Herpetology Notes, volume 15: 379-381 (2022) (published online on 08 June 2022)

Photographic evidence of melanism in the Pyrenean Rock Lizard, *Iberolacerta bonnali* (Squamata: Lacertidae)

Constant Perry[1], Tom Sarraude[1], Manon Billet[1], Elsa Minot[1], Paz Costa Escribano[1], Matthieu Berroneau[2], Gilles Pottier[3], Emilie Loutfi[2], and Fabien Aubret[1,*]

Melanism is widespread in ectotherms and in reptiles in particular (see Trullas et al., 2007 for a detailed review). Melanistic forms have been reported to occur in many species, for instance in *Psammodromus algirus* Linnaeus, 1758 (Reguera et al., 2014), *Vipera berus* Linnaeus, 1758, *Vipera aspis* Linnaeus, 1758 (Broennimann et al., 2014) and *Nilssonia hurum* Gray, 1831 (Dubla et al., 2020). Melanism is generally thought to provide a thermal advantage for ectotherms living in colder climates, as dark individuals heat up faster than light individuals (Clusella Trullas et al., 2007). Melanism may also confer extra protection against UV radiation for species living at high latitudes (Reguera et al., 2014). On the other hand, melanism may be physiologically (i.e. melanin production: [Jawor and Breitwisch, 2003]) or ecologically costly (i.e. black is conspicuous to predators: [Forsman, 1995]). Consequently, such morphs remain relatively rare in natural populations.

Here we report two observations and related photographic evidence of melanism in *Iberolacerta bonnali* Lantz, 1927. First, a melanistic female was observed at the location "Col d'Arrious" on 19 July 2018 (42.8458°N; -0.3455°W; 2250 m approx. elevation; no other data; Fig. 1). Secondly, on 16 July 2021 at 15:00 h, a female was captured in the vicinity of Pic du Midi de Bigorre, France (42.9127°N; 0.1419°E; 2171 m elevation). This adult female (snout-vent length = 53.63 mm; tail length = 68.57 mm; body mass = 2.97 g) was basking next to two, non-melanistic, conspecifics at the time of capture. This individual was fully black, including its eyes (Fig. 2). The typical colouration of *I. bonnali* is a plain brown or grey back and darker flanks with sometimes lighter longitudinal dorsal markings. The eye is usually composed of an orange iris and a black pupil. The species displays no clear sexual dimorphism with respect to colouration.

This is, to our knowledge, the first photographic records of melanistic *I. bonnali*, although the morphotype was first described by Arribas in 2000. This report also compiles our additional observations: one specimen observed on the 03/09/2020 at 12:40h approx. (42.9314°N; -0.3266°W; 2080 m approx. elevation) at "Lac d'Anglas"; one female specimen observed on 20 July 2021 at 12:49 h also at "Lac d'Anglas" (no other data); a specimen observed in 2020 at "Col d'Arrious" (no other data), and an older record at "Vallée de la Canau" on the 01/08/2003 (approx. 42.73°N; -0.09°W; 2000 m approx. elevation), for which we do not have photographic evidence.

Figure 1. Melanistic *Iberolacerta bonnali*, Col d'Arrious. Photo by Mathieu Berroneau.

[1] Station d'Ecologie Théorique et Expérimentale du CNRS à Moulis, Unité d'Appui et de Recherche 2029, 09200 Moulis, France.

[2] Association Cistude Nature, Chemin du Moulinat, 33185 Le Haillan, France.

[3] Nature en Occitanie, 14 Rue de Tivoli, 31000 Toulouse, France.

