

Even darker: a case of complete melanism in *Podarcis pityusensis* from Na Gorra Island (Ibiza)

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Fecha de aceptación: 21 de septiembre de 2023.

Key words: coloration, lizard, melanin, pigmentation.

RESUMEN: La pigmentación oscura de un animal producida por un exceso de melanina se conoce como melanismo. Existen varias poblaciones melánicas de lagartija de las Pitiusas (*Podarcis pityusensis*) en algunos islotes de Ibiza. Sin embargo, esta melanización no es completa porque los individuos presentan vientres y gargantas de color azul ultravioleta. En la presente nota se describe un caso de melanismo completo en un individuo de la isla de Na Gorra (Ses Bledes, Ibiza).

Melanism refers to the expression of high levels of melanin that results in dark pigmentation of the skin or other tissues. Within species, melanism can be found as discrete differences between individuals within a population (intraspecific polymorphism) or as a continuous color variation (True, 2003). Melanism is widespread in the animal kingdom, but it is more frequent in ectotherms, where it may serve several functions (Clusella-Trullas *et al.*, 2007). The so-called “thermal melanism hypothesis” is one of the most well-known hypotheses, which postulates that dark pigmentation has an adaptive advantage in cool climates because dark individuals heat up faster and can maintain a higher temperature (Watt, 1968; Clusella-Trullas *et al.*, 2008). However, melanism is also common in other environments, such as Mediterranean islands (Kramer, 1949; Eisentraut, 1954), where climatic conditions are dry and hot.

The Ibiza wall lizard (*Podarcis pityusensis*) is an endemic species of the Balearic Islands of Ibiza and Formentera and more than 30 surrounding islets. There is high variation in coloration between populations, and some islets harbor melanic populations of lizards

(Cirer & Martínez-Rica, 1990; Buades *et al.*, 2013). However, melanism is not complete because green and blue can be observed underneath the dorsal black and the ventral region exhibits UV-blue colorations (Buades *et al.*, 2013). While blue coloration is considered as a form of melanism by some authors (Raia *et al.*, 2010), it arises from the interaction between melanophores and iridophores, and is therefore different from the production of melanin itself (Bagnara *et al.*, 2007).

On the 19th April 2023, while carrying out field work in Na Gorra Island (Ses Bledes, Ibiza, Spain; UTM 31S X341051 / Y4314832), we found a completely melanic female of *P. pityusensis* (SVL = 70 mm, mass = 8.57 g). The lizard belongs to the subspecies *P. pityusensis maluquerorum*, characterized by highly melanic colorations as mentioned above (Salvador, 2015). However, this melanization is barely described and mainly based on dorsal coloration (Mertens, 1921), while information about ventral coloration is scarce and only reported as light or dark blue (Buades *et al.*, 2013). In fact, this subspecies is composed by seven insular populations (Salvador,

Figure 1: Dorsum and ventrum of the complete melanic female of *Podarcis pityusensis* from Na Gorra.

Figura 1: Dorso y vientre de la hembra melánica completa de *Podarcis pityusensis* de Na Gorra.



2015), which are very different in coloration and the degree of melanization (de la Cruz, personal observation). On the contrary, the individual we found was completely melanic, with no green and blue colors in the dorsum and all the ventral region covered by black (Figure 1). As far as we know, this is the first description of a completely melanic individual for this species.

Cases of “complete” melanism have been described in many other lizard species (see Reina *et al.* (2017) for a review in the genus *Podarcis*). However, many of these descriptions are only based on the dorsal coloration and ignore the melanization of the outer-ventral scales (usually with UV-blue patches) and the ventral surface (Mertens, 1921; Iković & Gvozdenović, 2014; Reina *et al.*, 2017). On the other hand, some studies have identified other colorations than black in the ventral region, but still describe the individuals as

melanic only according to the dorsal surface (Castilla, 1984; Pérez-Mellado, 1984; Domeneghetti *et al.*, 2016; Reina *et al.*, 2017). Only a few studies have reported completely black coloration both in the dorsum and ventrum (Zaldívar, 1991; García-Muñoz *et al.*, 2011; Kornilev *et al.*, 2018). Nevertheless, very dark blue colorations still can reflect the UV and thus a complete ventral melanism only can be assessed through UV lenses or spectrophotometry (Pérez i de Lanuza & Font, 2010). This female we found, contrary to normal individuals of this population, was not reflecting any UV coloration in the ventrum (Figure 2), so we are absolutely sure about its complete melanization.

