

# New record of leucism in *Eira barbara* Lineu, 1758 (Mammalia: Carnivora) for southeastern Brazil

<sup>1</sup>Henri Barbosa Pecora, <sup>2</sup>Felipe Santana Machado, <sup>3</sup>Rosângela Alves Tristão Borém, <sup>4</sup>Renato Augusto Junqueira Gaiga

<sup>1</sup> Biotropica Consultoria Ambiental Ltda, Avenida Santo Antônio, 571. Jd. Cascatinha. Poços de Caldas, MG, CEP 37701-036. henrao@hotmail.com

<sup>2</sup> Governo do Estado de Minas Gerais, Escola Estadual Celina de Rezende Vilela, Rua Francisco Valia, 50, Centro, Cordislândia, MG, CEP 37498-000. E Prefeitura de São Gonçalo do Sapucaí, Escolas Municipais Bento Gonçalves Filho e Maria Olímpia Borges, São Gonçalo do Sapucaí, MG, CEP 37490-000. epilefsama@hotmail.com

<sup>3</sup> Universidade Federal de Lavras, Departamento de Biologia, Campus Universitário, CP3037, Lavras/MG, CEP 37200-900. tristao@ufla.br

<sup>4</sup> Biotropica Consultoria Ambiental Ltda, Avenida Santo Antônio, 571. Jd. Cascatinha. Poços de Caldas, MG, CEP 37701-036. renatoaugustojg@hotmail.com

Received in: 26/04/2024

Accepted in: 24/06/2024

## Abstract

Records of leucism in *tayras* (*Eira barbara*) occur sporadically. There were found 18 records in Brazil and we present the most recent record for the southeast region, the last one occurred more than six years ago (2015). We demonstrate that records of leucistic *tayras* are punctual for the north of the Amazon and the south-central of the Atlantic Forest; and found that the number of records has increased in the last 10 years. Given this scenario, we suggest further research on the species to better understand the conservation status of the species and reasons for the increase in the number of occurrences of leucistic *tayras*.

**Keywords:** Camera trap. Conservation. Mustelid. Natural history. White coat.

## Introduction

The *tayra* (*Eira barbara*) is part of the Carnivora order and Mustelidae family. *Eira barbara* is one of the main mammals in inventories of medium and large animals, being widely recorded in Brazil (e.g. MACHADO *et al.*, 2017; MORAIS *et al.*, 2018; OLIVEIRA *et al.*, 2019; SANTIAGO *et al.*, 2020), however in other countries the record is rare (e.g. El Salvador – MARINEROS, 2006). The *tayra* is a Neotropical species, distributed from sea level to above 2600 m altitude (REYES-PUIG *et al.*, 2015). Individuals have a diurnal pattern, which varies throughout their distribution and seasons. This variation demonstrates broad phenotypic flexibility, which contributes for a wide geographic distribution (VILLAFANE-TRUJILLO *et al.*, 2021). This recording is related to its wide distribution and habits predominantly diurnal with their higher frequency of in occurrence lower elevations and in areas more distant from human habitation (LIMA; PASSAMANI; ROSA, 2020), which reaches from southern Mexico to Argentina, with records in all Brazilian morphoclimatic domains,

especially in environments with denser vegetation (REIS *et al.*, 2006).

Individuals have a coat with a dark brown tone along the body, becoming darker closer to the head. The head and neck are lighter brown. There are eight phenotypes of the species, not all of them have disruptive coat coloration, besides individual identification is possible due the throat patch (VILLAFANE-TRUJILLO *et al.*, 2018) and there are at least three phenotypes in Brazil (PRESLEY, 2000). However, this coat may vary according to geographic region (REIS *et al.*, 2006) or due to rare anomalies (TORTATO; ALTHOFF, 2007; TALAMONI *et al.*, 2017).

