

# First report of a leucistic Common Adder, *Vipera berus* (Linnaeus, 1758) in Latvia (Squamata: Viperidae)

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Patterns and body colouration have multiple functions in animals, ranging from thermoregulation to mimicry or aposematism (e.g., Bechtel, 1995; Worthington-Hill and Gill, 2019). In addition to the normal colour patterns, it is possible to observe individuals with numerous colour variations, among which the most common are melanism, albinism, and leucism (Broghammer, 2000; Gezova et al., 2016; Bruni, 2017). Melanistic snakes, with an entirely black colouration (Zuffi, 2008), are the most commonly seen, and studies seem to indicate that dark colouration could generate advantages for thermoregulation in cold climates or at high elevations (Luiselli et al., 1994; Bruni, 2017). Leucistic individuals present a pinkish-white colouration, with a pigmented eye (dark or blue), while albinos usually have similar coloration but with an unpigmented, reddish eye (Gezova et al., 2016; Bruni, 2017). Albinos and leucistic individuals would appear to be more disadvantaged in nature, including potential problems with thermoregulation, blindness, and greater visibility to predation (Krecsák, 2008; Bruni, 2017).

Among European vipers, the Common Adder (*Vipera berus*) is the species with the highest number of albino individuals reported, mainly from northern Europe (Krecsák, 2008) but with recent observations in Slovakia (Gezova et al., 2016). In vipers, studies have attributed to the zigzag dorsal pattern a camouflaging and/or aposematic function (e.g., Niskanen and Mappes, 2005; Valkonen et al., 2011) and a lack of such a pattern in albino and leucistic specimens could increase their risk of being preyed upon.

The Common Adder's distribution area is very large, ranking among the largest worldwide snake distributions (McDiarmid et al., 1999), covering

most of central northern Europe, Russia, Mongolia, and even Korea. The species has been recorded at elevations from sea level up to 2500 m. It lives in forests, wetlands, scrublands, dunes, and rocky areas (McDiarmid et al., 1999). *Vipera berus* is one of only three species of snakes present in Latvia, joining with *Natrix natrix* (Linnaeus, 1758) and *Coronella austriaca* (Laurenti, 1768). Herein, we report the first leucistic individual of *V. berus* from Latvia.

## Results and Discussion

On 14 May 2020 at 15:00 h a pink-coloured individual of *V. berus* (Fig. 1) was found by local residents near their house, while they were taking a walk on the side of the P128 road near Kemeru National Park (57.0686°N, 23.2878°E), ca. 50 km west of Riga, Latvia's capital. The habitat in this area is characterised by *Pinus sylvestris* forests and bush vegetation, at a short distance from the beach and houses (Fig. 2). The snake was observed among the vegetation on two consecutive days, displaying evident mobility problems. The people who found the animal contacted Riga Zoo staff, who intervened by collecting the animal. Unfortunately, the snake could not be treated successfully and died in captivity two weeks after it was captured. It was deposited in the collection of the Riga Zoo (local ID RIGA/R20004) and accessioned as specimen ZIMS (YRB20-03581). Measurements were taken on the specimen, scale counts were taken, and scale patterns were described (Table 1). The specimen (168 mm snout-vent length + 22 mm tail length = 190 mm total length; body weight = 3 g), had a pink body colouration and a darkly pigmented eye.

Although *Vipera berus* is a species with considerable variation in facial pattern and lepidosis (Hodges and Seabrook, 2014; Bauwens et al., 2018), the pholidosis of our specimen was similar to what was considered typical for the species by Bauwens et al. (2018). Contrary to the alterations of ventral scales evidenced by Merilä et al. (1992) in isolated populations in Scandinavia, our specimen conformed to expected parameters.

