REPTILES & AMPHIBIANS

Melanism in the Ring-headed Dwarf Snake, *Eirenis modestus* (Martin 1838) (Squamata: Colubridae), from Symi, Greece

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Coloration serves a multifaceted role in snake ecology and survival; ranging from predator evasion through aposematism (Banci et al. 2020) or crypsis (Allen et al. 2013) to thermoregulation, particularly via heliothermy (Martínez-Freiría et al. 2020). Squamate reptile (order: Squamata) coloration is a result of both reflection and scattering of light by cells or tissues and absorption by chemical pigments contained within chromatophore cells (Olsson et al. 2013). Differences in relative pigment abundance may lead to the occurrence of aberrant colorations (Macat et al. 2016; Borteiro et al. 2021).

Melanism describes an over expression of black coloration, resulting from increased quantities of melanin at the expense of more diverse pigments (Fănaru et al. 2022). Examples of melanism have been formally described in a variety of Eurasian colubrids, including the Smooth Snake (*Coronella austriaca*) (Reading and Pernetta 2009); Caspian Whipsnake (*Dolichophis caspius*) (Kalogiannis 2021); Coin-Marked Snake (*Hemorrhois nummifer*) (Jablonski and Ahmed 2023); Western Whipsnake (*Hierophis viridiflavus*) (Storniolo et al. 2023); Grass Snake (*Natrix natrix*) (Fănaru et al. 2022; Zadravec and Lauš 2011); and Dice Snake (*Natrix tessellata*) (Jablonski and Kautman 2017). Melanism occurs randomly but the frequency is thought to be greater where the condition is promoted by selection (Clusella Trullas et al. 2007) or gene flow is restrained (King 1988). Additionally, melanism is thought to occur at higher frequencies in snake populations occupying cooler climates (Luiselli 1992) as per the thermal melanism hypothesis (Bogert 1949; Clusella Trullas et al. 2007). More recently, Sahlean et al. (2025) proposed that melanism in snakes follows Gloger's rule, indicating that dark pigmentation increases with temperature and humidity, as is the case with birds and mammals (Delhey 2017), thus the ecological drivers of melanism in snakes occupying relatively warm and dry climates remain unclear.

The Ring-headed Dwarf Snake (*Eirenis modestus*) is a medium-sized colubrid (maximum total length 70 cm; Çiçek and Mermer 2007) that is widely distributed in western Asia (Midtgaard 2022), with a range encompassing southern Russia and the Caucasus (Armenia, Azerbaijan, and Georgia), Turkey, northern Iran, and Greece, including the islands of Alatonisi, Chios, Fournoi, Kalymnos, Kastellorizo, Leros, Lesvos, Samiopoula, Samos, Seskli, and Symi (Kalaentzis et

Figure 1. A typically patterned juvenile Ring-headed Dwarf Snake (*Eirenis modestus*) (left) and a melanistic adult (right) from the Pedi Valley of Symi, Greece. Photographs by Harry Searle-Webb.

Reptiles & Amphibians ISSN 2332-4961
https://doi.org/10.17161/randa.v32i1.22955

al. 2018; Cattaneo et al. 2020). The species also has been reported mistakenly from Thrace (Mahlow et al. 2013) and mentioned as occurring on the islands of Kasos and Karpathos (Dimitropoulos and Gaetlich 1986) but those records have never been confirmed (Cattaneo et al. 2020). *Eirenis modestus* typically occupies rocky, sparsely vegetated habitats such as maquis, steppes, agricultural land, and ruins where it is most frequently found beneath flat stones (Mahlow et al. 2013). The diet comprises predominantly arthropods, such as scorpions, chilopods, beetles and other insects, with larger individuals occasionally feeding on reptiles (Çiçek and Mermer 2007; Mahlow et al. 2013).

Eirenis modesutus typically has a unicolored light brown-grayish dorsum, occasionally with dark spots beginning at the neck and fading toward midbody, the venter is generally light brown, and juveniles have a dark collar and gray-black parietal and interocular bands that fade almost entirely with maturity (Mahlow et al. 2013). Blotched populations, which display greater numbers of dark spots, have been recorded from southern Anatolia, Turkey (Kumlutas et al. 2004; Kalaentzis et al. 2018) and Symi, Greece (Wilson and Grillitsch 2009). Melanistic *E. modestus* have been reported from the Turkish province of Muğla and the islands of Yassica and Sariot, (Baran 1986; Mahlow et al. 2013) and from the Greek island of Kastellorizo (Kalaentzis et al. 2018). We herein present the first record of a melanistic *E. modestus* from the Dodecanese Island of Symi, Greece.

On 5 April 2024, we found two *E. modestus* by actively searching beneath small and medium-sized stones in well vegetated, semi-forested habitat on the southern slope of the Pedi Valley, east of Ano Symi, Greece. The first individual was a typically colored juvenile (Fig. 1), the second was an adult (total length 305 mm) with a dark gray dorsum contrasting only faintly with the head markings and supralabials and venter that were mostly pale gray (Fig. 1), similar to melanistic individuals described from Kastellorizo (Kalaentzis et al. 2018). We counted scales and took photographs of both individuals prior to releasing them at the respective capture sites. We took measurements ex-situ from an image containing a scale using the software package ImageJ (Schneider et al. 2012). The melanistic snake had 17 midbody dorsal scale rows, seven supralabials, eight infralabials, one loreal, one preocular, and two postoculars in congruence with previous descriptions of the species (Mahlow et al. 2013).

This was the first melanistic *E. modestus* recorded from Symi. The lack of previous observations of melanism on Symi could suggest that melanism does not occur in the high frequencies observed on other Dodecanese Islands such as Kastellorizo (Kalaentzis et al. 2018). Further investigations focusing on understanding the extent to which melanism is present in *E. modestus* on Symi could reveal mechanisms that promote melanism in mixed populations.

Acknowledgements

We thank Ian Webb for his assistance in the observation of the snake and Dr James Hicks, School of Environmental and Natural Sciences, Bangor University, for his comments on previous drafts of this note.

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