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First record of melanism in *Tomodon dorsatus* (Duméril, Bibron & Duméril, 1854) (Serpentes: Dipsadidae: Tachymenini)

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ABSTRACT
Melanism, characterized by the excessive production of dark pigments, is a well-documented phenomenon in snakes, although its ecological and evolutionary causes remain poorly understood in Neotropical species. During curatorial work in the Herpetological Collection of the Universidade Federal de Juiz de Fora - Reptiles (CHUFJF), three melanistic specimens of *Tomodon dorsatus* collected between 2007 and 2009 in the municipality of Cristina, Minas Gerais, Brazil, were recorded. The specimens, all adult males, exhibited predominantly black body coloration with small whitish ventral areas. The presence of multiple records from the same locality suggests that melanism may be a recurrent and geographically restricted phenotype within this population. These data expand current knowledge of chromatic variation in the species and highlight the importance of population, ecological, and genetic studies to better understand the mechanisms and frequency of melanism in this group.

Key Words: Snakes; Phenotypic Variation; Scientific Collections; Pigmentation.

RESUMEN
El melanismo, caracterizado por la producción excesiva de pigmentos oscuros, es un fenómeno bien documentado en serpientes, aunque sus causas ecológicas y evolutivas permanecen poco comprendidas en especies neotropicales. Durante el trabajo curatorial en la Colección Herpetológica de la Universidade Federal de Juiz de Fora - Reptiles (CHUFJF) se registraron tres ejemplares melanísticos de Tomodon dorsatus, colectados entre 2007 y 2009 en el municipio de Cristina, Minas Gerais, Brasil. Los individuos examinados, todos machos adultos, presentaron una coloración corporal predominantemente negra, con pequeñas áreas ventrales blanquecinas. La presencia de múltiples registros de la misma localidad sugiere que el melanismo puede constituir un fenotipo recurrente y geográficamente restringido en esta población. Estos datos amplían el conocimiento sobre la variación cromática de la especie y destacan la importancia de estudios poblacionales, ecológicos y genéticos para comprender los mecanismos y la frecuencia del melanismo en este grupo.

Palabras claves: Serpientes; Variación Fenotípica; Colecciones Científicas; Pigmentación.

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Melanism is defined by the excessive production and accumulation of dark pigments in the skin of animals, and may have genetic or environmental causes (Kettlewell, 1973; Majerus, 1998; True, 2003; Gilhen & Scott, 2014). In vertebrates, pigmentation is regulated by specialized cells known as chromatophores (Bechtel, 1978). Among ectothermic animals, chromatophores are classified into four types: melanophores, which synthesize melanin; erythrophores, which produce red pigments; xanthophores, responsible for yellow pigmentation; and iridophores, which reflect light to produce iridescent coloration (Bechtel, 1978; Rosenblum *et al.*, 2004; Kuriyama *et al.*, 2020). Phenotypically, melanism is expressed on a gradient that ranges from localized patterns of black pigment to the complete darkening of the body (True, 2003).

In snakes, melanism is a well-documented phenomenon, frequently associated with adaptive functions such as thermoregulation (Kettlewell, 1973; Bechtel, 1978; Gibson & Falls, 1979, 1988; Trullas *et al.*, 2007). Dark pigmentation enhances solar radiation absorption, allowing melanistic individuals to reach optimal body temperatures more quickly in cooler environments, thereby enabling extended activity periods and improved physiological performance (Trullas *et al.*, 2007), as proposed by the thermal melanism hypothesis (Bogert, 1949). However, Borteiro *et al.* (2021) suggest that aberrant hyperpigmentation does not seem to confer significant advantages for thermoregulation in Neotropical snakes, given its low frequency in diurnal terrestrial species. More recently, Sahlean *et al.* (2025) proposed that melanism in snakes should follow Gloger's rule (see Delhey *et al.*, 2019), according to which dark pigmentation tends to increase in more humid environments, possibly conferring advantages related to camouflage, since such environments are generally more shaded and densely vegetated.

