NATURAL HISTORY NOTES

The Natural History Notes section is analogous to Geographic Distribution. Preferred notes should 1) focus on observations in the field, with little human intrusion; 2) represent more than the isolated documentation of developmental aberrations; and 3) possess a natural history perspective. Individual notes should, with few exceptions, concern only one species, and authors are requested to choose a keyword or short phrase that best describes the nature of their note (e.g., Reproduction, Morphology, Habitat, etc.). Use of figures to illustrate any data is encouraged, but should replace words rather than embellish them. The section's intent is to convey information rather than demonstrate prose. Articles submitted to this section will be reviewed and edited prior to acceptance.

Electronic submission of manuscripts is requested (as Microsoft Word or Rich Text format [rtf] files, as e-mail attachments). Figures can be submitted electronically as JPG, TIFF, or PDF files at a minimum resolution of 300 dpi. Please DO NOT send graphic files as imbedded figures within a text file. Additional information concerning preparation and submission of graphics files is available on the SSAR web site at: http://www.ssarherps.org/HRinfo.html. Manuscripts should be sent to the appropriate section editor: **Sean P. Graham** or **Crystal Kelehear Graham** (amphibians; grahasp@tigermail.auburn.edu); **James Harding** (turtles; hardingj@msu.edu); **Ruchira Somaweera** (crocodilians; ruchira.somaweera@gmail.com); **J. Sean Doody** (lizards and *Sphenodon*; herprev.ltc.nhn@gmail.com); and **John D. Willson** or **Andrew M. Durso** (snakes; hr.snake.nhn@gmail.com).

A reference template for preparing Natural History Notes may be found here: ssarherps.org/ publications/herpetological-review/. Standard format for this section is as follows: **SCIENTIFIC NAME** in bold, capital letters; standard English name in parentheses with only first letter of each word capitalized (if available, for the United States and Canada as it appears in Crother [ed.] 2017. *Scientific and Standard English Names of Amphibians and Reptiles of North America North of Mexico, with Comments Regarding Confidence in Our Understanding, 8th ed.* Herpetol. Circ. 43:1–102, available for download here: https://ssarherps.org/publications/); **KEYWORD(S)** referring to the content of the note in bold, capital letters; content reporting observations and data on the animal; place of deposition or intended deposition of specimen(s), and catalog number(s) if relevant. Then skip a line and close with author name(s) in bold, capital letters (give names and addresses in full—spell out state names—no abbreviations, e-mail address after each author name/ address for those wishing to provide it—e-mail required for corresponding author). References may be briefly cited in text (refer to this issue or the online template for citation format and follow format precisely). One additional note about the names list (Crother 2017) developed and adopted by ASIH-HL-SSAR: the role of the list is to standardize English names and comment on the current scientific names. Scientific names are hypotheses (or at least represent them) and as such their usage should not be dictated by a list, society, or journal.

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CAUDATA — SALAMANDERS

AMBYSTOMA BARBOURI **(Streamside Salamander). PREDATION.** *Ambystoma barbouri* larvae are known to be preyed upon by centrarchid fishes (Kats et al. 1988. Behav. Neural Biol. 50:126–131), flatworms (Petranka et al. 1987. Oecologia 71:624–630), larval *Pseudotriton montanus* (Kats 1986. Herpetol. Rev. 17:61–62), and *Nerodia s. sipedon* (Kats 1986, *op. cit.*). Larval *Eurycea cirrigera* are the only documented predators of *A. barbouri* eggs (Petranka 1984. J. Herpetol. 18:48–55). At 1500 h on 3 April 2017, in Fayette County, Kentucky, USA (37.89788°N, 84.39573°W; WGS 84), aquatic isopods (*Lirceus fontinalis*) were found preying upon and penetrating the external gelatinous casing of *A. barbouri* eggs in a second-order stream (Fig. 1). We did not observe predation on the embryos. However, if a sufficient amount of the casing is removed, death may occur through various mechanisms such as early extraction of the embryo, and facilitated entry of bacteria and other predatory aquatic taxa. Though *L. fontinalis* was used as a non-predatory control in an *A. barbouri* hatching plasticity study (Sih and Moore 1993. Am. Nat. 142:947–960), we clearly observed the isopods penetrating the gelatinous casing and therefore endangering the developing embryos, which likely led to mortality. To our knowledge, this is the first report of a crustacean feeding on *A. barbouri* eggs, the first report of arthropod predation on *A. barbouri*, and the second report of predation of *A. barbouri* eggs.

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Fig. 1. *Ambystoma barbouri* eggs being preyed upon by aquatic isopods (*Lirceus fontinalis*).

***AMBYSTOMA MACULATUM* (Spotted Salamander). OVIPOSITION SITE.** *Ambystoma maculatum* breed and deposit egg masses within aquatic habitats in eastern North America during late winter or early to mid-spring, depending on geographic location and variation in seasonal weather conditions (Petranka 1998. Salamanders of the United States and Canada. Smithsonian Institution Press, Washington D.C. 587 pp.; Savage and Zamudio 2005. *In* Lannoo [ed.], Amphibian Declines: The Conservation Status of United States Species, pp. 621–627. University of California Press, Berkeley, California). Typical oviposition sites for *A. maculatum* include fishless vernal pools, roadside ditches and ruts, wetlands and marshes, water-filled depressions, stream backwaters, ponds, and fishless lakes (Petranka 1998, *op. cit.*; Savage and Zamudio 2005, *op. cit.*). On 19 April 2017, I observed five *A. maculatum* egg masses attached to woody debris within a spring pool approximately 50 m from where the spring flowed into a small pond in which centrarchid fish are present, in Sugarloaf Township, northern Columbia County, Pennsylvania, USA (41.240127°N, 76.37079°W; WGS 84). I noted approximately 30 other *A. maculatum* egg masses, as well as those of *Lithobates sylvaticus* (Wood Frog) located within a vernal pool complex ca. 75 m E of where the *A. maculatum* eggs were observed in the spring. This observation suggests that at least some of the *A. maculatum* population in this locality oviposit within a spring habitat, which is unusual for this species (Petranka 1998, *op. cit.*; Savage and Zamudio 2005, *op. cit.*).

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***CRYPTOBRANCHUS ALLEGANIENSIS ALLEGANIENSIS* (Eastern Hellbender). TERRESTRIAL ACTIVITY.** A 1950 h, approximately one hour before sunset on 7 August 2017 within the Nottely River drainage, Union County, Georgia, USA (specific locality withheld due to conservation concerns), an adult hellbender (~36 cm total length) was observed out of water traversing along the surface of a maintained U.S. Forest Service trail ~12 m in elevation above and ~30 m from the margin of a stream (48% slope, surrounding understory vegetation consisting primarily of *Kalmia latifolia* (Mountain Laurel), *Rhododendron maximum* (Rhododendron) and ~15 m from and between two separate shallow hillside seepages (water depth < 2 cm). The observation occurred following a heavy and sustained precipitation event; 5.3 cm of rain fell within 24 h preceding the observation, 4.06 cm of which fell within three hours preceding the observation, and 2.7 cm of that fell within a 30-min. period one hour preceding the observation (University of Georgia, Automated Environmental Monitoring Network station, within ~10 km of the observation locality). The hellbender was observed crawling along ~12 m on the trail; when nudged after assuming a stationary position, the hellbender slowly retreated ~0.5 m to a ~1 cm deep puddle in the trail, once again assuming a stationary position, but within 10 min. of the original time of observation, the specimen had vacated the trail with no further observation.

Diurnal terrestrial movement has been observed in captive adult hellbenders (Floyd et al. 2013. Herpetol. Rev. 44:651) and adult hellbenders in the wild have been observed as far as 8.4 m from aquatic habitat in Virginia (Coe et al. 2016. Herpetol. Rev. 47:99–100). Beck (1965. Field and Stream 69:64–66, 109–113) reported catching hellbenders on land ~1 m from the water's edge within meat-baited mammal traps on more than one occasion along the Allegany River in Pennsylvania. Floyd et al. (2013, *op. cit.*) reported the observation of the terrestrial movement of a larval specimen in Georgia. To our knowledge, this is the first observation of terrestrial movement of a hellbender associated with a rainfall event, and represents the farthest documented distance a hellbender has been observed from water.

Fig. 1. An adult *Cryptobranchus alleganiensis* observed on a trail 30 m from a stream.

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***EURYCEA BISLINEATA* (Northern Two-lined Salamander). OOPHAGY.** Cannibalism and caudal predation is well known in many large plethodontid salamanders, mainly semi-aquatic species from the genera *Desmognathus, Gyrinophilus,* and *Pseudotriton.* Specifically, adults and large larvae from these genera are known to consume larval conspecifics and the larvae of related species, though smaller metamorphosed individuals are also occasionally predated upon (Bruce 1979. Evolution 33:998–1000; Beachy 1997. Copeia 1997:131–137). Conversely, oophagy/egg cannibalism has only been reported in the adults of the semi-aquatic plethodontid salamanders *Desmognathus auriculatus* (Chaney 1949. The Life History of *Desmognathus fuscus auriculatus.* M.S. Thesis, Tulane University, New Orleans, Louisiana. 130 pp.), *D. carolinensis* (Tilley 1972. Copeia 1972:532–540), *D. fuscus* (Bishop 1941. New York State Bull. 324), *D. ochrophaeus* (Wood and Wood 1955. J. Tennessee Acad. Sci. 39:36–39), *D. ocoee* (Tilley 1972, *op. cit.*), *D. monticola* (Camp 1997. Herpetol. Rev. 28:81–82), in larval *Gyrinophilus porphyriticus* (Bruce 1979, *op. cit.*), and an unsuccessful attempt was reported in a female *Pseudotriton ruber* (Miller et al. 2007. Herpetol. Conserv. Biol. 3:203–210).

On 8 April 2017, an adult female *Eurycea bislineata* (82.2 mm total length; 1.6 g) was found underneath a submerged rock in a first-order stream impacted by mountain top removal mining with a valley fill in Breathitt County, Kentucky, USA (37.42377°N, 83.17386°W; WGS 84). Non-lethal gastric lavage was performed and three eggs (3.62 mm in diameter) were recovered. Bishop (1941, *op. cit.*) noted freshly laid eggs are 2.5–3.0 mm in diameter, however, the *Eurycea* eggs in this region are well-developed in early April, and after four sampling periods, no *Pseudotriton* or *Gyrinophilus* were captured at this site. Therefore, the eggs most likely belong to another *Eurycea* (e.g., *E. bislineata* or *E. longicauda*). To our knowledge, this is the first report of oophagy in *E. bislineata* or in a member of the genus *Eurycea*. The female was found under a submerged rock devoid of eggs and no nests were seen within 10 m of the individual, though a female-guarded *Eurycea* nest had been observed 3 weeks before. Therefore, it is uncertain if the eggs were from this individual's nest or from the nest of another female.

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***PLETHODON CHLOROBRYONIS* (Atlantic Coast Slimy Salamander). PREDATION.** Salamanders of the genus *Plethodon* are well-known prey items of *Thamnophis sirtalis* (Ernst and Ernst 2003. Snakes of the United States and Canada, Smithsonian Institution Press, Washington, DC. 668 pp.). Reports of predation upon species in the *Plethodon glutinosus* complex, however, are much less common. *Thamnophis sirtalis* is known to predate four species in the complex: *P. albagula* (Konvalinka and Trauth 2003. Herpetol. Rev. 34:378), *P. chattahoochee* (Pierson et al. 2014. Herpetol. Rev. 45:302), *P. cylindraceus* (Uhler et al. 1939. Trans. Am. Wildl. Conf. 4:605–622), and *P. glutinosus* (McCoard 2008. M.S. Thesis. Marshall University, Huntington, West Virginia. 96 pp.).

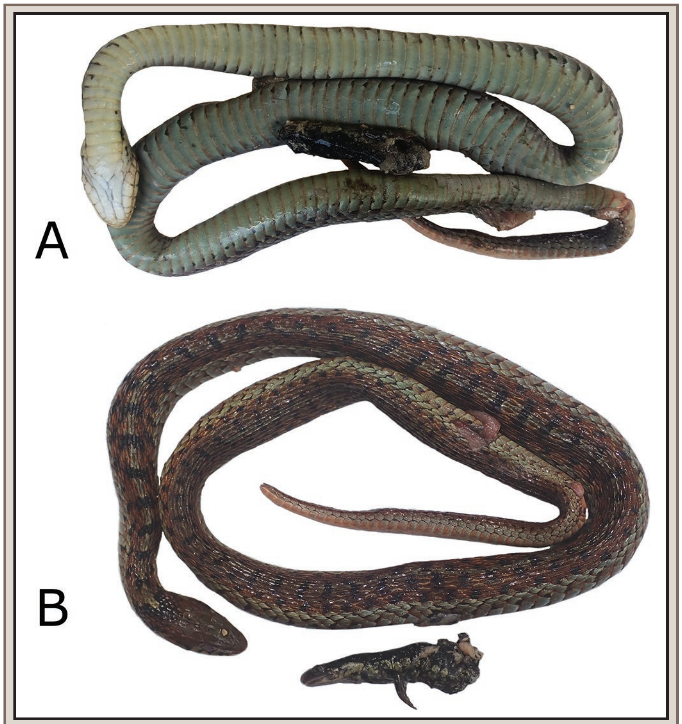

Fig 1. A) Ventral view of a DOR *Thamnophis sirtalis*, with partially-digested *Plethodon chlorobryonis* protruding from mid-body. B) Dorsal view of *T. sirtalis*, with partial *P. chlorobryonis* removed from digestive system.

At ~1015 h on 5 August 2017, we found a male *T. sirtalis* (Fig 1.) dead on a gravel road in the Croatan National Forest, near Havelock, Craven County, North Carolina, USA (34.95010°N, 77.03840°W, WGS 84; 11 m elev.). The anterior half of a *P. chlorobryonis* was largely intact and protruding from an injury at mid-body of the deceased snake. Further dissection of the *T. sirtalis* revealed mostly-digested portions of the posterior half of the *P. chlorobryonis*, which had been swallowed tail-first. *Thamnophis sirtalis* is sympatric with *P. chlorobryonis* across the salamander's entire range, and given the generalist feeding strategy of *T. sirtalis*, predator-prey interaction between the two species is not unexpected. To our knowledge, however, this is the first confirmed record of such an interaction, making *P. chlorobryonis* the fifth member of the *P. glutinosus* complex known to be consumed by *T. sirtalis*.

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***PLETHODON GLUTINOSUS* (Northern Slimy Salamander). CLIMBING BEHAVIOR.** Rainfall and moisture are important mediators of above-ground activity in plethodontid salamanders (Spotila 1972. Ecol. Monogr. 42:95–125). Without sufficient moisture, rates of evaporative water loss during above-ground activity are often too high to allow for such behavior (Spight 1968. Physiol. Zool. 41:195–203). Arboreal movements tend to be even more restricted by moisture because arboreal habitats lack the solid interface for efficient water exchange that is provided by soil (Spight 1967. Biol. Bull. 132:126–132). It is unsurprising then that observations of climbing behavior in *P. glutinosus* have mostly been restricted to rainy nights (Cliburn and Porter 1986. J. Mississippi Acad. Sci. 31:91–96). These temporally and moisture-driven restrictions on climbing behavior are known in many climbing species of plethodontids (Jaeger 1978. Copeia 1979:686–691; Trauth et al. 2000. Herpetol. Rev. 31:232–233; McEntire 2016. Copeia 104:124–131), and daytime climbing behavior has rarely been reported within most Appalachian plethodontid lineages (McEntire 2016, *op. cit.*). Herein, I report a rare observation of a plethodontid climbing a tree during the middle of a hot, sunny day.

At 1400 h on 15 June 2016, I encountered a small adult *P. glutinosus* perched on the trunk of a small maple tree 70 cm from the ground (Fig. 1) within mixed deciduous and longleaf pine forest in Oak Mountain State Park, Shelby County, Alabama, USA (33.32848°N, 86.75092°W; WGS 84). Skies were sunny and the air temperature was ~30°C (estimated from a reading of 30°C at the nearest weather station, about 8 km away, in Pelham, Alabama). Light rain precipitated during the early morning, but ended by 0800 h, giving way to sunny skies by 0815 h. The salamander was not present on the tree at 0830 h (30 min. after the rain ended), and therefore must have climbed the tree during sunny daytime

Fig. 1. A small adult *Plethodon glutinosus* clinging to the side of a small maple tree 70 cm above the forest floor on a hot, sunny day in Oak Mountain State Park, Alabama, USA.

conditions between 0830 h and 1400 h. When I encountered this individual in the tree, it had not rained for 6 h, and had been sunny for nearly as long. When approached, the salamander moved slightly, but did not attempt to climb down from the tree. I am unsure what caused this unusual climbing behavior when *P. glutinosus* would be expected to be under cover. Hartzell (2015. Collinsorum 4:2) documented this species climbing 20 cm up a moist fern during the day, but his observation occurred under balmy, wet conditions unlikely to present physiological challenges. Hairston (1987. Community Ecology and Salamander Guilds. Cambridge University Press, Cambridge, UK. 127 pp.) also documented climbing in this species, but remarked that such behavior was restricted to rainy nights. I believe my observation to be the first of climbing behavior in this species under hot, dry, daytime conditions.

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ANURA — FROGS

***ANAXYRUS AMERICANUS AMERICANUS* (Eastern American Toad). ABNORMAL COLORATION.** On 28 May 2016, a young hypomelanistic *Anaxyrus americanus* (Fig. 1.) was discovered in an open floodplain in Nelson County, Virginia, USA (37.77972°N, 78.71444°W, WGS 84; 150 m elev.) during the Virginia Herpetological Society's survey of The Quarry Gardens (Neff 2017. Catesbeiana 37:20–31). The individual had normally colored eyes, but its skin was bright orange in coloration.

Fig. 1. A hypomelanistic *Anaxyrus a. americanus* pictured with normally colored *A. fowleri* for comparison, Nelson County, Virginia, USA.

A typical adult *A. a. americanus* is described as being a plain-brown toad and sometimes patterned with patches of lighter brown, gray, olive, or dark red (Conant and Collins 1998. A Field Guide to Reptiles and Amphibians of Eastern and Central North America. Houghton Mifflin Company, Boston, Massachusetts. 640 pp.). The individual discovered was not a true albino or leucistic, which are defined as the absence of melanin in the skin, mucosa, and eyes, or being white, respectively (Bechtel 1995. Reptile and Amphibian Variants: Colors, Patterns, and Scales. Krieger Publishing Company, Malabar, Florida. 206 pp.). The *A. a. americanus* was bright orange and had no melanin present on its body except for its eyes. Because of the presence of melanin, this toad was classified as hypomelanistic, which is defined as having decreased amounts of melanin ranging from almost albino in coloration (like the toad that was found) to a less than normal amount of melanin (Bechtel 1995, *op. cit.*).

To our knowledge, only two records for abnormally colored *A. a. americanus* are known: a leucistic individual was recorded in North Carolina (Brannon 2006. Herpetol. Rev. 37:333–334) and an albino individual was recorded in Virginia (Bulmer 1975. Virginia Herpetol. Soc. Bull. 78:7). Although uncommon across most taxa of frogs in the United States, albinism has been documented before in *Lithobates catesbeianus* (American Bullfrog; Mitchell and McGranaghan 2005. Banisteria 25:51), *L. sylvaticus* (Wood Frog; Luce and Moriarty 1999. Herpetol. Rev. 30:94), and *Rana boylii* (Foothill Yellow-legged Frog; Norman and Moller 2002. Bull. Chicago Herpetol. Soc. 37:2–3). Leucism has been documented in *A. fowleri* (Fowler's Toad; Palmer and Braswell 1980. Brimleyana 3:49–52), *L. sylvaticus* (Thompson and Rea 2013. Herpetol. Rev. 44:128–129), *Scaphiopus hurterii* (Hurter's Spadefoot; McKnight and Ligon 2013. Herpetol. Rev. 44:131–132) and *S. holbrookii* (Eastern Spadefoot; Feinberg and Hoffmann 2004. Herpetol. Rev. 35:377). To our knowledge this is the first known documentation of a hypomelanistic American Toad.

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ANAXYRUS PUNCTATUS **(Red-spotted Toad). DIET.** *Anaxyrus punctatus* is a species with a relatively wide distribution, which spans from southeastern California through Nevada, southern Utah to southern Colorado and southwestern Kansas in the United States, to Baja California, Sinaloa, Aguascalientes, Jalisco, Guanajuato, San Luis Potosí, Hidalgo, and Tamaulipas, in Mexico (Dodd 2013. Frogs of the United States and Canada, Volume 1. The Johns Hopkins University Press, Baltimore, Maryland. 982 pp.). *Anaxyrus punctatus* is mostly active at night during the monsoon months from late June through late September. This species is known to feed on a variety of invertebrates, including beetles, true bugs, bees, and ants (Tanner 1931. Utah Acad. Sci. 8: 159–198; Smith 1934. Am. Midl. Nat. 15: 377–528; Little and Keller 1937. Copeia 1937: 216–222), and recently metamorphosed individuals feed on ants (Little and Keller 1937, *op. cit.*). Surprisingly, there is no information regarding the diet of its tadpoles. Herein, we report an instance of opportunistic feeding by tadpoles of *A. punctatus* on dead katydids in the northern Chihuahuan Desert of Trans-Pecos, Texas.

At 1325 h on 19 August 2017, we observed tadpoles of *A. punctatus* feeding on two dead and submerged katydids (Orthoptera) near Squaw Spring within Indio Mountains Research Station, situated ~40 km SW of Van Horn, Hudspeth County, Texas, USA (30.79712°N, 105.01143°W, WGS 84; 1263 m elev.). The site contained smaller isolated downstream pools, located ca. 20 m from the larger permanent spring pool, which are flanked by riparian vegetation represented mostly by *Baccharis salicifolia* and *B. salicina*. The early stages of decomposition of both katydids (*Pediodectes tinkhami* and *Dichopetala* sp.; Fig. 1A and 1B, respectively) indicated that they had fallen recently into the small pools. The tadpoles were located mostly in pool sites covered with substantial amounts of algae. We observed from two to six individual tadpoles actively feeding on both katydids' exoskeleton fragments, in addition to entering their body cavities and consuming internal soft tissues. To the best of our knowledge, we consider these observations to be the first published report of *A. punctatus*, and specifically its tadpoles, feeding on these two species of katydids.

PHOTOS BY VICENTE MATA-SILVA

Fig. 1. Tadpoles of *Anaxyrus punctatus* feeding on the dead katydids *Pediodectes tinkhami* (A), and *Dichopetala* sp. (B), in small pools downstream from Squaw Spring on Indio Mountains Research Station, Hudspeth County, Texas, USA.

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BOANA BANDEIRANTES. **AGONISTIC BEHAVIOR.** Anuran males can aggressively defend calling, courtship, and oviposition sites by means of physical fights (Wells 2007. Ecology and Behavior of Amphibians. University of Chicago Press, Chicago, Illinois. 1400 pp.). Physical combat has been reported in male Gladiator Frogs of the genus *Boana*, which have prepollical spines that may cause injuries to the opponent during combat (Martins et al. 1998. Amphibia-Reptilia 19:65–73; Menin et al. 2004. Iheringia Sér. Zool. 94:49–52; Giasson and Haddad 2006. J. Herpetol. 40:226–229; Brunetti et al. 2014. Salamandra 50:215–224; Furtado et al. 2016. South Am. J. Herpetol. 11:136–147). *Boana bandeirantes* is a medium-sized treefrog (male SVL = 27.1–29.1 mm, female SVL = 31.2 mm) known to occur in southern Rio de Janeiro state and northeastern São Paulo state, southeastern Brazil (Caramaschi and Cruz 2013. S. Am. J. Herpetol. 8:121–126).

Between 2200–2400 h on 27 March 2017, near the Rio Claro in São Paulo State, Brazil (23.65359°S, 45.88927°W; WGS 84) we observed a group of eight male *B. bandeirantes* calling perched on the marginal vegetation of a small stream (about 50 cm width, 30 cm depth); males were spaced about 1 m from each other and perched on grasses and bushes from 15 to 60 cm above the ground. One male (SVL = 30.79 mm; 1.5 g) had dorsal scratches consistent with previous agonistic behavior (Fig. 1). After measurements the frog was released in the original site. Dorsal injuries are probably scars resultant from territorial combat and caused by the prepollical spines of conspecific males, suggesting *B. bandeirantes* displays agonistic behavior associated with territoriality. Similar injuries resulting from agonistic behavior have been reported for *B. beckeri, B. cipoensis, B. goiana B. latistriata, B. leptolineata, B. phaeopleura, B. polytaenia,* and *B. stenocephala* (Antunes 2007. M.S. Thesis, Universidade Estadual Paulista, São Paulo, Brazil. 150 pp.; Reink and Deiques 2010. Neotrop. Biol. Conserv. 5:188–196).

Fig. 1. A male *Boana bandeirantes* from Estação Biológica de Boracéia, southeastern Brazil, showing dorsal scratches.

The agonistic encounters between males of *B. goiana* last about 2 min., during which males grasp each other, keeping their bellies in contact and their hands positioned in the backs of the opponent; while grasped, males inflict injuries to the opponent using their prepollical spines, resulting in characteristic scratches (Menin et al. 2004, *op. cit.*). This is the first reported observation of these injuries in *B. bandeirantes*.

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BOANA PARDALIS **(Leopard Treefrog). PREDATION.** *Boana pardalis* is a large treefrog included in the *B. faber* group (Faivovich et al. 2005. Bull. Am. Mus. Nat. Hist. 294:1–240; Dubois 2017. Bionomina 11:1–48). This species inhabits water bodies in forested and open habitats in the Atlantic Forest of southeastern Brazil (Caramaschi and Napoli 2004. J. Herpetol. 38:501–509). *Attila rufus* (Grey-headed Attila) is an endemic bird of the subtropical and tropical forests of Brazil and occupies the forest strata from the canopy through to the ground.

At 1630 h, on 1 June 2011 in Municipal Natural Park Açude da Concórdia, Valença Municipality, Rio de Janeiro State, Brazil (22.26538°S, 43.69109°W; WGS 84), we observed an *A. rufus* perched in woody vegetation ~2 m above the ground, holding a *B. pardalis* in its beak (Fig. 1). The *B. pardalis* was emitting a distress call. With the prey item in its beak, the *A. rufus* started hitting it against the branch, until after multiple hits the vocalization of the frog ceased and the bird swallowed the frog whole. This is the first report of *B. pardalis* being preyed upon by *A. rufus*.

Fig. 1. *Attila rufus* holding a treefrog, *Boana pardalis*, in its beak in the municipality of Valença, Rio de Janeiro, southern Brazil.

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BOANA POLYTAENIA. **MYIASIS.** It is not uncommon to find myiasis caused by Calliphoridae, Sarcophagidae, Chloropidae, and Muscidae dipterans on anuran amphibians, especially in the Neotropical region. Adult flies lay eggs in different body parts of the host (e.g., eyes, oral cavity, cloaca, dorsal and lateral regions), and the hatched larvae feed on the living prey tissues until the last stage of their development, usually causing the death of the host (Hagman et al. 2005. Phyllomedusa 4:69–73; Hoskin and McCallum 2007. Biol. J. Linn. Soc. 92:593–603; Eizemberg et al. 2008. Parasitol. Res. 102:339–339). Here, we report opportunistic observations of flesh fly infestation on two species of the *Boana polytaenia* group, for which myiasis has not been previously documented, in a montane region of southeastern Brazil. These records were obtained during herpetofaunal inventories at Serra da Mantiqueira mountain complex, on the border of the states of São Paulo and Minas Gerais. Both treefrog and larvae were collected and housed in the amphibian collection of the Laboratory of Zoology, at Universidade de Taubaté. We measured the SVL of treefrogs that were identified using specific literature (Caramaschi and Cruz 1999. Bol. Mus. Nac. 403:1–10; Caramaschi and Cruz 2004. Arq. Mus. Nac. 62:247–254; Faivovich et al. 2005. Bull. Am. Mus. Nat. Hist. 294:1–240). We collected the first infested specimen, a male *Boana latistriata* (SVL = 26.7 mm; collection number 2755), in the riparian vegetation surrounding a permanent pond at Campos do Jordão State Park, in Campos do Jordão, São Paulo (22.6905°S, 45.4808°W; WGS 84). It presented two larvae openings. The first one in the superior-dorsal region, in the left side, near the scapula, while the second one was in the inferior-dorsal region, near the sacra base (Fig. 1A). Despite the opening position, the larvae were located in the abdominal cavity. Most muscles in the back were consumed, but the organs were apparently intact. We found four unidentified larvae of the Calliphoridae in molt (10.2, 10.2, 10.2 and 8.9 mm long; mean 9.9 mm ± 0.7 SD). We noticed the infestation as soon as we captured the treefrog and placed it in the plastic bag, when some of larvae left its body, and the host died. The second specimen was a male *B. stenocephala* (SVL = 26.0 mm, collection number 6168), obtained at the Municipal Park of Cristina, Minas Gerais, in the riparian forest surrounding a small stream (22.2138°S, 45.2478°W; WGS 84). There was a single larva (5.2 mm long) identified as 2nd instar of *Lucillia* or *Hemilicillia* sp. (Calliphoridae). The opening was in the left side of the back, near the scapula. The infestation was detected when the treefrog

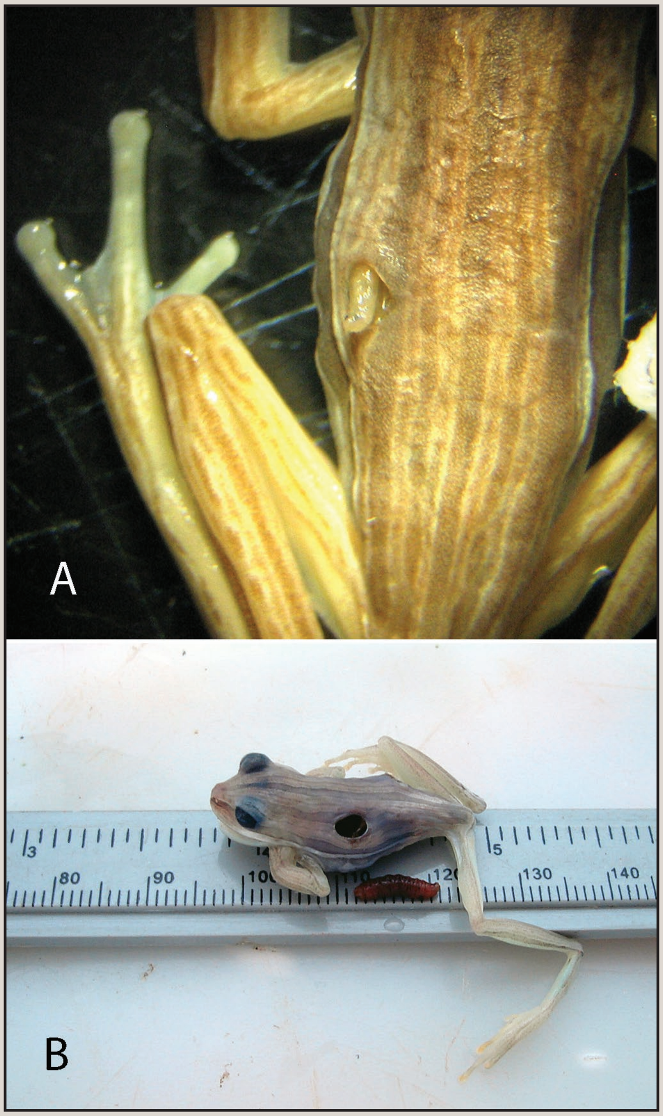

Fig. 1. Myiasis in frogs of the *Boana polytaenia* group. A) Male *Boana latistriata* and (B) male *B. stenocephala* infested by Calliphoridae larvae.

was being euthanized, when the small larva left the host (Fig. 1B). Although myiasis may be an important natural factor controlling frog populations, this ecological interaction is still barely understood, and should be deeper investigated.

