A case of partial melanism in *Lacerta agilis* (Linnaeus, 1758) from the Czech Republic

The main functions of coloration in reptiles are thermoregulation (Kettlewell 1973), camouflage (Tinbergen 1974) and signalling (Jackson et al 1976; Bechtel, 1995). In males of many lizard species, the skin coloration is changing during the year, being most conspicuous at the breeding season, when its signalling function is of particular importance (Cooper & Greendberg 1992). This is the period when the trade-off between attracting opposite sex and avoiding predation is strongest. Numerous species have developed different strategies to deal with this conflicting situation. Some of them, like *Egernia* sp., live in social groups, in which the risk is widespread among the group members (Chapple 2003). Others such as *Plestiodon laticeps* (Schneider, 1801) and *Psammodromus algirus* (Linnaeus, 1758) stay exposed, assess the distance of the approaching predator and then flee (Cooper 1999; Martín & López 2001).

In the wide range area of the Sand lizard, *Lacerta agilis* (Linnaeus, 1758), several types of individual and subspecific colorpatterns are known (Korsós & Bischoff 1997). The coloration differs between sexes and usually varies during the year and by age (Bischoff 1984). Both sexes are of brownish color after hibernation. In males, however, the color of the body sides turns into bright green (Fig. 1) during the mating season most likely to attract females and frighten away other males, and afterwards reverts to brown again (Ollson 1993, 1994). Besides, many cases of color anomalies were reported, melanistic individuals included (Mertens 1922; Drzewicki 1926; Peters 1958). Melanism is an individual's augmented expression of dark skin color in comparison to the majority of conspecifics-due to an increase in epidermal melanin pigments (Kettlewell 1973). At least two mechanisms are known to have the potential to alter body coloration: autosomal recessive gene mutations and hormonal changes (Hadley & Oldman 1969; Bechtel 1995). How melanism influences the mating success of male *L. agilis* is still unknown. Melanism in *L. agilis* occurs more often in the eastern part of its distribution range and at higher elevations (Bischoff 1984), where dark body color could be advantageous in coping with low temperatures (Clusella-Trullas, 2007). Despite the fact that the Sand Lizard is well studied in many scientific fields, information about partial melanism is missing.

In May 2011, an unusuallly colored male of *L. agilis* was observed and caught near the village of Studenec, Czech Republic, at N 49.22497°, E 16.05698° (WGS 84 datum) in the backyard of the Institute of Vertebrate Biology of the Academy of Sciences. The locality is surrounded by small patches of grassland, fields, woods and ponds, which altogether provide suitable habitats for Sand Lizards. When the author monitored the Sand Lizards in the area (N = 157), no further color anomalies were noticed.

The specimen was released and tracked again in July 2011 and May 2013. On these occasions, it was photographed on standardized gray colour background (18 % gray), its sex was determined and standard body dimensions were taken. By the time of first capture, it was diagnosed a very dark

adult male, with a few "green and brown" spots (Fig. 2). At closer examination, vestigial elements of the typical color-pattern were detected, obscured by the dark pigmentation. The pattern visibility depended on the view angle and light conditions. Only the belly was invariably completely black. Color saturation and body size were measured using the programs Adobe Photoshop CS (Adobe systems Inc. 1990-2003) and tpsDig (by F. James ROHLF 2010, State University of New York, Stony Brook), respectively. Snout-vent length was 7.88 mm in 2011 and 8.1 mm in 2013.

In July 2011, the lizard was caught when shedding. No changes were observed with regard to saturation of the dark portions, visibility of the original pattern and extent, position and number of the bright spots. Interestingly, in the last observation (May 2013), the original pattern was less distinct and the melanistic coloration more pronounced than before (Fig. 3). Moreover, after detailed comparison of pictures and records from May 2011 and 2013, small changes were detected. The number and size of several patches had altered, and some additional small spots had developed in the caudal and trunk regions. The belly color had remained the same. In some cases in which adult reptiles partially or completely changed their color for certain periods of their life, these changes were permanent, whereas in other cases they were not (KARÁSEK 2004).

The author concludes that these differences are not correlated with season, since both observations were made in May. Factors, such as aging, shedding cycle, hormonal or immune status, and epigenetic response of the organism, may play a little understood role in this process.

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Fig. 1: Normal coloration of a male of *Lacerta agilis* (Linnaeus, 1758) in the mating period.

Fig. 2: The studied partially melanistic male of *Lacerta agilis* (Linnaeus, 1758). Picture taken in May 2011.

Fig. 3: Same specimen as in Fig. 2. Picture taken in May 2013.