Despite these hypotheses, the ecological and evolutionary factors underlying melanism in snakes remain poorly understood, with few ecological and physiological studies exploring its adaptive relevance. This gap is particularly evident among Neotropical snakes, given the high species richness (Roll *et al.*, 2017) and the contrast with studies carried out in other regions (Lorioux *et al.*, 2008; Martínez-Freiría *et al.*, 2020; Storniolo *et al.*, 2023; Sahlean *et al.*, 2025), whose geoclimatic differences may impose distinct selective pressures on the expression of melanism. Therefore, occasional records are important sources of data to support future studies of melanism.

During curatorial work in the Herpetological Collection of the Universidade Federal de Juiz de For a - Reptiles (CHUFJF), we observed three melanistic specimens of the snake species *Tomodon dorsatus* (Duméril, Bibron & Duméril, 1854), collected by Alvaro F. B. Junqueira between 2007 and 2009 in the municipality of Cristina (22.21°S, 45.26°W), Minas Gerais, southeastern Brazil (Fig. 1; Tab. 1). *Tomodon dorsatus* is a South American Tachymenini snake species, whose distribution includes Brazil, Argentina, Paraguay, and Uruguay (Nogueira *et al.*, 2019). It is a diurnal, terrestrial species occurring in humid tropical forests and riparian woodlands, capable of adapting to areas that have undergone anthropogenic alteration (Bizerra, 1998; Marques *et al.*, 2001, 2019). In most specimens, the dorsum is yellowish olive-brown with small dark transverse blotches; a black postocular stripe extends obliquely to the mouth corner, and two dark bands on the posterior part of the head are separated by a pale median stripe; venter and tail are light olive to grayish with irregular dark blotches (Fig. 2) (Williams & Vera, 2023; Verrastro & Borges-Martins, 2025).

The melanistic specimens examined are adult males, exhibiting a predominantly black body coloration (Fig. 1). Specimens CHUFJF 1826 and CHUFJF 1829 show the gular region and the anterior third of the medial portion of the ventral scales as slightly whitish (Fig. 1B, D), whereas in specimen CHUFJF 1827 these areas are entirely white, extending as subtle whitish blotches to the cloacal region (Fig. 1D). The specimens exhibited similar scale count patterns (Tab. 2), with the loreal scale absent in CHUFJF 1826 and CHUFJF 1827 and present on the left side of the head in CHUFJF 1829. Although the absence of the loreal scale is considered a diagnostic character of *T. dorsatus,* its presence represents a morphological variation previously documented within the species (Abegg *et al.*, 2017).

The region of Cristina is characterized by remnants of Atlantic Forest and is located at about 1,025 meters above sea level, with an average annual temperature of 20.5 °C and average annual precipitation of 1,591 mm (Roldão *et al.*, 2012). The observation of three melanistic specimens of *T. dorsatus* from the same locality suggests the existence of a population with a relative frequency of melanistic individuals. Studies with other snake species indicate that some populations may present significant proportions

