



Two Instances of Tail Regeneration and One Case of Tail Bifurcation in Adult Eastern Blue-tongued Lizards (*Tiliqua scincoides scincoides*) in Australia

Matthew Mo

P.O. Box A290, Sydney South, NSW 1232, Australia (matthew.sk.mo@gmail.com)

A number of reptilian and amphibian taxa can regrow amputated tails (Lozito and Tuan 2016; Baddar et al. 2019). Tail amputation may occur from various causes. In caudal autotomy, prey species exhibit an anti-predator strategy in which a portion of the tail can be voluntarily shed to distract predators and facilitate escape (Gilbert et al. 2013). This mechanism has been most frequently reported in lizards and salamanders (Bateman and Fleming 2009; Lewis and Sullivan 2020), but also in tuataras (e.g., Hoare et al. 2006) and certain snakes (e.g., Fitch 2003; Bowen 2004). Alternatively, tails may be amputated by predators or competitors (e.g., Itescu et al. 2017).

In taxa exhibiting tail regeneration, a new tail may develop even when the original tail is not entirely detached, leaving the animal with a seemingly forked tail (Ramadanovi and Zimi 2019; Khandakar and Sultana 2020). This occurrence, termed “tail bifurcation,” is relatively rare in the wild. However, it has been reported in a number of families, including but not limited to the Iguanidae (Koleska et al. 2017), Phrynosomatidae (Mata-Silva et al. 2013), Tropiduridae (Martins et al. 2013; Passos et al. 2014), Agamidae (Ananjeva and Danov 1991; Ofori et al. 2018), Gekkonidae (Kumbar et al. 2011; Monte de Andrade et al. 2015; Maria and Al-Razi 2018), Phyllodactylidae (Koleska 2018), Scincidae (Mitchell et al. 2012; Vrcibradic and Niemeyer 2013; Miles et al. 2020), Lacertidae (Dudek and Ekner-Grzyb 2014; Kolenda et al. 2017; Sorlin et al. 2019), Teiidae (Cordes and Walker 2013; Pelegrin and Leão 2016), Gymnophthalmidae (Plessey et al. 2014), Anguillidae (Conzendey et al. 2013), Plethodontidae (Hartzell 2017), and Salamandridae (Henle et al. 2012).

The blue-tongued lizards (*Tiliqua* spp.), a genus comprising some of the largest members of the family Scincidae, are found exclusively in Australia, New Guinea, and Indonesia. The Common Blue-tongued Lizard (*T. scincoides*) is represented by three subspecies; one of which is the Eastern Blue-tongued



Fig. 1. An Eastern Blue-tongued Lizard (*Tiliqua scincoides scincoides*) with a bifurcated tail from Kurnell, New South Wales, Australia. Photograph by the author.

Lizard (*T. s. scincoides*) found in southern and eastern Australia (Cogger 2018). On 8 December 2010, I encountered and measured an adult (SVL 332 mm) exhibiting tail bifurcation (Fig. 1). This lizard was found in dune vegetation adjacent to Wanda Beach, Kurnell, New South Wales, Australia (34.035081°S, 151.176229°E). The point of bifurcation was 120 mm from the base of the tail. The right division, presumably the original that had partially broken, was smaller in width than the left and was curled in such a way that the acute tip permanently pointed slightly upward when the lizard was on the ground.

On 12 October 2012, I captured and measured another adult Eastern Blue-tongued Lizard (SVL 321 mm) exhibiting tail regeneration (Fig. 2). This lizard was in Turrella Reserve, New South Wales, Australia (33.927408°S, 151.138677°E),

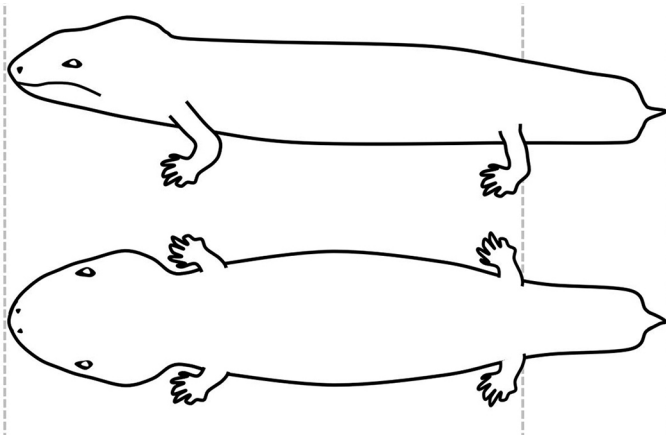


Fig. 2. Diagrammatic representation of an Eastern Blue-tongued Lizard (*Tiliqua scincoides scincoides*) from the Turrella Reserve, New South Wales, Australia, exhibiting some tail regeneration from an amputated stump.

a small bushland remnant along Wollie Creek, 8 km southeast of the Sydney central business district. The tail had been broken 52 mm from the base but a regenerated portion measuring 13 mm protruded from the tail stump. Given the urban surroundings, the amputation might have been inflicted by a dog or an unfortunate encounter with machinery.

Some species of blue-tongued lizards with amputated tails have been reported in the wild (Fenner et al. 2006; Price-Rees and Shine 2011), although most are not thought to be capable of caudal autotomy as they lack the necessary transverse fracture planes (Shea 1992). The examples described herein are of interest because tail regeneration is rarely reported in blue-tongued lizards (Fenner et al. 2006). Typically, blue-tongued lizards that have lost all or a portion of their tail retain only a stump where amputation occurred (pers. obs).

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