 meters (MMA, 2010).

Mist nets were placed in the understory, in the canopy and in clearings and edges of the forest and were kept open for six hours after sunset during three consecutive nights of sampling.

An adult male *E. taddeii* was captured on a canopy net. The forearm of the specimen measured 45.4mm for and its body mass weighted 14g. It had a patch of white hair above the right eye (Figure 2), while the rest of the body was normally colored. The specimen was captured and collected in accordance with license number 44193-2 obtained from SISBIO, and the ethical standards provided in the license and by the American Society of Mammalogists (Sikes et al., 2019) were met. The specimen was deposited in the Mastozoology Archive at Universidade Federal do Paraná (DZUP - UFPR) and registered with number 2251.



Figura 2. Individual of *E. taddeii* showing anomalous color, captured in Estação Ecológica Municipal Capivara I, municipality of Campina do Simão, state of Paraná, Brazil. Photo: Mariane de Araujo.

The fact that an adult individual of *E. taddeii* has piebaldism shows that the anomaly does not interfere with survival, which is also true for other bat species (Hernández-Aguilar & Santos-Moreno, 2018; Velandia-Perilla et al., 2013). Furthermore, it demonstrates that there is no excessive increase in predation risk, to the point that the species never reaches adulthood, for young individuals (Brack and Johnson, 1990; Bartonička & Burič, 2007; Sánchez-Hernández et al., 2010; Souza et al., 2013). Bats survive with such anomalies thanks to their use of echolocation and nocturnal habits (Buys et al., 2002). Additionally, abnormal pigmentation in pregnant females, which have been reported, (García-Morales et al., 2012; Sánchez-Hernández et al., 2010; Treitler et al., 2013), apparently do not interfere with bat reproduction.

We suggest further research in the studied region to check if other new records of color anomalies can be found and if there are possible negative consequences for the population of *E. taddeii*.

Author contribution

Luana de Almeida Pereira: Methodology; Writing the original draft; Comments, review and editing. Sabrina Marchioro: Methodology; Comments, review and editing. Gabriel Cezar Silveira Rocha: Methodology; Comments, review and editing; Producer of the

location study site's map. João Marcelo Deliberador Miranda: Obtaining the SISBIO license; Confirmation of specimen identification; Final text review.

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