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***GASTROPHRYNE CAROLINENSIS* (Eastern Narrow-mouthed Toad). ARBOREAL ACTIVITY.** At 2030 h on 14 May 2017, we observed an adult *Gastrophryne carolinensis* on the trunk of a mid-sized buttonbush (*Cephalanthus occidentalis*) approximately 1.3 m above ground at Joyce Wildlife Management Area (WMA), Tangipahoa Parish, Louisiana, USA (30.39734°N, 90.42799°W; WGS 84). We watched the animal for several minutes while taking photographs and considering its odd location. The animal soon retreated into a small hole in the base split of the tree, just big enough to fit in. Subsequent visits yielded no *G. carolinensis* in the same spot. Weather was clear skies, calm winds, and around 23°C. It had not rained since the day before.

An additional observation of an arboreal *G. carolinensis* was made at 2045 h on 29 July 2017 at Indian Bayou WMA in the Atchafalaya Basin, St Landry Parish, Louisiana, USA (30.40641°N, 91.70936°W; WGS 84). This individual was crawling on the bark of a large oak (*Quercus* sp.) 2.5 m above the ground (not pictured); it had rained earlier that day. Interestingly, the animal was approximately 30 cm above a *Hyla chrysoscelis* (Cope's Gray Treefrog). On both of these occasions, males were heard calling, but no indication of calling came from the tree-dwelling animals; no efforts were made to determine the sex of the individuals. However, calling has only been reported from near ground surface with standing water present (Etges 1987. Copeia 1987:910–923). Along with evidence that this time period is prime for foraging in this species (Anderson 1954. Tulane Stud. Zool. 2:15–46), we are left to conclude that these animals were foraging in the trees. Whether they returned to a terrestrial/subterranean or arboreal refuge is unknown.

Although we have observed several *G. carolinensis* up to 20–30 cm above the water/mud at Joyce WMA before on *Taxodium distichum* (Bald Cypress) trunks, knees, and other retreats, this is the first report of active *G. carolinensis* being so far above the ground for a species often described as being fossorial. Anderson (1954, *op. cit.*) mentioned finding one in a dead stump 2.4 m above ground, but this animal was presumably resting. Wright (1932. Life-histories of the Frogs of Okefenokee Swamp, Georgia. North American Salientia (Anura) No. 2. The Macmillan Co., New York. 497 pp.) remarked on the ability of this species to scale vertical surfaces. While arboreality is common in the family Microhylidae, we find it remarkable that this behavior is so poorly documented

Fig. 1. Arboreal activity of *Gastrophryne carolinensis* in southeast Louisiana, USA.

within the scientific literature for North American species, despite its potential prevalence.

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***KALOPHRYNUS BALUENSIS* (Kinabalu Sticky Frog). REPRODUCTION AND VOCAL DESCRIPTION.** The microhylid frog genus *Kalophrynus* currently consists of 25 species (Frost 2017. Amphibian Species of the World: an Online Reference. Version 6.0 [accessed 14 Jun 2017], available at: http://research.amnh.org/herpetology/amphibia/index.html. American Museum of Natural History, New York) with 11 of them reported from the island of Borneo. *Kalophrynus baluensis* has a very restricted range, and is endemic to Mount Kinabalu in Sabah, Malaysian Borneo, ranging from 1000–1800 m elev. *Kalophrynus baluensis* is often found in leaf litter and we have observed them climbing as high as 1.2 m on trunks and shrubs. Currently, detailed descriptions of *K. baluensis* reproductive ecology and behavior are lacking (Inger and Stuebing 2005. A Field Guide to the Frogs of Borneo. Natural History Publications. Kota Kinabalu, Malaysia. 204 pp.). Furthermore, the current known range of vocalizations is limited to a single-noted nocturnal call (Malkmus and Riede 1996. Herpetozoa 9:151–155; Malkmus et al. 2002. Amphibians and Reptiles of Mount Kinabalu. A. R. G Gantner Verlag. Königstein, Germany. 424 pp.). Here, we present the first description of the breeding habits of *K. baluensis*, as well as a novel diurnal vocalization.

Kalophrynus baluensis was found in a tree buttress hole near the ground during a survey of Kinabalu Park (6.00745°N, 116.54215°E; WGS 84) on 22 June 2010. The buttress hole was approx. 40 x 20 cm wide, and was filled with ~150 eggs. In April 2016, several individuals (at one point as many as five) of *K. baluensis* were observed in a tree hole (hollow stump) created from a felled tree fern (*Cyathea* sp.) at approx. 1450 m elev. The ambient air temperature at this altitude averages 20°C (Kitayama 1992. Vegetatio 102:149–171). The tree fern was located near the upper loop road in the park, next to the Padahaan shelter. The top of the tree fern stump ranged between 115–120 cm from the ground. In April of 2016 the water column was 42 cm deep, and 51.5 cm deep including the leaf litter at the bottom. The temperature of the water was 20°C and it had a pH of 6. The internal diameter of the tree hole was 9 cm. Eggs were observed (Fig. 1A) but disappeared during embryonic development, likely due to predation, preventing measurements of these critical periods.

At 1356 h on 6 June 2017, the species was observed in amplexus in the same tree hole. The pair was filmed using a Nikon AW130 camera that was left unattended to reduce disturbance to the frogs. They were filmed for 0.5 h, from 1415 until 1445 h, as well as one hour under red light between 1900 and 2100 h. The male periodically came up to the surface of the water to emit short calls (see spectrogram, Fig. 1B, C) that differed from the typical advertisement call reported in the literature (Malkmus et al. 2002, *op. cit.*). We analyzed 25 of these contact calls (emitted by the same individual) and they averaged 57 ms in length (range: 43–70 ms) and consisted of a single note with an average mean dominant carrier frequency of 1.4 kHz (range: 1.3–1.6 kHz; Fig 1B, C). In comparison, the previously recognized advertisement

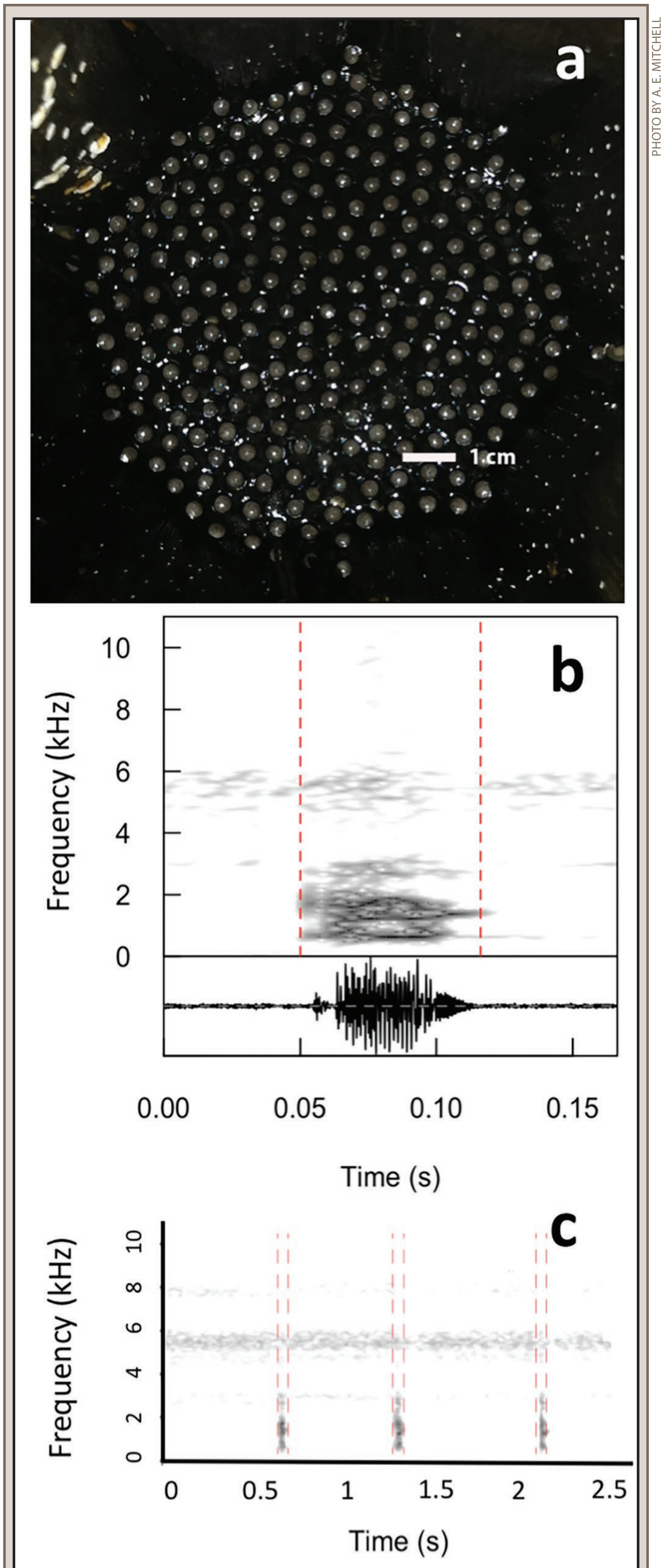

Fig. 1. A) *Kalophrynus baluensis* egg mass; B) spectrogram with oscillogram underneath of *K. baluensis* contact call; and C) long spectrogram of *K. baluensis* contact call. Call is identified between dashed lines.

call of *K. baluensis* averages 125 ms in length and a dominant carrier frequency at 2.6 kHz (Malkmus et al. 2002, *op. cit.*). The call analysis was performed using the package warbleR in the software R.

After the male vocalized, the female subsequently emerged from the bottom of the water column. The female was seen surfacing just beneath the male on numerous occasions. The male used his forearms to grasp the female on both sides of her head as her snout reached the surface. The back legs were not used to hold onto the female but were left floating at the surface. The female frequently dove down, causing the male to vocalize again, which seemed to cause the female to resurface. These unique behaviors were observed during the day (1415–1445 h) as well as night (1900–2100 h). No eggs were observed in the tree hole over the following two days, suggesting that the pair spends several days together prior to oviposition.

Although egg laying was never directly observed, evidence strongly suggests the eggs photographed in 2016 (Fig. 1a) belong to *K. baluensis*. Aside from the eggs appearing in the same location as amplexed adults, we can rule out most other frogs from this field site as well. Members of the genera *Ansonia*, *Leptobrachium*, *Leptolalax*, *Megophrys*, *Meristogenys*, *Staurois*, and *Rhacophorus* from the same site all rely on streams or water bodies on the forest floor for reproduction. *Pelophryne* spp. use leaves with accumulated water on the forest floor. *Chaperina fusca* and *Nyctixalus pictus* both attach their eggs to the walls of small water bodies or to submerged leaf litter. *Philautus* spp. in this region are all thought to deposit their eggs directly on leaves and are not dependent on water bodies, and their eggs are much larger in diameter than those observed in this tree hole. Furthermore, other *Kalophrynus* spp., which may have similar breeding habits, do not occur at this elevation (Malkmus et al. 2002, *op. cit.*). The eggs we observed were ~3 mm in diameter (Fig. 1A) and light grey in color. The genus is known to use tree holes and other aquatic microhabitats for breeding (Malkmus et al. 2002, *op. cit.*) and breeding in temporary pools has been speculated for *K. baluensis.* As far as we are aware, this is the first confirmation that *K. baluensis* breeds in tree holes. It also shows that they may climb, in this case to just over 1 m in height, to reach available small water bodies.

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***LEPTODACTYLUS RHODOMYSTAX* (White-lipped Frog). DIET.** Even though many invertebrate groups have been found to be important prey items of frogs (Duellman and Trueb 1994. Biology of Amphibians. Johns Hopkins University Press, Baltimore, Maryland. 670 pp.), non-arthropods are not as frequently reported (Solé et al. 2009. Herpetol. Notes 2:9–15; Pazinato et al. 2011. Rev. Biotem. 24:147–151; Sugai et al. 2012. Biota Neotrop. 12:99–104; Camera et al. 2014. Herpetol. Notes 7:31–36). Leptodactylid frogs are considered to be generalists and opportunistic predators (Strüssmann et al. 1984. J. Herpetol. 18:138–146; Rodrigues et al. 2004. Rev. Esp. Herpetol. 18:19–28). Recently, a Pepper Frog (*Leptodactylus knudseni*) was found swallowing a Giant Earthworm (*Rhinodrilus priolli*) in an Amazon rainforest (Barros et al. 2015. Herpetol. Rev. 46:613). Here, we report a similar observation. At 2030 h on 10 December 2012, at the beginning of the rainy season in the Matupiri State Park, Municipality of Manicoré, Amazonas State, Brazil (4.01849°S, 61.61469°W; WGS 84), we observed a *L. rhodomystax* (male, SVL = 69.9 mm) preying upon a Giant Earthworm (*R. priolli*). The frog took about 25 min. to swallow the earthworm completely, while the earthworm continually stretched out its body as a defensive behavior (Fig. 1). Prey and predator were deposited in the herpetological collection of the zoological collections of the Instituto Nacional de Pesquisas da Amazônia, Manaus, Brazil (INPA–H 32484). Giant Earthworms are potentially an excellent source of protein for frogs, because they can grow up to 2 m, and they are usually abundant in the areas where they occur (Lang et al. 2012. Am. Midl. Nat. 167:384–395). This is the first report of *L. rhodomystax* feeding on giant earthworms.

Fig. 1. Male adult of *Leptodactylus rhodomystax* preying on a Giant Earthworm, *Rhinodrilus priolli*, in central Amazonia, Brazil.

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***MANTELLA AURANTIACA* (Golden Mantella). PREDATION BY TERRESTRIAL BEETLE LARVAE.** *Mantella aurantiaca* is one of 16 species of *Mantella* endemic to the island of Madagascar. Found only in the district of Moramanga in eastern Madagascar, it is highly threatened mainly due to habitat loss and also collection for the pet trade. It is currently listed as Critically Endangered on the IUCN Red List due to its restricted distribution (http://www.iucnredlist.org/details/12776/0; 26 Jun 2017).

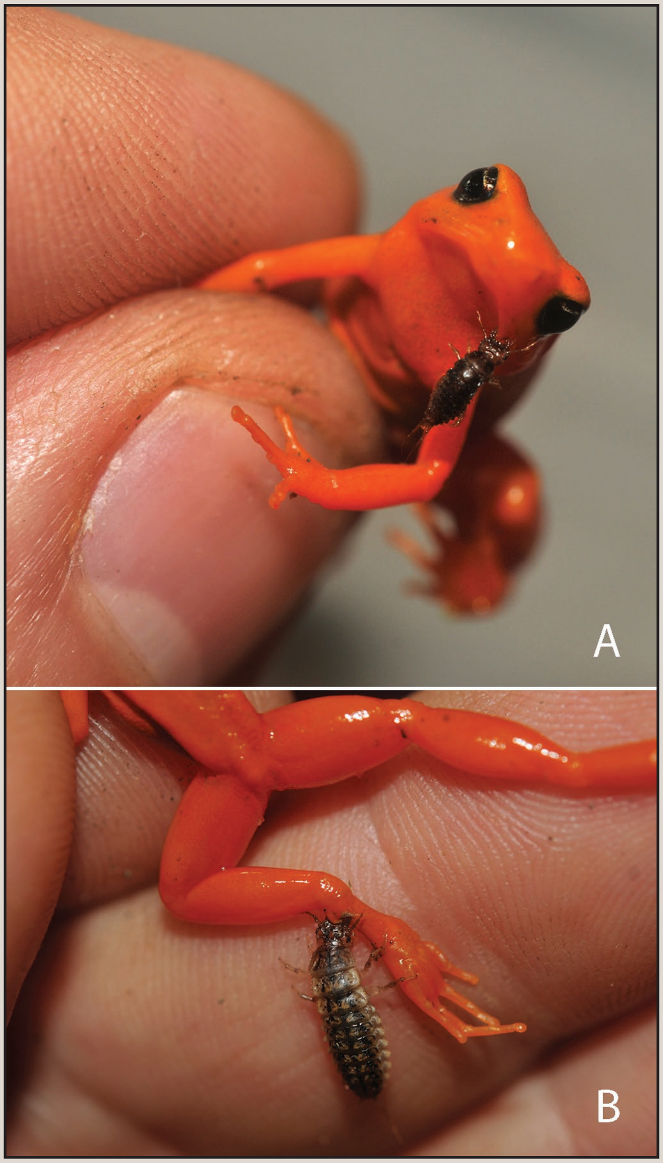

Fig. 1. A) *Mantella aurantiaca* with a first-instar larva of *Epomis* beetle attached to its lower jaw. B) *Mantella aurantiaca* with a second-instar larva of *Epomis* beetle attached to its hind leg.

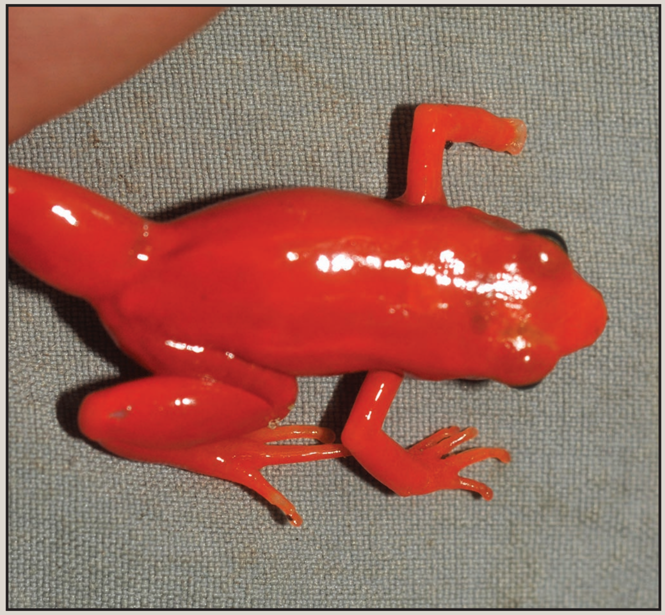

Fig. 2. *Mantella aurantiaca* missing a hand, possibly as a result of *Epomis* beetles.

During a 2016 expedition undertaken by local NGO Madagasikara Voakajy (http://www.madagasikara-voakajy.org/; 26 Jun 2017) and Chester Zoo staff, *M. aurantiaca* surveys of four breeding ponds were undertaken in the Mangabe Protected Area. This was conducted as part of a two-year (November 2014 – March 2016) monitoring program of the *M. aurantiaca* population, and consists of visiting four alternate days three times per year for a period of two years. A total of 5207 frogs were handled and externally examined.

Between 15 and 24 January 2016, 1015 frogs were monitored at a single pond (Andranomena Pond) and three adult male *M. aurantiaca* individuals were observed with beetle larvae attached to their skin. One first instar larva was on the lower jaw (Fig. 1A) and the other two were older and attached to the hind legs (dorsally and ventrally; Fig. 1B). These frogs were observed around the edge of a breeding pond to a distance 20 m. The frogs didn't seem to be affected by the larvae immediately after collection. Five minutes after being found the larvae attached to the legs produced an ulcer of approximately 2 mm where the mandibles were attached to the skin, exposing the internal tissue.

The *Epomis* genus contains around 30 species distributed across the Old World. Their larvae have been recorded predating amphibians in the wild: in Israel (Elron et al. 2007. Herpetol. Rev. 38:30–33; Wizen and Gasith 2011a. ZooKeys 100:181–191), Sri Lanka (Silva et al. 2009. FrogLog 91:5–7), Japan (Crossland et al. 2016. Herpetol. Rev. 47:107–108), and India (Wizen et al. 2017. Herpetol. Rev 48:612). By undertaking laboratory experiments, Wizen and Gasith (2011b. PLoS ONE 6: e25161) described how beetle larva predated upon amphibians. When the larva and amphibian are introduced the larva will begin with luring behavior using antenna waving and mandible movements. When the amphibian tries to eat it, the larva will quickly move and attach itself to the amphibians' skin. In most experiments the larva will begin by sucking body fluids but often progresses to chewing flesh. In most cases the end result will be the death of the amphibian.

This is the first record of *Epomis* predating frogs in Madagascar. Interestingly, predation observed in Moramanga was at low frequency, in one pond, and over a single time period. They may have been in the early stages, only consuming body fluids; however it is also possible that *M. aurantiaca* is resistant to this attack. This might explain the observations of individuals with missing digits and hands which could have been consumed by the larvae (Fig. 2). More research is needed to determine the impacts of *Epomis* beetles on the *M. aurantiaca* population. Naturally occurring skin alkaloids (Daly et al. 1996. Am. Mus. Novit. No. 3177) might deter larvae from chewing the flesh.

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MERTENSOPHRYNE LOVERIDGEI **(Mahenge Toad). DIET.** Several species of frogs, such as *Rana catesbeiana* (American Bullfrog) and *Acris crepitans* (Western Cricket Frog), have been documented to include snails as part of their diet (Frost 1935. Copeia 1935:15–18; Johnson and Christensen 1976. J. Herpetol. 10:63–74). Others, such as *Leptopelis brevirostris* (Cameroon Forest Treefrog) and *Paracassina* (common striped frogs), specialize on snails (Perret 1966. Zoologisches Jahrbuch [Systematik] 8:289–464; Drewes and Roth 1981. Zool. J. Linn. Soc. 73:267–287). *Rhinella marina* (Cane Toad) has been documented to eat snails in areas where it is invasive (Hinckley 1963. Herpetologica 18:253–259; Grant 1996. Herpetol. Rev. 27:67–69). The diet of *Mertensophryne loveridgei*, a medium-sized toad endemic to southeastern Tanzania, has not yet been described, but examination of stomach contents from two other species in the genus, *M. anotis* (Chirinda Forest Toad) and *M. micranotis* (Loveridge's Snouted Toad), did not find evidence of molluscs (Grandison and Ashe 1983. Bull. Brit. Mus. Nat. Hist. 45:85–93; Channing 1993. J. Herpetol. 27:214–218). The most common prey items found in the stomachs of both species were ants, although mites also formed a large part of the diet of *M. micranotis.* Coleopterans, hemipterans, millipedes, arachnids, and the larvae of dipterans and lepidopterans were less frequently consumed. On 25 January 2012 an adult male *M. loveridgei* (MCZ A-148816; SVL = 33 mm) was collected from the Rondo Plateau in Tanzania (10.11791°S, 39.17776°E, WGS 84; 797 m elev.); a radiograph revealed a small snail (Urocyclidae) with a shell diameter of 1 mm in the stomach of the frog (Fig. 1). The identities of the other items visible in the digestive tract are not discernible from the radiograph. This is the first published information about the diet of this species and the first documented case of molluscivory in this genus of toads.

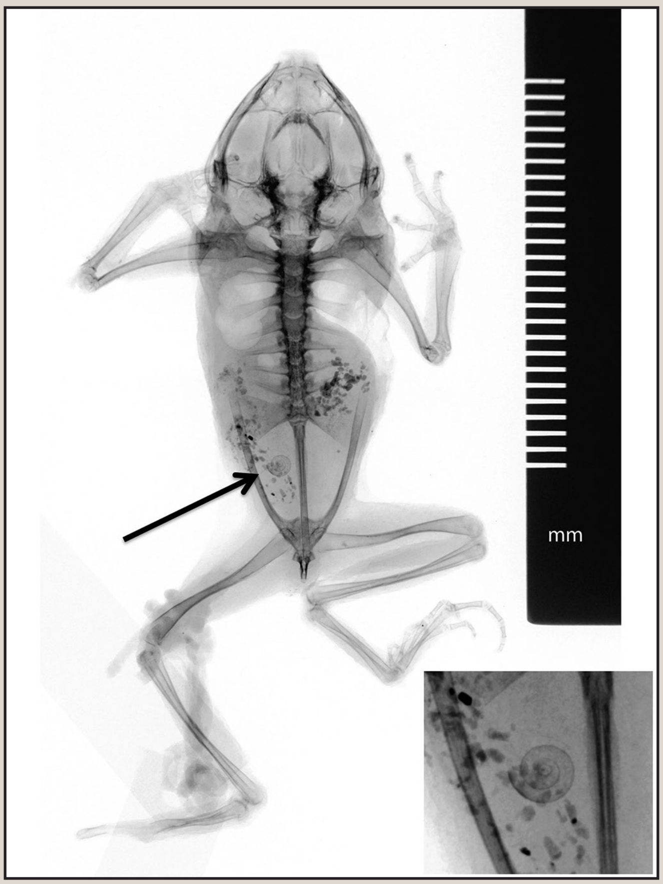

Fig. 1. A radiograph of *Mertensophryne loveridgei* with a snail, indicated by the arrow, in its digestive tract. Inset shows an enlarged image of the snail.

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PRISTIMANTIS CHIASTONOTUS **(Brownberg Robber Frog). DIET.** *Pristimantis chiastonotus* (Craugastoridae) is a small to moderate-sized nocturnal species found in the leaf litter of primary forest in northeastern Brazil, Guyana, French Guiana, and Surinam (Lynch and Hoogmoed 1977. Proc. Biol. Soc. Washington 90:424–439). This species' diet is composed of a variety of arthropods (Garcia-R et al. 2015. Acta Biol. Colomb. 20:79–87). In this note we describe an unusual predation event of *P. chiastonotus* feeding upon the gymnophthalmid lizard *Leposoma guianense*.

On 30 May 2017 at 1930 h, within Cancão Municipal Natural Park in Serra do Navio, Amapá state, Brazil (0.90275°N, 52.00497°W; WGS 84), we collected an adult male *P. chiastonotus* (SVL = 34 mm; 2.3 g). The frog was dissected and its stomach contents examined. We found an adult of *L. guianense* (SVL = 32 mm) partially digested and occupying the total space of the stomach. Both the frog and the lizard were deposited at the Herpetological Collection of Universidade Federal do Amapá, Brazil (CECCAMPOS 01249, 01250). This is the first record of *L. guianense* as an item in the diet of *P. chiastonotus*.

The specimens were collected under license System Authorization and Information on Biodiversity (ICMBio 48102–2).

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PRISTIMANTIS RAMAGII **(Leaf-litter Frog). PREDATION.** *Pristimantis ramagii* is a small endemic frog of the Atlantic Forest in northeastern Brazil (Canedo and Haddad 2012. Mol. Phylog. Evol. 65:610–620). Habitat loss has caused population declines in this species and very little is known about its natural history, such as information about predators (Santos and Carnaval 2002. *In* Tabarelli and da Silva [eds.], Diagnostico da Biodiversidade de Pernambuco, pp. 529–536. SECTMA/Massangana, Recife, Brazil). Here, we describe the predation of *P. ramagii* by *Leptodeira annulata*, a snake known to feed on amphibians, reptiles, and insects (Cantor and Pizzatto 2008. Herpetol. Rev. 39:462–463).

At 2109 h, on 11 October 2016 (air temp. = 20°C, relative humidity = 83%), in the forest fragment Serra do Ouro inside the Estação Ecológica de Murici, Alagoas state, Brazil (9.143612°S, 35.50163°W, WGS 84; 518 m elev.), we observed an adult *P. ramagii* (SVL = 18.2 mm; 3.5 g) being preyed upon by a juvenile *L. annulata* (SVL = 315.4 mm; 94.2 g; tail length = 112.8 mm; Fig. 1). The snake was on top of a fallen log, about 40 cm from the ground and looking down in attack position. After a few seconds, it attacked the frog, which was on the ground among dead leaves and then quickly returned up the trunk with the frog held in its mouth. There was no constriction and the *L. annulata* began to ingest the amphibian from the hind limbs. The whole process, from attack until total ingestion, took five minutes.

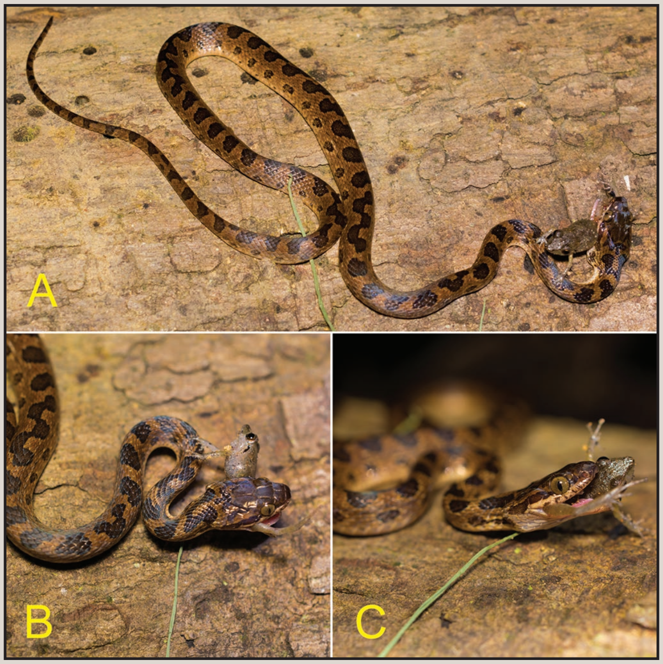

Fig. 1. A) Initial attack of *Leptodeira annulata* against *Pristimantis ramagii* ; B) adjusting *P. ramagii* in its mouth; and C) ingestion process.

Bufonids, leptodactylids, and hylids are known in the diet of *L. annulata* (Cantor and Pizzatto 2008, *op. cit.*); however, to our knowledge, this is the first record of predation by *L. annulata* of a craugastorid.

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***RHINELLA POEPPIGII* (Gray Toad). PREDATION.** *Rhinella poeppigii* is a large bufonid that lives in a wide range of habitats and at elevations of 350–2000 m. During the mating season, males congregate and make hoarse and distinctive calls to attract females, which lay eggs close to riverbanks, or in ephemeral ponds or puddles (de la Riva 2002. Graellsia 58:49–57). This activity exposes them to predators, including fish.

As part of a biodiversity survey on the afternoon of 4 May 2015 on the Hondo River in Madidi National Park in the La Paz Department, Bolivia (14.63360°S, 67.85080°W, WGS 84; 302 m elev.), we used a hook-line to catch a Red-tailed Brycon (*Brycon cephalus*) (ca. 40 cm total length; CBF-14317). In the laboratory we discovered an entire male adult (SVL = 87.76 mm) *R. poeppigii* (CBF-7241) within the stomach contents of the *B. cephalus*. Both individuals were deposited in the Colección Boliviana de Fauna. *Brycon cephalus* (Bryconidae: Characiformes) is an omnivorous fish (Vieira et al. 2005. Comp. Biochem. Physiol. A 140:337–342), and this is the first predation record of *R. poeppigii*. Previous predation records of toxic *Rhinella* spp. by fish species include one by *Hoplias* cf. *malabaricus* (Haddad and Bastos 1997. Amphibia-Reptilia 18:295–298), another by *Salminus brasiliensis* (Almeida et al. 2009. Herpetol. Rev. 40:210), and a third by *Rhamdia quelen* (Severo-Neto and Sugai 2014. Herpetol. Rev. 45:684).

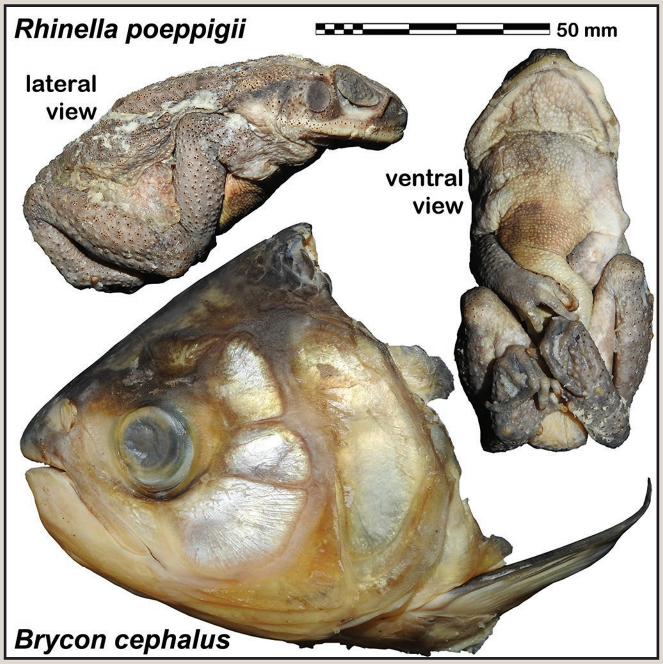

Fig. 1. *Rhinella poeppigii* (CBF-7241) found in the stomach contents of *Brycon cephalus* (CBF-14317), both species depicted at the same scale.