[*] Corresponding author. E-mail: faubret@gmail.com

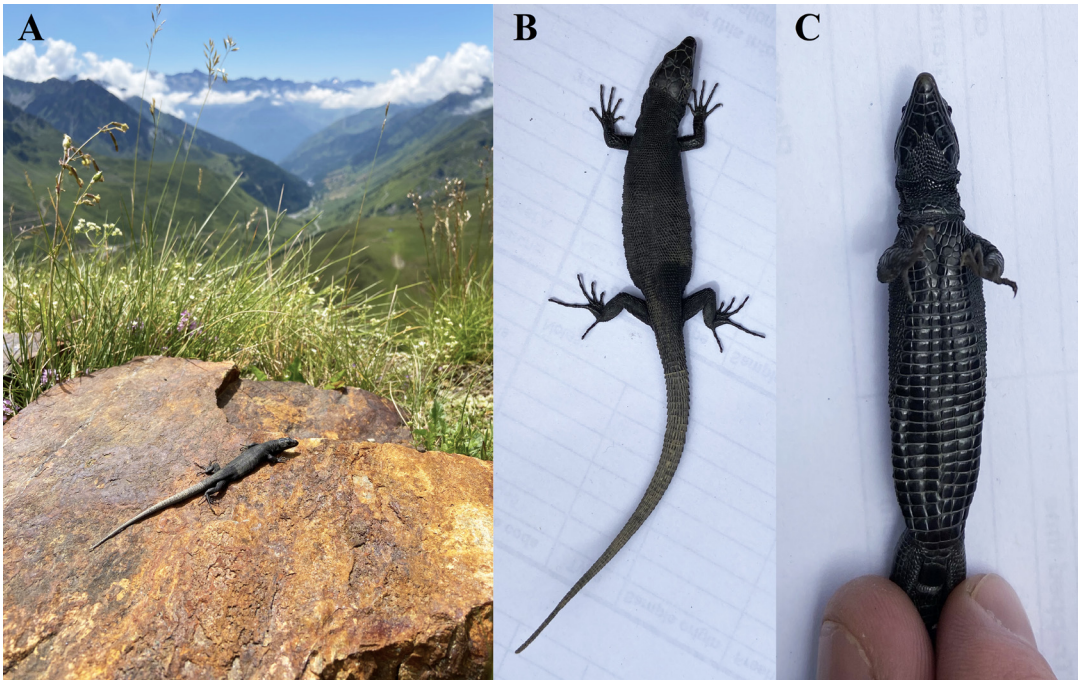

Figure 2. Melanistic female *Iberolacerta bonnali* in its habitat (A), dorsal (B) and ventral views C). Photos by Constant Perry.

Although this report did not intend to quantify the proportion of melanistic *Iberolacerta* forms in the Pyrenees, it suggests that such forms are quite rare. Melanism in the Pyrenees is known in several "reptilian" taxa (i.e. *Vipera*, *Natrix*, *Zootoca*), but the published information is far too limited and disparate, and often appears in local and/or highly specialised journals (Saint Girons and Fons, 1977; Pottier, 2001; Fitze, 2008; Roberto García-Roa and Carbonell, 2020). From an evolutionary perspective, one can expect melanistic forms to become even rarer as climate warms in the coming decades, as thermal advantages conferred by dark pigmentation are lost (Clusella Trullas et al., 2007). We hope that this report will generate traction for naturalists to carry out well-designed surveys capable of documenting the level of rarity for melanism in reptile populations, and to help better understand hypothesis related to climate change.

References

Arribas, O.J. (2000): Taxonomic revision of the Iberian "Archaeolacertae" III: Diagnosis, morphology, and geographic variation of *Iberolacerta bonnali* (Lantz, 1927) (Squamata: Sauna: Lacertidae). Herpetozoa **13**(3): 99–131.

Broennimann, O., Ursenbacher, S., Meyer, A., Golay, P., Monney, J.-C., Schmocker, H., Guisan, A., Dubey, S. (2014): Influence of climate on the presence of colour polymorphism in two montane reptile species. Biology Letters **10**(11): 20140638.

Clusella Trullas, S., van Wyk, J.H., Spotila, J.R. (2007): Thermal melanism in ectotherms. Journal of Thermal Biology **32**(5): 235–245.

Dubla, R., Singh, S., Riedle, D.J., Walde, A.D. (2020): *Nilssonia hurum* (Indian Peacock Softshell Turtle). Melanism. Herpetological Reviews **51**(4): 835–836.

Fitze, P. (2008): Frequency and phenotypic differences of melanistic and normally colored common lizards, *Lacerta* (*Zootoca*) *vivipara* of the Southern Pyrenees (Spain)."

Forsman, A. (1995): Opposing fitness consequences of colour pattern in male and female snakes. Journal of Evolutionary Biology **8**(1): 53–70.

Jawor, J.M., Breitwisch, R. (2003): Melanin Ornaments, Honesty, and Sexual Selection. The Auk **120**(2): 249–265.

Pottier, G. (2001): Notes sur trois cas de mélanisme chez *Vipera aspis zinnikeri* Kramer, 1958 (Ophidia, Viperidae) dans les Hautes-Pyrénées (France). Bulletin de la Société Herpétologique de France **97**: 49–53.

Reguera, S., Zamora-Camacho, F.J., Moreno-Rueda, G. (2014): The lizard *Psammodromus algirus* (Squamata: Lacertidae) is darker at high altitudes: Colour variation in *Psammodromus algirus*. Biological Journal of the Linnean Society **112**(1): 132–141.

Roberto García-Roa, R., Carbonell, G., (2020): The dark side of *Vipera aspis* a case of melanismin the Iberian Peninsula. Boletín de la Asociación Herpetológica Española **31**(2): 9–11.

Saint Girons, R., Fons, R. (1977): Un cas de mélanisme chez *Vipera aspis* dans les Pyrénées. Vie et Milieu **XXVII**: 145–146.
Trullas, S.C., van Wyk, J.H., Spotila, J.R. (2007): Thermal melanism in ectotherms. Journal of Thermal Biology **32**(5): 235–245.

Accepted by Anamarija Žagar