Among the rare anomalies of coat color are melanism, increased melanin pigment and consequent darkening of the skin and hair; piebaldism, partial depigmentation (lack of melanocytes) in part of the animal's body; and leucism (MILLER, 2005). Leucism is the occurrence of anomalous whitish coloration of the coat resulting from the total or partial reduction of melanin pigmentation. The albinism is the

exclusive lack of melanin, leucism is the lack of pigmentation in general, which may or may not have a hereditary genetic background. In this case, the entire body may be white or just some parts. To visually differentiate the two conditions, it is necessary to observe the species' eyes. In animals with leucism, the eyes have a normal color, while albinos have pink or red eyes (MILLER, 2005).

This phenotypic condition is still not fully explained, as the expression of this characteristic may be attributed to a recessive mutant allele (BENSCH *et al.*, 2000), or to the absence of Tyrosinase production, an enzyme which favors melanin production (SANCHEZ-FERRER *et al.*, 1995). The albinism and leucism are rare in nature (TALAMONI *et al.*, 2017), however there are records in field reports in the last ten years, as well as specimens deposited in museums (see records in TORTATO; ALTHOFF 2007; AXIMOFF; ROSA, 2016; SOBROZA *et al.*, 2016; TALAMONI *et al.*, 2017; SCRICH *et al.*, 2019). With this note our aim is to add one more record of leucistic tayra *Eira barbara* Lineu, 1758 to São Paulo State, Brazil, and present past records in scientific articles, making a critical analysis.

## Material and methods

This record was obtained during fauna studies in Botucatu, São Paulo State, Brazil. The city has a population of 145,155 inhabitants, in an area of 1,482.87 km<sup>2</sup>. The region's economy

is based on agriculture, livestock, and forestry with advances in the industrial sector (IBGE, 2024). The vegetation includes two domains, Cerrado and Atlantic Forest, with AW Köppen climate classification (FRANCO *et al.*, 2023). The annual precipitation is 1500 mm and the average annual temperature is 21.34 °C. Bushnell trap cameras were used, positioned approximately 50 cm high, without attractive bait. The traps were placed in linear transects across the landscape.

## Results and discussion

The record was obtained on April 7, 2021 (autumn – dry season), at around 9:28 am in Botucatu city, São Paulo state (22° 57' 55" S 48° 17' 32" W) (Figure 1) in 874 m high. There were found 18 records of tayras with white coat due leucism or albinism (including this note) throughout the Brazilian territory (Table 1; Figure 2). The records in the north of the Amazon are in well-preserved forests of the biome, in line with the direction of expansion of areas of urban agglomerations.

The anomalous coloration could ease the detection of individuals, as it makes it impossible to camouflage in the environment (as mentioned by TALAMONI *et al.*, 2017). Therefore, it is suggested to increase the preservation and management of these areas to maintain population. The records in the south-central

**Figure 1.** Record of leucistic tayra in Botucatu city, São Paulo State. Letter A with emphasis on the rostral region and letter B with emphasis on the tail.