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***SCINAX ALTER*. PREDATION.** Anurans are commonly predated by vertebrates and invertebrates at all life stages (Duellman and Trueb 1986. Biology of Amphibians. McGraw-Hill, New York, New York. 670 pp.; Wells 2007. The Ecology and Behavior of Amphibians. University of Chicago Press, Chicago, Illinois. 1400 pp.).

Fig. 1. *Thaumasia velox* preying upon *Scinax alter.*

Anuran predation by spiders is well documented in the Neotropical region (Menin et al. 2005. Phyllomedusa 4:39–47; Pombal Jr. 2007. Rev. Bras. Zool. 24:841–843). There are a few reports of hylids being preyed upon by spiders of the Pisauridae (Bernarde et al. 1999. Biociências 7:199–203; Bovo et al. 2014. Herpetol. Notes 7:329–331) and here we provide documentation of an additional instance.

At 1920 h, on 15 July 2016, in a lake at Reserva Ecológica de Guapiaçu, Cachoeira de Macacu, Rio de Janeiro, southeastern Brazil (22.45222°S, 42.77166°W, WGS 84; 33 m elev.), we observed the predation of an adult *Scinax alter* (SVL = 14 mm) by the spider *Thaumasia velox*. The spider was seen catching the frog and holding it with its pedipalps and chelicerae after the prey jumped between leaves (Fig. 1). The arachnid held the frog for 10 min., consuming part of its right posterior leg before releasing it. The frog produced a large amount of cutaneous secretions, suffered paralysis, necrosis on the local bite, and stayed alive for 30 min. The spider (female, 13.3 mm cephalothorax and abdomen length; identified by R.L.C. Baptista) was deposited in the Arachnids Collection of Universidade Federal do Rio de Janeiro, Rio de Janeiro, Brazil. Frog identification was verified by J. P. Pombal Jr., and was deposited in the Herpetological Collection of Museu Nacional (MNRJ 91162).

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***SMILISCA BAUDINII* (Mexican Treefrog) and *INCILIUS LUETKENII* (Yellow Toad). INTERSPECIFIC AMPLEXUS.** Anurans, particularly species that form large breeding assemblages, periodically exhibit atypical amplectic behavior, including multiple amplexus, same-sex amplexus, and interspecific amplexus (Gómez-Hoyos et al. 2012. Herpetol. Notes 5:497–498). Indeed, the drive to reproduce may be so intense for some species that amplexus between different families and even orders has occasionally been reported (Simovi et al. 2014. Herpetol. Notes 7:25–29).

Fig. 1. Interspecific amplexus between a male *Smilisca baudinii* and an adult *Incilius luetkenii* of an undetermined sex.

At ~2100 h on 8 May 2017, near the shore of Laguna de Apoyo, Masaya Department, Nicaragua (11.93337°N, 86.05472°W, WGS 84; 189 m elev.), we observed prolonged interfamilial amplexus between a male *Smilisca baudinii* and an adult *Incilius luetkenii* of an undetermined sex (Fig. 1). However, given the absence of a release call on the part of the toad, it was presumed to be a female. The animals were observed near the exposed bottom corner of an abandoned swimming pool, which contained ~15 cm of water. The *S. baudinii* grasped the *I. luetkenii* in axillary amplexus. No vocalizations were noted for either species during approximately 10 min. of observation, despite calling by multiple other *S. baudinii* in the immediate vicinity. The *I. luetkenii* hopped repeatedly along the edge of the water and the *S. baudinii* never relaxed its grip. Following observation and photography, the animals remained in amplexus and were subsequently allowed to hop away unharmed. While other cases of interspecific amplexus involving *S. baudinii* have been noted (Streicher et al. 2010. Herpetol. Rev. 41:208; Loc-Barragan et al. 2016. Mesoam. Herpetol. 3:463–464), this is the first reported amplexus between these two species, and the first interfamilial amplexus noted for *S. baudinii*.

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TESTUDINES — TURTLES

***ACTINEMYS MARMORATA* (Northwestern Pond Turtle). ATYPICAL NESTS.** The Northwestern Pond Turtle is considered a species of special concern in California (Thompson et al. 2016. California Amphibian and Reptile Species of Special Concern. University of California Press, Berkeley, California. 390 pp.). Bury et al. (2012. Northwest Fauna 7:1–128), and Thompson et al. (2016, *op. cit.*) suggested that the declines in the range of these turtles in California may be directly or indirectly related to aspects of the nesting ecology (e.g., destruction or loss of habitat, absence of protection for nest sites, lack of information on nesting ecology, etc.). Herein, we report on atypical or novel aspects of the nesting ecology of a population of pond turtles. The study area, which is hydrologically connected to the San Francisco Bay Estuary, probably represents an area of potential genetic admixture with the recently elevated *A. pallida,* as described by Spinks et. al. (2014. Mol. Ecol. 23:2228–2241).

While conducting a turtle-nesting ecology study between 2013 and 2016 at Mt. View Sanitary District's Moorhen Marsh, Martinez, California, we frequently observed female pond turtles engaged in nest-site selection, nest excavation, oviposition, and nest completion. This general series of behaviors follows a relatively predictable pattern to the experienced observer. Between 2014 and 2016, however, we observed—on several occasions and over several years—behaviors that, when viewed in the context of hundreds of observed nesting attempts, would likely be considered atypical.

Phantom nests. We observed six adult females (two in June 2014 and four in June 2015) select a nest site, excavate a nest chamber, appear to lay eggs, fill the nest and install a nest plug, and move away from the nest. In each case we immediately placed protective cages over the nests and monitored the sites through mid-spring. One month after all other hatchlings had emerged

PHOTO BY JEFF ALVAREZ

FIG. 1. Nest attempt by *Actinemys marmorata* showing a shallow excavation, approximately one cm deep. The anterior of the digging turtle was pointed towards the left side of the photo (red arrow).

PHOTO BY JEFF ALVAREZ

FIG. 2. Nest attempt by *Actinemys marmorata* showing a fully constructed nest, approximately 13–15 cm deep. The anterior of the digging turtle at the time of nest construction was pointed towards the top, left side of the photo (red arrow).

from monitored nests, we excavated nests where no emergence had occurred. Upon excavation of each of these nests, we noted that although the nest chambers were intact and no rodent burrows or desiccation cracks intersected the chamber, no eggs were present. We presumed that the females had engaged in all behaviors except ovipositing, and characterized these nests as "phantom" nests.

Incomplete nest attempts. On 10 occasions (one in June 2014, one in June 2015, and eight in May, June, and July of 2016) we observed that females had left the aquatic habitat to locate potential nest sites, and begun excavation, but had abandoned the sites before nest completion and oviposition. The excavations ranged from shallow scrapes (≤ 1 cm) in the soil (Fig. 1) to fully formed nest chambers 13–15 cm deep (Fig. 2). In each case, the site was abandoned; only the nest attempt indicated that a female turtle had been present but not completed the nest.

Incomplete nest. On a single occasion (June 2016), we observed that a female had excavated a nest and laid eggs, but failed to adequately plug the nest cavity, leaving the eggs partially exposed (Fig. 3). As this condition potentially subjected the eggs to desiccation and/or predation, we elected to use moistened soil from the immediate area to construct and place an artificial plug. The nest was then covered with a protective cage and monitored. This strategy (installing an artificial plug) was based on experience gained in 2015, when an unknown predator was discovered to have removed a plug from a caged nest but had left the eggs unharmed in the cavity. On that occasion, an artificial plug was constructed and placed over the cavity and the nest successfully produced eight hatchlings the following March.

Obscured predated nest. On 11 April 2016, we excavated a caged nest that showed no sign of emergence. We removed one unhatched egg, one fully formed dead neonate, and six broken eggs containing turtle parts in various stages of decomposition. Through veterinary examination of the remains, the majority of these nest contents were determined to have been predated by rodents (species unknown) in the nest chamber. This undetectable predation had occurred underground, while the nest was covered by a protective cage.

With appropriate experience, nesting sign can be detected during targeted surveys. Understanding ambiguous nesting sign by these declining turtles can certainly aid in documenting reproductive activity at a specific site. However, observations of nests—even direct observation of nesting females, with no indication of nest-site predation at the surface—cannot be correlated with emergence of neonate turtles. Despite indications in the field of nesting, determination of "successful" nesting of Northwestern Pond Turtles should be confined to observations of post-emergent hatchlings.

We are grateful for editorial assistance from Nicole Parizeau. Sarah Foster, Stephen Gergeni, Brandt Muller, Lucy Stevenot, and Chris Vang assisted with field observations and installing protective nest cages. Thanks to Louisa Asseo, DVM, from the Oasis Veterinary Hospital, who examined the obscured predated

PHOTO BY ALAN RESETAR

Fig. 3. "Incomplete nest" of *Actinemys marmorata* showing a fully constructed nest with eggs deposited, but exposed. The nest plug was not constructed by the female.

nest contents and determined that rodents predated eggs/ contents. Mt. View Sanitary District generously supported and funded the turtle study and allowed access to the site. Laura Patterson, California Department of Fish and Game, approved our proposal to conduct a broad-scale turtle study under permit number SCP-000040.

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***APALONE SPINIFERA* (Spiny Softshell). HEALED INJURY.** Turtles are renowned for their ability to sustain and survive traumatic injuries that result from predation attempts or strikes from automobiles, boat propellers, or agricultural equipment. Such injuries, including cracked shells in hard-shelled species and amputated limbs, remain evident years after wounds have healed (Saumure and Bider 1998. Chelon. Conserv. Biol. 3:37-45; Ferronato et al. 2009. Phyllomedusa 8:19-25; Bulté et al. 2010. Aquat. Conserv. Mar. Freshw. Ecosyst. 20: 31–38). Trionychid turtles are distinguished by a flexible, cartilaginous covering of the carapace and plastron, which extends beyond the margins of the underlying bones of the carapace laterally and posteriorly. While numerous biomechanical and physiological advantages have been suggested to explain the evolution of their soft shells (Scheyer et al. 2007. Org. Divers. Evol. 7:136-144), they may leave these turtles prone to traumatic injuries. Indeed, carapace injuries from boat strikes analogous to those reported for hard-shelled turtles have been reported for *Apalone spinifera* of eastern North America (Galois and Ouellet 2007. Chelon. Conserv. Biol. 6:288-293).

Fig. 1. Adult female *Apalone spinifera* (318 mm straight-line carapace length) from the Chunky River in Newton County, Mississippi, with a healed hole through its carapace (indicated by the author's thumb projecting through the hole). The inset photo shows the hole as viewed dorsally, with skin of the right hind leg visible underneath.

On 23 May 2016, I captured an adult female *A. spinifera* in a fykenet set in an outer bend of the Chunky River, ca. 1.5 river km upstream of the old Griffis Fountain bridge in the town of Chunky, Newton County, Mississippi, USA. The turtle's straight-line carapace length was 318 mm. The turtle's right posterior carapace exhibited a large oval hole (ca. 1.5 × 1.0 cm) that penetrated all the way through the body (Fig. 1), with the ventral opening located in the inguinal pocket immediately lateral to the hind leg. The injury was apparently on old one that had healed completely, as there were no signs of scabbing. A wrinkle-like scar extended ca. 6 cm from the hole anterolaterally to the edge of the carapace, possibly indicating that the initial injury had torn at least partially all the way to the carapace margin. The hole appeared to be just outside the area of the bony disc of the carapace, but whether the disc margin or projecting rib tips had also been injured was not clear.

The most obvious candidates for the cause of the hole are the tooth of an American Alligator (*Alligator mississippiensis*), a stabbing beak of a large wading bird such as the Great Blue Heron (*Ardea herodias*), or a bullet fired by someone engaged in "plinking," the shooting of turtles by people who may regard them as vermin. The large size of the hole and the complete healing of the wound suggest the injury was likely a very old one, perhaps incurred when the turtle was a small juvenile. Given the complete penetration of the body, the case history reported here is another impressive demonstration of the ability of turtles to survive traumatic injuries.

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***CHELONIA MYDAS* (Green Sea Turtle). DIET.** *Chelonia mydas* appears to be pelagic in the first years of life (Reisser et al. 2013. Mar. Biol. 160:3169–3179), preferentially feeding on macroalgae (Ramanini 2014. Ecologia Alimentar de Tartaruga-Verde *Chelonia mydas* [Linnaeus, 1758] em Ilha Bela e Ubatuba-Litoral Norte de São Paulo, Brazil. 57 pp.). In Brazil there are few studies on the trophic ecology of this species. Nagaoka et al. (2012. Mar. Biol. 159:573–589) reported the food preference of this species as macroalgae, without specifying the species consumed. Reisser et al. (*op. cit.*) reported that this species feeds on red algae, *Pterocladiella capillacea,* in reef areas of the South Atlantic. Other red macroalgae that are potential food for the turtle in the area, such as *Plocamium brasiliense* and *Pterocladiella capillacea,* were reported by Gonzales Carman et al. (2013. J. Exp. Biol. Ecol. 429:64–72), who also describe Ochrophyta of the genus *Sargassum* and the Chlorophyta *Codium intertextum* in the Atlantic Ocean. For the Pacific Ocean region, Amorocho and Reina (2007. Endang. Spec. Res. 3:43–51) noted species of the genera *Gelidium* (Rhodophyta) and *Cladophora* (Chlorophyta).

In this study, the area investigated is located on the Island of Fernando de Noronha, South Atlantic, State of Pernambuco, northeast Brazil. *Chelonia mydas* is classified internationally as Endangered-EN (IUCN 2017. Red List of Threatened Species. http://www.iucnredlist.org/ accessed 23 April 2017), nationally as Vulnerable-VU (MMA 2017), and in the state of Pernambuco as Data Deficient.

On 8 June 2016, at 1230 h, we observed three juvenile *C. mydas* at Sancho Beach (3.852454°S, 32.443568°W), on the island of Fernando de Noronha. The event was recorded and photographed by MLBF. The *C. mydas* were feeding on the macroalga *Dictyota cervicornis.* This observation is significant because it shows one of the terminal species that make up the diet of *C. mydas* in this area. Knowledge of the local diet may assist in formulating conservation plans for the species. An image of a *C. mydas* foraging on the algae is archived in the Herpetological and Paleoherpetological collection (CHP-UFRPE 0001) of the Laboratory of Herpetological and Paleoherpetological Studies of the Federal Rural University of Pernambuco - UFRPE, Recife, Pernambuco, Brazil.

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***CHELONIA MYDAS* (Eastern Pacific Green Sea Turtle). DIET.** The Eastern Pacific Green Sea Turtle (EPGST) is a highly migratory species that crosses the border of several countries in East Pacific using different habitats during their life cycle (Hirth 1997. U.S. Fish and Wildlife Service Biological Report 97, 120 pp.). Variation in diet may be a consequence of local availability of food, turtle selectivity, and/or type of habitat (Garnett et al. 1985. Wildl. Res. 12:103–112). Such dietary diversity is a response to the energy requirements in the early life stages, facilitating nutritional (e.g., protein) gains for development and maturation (Bjorndal 1985. Copeia 1985:736–751). In Baja California Sur (B.C.S), novel diet items have been reported, including sea urchin (Reséndiz et al. 2016. Herpetol. Rev. 47:282) and cannonball jellyfish (Reséndiz et al. 2017. Herpetol. Rev. 48:172–173); despite this, knowledge of diet in EPGST in San Ignacio Lagoon is limited. In 2016, we collected food samples from the esophagi of 20 juvenile *Chelonia mydas* (mean body mass 13.75 ± 7.64 kg) during three field forays, and recorded their straight carapace length (mean 52.18 ± 5.46 cm). Collection site was Isla Garza (26.92989°N, 113.16609°W) in San Ignacio Lagoon (B.C.S), Mexico. In all samples, Moon Jellyfish, probably *Aurelia aurita*, and sponges, probably *Suberites aurantiaca*, were present and comprised 73% of the total volume (38.2 and 34.8, respectively) Turtle mean body condition index (BCI) was 1.4 (range = 1.2–1.6), similar to the values reported for previous studies in B.C.S. (Koch et al. 2007. Mar. Biol. 153:35– 46; Seminoff et al. 2003. J. Mar. Biol. Assoc. U.K. 83:1355–1362), indicating that the turtles had good nutritional status and presumably the capacity for favorable reproductive performance. *Chelonia mydas* is primarily an herbivore so this is the first report of targeted moon jellyfish and sponge consumption by *C. mydas* in San Ignacio Lagoon and in B.C.S., suggesting that these turtles are able to adapt by dietary shifts in this area. Jellyfish provide protein, fat, lipids, minerals, and water (Doyle et al. 2007. J. Exp. Mar. Biol. Ecol. 343:239–252; Abdullah et al. 2015. I.J.C.B.S. 1:12–16).

The sponge material provides protein to their diet (Russell and Balazs 2009. Pac. Sci. 63:181–192), and may also provide energy and nitrogen, depending of the mineral content levels of the sponge (Bjorndal 1990. Bull. Mar. Sci. 47:567–570). Foraging on sponges has been reported for *C. mydas* from Hawaii and from Bahia de Los Angeles in the central Gulf of California, Mexico. Sponges were frequently recovered in diet samples despite their low abundance in some areas suggesting they were deliberately consumed and that *C. mydas* may opportunistically consume invertebrate material, especially when it occurs locally in high densities (Seminoff et al. 2002. J. Herpetol. 36:447–453; Russell et al. 2011. Pac. Sci. 65:375–381).

Previous data from the East Pacific shows that *C. mydas* diet is composed primarily of red algae species, but in addition, invertebrates such as sponges and jellyfish are ingested. *C. mydas* may also be forced to turn to invertebrates if they cannot find enough algae to sustain themselves (Seminoff et al. 2002, *op. cit.*; Arthur and Balazs 2008. Pac. Sci. 62:205-217; Russell et al., *op. cit.*). Differences in species consumption in the diet of *C. mydas* at the San Ignacio Lagoon may occur with changes in the environment throughout the year. San Ignacio Lagoon is an important feeding and development ground for *C. mydas;* in these inshore foraging habitats turtles demonstrate high site fidelity (Balazs and Chaloupka 2004. Mar. Biol. 145:1043–1059). The fact that these invertebrates accounted for a substantial portion (73%) of EPGST diet suggests that *Cnidaria* and *Porifera* may constitute another significant food resources for these sea turtles, and that they have the capacity to assimilate their nutrients (Bjorndal 1990, *op. cit.*). Understanding feeding and dietary ecology of sea turtles is essential for informing conservation efforts for endangered populations and habitats (Bjorndal 1999. *In* K. L. Eckert et al. [eds.], Priorities for Research in Foraging Habitats, pp. 12–18. Research and Management Techniques for the Conservation of Sea Turtles. IUCN/SSC Marine Turtle Specialist Group Publication No. 4).

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CHELYDRA SERPENTINA **(Snapping Turtle). DIET AND SHELTER.** *Chelydra serpentina* is a diet generalist and is known to consume a wide variety of invertebrates, fish, birds, mammals, carrion, and even plant material (Buhlmann et al. 2008. Turtles of the Southeast. University of Georgia Press, Athens, Georgia. 252 pp.; Ernst and Lovich 2009. Turtles of the United States and Canada. Johns Hopkins University Press, Baltimore, Maryland. 827 pp.). Despite observations of carrion consumption, there is limited specific information on this behavior and what deceased species might be consumed.

On 5 July 2012 we observed a dead White-tailed Deer (*Odocoileus virginianus*) in a ditch located in Johnson County, Tennessee, USA. The carcass appeared to be intact, with what appeared to be a bullet wound. On 12 July 2012, the carcass appeared to opened and disturbed. Upon closer inspection an adult male *C. serpentina* was found in the body cavity of the deer. The turtle was observed, and photographed, with its head sticking out from the body cavity (Fig. 1). After capture of the turtle, it was discovered that the majority of the deer's internal organs were absent from the carcass. After obtaining voucher photos, the turtle was returned to the creek beside the carcass. We returned on 19 July 2012 and found that the deer carcass had been dragged approximately 9 m into the adjacent wetland, presumably by an American Black Bear (*Ursus americanus*). There were no signs of the *C. serpentina* in or around what remained of the deer carcass.

Fig. 1. Adult male *Chelydra serpentina*, at bottom of photo, with head protruding from body cavity of a White-tailed Deer.

It is uncertain whether the turtle consumed the organs or other flesh of the carcass but it was apparently using the carcass as a shelter, at least until it was disturbed. Given that there are numerous reports of carrion consumption and scavenging behavior for *C. serpentina*, it is reasonable to assume that it may have eaten some flesh from the deer. Opportunity for consumption of large mammals is certainly limited for *C. serpentina*, but this observation exemplifies the opportunistic tendencies of this species.

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CHELYDRA SERPENTINA **(Common Snapping Turtle). SCAVENGING.** Scavenging (carrion foraging) is a key ecological process in the flow of energy through food webs, and can make important contributions to the diet (DeVault et al. 2003. Oikos 102:225–234; Bauer et al. 2005. Southwest. Nat. 50:466–471). Scavenging among non-avian vertebrates is probably more prevalent than is generally recognized because traditional dietary studies that rely on fecal and stomach contents analyses usually cannot distinguish between scavenging and predation (DeVault et al., *op. cit.*) except under unusual circumstances (e.g., Platt et al. 2010. Can. Field-Nat. 124:265–267; Platt and Rainwater 2011. J. Kansas Herpetol. 37:8–9). Given these inherent limitations, opportunistic field observations are crucial for understanding the role of scavenging as a trophic pathway (Walde et al. 2007. Southwest. Nat. 52:147–149; Logan and Montero 2009. Herpetol. Rev. 40:352). We here report an observation of scavenging by *Chelydra serpentina* in the Great Swamp, Putnam County, New York, USA. The Great Swamp encompasses 30,000 ha of floodplains, swamp forest, marsh, and fen in Putnam and Dutchess counties, and as such, is the largest freshwater wetland in New York (see Holt et al. 2006. Northeast. Nat. 13:353–374 and references therein for detailed description of the area).

Our observation occurred on 1 September 2017 (1330 h) in shrub-swamp surrounding Ice Pond along the Metro-North Commuter Railroad (41.45600°, -73.61426°), approximately 5.0 km N of Southeast Station (Brewster) where we captured a juvenile *C. serpentina* (carapace length = 90 mm) while it was feeding on the carcass of a yellow-breasted chat (*Icteria virens*), most likely killed by a passing commuter train. The carcass was floating venter-side up in shallow water (ca. 35 cm deep) adjacent to the railroad tracks and appeared fresh with no discernible odor of decomposition (Stage 1 of Payne 1965. Ecology 592–602). We examined the carcass and found the viscera, neck, and much of the dorsum was missing, presumably consumed by the turtle, which had part of the head, mandible, and an eye clasped between its jaws when captured. After examining and photographing the carcass and turtle, we returned both to the water.

Observations of scavenging by *C. serpentina* are not unexpected. *Chelydra serpentina* is omnivorous with an extremely varied diet that includes fresh prey and carrion (Ernst and Lovich. 2009. Turtles of the United States and Canada. 2nd Edition. Johns Hopkins University Press, Baltimore, Maryland. 827 pp.). Furthermore, *C. serpentina* is readily taken in traps baited with rancid (Ernst 1965. J. Ohio Herpetol. Soc. 5:53) and fresh carrion (Jensen 1998. Chelon. Conserv. Biol. 3:109–111; Johnston et al.

2012. Bull. Florida Mus. Nat. Hist. 51:243–256; Rose and Small 2014. Southwest. Nat. 59:331–336). That said, first-hand reports such as ours that describe the scavenging behavior of *C. serpentina* appear under-represented in the literature.

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***CLEMMYS GUTTATA* (Spotted Turtle). FIRE SCAR HEALING.** On 10 April 2017, we recaptured an adult male *Clemmys guttata* in Lucas County, Harding Township, Ohio, USA, with shell injuries previously attributed to contact with prescribed fire, as described in Cross and Bekker (2017. Herpetol. Rev. 48:175). Upon recapture in 2017, about one year after the previous capture, we noted the coloration of the carapace had started to regenerate. We used imageJ to create binary images of the 2016 and 2017 carapace photographs (Fig. 1A, B) and determined there had been ~43% coloration regrowth in about 205 Julian days (accounting for an overwintering period of ~150 days). Although the pattern had begun to return, the structural damage to the shell from the fire (e.g., fusion of scutes) remained unchanged.

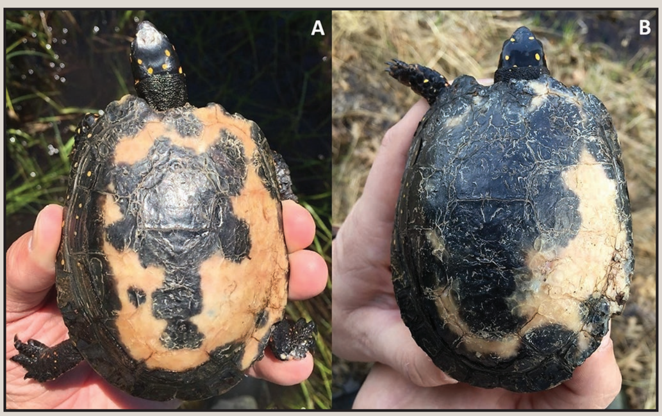

Fig. 1. Fire scarring on the carapace of a male *Clemmys guttata* in A) 2016 (photo from Cross and Bekker, *op. cit.*), and B) 2017.

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***EMYDOIDEA BLANDINGII* (Blanding's Turtle). AGGRESSION.** Aggressive interactions related to basking behavior have been observed in many emydid turtles, including *Emys orbicularis* (European Pond Turtle; Rovero et al. 1999. J. Herpetol. 33:258–263) and *Actinemys marmorata* (Pacific Pond Turtle; Bury and Wolfheim 1973. BioSci. 23:659–662). In addition, researchers have observed that larger and more aggressive individual *Trachemys scripta* (Pond Slider), *Pseudemys concina* (River Cooter), *Graptemys pseudogeographica* (False Map Turtle) and *G. ouachitensis* (Ouachita Map Turtle) are more likely to displace smaller and more passive individuals during basking (Lindeman 1999. J. Herpetol. 33:214–219). In contrast, *Emydoidea blandingii* has not been described as an aggressive species. Many knowledge gaps exist regarding intraspecific behavior of *E. blandingii* as a result of their skittish nature, which makes observation of natural behaviors difficult. We could find only one report of same-sex aggression in *E. blandingii* in the published literature: one male was observed mounting and biting a conspecific male (Macpherson 2016. Herpetol. Rev. 47:284).

Here we describe an observation of same-sex aggression related to basking in *E. blandingii* in a population in northern Ontario, Canada. On 15 July 2017, at approximately 1230 h, two *E. blandingii*, one adult female and one adult male, were observed basking with three *Chrysemys picta marginata* on a log approximately 5 m long, in a small open water marsh (ca. 2 ha). The female *E. blandingii* was on one end of the log closest to shore and the male *E. blandingii* was on the other end closest to deeper water, with the *C. picta marginata* dispersed between them at varying distances. At approximately 1300 h, a smaller male *E. blandingii* successfully mounted the log a few centimeters away from the larger male. At 1301 h, the larger male *E. blandingii* raised his head out of his shell and began repeatedly snapping his jaws towards the smaller male, producing a loud clicking sound; this behavior lasted for about 1 minute. At 1302 h the smaller male slid off the log and into the water. The larger male then lowered his head onto the log and continued to bask alongside the *C. picta marginata* with no further aggression observed. No measurement data were collected as the turtles were not captured after the observation. Our observation corroborates the previous report of aggression in *E. blandingii* (Macpherson 2016, *op. cit.*), suggesting that the species may not be as passive as previously thought, and indicates that more research should be done on intraspecific interactions in *E. blandingii.*

All work involving animals was carried out under an approved Laurentian University Animal Care protocol (AUP 2013-03-01) and was authorized by permits from the Ontario Ministry of Natural Resources and Forestry. Financial and in-kind support for this work was provided by the Natural Sciences and Engineering Research Council, Northern Ontario School of Medicine, and Laurentian University.

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***GLYPTEMYS INSCULPTA* (Wood Turtle). PREDATION.** Northern Raccoons (*Procyon lotor*) are responsible for direct mortality of all life stages of many freshwater turtle species (Ernst and Lovich 2009. Turtles of the United States and Canada. Johns Hopkins University Press, Baltimore, Maryland. 840 pp.); reports include observations of mortality of adult *Glyptemys insculpta* (COSEWIC 2007. COSEWIC assessment and update status report on the Wood Turtle, *Glyptemys insculpta,* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vii + 42 pp.). Here we present an unusual observation of mortality of an adult female *G. insculpta* within an agricultural landscape, likely caused by a raccoon.