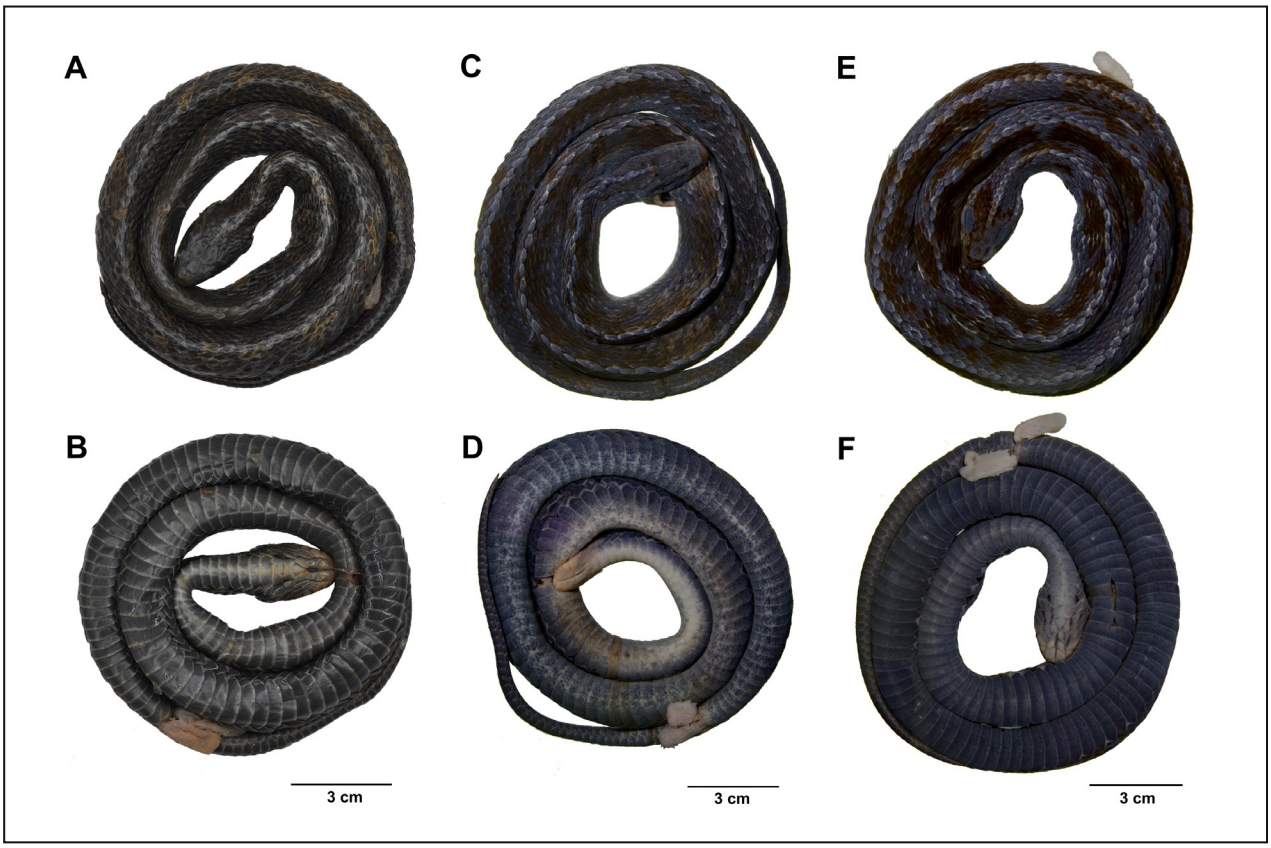

Figure 1. Adult male melanistics of *Tomodon dorsatus*. Specimens CHUFJF 1826 (dorsal A, ventral B), CHUFJF 1827 (dorsal C, ventral D), and CHUFJF 1829 (dorsal E, ventral F).

Table 1. Data on the three melanic specimens of *Tomodon dorsatus* from Cristina, Minas Gerais, Brazil. SVL = snout-vent length; TL = tail length.

Specimen	Sex	SVL (mm)	TL (mm)	Collection date
CHUFJF 1826	male	435	118	7 Nov. 2007
CHUFJF 1827	male	673	149	11 Sep. 2007
CHUFJF 1829	male	564	147	10 Sep. 2009

of individuals with this phenotype (Jablonski & Kautman, 2017; Storniolo *et al.*, 2023), as observed in *Natrix tessellata*, in which about 50% of the population of Lake Sevan, in Armenia, consists of melanistic individuals (Tuniyev *et al.*, 2011). Within the context of the tribe Tachymenini, Walker (1945), in his revision of the *Tachymenis chilensis* complex (currently *Galvarinus chilensis*), described a Chilean form characterized by a "great development of melanin" originally named *T. chilensis melanura.* This form was considered extremely localized, being known only from the vicinity of Máfil, in Valdivia Province, southern Chile, suggesting that, at least in specific micro-localities, melanism could constitute a distinctive and geographically restricted phenotype.

The records presented here expand the knowledge of chromatic variation in *Tomodon dorsatus* and suggest that melanism in the population from the municipality of Cristina may represent a recurrent and localized phenotypic characteristic, as observed for the population of *Galvarinus chilensis* in southern Chile. Although the current data do not allow causal inferences, they indicate the need for future studies integrating population, ecological, and genetic approaches to better understand the mechanisms and expression of this phenotype in certain populations of Tachymenini species.

