



# Notes on the Stomach Contents of a Juvenile Sleepy Lizard, *Tiliqua rugosa* (Gray 1825), Killed by an Eastern Brown Snake, *Pseudonaja textilis* (Duméril, Bibron, and Duméril 1854) in South Australia

Gerrut Norval<sup>1\*</sup>, Jessica Clayton<sup>1</sup>, Robert D. Sharrad<sup>1</sup>, and Michael G. Gardner<sup>1,2</sup>

<sup>1</sup>College of Science and Engineering, Flinders University, Adelaide, South Australia, Australia (norv0003@flinders.edu.au)

<sup>2</sup>Evolutionary Biology Unit, South Australian Museum, North Terrace Adelaide 5000, South Australia, Australia, (michael.gardner@flinders.edu.au)

Photographs by the senior author.

Lizards are a very diverse group of vertebrates that inhabit and utilize a variety of habitats and niches; that their diets vary dramatically is not surprising. Only a few species have adaptations, such as colic valves and elongated intestines, that enable them to be mainly herbivorous (i.e., >90% of the diet consists of plant material; Cooper and Vitt 2002). Most lizards are carnivorous, but many are facultative omnivores that will consume some plant material (e.g., Pianka and Vitt 2003). The Sleepy Lizard, *Tiliqua rugosa* (Gray 1825), which is endemic to the southern parts of Australia (Cogger 2014), is an example of such an omnivorous species. These relatively large skinks (Scincidae) opportunistically feed on invertebrates and even carrion (Fig. 1), but feed primarily on flowers (Fig. 2), fruit (Fig. 3), and leaves of a variety of native and introduced plant species (Yeatman 1988; Henle 1990; Dubas and Bull 1991). Our understanding of the diet of *T. rugosa* stems largely from observations of adult lizards or individuals whose age class was not specified, so the diet of juveniles is relatively poorly understood. Herein we describe the stomach contents of a juvenile *T. rugosa*, with notes on dietary items of adult lizards from the same locality.

At 1135 h on 20 September 2017, GN noticed an adult Eastern Brown Snake, *Pseudonaja textilis* (Duméril, Bibron, and Duméril 1854) on the side of a dirt road in the Mid North Region of South Australia (33°57'38"S, 139°14'05"E; 211 m elev.; datum: WGS84). Upon closer inspection, he found that the snake was starting the process of ingesting a juvenile *T. rugosa* (SVL 173 mm; tail length 40 mm; body mass 94 g). However, the presence of the observer disturbed the snake and it fled after releasing the already dead lizard.

The lizard (Fig. 4) was collected and dissected to examine its digestive tract contents. The stomach was filled with leaves, a few flower buds, and pods of Ward's Weed, *Carrichtera annua* (L.) DC, in various advanced stages of digestion plus a few fragments of an unidentifiable forb. The only non-plant material observed was the remains of a beetle.

During the 2017 field season (mid-August to mid-December), 34.4% (129) of the Sleepy Lizards we encountered ( $n = 375$ ) were observed feeding. SVLs of these lizards ranged from 205 to 380 mm (mean  $\pm$  SD = 318  $\pm$  30.9 mm), so most were adults. Although they were feeding on a variety of food items (Table 1), in 49.7% of the instances where the food item could be identified they were parts of *C. annua*. Yeatman (1988) examined the scats of three juvenile (less than 3 months old) *T. rugosa* and found that the contents resembled those of adult lizards. Our observation therefore provides additional support for the conclusion that the juveniles feed on the same types of dietary items as the adults. Although some observations about the diet of wild *Tiliqua scincoides* also have suggested that juveniles and adults have similar diets (Yeatman 1988), this behavior does not apply to all species in the subfamily Egerniinae. In *Egernia*, juveniles usually are more insectivorous, whereas adults tend to be herbivorous (Chapple 2003). The apparent lack of a dietary shift in *T. rugosa* is most likely due to the fact that this species is an opportunistic omnivore that usually inhabits xeric environments, so individuals of all age classes will feed on the most frequently encountered food items. Empirical studies into the extent of competition between the different age classes in *T. rugosa* populations are therefore warranted.