An adult female *G. insculpta* (notch = 94; midline plastron length [PL] = 172 mm; mass = 980 g; age ≥ 42 years in 2016) was

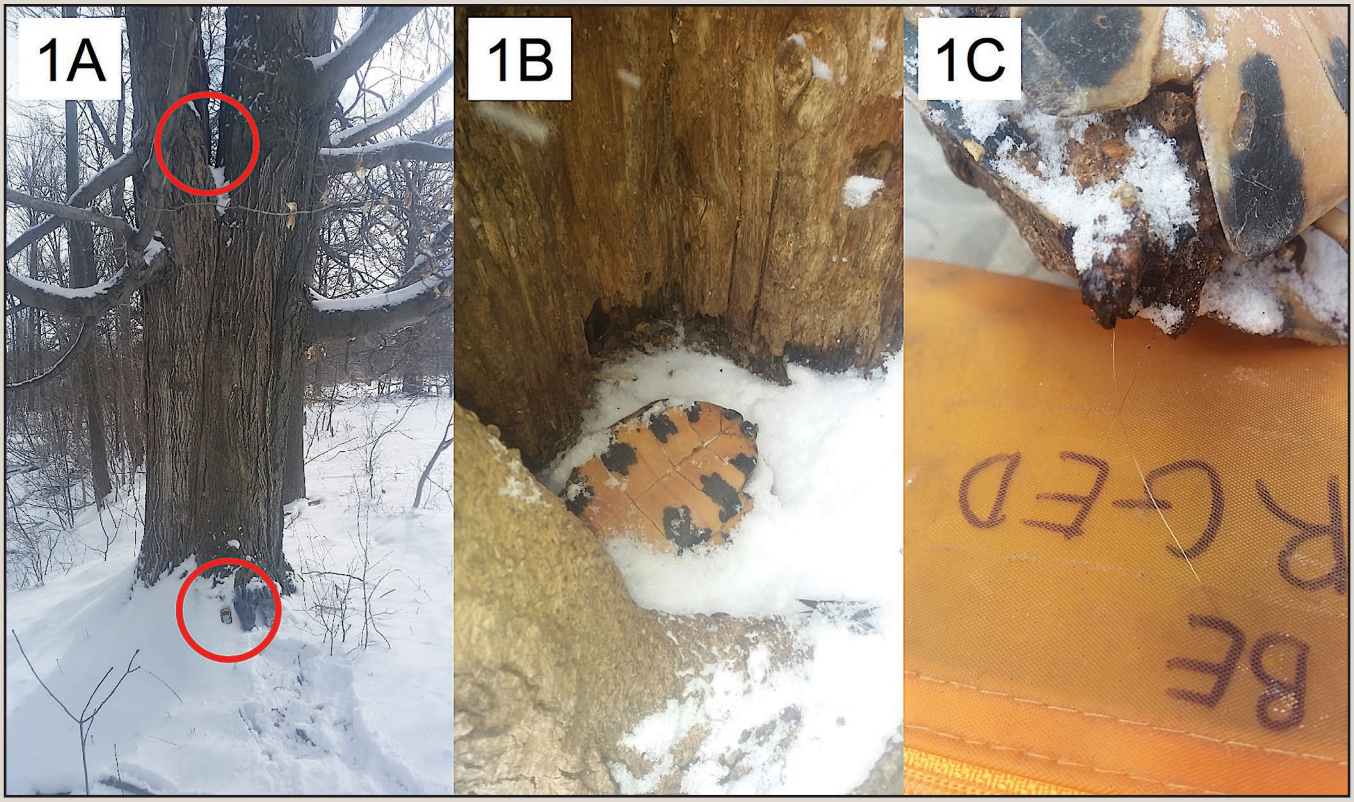

Fig. 1. Adult female *Glyptemys insculpta* (Notch 94) found dead in an *Acer saccharum* on 10 March 2017. A) The turtle was found at a height of 2.7 m in a hollow cavity between two tree trunks, indicated by the upper red circle. The lower red circle is noting a Garmin eTrex 10 handheld GPS unit for size reference. B) Turtle 94 found dead, lying on her carapace, within snow accumulated in the tree cavity. C) Black and white striped hairs located on the carcass of the turtle. Note tail tissue remaining.

tracked with VHF radio-telemetry as part of a long-term monitoring and headstarting program in an agricultural landscape in Ontario, Canada. Turtle 94 was first marked as an adult female in 1991 (PL = 166 mm; mass = 900 g; growth ring count = 17). On 22 October 2016, we tracked Turtle 94 to a deep pool of water within the river, which we suspected would be her overwintering location. We subsequently tracked Turtle 94 on 21 January 2017; however, it was difficult to pinpoint her exact location as the VHF signal suggested she was out of the river and in the adjacent agricultural land. Given our experience with the difficulties in pinpointing turtles that overwinter under the riverbank, we assumed the radio-telemetry signal was bouncing and so we recorded a general GPS point (+/- 20 m). We subsequently tracked Turtle 94 on 10 March 2017, and again had difficulties pinpointing her location because the VHF signal suggested she was in the agricultural land. We increased our efforts to follow the signal, which led us to the base of a large Sugar Maple tree (*Acer saccharum*); Fig. 1A) adjacent to an agricultural field; however, the signal remained weak. Finally, we pointed the 3-element Yagi antenna upwards towards the top of the tree and received a strong signal. We climbed the tree and located the turtle 2.7 m up the tree in a hollow cavity between two tree trunks (Figs. 1A and 1B). We found the turtle dead, resting on her carapace with the limbs and head removed, with only partial remains of the tail and some tissue within the body cavity (Fig. 1B). We also found black and white striped hairs on the turtle's carcass (Fig. 1C). An Ontario Ministry of Natural Resources and Forestry Conservation Officer identified these as the hairs of *P. lotor* leading us to suspect that Turtle 94 was killed and cached in the tree cavity by a raccoon. Although raccoons have been reported to kill adult turtles, and we have observed such predation in our long-term study, to our knowledge this report is the first observation suggesting that a raccoon was capable of hauling a relatively large-bodied turtle up a tree. Turtle carcasses have been reported to be cached by other predators including eagles (Clark 1982. J. Field Ornithol. 53:49–50) and otters (Lanszki et al. 2006. J. Zool. 270:219–226); however, we believe ours is the first published account of *P. lotor* caching a large-bodied turtle.

Turtles have evolved a suite of life-history characteristics in which high adult survivorship is essential for maintaining populations (Enneson and Litzgus 2008. Biol. Conserv. 141:1560–1568). While the specifics of this report likely represent a rare observation, changes in predator-prey dynamics from subsidization of predators, such as occurs in agricultural lands, could have serious consequences for turtle population viability if adult survivorship decreases.

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***GRAPTEMYS SABINENSIS* (Sabine Map Turtle). PREDATION.** Apparently predation on *Graptemys sabinensis* has not been documented (Ernst and Lovich 2009. Turtles of the United States and Canada, Second Edition. Johns Hopkins University Press. Baltimore, Maryland. 827 pp.; Lindeman 2013. The Map Turtle and Sawback Atlas: Ecology, Evolution, Distribution, and

Conservation. University of Oklahoma Press, Tulsa, Oklahoma. 460 pp.). On 26 March 1986 a large male *Macrochelys temmincki* (Alligator Snapping Turtle; UTA R 16618) was found dead on a trotline in the Sabine River (Panola County, Texas, USA), ca. 2 km W St. Hwy 43. While the remains were being prepared as a skeleton, the stomach contents were salvaged. These remains were later examined and revealed the bones of fish, mussel shells, plant material, sand, and the shell fragments of *G. sabinensis* (UTA R 62900). Cheloniophagy is known for *M. temmincki* and *Graptemys* sp. have been found in the stomach contents of *M. temmincki* (Elsey 2006. Southeast. Nat. 5:443–452). This is the first documentation of presumed predation of a *G. sabinensis* by a *M. temmincki*.

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***INDOTESTUDO ELONGATA* (Elongated Tortoise). UNUSUAL MORTALITY.** An adult female *Indotestudo elongata* was found deceased in a small pool in a dry riverbed of the Sakaerat Biosphere Reserve, Thailand. The animal was discovered with its front half in the water but its rear half remaining outside before being removed (Fig. 1A). Sixty-three days later the carcass had decomposed, revealing a broken egg within the carapace. The cause of the animal's death is unknown; there were no obvious signs of injury or attempted predation, and it appears the animal drowned in the pool, which measured 15 cm in diameter and was 16 cm at the deepest point. One possibility is that the animal was weak, perhaps suffering from malnourishment, dehydration, or exhaustion; however, previous experience with this species also suggests the animal may have accidentally drowned by getting into a situation from which it couldn't escape.

The animal was an adult female measuring 24.3 cm carapace length and 13.6 cm in width (Fig. 1B). This measurement is within the top 20% for female *I. elongata* discovered within the reserve. She was found on 10 December 2016 in the Sakaerat Biosphere Reserve (14.85222°N, 102.5725°E) by a tracker for the Sakaerat Tortoise Telemetry Project, who was conducting a radio-telemetry study of other animals. The site was in a dried stream bed in an evergreen forest fragment (Ward 2016. Herpetol. Rev. 47:653–655). The stream bed had not had running water within it for most of the project's extent, however after recent rains there were pools of water forming within the depressions and cavities in the stream bed rocks. The last remaining rock pool was the location for the drowned tortoise, which must have died between 8–10 December, as the location was used regularly by other tracked animals with observers regularly visiting the area. The pool was 15 cm wide and 16 cm deep at the deepest, not deep enough for complete submergence of the animal and with enough solid rock available for the animal to maintain footing and retreat from the pool after anterior submergence (Fig. 1A). The Sakaerat Biosphere Reserve has been experiencing drier conditions seasonably in the current decade than expected based on historic data, however this event took place after several months of rain, with 821 mm of rain falling in the four months prior, and multiple sources of water were available. It thus seems unlikely that the tortoise was unusually dehydrated. The rock itself was also covered in water with a diameter of 14 cm and a depth of 0.8 cm around the posterior of the animal, however this should still have provided enough grip and even footing for the animal to remove itself.

Fig. 1. A) Adult female *Indotestudo elongata*, as found, dead in a small pool within an otherwise dry riverbed; B) removed from the pool and showing no obvious signs of trauma.

It also seems unlikely that the tortoise was malnourished or weakened from the energy investment of producing and carrying eggs. This species is known to eat a wide variety of food stuffs available in the area, including grasses, leafy vegetation, carrion, feces, vines, and invertebrates, as well as fungi and fruits (Ihlow 2012. Herpetol. Notes 5:5–7). The body condition of the animal suggested good health, with fat reserves in the tail remaining. The rock pool is at the base of a large rocky ledge, 60–67 cm drop, and a fall from this drop could presumably cause enough trauma to leave the animal unable to remove itself from the water. There were no visible signs on the animal's carapace or plastron which would suggest such a drop. This individual was also within its prime adult life stage, according to size and carapacial coloration, and unlikely to have died from old age or related diseases.

There were no signs of parasites or obvious disease vectors based on an external examination of the body. While the cause of death will never be known for certain, the most likely explanation might be that the tortoise walked head first into the deepest section of the pool and was unable to retreat for unknown reasons, or perhaps it did experience unseen trauma from a fall from the rock ledge.

I thank the Sakaerat Tortoise Telemetry Project and all of the team members that have helped within the study, especially Mark Read and Thanchira MJ Suriyamonkol who discovered and reported the mortality to me and were able to take pictures documenting the scene. I also acknowledge the Sakaerat Environmental Research Station for allowing this project to be run within the biosphere reserve and using their population of *I.*

elongata to build a better understanding of the species for range-wide conservation plans. Finally, I thank the National Geographic Conservation fund and British Chelonia group for funding this project and supporting throughout, along with donations from Gurit ltd. Craghoppers and Perdix wildlife supplies.

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***KINOSTERNON DURANGOENSE* (Durango Mud Turtle). LIFE HISTORY.** The life history of *Kinosternon durangoense* is virtually unknown, and no reproductive data are available (Legler and Vogt 2014. The Turtles of Mexico: Land and Freshwater Forms. Univ. California Press, Berkeley, California. 402 pp.). Fieldwork in Durango, Mexico in 1980 and 1997 expanded the known range (Iverson et al. 2018. Herpetol. Rev. 49: this issue), and dissections of the voucher specimens cited therein provide the first information on the size, growth, maturity, and reproduction for the species. For all specimens measured to date (including those cited by Iverson 1979. Copeia 1979:212–225), five mature females (follicles > 9 mm) averaged 132.8 mm maximum carapace length (CL; range 119–145; mean plastron length, 122.7 mm PL), and nine males averaged 155.6 mm CL (range 134–192; mean PL, 134.3 mm). Three presumed immature females (follicles < 4 mm diameter) were 115, 116, and 117 mm CL. These data suggest that maturity in females is reached at ca. 115–120 mm CL (ca. 106 – 111 mm PL). Based on measurements of the scute annuli on the right abdominal scute, plastron length through age nine was estimated (following the method of Ernst et al. 1973. Herpetologica 29:247–250) for six males and three unsexed yearlings ($N = 33$ estimates; PL in mm $= 28.46x - 1.63x^2 - 6.89$; $r = 0.90$; $p < 0.0001$; where x equals the number of annuli, which is equivalent to the number of winters following oviposition), and for four females and the same three unsexed yearlings ($N = 22$ estimates; PL in mm $= 26.42x - 1.52x^2 - 4.21$; $r = 0.97$; $p < 0.0001$). The latter equation suggests that maturity in females is reached after 7 or 8 winters (6 or 7 growth seasons). Three dissected adult females contained 1) five corpora lutea, nine 10–12 mm follicles, and ten 7–8 mm follicles (CL 143 mm, 24 July); 2) three 9 mm follicles (CL 123 mm, 7 August); and 3) four 13 mm follicles and four 8–11 mm follicles (CL 119 mm, 24 July), suggesting that multiple clutches of three to five eggs each are laid in July and August.

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***KINOSTERNON HIRTIPES* (Rough-footed Mud Turtle). NESTING BEHAVIOR AND NEST SITES.** *Kinosternon hirtipes* occurs from the Big Bend Region of Texas, USA, southwards into northern and central Mexico through the Sierra Madre Occidental to the Valley of Mexico (Ernst and Lovich 2009. Turtles of the United States and Canada. 2nd Edition. Johns Hopkins University Press, Baltimore, Maryland. 827 pp.). In Texas, *K. hirtipes* is restricted to Presidio County (Scudday and Miller 1986. The status of the Chihuahuan mud turtle, *Kinosternon hirtipes murrayi*. Report to U.S. Fish and Wildlife Service, Washington, D.C. 43 pp.), is thought to be declining (IUCN Red List. Available from: www.iucnredlist.org), and is classified as Threatened, and a Species of Greatest Conservation Need, by the Texas Parks and Wildlife Department (Texas Parks and Wildlife Department 2013. Species of Conservation Concern. Available from: www.tpwd.state.tx.us). Populations of *K. hirtipes* in Texas are threatened due to a combination of limited distribution, desertification, and continuing habitat degradation and fragmentation resulting from anthropogenic climate change (Smith 2015. Habits and habitats of the Rough-footed Mud Turtle, *Kinosternon hirtipes*, and outlook for its survival. Ph.D. dissertation, New Mexico State University, Las Cruces, New Mexico. 166 pp.; Butler et al. 2016. Ecol. Evol. 6:7690–7705).

Kinosternon hirtipes is considered among the least-studied of North American turtles and very little is known concerning its natural history (Ernst and Lovich, *op. cit.*; Lovich and Ennen 2013. Amphibia-Reptila 34:11–23). In particular, there is a notable paucity of information on the reproductive biology of *K. hirtipes*. Iverson et al. (1991. J. Herpetol. 25:64–72) investigated reproduction in a population in Chihuahua, Mexico, and Platt et al. (2016. Acta Herpetol. 11:221–225) described reproductive attributes of *K. hirtipes* in West Texas. These studies notwithstanding, many aspects of the reproductive biology of *K. hirtipes* remain undescribed, including nesting behavior, habitat, and oviposition sites. Here, we report observations of nesting by *K. hirtipes* and qualitatively describe habitat and egg-laying sites.

Observations of nesting behavior were made as part of an on-going radio-telemetry study of *K. hirtipes* being conducted in the Alamito Creek drainage (described by Wilde and Platt 2011. J. Big Bend Studies 23:39–62), Presidio County, Texas, USA. Nesting was observed near a permanent, spring-fed pond (452 m^2) with a shallow (< 20 cm deep) outflow channel that drains excess water into a vegetated marsh (detailed site description in Platt et al. 2015. Herpetol. Conserv. Biol. 11:142–149). Turtles were captured in double throated wire-mesh funnel traps (1.0 m long × 30 cm diameter; mesh = 12.5 mm) baited with canned sardines packed in soybean oil. Captured turtles were weighed, measured, sexed, and permanently marked by notching a unique series of marginal scutes (see Platt et al. 2015, *op. cit.*). We affixed VHF radio transmitters weighing ca. 3 g (Model R1680; Advanced Telemetry Systems) to the posterior carapace of 13 (4F:9M) sexually mature turtles (carapace length [CL] > 90 mm) and returned these to the pond within 24 h of capture. Turtle movements were monitored daily using a Challenger® receiver (Model R2000) equipped with a hand-held Yagi Antenna. The position of each turtle was determined daily with a Garmin® GPS (Montana 680) and straight-line distance between locations was calculated using tools available in Google Earth.

On 20 June 2016, one of us (JLS) was tracking an adult female (CL = 142 mm) submerged in the pond. At 1100 h the female moved from the pond into the outflow channel, traveled 27.6 m downstream, and then burrowed ca. 20 cm into the soft mud where she remained for 20 h. The following morning (21 June 2016; 0700 h) the female moved an additional 79.7 m down the outflow channel, burrowed into the mud, and remained buried for 2 h. At 1100 h the female then exited the water, traveled overland for 7.8 m into a dense thicket of mesquite (*Prosopis glandulosa*) and began excavating a nest cavity using her forelimbs. The nest was positioned beneath the overhanging branches of a low mesquite, partially shaded, and had a west-facing aspect. The substrate at the nest was dry but friable sand-clay soil covered sparingly with leaf litter that consisted mostly of dried mesquite foliage; herbaceous ground vegetation was absent. Concerned that prolonged scrutiny would cause the female to abandon her efforts and return to the water, JLS observed nest construction for ca. 5 min and then withdrew from the area, but continued to remotely monitor the female with telemetry. Nest construction and oviposition required approximately two hours and at 1300 h the female returned to the outflow channel. In early evening (1900 h) JLS returned to the site and found eggshell fragments scattered around the excavated nest hole. Based on tracks and sign found at the site, it appeared that a predator (most likely a raccoon, *Procyon lotor*) had excavated the nest and consumed the eggs shortly after the clutch was deposited. The female was relocated in the outflow channel, 5.7 m from the nest site where she remained buried in the mud for 48 h before moving back into the deeper water of the pond.

Four additional nests were found during a population study of *K. hirtipes* at another site, also within the Alamito Creek drainage (specific locality withheld at request of the landowner). Like other wetlands inhabited by *K. hirtipes* in West Texas (Platt et al. 2015, *op. cit.*; Platt and Medlock 2015. Herpetol. Rev. 46:424–425; Smith et al. 2015. Herpetol. Rev. 46:82–83), this site is a permanent, spring-fed pond that consists of two elongated arms (maximum depth ca. 2.0 m) linked by a shallow (0.3 m deep) channel (0.9 m × 7.0 m). The pond is characterized by algal mats and submerged beds of aquatic vegetation, surrounded by dense mesquite thickets and scattered cottonwood (*Populus deltoides*) and willow (*Salix* spp.) trees with limited areas of sparse grass and bare soil. At least nine adult *K. hirtipes* are known to inhabit the pond, including five males (CL = 161 to 180 mm) and four females (CL = 152 to 160 mm). Yellow Mud Turtles (*Kinosternon flavescens*), which are broadly sympatric with *K. hirtipes* in West Texas (Ernst and Lovich, *op. cit.*), have not been trapped in this pond. Indeed, our trapping data within the Alamito Creek drainage suggests that *K. flavescens* is largely restricted to ephemeral water bodies such as rain-fed livestock ponds and rarely occurs in microsympatry with *K. hirtipes* (S. G. Platt and J. L. Smith, unpubl. data).

On 19 July 2017, JLS found four turtle nests along the western shoreline of the pond that had recently been excavated by predators (probably *P. lotor*). Given the apparent absence of *K. flavescens* from this pond, we feel confident in attributing these nests to *K. hirtipes*. Each nest hole was identified by the presence of dried eggshells, eggshell membranes, and shell fragments, and measured 80–100 mm deep. The nesting substrate was bare soil (friable with high sand content) with a loose covering of fine woody debris, dried grass, and pebbles. The distance between the first and last nest was 4.7 m and each nest had an east-facing aspect. The first nest was located 1.4 m from the pond, constructed at the base of a grass clump, and partially shaded by the canopy of a low mesquite. The second nest was positioned 2.7 m from the water in a small clearing amidst sparse herbaceous vegetation, excavated beside an old fencepost lying on the ground, and shaded by a large mesquite. The third nest was located 2.3 m from the pond beneath a low but dense mesquite thicket. The fourth nest was excavated 5.9 m from the pond in a relatively open area within a mesquite thicket. The mean (± 1 SD) distance from water of the five (including our observation of the nesting female) nests we examined was 4.0 ± 2.7 m (range = 1.4–7.8 m). To our knowledge, this report is the first to describe nesting behavior and nest sites of *K. hirtipes* in the wild or captivity.

In summary, our observations and previous studies of *K. hirtipes* in the Alamito Creek drainage (Scudday and Miller, *op. cit*; Platt et al. 2016, *op. cit.*) indicate that females deposit eggs during June and July in West Texas. Eggs most likely over-winter in the nest with embryos undergoing diapause at the onset of cooler autumnal temperatures (Ewert et al. 2004. *In* Temperature-dependent Sex Determination in Vertebrates, pp. 21–32. Smithsonian Institution Press, Washington, D.C.) and neonates emerge the following summer during the annual monsoon (July–August). Based on our limited number of observations (N = 5), females appear to construct nests on bare, moderately shaded substrates within a relatively short distance of water. Proximity of the nest to water reduces the risk of predation to nesting females and neonates.

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***STERNOTHERUS ODORATUS* (Eastern Musk Turtle). DIET.** *Sternotherus odoratus* is omnivorous and is known to consume a wide range of food items, including but not limited to: algae, seeds and other plant material, crayfish, mollusk, insects, and fish. One study revealed that 62.3% of the *S. odoratus* examined consumed seeds of *Ludwigia peploides* (Ford and Moll 2004. J. Herpetol, 38:296–301). Here I report the deliberate eating and consumption of the fruit and seed from a Chinaberry Tree (*Melia azedarach*). On 3 May 2011 at 1744 h at the San Saba River crossing at Bois D' Arc Lane near Hwy 190 in Menard County, Texas,

Fig. 1. An adult male *Stenotherus odoratus* with partially chewed chinaberry fruit. The turtle continued eating the fruit after it was released.

USA (30.90195°N, 99.91521°W; 597 m elev.), an adult male *S. odoratus* was observed approaching and then consuming a fallen *Melia azedarach* fruit in ca. 5 cm of water. The fruit of the Chinaberry Tree is well documented as a source of poisoning in children (as few as six fruits can be fatal to children) and domestic animals (Méndez et al. 2002. Pesquisa Veterinária Brasileira 22:19–24). Any effect on turtles is apparently unreported. The turtle was photographed with the partially chewed fruit in its mouth (Fig. 1; UTADC 9180) and then released. No further observations were made, so it is unknown if the consumption of the fruit caused any altered behavior or illness. If the seed remained viable after consumption, the role *S. odoratus* might play in the dispersal of Chinaberry seeds might be of further research interest.

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***TERRAPENE CAROLINA* (Eastern Box Turtle). RESISTANCE TO EGG PREDATION.** Turtle eggs are often subject to significant predation by vertebrates, but invertebrates have also been identified as egg predators (e.g., Buhlmann and Coffman 2001. J. Elisha Mitchell Sci. Soc. 117:94–100). Unlike squamate eggs, which can apparently be penetrated by certain insects (especially ants; Conners 1998. Herpetol. Rev. 29:243; Mount et al. 1981. J. Alabama Acad. Sci. 52:66–70; Thawley and Langkilde 2016. J. Herpetol. 50:284–288), turtle eggs appear to be difficult for insects to consume prior to hatching (Conners 1998. Herpetol. Rev. 29:235; Moulis 1997. Chelon. Conserv. Biol. 2:433–436). However, eggs with surface imperfections that make them susceptible to penetration may be preyed upon by ants (Buhlmann and Coffman 2001, *op. cit.*). Whether box turtle (*Terrapene* spp.) eggs are susceptible to invertebrate predation in the absence of prior damage to the shell is unknown (Dodd 2001. North American Box Turtles: A Natural History. University of Oklahoma Press, Norman, Oklahoma. 231 pp.). Here I report an observation of a carcass of a female *Terrapene c. carolina* in which all flesh had been scavenged but an intact egg remained, suggesting the inability of at least some insects to penetrate the eggshell.

On 11 August 2017, a complete, undamaged shell of a deceased female *T. c. carolina* was found in Parke County, Indiana, USA (39.86145°N, 87.27866°W; WGS 84). The plastron was attached to the carapace but fell off while the shell was being handled. Inside the shell were several bones and a single, turgid egg. All soft tissue had been completely removed, presumably by invertebrate scavengers, as a majority of vertebrate scavengers would have been unable to remove all the flesh without significant damage to the shell (minimally, removal of the plastron). However, there was no apparent damage to the egg. The egg was cut open and the contents had clearly begun decomposing within the shell. A similar case of several intact eggs being found within an otherwise denuded *T. c. carolina* shell in western Indiana was also communicated to me (G. Nyberg, pers. comm.)

The persistence of eggs within the decomposing carcasses of box turtles suggests that the invertebrates that consumed the flesh of the dead turtles were unable to penetrate the eggs. While there is certainly a different assemblage of invertebrates consuming turtle carcasses than those that invade turtle nests, there is likely to be broad taxonomic and functional overlap, and this observation suggests that common scavenging insects are unable to easily break open intact box turtle eggs.

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***TERRAPENE ORNATA ORNATA* (Ornate Box Turtle) x *TERRAPENE ORNATA LUTEOLA* (Desert Box Turtle). DIET.** *Terrapene ornata* occurs in the central United States, ranging generally from the Mississippi River to the Rocky Mountains and north to South Dakota and Wisconsin, south to Texas and west into the Sonoran Desert (Dodd 2001. North American Box Turtles: A Natural History. University of Oklahoma Press, Norman, Oklahoma. 231 pp.). Two subspecies have been recognized, with the nominate form *T. ornata ornata* occupying most of this range, while *T. o. luteola* is found in West Texas, New Mexico, southeastern Arizona, and in northern Sonora and Chihuahua in Mexico (www.iucnredlist.org; accessed 7 September 2017). A zone of intergradation between the two subspecies is recognized close to the New Mexico-Texas border (Dodd, *op. cit.*). We acknowledge recent research that questioned the recognition of these subspecies (Bernstein 2013. Mol. Phylog. Evol. 68:119–134), but prefer to continue using the subspecies designations at this time.

Little is known about the biology of these turtles in the intergradation zone, especially with regard to their diet. Although both subspecies are considered to be omnivorous, *T. o. luteola* lives in rather arid habitats (Nieuwolt-Dacanay 1997. Copeia 1997:819–826), and it is uncertain how they keep themselves hydrated. *T. o. ornata* have been found feeding on invertebrates

Fig. 1. A) Putative adult *T. o. luteola* × *T. o. ornata* intergrade found feeding on a cow "patty" in Crane County, Texas on 22 July 2017. B) An image of the cow patty taken after the *T. o. luteola* × *T. o. ornata* intergrade had finished feeding on it. Note the considerable reduction in size, presumably due to coprophagy by the turtle.

in cow dung (Metcalf and Metcalf 1970. Trans. Kansas Acad. Sci. 73:96–117; Blair 1976. Southwest. Nat. 21:89–103), however, there are apparently no records of these turtles feeding directly on cow dung ("patties") for moisture and energy.

On 22 July 2017 at ~0915 h in Crane County, Texas, USA, an adult *T. o. luteola* × *T. o. ornata* intergrade was observed feeding on a cow patty. The individual had ~5 radial lines on the second pleural scute characteristic of *T. o. ornata*, but a pale, yellow head typical of *T. o. luteola*. The individual was measured (CL = 9.7 cm, PL = 7.8 cm), as was the cow patty (11.4 cm × 10.9 cm) and was then left undisturbed to continue feeding (Fig. 1A). Subsequently, the cow patty was revisited at 1152 h, and the turtle was no longer present. The cow patty was remeasured, and had visibly decreased in size (Fig. 1B). The cow patty was moist to the touch and had no visible invertebrates in it, therefore, we tentatively conclude that the turtle was feeding on the patty for its moisture and/or for the vegetation present in it. This is apparently the first documented occurrence of coprophagy presumably for hydration and/or nutritional purposes by an intergrade *T. o. ornata* x *T. o. luteola*. All work was conducted under a Scientific Permit for Research (SPR-0102-191) issued to Michael R. J. Forstner by the Texas Parks and Wildlife Department.

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***TRACHEMYS SCRIPTA ELEGANS* (Red-eared Slider). DIET AND SEED DISPERSAL.** *Trachemys scripta elegans* naturally occur across a broad native range in the central United States. However, they have been widely introduced elsewhere, both in North America as well as other continents, where they can become invasive (Lever 2003. Naturalized Reptiles and Amphibians of the World. Oxford University Press, New York, New York. 318 pp.). *Trachemys scripta elegans* is now a well-established exotic species in the greater Cleveland (Ohio) area and can be found in high densities in area waterways.

Although the diet of *T. scripta* has been well documented within its native range (Ernst and Lovich 2009. Turtles of the United States and Canada, 2nd ed. Johns Hopkins University Press, Baltimore, Maryland. 827 pp.), relatively little is known of the species' diet or natural history outside of its native range. Here, I report anecdotal dietary data from an introduced population of *T. scripta elegans* in northern Ohio (USA: Cuyahoga County, Cuyahoga Heights, 41.4355°N, 81.6617°W; WGS 84).

On 9 July 2015, a female *T. scripta elegans* (maximal straight-line carapace length = 15.3 cm, maximal straight-line plastron length = 14.5 cm, live mass = 475 g) was captured, and she later defecated in her holding container. The feces contained five intact *Nuphar advena* (Nymphaeales: Nymphaeaceae) seeds, *Lemna* sp. leaves, unidentified plant matter, and numerous *Dreissena polymorpha* (Veneroidea: Dreissenidae) shell fragments. Since this initial observation, several other specimens have defecated *N. advena* seeds, and one specimen retained for educational outreach programs has readily fed upon *N. advena* seed pods. This is the first documentation of *N. advena* and *D. polymorpha* in the diet of *T. s. elegans*.

It has been shown that *T. s. elegans* may act as a seed disperser by means of consumption and subsequent defecation of seeds (Kimmons and Moll 2010. Chelon. Conserv. Biol. 9:289–294) or by seed attachment to the shell (Franklin and Oyervides 2016. Herpetol. Rev. 47:450–451). Presence of *N. advena* seeds in the feces of the specimen described herein provides additional documentation of this species' ability to disperse seeds. Furthermore, mark-recapture data from this site (OML, unpubl. data) shows that *T. s. elegans* regularly travel among several aquatic habitats (e.g., wetlands, abandoned gravel pits, and canals), thereby increasing the likelihood of seed dispersal among different habitats. The presence of bivalve remains highlights the fact that though adult *T. s. elegans* may consume a larger relative proportion of vegetative matter than do juveniles (Hart 1983. Herpetologica 39:285–290), adults will take animal prey when available.

The specimen was collected under scientific collection permit #17-114 issued by the Ohio Department of Natural Resources Division of Wildlife. I thank Tim Krynak and Terry Robison for helpful comments on this manuscript.

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CROCODYLIA — CROCODILIANS

***ALLIGATOR MISSISSIPPIENSIS* (American Alligator). MORTALITY.** *Alligator mississippiensis* is a warm-temperate distributed species ranging from North Carolina, to southern Florida, and west to Texas, USA. Its northern range limits are most likely restricted by an inability to survive cold seasonal weather, and likely further constrained by the inability of young *A. mississippiensis* to alter cutaneous blood flow in response to cooling temperatures to the same extent as larger alligators (Smith and Adams 1978. Herpetologica 34:406–408). Colbert et al. (1946. Bull. Am. Mus. Nat. Hist. 86:329–373) defined the lower thermal limit of *A. mississippiensis* at 3°C. However, Brisbin et al. (1982. Am. Midl. Nat. 107:209–218) concluded that for adult *A. mississippiensis* in North Carolina the lowest ambient temperatures that could be survived were 4–5°C. *Alligator mississippiensis* exhibits two main behaviors in response to freezing weather: moving to deeper sections of the body of water where temperatures may remain higher or more stable; or they may exhibit "icing" behavior where they move to the edge of the pond and keep just their snout above the water surface, allowing the water to freeze around them. Both behaviors have been reported in response to freezing temperatures in different parts of their range (McIlhenny 1935. The Alligator's Life History. Christopher Publishing House, Boston, Massachusetts. 117 pp.; Brisbin et al., *op. cit.*). Here I report the likely winter mortality of a captive *A. mississippiensis* after being released illegally into a wetland in central Maryland.

On 17 April 2015, the deceased *A. mississippiensis* was found floating in the middle of a permanent emergent wetland (GPS locations not specified due to the presence of sensitive species). The alligator was approximately 1.5 m long and weighed 22 kg. Winter air temperatures during 2015 in central Maryland dropped to -17.2°C, far beneath the absolute thermal limit of *A. mississippiensis* (weather data taken from Baltimore-Washington International Airport). However, the date of release and death are both unknown. The stomach was devoid of contents, suggesting it was unable to find food, or did not eat before death. Although the cause of death was unknown, it seems likely that the alligator died from exposure to extreme cold temperatures. If so, this confirms that *A. mississippiensis* cannot survive sub-zero temperatures typical of Maryland winters and springs.

Later that summer, another *A. mississippiensis* was found walking in a driveway near the location of the original animal. The animal was confiscated and the owner of the animal was charged with possession of a dangerous animal. The investigating Natural Resource Police officer believes that the man was responsible for both releases and most likely released the deceased *A. mississippiensis* in the fall (pers. comm.). This release of a large non-native reptile into a sensitive ecosystem has multiple ramifications; most obviously, the unnecessary death of the *A. mississippiensis* that could have been easily prevented. Other impacts may have included the spread of invasive pathogens from the pet trade to the wild, and the potential predation of a declining sensitive species (e.g., *Clemmys guttata* [Spotted Turtle]). Alternately, if the *A. mississippiensis* was released into a deeper wetland (the wetland was < 1.2 m deep) and the winter weather remained warmer (as it is likely to do as temperatures continue to increase), it might have persisted into the next season and continued to negatively impact the local ecosystem.

