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MIMICKING TAIL LOSS: AN UNUSUAL BEHAVIOUR IN THE EUROPEAN GREEN LIZARD (*Lacerta viridis*)

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ABSTRACT. *On September 2020 we encountered a male of Lacerta viridis that upon grabbing had displayed caudal movements typical to a shed tail, but without actually detaching the tail from its body. Tail loss is a common escape behaviour in lizards, applied when benefits exceed costs. We do not know if tail loss mimicking was a type of antipredator behaviour adopted by the lizard or an unsuccessful try to shed its tail, thus further studies are recommended in this sense.*

KEY WORDS: *green lizard, escape behaviour, tail loss, tail preservation.*

In order to escape predation lizards adopt various strategies that depend on multiple factors such as degree of anthropogenic influence on the habitat, season, sex (Majláth & Majláthová 2009) and age of the individual (Bateman & Fleming 2009), type of refuge (Ihász et al. 2006), environment (Kopena et al. 2015). Deliberate tail loss can be one of such adopted defence mechanism, which implies an intra- or intervertebral rupture (for a discussion on the terminology see Abegg et al. 2020) along specialized fracture planes followed by the regeneration of the tail (Arnold 1984). Caudal autotomy is a widespread and well-studied phenomenon in lizards (see Bateman & Fleming 2009 for a review, Lin et al. 2017, Savvides et al. 2017), while snakes and certain lizards present pseudoautotomy i.e. fracture of the tail not followed by regeneration (Strugariu et al. 2018, see in Abegg et al. 2020).

The European green lizard (*L. viridis* (Laurenti, 1768); Lacertidae)) is a

large-sized lizard with a snout-vent length (SVL) ranging between 68.5 and 115.5 mm for males and 68.5-110.5 mm for females (Dely 1978). The tail is particularly long (about two thirds of the total body length) and can be shed if needed (Strijbosch et al. 1989). It is a territorial ground-dwelling predator that feeds on various invertebrates, especially insects (Dely 1978, Majláth & Majláthová 2009). It also represents the prey for different species of birds, mammals and snakes (Ihász et al. 2006, Majláth & Majláthová 2009). It can be a common species in bushy areas, forest outskirts, hedgerows, glades of Central and South-Eastern Europe (Dely 1978).

On September 12, 2020, we were doing herpetological survey in Someș Guruslău, Sălaj County, Romania. Suddenly, at the base of a dog rose bush, we noticed a male of *L. viridis* (Figure 1). SKI hurried to catch the lizard, quickly putting his hands on it. However, he was left with only its tail writhing under his fingers, or so it seemed to us. Convinced that the lizard itself had fled, voluntary self-amputating its tail, he started to look carefully around, searching for the lizard. Then, he raised his hand, but to our great surprise, the lizard was still there, with its tail attached to its body. The lizard remained motionless but its tail continued to wriggle in the same way, for about half a minute, and stopped only when the lizard went away. It had only mimicked the movements made by a shed tail, but in reality did not perform caudal autotomy. It was just a "trick" to fool us.

In case of danger, such as being attacked by a predator, green lizards try to reach a known suitable refuge, even if this involves an initial move in the direction of the predator (Ihász et al. 2006, Kopena et al. 2015). Common escape behaviour is caudal autotomy, which is meant to evade from the grab of a predator, to distract it for a moment, leaving enough time for the prey to flee. The more vigorously an autotomized tail moves the more likely its owner will escape (Clause & Capaldi 2006). However, tail loss involves energetic, social (see Bateman & Fleming 2009 for a review) and locomotion costs (Savvides et al. 2017), as well as alteration in antipredator behaviour, habitat use, foraging (see in Bateman & Fleming 2009), survival (Lin et al. 2017). In addition, to regenerate a tail is also costly energetically (Naya et al. 2007) and a regrown tail differs from the original not just in skeletal structure i.e. replacement of osseous tissues by cartilaginous ones (Arnold 1984), but also in colour (Kornilev et al. 2018). Therefore, only imitating tail loss may seem a better alternative. It worked for us, but can sufficiently confuse a real predator? Do the reduced costs

Figure 1. The *Lacerta viridis* male and its habitat with the dog rose bush

would still give the benefits of a real tail loss?