The potential consequences of the complete melanization of this individual are difficult to argue, since we do not know if the complete black dorsum and the typical dark one of this population are different in terms

Photo R. García Roa

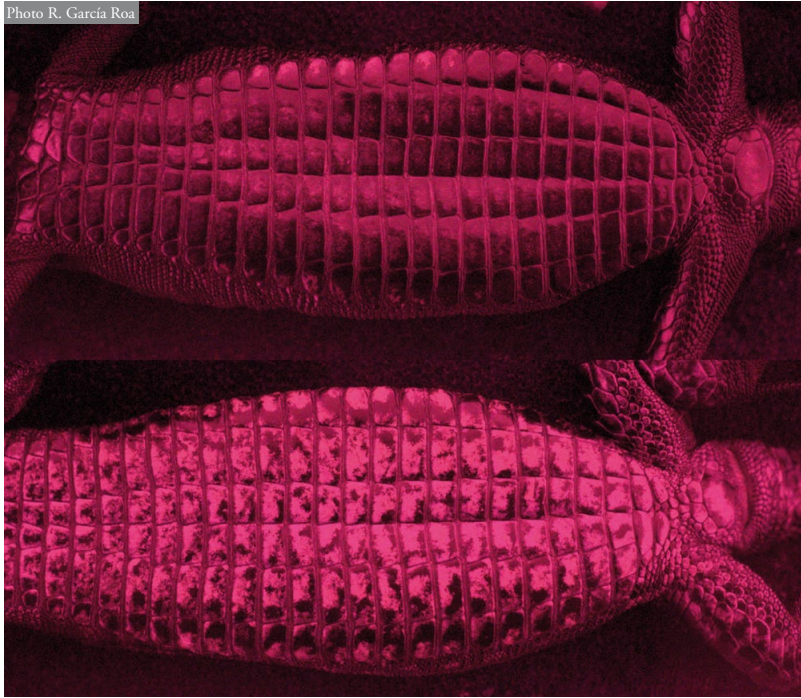


Figure 2: Ventrum of the complete melanic female (top) and a normal female (bottom) of *Podarcis pityusensis* from Na Gorra in the ultraviolet spectrum. Note that bright pink colorations are indicative of high UV reflectance.

Figura 2: Vientre de la hembra melánica completa (arriba) y una hembra normal (abajo) de *Podarcis pityusensis* de Na Gorra en el espectro ultravioleta. Las coloraciones rosas brillantes indican mayor reflectancia en el ultravioleta.

of thermoregulation, radiation protection, crypsis, or other biological aspects. Additionally, the communicative role of the ventral coloration of *Podarcis* lizards is not compelling yet (Abalos *et al.*, 2020), so we ignore the potential effects of the loss of the UV-blue coloration in this individual. Nonetheless, the publication of cases like this can contribute to future studies addressing some of the remaining unanswered questions about melanism and the ventrum role in lizards' communication. Additionally, this note hi-

ghlights the importance of objective color measuring techniques when dealing with animal coloration.

ACKNOWLEDGEMENTS: FDL is supported by a PhD fellowship from Fundação para a Ciência e a Tecnologia (2022.14105.BD; Ministério da Educação e Ciência, Portugal). Permits were provided by the Conselleria de Medi Ambient i Territori del Govern de les Illes Balears (SEN 22/23, GOIBE782818/2022). I thank R. García for his help with fieldwork, the provision of the photos, and his comments of this note.

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Melanismo en *Triturus marmoratus* de una galería industrial abandonada de la comarca del Bierzo (León)

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Fecha de aceptación: 11 de octubre de 2023.

Key words: Marbled newt, melanism, pigmentary alteration.

El melanismo en anfibios es una variación en la pigmentación observada con cierta frecuencia, en la que el diseño normal aparece obliterado debido a una sobreabundancia de melanina en las células cutáneas (Rivera, 2001a). En *Triturus marmoratus* los casos de anomalía pigmentaria conocidos en la península ibérica describen ejemplares albinos (Matallanas & Lombarte, 1990; Arribas & Rivera, 1992; Budó, 1998,

Diego-Rasilla *et al.*, 2007), hipomelánicos (Gosá, 2021), hipopigmentarios (Moreno *et al.*, 2009; Rivera *et al.*, 2001b), y además se han documentado dos casos de melánicos (Vives-Balmaña, 1980; Domènech, 2001).

En la presente nota damos a conocer la detección de, al menos, un ejemplar melánico adulto de *T. marmoratus* (Figura 1) en una galería industrial inundada localizada en Ponfe-