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***MELANOSUCHUS NIGER* (Black Caiman) and *CAIMAN CROCODILUS* (Spectacled Caiman). NESTING.** As far as we know, the only report of caiman nesting in Amazonian fluvial islands was described by Da Silveira et al. (1997. J. Herpetol. 31:514–520), who found a *Melanosuchus* nest during a decade of caiman monitoring in the archipelago of Anavilhanas National Park, Brazil. These islands are seasonally flooded by a mixture of nutrient-poor black waters of the Rio Negro and sediment-laden water from the Rio Branco. Despite finding only one nest, the authors suggested that river islands of the Anavilhanas are used as successful nesting areas, given the common occurrence of hatchling groups of *Melanosuchus niger* and *Caiman crocodilus* (Spectacled Caiman) there. Herein we report additional observations of nesting on Amazonian river islands by *M. niger* and *C. crocodilus*.

From September to November 2014, we conducted surveys along line-transects across 15 forested islands (Fig. 1) located in the Solimões-Japurá interfluve (64.4–65.4°W; 2.2–3.5°S), in Central Amazonia. Unlike the Anavilhanas, these islands are seasonally flooded only by nutrient-rich white-water rivers. We found 11 caiman nests (six of *M. niger* and five of *C. crocodilus*) occurring on six islands. Island size varied from 166 to 2109 ha, and minimum distances from island edges to river margin varied from 65 to 1479 m. Distances from nests to the nearest water body were < 5 m for *M. niger*, and > 12 m for *C. crocodilus*. One of six *M. niger* nests was attended by an adult, presumably a female, and two had evidence of predation based on the patterns

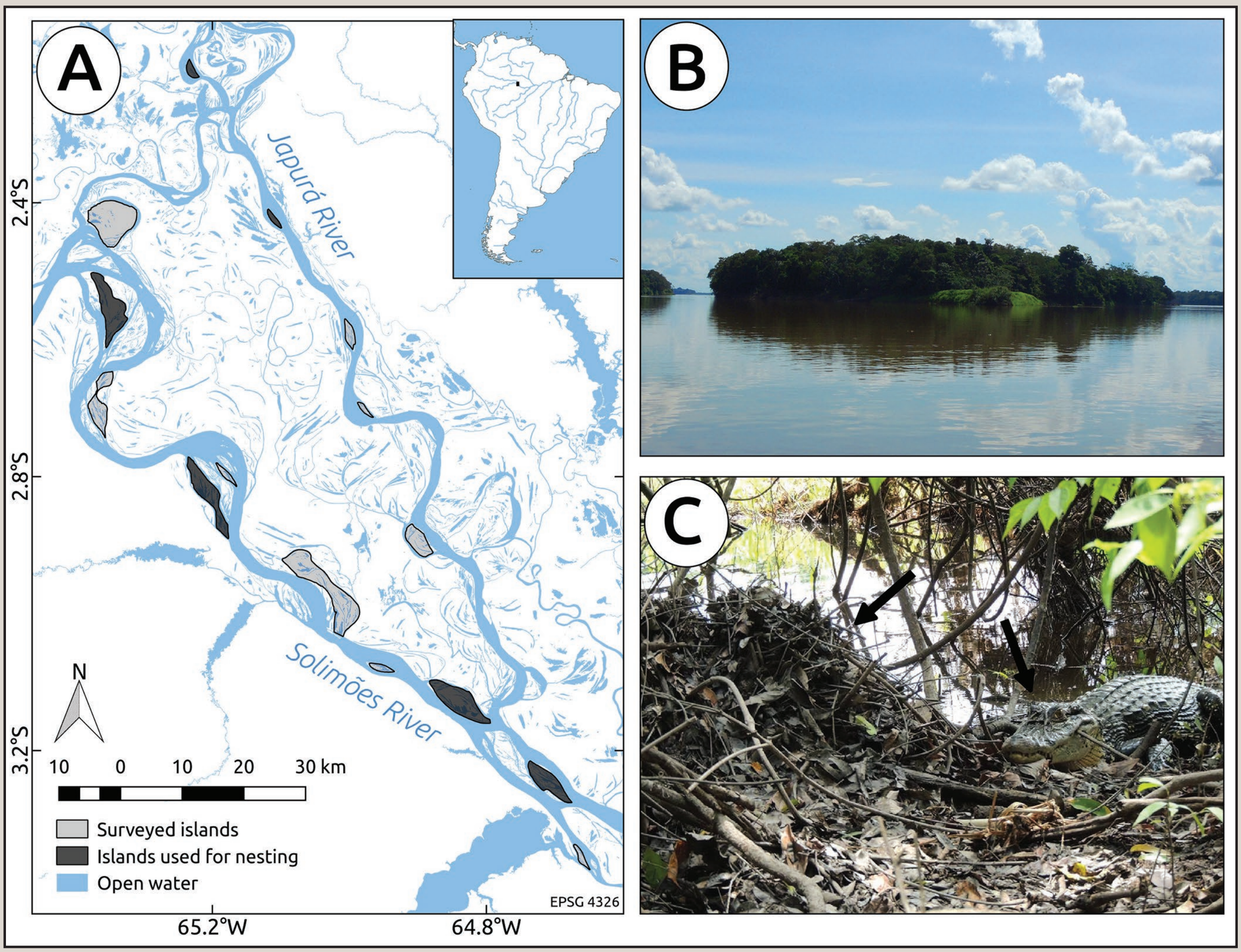

Fig. 1. A) Location of survey islands in the Solimões-Japurá interfluvial region; B) one of the islands used by nesting caimans; and C) a nest of *Melanosuchus niger* attended by an adult (arrows).

of nest predation described by Torralvo et al. (2017. PLoS ONE 12:e0183476), one by *Panthera onca* (Jaguar) and the other by *Tupinambis teguixim* (Black-and-white Tegu). We found no evidence of predation on the five *C. crocodilus* nests, and four of them were attended by an adult.

One of the most frequent causes of caiman egg mortality during incubation is predation (Torralvo et al., *op. cit.*). The occurrence of predator species, such as capuchin monkeys and jaguars, may be lower on islands than on the mainland (Rabelo et al. 2017. J. Biogeog. 44:1802–1812), so these river islands are potentially successful nesting sites for caiman species. Our findings provide new evidence for the use of river islands as reproductive sites for caiman species in the Amazon, highlighting the importance of these islands for the conservation of these species.

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SQUAMATA — LIZARDS

***ABRONIA MIXTECA* (Mixtecan Arboreal Alligator Lizard). MATING BEHAVIOR.** *Abronia mixteca* is an arboreal anguid that inhabits oak and pine-oak forests in mountains of Oaxaca and Guerrero, Mexico, at elevations of 2134–2400 m (Campbell and Frost 1993. Bull. Amer. Mus. Nat. Hist. 216:1–121; Casas-Andreu et al. 1996. Acta Zool. Mex. 69:1–35; Canseco-Márquez and Gutiérrez-Mayén 2010. Anfibios y Reptiles del Valle de Tehuacán-Cuicatlán. CONABIO, Cuicatlán A.C., BUAP, México, D.F. 302 pp.). Existing information about the biology and reproduction is limited to only three species in the genus (*A. graminea*, *A. lythrochila*, and *A. oaxacae*; Greer 1967. Herpetologica 23:94–99), and most observations have been under captive conditions (Schmidt-Ballardo and Mendoza-Quijano 1999. Herpetol. Rev. 30:96; Langner 2014. TERRARIA/Elaphe 45:28–34; Gonzáles-Porter et al. 2015. Rev. Dig. E-BIOS 1:1–9; Clause et al. 2016. Herpetol. Rev. 47:231–234). Observations of secretive behaviors such as mating are difficult because *A. mixteca* is arboreal. Herein we report the first observations of mating in *A. mixteca* in the wild.

At 1110 h on 22 July 2014, we observed mating in the vicinity of La Cofradia, during herpetofauna research conducted in logging areas in San Pedro el Alto community, Zimatlán district in Oaxaca (16.74504°N, 97.11253°W, WGS 84; 2818 m elev.). The pair was on the trunk of a *Pinus oaxaca*. Distinctive courtship behavior was deployed by the male, which consisted of taking the temporal region of the female's head with the jaws and rubbing against the body, while attempting to align the vent to copulate (Fig. 1A, B). Copulation lasted for about 35 min.

Subsequently, at 1635 h on 30 July 2015, a second pair was recorded in copulation in a community conservation area known as La Yerbabuena (16.75469°N, 97.11203°W, WGS 84; 2768 m elev.). This pair was on a *Pinus pseudostrobus* trunk, 170 cm above the ground. Both pairs displayed the posture of the male holding the female's head in its jaws (Fig. 1C, D). Copulation ended 50 min. after detection, but the pair was mating when found.

Fig. 1. Pairs of *Abronia mixteca*, showing courtship (A and B) and copulation (C and D).

Copulation times in captivity can extend up to 18 h (Schmidt-Ballardo et al. 2015. Mesoam. Herpetol. 2:192–194). Longer mating periods in captivity may reflect the lack of predation risk or competition for food or other resources Our observations are the first records of mating in *A. mixteca* in nature.

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***ANOLIS CAROLINENSIS* (Green Anole). INTERSPECIFIC MATING.** *Anolis carolinensis* is the only anole native to the United States, and occurs throughout the southeast portion of the country (Powell et al. 2016. Field Guide to Reptiles and Amphibians of Eastern and Central North America, 4th ed. Houghton Mifflin Harcourt Publishing Company, New York, New York. 512 pp.). However, several *Anolis* spp. have been introduced to the United States, with the Brown Anole (*Anolis sagrei*) being the most widespread (Powell et al., *op. cit.*).

At 1136 h on 12 June 2017, a male *A. carolinensis* was observed mating with a female *A. sagrei* at the Archie Carr Sea Turtle House in Brevard County, Florida (Fig. 1; 28.0131°N, 80.5326°W; WGS

Fig. 1. Male *Anolis carolinensis* mating with female *Anolis sagrei* in Brevard County, Florida, USA.

84). *Anolis sagrei* is the most frequently observed *Anolis* at the site (NMS, pers. obs.). Photos of this event have been deposited at HerpMapper (HM 190125). To our knowledge this is the first published record of a male *A. carolinensis* mating with a female *A. sagrei*.

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ANOLIS CAROLINENSIS **(Green Anole). NEST SITES AND COMMUNAL NESTING.** The Green Anole is a small, slender, arboreal lizard native to the southeastern United States (Powell et al. 2016. Field Guide to Reptiles and Amphibians of Eastern and Central North America, 4th ed. Houghton Mifflin Harcourt Publishing Company, New York, New York. 512 pp). This species is mostly insectivorous and usually feeds on small, soft-bodied insects (Crews 1980. Adv. Stud. Behav. 11:1–74). The breeding season occurs over ~ 4 months from about April to July (Lovern et al. 2004. ILAR Journal 45:54–64), when the female lays several clutches of a single egg, often in moist leaves or in a shallow hole which is either pre-existing or created by the female (Crews 1980, *op. cit.*). Females will also conceal their eggs under leaves, logs, stones, or other objects and debris; the interval between clutches is 7–14 days (Lovern et al, *op. cit.*; Crews, *op. cit.*).

On several occasions during Spring 2016 and Spring 2017, we uncovered *A. carolinensis* nests in the tidal freshwater forested wetlands of the Savannah River near Hardeeville, South Carolina (32.20981°S, 81.11784°W; WGS 84). The majority of the nests were found in elevated mounds of soil substrate and leaf litter (i.e., "hummocks") at the base of Bald Cypress (*Taxodium distichum*) and Water Tupelo (*Nyssa aquatica*) trees. The hummocks are generally the only suitable nesting substrate that remains above the average water level in this tidal wetland (roughly 15–25 cm above water).

Eggs were measured, photographed in situ, and immediately covered with leaf litter. The average egg size (N = 22) was 10 mm in length. We discovered that the eggs belonged to *A. carolinensis* during fieldwork conducted at the same site during Spring 2016. An egg that was collected temporarily for photographs hatched several hours later in a container before it could be returned. This may have been an example of environmentally cued hatching (Doody 2011. Int. Comp. Biol. 51:49–61). The aforementioned egg was taken from a communal nest of approximately five eggs, which we found within a decomposing tree limb (roughly 20 cm above water). Repeated visits to the nest revealed that all of the eggs hatched successfully. The eggs had not been disturbed or preyed upon, and all of the eggs had typical egg tooth perforations.

Our record provides previously undocumented descriptions of *A. carolinensis* nest sites in tidal freshwater forested wetlands, along with a further record of communal nesting (Doody et al. 2009. Quart. Rev. Biol. 84:229–252). It is likely that other reptile species found in tidal freshwater forested wetlands also use hummocks or similar habitat features (e.g., accumulated organic matter at the base of shrubs) as nesting sites. Information regarding the ecology of herpetofauna in tidal, freshwater forested wetlands is incomplete. Our record improves our understanding of reptilian reproduction in this wetland type.

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ANOLIS CRISTATELLUS **(Puerto Rican Crested Anole). CANNIBALISM.** *Anolis cristatellus* is native to Puerto Rico but has been introduced, and become regionally established, in Greater Miami, Florida, USA (Kolbe et al. 2016. Landsc. Ecol. 31:1795–1813). It is a generalist consumer of terrestrial arthropods, although it has been occasionally recorded preying on other lizards in its native range (Ríos-López et al. 2015. Life Excit. Biol. 3:118–136). Cannibalism is widespread in *Anolis* lizards (Powell and Watkins. 2014. IRCF Reptiles Amphib. 21:136–137) and has been recorded in *A. cristatellus* in its native range of Puerto Rico (Ríos-López et al. 2015, *op. cit.*), as well as in the Dominican Republic where this species is invasive (Fitch et al. 1989. Amphibia-Reptilia 10:307–320). Here we report, to our knowledge, the first record of cannibalism in *A. cristatellus* in Florida, a region outside of its native range.

On 14 October 2017 at ca. 1400 h, an adult male *A. cristatellus* (ca. 6 cm snout–vent length) was observed in Fairchild Tropical Botanic Garden (25.676°N, 80.274°W; WGS 84, elev. < 1 m) preying upon a smaller conspecific (ca. 3 cm SVL; Fig 1). The larger lizard seized the smaller lizard across the torso. The prey lizard frequently bit the head of the predatory lizard in response, as well as consistently extending its dewlap throughout the course of the interaction. Other lizards, including a female conspecific, were present in the immediate vicinity of the interaction, although only the two lizards involved in the trophic event were physically involved. We have observed multiple other cannibalism interactions of *A. cristatellus* at this and different sites in Miami, Florida, however this is the first time

Fig. 1. Cannibalism of a juvenile *Anolis cristatellus* by a larger mature male. An adult female (left) observed the interaction.

we have been able to obtain clear photographic support. These observations suggest that cannibalism is a conserved behavioral trait in *A. cristatellus* when subjected to novel abiotic and biotic environmental conditions, such as those experienced in its non-native range in southern Florida, USA.

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***ANOLIS SAGREI* (Brown Anole). OPHIOPHAGY.** Native to Cuba and the Bahamas, *Anolis* (*Norops*) *sagrei* was first noted in Florida, USA in 1887 (Garman 1887. Bull. Essex Inst. 19:25–50) and has subsequently become established throughout Florida, southern Georgia, and other areas of the southern United States (Campbell 1996. Herpetol. Rev. 27:155–157). The species is considered a direct threat to native fauna, especially its congener the Green Anole (*Anolis carolinensis*), due to its voracious appetite. *Anolis sagrei* consumes an array of invertebrate and more rarely vertebrate prey, particularly other lizards (Norval 2007. Herpetol. Bull. 102:34–37; Norval et al. 2010. Russ. J. Herpetol. 17:131–138; Giery et al. 2013. Funct. Ecol. 27:1436–1441). Here I report the first record of ophiophagy by *A. sagrei*.

At 1057 h on 9 November 2017, I observed an adult male *A. sagrei* consuming a small, burnt-red colored snake on the East campus of Valencia College in Orlando, Florida (28°33’05.5”N, 81°15’03.6”W, WGS 84; 22 m elev.). The apparently deceased snake was being consumed headfirst (Fig. 1). The anole escaped with the prey item into nearby bushes as I attempted capture. Therefore, species-level identification of the snake is not possible. Given its scalation, burnt-red dorsal coloration largely lacking in pattern, and lighter colored venter, the snake could possibly be *Storeria victa*, *Rhadinaea flavilata*, or *Tantilla relicta*, all of which occur in central Florida.

My observation is the first documented case of ophiophagy by *A. sagrei* and represents a new prey suborder for the species and, to my knowledge, the diverse genus *Anolis*. This record adds to the known prey items of this opportunistic feeder and confirms its ability to consume relatively large vertebrate prey.

Fig. 1. Adult Brown Anole (*Anolis sagrei*) preying upon a small, unidentified snake.

I thank Steve Myers for helpful discussion, as well as Kevin Enge, Kenneth Krysko, and Paul Moler for comments on the potential identity of the snake.

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***ASPIDOSCELIS VELOX* (Plateau Striped Whiptail) and *ASPIDOSCELIS UNIPARENS* (Desert Grassland Whiptail). RARE SYNTOPY.** *Aspidoscelis velox* and *A. uniparens* are triploid obligatory parthenogenetic species; they were separately derived in two-stage hybridization processes (Dessauer and Cole 1989. *In* Dawley and Bogart [eds.], Evolution and Ecology of Unisexual Vertebrates, pp. 49–71. Bulletin 466, New York State Museum; Moritz et al. 1989. Evolution 43:958–968). These species of lizards have been shown to have essentially complementary natural geographic ranges, with *A. velox* distributed to the north of *A. uniparens*. The range of *A. velox* includes parts of Arizona, Colorado, New Mexico, and Utah, whereas the range of *A. uniparens* includes mostly allopatric parts of Arizona and New Mexico and entirely allopatric parts of Texas and areas in the Mexican states of Chihuahua and Sonora (Wright 1968. J. Herpetol. 1:1–20; Dessauer and Cole, *op. cit.*; Lemos-Espinal et al. 2017. Herpetol. Rev. 48: 639). The initial survey by Wright (*op. cit.*) to determine the respective geographic distributions of these triploid species, in relationship to that of *A. inornatus*, a common gonochoristic progenitor in their independently complicated ancestries, revealed only two areas where these parthenogenetic species are syntopic. Wright (*op. cit.*) reported sites of syntopy in Yavapai County, Arizona (documented only by specimens examined) and Socorro County, New Mexico (documented by specimens examined and brief remarks). However, Wright’s report of syntopy between *A. velox* and *A. uniparens* was overlooked by Cuellar (1979. Amer. Zool. 19:773–786). Exhaustive independent searches at many sites in Arizona and New Mexico by BKS and associates, JEC, and JMW have not increased the number of known counties for syntopy between *A. velox* and *A. uniparens*. Herein, we provide the first detailed description of syntopy between these species at the two known sites in Yavapai County. The sites described also provide examples of the presence of up to three parthenogenetic species of *Aspidoscelis* in the *A. sexlineatus* species group in habitats not occupied by gonochoristic congeners, a pattern of distribution first recognized by Wright and Lowe (1968. Copeia 1968:128–138).

As part of a comprehensive analysis of phylogenetic relationships among whiptail lizards of the American southwest resulting in several publications (Walker et al. 2012. Herpetol. Conserv. Biol. 7:265–275; Sullivan et al. 2013. Copeia 2013:366–377; Sullivan et al. 2014. Copeia 2014:519–529), we sought samples of various taxa of *Aspidoscelis* from what represented sites of 'distant allopatry' relative to taxa from southeastern Arizona. Prompted by the comments from John W. Wright (BKS, pers. comm., July 2000), we also undertook a survey for sites occupied by both *A. velox* and *A. uniparens* in central Arizona during 2000–2003. Wright's guidance led BKS, KOS, and JRS to search for *Aspidoscelis* lizards in the vicinity of Prescott, Yavapai County, Arizona, as well as elsewhere in the general area. Fieldwork was opportunistically conducted during July and August in each year following the initiation of summer rains, and based on the presumption of increased activity of these widely foraging lizards. These searches also revealed that a third triploid obligatory parthenogenetic species, *A. flagellicaudus* (Gila Spotted Whiptail), was syntopic with *A. velox* and *A. uniparens* at two ecologically very different sites. Of the aforementioned three parthenogenetic species, *A. flagellicaudus* grows to > 90 mm in snout–vent length (SVL), whereas *A. velox* and *A. uniparens* are smaller species and grow to between 70 and 80 mm in SVL in Arizona (BKS, JEC, and JMW, pers. obs.).

One site in Yavapai County, Arizona, inhabited by both *A. velox* and *A. uniparens*, in addition to *A. flagellicaudus*, was along Granite Creek in a riparian woodland community dominated by *Populus fremontii* (Fremont's Cottonwood) and *Salix gooddingii* (Goodding's Willow), located immediately northeast of Prescott (34.571167°N, 112.434137°W, WSG 84; ca. 1581 m elev.). At this site lizards were found syntopically in open areas among the cottonwoods and willows, foraging in abundant leaf litter. Adjacent to the sandy cobbled floodplain of Granite Creek, lizards were also found in disturbed areas occupied by weedy grass and shrub species growing along dirt and paved roadways. Both *A. velox* and *A. uniparens* appeared to be equally abundant. Moreover, these parthenogens, as well as *A. flagellicaudus*, were relatively unwary and easily approachable by human intruders. Individuals of *A. flagellicaudus* were identifiable by striping pattern (i.e., closely spaced paravertebral stripes in the mid-dorsal region), profusion of distinct spots (both on and between the dorsal stripes), and general ensembles of other color pattern features. Individuals of *A. velox* often possessed a partial seventh stripe between the paravertebrals, and all of them possessed only very faint spots in the dark fields between the stripes. Certain of these color pattern features (i.e., spots) were absent from the individuals of *A. uniparens*, which were six-striped with brown-hued fields between the stripes. Small numbers of these species were collected alive by BKS, KOS, and JRS from 0800–1045 h MST on 2 July 2000, and released after tail tips were removed for genetic analysis by Michael E. and Marlis R. Douglas, University of Arkansas. Air temperature on this date ranged from 19–23°C from the dense vegetation of the riparian corridor to the open disturbed areas along dirt roads and trails.

A second site, at approximately 26 km NNW of the Prescott vicinity, with individuals of all three of these triploid parthenogenetic whiptail taxa, comprised an ecotone between Great Basin Conifer Woodland and Plains Basin Grassland (biotic community boundaries based on Brown et al. 2007. Southwest. Nat. 52:610–616) in the vicinity of Indian Ruins Road (34.78125°N, 112.54450°W, WGS 84; ca. 1531 m elev.). Individuals of *A. flagellicaudus*, *A. velox*, and *A. uniparens* were found along Indian Ruins Road, a dirt track, in the primarily woodland formation dominated by *Pinus monophylla* (Single-leaf Pinyon Pine) and *Juniperus monosperma* (One-seed Juniper), and to a lesser extent, *Purshia mexicana* (Mexican Cliff-rose), *Arctostaphylos pungens* (Pointleaf Manzanita), *Quercus turbinella* (Shrub Live Oak), and *Q. emoryi* (Emory Oak). These three species of lizards were equally abundant, with small numbers of each taxon collected by BKS, KOS, and JRS within 30 minutes during the morning of 20 July 2003, a sunny, warm day with air temperature during fieldwork of 20–22°C (0830–1030 h MST).

Coexistence of *A. velox* and *A. uniparens* at the two ecologically distinctive sites in Arizona as here described further supports the interpretation that they are discreet historical entities with different adaptive ecological profiles (mostly woodland for the former versus mostly desert grassland for the latter) resulting from separate and different progenitor combinations, areas of origin, and evolutionary trajectories (Wright, *op. cit.*; Dessauer and Cole, *op. cit.*; Moritz et al., *op. cit.*). This is also reflected by their treatment as species in the SSAR checklist of lizards (de Queiroz and Reeder 2012. Squamata-Lizards. SSAR Herpetol. Circ. 39:32–51; but also see contrary remarks by Dessauer and Cole, *op. cit.*). However, our spellings of certain specific epithets (e.g., *A. flagellicaudus* and *A. inornatus*) are based on the masculine gender of *Aspidoscelis* as clarified by Steyskal (1971. Proc. Biol. Soc. Washington 84:7–11) and Tucker et al. (2016. Mol. Phylog. Evol. 103:75–84), rather than those of de Queiroz and Reeder (*op. cit.*) based on incorrect presumption of feminine gender.

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GEHYRA BREVIPALMATA (Palau Gecko). REPRODUCTION. *Gehyra brevipalmata* is endemic to Palau and occurs widely through the Palaun Archipelago in the western Pacific Ocean (Zug 2013. Reptiles and Amphibians of the Pacific Islands A Comprehensive Guide. University of California Press, Berkeley. 306 pp.). It is fond of crevices and has adapted to living in man-made structures (Crombie and Pregill 1999. Herpetol. Monogr. 13:29–80), and produces clutches of two eggs; adult males ranged from 66 to 89 mm SVL, females from 62 to 77 mm SVL (Zug, *op. cit.*). In this note, I provide additional information on the reproduction of *G. brevipalmata*.

A sample of 30 *G. brevipalmata* consisting of 14 adult males (mean SVL = 72.5 mm ± 5.6 SD, range = 63–81 mm), 14 adult females (mean SVL = 67.9 mm ± 3.1 SD, range = 63–73 mm), one subadult female (SVL = 58 mm), and one unsexed subadult (SVL = 53 mm) collected 2003 to 2014 from the Palau Islands (7.5150°N, 134.5825°E) was borrowed from the herpetology collection of the California Academy of Sciences (CAS), San Francisco, California, USA (CAS 236311, 237061, 237071, 237897, 238009, 238010, 238030, 238170, 249187, 249255–249257, 249259, 249384, 249399, 249441, 251700, 251701, 251706, 251710, 251948, 254324, 254325, 254408, 255006, 255007, 256555, 256567, 257940, 257941).

A cut was made in the lower abdominal cavity and the left testis or left ovary was removed, embedded in paraffin, cut into 5-µm sections and stained by Harris hematoxylin followed by eosin counterstain. Enlarged follicles (> 4 mm) or oviductal eggs were counted. Histology slides were deposited at CAS.

The only stage present in the testis cycle was spermiogenesis (= sperm formation) in which the seminiferous tubules were lined by sperm or groups of metamorphosing spermatids. *Gehyra brevipalmata* males in this condition were found: January (N = 1); April (N = 1); May (N =1); June (N =2); August (N = 1); September (N =2); October (N = 2); November (N =2); December (N =2). The smallest reproductively active male (spermiogenesis) measured 63 mm SVL (CAS 237071) and was collected in December.

Three stages were noted in the ovarian cycle (Table 1): (1) quiescent, no yolk deposition; (2) enlarged follicles, > 4 mm; (3) oviductal eggs. Mean clutch size (N = 10) was an invariant 1.0. In one female from April with an oviductal egg (CAS 249255), early yolk deposition was noted in the opposite (left) ovary, indicating production of a subsequent clutch (Table 1). Also, in two additional females with one oviductal egg, each (CAS 249259, 256555), the opposite (right ovary) contained one enlarged follicle (5 mm) for a subsequent clutch (Table 1.) The smallest reproductively active females measured 64 mm SVL (CAS 249441, 256555). Each contained one oviductal egg. One slightly smaller female, SVL = 63 mm, with a quiescent ovary (CAS 251706) from November was arbitrarily considered as an adult.

Reproductive data on congeners (*Gehyra mutilata* Goldberg and Kraus 2012. Herpetofauna 42:24–27; *Gehyra oceanica* Goldberg 2015. Bull Maryland Herpetol. Soc. 51:1–4) indicated clutches of 1–2 eggs *(G. mutilata*) and 2–3 eggs (*G. oceanica*). There is a previous report of clutches of two egg clutches for *G. brevipalmata* (Zug, *op. cit.*). The clutch size of 1 egg reported herein might reflect my small sample size of gravid females (N = 10).

The presence of reproductively active males in nine months and female reproductive activity in eight months indicates *G. brevipalmata* has an extended period of reproduction. Examination of additional monthly samples might show *G. brevipalmata* reproduces throughout the year. Continuous reproduction appears to be common in lizards from Oceania, see for example Schwaner (1980. Occas. Pap. Mus. Nat. His. Univ. Kansas 86:1–53) and Goldberg (2017. Herpetol. Rev. 48:850–851).

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Table 1. Monthly stages in the ovarian cycle of 14 *Gehyra brevipalmata* adult females from Palau; * = early yolk deposition present in opposite ovary; **=one oviductal egg and enlarged 5 mm follicle in opposite ovary.

Month	N	Quiescent	Enlarged follicles > 4 mm	Oviductal eggs
January	2	2	0	0
February	2	0	1	1
March	1	0	0	1
April	3	0	0	3*,**
May	2	0	0	2**
July	1	0	0	1
October	1	1	0	0
November	2	1	1	0

***LEIOCEPHALUS CARINATUS* (Northern Curly-tailed Lizard). EXTREME FECAL IMPACTION.** *Leiocephalus carinatus* is a non-native and abundant lizard in many urban areas of southeastern Florida, USA (Duellman and Schwartz 1958. Bull. Florida State Mus. 3:181–342; Engeman et al. 2011. Curr. Zool. 57:599–612). At 1120 h on 18 June 2017, we observed a female *L. carinatus* on the trunk of a tree at Cocoa Beach Post Office parking lot (28.326573, -80.611595; WGS 84) among numerous conspecifics. The lizard was active and fled when approached with a noosing pole. At capture, the body of the lizard appeared pear-shaped, and a large, dense object in the lower abdomen was detected via palpation.

The individual had a mass of 39.5 g and SVL of 90 mm. Dissection revealed a large, putty-like mass of feces in the lower colon measuring 48 mm by 22 mm (Fig. 1). The bolus was weighed while still intact in the gastrointestinal tract at a mass of 15.5 g. The fecal mass therefore was approximately 40% of the lizard's total body mass. No obvious cincturing or obstruction distal to the mass was detected. The specimen was accessioned intact to the Florida Museum of Natural History (FLMNH UF 180312; Field ID, NMC 102).

The possible causes of this extreme fecal obstruction are uncertain. Prolonged absorption of water in the gut without compensating fluid intake can cause occasional intestinal obstruction in some reptiles (Lillywhite 2014. How Snakes Work: Structure, Function, and Behavior of the World's Snakes. Oxford University Press, New York. 241 pp.). For example, reports of fecaliths in wild rattlesnakes are associated with periods of drought (Brown and Simon 2017. Herpetol. Rev. 48:208–209) and/or brumation (Corbit et al. 2014. J. Anim. Physiol. 98:96–99). However, the putty-like consistency of the fecal bolus in the female *L. carinatus* combined with the regular rainfall in Florida indicate dehydration as an unlikely factor. Gut obstruction and fecal impaction caused by ingestion of substrate and/or dehydration are common ailments of captive lizards *Eublepharis macularius* and *Pogona vitticeps* (Stahl 2003. Sem. Avian. Exot. Pet. 12:162–183; Wright 2008. J. Exot. Pet Med. 14:267–272). Thus,

Fig. 1. Dissected female *Leiocephalus carinatus* (FLMNH UF 180312, NMC102) with fecal bolus intact in gut, June 2017.

the impaction of the female *L. carinatus* may be a result of the animal ingesting sandy soil at the site while engorging itself on available prey. However, several other *L. carinatus* individuals were captured and dissected from the same location (N = 9) and other locations (N = 37), but no gut obstructions or fecal boluses were observed. Therefore, it is likely that the fecal impaction reported here represents a rare case among wild *L. carinatus* populations.