**Table 1.** Records in Brazil of leucistic tayras documented in scientific articles, including new registration.

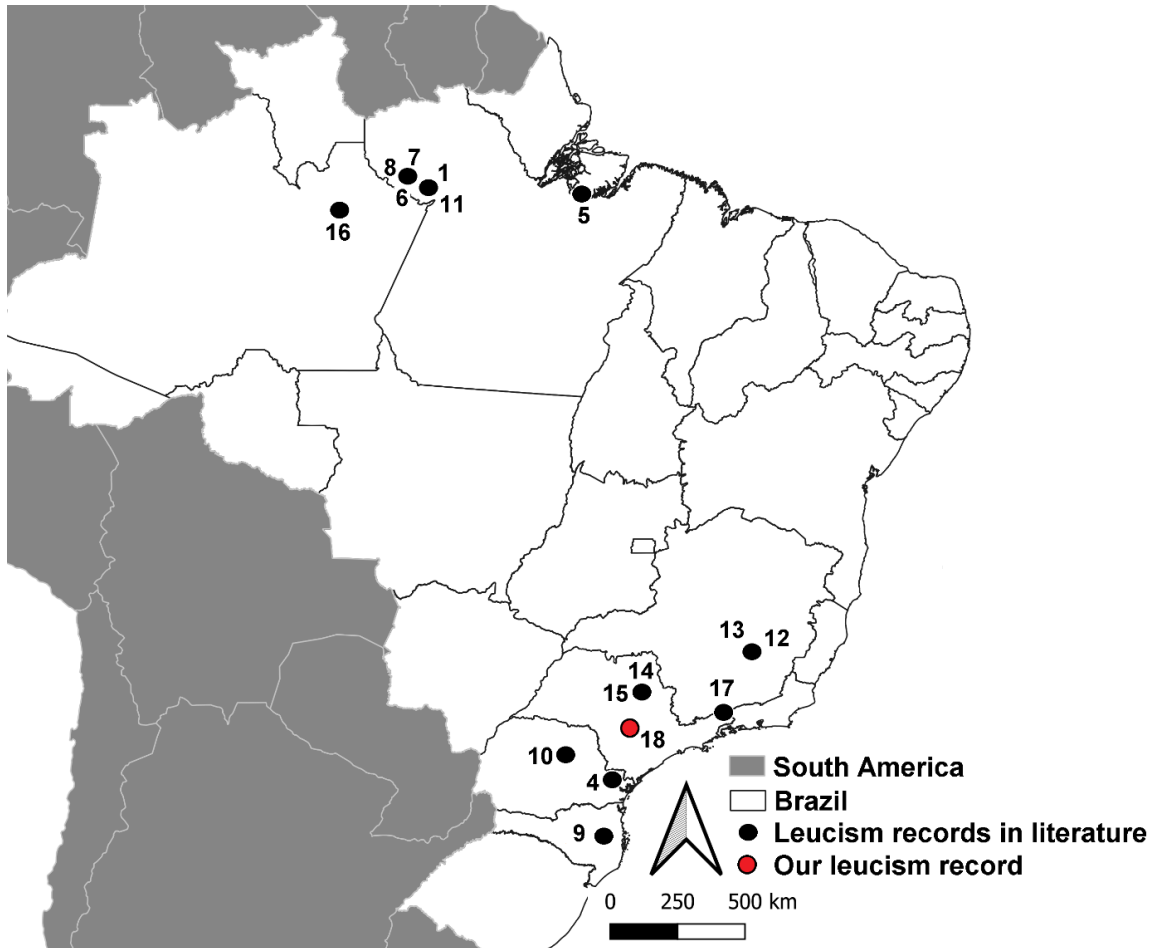
| Year | Local     | Type of record               | Condition of the specimen                                 | Coordinates                      | Reference                        |                     |
|------|-----------|------------------------------|---|----------------------------------|----------------------------------|---------------------|
| 1    | No data   | Oriximiná (PA)               |   | 1°28'20.0" S<br>56°22'35.5" W    | Talamoni <i>et al.</i> , 2017    |                     |
| 2    | 1905      | Parque da Luz (SP)           |   | No data                          | Talamoni <i>et al.</i> , 2017    |                     |
| 3    | 1905      | Parque da Luz (SP)           |   | No data                          | Talamoni <i>et al.</i> , 2017    |                     |
| 4    | 1944      | Iporanga (SP)                |   | 24°58'41.67" S<br>48°59'27.00" W | Talamoni <i>et al.</i> , 2017    |                     |
| 5    | 1965      | Boiuçú (PA)                  |   | 1°48'0.000" S<br>50°16'59.88" W  | Talamoni <i>et al.</i> , 2017    |                     |
| 6    | 1977      | Oriximiná (PA)               |   | 1°06'57.20" S<br>57°05'24.50" W  | Talamoni <i>et al.</i> , 2017    |                     |
| 7    | 1978      | Oriximiná (PA)               |   | 1°06'57.20" S<br>57°05'24.50" W  | Talamoni <i>et al.</i> , 2017    |                     |
| 8    | 1978      | Oriximiná (PA)               |   | 1°06'57.20" S<br>57°05'24.50" W  | Talamoni <i>et al.</i> , 2017    |                     |
| 9    | 2004-2006 | State Reserve Sassafrás (SC) |   | 26°42" S<br>49°40" W             | Tortato & Althoff 2007           |                     |
| 10   | 2005      | Fazenda Monte Alegre (PR)    |   | 24°19'39" S<br>50°32'18" W       | Reis <i>et al.</i> , 2005        |                     |
| 11   | 2007      | Oriximiná (PA)               |   | 1°28'20.0" S<br>56°22'35.5" W    | Talamoni <i>et al.</i> , 2017    |                     |
| 12   | 2009      | Catas Altas (MG)             |   | 20°0'51" S<br>43°29'28" W        | Talamoni <i>et al.</i> , 2017    |                     |
| 13   | 2009      | Catas Altas (MG)             |   | 20°0'51" S<br>43°29'28" W        | Talamoni <i>et al.</i> , 2017    |                     |
| 14   | 2013      | Luiz Antônio (SP)            |   | 21°32'27.5" S<br>47°48'09.3" W   | Scrich <i>et al.</i> , 2019      |                     |
| 15   | 2013      | Luiz Antônio (SP)            |   | 21°33'06.5" S<br>47°49'12.0" W   | Scrich <i>et al.</i> , 2019      |                     |
| 16   | 2014      | Manaus (AM)                  |   | 2°23'23.65" S<br>59°52'45.96" W  | Sobroza <i>et al.</i> , 2016     |                     |
| 17   | 2015      | Itatiaia National Park (RJ)  | Specimen in Collection, Camera trap record, among others. | Leucism - Albinism               | 22°23'24.71" S<br>44°33'52.16" W | Aximoff & Rosa 2016 |
| 18   | 2021      | Botucatu (SP)                |   | 22° 57' 55" S<br>48° 17' 32" W   | This note                        |                     |

