

*Herpetological  
Review*

Volume 45, Number 2 – June 2014



amphibians throughout the world (see Chan et al. 1984. Hawaii Volcanoes National Park: Proceedings of the Fifth Conference of National Science, pp. 41–50; Owens and Knapp 2007. Herpetol. Rev. 38:454–455; Gogliath et al. 2012. Herpetol. Rev. 43:129; Avila et al. 2013. Herpetol. Rev. 44:144–145; Conzende et al. 2013. Herpetol. Rev. 44:145–146; and citations therein). *Plica plica* and *P. umbra* are lizards restricted to the Amazonian rainforest and usually live on tree trunks, although they can occasionally be spotted on shrubs, fallen logs, sleeping on leaves or on the ground (Ávila-Pires 1995. Zool. Verh. Leiden. 1995:1–706).

During a taxonomic study on these lizards, we obtained specimens in the field with some morphological abnormalities that we report for the first time here. The specimens examined are housed in the Museu Paraense Emílio Goeldi (MPEG) and in the Instituto Nacional de Pesquisas da Amazônia (INPA). One of the lizards examined, a male *P. plica* (MPEG LAG 2612; 101.5 mm SVL) from Mazagão, Amapá state, Brazil (0.115°S, 51.288889°W), had a filiform appendix in the gular region (Fig. 1A). A male *P. umbra* (MPEG LAG 11279; 74 mm SVL) from Nova Vida, Maranhão state, Brazil (1.827669°S, 46.100781°W) had a malformation of the ear opening (1C and D). The ear opening is reduced to a small slit (1.5 mm diam) on the right side, and an almost absent opening on the left side. Another male *P. umbra* (INPA 0006; 95.3 mm SVL) examined from UHE Cachoeira Porteira, Oriximiná, Pará state, Brazil (1.440000°S, 56.523889°W), had a symmetrical cavity on the first infralabial scales (Fig. 1E). It is unknown if these abnormalities decreased probability of survival in these lizards, though these specimens had reached adult size and otherwise appeared to be in good health. However, it is also clear that visual, olfactory, and auditory cues are very important to lizards (Chou et al. 1988. J. Herpetol. 22:349–351; Oliver and Hutchinson 2009. Herpetol. Rev. 2009. 40:414–415).

To our knowledge, this is the first report of these conditions in *Plica*. We conclude that these abnormalities are of long-standing condition and may be the result of a congenital defect or defective development at an early stage.

We are grateful to Ana Lúcia da Costa Prudente and Richard Vogt for making facilities available and permitting access to the Museu Paraense Emílio Goeldi and Instituto Nacional de Pesquisas da Amazônia, respectively. We thank CAPES for doctorate fellowships awarded to SCG and to CNPq and FAPESP.

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**PODARCIS ERHARDII** (Erhard's Wall Lizard). **BIFURCATED TAIL, POST-AUTOTOMY.** While conducting fieldwork in the Aegean Islands, we came across an Erhard's Wall Lizard with a forked tail. This phenomenon, though not novel, has never been formally documented in this species.

Many lizards rely on caudal autotomy (tail shedding) to escape predation. The tail separates from the body along an intravertebral breakage plane close to the point of attack (Bateman and Fleming 2009. J. Zool. 277:1–14). After autotomization has occurred, the severed tail writhes for several minutes (up to 14 minutes in *P. erhardii*), presumably distracting the predator (Pafilis et al. 2005. Physiol. Biochem. Zool.



FIG. 1. *Podarcis erhardii* with a post-autotomized, bifurcated tail.

78:828–838). In addition, there is some evidence that shedding a bitten tail that has been injected by venom may help avoid lethal exposure to viper predation (Pafilis et al. 2009. Evolution 63:1262–1278). Nevertheless, tail shedding also has important costs, including elevated stress hormone levels (Langkilde and Shine 2006. J. Exp. Biol. 209:1035–1043), as well as declines in social status and reproductive fitness (Simou et al. 2008. Copeia 2008:504–509).

The lizard we observed was found on Gaiduronissi Islet (off NE Paros Island, Cyclades Pref., Aegean Sea, Greece). This uninhabited islet is quite small (< 1 km<sup>2</sup>), has limited food availability, yet high lizard density compared to other Cycladic islands of its size (12 lizards per 100 m transect). Gaiduronissi does not harbor vipers, which have been implicated in elevated autotomy rates in the Greek Archipelago (Pafilis et al. 2009, *op. cit.*). We hypothesize the two-tailed individual had experienced an aggressive encounter either with a predator (Black Rat, *Rattus rattus*, the only predatory vertebrate on this island) or a conspecific, and had autotomized its tail. At some point during the regeneration process, the lizard must have again autotomized, this time only partially. Physiological cues triggered tail regrowth at the site of injury despite the incomplete autotomy, thus leaving the lizard with two tails. The bifurcated tail differs morphologically from the base of the tail (Fig. 1): the original unautotomized base of the tail displays the original scalation pattern, while the newly regenerated tail is discolored and does not follow the black striped pattern. These external differences in appearance extend to internal morphology; regenerated tails contain cartilage rather than calcified vertebrae, making this observation especially odd because regenerated tails do not have breakage planes (Bateman and Fleming, *op. cit.*). The specimen was deposited in the Michigan Museum of Zoology Herpetology Division collection (acquisition ID: 20026).

While possessing the ability to shed a body part grasped by an enemy is a powerful and effective escape strategy, having two tails is likely to be disadvantageous to the individual. In addition to potentially being more conspicuous to predators, a lizard with two tails possibly experiences decreased locomotory performance compared to its one-tailed conspecifics.

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The Official Bulletin of the  
**SOCIETY FOR THE STUDY OF AMPHIBIANS AND REPTILES**

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