Figure 2. Adult *Tomodon dorsatus* in life, showing the typical non-melanistic coloration. Photograph by Tomaz Nascimento de Melo / iNaturalist [https://www.inaturalist.org/observations/145350098] / CC BY-NC-ND 4.0

Table 2. Scale count data for the three melanic specimens of *Tomodon dorsatus*. Dorsal scale rows are given at the neck, midbody, and near the tail, respectively. Bilateral scale counts are given as right/left.

	CHUFJF 1826	CHUFJF 1827	CHUFJF 1829
Dorsal scale rows	17/17/15	17/17/15	17/17/15
Ventrals	137	139	136
Subcaudals	60	60	59
Supralabials	7/7	7/7	7/7
Infralabials	9/9	9/9	8/9
Preocular	1/1	1/1	1/1
Postocular	2/2	2/2	2/2
Loreal scale	Absent	Absent	Present on left side

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Literature cited

Abegg, A.D.; Entiauspe-Neto, O.M.; Ortiz, F.R.; Rosa, C.M. & Borges, L.M. 2017. Presence of loreal scale in *Tomodon dorsatus* (Serpentes: Dipsadidae). *Boletim do Museu de Biologia Mello Leitão (Nova série)* 39: 1-10.

Bechtel, H.B. 1978. Color and pattern in snakes (Reptilia, Serpentes). *Journal of Herpetology* 12: 521-535.

Bizerra, A. 1998. História natural de *Tomodon dorsatus* (Serpentes: Colubridae). Unpublished PhD thesis, Universidade de São Paulo, São Paulo, Brazil.

Bizerra, A., Marques, O. & Sazima, I. 2005. Reproduction and feeding of the colubrid snake *Tomodon dorsatus* from southeastern Brazil. *Amphibia-Reptilia* 26: 33-38.

Bogert, C.M. 1949. Thermoregulation in reptiles, a factor in evolution. *Evolution* 3: 195-211.

Borteiro, C.; Abegg, A.D.; Oda, F.H.; Cardozo, D.E.; Kolenc, F.; Etchandy, I. & Baldo, J.D. 2021. Aberrant colouration in wild snakes: case study in Neotropical taxa and a review of

terminology. *Herpetology Notes* 14: 124-138.

Delhey, K. 2019. A review of Gloger's rule, an ecogeographical rule of colour: definitions, interpretations and evidence. *Biological Reviews* 94: 1294-1316.

Gibson, A.R. & Falls, J.B. 1979. Thermal biology of the common garter snake *Thamnophis sirtalis* (L.). II. The effects of melanism. *Oecologia* 43: 99-109.

Gibson, A.R. & Falls, J.B. 1988. Melanism in the common garter snake: a Lake Erie phenomenon: 233–245. In: Downhower, J. E. (ed.), Lake Erie. Springer. New York.

Gilhen, J. & Scott, F.W. 2014. Melanistic diversity in the Maritime gartersnake, *Thamnophis sirtalis pallidulus*, in Nova Scotia, Canada. *The Canadian Field-Naturalist* 128: 63-71.

Jablonski, D. & Kautman, J. 2017. Melanism in *Natrix tessellata* (Serpentes: Colubridae) from Slovakia. *Herpetology Notes* 10: 173-175.

Kettlewell, B. 1973. The evolution of melanism: the study of a recurring necessity. Clarendon Press. Oxford.

Kuriyama, T.; Murakami, A.; Brandley, M. & Hasegawa, M. 2020. Blue, black, and stripes: evolution and development of color production and pattern formation in lizards and snakes. *Frontiers in Ecology and Evolution* 8: 1-14.

Lorioux, S.; Bonnet, X.; Brischoux, F. & De Crignis, M. 2008. Is melanism adaptive in sea kraits? *Amphibia-Reptilia* 29: 1-5.

Majerus, M.E.N. 1998. Melanism: evolution in action. Oxford University Press. Oxford.