Atlantic Forest deserve special attention, as some of them are from areas that were fully urbanized, such as those made more than a century ago in the center of São Paulo (Parque da Luz – TALAMONI *et al.*, 2017), as well as of the others also ancient which are from specimens in scientific collections. The records from the decade of 2000 are from forest remnants that need special attention to maintain these environments, as they are highly fragmented (RIBEIRO *et al.*, 2009)

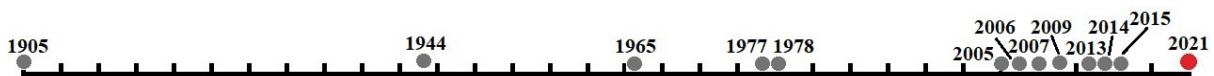
and the current environmental policy situation does not favor the maintenance of conservation and preservation aspects (ARAÚJO, 2020).

From a regional point of view, this record is relevant by increasing the regional species pool, and adding the information of pelage color that may be the result of abnormalities of genetic and/or environmental causes. Also, the record could be the result of a recessive gene, or a reduction of a protein, or the high values of

**Figure 2.** Map with the leucism records in Brazil from previous articles and from this study. The records in articles are in black and our record is in red. The numbers on the map are the same of the Table 1.



**Figure 3.** Timeline with documented records of albinism or leucistic tayras in the Brazilian territory. Records in articles are in gray, and the record of this note is in red. Each segment of the timeline represents  $\sim 3.6$  years.



consanguinity index. More research is suggested for the topic. Furthermore, this record increasing the conservation and preservation status. The amount of tayra's leucism records has been increased in recent years (Figure 3), which raises relevant questions for the conservation of the species.

### Acknowledgement

To Biotropica Environmental Consulting LTDA for supporting and encouraging the publication of the note.

### References

ARAÚJO, S. M. V. G. Environmental policy in the Bolsonaro government: the response of environmentalists in the Legislative Arena. **Brazilian Political Science Review**, v. 14, e0005, 2020. Disponível em: <https://www.scielo.br/j/bpsr/a/BvykxZmxfgSHpTKj67jSmfQ/> Acesso em: 26 out. 2023.