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OTOSAURUS CUMINGI **(Philippine Giant Forest Skink). NEST SITE and ENVIRONMENTALLY CUED HATCHING.** *Otosaurus cumingi* is endemic to the Philippines and is the largest skink in the region. It is a ground-dwelling species frequently encountered actively foraging under leaves and logs as well as in open spaces at midday in mid-elevation forests (200–500 m elev.) (Brown and Alcala 1980. Philippine lizards of the family Scincidae. Silliman University Press, Dumaguete City, Philippines; Linkem et al. 2011. Zool. J. Linn. Soc. 163:1217–1243; Brown et al. 2013. Zookeys 266:1–120). Here we report the first nest found for the species, as well as evidence for environmentally cued hatching. We also present data on egg size, clutch size, and hatchling size.

On 1 August 2017, while conducting herpetological surveys on Biak-Na-Bato National Park, Municipality of San Miguel in Bulacan Province, Luzon Island, Philippines (15.1075°N, 1221.0763°E, WGS 84; 81 m elev.), we found a clutch of four eggs inside a crevice of a limestone boulder, in limestone karst habitat in disturbed forest (Fig. 1A). When the eggs were collected for identification, three of them hatched immediately upon handling, suggesting that we induced hatching. The fourth egg hatched while being processed as a voucher specimen. Environmentally cued hatching, including early hatching in response to the (perceived) threat of predation, has been documented in lizards, including skinks (Doody et al. 2011. Integrat. Comp. Biol. 51:49–61).

The eggs ranged in diameter from 16.6–16.8 mm and height from 26.5–30 mm (Fig. 1B), and hatchlings ranged from 45.5–48.4 mm SVL and from 66.9–68.4 mm tail length (Fig. 1B). Dorsal coloration was reddish brown with alternating irregular dark and light brown spots along the medial region from neck to tail. Oblique coloration was brown above to light brown below, with black, irregular stripes above starting from ears to groin, and with yellow to light brown spots along the body. Ventral coloration was pale yellow. Upper and lower eyelids were yellow.

The *O. cumingi* hatchlings (PNM 10189, 10190) and eggshells were deposited in the Herpetology Section, Zoology Division, National Museum of the Philippines, Manila, Philippines. To the best of our knowledge, this is the first account of a nest site, clutch, egg and hatchling size, and evidence of early hatching in response to predation risk in *O. cumingi*.

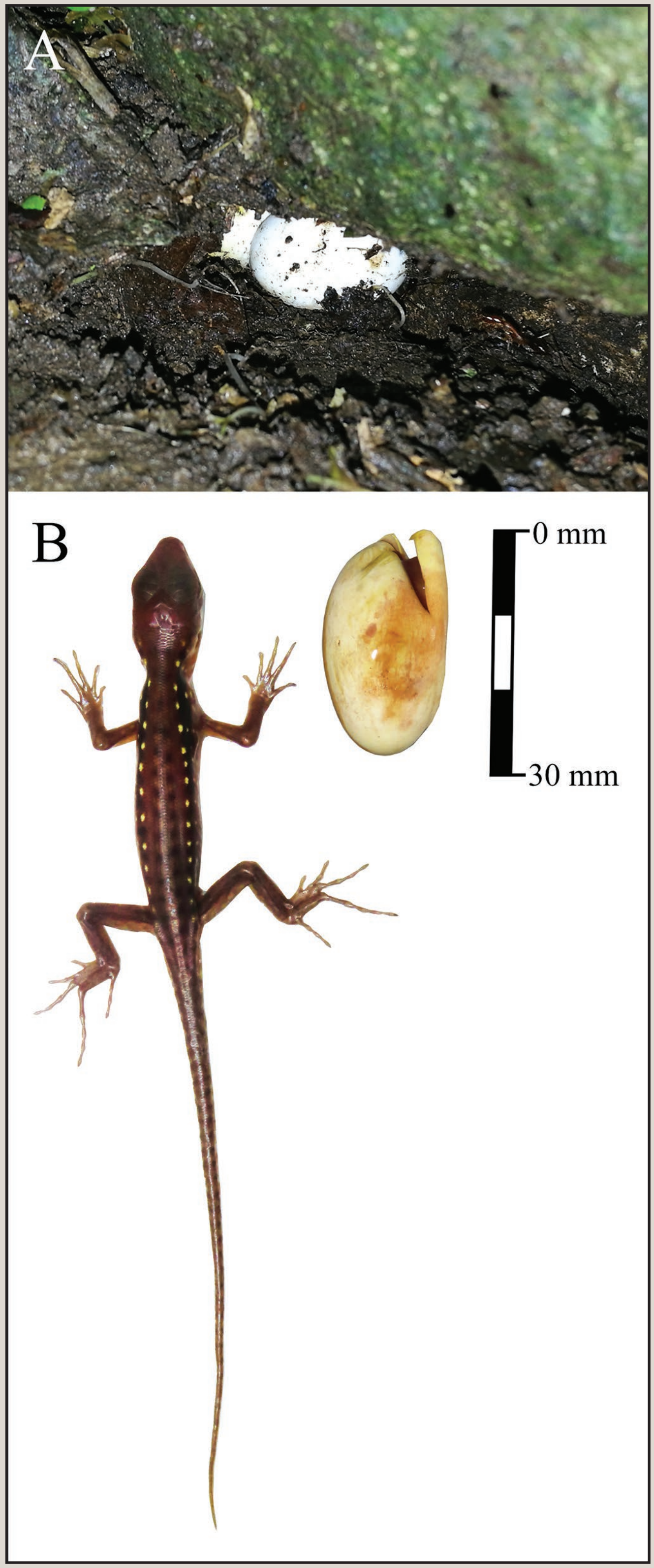

Fig. 1. A) *Otosaurus cumingi* eggs inside the crevice of a limestone boulder; B) hatchling and eggshell.

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***PEROCHIRUS ATELES* (Micronesian Speckle-bellied Gecko). REPRODUCTION.** *Perochirus ateles* occurs in western Micronesia from Tinian, the Mariana and Marshall Islands southward through Truk and Pohnpei (Zug 2013. Reptiles and Amphibians of the Pacific Islands, A Comprehensive Guide. University of California Press, Berkeley. 306 pp.). Sabath (1981. J. Herpetol. 15:71–75) reported six *P. ateles* from Guam (collected in 1969) contained 2–3 yolked follicles (mean = 2.1). In this note I report additional information on the reproductive cycle of *P. ateles* from a histological examination of museum specimens.

I examined a sample of 18 *P. ateles* consisting of 9 males (mean SVL = 73.6 mm ± 11.6 SD, range = 57–88 mm) and 9 females (mean SVL = 56.1 mm ± 6.1 SD, range = 48–67 mm) collected from 1953 to 2012 in Micronesia which were deposited in the Bernice P. Bishop Museum herpetology collection (BPBM) Honolulu, Hawaii, USA (by location): Federated States of Micronesia, Caroline Islands: BPBM 5587, 5601; Pohnpei State: BPBM 12659, 13759, 13761, 13796; Chuuk State: BPBM 31607, 31608, 31610, 34516, 34517, 43587, 43589, 43594, 43597, 43600; Commonwealth of the Northern Mariana Islands, Saipan Island: BPBM 26811, 26837.

A cut was made in the lower abdominal cavity and the left testis or ovary was removed, embedded in paraffin, cut into 5-µm sections and stained by Harris hematoxylin followed by eosin counterstain. Enlarged follicles (> 4 mm) were counted. Histology slides were deposited in BPBM.

The only stage observed in the testicular cycle was spermiogenesis in which the seminiferous tubules were lined by sperm or clusters of metamorphosing spermatids. Males in this condition were collected in February (N = 1), June (N = 3), July (N = 2), September (N = 1), November (N = 1), and December (N = 1). The smallest reproductively active male measured 57 mm SVL (BPBM 12659) and was collected in November.

Two stages were present in the ovarian cycle (Table 1): (1) quiescent, no yolk deposition; (2) enlarged ovarian follicles > 4 mm. One female (BPBM 43594) from July contained one corpus luteum, indicating a recent clutch was produced. The smallest female in my sample (BPBM 34516) measured 48 mm SVL, only 4 mm smaller than two females with enlarged ovarian follicles (BPBM 5587 26837) and was arbitrarily considered as an adult. Mean clutch size (N = 3) was 2.0 ± 1.7 SD, range = 1–4. One is a new minimum and four is a new maximum clutch size for *P. ateles*.

TABLE 1. Monthly stages in the ovarian cycle of nine *Perochirus ateles* from Micronesia; * represents one July female with a corpus luteum indicating recent production of a clutch.

Month	N	Quiescent	Enlarged follicles > 4 mm
January	1	0	1
April	1	0	0
May	1	0	0
June	1	0	0
July	1	0*	0
September	1	0	1
December	3	2	1

Despite my limited samples, the presence of males undergoing spermiogenesis from all six months sampled through the year and reproductively active females from four months (Table 1), suggests *P. ateles* exhibits an extended reproductive cycle, as do other lizards from Oceania. See for example (Goldberg and Kraus 2012. Russ. J. Herpetol. 19:199–202). Examination of additional samples of *P. ateles* are warranted to fully characterize the reproductive cycle.

I thank Molly Hagemann (BPBM) for permission to examine *P. ateles*.

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***PHRYNOSOMA ORBICULARE* (Mexican Plateau Horned Lizard). REPRODUCTION.** *Phrynosoma orbiculare* is a medium-sized lizard found in semiarid shrub, grassland, and woodland throughout much of the Mexican Plateau and in several parts of the Sierra Madre Occidental and Oriental (Montanucci 1981. Copeia 1981:147–153). Davis and Smith (1953. Herpetologica 9:100–108) reported that two males and two females (SVLs = 63–74 mm) captured 8–20 August, between Tres Cumbres and Cuernavaca, Morelos, were in breeding condition. Testes of the males were 8–10 mm in length, and ova in the females were 9 mm in diameter. One female contained 12 enlarged ova, the other 13. As far as we know, this is the only existing information on reproduction in this species. The purpose of this note is to provide data on date of birth and litter size in *P. orbiculare*.

On 7 April 2017, in open, grassy areas in xerophilous scrub, municipality of Tepeyehualco, Puebla, Mexico (19.4855°N; 97.5550°W, WGS 84; 2377 m elev.), we collected five specimens of *P. orbiculare*, three males and two females. The specimens were transferred to the Museum of Zoology of the FES Zaragoza, UNAM, and were placed in individual plastic boxes (30 × 30 × 10 cm). On 3 May 2017, one of the females (SVL = 74 mm, tail length = 43 mm, mass = 37.55 g) gave birth to nine neonates (one died a few hours after birth). The SVL, tail length, and mass of the neonates (mean ± 1 SE in mm/g, with range in parentheses) were, 23.99 ± 0.340 (23.65–24.33), 10.23 ± 0.157 (10.08–10.39), 1.06 ± 0.026 (1.03–1.08). After parturition the mother weighed 27.38 g.

On 18 May 2017, at the same locality, we collected another pregnant female (SVL = 6.08 cm, tail length = 4.2 cm, mass = 48.8 g) of *P. orbiculare*. On 26 May 2017, she gave birth to 15 young in the museum (one neonate did not develop completely). The SVL, tail length, and mass of the neonates (mean ± 1 SE in mm/g, with the range in parentheses) was 24.26 ± 0.375 (23.88–24.63), 10.37 ± 0.191 (10.17–10.56), 0.93 ± 0.014 (0.92–0.95). After parturition, the mother weighed 27.8 g. Litter sizes of *P. orbiculare* (9, 15) seemed to be smaller than those reported for *P. douglasii* (9–30 young: Goldberg 1971. Herpetologica 27:311–314). However, they were larger in comparison to the average litter size estimated for *P. braconnieri* (4–10 young: Zamudio and Parra-Olea 2000. Copeia 2000:222–229).

The dead neonates were deposited in the herpetological collection of the FES Zaragoza, UNAM. The rest of the specimens were released at the capture location.

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***PHYMATURUS PALLUMA* (High Mountain Lizard). DIET.** *Phymaturus palluma* is a medium-sized, saxicolous, viviparous, and herbivorous lizard that inhabits the Altoandina phytogeographic province in the Andes Highlands, Argentina. Populations are restricted to rocky outcrops, and their diet is based on shrub vegetation like *Artemisia* and *Ephedra* (Videla 1983. Deserta 7:192– 202). During October 2014 (austral spring), we observed and recorded individuals of *P. palluma* eating small bites of soil and licking rocks (Fig. 1) at the Aconcagua Provincial Park, Mendoza, Argentina (32.8453°S, 69.7619°W, WGS 84; 2480 m elev.). Geophagy has been reported in other herbivorous lizards such as hatchlings of *Iguana iguana*, in which it has been demonstrated that this type of ingestion is related to the transfer of cellulytic soil bacteria that are utilized in the gut for the effective degradation of plant materials (Troyer 1984. Behav. Ecol. Sociobiol. 14:189–193). However, in *P. palluma* the geophagy and rock-licking behavior was not restricted to hatchlings and occurred in both in juveniles and adults, which suggests that these behaviors are probably related to a nutritive function, more than to the acquisition of symbiotic gut microflora. Moreover, our observations occurred at the start of the active season, following six months of hibernation. Previous studies have recorded soil in stomach contents of *P. punae* (Córdoba et al. 2015. Rev. Mex. Biodivers. 86:1004–1013); however, due to the low proportion of soil found, those authors suggested that its consumption was accidental. Our observations show that ingestion of soil in *Phymaturus* lizards is not accidental. The geophagy and rock-licking behavior in *Phymaturus* probably has an important role in supplementing the lizard's herbivorous diet, facilitating the acquisition of macronutrients such as calcium, phosphorus, and sodium, and of micronutrients such as iron, copper, and selenium (Esque et al 1994. *In* Bury and Germano [eds.], Biology of North American Tortoises, pp. 105–112. U.S. Department of Interior National Biological Survey, Fish and Wildlife Research).

Fig. 1. *Phymaturus palluma* licking and eating soil.

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***STENODACTYLUS PETRII* (Anderson's Short-fingered Gecko). REPRODUCTION.** *Stenodactylus petrii* is known to occur in Morocco, Western Sahara, Algeria, Tunisia, Egypt, Israel, Sudan, Senegal, Mauritania, Mali, Libya, Eritrea, and Niger (Bar and Haimovitch 2011. A Field Guide to Reptiles and Amphibians of Israel. Herlizya, Israel. 245 pp.). *Stenodactylus petrii* begins reproduction in March in captivity (Schleich et al. 1996. Amphibians and Reptiles of North Africa. Koeltz Scientific Books, Koeninstein, Germany. 630 pp.). In this note we add information on *S. petrii* reproduction in Israel from a histological examination of gonadal material from museum specimens.

A sample of 23 *S. petrii* consisting of four adult males (mean SVL = 48.0 mm ± 4.1 SD, range = 43–53 mm), five adult females (mean SVL = 57.4 mm ± 7.2 SD, range = 48–68 mm), one female subadult (SVL = 38 mm) and thirteen unsexed subadults (mean SVL = 27.5 mm ± 2.1 SD, range = 24–31 mm) collected between 1950–2015 in Israel and deposited in the Steinhardt Museum of Natural History, Tel Aviv University, (TAUM), Tel Aviv, Israel was examined. All were collected from the Northern Negev Region: TAUM 574, 6498, 9979, 11937, 12765, 13025, 16134, 16938, 17274, 17281, 17283, 17284, 17286, 17296, 17298, 17300–17305, 17308, 17310, except for TAUM 16938, which was from the Central Negev Region.

A small slit was made in the left side of the abdomen and the left testis was removed from males and the left ovary was removed from females for histological examination. Enlarged ovarian follicles (> 4 mm) or oviductal eggs were counted *in situ*. No histology was done on them. Removed gonads were embedded in paraffin, sections were cut at 5 µm and stained by Harris hematoxylin followed by eosin counterstain. Histology slides were deposited at The Steinhardt Museum of Natural History at Tel Aviv University.

Reproductive activity of males and females of *S. petrii* occurred in spring. *Stenodactylus petrii* males from May (TAUM 16134, 16938) exhibited spermiogenesis in which lumina of the seminiferous tubules were lined by sperm or clusters of metamorphosing spermatids. One male from June (TAUM 9979) was in late spermiogenesis in which the germinal epithelium was reduced and diffuse sperm clusters were present. The one male *S. petrii* from August (TAUM 17296) contained regressed seminiferous tubules in which spermatogonia predominated. The smallest reproductively active male measured 43 mm SVL (TAUM 16938) and was collected in May.

Considering reproduction of *S. petrii* females, ovaries of one female from late March (TAUM 574) and one from late April (TAUM 13205) exhibited early yolk deposition in which basophilic vitellogenic granules were present in the ooplasm. One female from early April (TAUM 11937) contained two oviductal eggs and a concurrent yolking follicle (> 4 mm) in each ovary indicating production of multiple clutches during the same reproductive season. One female from July (TAUM 12765) contained quiescent ovaries (no yolk deposition). The smallest reproductively active female (SVL = 55 mm, TAUM 574) exhibited early yolk deposition and was from late March. A slightly smaller female (SVL 48, TAUM 17274) from August with quiescent ovaries was considered to be an adult.

All 13 unsexed *S. petrii* juveniles (SVL = 24–31 mm) were collected in early August and may be offspring of eggs deposited earlier in the year.

The reproductive cycle of the congener *Stenodactylus sthenodactylus* from Israel was studied by Goldberg and Maza (2014. Herpetol. Rev. 45:136–137). Reproduction was similar in *S. petrii* and *S. sthenodactylus*, as both species breed in spring and produce multiple clutches of two eggs.

We thank Shai Meiri (TAUM) for permission to examine *S. petrii* and the National Collections of Natural History at Tel-Aviv University for providing the *S. petrii* to study.

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***TILIQUA ADELAIDENSIS* (Pygmy Bluetongue Lizard). MORTALITY.** *Tiliqua adelaidensis* is an endangered skink, endemic to South Australia, living in small fragments of native grassland. Individuals spend the majority of their time in or at the entrance of burrows built by lycosid or mygalomorph spiders (Milne et al. 2003. Wildl. Res. 30:523–528). Reptiles are often attracted to roads for thermoregulation (Andrews et al 2008. Herpetol. Conserv. 3:121–143), and death on roads from being run over by vehicles is common among species living sympatrically with *T. adelaidensis*, including *Tiliqua rugosa* (Sleepy Lizards; Bull 1995. Austral Ecol. 20:393–402); *Pogona vitticeps* (Bearded Dragons; Taylor and Goldingay 2004 Wildl. Res. 31:83–91); and *Pseudonaja textilis* (Brown Snakes; Wotherspoon and Burgin 2011. Austral. Zool. 35:1040–1046). However, although recorded causes of death of *T. adelaidensis* include predation (Hutchinson et al 1994. Trans. Roy. Soc. South Australia 118:217–226) and intraspecific aggression (Nielsen and Bull 2016. Herpetol. Rev. 47:32–33), there are no previous records of road-killed mortality for this species. This is probably because surface movements by *T. adelaidensis* are rare, and pit-fall trapping is only successful in early spring, as males search for females, and in late summer, as neonates leave their natal burrows (Schofield et al 2012. Wildl. Res. 39:677–684). Herein, we report the first road-killed specimen of *T. adelaidensis*.

On 19 October 2015, during the time when males seek females, a dead lizard was found on an unpaved driving track on the Nature Foundation owned Tiliqua property near Burra, South Australia (-33.67711°, 138.93353°). The track runs in a northerly direction through a sheep-grazed grassland occupied by *T. adelaidensis*, and is used regularly by the property managers and researchers. The dead lizard was found lying in the left tire track with its head pointing to the right, perpendicular to the track. The direction of the body supports the suggestion that the car-lizard encounter occurred while the lizard was starting to cross the track from east to west.

The lizard was flattened, with ants feeding on tissue, assumed to be internal organs, lying externally to the body. It was not possible to determine the sex. Although road kills are likely to remain uncommon for this species, they could become an increasing threat with the development of wind tower infrastructure close to known populations. The occurrence of movement across open space may be greater than assumed.

Dedication: This short note is dedicated to the late Professor Mike Bull who passed away before publication. He is greatly missed by all who had the privilege of knowing him.

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***TRACHYLEPIS ATLANTICA* (Noronha Skink). CANNIBALISM ATTEMPT.** *Trachylepis atlantica* is the only known (and endemic) native lizard species from Fernando de Noronha archipelago, Brazil. The species eats plant material and invertebrates (Rocha et al. 2009. J. Herpetol. 43:450–459), but there have been observations of intraspecific predation, including egg consumption and the consumption of the tails of juveniles (Silva-Jr. et al. 2005. Herpetol. Rev. 36:62–63). Here, we describe a cannibalism attempt involving two *T. atlantica* adults and one juvenile from Praia do Sancho, Fernando de Noronha archipelago, Brazil (3.8542°S, 32.4428°W; WGS 84).

At 1013 h on 18 July 2017, after a brief chase, an adult *T. atlantica* (total length = 210 mm) captured a conspecific juvenile (total length = 70 mm) with a bite in the pelvic portion of body (Fig. 1). With the juvenile in its mouth, the adult shook the head, a common behavior for stunning prey. At 1017 h, a second adult (total length = 190 mm) appeared, and the first adult released the juvenile. Again, the first adult chased and captured the juvenile by the pelvis, shaking and stunning the prey, while avoiding defensive bites. At 1019 h the juvenile escaped, taking shelter in a hole below a rock, being chased by the first adult that also entered in the hole, preventing the continuity of observation. This event reinforces the previous accounts of cannibalism in *T. atlantica*, and suggests that the behavior may be common.

Fig. 1. Juvenile *Trachylepis atlantica* captured by a conspecific adult.

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SQUAMATA — SNAKES

***AGKISTRODON CONTORTRIX* (Copperhead). HIBERNACULA.** *Agkistrodon contortrix* is a wide-ranging, medium-sized pitviper native to the eastern United States and portions of northeastern Mexico (Ernst et al. 2003. Snakes of the United States and Canada. Smithsonian Institution Press, Washington, D.C., 668 pp.). Patterns of hibernacula use vary in a similar fashion to other snakes: generally speaking, communal hibernacula are common in northern range portions, and individual hibernacula increase in frequency with decreasing latitude. Specific documentation of hibernacula use by many snakes across their range, however, is lacking and hinders investigation into the causal factors of specific overwintering behaviors across geographic and ecological gradients.

Between May 2014 and June 2015, we radiotracked two adult male *A. contortrix* in the University of Kentucky's Robinson Forest in Breathitt and Knott counties, Kentucky, USA. The first male (310 g, SVL = 82 cm) entered its hibernaculum between 13 October 2014 and 20 October of 2014, and emerged between 30 March 2015 and 13 April 2015. The first male appeared normal and healthy throughout the spring of 2015 until it was killed by a human on 15 June 2015. The second male (321 g, SVL = 75 cm) entered its hibernaculum between 27 October 2014 and 3 November 2014, and emerged at an unknown date as the transmitter failed over the winter. The hibernacula of the first male was visited once per week for four weeks after fall ingress, and twice in the month immediately preceding spring egress. The hibernaculum of the second male was visited once per week for two weeks after fall ingress. No other snakes of any species were seen near either of the two hibernacula at any time. The two hibernacula were separated by > 1 km, yet were similar in form; both consisted of naturally occurring patches of talus and woody debris covered by leaf litter, and were approximately 2 m in diameter and of equal height to the surrounding soil. The forest cover at each site was not substantially different than the surrounding area, and both sites were located near the middle or upper portions of southeast facing slopes. This work was approved under University of Kentucky IACUC protocol #2012-0954, and we thank Ashley Keith, DVM, for his veterinary services.

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***ATRETIUM SCHISTOSUM* (Olive Keelback Watersnake). DIET / SCAVENGING.** *Atretium schistosum* is a diurnal watersnake distributed throughout peninsular India as well as Nepal, Bangladesh, and Sri Lanka (Das 2002. A Photographic Guide to Snakes and Other Reptiles of India. New Holland Publishers Ltd., UK. 20 pp.). It is known to feed on frogs, tadpoles, fish, prawns, crabs, and mosquito larvae (Das, *op. cit.*; Whitaker and Captain 2004. Snakes of India, The Field Guide. Draco Books, India. 218 pp.). Here I report a case of *A. schistosum* preying on a dead fish (family Cyprinidae) at New Town, North 24 parganas (22.60326°N, 88.47634°E; WGS 84), West Bengal, India. On 19 November 2015, at ca. 0900 h, an *A. schistosum* was observed foraging on the surface of a small canal. It approached a dead fish floating on the water and after catching and taking it to dry ground, started to ingest it (Fig. 1). The snake swallowed the fish headfirst in ca. 5 min and then swam away into thick aquatic vegetation.

Fig. 1. *Atretium schistosum* scavenging on a dead fish belonging to the family Cyprinidae.

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***BOA CONSTRICTOR* (Boa Constrictor). DIET.** *Boa constrictor* is widely distributed, occurring from Mexico to Argentina, and is known to have a generalist diet, feeding on lizards, small to medium-sized mammals, and several species of birds (Martins and Oliveira 1998. Herpetol. Nat. Hist. 6:78–150; Cisnero-Heredia et al. 2005. Neotrop. Primates 13:11–12; Pizzatto et al. 2009. Amphibia–Reptilia 30:533–544; Bernarde and Abe 2010. South Am. J. Herpetol. 1:102–103). On 13 October 2015, at Sítio Nova Floresta (6.82719°S, 39.01677°W, WGS 84; 258 m elev.), located in the municipality of Lavras da Mangabeira, Ceará state, Brazil, a female *B. constrictor* (SVL = 706 mm; tail length = 81 mm; 500 g) was observed in a tree eating an adult *Tangara sayaca* (Sayaca

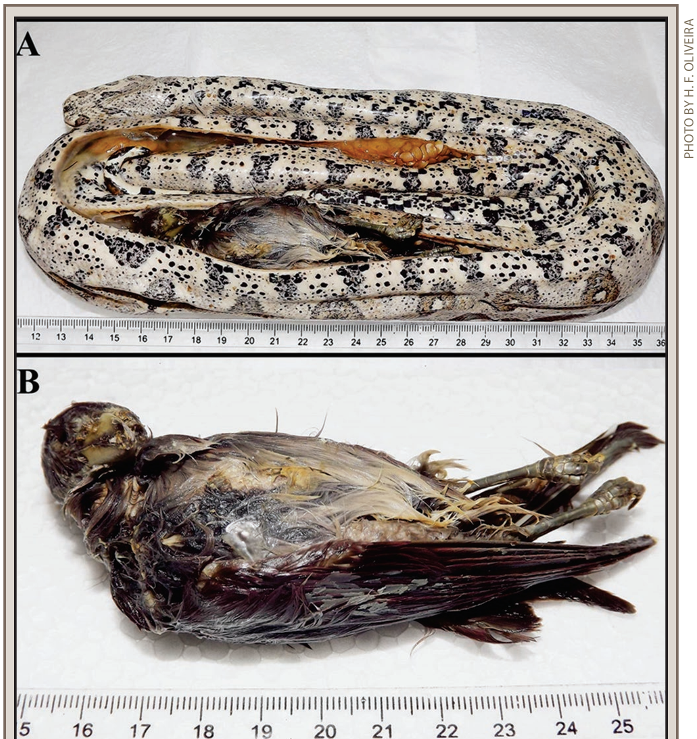

Fig. 1. A) *Boa constrictor* with *Tangara sayaca* inside stomach; B) *Tangara sayaca* preyed upon by a *Boa constrictor* collected in Lavras da Mangabeira, Ceará, Brazil.

Tanager; 75 mm length; 20 g) headfirst. The snake was collected, euthanized, and its stomach was analyzed to identify the bird (Fig. 1A, B). The snake was deposited at the Coleção Herpetológica da Universidade Regional do Cariri (URCA-H 11345). Despite the variety of birds reported in the diet of *B. constrictor*, to the best of our knowledge this is the first record of predation of *T. sayaca* by *B. constrictor*.

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BOTHROPS ATROX **(Common Lancehead, Jararaca). HABITAT USE.** *Bothrops atrox* is a primarily nocturnal and terrestrial neotropical pitviper, found in lowland rainforests of northern cis-Andean South America (Oliveira and Martins 2001. Herpetol. Nat. Hist. 8:101–110; Campbell and Lamar 2004. The Venomous Reptiles of the Western Hemisphere. Cornell University Press, Ithaca, New York. 1032 pp.). It feeds on frogs, mammals, lizards, birds, centipedes, and snakes (Cunha and Nascimento 1993. Mus. Para. Emílio Goeldi Sér. Zool. 9:1–191; Martins and Oliveira 1998. Herpetol. Nat. Hist. 6:78–150; Campbell and Lamar, *op. cit.*). Arboreal habitat use for foraging is more common among juveniles but has been observed occasionally in adults (Oliveira and Martins, *op. cit.*). The maximum heights where this species has been found do not exceed 1.5 m (Oliveira and Martins, *op. cit.*; Turci et al. 2009. Biota Neotrop. 9:197–206). On 22 October 2014, 2151 h, at Parque Zoobotânico da Universidade Federal do Acre, Rio Branco, Acre state, Brazil (9.95481°S, 67.87311°W, WGS 84; 164 m elev.), we found an adult *B. atrox* in a palm tree 4 m high, near an abandoned dam (Fig. 1). This represents a new maximum height for *B. atrox*.

Fig. 1. *Bothrops atrox* in the palm tree 4 m high.

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BOTHROPS DIPORUS **(Southern Pitviper/Chaco Lancehead). DIET / OPHIOPHAGY.** *Bothrops diporus* is a medium-sized pitviper found in southern Brazil, southern Paraguay, northern Argentina, and probably extreme south-central Bolivia. It feeds on a wide diversity of prey, including rodents, frogs, and lizards (Yanosky et al. 1996. Herpetol. Nat. Hist. 4:97–110; Giraudo et al. 2008. Revista FABICIB 12:69–89), and also sometimes on snakes (e.g., *Erythrolamprus poecilogyrus*, *Chironius maculoventris*; Giraudo et al., *op. cit.*; Barros and Waller 2015. Herpetol. Rev. 46: 443–444).

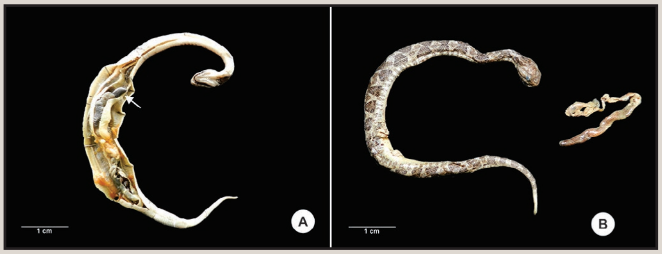

Fig. 1. Juvenile *Bothrops diporus* with *Epictia albipuncta* prey from Chaco province, Argentina: A) female with prey in stomach; B) male with prey removed from the stomach and gut. The white arrow points to the tail of *E. albipuncta*.

Between 0935 and 1000 h on 23 March 2013, we collected two juvenile specimens of *B. diporus*, both with umbilical scars, within 30 m of one another in a *Prosopis* and *Aspidosperma* forest in the Impenetrable region (Dry Chaco eco-region) of General Güemes Department, Chaco Province, Argentina (24.9701°S, 61.0579°W; WGS 84). The female (SVL = 242 mm, tail length = 34.86 mm; 12 g, Fig. 1A) and the male (SVL = 244 mm, tail length = 33.94 mm; 12.1 g, Fig. 1B) each had a single prey item, both *Epictia albipuncta* (Leptotyphlopidae), which were partly digested in the stomach and anterior portion of the intestine. The female *B. diporus* had ingested the *E. albipuncta* headfirst, whereas the male had ingested its prey tailfirst. Our observation is the first record of *E. albipuncta* in the diet of *Bothrops diporus*. Voucher specimens are deposited in the Herpetological Collection of the Universidad Nacional del Nordeste (UNNEC 13114, 13115).

