Diet and foraging in the Curaçao Whiptail, *Cnemidophorus murinus* (Laurenti, 1768)

Philip J. Senter[1]

[1] Department of Biological and Forensic Sciences, Fayetteville State University, Fayetteville, North Carolina, USA.
Email: psenter@uncfsu.edu

Edited by: Robert Powell. **Date of publication**: 22 February 2024.
Citation: Senter PJ. 2024. Diet and foraging in the Curaçao Whiptail, *Cnemidophorus murinus* (Laurenti, 1768). *Caribbean Herpetology* 93: 1–3.
DOI: https://doi.org/10.31611/ch.93

The Curaçao Whiptail (*Cnemidophorus murinus*) (Squamata: Teiidae) was once considered to have two subspecies, *C. m. murinus* (endemic to Curaçao and Klein-Curaçao) and *C. m. ruthveni* (endemic to Bonaire and Klein-Bonaire), but the two are now considered separate species (Ugueto and Harvey 2010). Little has been published on the natural history of *C. murinus*. Most of the literature on the natural history of "*C. murinus*" actually pertains to *C. ruthveni* and includes studies on diet (Dearing and Schall 1992, Schall 1996), body temperature (Schall and Dearing 1994), metabolic expenditure (Bennett and Gleeson 1979), population density and energetics (Bennett and Gorman 1979), signaling behavior (Cooper et al. 2004), escape behavior (Cooper et al. 2003), and learning (Schall 2000). In contrast, published literature on *C. murinus* that deals with topics other than its taxonomy, morphology, and distribution is limited to a few notes on its parasites (Specian and Whittaker 1980), pathology (Hughes and Delis 2014), clutch size (van Buurt 2011), conservation (van Buurt 2006), and interactions with tourists (van Buurt 2011). Herein I add to the published knowledge of *C. murinus* with observations on diet and foraging.

Most species of *Cnemidophorus* are primarily insectivorous, but those of Aruba (*C. arubensis*), Curaçao (*C. murinus*), and Bonaire (*C. ruthveni*) are primarily herbivorous, supplementing the plants in their diets with occasional carrion and small invertebrates that include insects (Schall and Ressel 1991, Dearing and Schall 1992, van Buurt 2005). Plants eaten by these lizards have been reported only for *C. arubensis* and *C. ruthveni*. The former is known to consume at least nine species of plants from six families (Schall and Ressel 1991), whereas the latter is known to consume at least 25 species of plants from 14 families (Dearing and Schall 1992).

At 09.30–11.00 h during sunny weather on 29 December 2023, I observed two adult male *C. murinus* foraging at Shete Boka National Park. Both lizards were near the footpath that forms a loop atop the small peninsula constituting the western border of the rocky inlet called Boka Tabla. The first lizard was about 3 m east of the eastern end of the loop (12.368611, -69.115833; elevation 9 m asl) and the second was 2–3 m west of the southeastern end of the loop (12.368333, -69.115556; elevation 8 m asl).

The first lizard was walking amid patches of Shoreline Purselane (Caryophyllales: Aizoaceae: *Sesuvium portulacastrum*) over the fossil coral that forms the rocky substrate of the peninsula (Senter 2024a, 2024b). The lizard was obviously foraging, occasionally snapping at something among ground-hugging, horizontal stems of the plants and at times overturning a pebble and then snapping at an item that had been beneath it. The lizard appears to eat the items at which it has snapped, but camera shake and the size of these apparent bits of food (too small to see on the videos) makes it impossible to identify the apparent bits of food and to confirm that the lizard successfully ate them. At no point in either video is any part of the plant visibly pulled when the lizard snaps, and at no point is any part of the plant visibly missing after a snap. This suggests that the lizard was not eating parts of the plant but was instead snapping at and eating small items in the vicinity of the horizontal stems. After filming, I walked over to where the lizard had been foraging and confirmed that no other plants were in the foraging area and that the lizard likely was eating small invertebrates such as tiny insects.

The second lizard was walking on a mixed patch of Oldfield Grass (Poales: Poaceae: *Anthephora hermaphrodita*) and Slender Goat's Rue (Fabales: Fabaceae: *Tephrosia cinerea*) growing in a depression in the fossil coral

(Senter 2024c). The lizard was foraging during the first 39 s of the video before leaving the patch of vegetation. This lizard clearly was eating leaflets of Slender Goat's Rue (Fig. 1), consuming eleven leaflets in the 39 s of foraging (an average of one leaflet every 3.5 s). In each instance, it snapped its jaws onto a leaflet, pulled it neatly off the leaf, then rapidly snapped its jaws open and shut a few times with the head stationary (that is, without thrusting the head forward as in inertial feeding), while apparently using the tongue to move the leaf toward the throat. In seven of the eleven instances, the leaflet was swallowed after three snaps, which collectively took approximately 1 s. The exceptions were the sixth, eighth, ninth, and tenth leaflets, which respectively took two, five, zero, and six snaps to swallow. At no point did I observe the lizard eating anything other than Slender Goat's Rue leaflets, despite an abundance of Oldfield Grass.

Figure 1. Adult male Curaçao Whiptail (*Cnemidophorus murinus*) with a single leaflet of Slender Goat's Rue (*Tephrosia cinerea*) in its mouth. From video footage captured by the author with a digital camera at Shete Boka National Park, Curaçao.