AXIMOFF, I. A.; ROSA, C. A. First records of greyheaded tayra (Carnivora, Mustelidae) on high altitude grasslands and with albinism

in Brazil. **Oecologia Australis**, v. 20, n. 4, p. 526-531, 2016. Disponível em: <https://pdfs.semanticscholar.org/0689/470e5646e134900714bd022c967331b6851b.pdf> Acesso em: 20 mar. 2022.

BENSCH, S.; HANSSON, B., HASSELQUIST, D., NIELSEN, B. Partial albinism in a semi-isolated population of great reed warblers. **Hereditas**, v. 133, n. 2, p. 167-170, 2000. Disponível em: <https://onlinelibrary.wiley.com/doi/abs/10.1111/j.1601-5223.2000.t01-1-00167.x> Acesso em: 10 jan. 2024.

FRANCO, J. R.; DAL PAI, E.; CALÇA, M. V. C.; RANIERO, M. R.; DAL PAI, A.; SARNIGHAUSEN, V. C. R.; SANCHÉZ-ROMÁN, R. M. Atualização da normal climatológica e classificação climática de Köppen para o município de Botucatu-SP. **Irriga**, v. 28, n. 1, p. 77-92, 2023. Disponível em: <https://revistas.fca.unesp.br/index.php/irriga/article/view/4615> Acesso em: 26 abr. 2024.

IBGE. Instituto Brasileiro de Geografia e Estatística. **Dados sobre o município de Botucatu, SP**. 2024. Disponível em: <https://www.ibge.gov.br/cidades-e-estados/sp/botucatu.html>. Acesso em: 24 mai. 2024.

LIMA, K. C. B.; PASSAMANI, M.; ROSA, C. A. Daily tayra (*Eira barbara*, Linnaeus 1758) activity patterns and habitat use in high montane tropical forests. **Acta Oecologica**, v. 108, 103624, 2020. Disponível em: [https://www.icmbio.gov.br/parnaitatiaia/images/stories/2020/O\\_que\\_fazemos/Notas\\_de\\_Pesquisa/405.pdf](https://www.icmbio.gov.br/parnaitatiaia/images/stories/2020/O_que_fazemos/Notas_de_Pesquisa/405.pdf) Acesso em: 04 out. 2023.

MACHADO, F. S.; MOURA, A. S.; SANTOS, K. K.; MENDES, P. B.; ABREU, T. C. K.; FONTES, M. A. L. Registros ocasionais de mamíferos de médio e grande porte na microrregião de Lavras e São João del Rei, Campo das Vertentes, Minas Gerais. **Revista Agrogeoambiental**, v. 9,

n. 1, p. 35-44, 2017. Disponível em: <https://agrogeoambiental.ifsuldeminas.edu.br/index.php/Agrogeoambiental/article/view/930> Acesso em: 23 jun. 2020.

MARINEROS, L. **Inventario de Mamíferos del Sitio Arqueológico Río Amarillo, Copán, Honduras**. 2006. 15 p. Disponível em: [https://repositorio.credia.hn/bitstream/handle/123456789/135/2006\\_inventario\\_de\\_mamiferos\\_del\\_sitio\\_arqueologico\\_rio\\_amarillo%2C.pdf](https://repositorio.credia.hn/bitstream/handle/123456789/135/2006_inventario_de_mamiferos_del_sitio_arqueologico_rio_amarillo%2C.pdf) Acesso em: 09 jul. 2023.

MILLER, J. D. All about albinism. **Missouri conservationist**, v. 66, n. 6, p. 4-7, 2005. Disponível em: <https://mdc.mo.gov/magazines/conservationist/2005-06/all-about-albinism> Acesso em: 01 jan. 2023.