Marques, O.A.V.; Eterovic, A. & Sazima, I. 2001. Serpentes da Mata Atlântica: guia ilustrado para a Serra do Mar. Holos. Ribeirão Preto.

Marques, O.A.V.; Eterovic, A. & Sazima, I. 2019. Serpentes da Mata Atlântica: guia ilustrado para as florestas costeiras do Brasil. Ponto A. São Paulo.

Martínez-Freiría, F.; Toyama, K.S.; Freitas, I. & Kaliontzopoulou, A. 2020. Thermal melanism explains macroevolutionary variation of dorsal pigmentation in Eurasian vipers. *Scientific Reports* 10: 16122.

Nogueira, C.C.; Argôlo, A.J.S.; Arzamendia, V.; Azevedo, J.A.; Barbo, F.E.; Bérnils, R.S.; Bolochio, B.E.; Borges-Martins, M.; Brasil-Godinho, M.; Braz, H.; Buononato, M.A.; Cisneros-Heredia, D.F.; Colli, G.R.; Costa, H.C.; Franco, F.L.; Giraudo, A.; Gonzalez, R.C.; Guedes, T.; Hoogmoed, M.S. & Marques, O.A.V. 2019. Atlas of Brazilian snakes: verified point-locality maps to mitigate the Wallacean shortfall in a megadiverse snake fauna. *South American Journal of Herpetology* 14(Special Issue 1): 1-274.

Roldão, A.F.; Santos, J.G. & Oliveira, L.A. 2012. Correlação entre variáveis climáticas (altitude, temperatura e precipitação) na mesorregião sul e sudoeste de Minas Gerais. *Revista Geonorte* 1: 515-525.

Roll, U.; Feldman, A.; Novosolov, M.; Allison, A.; Bauer, A.M.; Bernard, R. & Meiri, S. 2017. The global distribution of tetrapods reveals a need for targeted reptile conservation. *Nature Ecology & Evolution* 1: 1677-1682.

Rosenblum, E.B.; Hoekstra, H.E. & Nachman, M.W. 2004. Adaptive reptile color variation and the evolution of the Mc1r gene. *Evolution* 58: 1794-1808.

Sahlean, T.C.; Martin, R.A.; Spaseni, P.; Gherghel, I. & Strugariu, A. 2025. Melanism in polymorphic terrestrial snakes: a meta-analysis and systematic review. *Journal of Biogeography* 52: 27-41.

Storniolo, F.; Mangiacotti, M.; Zuffi, M.A.; Scali, S. & Sacchi, R. 2023. Large-scale phenotypic characterisation of *Hierophis viridiflavus* (Squamata: Serpentes): climatic and environmental drivers suggest the role of evolutionary processes in a polymorphic species. *Evolutionary Ecology* 37: 419-434.

Trevine, V.C.; Grazziotin, F.G.; Giraudo, A.; Sallaberry-Pincheira, N.; Vianna, J.A. & Zaher, H. 2022. The systematics of Tachymenini (Serpentes: Dipsadidae): an updated classification based on molecular and morphological evidence. *Zoologica Scripta* 51: 643-663.

True, J.R. 2003. Insect melanism: the molecules matter. *Trends in Ecology & Evolution* 18: 640-647.

Trullas, S.C.; Van Wyk, J.H. & Spotila, J.R. 2007. Thermal melanism in ectotherms. *Journal of Thermal Biology* 32: 235-245.

Tuniyev, B.; Tuniyev, S.; Kirschey, T. & Mebert, K. 2011. Notes on the dice snake, *Natrix tessellata*, from the Caucasian Isthmus. *Mertensiella* 18: 343-356.

Verrastro, L. & Borges-Martins, M. 2025. Anfíbios e répteis do Pampa. TheMediaGroup. Rio Grande do Sul.

Walker, W.F. 1945. A study of the snake *Tachymenis peruviana* Wiegmann and its allies. *Bulletin of the Museum of Comparative Zoology* 96: 1-56.

Williams, J.D.; Vera, D.G. & Povedano, H. 2023. Serpientes de la Argentina: guía completa. Editorial LBN. Buenos Aires.

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