This is the first report of the fabacean genus *Tephrosia* in the diet of any species of *Cnemidophorus* on Aruba, Curaçao, or Bonaire, although *C. ruthveni* is known consume the fabacean species *Libidibia coriaria* (Divi-Divi Tree) (Dearing and Schall 1992) and *C. arubensis* is known to feed on the fabacean genera *Acacia, Cassia,* and *Prosopis* (Schall and Ressel 1991). That the *C. murinus* foraging in the mixed patch of Slender Goat's Rue and Oldfield Grass ignored the grass and ate only the Slender Goat's Rue leaflets is interesting, because *C. arubensis* is known to consume grass flowers and leaves (Schall and Ressel 1991) and *C. ruthveni* is known to eat grass leaves (Dearing and Schall 1992). Also interesting is that the *C. murinus* foraging amid patches of Shoreline Purselane appears not to have been consuming the plant, because *Sesuvium* flowers are known to be eaten by *C. arubensis* (Schall and Ressel 1991), although *C. ruthveni* is not known to consume any species of Aizoaceae (Dearing and Schall 1992). No Shoreline Purslane flowers were present in the area where I observed the foraging lizard, so I was unable to determine whether *C. murinus* would eat the flowers if available.

Schall and Ressel (1991) catalogued the plant species in the diet of *C. arubensis* by killing 185 lizards and examining stomach contents. Dearing and Schall (1992) did the same with 1,102 *C. ruthveni.* This method is effective but may not be necessary. My observations indicate that filming foraging lizards can show not only which plant species are eaten but also which species are ignored. A more complete picture of the dietary habits of *C.*

murinus will require much more than a mere three minutes of footage of two individual lizards, but this species is abundant at Shete Boka and other locations on Curaçao, providing plentiful opportunities to further document the feeding habits of this species.

References

Bennett AF, Gleeson TT. 1979. Metabolic expenditure and the cost of foraging in the lizard *Cnemidophorus murinus. Copeia* 1974: 573–577. Article

Bennett AF, Gorman GC. 1979. Population density and energetics of lizards on a tropical island. *Oecologia* 42: 339–358. Article

Cooper WE Jr, Pérez-Mellado V, Baird T, Baird TA, Caldwell JP, Vitt LJ. 2003. Effects of risk, cost, and their interactions on optimal escape by nonrefuging Bonaire whiptail lizards, *Cnemidophorus murinus. Behavioral Ecology* 14: 288–293. Article

Cooper WE Jr, Pérez-Mellado V, Baird TA, Caldwell JP, Vitt LJ. 2004. Pursuit deterrent signalling in the Bonaire whiptail lizard *Cnemidophorus murinus. Behaviour* 141: 297–311. Article

Dearing MD, Schall JJ. 1992. Testing models of optimal diet assembly by the generalist herbivorous lizard *Cnemidophorus murinus. Ecology* 73: 845–858. Article

Hughes DF, Delis PR. 2014. *Cnemidophorus murinus murinus* (Laurent's Whiptail). Myiasis. *Herpetological Review* 45: 126–127.

Schall JJ. 1996. *Cnemidophorus murinus ruthveni* (Bonaire Island Whiptail Lizard). Seeds in diet. *Herpetological Review* 27: 142–143.

Schall JJ. 2000. Learning in free-ranging populations of the whiptail lizard *Cnemidophorus murinus. Herpetologica* 56: 38–45.

Schall JJ, Dearing MD. 1994. Body temperature of the herbivorous Bonaire Island whiptail lizard (*Cnemidophorus murinus*). *Journal of Herpetology* 28: 526–528. Article

Schall JJ, Ressel S. 1991. Toxic plant compounds and the diet of the predominantly herbivorous whiptail lizard, *Cnemidophorus arubensis. Copeia* 1991: 111–119. Article

Senter PJ. 2024a. 2023 Dec 29 *Cnemidophorus murinus* (Curaçao Whiptail) Lizard 1 foraging (video 1 of 2). figshare. Media. Article

Senter PJ. 2024b. 2023 Dec 29 *Cnemidophorus murinus* (Curaçao Whiptail) Lizard 1 foraging (video 2 of 2). figshare. Media. Article

Senter PJ. 2024c. 2023 Dec 29 *Cnemidophorus murinus* (Curaçao Whiptail) Lizard 2 foraging. figshare. Media. Article

Specian RD, Whittaker FH. 1980. A survey of the helminth fauna of *Cnemidophorus murinus* from the island of Curacao. *Proceedings of the Helminthological Society of Washington* 47: 275–276.

Ugueto GN, Harvey MB. 2010. Southern Caribbean *Cnemidophorus* (Squamata: Teiidae): Description of new species and taxonomic status of *C. murinus ruthveni* Burt. *Herpetological Monographs* 24: 111–148.

van Burrt G. 2005. *Field Guide to the Amphibians and Reptiles of Aruba, Curaçao and Bonaire.* Frankfurt am Main: Chimaira.

van Buurt G. 2006. Conservation of amphibians and reptiles in Aruba, Curaçao and Bonaire. *Applied Herpetology* 3: 307–321. Article

van Buurt G. 2011. The teiid lizards of Aruba, Curaçao, Bonaire (Dutch Caribbean), and the Península de Paraguaná (Venezuela). *Reptiles & Amphibians* 18: 93–104. Article