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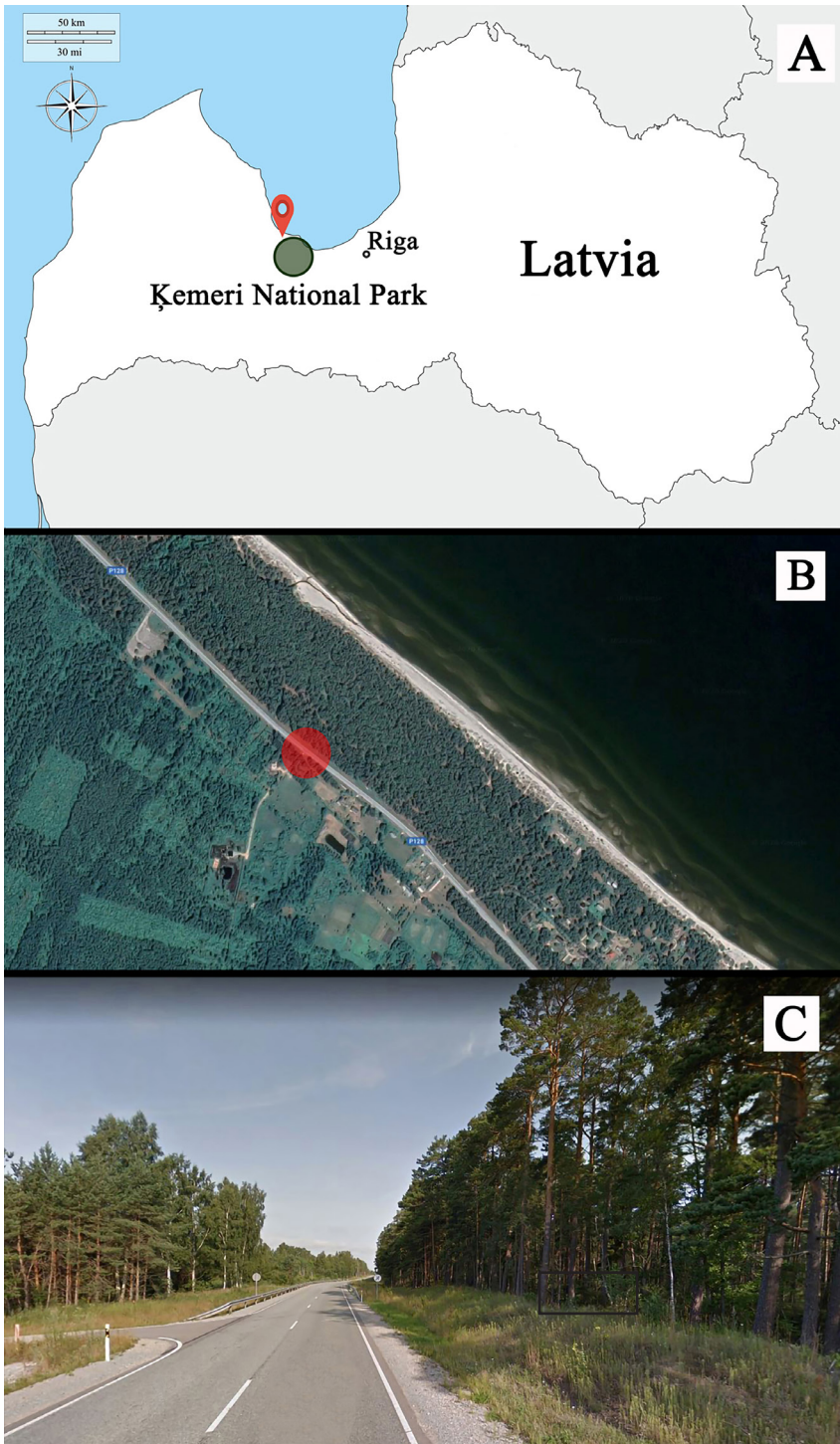


**Figure 1.** A leucistic individual of the Common Adder, *Vipera berus*, from Latvia. (A) Full body, showing pink colouration. (B) The dark eye pigmentation is strongly visible against the pink background. (C, D) Head scales in post-mortem inspection (C, D). Photos by Inga Purgaiļe (A, B), Elina Gulbe (C), and Alessandro Di Marzio (D).

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**Figure 2.** Locality information for the discovery of a leucistic individual of *Vipera berus* in Latvia. (A) Country borders of Latvia, with the red marker indicating the observation locality. (B) Satellite view showing the proximity of the locality (red circle) to the Baltic Sea, with pine forest to one side and disturbed forest to the other. (C) View of the habitat where the leucistic Common Adder was found. Photograph in (C) by Google street view.

**Table 1.** Scale counts and pholidosis of a leucistic individual of *Vipera berus* from Latvia compared to reference (median) values from (a) Boulenger (1913), (b) Lindell et al. (1993), and (c) Bauwens et al. (2018). The asterisk (\*) indicates the same counts on both sides of the specimen. Given that there is some sexual dimorphism in this species, values for both males (♂) and females (♀) are reported. Based on its ventral and subcaudal counts, our specimen is most likely a male.

Character	Value	Reference Values
Middorsal scale rows, number	20	21 <sup>a</sup>
Ventral scales, number	138	♂ 137–147 ♀ 140–150 <sup>a</sup> ♂ 144–145 ♀ 148–150 <sup>b</sup>
Subcaudal scales, number	39	♂ 35–40 ♀ 28–33 <sup>a</sup>
Apical + Canthals	6	6 <sup>a,c</sup>
Intercanths	12	7 <sup>c</sup> 12 <sup>a</sup>
Parafrontals (left + right)	4 + 4	3 + 3 <sup>c</sup>
Frontal	1	1 <sup>c</sup>
Parietals	2	♂ 2 ♀ 3 <sup>c</sup>
Interparietals	-	- <sup>c</sup>
Supralabials + Infralabials	8* + 5*	8–9 + 4 <sup>a</sup>
Nasal	1*	1 <sup>a</sup>
Oculars (Pre + Supra + Post + Sub)	10* (4 + 1 + 3 + 2)	10 <sup>a</sup>

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