MORAIS, T. A.; DA ROSA, C. A.; MACHADO, F. S.; PASSAMANI, M. Mamíferos de médio e grande porte da Reserva Biológica Unilavras-Boqueirão, Sul de Minas Gerais, Brasil. **Boletim da Sociedade Brasileira de Mastozoologia**, v. 83, p. 152-157, 2018. Disponível em: [https://www.researchgate.net/profile/Clarissa-Alves-Da-Rosa/publication/342126480\\_Mamiferos\\_de\\_medio\\_e\\_grande\\_porte\\_da\\_Reserva\\_Biologica\\_Unilavras-Boqueirao\\_Sul\\_de\\_Minhas\\_Gerais\\_Brasil/links/5ee373a3458515814a58408b/Mamiferos-de-medio-e-grande-porte-da-Reserva-Biologica-Unilavras-Boqueirao-Sul-de-Minas-Gerais-Brasil.pdf](https://www.researchgate.net/profile/Clarissa-Alves-Da-Rosa/publication/342126480_Mamiferos_de_medio_e_grande_porte_da_Reserva_Biologica_Unilavras-Boqueirao_Sul_de_Minhas_Gerais_Brasil/links/5ee373a3458515814a58408b/Mamiferos-de-medio-e-grande-porte-da-Reserva-Biologica-Unilavras-Boqueirao-Sul-de-Minas-Gerais-Brasil.pdf) Acesso em: 24 abr. 2024.

OLIVEIRA, E. C. M.; MACHADO, F. S.; ZANZINI, A. C. Activity patterns of mammals at Quedas do Rio Bonito Ecological Park, Lavras City, Minas Gerais State, Brazil. **Revista Agrogeoambiental**, v. 11, n. 2, p. 55-70, 2019. Disponível em: <https://agrogeoambiental.ifsuldeminas.edu.br/index.php/Agrogeoambiental/article/view/1281> Acesso em: 05 set. 2023.

PRESLEY, S. J. *Eira barbara*. **Mammalian species**, v. 2000, n. 636, p. 1-6, 2000. Disponível em: [https://doi.org/10.1644/1545-1410\(2000\)636<0001:EB>2.0.CO;2](https://doi.org/10.1644/1545-1410(2000)636<0001:EB>2.0.CO;2) Acesso em: 22 jun. 2024.

REIS, N. R.; PERACCHI, A. L.; PEDRO, W. A.; LIMA, I. P. **Mamíferos do Brasil**. Local: Editora Universidade Estadual de Londrina, 2006. 437 p.

REIS, N. R.; PERACCHI, A. L.; FANDIÑO-MARIÑO, H.; ROCHA, V. J. **Mamíferos da Fazenda Monte Alegre**, Paraná. 2005. Disponível em: [https://www.researchgate.net/profile/Vlamar-Rocha-3/publication/301696415\\_Mamiferos\\_da\\_Fazenda\\_Monte\\_Alegre/links/57235afe08ae262228aa6718/Mamiferos-da-Fazenda-Monte-Alegre.pdf](https://www.researchgate.net/profile/Vlamar-Rocha-3/publication/301696415_Mamiferos_da_Fazenda_Monte_Alegre/links/57235afe08ae262228aa6718/Mamiferos-da-Fazenda-Monte-Alegre.pdf) Acesso em: 26 abr. 2024.

REYES-PUIG, C. P.; RÍOS-ALVEAR, G. D.; REYES-PUIG, Juan Pablo. Notable ampliación del rango altitudinal de *Eira barbara* Cabeza de Mate (Mammalia: Mustelidae). *ACI Avances en Ciencias e Ingenierías*, v. 7, n. 1, 2015. Disponível em: <https://revistas.usfq.edu.ec/index.php/avances/article/view/229> Acesso em: 22 jun. 2024.

RIBEIRO, M. C.; METZGER, J. P.; MARTENSEN, A. C.; PONZONI, F. J.; HIROTA, M. M. The Brazilian Atlantic Forest: how much is left, and how is the remaining forest distributed? Implications for conservation. **Biological conservation**, v. 142, n. 6, p. 1141-1153, 2009. Disponível em: <https://www.sciencedirect.com/science/article/abs/pii/S0006320709000974> Acesso em: 18 mar. 2023.

SÁNCHEZ-FERRER, Á.; RODRÍGUEZ-LÓPEZ, J. N.; GARCÍA-CÁNOVAS, F.; GARCÍA-CARMONA, F. Tyrosinase: a comprehensive review of its mechanism. **Biochimica et Biophysica Acta**

**(BBA) - Protein Structure and Molecular Enzymology**, v. 1247, n. 1, p. 1-11, 1995. Disponível em: <https://www.sciencedirect.com/science/article/abs/pii/016748389400204T> Acesso em: 21 dez. 2023.

