

HERPETOCULTURE NOTES

SQUAMATA — LIZARDS

AMEIVULA ABAETENSIS. DRINKING BEHAVIOR. Many reptiles have morphological adaptations (Sherbrooke et al. 2007. *Zoomorphology* 126:89–102) and behavioral strategies (Al-Sadonet al. 1999. *Saudi J. Biol. Sci.* 6:91–101) for the acquisition of water in the environment, with documented cases of convergent adaptations for species in arid environments (Comanns et al. 2011. *Beilstein J. Nanotechnol.* 2:204–214). *Ameivula abaetensis* is a diurnal lizard species, endemic to the sand dune habitats (“restinga”) along the Brazilian coastline. The geographic distribution of the species extends from the north coastline of Bahia State in Salvador Municipality, to Santo Amaro de Brotas Municipality in Sergipe State (Dias et al. 2002. *Copeia* 2002:1070–1077). Previous research by Santa-Rosa et al. (2012. *Bol. Mus. Biol. Mello Leitão* 29:53–63) suggested that the ingestion of *Byrsonima microphyla* fruits by *A. abaetensis* may be an important source of

water in restinga habitat during the dry season. This note reports drinking behavior in *A. abaetensis*.

Two independent groups of *A. abaetensis* were kept in captivity during the period of 28 February to 25 April 2009 (N = 8), and 20 to 27 October 2012 (N = 6). The specimens were collected during field activities, in the sand dunes habitat in Restinga do Abaeté, Salvador, Bahia (12.9283°S, 38.3358°W; datum WGS84), and they were kept in captivity for behavioral observations (license n° 31047-1/SISBIO). The climatic and structural conditions of captivity (terrarium with dimensions 100 × 100 × 100 cm) were very similar to those found in the natural microhabitat inhabited by the species (Dias and Rocha 2004. *J. Herpetol.* 38:586–588; Dias et al. 2005. *J. Herpetol.* 15:133–137; Dias and Rocha 2007. *Braz. J. Biol.* 67:41–46), but the specimens were kept sheltered from direct sunlight. For the first group, we provided fruit (*B. microphyla*) and water for sustenance in shallow containers. For the second group, we provided small beetles and water. For

both conditions, during *ad libitum* observations, we recorded the drinking behavior at 1300 h on 20 April 2009 and 1000 h on 25 October 2012 using an SLR camera. In both treatments (with and without the availability of fruit), it was possible to verify the drinking behavior. The behavior consisted of approaching the water source, followed by the animal lowering its head and using its tongue to collect water. Once the water was obtained, the animal raised its head, keeping it perpendicular to the soil surface for up to five seconds. Further, the animals simultaneously kept their front limbs flexed, such that the anterior ventral surface of the body was not in contact with the ground.

Although there are no published data concerning ingestion of water in natural habitat for *A. abaetensis*, these observations suggest that this behavior can be common when water is available in a xeric ecosystem, despite water availability within the diet (e.g., *B. microphyla*). The opportunistic behavior of drinking water has been described in other species of heliophilous lizards (Ribeiro and Freire 2009. *Herpetol. Rev.* 40:228–229) and it can be considered a convergent behavioral adaptation for lizards occurring in habitat with low water availability.

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PHRYNOSOMA ASIO (Giant Horned Lizard). DRINKING BEHAVIOR. Stereotypical behaviors surrounding water intake in the genus *Phrynosoma* have been well reported (Mayhew and Wright 1971; Peterson 1998; Sherbrooke 1990). Desert lizards like *Phrynosoma* rarely have access to bodies of water and are adapted to take little or no water for long periods of time (Meyer 1966). Herein we report an unknown and unusual water ingestion method in *P. asio*, a horned lizard widely distributed in

southwest Mexico (Reeve 1952). On 30 April 2012 we observed a captive female *P. asio* (95 mm SVL) dipping her head, neck, and forelimbs into the water trough of her terrarium while making light and leisurely sucking motions with her throat (Fig. 1). We also recorded the behavioral display time, having a duration of 7 minutes and a repeat of the same behavior the next day with a duration of 5 minutes. The knowledge of this horned lizard's ecological and ethological aspects are relatively little documented (Pianka and Parker 1975). We thank Oscar Avila Morales, Jonathan Vazquez Sanchez, and Jose Antonio Rosas by supporting us in the field and Tania Raya Garcia for support in caring for the specimen in captivity.

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SQUAMATA — SNAKES

CROTALUS OREGANUS OREGANUS (Northern Pacific Rattlesnake). LONGEVITY. At a local non-profit education center in Mather, California, USA, we believe we have one of the oldest captive rattlesnakes on record. During the spring of 1982, a small juvenile male *Crotalus oreganus oreganus* was collected in Auburn, California, USA, by a student attending Placer High School. It was presented to Placer High biology teacher, Douglas Stryker, who kept the specimen as an educational classroom pet. The snake was kept in the classroom for 31 years. Recently Mr. Stryker retired, and in November 2012 the snake was given to a local non-profit, Sacramento Splash, and now resides in the Splash Education Center.