Epictia albipuncta is a small (to 341 mm total length) fossorial threadsnake distributed in the Chaqueña, Espinal, Monte and Pampeana phytogeographic provinces (Kretzschmar 2006. Cuad. Herpetol. 19:43–56). Scolecophidian snakes are common prey of *Micrurus* coralsnakes (Marques and Sazima 1997. Herpetol. Nat. Hist. 5:88–93; Giraudo et al., *op. cit.*; Ávila et al. 2010. South Am. J. Herpetol. 5:97–101). However, predation on blindsnakes has also been recorded in juvenile *Bothrops leucurus* (Baptista et al. 2016. Herpetol. Rev. 47:474–475) and in juvenile *Porthidium yucatanicum* (McCoy and Censky 1992. *In* Campbell and Brodie Jr. [eds.], Biology of the Pitvipers, pp. 217–222. Selva, Tyler, Texas).

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BOTHROPS MOOJENI **(Caiçaca; Brazilian Lancehead). DIET.** *Bothrops moojeni* is a large member of *B. atrox* group (Wüster et al. 1996. Herpetologica. 52:263–271; Pyron et al. 2014. Mol. Phylog. Evol. 81:221–231) that is widely distributed throughout the Cerrado morphoclimatic domain, being a common inhabitant of riparian vegetation of open areas or disturbed forest edges in central and southeastern Brazil (Borges and Araújo 1998. Rev Bras

Biol. 58:591–601; Leloup 1984. Acta Zool. Path. Antverp. 78:177–198). It is primarily nocturnal and is active during the hot and rainy season (Nogueira et al. 2003. J. Herpetol. 37:653–659). *Bothrops moojeni* has a generalist diet (Andrade et al. 1996. J. Herpetol. 30:285–288) consisting primarily of mammals, frogs, lizards, and occasionally snakes and birds (Martins et al. 2002. *In* Schuett et al. [eds.], Biology of the Vipers, pp. 307– 328. Eagle Mountain Publishing, Eagle Mountain, Utah; Nogueira et al. 2003, *op. cit.*).

On 3 May 2011, an adult male *B. moojeni* (SVL = 1198 mm; tail length [TL] = 141 mm; head length = 45 mm; Fig. 1A) was found road-killed on the road BR 158 at the municipality of Aparecida do Taboado, Mato Grosso do Sul state, close to the border with Goiás, São Paulo, and Minas Gerais states, Brazil (19.9019°S, 51.1225°W, WGS 84; elev. 446 m). Nearby was an adult male of the rodent *Calomys expulsus* (head–body length [HBL] = 86 mm, TL = 73 mm; Fig. 1B) dead on the road with bite marks on its venter, which exhibited partial necrosis. Analysis of *B. moojeni* stomach contents revealed a second *C. expulsus*, an adult male that was partially digested (HBL = 104 mm, TL = 68 mm; Fig. 1C). Prey items are deposited with the *B. moojeni* (MBML 3408) in Zoological Collection of Museu de Biologia Prof. Mello Leitão, Instituto Nacional da Mata Atlântica, Espírito Santo state, Brazil.

Calomys expulsus is a small nocturnal rodent species in the family Cricetidae, subfamily Sigmodontinae, distributed throughout open environments of northeastern and central Brazil (Mello and Teixeira 1977. Rev. Saúde Públ. 11:561–564), from Piauí and Ceará southwest through Goiás and Minas Gerais states (Musser and Carleton 2005. *In* Wilson and Reeder [eds.], Mammal Species of the World: A Taxonomic and Geographic Reference, pp. 894–1531. Johns Hopkins University Press, Baltimore, Maryland). The present record reinforces previous studies suggesting that diet of adult *Bothrops* spp. consists predominantly of mammals (Nogueira et al., *op. cit.*). However, the present report is one of the few works that identifies prey of *B. moojeni* to the species level, being the first predation record of *B. moojeni* on *C. expulsus*.

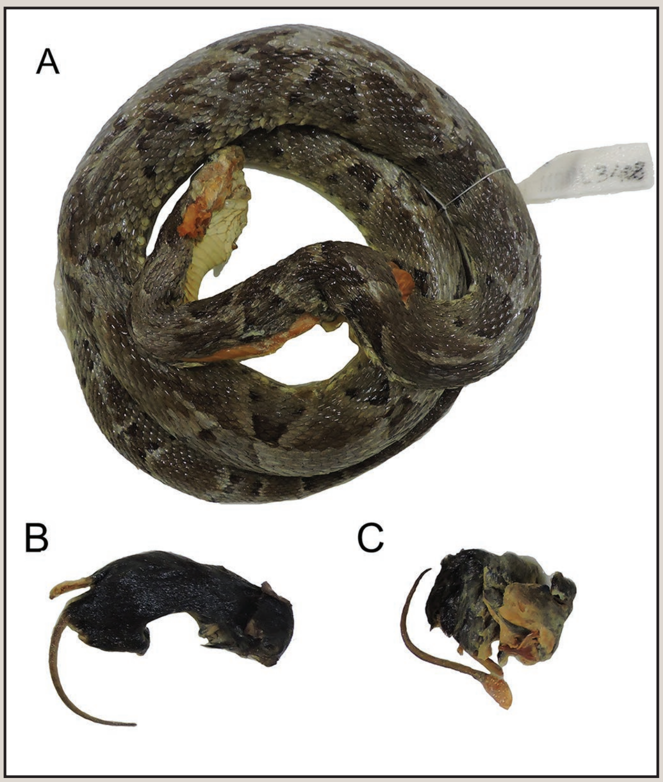

Fig. 1. Specimen of (A) *Bothrops moojeni* (MBML 3408) and its prey items with the (B) partially digested *Calomys expulsus* and (C) the second specimen found dead near the snake's head.

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***CLELIA SCYTALINA* (Highland Mussarana, Mexican Snake Eater). DIET.** Members of the genus *Clelia* are rather large, mostly nocturnal snakes of the neotropics ranging from the lowlands of tropical Mexico to South America, reaching central Ecuador west of the Andes and central Argentina east of the Andes (Savage 2002. The Amphibians and Reptiles of Costa Rica: A Herpetofauna Between Two Continents, Between Two Seas. University of Chicago Press. Chicago, Illinois. 934 pp.). *Clelia clelia* has been documented feeding on a variety of vertebrates, but mostly eats snakes (Gaiarsa et al. 2013. Pap. Avul. Zool. 53:261–283). Ophiophagy has also been reported in other species of *Clelia* (Vitt and Vangilder 1983. Amphibia-Reptilia 4:273–296; Roja-Morales 2012. Phyllomedusa 11:135–154), but the diet of *C. scytalina* is poorly known. *Clelia scytalina* is a rare snake and very little is known about its natural history (Gaiarsa et al., *op. cit.*; Savage 2002, *op cit.*). There are records of *C. scytalina* hunting frogs in ponds and with lizards in the gut contents of juveniles in Veracruz, Mexico (Perez-Higareda et al. 2007. Serpientes de la Region de Los Tuxtlas, Veracruz, Mexico. Guia de Identificacion Illustrada. Universidad Nacional Autonoma de Mexico. 189 pp.) and one account of a feeding attempt on a *Leptophis ahaetulla* (Parrot Snake) (Campos Villaneuva and Cabrera-Guzman 2009. Herpetol. Rev. 40: 352–353). Here we report the first confirmed record of ophiophagy in this species.

On 6 March 2017 at 2218 h adjacent to the University of Georgia-Costa Rica campus (UGACR, 10.28333°N, 84.79444°W, WGS 84; 1073 m elev.), we found an adult *Clelia scytalina* (total length ca. 200 cm) with an adult *Imantodes cenchoa* (Blunt-headed Tree Snake; total length ca. 160 cm) clutched in its jaws. The *Clelia* was in a coiled position that appeared to provide leverage to help pull the *Imantodes* from the vegetation, but was not coiled around any part of the *Imantodes*. It had grasped the *Imantodes* in the region of the cloaca and the base of the tail of the clutched snake was folded back on itself so that the tail and area anterior to the vent were parallel to one another with the fold firmly grasped by the *Clelia*.

Once the *Clelia* had pulled the *Imantodes* from the vegetation (2221 h) it began to swallow it tail first. As it was being swallowed, the *Imantodes* lifted its body into the air in what appeared to be an attempt to find something to grasp. Failing to grasp a suitable branch to prevent being consumed, the *Clelia* was able to completely swallow the *Imantodes* in 14 min. When the *Imantodes*' head was about 1.5 cm from the *Clelia*'s mouth it opened its mouth for the first time as if it was going to attempt to bite the *Clelia*, but instead, it closed its mouth and disappeared down the throat of the *Clelia* (2235 h). To our knowledge this is the first documented record of *Clelia scytalina* consuming an *Imantodes cenchoa*.

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COELOGNATHUS ERYTHRURUS MANILLENSIS **(Philippine Rat Snake). CAVE HABITAT USE.** *Coelognathus erythrurus manillensis* is common in Luzon, Phillipines, and other parts of Southeast Asia (Das 2015. A Field Guide to the Reptiles of South-East Asia. Bloomsbury Publishing, London, UK. 384 pp.). It inhabits lowlands to mid-elevations in open forest, forest edges (Das, *op. cit.*), and disturbed forests (McLeod et. al. 2011. Asian Herpetol. Res. 2:177–198). Here we report the novel discovery of cave habitat use by *C. e. manillensis*.

On 3 June 2017 at 1300 h, two juvenile *C. e. manillensis* were encountered in the dark zone of Lumimbot Cave, Barangay Mapaco, Guinobatan, Albay, Bicol Peninsula, Philippines (13.1679°N, 123.5809°E; WGS 84). The snakes were observed resting in a cave wall approximately 8 m above the ground (Fig. 1). Two freshly shed snake skins were seen ca. 1.5 m away. This observation suggests plasticity in habitat use of *C. erythrurus manillensis.*

Fig. 1. Two Juvenile *Coelognathus erythrurus manillensis* from Lumimbot Cave, Barangay Mapaco, Guinobatan, Albay, Bicol peninsula, Philippines.

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COLUBER CONSTRICTOR **(North American Racer). FORAGING AND PREDATION BEHAVIOR.** *Coluber constrictor* are diurnal, active, sight-oriented foragers (Ernst and Ernst 2003. Snakes of the United States and Canada. Smithsonian Books, Washington, D.C. 668 pp.). Because they are alert, *C. constrictor* typically react to the presence of humans by fleeing before being detected. As a consequence, detailed published observations of behavior under natural conditions are scarce (Cohen 1948. Copeia 1948:137–138; Fitch 1963. Univ. Kansas Publ. Mus. Nat. Hist. 15:351–468; Lillywhite 1985. J. Herpetol. 19:306–308). Here, I describe foraging and predation behavior of a *C. constrictor* that I observed continuously for 1.25 h in Shawnee National Forest, Union County, Illinois, USA.

At 1440 h, on 22 April 2014, I observed an outstretched adult *C. constrictor* (total length ca. 1.2 m) slowly crawling on bare ground. The sky was cloudless and the air temperature was 23°C. I stopped and initiated observations, which included methodical trailing of the snake from a distance of ≤ 5 m. I moved only when snake moved and its head was out of sight. I often kept a tree trunk between myself and the snake, especially when I changed locations. When initially encountered, the *C. constrictor* was moving down a gentle-grade, west-facing slope through an oak (*Quercus* spp.)-hickory (*Carya* spp.)-Sweetgum (*Liquidambar styraciflua*)-Tulip Poplar (*Liriodendron tulipifera*) forest that had been burned by U.S. Forest Service personnel on 26 March 2014. As a result of the fire, the forest floor was clear of organic debris except for scattered logs, branches, and a few small (generally 1–2 m^2), unburned patches of leaf litter.

The *C. constrictor* changed direction often, tongue-flicked frequently, and moved its head, elevated ca. 1–2 cm above the ground, slowly from side to side. The *C. constrictor* spent considerable time at unburned patches of leaf litter where, in addition to tongue flicking, it poked its head in and out of the leaves multiple times. The *C. constrictor* meandered westward down the hill to the vicinity of a large wetland and then northward, parallel to the wetland, up and down the low end of the slope and back and forth across the trail, never getting closer than 2 m to the wetland edge. By 1515 h, the *C. constrictor* had stopped to bask three times, twice upon a log and once on the ground, for periods of 1–2 min. While basking, the outstretched *C. constrictor* held its head high above the substrate in an alert posture.

At 1520 h, the *C. constrictor* moved upslope back into the forest. At 1526 h, it began probing a patch of leaf litter. At 1528 h, the *C. constrictor* pulled its head up out of the leaf litter with an adult *Hyla chrysoscelis* (Cope's Gray Treefrog) in its mouth. The *C. constrictor* had captured the frog by its left side and, by 1531 h, had swallowed the frog rear-first. For the next 3 min, with its head held high off the ground, the *C. constrictor* repeatedly opened and closed its mouth, perhaps in response to the frog's skin secretions. At 1534 h, the *C. constrictor* began burrowing through the leaf litter, frequently stopping, raising its head off the ground, and opening and closing its mouth. This also may have been an effort to remove the frog's skin secretions. By 1540 h, the *C. constrictor* had stopped moving and lay coiled in the leaf litter.

Two minutes later, the *C. constrictor* abandoned the leaf litter patch and began foraging northeastward and upslope, further into the forest. At 1545 h, it stopped to bask, outstretched on the ground with its head held high, for 5 min. Soon after resuming movement, the *C. constrictor* stopped suddenly and quickly jerked its head up into a periscoping position. I suspect the *C. constrictor* had become aware of my presence. It then entered a nearby unburned branch pile at 1555 h whereupon I lost visual contact.

Previous observations of *C. constrictor* foraging behavior differ slightly from my observation. Fitch (*op. cit.*) described foraging *C. constrictor* as moving "rapidly and alertly, in a jerky fashion" and Fleet et al. (2009. Southeast. Nat. 8:31–40) observed *C. constrictor* foraging with their heads elevated ca. 10 cm above ground. These variations in *C. constrictor* foraging behavior may be related to prey availability and/or vegetative cover. Fitch (*op. cit.*) observed *C. constrictor* moving through dense herbaceous vegetation, flushing and pursuing ranid frogs. Fleet et al. (*op. cit.*) observed *C. constrictor* foraging in areas having both abundant groundcover and orthopteran insects. The *C. constrictor* I observed foraged in an area where leaf litter and vegetation were sparse and localized. This may have compelled the snake to forage with its head close to ground level and focus its efforts on isolated patches of unburned leaf litter.

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***CROTALUS HORRIDUS* (Timber Rattlesnake). HIBERNATION BEHAVIOR.** *Crotalus horridus* populations in mountainous parts of its range typically den communally (Brown and MacLean 1983. Herpetologica. 39:430–436.), whereas the southern populations largely den independently (Sealy 2002. *In* Schuett and Hoggren [eds.], Biology of the Vipers, pp. 561–578. Eagle Mountain Publishing, Eagle Mountain, Utah; Waldron et al. 2006. Herpetologica 62:389–398). The only previous documentation of communal denning in *C. horridus* in the Southeastern Coastal Plain comes from Neill (1948. Herpetologica 4:107–114), who described snakes converging on an area of limestone caves in Richmond and Burke counties, Georgia, USA. Here we document an extension of the southernmost record of communal denning for this species.

Baker County, Georgia (ca. 320 km SW of Richmond and Burke counties, Georgia) sits in the Dougherty Plain, which is characterized by karst topography with limestone outcrops and sinkholes of various sizes. Between 2004 and 2017, we observed *C. horridus* (N = 12) using a limestone outcrop situated in a bottomland forest along a 5th order stream (Ichawaynochaway Creek) as a communal winter denning site (Figs. 1, 2). Additionally, we found aggregations of *C. horridus* overwintering in a deep sinkhole within a mixed pine hardwood forest approximately 4.5 km from the creek (N = 6 snakes) and at a second, more shallow sinkhole with numerous exposed limestone boulders, within a wildlife food plot (N = 5 snakes). *Crotalus horridus* were found at these den sites as early as 11 October and as late as 29 March. Similar to northern dens (Brown 1982. J Herpetol. 16:145–150), *Agkistrodon contortrix* (Copperheads) and *Pantherophis spiloides* (Gray Ratsnakes) were found sharing these sites with *C. horridus*.

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FIG. 1. A portion of the large limestone outcrop used as a communal overwintering site by *Crotalus horridus*.

FIG. 2. *Crotalus horridus* found in a crevice in a limestone outcrop in late March 2004.

***CROTALUS OREGANUS LUTOSUS* (Great Basin Rattlesnake). REPRODUCTION / MATING.** Surprisingly, there are no published observations of reproductive behavior (courtship and mating) in *Crotalus oreganus lutosus*, despite the large range and relative abundance of this species (Stebbins 2003. Western Reptiles and Amphibians, 3rd Ed. Houghton Mifflin, New York. 560 pp.). Here, I relate two observations of courtship and mating in wild *C. o. lutosus*.

The following observations were made during a long-term study of the species' ecology at the northern end of the Great Basin (Harney County, Oregon, USA; 43.2658°N, 118.8442°W, WGS 84; 1256 m elev.). This area is high desert: annual precipitation averages 16.5 cm. Daytime high air temperatures during summer (June–September) range from 21 to 32°C; nighttime low temperatures over the same period range from 4 to 10°C. On average, nighttime temperatures are below freezing (≤ 0°C) from mid-September to May. These conditions influence snake activity: *C. o. lutosus* in this area exhibit an annual activity period of approximately five to six months; the remainder are

FIG. 1. *Crotalus oreganus lutosus* copulating atop hibernacula: male (gray) snake on left; female (tan) on right. Note third snake coiled between the two.

spent in communal hibernacula. The observations reported here were made at one such hibernaculum: a south-facing outcrop of fissured basalt surrounded by dry, alkaline playas and sandy dunes dominated by sagebrush (*Artemisia tridentata*) and greasewood (*Sarcobatus vermiculatus*).

At 1540 h on 7 May 2013 (overcast, light breeze, air temp 24.4°C), I observed a pair of *C. o. lutosus* (male ca. 780 mm SVL; female ca. 650 mm SVL) mating atop an outcrop of fissured basalt, 3.7 m above the ground. When first observed, the snakes' tails were intertwined, and the male was laying alongside the female, rubbing his chin along her dorsal surface via a series of short head thrusts. After a few minutes of this, insertion was effected, and the pair raised their tails in the air (Fig. 1). Following insertion, the male alternated periods of chin-rubbing and crawling in various directions (often away from the female) with periods of inactivity. This continued until just after 1600 h, when the pair separated, and the female slowly crawled off. During the entire process, a third adult snake (sex unknown) was coiled next to the mating pair; it remained essentially immobile during the entire process, despite the fact that the male crawled over it repeatedly. The surface of the rock on which the *C.o. lutosus* were mating was 27.2°C.

At 1400 h on 30 April 2014 (clear, light breeze, air temp 23.9°C), I observed a second pair of *C. o. lutosus* (male ca. 650 mm SVL; female ca. 600 mm SVL) mating, at the same den as the first. When first observed, these snakes were also atop fissured basalt, 3.7 m above the ground, and < 1 m from a group of five other adult *C. o. lutosus*. As I watched, the male repeatedly crawled over the female, energetically rubbing her with his chin in the same manner as the male of the first pair observed. He repeatedly wrapped his tail around hers in an attempt to achieve insertion. When copulation finally began, the male alternated bouts of slow crawling (often facing away from the female) with periods of quiescence, as described above. The pair remained engaged for > 30 min, at which point I left them. When I returned at 1730 h, they had disengaged and moved to separate locations among the rocks.

One of the most significant aspects of these observations is their timing (i.e., spring), as existing accounts are contradictory. *Crotalus o. lutosus* are frequently reported to mate during summer (July and August), a statement based largely on examination of reproductive organs and studies of other subspecies of *C. oreganus* (Glaudas et al. 2009. J. Arid Environ. 73:719–725; Ernst and Ernst 2012. Venomous Reptiles of the United States, Canada, and Northern Mexico, Vol. II: *Crotalus*. Johns Hopkins University Press, Baltimore Maryland. 391 pp.). For example, based on examination of the kidneys and gonads of preserved snakes, Glaudas et al. (*op. cit.*) suggest that *C. o. lutosus* "mates only in summer." However, Klauber (*in* Wright and Wright 1957. Handbook of Snakes of the United States and Canada. Cornell University Press, Ithaca, New York. 1105 pp.) states that *C. o. lutosus* "mate in the spring and young are born alive in the fall." Nussbaum et al. (1983. Amphibians and Reptiles of the Pacific Northwest. University of Idaho Press, Moscow, Idaho. 332 pp.) state that *C .o. lutosus* "emerge from the dens in late April and mate during May. During the mating season, males may be seen in combat near the dens." In addition, various accounts of mating in other subspecies of *C. oreganus* (mostly *C. o. oreganus*) indicate that the activity may take place in either late summer or spring, and that variation in timing between populations and regions exists (Wright and Wright, *op. cit.*; Klauber 1956. Rattlesnakes: Their Habits, Life Histories, and Influence on Mankind. University of California Press, Berkeley, California. 1476 pp.; Ernst and Ernst, *op. cit.*).

With respect to these accounts, I note that the observations reported here were made at the extreme northern limit of the species' range, where winters are severe and the active season of the snakes is short. Furthermore, I observed other reproductive behaviors in this population (e.g., male combat, pursuit of females, and courtship) during late summer (August), consistent with the completion of vitellogenesis in late summer (Wright and Wright, *op. cit.*, Glaudas et al., *op. cit.*). The timing of these behaviors suggest that snakes in this population begin mating in late summer (following vitellogenesis), and that the spring mating described here is an artifact of the onset of cold temperatures, which forces snakes into hibernacula before all females have mated. Such a pattern matches that observed by Klauber (*op. cit.*) and thoroughly described by Aldridge and Duvall (2002. Herpetol. Monogr. 16:1–25), the latter of whom considered it a modification to the tropical pattern of vitellogenesis and mating in response to seasonal interruption by cold temperatures.

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***CROTALUS VIRIDIS* (Prairie Rattlesnake). DIET.** On 19 July 2017 at 0130 h, we observed an adult *Crotalus viridis* (total length ca. 68 cm) on Texas Hwy 54 just south of its junction with US Hwy 62/180 (approx. 31.7969°N, 104.8496°W, WGS 84; 1275 m elev.), Culberson County, Texas, USA. The snake's head was nearly touching a freshly envenomated small adult *Scaphiopus couchii* (Couch's Spadefoot). It appeared as though the snake was about to ingest the anuran, but it retreated a short distance upon our approach (Fig. 1). Based on our review of relevant literature (Degenhardt et al. 1996. Ampibians and Reptiles of New Mexico. University of New Mexico Press, Albuquerque. 431 pp.; Hammerson 1999. Amphibians and Reptiles in Colorado: A Colorado Field Guide, 2nd ed. University Press of Colorado and Colorado Division of Wildlife, Niwot, Colorado. 484 pp.; Werler and Dixon 2000. Texas Snakes: Identification, Distribution, and Natural History. University of Texas Press, Austin. 437 pp.; Ernst and Ernst 2003. Snakes of the United States and Canada. Smithsonian Books, Washington, D.C. 668 pp.; Morey 2005. *In* M. J. Lannoo

Fig. 1. Adult *Crotalus viridis* and recently envenomated *Scaphiopus couchii*, Culberson County, Texas, USA.

[ed.], Amphibian Declines: The Conservation Status of United States Species, pp. 508–511. University of California Press, Berkeley; Davis and Douglas 2016. *In* G. W. Schuett et al. [eds.], Rattlesnakes of Arizona: Species Accounts and Natural History, Volume 1, pp. 289–332. ECO Publishing, Rodeo, New Mexico), we believe this is the first account of attempted predation of *S. couchii* by *C. viridis*. Anurans are rare or unrecorded in the diets of North American rattlesnakes for which numerous feeding records exist, with pygmy rattlesnakes (*Sistrurus* spp.) being exceptions (Ernst and Ernst 2003, *op. cit.*, and references therein).

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CRYPTELYTROPS ALBOLABRIS **(White-lipped Viper). BEHAVIOR.** Studies of terrestrial vipers have observed direct and indirect responses to fire (Smith et al. 2001. Southwest. Nat. 46:54–61). We present the first in-depth, direct behavioral response of an arboreal pit viper species to fire. This viper, a gravid female *Cryptelytrops albolabris* (CRAL013) located in the buffer zone of the Sakaerat Biosphere Reserve, Thailand (14.51382°N, 101.95125°E, WGS 84; 249 m elev.), was radio-tracked (Holohil 1.8 g BD-2THX temperature sensitive transmitter) regularly once during the day and once at night from 1 October 2015 to 13 March 2016. On 9 February 2016 at 1916 h, a fire was observed being tended to by local villagers within 20 m of the snake, which was sheltered within a log ca. 0.5 m above the ground (Fig. 1). It had moved to this location on 24 January 2016 after rain (< 12 h), the previous site being 15.6 m to the northwest.

Progress of the fire was checked at 1950 h after the standard radiotelemetry study datapoint at 1916 h, when local people were no longer attending to the fire. The fire was ca. 16 m north of the viper, moving in a disjointed line through the forest. The fire began to pick up and could be felt near the viper (< 10 m) at 1952 h. At 1955 h the fire was 12 m to the north of the viper, and less intense. Another fire front was observed 30 m to the west. At 2014 h fire began to encroach from the northeast. By 2018 h the fire was 3.5 m away to the west, and by 2022 h 1 m away from the north and the east. The fire on the east side died down at 2030 h when it reached a streambed, 30 cm from the shelter. However, the fire from the north passed directly under the log the snake was sheltering in at 2039 h. The flames were small and did not set the log ablaze. By 2047 h the fire had mostly passed, but much smoke was present at the shelter site. At 2053 h leaves were smoldering in the streambed to the east of the log. The viper was still within the shelter at 2058 h. By 2106 h fire patches were still present within 6–7 m of the shelter, but most of the main fire line had moved beyond 15 m. Checks at 2118, 2120, 2123, and 2152 h suggested that the viper was still in the shelter. The fire was 100 m away from the location at 2212 h. To summarize, the viper sheltered in the log throughout the duration of the event (from 1950 to 2212 h), despite changes in intensity and proximity of the fire. Effects of the fire can be seen in Fig. 1. Internal body temperature of the snake was 25.5°C at the start of the observation, 27.5°C from 123–236 minutes (taken at 5 intervals; 123, 136, 204, 207, and 236 minutes) into the observation, and 25.5°C at the conclusion (296 minutes after observation start).

The viper remained relatively stationary from 24 January to 28 February 2016, moving less than 2.5 m along the log. A Bushnell™ trail camera (Model X-8) was set at 1-min intervals to observe the log once observers left on 9 February; CRAL013 was not observed leaving the shelter at any point during that night or the following morning. Interestingly, the results of a second, smaller, burn near the same viper were observed on 8 March. We did not directly observe the second fire event, but the ground was freshly scorched on our 8 March daily check. The viper had moved less than 2.5 m between the night check (2037 h) on 7 March and the afternoon check (1612 h) on 8 March, and was located underground in a termite mound. The earliest date after the first fire TRAL013 was observed was 14 February (Fig. 2), and 13 March was the earliest date after the second fire; she did not appear to have sustained injuries after either fire event.

Fig. 1. Post-fire surrounding habitat of CRAL013 from 9 February illustrating the fallen tree (circled in red) used as a shelter site.

Fig. 2. Tracked female *Cryptelytrops albolabris* (CRAL013) ambushing on 14 February adjacent to the log she sheltered in during the fire of 9 February.

Previous work has primarily looked at large-scale (population level) responses of snakes to fire. More study is required to understand the behavioral mechanisms that individual snakes exhibit in response to fire (Withgott and Amlaner 1996. Herpetol. Rev. 27:145–146). Interestingly, the viper in our observation sought shelter rather than fleeing or climbing vertically, a response similar to that of many terrestrial viper species (Durbian 2006. Amer. Midl. Nat. 155:329–334; Smith et al., *op. cit.*). Further study is required to better characterize the behavioral responses of slow moving and presumably arboreal snakes such as *C. albolabris*.

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DIADOPHIS PUNCTATUS **(Ring-necked Snake). VENOM.** *Diadophis punctatus* is a small fossorial species of mildly venomous snake found throughout much of the United States, and portions of Mexico and Canada. It is known to feed on amphibians, reptiles, insects, slugs, and worms (Ernst and Ernst 2003. Snakes of the United States and Canada. Smithsonian Books, Washington, D.C. 668 pp.). *Diadophis punctatus* venom is reported to be lethal within minutes to snakes (O'Donnell et al. 2007. Toxicon. 50:810–815) and lizards (Anton 1994. Bull. Chicago Herpetol. Soc. 29:95), and lethal within seconds to *Plethodon serratus* (Mendelson 2014. Herpetol. Rev. 45:709–710).

On 17 May 2017 in Harlan County, Kentucky, USA, a *D. punctatus* was observed struggling in a small stream. Upon further investigation it was determined that the snake had captured a *Plethodon glutinosus* (Fig. 1). The salamander was rendered motionless within seconds of our initial observation, at which time the snake pulled the salamander from the water and onto the bank. The snake was not followed to avoid interrupting its meal. Although the snake was not observed seizing the salamander, and therefore the exact time from prey capture to immobilization is not known, we provide evidence that *D. punctatus* venom likely immobilizes *Plethodon glutinosus* rapidly after capture.

Fig. 1. *Diadophis punctatus* subduing a *Plethodon glutinosus* in a small stream, Kentucky, USA.

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ERYTHROLAMPRUS JAEGERI **(Jaeger's Ground Snake). PREDATION.** *Erythrolamprus jaegeri* is a small (to ca. 550 mm total length) dipsadid snake that occurs in floodplains of open areas of south and southeast Brazil as well as Argentina and Uruguay (Dixon 1987. Ann. Carnegie Mus. 56:173–191; Giraudo 2001. Serpientes de la Selva Paranaense y del Chaco Húmedo. L. O. L. A., Buenos Aires. 328 pp.). Although records of predation on snakes by birds are abundant in the literature, the only record we know of for *E. jaegeri* is that of Tozetti et al. (2011. Panamjas 6:65–67), who found an individual of this species in stomach contents of a *Ciconia maguari* (Maguari Stork). Here we report a case of predation of *E. jaegeri* by *Rupornis magnirostris* (Roadside Hawk), a raptor occurring from Mexico to Argentina.

At approximately 1500 h on 26 April 2014, at Palmares do Sul city, Rio Grande do Sul state, southern Brazil (30.3723°S, 50.3458°W; WGS 84), we observed a *R. magnirostris* leaving a floodplain and crossing a road with an *E. jaegeri* in its talons. The snake was still alive and exhibited vigorous movements when the hawk landed on a perch and started to feed on the snake (Fig. 1). When approached by the observers, the bird flew away carrying the snake, which was apparently dead.

Fig. 1. Predation of *Erythrolamprus jaegeri* by *Rupornis magnirostris* in southern Brazil.

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ERYTHROLAMPRUS POECILOGYRUS CAESIUS. **REPRODUCTION.** *Erythrolamprus poecilogyrus* a medium-sized snake that is predominantly terrestrial and diurnal and is widely distributed in South America (Vitt and Vangilder 1983. Amphibia-Reptilia 4:273–276; Dixon and Markezich 1992. Texas J. Sci. 44:131–166). In northeastern Argentina, it is frequently found near rivers and lagoons, and feeds mainly on anurans, with occasional ingestion of alternative prey such as *Cercosaura schreibersii* (Prieto et al. 2012. J. Herpetol. 46:402–406) and geckos (Alencar and Nascimento 2014. Herpetol. J. 24:79–85). Here we report the first observation of mating of *E. poecilogyrus caesius* in the wild.

At 1140 h on 29 September 2013, in Presidencia de la Plaza Department, Chaco Province, Argentina (27.1062°S, 59.6011°W, WGS 84; 81 m elev.), we observed a mating pair of *E. poecilogyrus caesius* (male SVL = 375.5 mm, tail length = 71 mm; female SVL

= 301.2 mm, tail length = 80.9 mm) under tree trunk of *Prosopis* sp. The snakes remained together for at least 180 min (Fig.1). The specimens were deposited in the Herpetological Collection of the Universidad Nacional del Nordeste (UNNEC 12876, 12885).