SANTIAGO, W. T. V.; FONSECA, C.; DA SILVA ZANZINI, A. C.; MACHADO, F. S.; DE MOURA, A. S.; FONTES, M. A. L. Medium and large sized mammals of the Cerrado domain of Tocantins state, Brazil. **Revista Agrogeoambiental**, v. 12, n. 3, p. 21-37, 2020. Disponível em: <https://agrogeoambiental.ifsuldeminas.edu.br/index.php/Agrogeoambiental/article/view/1485> Acesso em: 18 mar. 2023.

SCRICH, V. M.; PÔNZIO, M. C.; PASQUALOTTO, N.; RODRIGUES, T. F.; PAOLINO, R. M.; CHIARELLO, A. G. Occurrence of tayras (*Eira barbara* Linnaeus, 1758) with anomalous coloration in Cerrado remnants in the state of São Paulo, Brazil. **Biota Neotropica**, v. 19, e20180680, 2019. Disponível em: <https://www.scielo.br/j/bn/a/VGk5rz3R7JBy3JtndSY777y/> Acesso em: 26 abr. 2024.

SOBROZA, T. V.; GONÇALVES, A. L.; DOS SANTOS, L. S. Predation attempt and abnormal coat coloration of the tayra (*Eira barbara*) in the Brazilian Central Amazon. **Studies on neotropical fauna and environment**, v. 51, n. 3, p. 231-234, 2016. Disponível em: <https://www.tandfonline.com/doi/abs/10.1080/01650521.2016.1227137> Acesso em: 26 abr. 2024.

TALAMONI, S.; VIANA, P. I. M.; COSTA, C. G.; PALÚ, L.; OLIVEIRA, R. B.; PESSÔA, L. M. Occurrence of leucism in *Eira barbara* (Carnivora, Mustelidae) in Brazil. **Biota Neotropica**, v. 17, e20170328, 2017. Disponível em: <https://www.scielo.br/j/bn/a/pMGfqm3xgTdsT9gK3cGcNtj/?lang=en> Acesso em: 16 abr. 2024.

TORTATO, F. R.; ALTHOFF, S. L. Variações na coloração de iraras (*Eira barbara* Linnaeus, 1758-Carnivora, Mustelidae) da Reserva Biológica Estadual do Sassafrás, Santa Catarina, sul do Brasil. **Biota Neotropica**, v. 7, n. 3, p. 365-367, 2007. Disponível em: <https://www.scielo.br/j/bn/a/h3St7nqJ4kQgPvVV8rDbngd/> Acesso em: 16 abr. 2024.

VILLAFANE-TRUJILLO, A. J.; KOLOWSKI, J. M.; COVE, M. V.; MEDICI, E. P.; HARMSSEN, B. J.; FOSTER, R. J.; HIDALGO-MIHART, M. G.; ESPINOSA, S.; RÍOS-ALVEAR, G.; REYES-PUIG, C.; REYES-PUIG, J. P.; SILVA, X. M.; PAVIOLO, A.; CRUZ, P.; LÓPEZ-GONZÁLEZ, C. A. Activity patterns of tayra (*Eira barbara*) across their distribution. **Journal of Mammalogy**, v. 102, n. 3, p. 772-788, 2021. Disponível em: <https://academic.oup.com/jmammal/article/102/3/772/6105845?login=false> Acesso em: 24 mai. 2024.

VILLAFANE-TRUJILLO, Á. J.; LÓPEZ-GONZÁLEZ, C. A.; KOLOWSKI, J. M. Throat patch variation in tayra (*Eira barbara*) and the potential for individual identification in the field. **Diversity**, v. 10, n. 7, p. 1-27, 2018. Disponível em: <https://www.mdpi.com/1424-2818/10/1/7> Acesso em: 15 dez. 2023.