Crotalus oreganus are typically born in the fall, but do not emerge until the following spring (Diller and Wallace 1984). As this specimen of *C. o. oreganus* was collected as a small juvenile in the spring, it is believed to have been born in the fall of 1981. This makes this *C. o. oreganus* over 31 years old at the time of submission (April 2013). We believe this is the oldest *C. oreganus* on record and among the oldest *Crotalus* that have been recorded.

The average lifespan for *C. oreganus* in the wild is approximately 20 years (Fitch 1949). A captive *C. o. oreganus* that was recorded at 22 years, 7 months is reported by Slavens (<http://www.pondturtle.com/l/snaked.html#Crotalus>). Still, no records document an individual *C. o. oreganus* older, or even close to the age of the snake reported herein.

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MASTICOPHIS MENTOVARIUS (Neotropical Whipsnake). REPRODUCTION. *Masticophis mentovarius* is a neotropical colubrid that ranges from northern Mexico to northern South America (Lemos-Espinal and Smith 2007. *Amphibians and Reptiles of the State of Chihuahua, Mexico*. CONABIO-UNAM. 178 pp.). The reproductive mode is oviparous and, at least in a population in Veracruz, Mexico, wild females are gravid from April to May (Pérez-Higareda et al. 2007. *Serpientes de la Región de los Tuxtlas, Veracruz, México*. UNAM. 189 pp.). Eggs have been reported to be laid inside abandoned burrows or cracks in the ground (Vázquez and Quintero 2005. *Anfibios y Reptiles de Aguascalientes*. CIEMA-CONABIO. 197 pp.). In populations studied, the eggs are white and are laid in clutches of 17–20, have a granular surface, are not adhesive to one other, and measure 46–64 mm



FIG. 1 Adult Female *Phrynosoma asio* exhibiting their water intake behavior.

in length, 26–36 mm in diameter (Lemos-Espinal and Smith, *op. cit.*).

The herpetology laboratory at Facultad de Estudios Superiores Iztacala, Universidad Nacional Autónoma de México, supports a diverse live collection of reptiles and amphibians. The majority of them are Mexican species. The collection includes *Masticophis* spp., including two individuals of *M. mentovarius*. Here we report reproductive information about this species, based on our observations in recent years, including timing of copulation events, clutch production, hatchings, and egg sizes.

Between 1991 and 2000, four copulation events were recorded, two during February and two during March. Four clutches have been laid, two in April and two in July (9, 7 and 2, 5 eggs respectively). Two clutches have hatched during June (4 and 5 hatchlings respectively); on this last clutch, the eggs (N = 5) had a mean mass of 5.14 g, mean length of 42.8 mm, and mean width of 16.4 mm.

During 2008 and 2009 we recorded two additional reproductive events. In April 2008, in an exhibition enclosure (165 × 165 × 65 cm), copulation was observed; temperature was 28–30°C and relative humidity (RH) was 50–70%. The male (1330 mm SVL) came from the state of Morelos and the female (1180 mm SVL) was from the state of Guerrero, Mexico. On 7 July 2008, the female laid a clutch of 11 eggs, of which six were judged to be in good condition. Those eggs were incubated at 28–30°C and a RH of 50–70%. The mean weight of the eggs was 11.30 g. Two hatchlings were found on 13 and 14 August (mean mass 7.73 g, mean SVL 221.1 mm). On 19 August the rest of the eggs were discovered in poor condition and four snakes were found dead inside the eggs (mean mass 5.74 g, mean SVL 194.5 mm).

The second observation was on 13 February 2009. The same pair of *M. mentovarius* produced a clutch of nine eggs (mean mass 13.83 g, mean length 49.9 mm, and mean width 21.4 mm). The eggs were infertile.

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THAMNOPHIS RADIX (Plains Gartersnake). REPRODUCTION / LITTER SIZE. Brood (litter) sizes for *Thamnophis radix* are well documented, and are known to vary by geography, size (and age), and prey availability (Engeman et al. 2002. *Herpetol. Rev.* 33:59; Fitch 1985. *Misc. Publ. Univ. Kansas Mus. Nat. Hist.* 76:1–76; Stanford and King 2004. *Copeia* 2004:465–478). Blackburn



FIG. 1. All 90 of the seemingly healthy offspring produced by a large *Thamnophis radix* collected in Edmunds Co., South Dakota.

and Stewart (2011. *In* Aldridge and Sever [eds.], *Reproductive Biology and Phylogeny of Snakes*, pp. 119–181. Science Publishers, Enfield, New Hampshire) report the largest known litter size for *T. radix* to be 92.

During the fall of 2011, MZ collected a large adult female *T. radix* along a busy highway in Edmunds Co., South Dakota, USA. The female was kept in an enclosure with an adult male *T. radix* and both were hibernated during the winter. The pair was kept in the enclosure until early August 2012 at which time the male was moved into a separate enclosure in anticipation of the female giving birth. Starting on the evening of 9 August 2012, the female gave birth to one unfertilized ovum, six stillborn, one malformed, and 90 seemingly healthy offspring (Fig. 1). Three of the stillborn and the single live malformed offspring displayed bicephaly. The production of 97 offspring represents the largest brood for *T. radix* documented to date.

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