**Fig. 1.** A Sleepy Lizard (*Tiliqua rugosa*) that was feeding on the carcass of a Western Grey Kangaroo (*Macropus fuliginosus*).



**Fig. 2.** A Sleepy Lizard (*Tiliqua rugosa*) eating the flower of a Thread Iris (*Moraea setifolia*) (inset on the right).



**Fig. 3.** A Sleepy Lizard (*Tiliqua rugosa*) eating the fruit of a Ruby Saltbush (*Enchylaena tomentosa*) (inset on the right).



**Fig. 4.** A dorsal (top) and ventral (bottom) view of the juvenile Sleepy Lizard (*Tiliqua rugosa*) described herein prior to being dissected. The shape of the abdomen and tail suggests that it was not malnourished.

**Acknowledgements**

The main observation presented herein was made by the senior author while conducting surveys as part of his doctoral research, which was partly funded in 2017 by a grant from the Royal Society of South Australia. Clearance for the research was granted by the Animal Welfare Committee of Flinders University (No.: E454/17) and the Department of Environment, Water and Natural Resources of the Government of South Australia (Permit No.: A23436-25).

**Table 1.** Plant and animal material observed in 2017 as dietary items of the Sleepy Lizard (*Tiliqua rugosa*) at the study site near Mt. Mary in the Mid North Region of South Australia.

| Species  | Note                      |
|--|---------------------------|
| Ward’s Weed ( <i>Carrichtera annua</i> )               | flowers, leaves, and pods |
| Grassy Bindweed ( <i>Convolvulus remotus</i> )         | flowers and leaves        |
| Paterson’s Curse ( <i>Echium plantagineum</i> )        | leaves                    |
| Ruby Saltbush ( <i>Enchylaena tomentosa</i> )          | fruit                     |
| Berrigan ( <i>Eremophila longifolia</i> )              | flowers                   |
| Little Bur Clover ( <i>Medicago minima</i> )           | flowers and leaves        |
| Sugarwood ( <i>Myoporum platycarpum</i> )              | flowers                   |
| Wild Sage ( <i>Salvia verbenaca</i> )                  | flowers and leaves        |
| California Pepper Tree ( <i>Schinus molle</i> )        | fruit                     |
| Tangled Sida ( <i>Sida intricata</i> )                 | leaves                    |
| Wooly New Holland Daisy ( <i>Vittadinia gracilis</i> ) | leaves                    |
| Western Grey Kangaroo ( <i>Macropus fuliginosus</i> )  | carrion                   |

**Literature Cited**

Chapple, D.G. 2003. Ecology, life-history, and behavior in the Australian scincid genus *Egernia*, with comments on the evolution of complex sociality in lizards. *Herpetological Monographs* 17: 145–180.

Cogger, H.G. 2014. *Reptiles and Amphibians of Australia*. 7th ed. CSIRO Publishing, Collingwood, Victoria, Australia.

Cooper, W.E. and L.J. Vitt. 2002. Distribution, extent, and evolution of plant

- consumption by lizards. *Journal of Zoology* 257: 487–517.
- Dubas, G. and C.M. Bull. 1991. Diet choice and food availability in the omnivorous lizard, *Trachydosaurus rugosus*. *Wildlife Research* 18: 147–155.
- Henle, K. 1990. Notes on the population ecology of the large herbivorous lizard, *Trachydosaurus rugosus*, in arid Australia. *Journal of Herpetology* 24: 100–103.
- Pianka, E.R. and L.J. Vitt. 2003. *Lizards: Windows to the Evolution of Diversity*. University of California Press, Berkeley.
- Yeatman, E.M. 1988. Resource Partitioning by Three Congeneric Species of Skink (*Tiliqua*) in Sympatry in South Australia. Unpublished Ph.D. Thesis, Flinders University, Adelaide, South Australia.