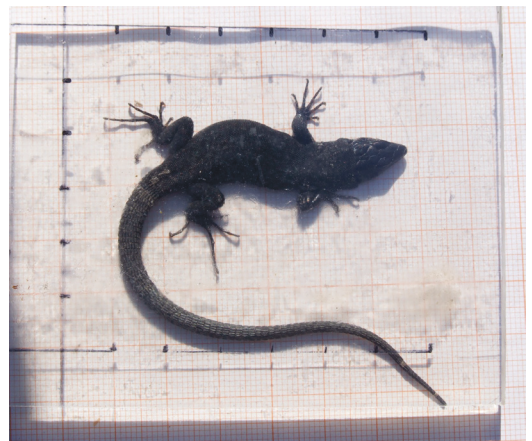


## Melanism and pseudo-melanism in the Common Wall Lizard, *Podarcis muralis* Laurenti, 1768 (Reptilia: Lacertidae) in central Italy

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The presence of totally black coloured individuals is quite common in reptiles, this condition is called “melanism”. It refers to a phenotype in which the black pigmentation of an individual is entirely or near entirely (called melanotic or melanoticism) expressed. Pseudo-melanism (also called abundism), is another variant of pigmentation, characterized by an increase in dark pigmentation in patterned coats or skins which causes an increase in the number or size of pigmented spots, stripes or other patch types (Zuffi, 2008). Melanism is a well studied condition in different *taxa*, and the possible genetic basis of this variation has received considerable attention in literature (Alho et al., 2010). Ectothermic organisms rely on external resources for thermoregulation, and thus temperature is a critical factor limiting their distribution, diversity, and activity (Tanaka, 2005). Melanism is well documented in many European reptile species, with both entire populations being characterized by this phenotype or in sporadic (sometimes rare) individuals in normal-coloured populations. This is commonly observed in European Lacertidae: *Podarcis hispanicus* (Castilla, 1994; García-Muñoz et al., 2011), *P. lilfordi* (Buades et al., 2013), *P. muralis* (Zuffi, 1986; Zaldivar Ezquerro, 1991; Sound, 1994; Trócsányi and Kórsos, 2004), *P. pityusensis* (Buades et al., 2013), *P. siculus* (Parisi and Galliano, 1984; Fulgione et al., 2004; Krofel, 2005), *Lacerta agilis* (Krecsák and Hartel, 2001), *Zootoca vivipara*

(Iftime and Iftime, 2010; Jambrich and Jandzik, 2012). We report two cases of black Common Wall Lizard (*Podarcis muralis*) found in central Italy: 1) a totally melanic individual (Fig. 1) in the Castelporziano estate (Latium); 2) a partially melanic individual (Fig. 2) from Monte Morello (Tuscany). *Podarcis muralis* is a common species in Italy, and in suitable habitats it can reach considerable densities. It can be found almost in the entire Italian Peninsula, from sea level up to 2.500 meters of altitude, except in the Apulia region (Corti, 2006). In the southern part of the Italian Peninsula, this species is strictly confined at much higher altitudes to reach its optimal ecological conditions. In Italy, *P. muralis* inhabits a diverse range of habitat types, with preference to moist environments such as woods, shrubs and near rivers and streams (Capula, 2000). Melanic specimens of *P. muralis* are not common in Europe and



**Figure 1.** Melanic individual of Common Wall Lizard (*Podarcis muralis*) observed in the Castelporziano estate (Latium).

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**Figure 2.** Partially-melanic individual of Common Wall Lizard (*Podarcis muralis*) observed on the Monte Morello (Tuscany).

only a few occurrences of full melanism are known in this species, with these being occasional findings rather than recurring polymorphism (Trócsányi and Kórsós, 2004). However, no occurrences have been reported for central Italy.

We observed the totally melanic *P. muralis* on the 17<sup>th</sup> of April 2014 in the northern part of Castelporziano estate (12.405488° - 41.772832° WGS84, 25 meters of altitude). The estate is extended for 60 km<sup>2</sup> stretching from the outskirts of Rome to the Tyrrhenian coast, in a typical Mediterranean climatic zone. The individual was found in a colony formed by tens of individuals with typical coloration patterns of *P. muralis* in “Valle Trafusina”, an area with humid microclimate characterized by a little stream cutting deeply the geological formation of the ancient dune. Some caves, that horizontally went into the rocks, were dug in the last Century, for several purposes (mainly as shelter for livestock and farm tools), making in this way an optimal habitat for some reptile species. The partially melanic *P. muralis* was found on the 13<sup>th</sup> of July 2016 in the north-western side of the Monte Morello (Site of Community Importance IT5140008) (11.210444° - 43.889806° WGS84, 267 meters of altitude) on the walls of an old ruin. The surrounding environment is characterized by woods of *Quercus pubescens* and olive tree fields. On ruin walls we observed five other lizards with normal colouration. The totally melanic lizard, an adult female, appeared completely black, on the dorsal and the ventral side, with the original ornamentation entirely covered by black colour, with some bluish reflection, and lightly visible under them. Even darker patches on the throat

and on the ventral parts were also softly evident. The partially melanic individual, an adult male, had large irregular black areas on the dorsal side, zones with usual green and black colour pattern were still present, blackish patches occurring on the paws. The ventral side appeared with a normal whitish colouration. The lizards have been released just after observations.

The last case of melanism known in *P. muralis* in the Italian Peninsula (see Zuffi, 1986) dates to about thirty years ago. It is generally believed that melanism in the genera *Zootoca* and *Podarcis* is either an alpine or insular mutation, related to thermal ecology and its functional adaptive implications (Trócsányi and Kórsós, 2004), but recently it has been shown by Sannolo *et al.* (2014) the absence of thermoregulatory advantage in *P. muralis* by colour patterns. Both individuals were adults in a good body condition (e.g. no tail autotomy), which suggests that this phenotype does not negatively affect the individuals' survival. Observations of totally and partially black specimens in *P. muralis* could suggest how much the phenomenon of melanism in European lizards is not entirely known and this should encourage studies to direct attention towards the clarification of the meaning of black colouration in this group of animals.

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