Another explanation might be that the lizard tried to shed its tail, but did not succeed. This process implies a series of complex physiological

modifications (Clause & Capaldi 2006) and may be difficult to accomplish if the tail is not grasped and the lizard is held by the body (Arnold 1984). It was formulated the idea that lizards in habitats with low predation pressure may deliberately lose their tails later and with greater difficulty than those subjected to higher predation probability (Bateman & Fleming 2009). We do not know the predation pressure in the surveyed area, but the anthropogenic influence might be pronounced as the dog rose bush was located near a dirt road, at the edge of a dried forest, close to the vineyards of the nearby village.

Variations in the ease of tail loss may occur within the same individual depending on external factors (Arnold 1984). According to Arnold (1984), sometimes lizards deliberately use various tail movements in order to divert the focus of the predator from the head and body to the tail still attached to the lizard's body. It may be possible that the European green lizard has done something similar to us. This tail loss mimicking behaviour observed in a *L. viridis* male might also indicate that despite the numerous studies on tail autotomy in lizards (e.g. Herczeg et al. 2004, Clause & Capaldi 2006, Bateman & Fleming 2009, Lin et al. 2017, Savvides et al. 2017) this research area may still bear interesting findings.

REFERENCES

Abegg, A.D., Gomes, C.A., Entiauspe-Neto, O.M., Passos, P. (2020): Does a defensive pseudoautotomy mechanism exist in the subfamily Xenodontinae? A study of the genus *Echinanthera*. South American Journal of Herpetology 18: 24-32.

Arnold, E.N. (1984): Evolutionary aspects of tail shedding in lizards and their relatives. Journal of Natural History 18: 127-169.

Bateman, P.W., Fleming, P.A. (2009): To cut a long tail short: a review of lizard caudal autotomy studies carried out over the last 20 years. Journal of Zoology 277: 1-14.

Clause, A.R, Capaldi, E.A. (2006): Caudal autotomy and regeneration in lizards. Journal of Experimental Zoology 305A: 965-973.

Dely, O.G. (1978): Hüllők – Reptilia (Magyarország állatvilága- Fauna Hungariae 130.). XX. kötet, 4. füzet (Pisces, Amphibia, Reptilia). Budapest. [in Hungarian]

Herczeg, G., Kovács, T., Tóth, T., Török, J., Korsós, Z., Merilä, J. (2004): Tail loss and thermoregulation in the common lizard *Zootoca vivipara*. Naturwissenschaften 91(10): 485-488.

Ihász, N., Bayer, K., Kopena, R., Molnár, O., Herczeg, G., Török, J. (2006): Szemben a ragadozóval – a zöld gyík (*Lacerta viridis*) búvóhelyközpontú menekülési stratégiája. Állatani Közlemények 91(2): 127-138.

Kopena, R., Herczeg, G., López, P. Martín, J. (2015): Escape strategy of Schreiber's green lizards (*Lacerta schreiberi*) is determined by environment but not season or sex. Behaviour 152(11): 1527-1542.

Kornilev, Y.V., Popgeorgiev, G., Vacheva, E., Tzankov, N. (2018): First records of melanism (including in tail bifurcation) of lacertid lizards (Reptilia: Lacertidae) in Bulgaria. North-Western Journal of Zoology 14(1): 142-144.

Lin, J.W., Chen, Y.R., Wang, Y.H., Hung, K.C., Lin, S.M. (2017): Tail regeneration after autotomy revives survival: a case from a long-term monitored lizard population under avian predation. Proceedings of the Royal Society B: Biological Sciences 284(1847): art.20162538.

Majláth, I., Majláthová, V. (2009): Escape behavior of the green lizard (*Lacerta viridis*) in the Slovak Karst. Acta Ethologica 12, article number: 99.

Naya, D.E., Veloso, C., Muñoz, J.L.P., Bozinovic, F. (2007): Some vaguely explored (but not trivial) costs of tail autotomy in lizards. Comparative Biochemistry and Physiology, Part A 146: 189-193.

Savvides, P., Stavrou, M., Pafilis, P., Sfenthourakis, S. (2017): Tail autotomy affects bipedalism but not sprint performance in a cursorial Mediterranean lizard. The Science of Nature 104, article number: 3.

Strijbosch, H., Helmer, W., Scholte, P.T. (1989): Distribution and ecology of lizards in the Greek province of Evros. Amphibia-Reptilia 10(2): 151-174.

Strugariu, A., Dincă, P.C., Zamfirescu, Ș.R. (2018): Deliberate tail loss (pseudoautotomy) in a viperid snake. North-Western Journal of Zoology 14(1): 144-146.