Dissection of the preserved specimens and histological examination of the gonads provided additional data about the reproductive event. The largest ovarian vitellogenic follicle of the female had a diameter of 3.94 mm (Fig. 2A). The male had seminiferous epithelium with metamorphosing spermatids at the luminal margins and sperm in the lumen of the seminiferous tubules and in the distal region of ductus deferens (Fig. 2B–C). The sexual segment of the kidney exhibited hypertrophy with a high density of secretory granules all over the cytoplasm (Fig. 2D). Our observation of the reproductive season is similar to that of *E. p. sublineatus* (October–December) recorded in Buenos Aires by Gallardo (1977. Reptiles de los alrededores de Buenos Aires. Editorial Universitaria de Buenos Aires, 125 pp.).

Fig. 1. A mating pair of *Erythrolamprus poecilogyrus caesius* (top = female; bottom = male) from Chaco Province, Argentina.

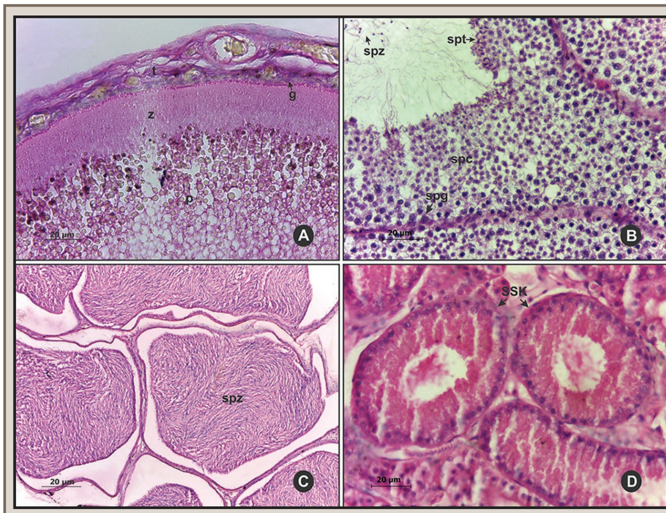

Fig. 2. Histology of gonads of *Erythrolamprus poecilogyrus caesius.* A) Ovarian vitellogenic follicle: g = granulosa; p = spherical yolk platelets; t = theca. B) Seminiferous tubules actively producing sperm: spz = spermetazoa; spg = epermatogonia; spc = spermatocyte; spt = spermatid. C) Ductus deferens with sperm. D) Sexual segment of the kidney in hypertrophy (SSK).

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***GONYOSOMA OXYCEPHALUM* (Red-tailed Green Ratsnake). DIET.** *Gonyosoma oxycephalum* is a large arboreal snake found in southeast Asia, from Thailand to the Sunda Islands and the Philippines (Schulz 1996. A Monograph of the Colubrid Snakes of the Genus *Elaphe* Fitzinger. Koeltz Scientific Books, Havlickuv Brod, Czech Republic. 439 pp.). This species is known to feed on bats, rodents, and birds (Schulz, *op. cit.*, Whitaker 1984. Hamadryad 9:5–9; Das 2015. A Field Guide to the Reptiles of South-East Asia. Bloomsbury Publishing, London, UK. 384 pp.). On 3 June 2017 at 1700 h, FA witnessed a juvenile *G. oxycephalum* (Fig. 1) in the process of consuming an adult *Cinnyris jugularis* (Olive-backed Sunbird) in a young *Mangifera indica* (Mango tree) near

Fig. 1. *Gonyosoma oxycephalum* that consumed a *Cinnyris jugularis.*

the presumed *C. jugularis* nest in Barangay Morera (13.19297°N, 123.59208°E; WGS 84), Guinobatan, Albay, Bicol Peninsula, Philippines. The *C. jugularis* was half eaten when FA encountered the snake. We assumed that the snake was trying to depredate the nest. Due to the rarity of the *G. oxycephalum* in the area, we decided not to dissect the snake, instead releasing it far away from residential areas. To the best of our knowledge this observation is the first record of *G. oxycephalum* consuming *C. jugularis*.

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***HYDROPHIS PLATURUS* (Yellow-bellied Seasnake). REPRODUCTION.** The elapid seasnake *Hydrophis platurus* is one of the best-studied seasnakes. Its reproductive cycle is considered to be continuous throughout the year (Ineich 1988. L'Année Biologique, 4ème sér. 27:93–117) but two birthing peaks have been reported in Costa Rica, one in December and January and another in July and August (Solorzano 2004. Serpientes de Costa Rica. Editorial INBio, Santo Domingo Heredia, Costa Rica. 791 pp.). Solorzano and Sasa (2011. Herpetol. Rev. 42:443–444) reported the first observation of mating behavior for the species at the sea surface in Costa Rica in August 2009. Ineich and Dune (2013. Herpetol. Rev. 44:695–696) reported a second case of observation of mating behavior in Mexico in January 2012. Here we report on a third case of in situ copulation at the sea surface. Two seasnakes were observed in copulation on 16 April 1992 in the sea off Raiatea Island (16.816°S, 151.45°W; WGS 84), the second largest island of the Society Archipelago (Leeward Islands) in French Polynesia. The two specimens were collected by Léon Tauvirai and deposited to MNHN collections (MNHN-RA 1992.4374 [male with hemipenes separated] and MNHN-RA 1992.4375 [female]). This observation is also a first island record for the species on Raiatea. The species was previously reported from French Polynesia from Society Archipelago (Tahiti Isl., Moorea Isl., Tetiaroa Atoll, Tahaa Isl., and Huahine Isl.) and Tuamotu Archipelago (Apataki Atoll, and Rangiroa Atoll). There are no reports from the three other archipelagos of French Polynesia: Austral Islands (sometimes called Tubuai Islands), Marquesas Islands, and Gambier Islands (Domard 1961. Bull. Soc. Ét. Océan. 136–137:330; Ineich and Loyer 1998. Bull. Soc. Ét. Océan. 276:86; Ineich 2016. *In* Galzinet al. [eds.], Biodiversité terrestre et marine des îles Marquises, Polynésie française, pp. 365–390. Société Française d'Ichtyologie, Paris).

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***LAMPROPHIS FISKII* (Fisk's Snake). DIET.** *Lamprophis fiskii* is a poorly known and seldom observed terrestrial, probably nocturnal, snake found mainly in the arid semi-desert-like Nama and Succulent Karoo biomes in the Cape provinces of South Africa (Barts et al. 2012. Sauria 34:41–51; Bates et al. 2014. Atlas and Red List of the Reptiles of South Africa, Lesotho and Swaziland. South African National Biodiversity Institute, Pretoria. xvii + 485 pp.). Very little is known about its biology. While captive specimens have been recorded feeding on geckos (*Afrogecko porphyreus* and *Hemidactylus* sp.) and 'pink mice' (Barts et al., *op. cit.*), the only record of natural prey is that of Broadley (1983. FitzSimons' Snakes of Southern Africa. Delta Books, Cape Town. 376 pp.) who noted a lacertid *Eremias* [= *Pedioplanis*] *burchelli* in the stomach of a preserved specimen housed at the Natural History Museum of Zimbabwe (Bulawayo).

Fig. 1. *Lamprophis fiskii* with *Meroles knoxii* found in its stomach.

On a visit to that institution in July 2016, I came across a bottle containing a specimen (NM/M 1169) of *L. fiskii* (belly dissected) from 'Cape Province,' together with a lacertid lizard superficially similar to *P. burchelli* (Fig. 1). It was the only specimen of this snake species in the Bulawayo collection and must therefore be the basis of Broadley's (*op. cit.*) record. While checking the identity of the snake I opened a copy of the latter book on Don Broadley's desk in order to use the diagnostic key, and noticed a penciled comment correcting the identification of the lizard from '*Eremias burchelli*' to '*Meroles knoxii*' (handwriting confirmed to be his by his widow, Shiela Broadley). Unfortunately, Don Broadley passed away on 10 March 2016 and the correction was never published.

A detailed examination was conducted on both the snake and lizard to confirm their identities. Snake, *L. fiskii* (characters according to Broadley, *op. cit.*): female (no inverted hemipenis in base of tail); ventrals 183; subcaudals 30; tail tip a conical spike; midbody scale rows 23. Lizard, *Meroles knoxii* (characters according to FitzSimons 1943. Transvaal Mus. Mem. 1:i–xv + 1–528): venter blackish [mostly white in *P. burchelli*]; subocular not bordering lip [borders lip in *P. burchelli*]; prefrontals separated [usually in contact in *P. burchelli*]; one enlarged scale (tympanic shield) above each ear opening [absent in *P. burchelli*]; 3–4 projecting scales on anterior border of (exposed) ear opening [projecting scales absent in *P. burchelli*]; anterior two pairs of chin shields (four pairs in all) in contact [three pairs in contact in *P. burchelli*]; gular fold absent [weakly indicated in *P. burchelli*]; dorsals small, distinctly keeled [unkeeled in *P. burchelli*] and slightly overlapping; longitudinal rows of ventrals 12 [14–16 in *P. burchelli*]; digits weakly fringed laterally [not fringed in *P. burchelli*]; 23 (strongly keeled) subdigital lamellae (right foot) [25–29 in *P. burchelli*]. This note corrects the earlier error in identification of the prey item as *P. burchelli* (Broadley, *op. cit.*) to *M. knoxii*. Considering the known distribution of this lizard (Bates et al., *op. cit.*), the snake was probably collected west of 21°30'E in the Northern or Western Cape provinces of South Africa.

I thank Shiela Broadley of the Natural History Museum of Zimbabwe (Bulawayo) for supplying close-up photographs of the lizard, which allowed me to re-check certain scale characteristics.

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***LOXOCEMUS BICOLOR* (Mexican Burrowing Python). DIET.** *Loxocemus bicolor* is the only representative of the family Loxocemidae, which shares many features with primitive boids (Savage 2002. The Amphibians and Reptiles of Costa Rica: A Herpetofauna between Two Continents, between Two Seas. University of Chicago Press, Chicago, Illinois. 560 pp.). The species ranges from Nayarit, Mexico to northwestern Costa Rica in the subhumid lowlands and adjacent montane slopes on the Pacific with scattered Atlantic localities. It is typically found in the drier portion of the Lowland Dry Forest, as well as on beaches (Savage, *op. cit.*). *Loxocemus bicolor* has been observed to feed on small mammals and frogs, and three accounts exist of this species preying on other reptile species and their eggs (Mora and Douglas 1984. Rev. Biol. Trop. 32:161–162; Mora 1987. J. Herpetol. 21: 334–335; Mora 1991. Herpetol. Rev. 22:61).

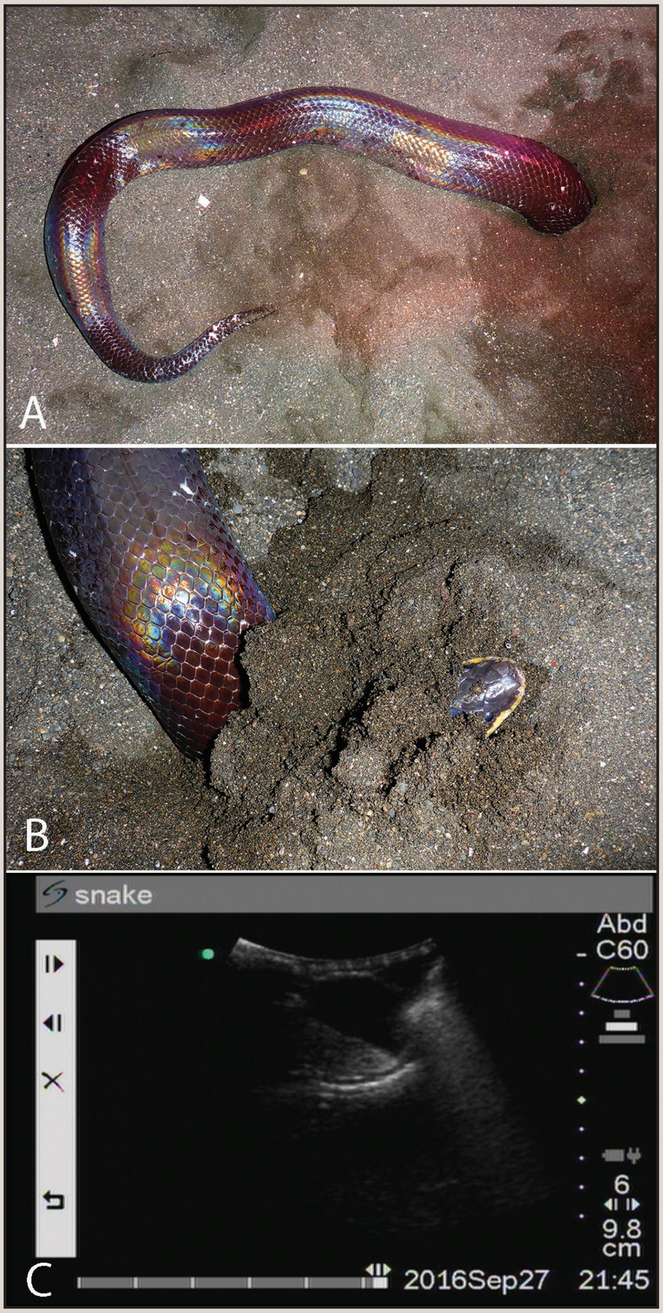

Fig. 1. *Loxocemus bicolor* predating a *Lepidochelys olivacea* nest in Ostional, Costa Rica: (A) half of the body buried in sand; (B) leaving egg chamber via different path; and (C) ultrasound image of sea turtle egg in digestive tract of the snake.

On 27 September 2016, at 2115 h, we witnessed the active predation of a *Lepidochelys olivacea* (Olive Ridley Sea Turtle) nest by an *L. bicolor*. While surveying for sea turtles during the days leading up to a synchronized mass-nesting at Ostional beach (Guanacaste, Costa Rica; 9.99361°N, 85.70094°W; WGS 84), we came across an *L. bicolor* (total length = 160.5 cm) that had burrowed the front half of its body into an *L. olivacea* nest (Fig. 1A). The outlines of three eggs in the digestive tract of the snake were clearly visible. We continued observing the animal without disturbing it, and it remained inside the nest for an additional 10 min before it re-surfaced. During that time, convulsive body movements that propelled the animal forward suggested that the snake was actively burrowing into the nest rather than using a pre-existing hole (e.g., crab holes). When leaving the nest, instead of retracting its body out of the original hole, the animal exited the nest head-first and re-surfaced via a newly dug route (Fig. 1B). We had an ultrasound machine available for turtle research and were able to take an ultrasound image of the sea turtle eggs in the digestive tract of *L. bicolor* (Fig. 1C).

The only previous account of this snake species eating sea turtle eggs (Mora and Douglas, *op. cit.*) described opportunistic feeding on exposed eggs of an already excavated (poached) nest. Thus, our observations provide the first evidence for active predation by *L. bicolor* on a sea turtle nest, including the burrowing into an intact egg chamber.

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***MASTICOPHIS FLAGELLUM* (Coachwhip) and *HETERODON NASICUS* (Western Hog-nosed Snake). DIET AND PREDATION.** *Masticophis flagellum* diet includes lizards, birds, mammals, turtles, and snakes (summarized in Beane 2013. Herpetol. Notes. 6:285–287). Snakes reportedly depredated by *M. flagellum* include *Pituophis catenifer* (Western Gophersnake; Beaman and Harris 2002. Herpetol. Rev. 33:214–215), *Trimorphodon lambda* (Sonoran Lyresnake; Beaman and Basey 2011. Herpetol. Rev. 42:437), *Opheodrys aestivus* (Rough Greensnake; Mueller and Whiting 1989. Herpteol. Rev. 20:72–73), and *Crotalus viridis* (Prairie Rattlesnake; Tabor and Germano 1997. Herpetol. Rev. 28:90). Hamilton and Pollack (1956. Ecology 37:519–526) reported that one *M. f. flagellum* (Eastern Coachwhip) from Fort Benning, Georgia, had a *Heterodon* species in its stomach, but they did not identify the prey to species. Undoubtedly, the *Heterodon* was either *H. platirhinos* (Eastern Hog-nosed Snake) or *H. simus* (Southern Hog-nosed Snake). Here we report the first known predation of *H. nasicus* by *M. flagellum.* On 5 June 2017 at approximately 0900 h, a *M. flagellum* was observed depredating an *H. nasicus* at Bitter Lake National Wildlife Refuge, Roswell,

Fig. 1. *Masticophis flagellum* depredating *Heterodon nasicus* at Bitter Lake National Wildlife Refuge, Roswell, New Mexico, USA.

New Mexico, USA (33.485°N, 104.419°W; WGS 84). The depredation event was observed along a dirt road in a closed area of the refuge (Fig. 1). The *H. nasicus* did not appear to be alive when approached and photographed. During 3 min of observation there was only a slight repositioning movement by the *M. flagellum*, and at approximately 1300 h both snakes were no longer observed on or adjacent to the road. The findings and conclusions in this article are those of the authors and do not necessarily represent the views of the U.S. Fish and Wildlife Service.

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***MICRURUS ALBICINCTUS* (White-banded Coralsnake) and *MICRURUS HEMPRICHII* (Hemprich's Coralsnake). DIET AND PREDATION.** *Micrurus albicinctus* is found in the western part of the Amazon Basin in Brazil and Peru, whereas *M. hemprichii* occurs more widely throughout the Amazon. Both occur in sympatry in the western Brazilian Amazon. Both species have fossorial habits and are thus cryptozoic (Bernarde and Abe 2006. South Am. J. Herpetol. 1:102–113). Data on the diet of *M. albicinctus* are scarce, and they are known to prey only on other snakes (*Atractus*; Souza et al. 2011. Herpetol. Notes 4:369–372) that also exhibit fossorial or semi-fossorial habits. To date, there is no record of *Micrurus albicinctus* predating other coralsnakes.

At 1530 h on 6 February 2016, we observed an adult *M. albicinctus* preying upon an adult *M. hemprichii* (Fig. 1) in the tropical moist terra firme forest within the 24-km^2 Research Grid of the RAPELD (Rapid Assessment Program) / PPBIO (Biodiversity Research Program) inside the Experimental Farm Area of the Federal University of Amazonas (2.37°N, 60.03°W; WGS 84), in the peri-urban region of Manaus, Amazonas, Brazil. The area has a high diversity of snakes (Masseli and Kaefer 2017. BioLins. 2:88–100). The whole process lasted approximately 50 min and was observed completely, from the capture of the prey to the end of the ingestion. The behavior during the ingestion process was very similar to that described for *Boiruna maculata* by Pinto and Lema (2002. Iheringia Sér. Zool. 92:9–19), which may help snakes avoid injury as they are consuming other snakes.

Fig. 1. *Micrurus albicinctus* predating *Micrurus hemprichii*, Manaus, Amazonas, Brazil.

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***NAJA SUMATRANA* (Sumatran Spitting Cobra). DIET.** *Naja sumatrana* is a widespread elapid, ranging from Thailand and peninsular Malaysia, to the Philippines, Sumatra, and Borneo (Das 2012. Naturalist's Guide to the Snakes of South-East Asia: Malaysia, Singapore, Thailand, Myanmar, Borneo, Sumatra, Java and Bali. John Beaufoy Publishing Ltd., Oxford, UK. 176 pp.). This generalist is found in a range of habitats and accepts a wide prey base, including small mammals, amphibians, reptiles, birds, and fish. Here, we provide the first documented observation of predation by *N. sumatrana* on a freshwater eel (*Anguilla borneensis*) in northern Borneo.

At 1931 h on 16 March 2017, an adult *N. sumatrana* (SVL ca. 1.5 m) was found in Deramakot Forest Reserve, Borneo. The individual was semi-submerged in a 4-m wide, fast flowing and rocky stream in unlogged, lowland forest (5.36956°N, 117.43510°E, WGS 84; 153 m elev.). The *N. sumatrana* was in the process of ingesting an *Anguilla borneensis* (Indonesian Longfinned Eel)

Fig 1. *Naja sumatrana* ingesting an *Anguilla borneensis* within the Deramakot Forest Reserve, northern Borneo.

(Fig. 1). The *A. borneensis* was half consumed from the posterior end when first spotted. The *N. sumatrana* continued to swallow the eel, completing the process in 2 min. We thank the Sabah Forestry Department for allowing us to conduct research within the Deramakot Forest Reserve. Additionally, we thank Indraneil Das for verification of species identities.

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***NERODIA ERYTHROGASTER* (Plain-bellied Watersnake). DEFENSIVE BEHAVIOR.** *Nerodia erythrogaster* is a common natricine snake often found near marshes, pocosins, and other aquatic environments in the eastern United States. When encountered, all species of *Nerodia* usually attempt to escape into the water, but will flatten their head and body, release musk, and attempt to bite if unable to flee (Gibbons and Dorcas 2004. North American Watersnakes: A Natural History. University of Oklahoma Press, Norman. 438 pp.). Additionally, *N. erythrogaster* have been found to autohemorrhage when handled (Smith et al. 1993. Herpetol. Rev. 24:130–131), and can defensively autotomize parts of their tail (Hampton 2007. Herpetol. Rev. 38:91).

At 0915 h on 25 May 2017, while driving along a narrow gravel road in the Croatan National Forest, Craven County, North Carolina, USA (34.9639°N, 76.9884°W; WGS 84), I encountered a subadult *N. erythrogaster* crossing between a roadside ditch and the nearby forest. The snake froze in place as I approached on foot, then assumed a common defensive posture: body coiled in a strike-ready pose, with its head pulled back and jaws flattened, occasionally striking at the air towards me (Fig. 1A). The snake then straightened its body towards the edge of the road as if to escape. Instead of immediately fleeing, the snake raised the anterior end of its body (ca. one-third of its total length) towards me, spread this portion of its body and neck laterally and widened its head, and then proceeded to move towards the edge of the road with its body still raised (Fig. 1B). The snake moved ca. 1.5 m in this position, then lowered its body and fled into the nearby grass.

Fig. 1. A) Defensive posturing by a *Nerodia erythrogaster*. B) "Blocked-flight aggressive behavior" by the same individual.

This posturing is an example of "blocked-flight aggressive behavior" (Means 2010. IRCF Rept. Amphib. 17:76–81), where a snake raises the anterior portion of its body aggressively toward a perceived threat obstructing its escape. Means (2010, *op. cit.*) noted this behavior in several snakes, including *Nerodia fasciata*, but it has not been reported in *N. erythrogaster* or any other species of *Nerodia*, despite multiple studies on the defensive and escape behaviors of the genus (e.g., Scudder and Burghardt 1983. Z. Tierpsychol. 63:17–26; Cooper et al. 2008. J. Herpetol. 42:493–500). Similar behavior has been reported in a variety of other snakes in the Western Hemisphere (e.g., Angarita-Sierra 2015. Herpetol. Notes 8:339–344; Greene 1975. Am. Midl. Nat. 93:478–484), and it is likely performed by more taxa than have been observed. As noted by Means (2010, *op. cit.*), observations of this behavior may have contributed to the commonly held belief that snakes "chase" humans.

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***NERODIA SIPEDON* (Northern Watersnake). DIET.** *Gambusia affinis* (Western Mosquitofish) is one of the most widespread and detrimental invasive fish in the world (Pyke 2008. Annu. Rev. Ecol. Evol. Syst. 39:171–191). Understanding the potential for native predators to consume this non-native species might be important to understanding its potential impacts on native communities. While monitoring a population of *G. affinis* in a small pond (0.60 ha) in Granville, Licking County, Ohio, USA (Olde Minnow Pond; 40.0833°N, 82.5180°W; WGS 84), we captured a *Nerodia sipedon* (total length = 69.5 cm) in a Gee minnow trap on 21 July 2017. We gently palpated the snake to cause it to regurgitate a portion of its stomach contents, which consisted of at least five *G. affinis*, including both males and females. The fish ranged from fresh to partially digested, and further palpation suggested additional prey items remained in the snake. While the snake being in the trap may have facilitated the capture and consumption of the mosquitofish (e.g., Wittenberg and Gifford 2008. J. Freshw. Ecol. 23:213–218), the range of the extent of digestion of the regurgitated mosquitofish was such that it suggests the snake likely had consumed at least some *G. affinis* prior to entering the trap (traps had been set for 24 h prior to checking). To our knowledge, this is the first evidence that *N. sipedon* consumes *G. affinis* outside the native range of this invasive fish. *Nerodia sipedon* are known to consume *Gambusia* sp. in the native range of mosquitofish (Zelnick 1966. Southwest. Nat. 11:311–312, Himes 2003. Amphibia-Reptilia 24:181–188). Thus it appears likely that *N. sipedon* will consume *G. affinis* or *G. holbrooki* (Eastern Mosquitofish), which is also an invasive fish, in places where they have been introduced. Whether the exploitation of *Gambusia* by *N. sipedon* will affect populations of *N. sipedon*, like their consumption of the invasive *Neogobius melanostomus* (Round Goby; King et al. 2006. Can. J. Zool. 84:108–115), or affect populations of *Gambusia*, warrants further study.

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***NERODIA TAXISPILOTA* (Brown Watersnake). PREDATION.** *Nerodia taxispilota* are found throughout the Coastal Plain of the southeastern United States but little is known of their ecology and natural history. The species is highly piscivorous and may prefer catfish as prey, including invasive species like *Pylodictis olivaris* (Flathead Catfish; Steen et al. 2008. Herpetol. Rev. 39:472); herein we describe an observation of *P. olivaris* returning the favor. *Alligator mississippiensis* (American Alligator), *Agkistrodon piscivorus* (Cottonmouth), *Chelydra serpentina* (Snapping Turtle), and *Phalacrocorax auritus* (Double-crested Cormorant) are described as predators of *N. taxispilota* (Ernst and Ernst 2003. Snakes of the United States of Canada. Smithsonian Books, Washington, DC. 668 pp.), however, other authors have noted, "…no documented cases of predation on *N. taxispilota* have been reported in the literature." (Gibbons and Dorcas 2004. North American Watersnakes. University of Oklahoma Press, Norman. 438 pp.). On 2 June 2017, during the Choctawhatchee Catfish Roundup on the Choctawhatchee River near Carryville, Florida, USA, ET captured a 4.5-kg *P. olivaris*. Upon cleaning, a previously ingested and approximately 0.6 m *N. taxispilota* was revealed (Fig. 1). Introductions of *P. olivaris* into waters in which it is not indigenous have been associated with severe declines of native fish species. Future research may reveal whether this invasive fish is impacting populations of semi-aquatic reptiles as well.

Fig. 1. A *Nerodia taxispilota* (Brown Watersnake) ingested by a *Pylodictis olivaris* (Flathead Catfish) captured by anglers on the Choctawhatchee River, Florida. The juvenile *Lepomis* was the bait.

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***NERODIA TAXISPILOTA* (Brown Watersnake). PREDATOR INSPECTION BY FISH.** Birds and mammals are known to mob reptiles (Chiver et al. 2017. J. Ornithol. 2017:1–8), Gardner et al. 2015. Am. J. Primatol. 75:281–291). Rarely, fish have been reported to perform this behavior (Dominey 1983. Copeia 1983:1086–1088 [fish to a turtle]). One case even suggested the mobbing of a *Nerodia sipedon* by fish (Anderson and Roz-Marynowski 2011. Herpetol. Rev. 42:442). A more common behavior documented in fish towards predators (typically fish predators) is 'predator inspection' (Pitcher 1991. Neth. J. Zool. 42:371–391). Here we report the predator inspection of a feeding *Nerodia taxispilota* by juvenile centrarchid fishes in southwest Georgia.

On 24 July 2017, at 1500 h, we observed an *N. taxispilota* (ca. 75 cm total length) feeding on an unknown fish in shallow water (around 8 m from the bank in 15 cm of water) on the eastern bank of the Flint River (31.43300°N, 84.01087°W; WGS 84). The snake was oriented facing into deeper water among rock and gravel substrate with some rocks emerging from the water. Approximately 8–10 juvenile (ca. 7 cm total length) centrarchid fishes were maintaining positions facing the head of the *N. taxispilota* at a distance of about 20 cm (Fig. 1). At least three of these fishes were identified as *Micropterus salmoides* (Largemouth Bass) and one other fish was identified as a *Lepomis* species. The fish being eaten was not identified but was clearly larger (at least 15 cm total length) than the fish inspecting the snake. The snake swam to deeper water after spending ca. 30 sec finishing ingestion of the prey item and the centrarchids dispersed to get out of the way of the escaping snake. There was no aggressive contact or action directed towards the snake or the fishes.

While the interaction of a small group of prey animals with a large potential predator is often observed as mobbing, this reported incident involved no contact or aggressive interaction between the species. Mobbing has been observed in fish, often versus other fish (Hein 1996. Copeia 1996:989–991), but 'predator inspection' is a more commonly observed behavior of fish in response to predators. This has been classically observed with guppies (Heathcote et al. 2017. Sci. Rep. 7:1–35), but has been documented in several other species as well. Predator inspection is complex and involves high-risk behavior to gather information about a predator by actually approaching it. It is differentiated from mobbing because there is no harassment, physical or otherwise, against the potential predator (Dugatkin 1997. Cooperation Among Animals: An Evolutionary Perspective. Oxford University Press, New York. 240 pp.). While inspection has most often been studied with fish reacting to other fish that are predatory, *Nerodia sipedon* scents elicited predator inspection behavior in lamprey (Imre et al. 2014. J. Fish Biol. 2014:1490–1502). Here we observed visual predator inspection of a watersnake by multiple fish species simultaneously.

Fig. 1. *Nerodia taxispilota* consuming prey fish and at least four centrarchids oriented towards the snake's head (red arrows).

It is likely that the observation of interaction with *M. salmoides* and *N. sipedon* by Anderson and Roz-Marynowski (*op. cit.*) was also predator inspection, as they also did not observe any contact. Also of note is how the *M. salmoides* avoided the mouth in their observation, but in our observation the fishes were oriented towards the mouth of the *N. taxispilota*, possibly because our observation involved a *Nerodia* in the process of ingesting prey. The study involving turtle mobbing (Dominey, *op. cit.*) also involved fish following the turtle and not attacking, and is perhaps a situation better defined as inspection (and also territoriality as the turtle was intentionally placed in a spawning colony).

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***OXYRHOPUS GUIBEI* (False Coral Snake). PREDATION.** *Oxyrhopus guibei* is a dipsadine snake that occurs in Brazil, Bolivia, Paraguay, Peru, and Argentina (Uetz et al. 2017. www.reptile-database.org; accessed 18 Jun 2017). It is a terrestrial snake that is associated with the edges of forests, open areas, and cultivated areas, and is usually nocturnal or active at twilight (although there are records of individuals moving during the day; Sazima and Abe 1991. Stud. Neotrop. Fauna Environ. 26:159–169). Predators of *O. guibei* include birds (*Herpetotheres cachinnans;* Laughing Falcon) and other snakes (*Erythrolamprus aesculapii*; Sazima and Abe, *op. cit.*). The corvid *Cyanocorax chrysops* (Plush-crested Jay) is an omnivorous bird that feeds on various food items ranging from seeds and fruits (Ramos et al. 2011. Biotemas. 24:153–170) to vertebrates (Farina et al. 2011. Chiropt. Neotrop. 17:993–996). Here, we report a dead *O. guibei* being consumed by a group of *C. chrysops.*

The observation occurred during the day on18 June 2015, in a ciliary forest in the state of Mato Grosso do Sul, municipality of Angélica, Brazil (22.42223°S, 53.50774°W, WGS 84; Fig. 1). We observed three *C. chrysops* disputing the resource. One individual was carrying the snake, landed, and ate part of it. A second individual stole the prey and exhibited the same behavior as the first. This continued until the birds moved away carrying the dead snake. *Oxyrhophus guibei* showed dull coloration and the body was severely damaged. Thus, rather than being killed by the *C. chrysops* it is possible that this represents a case of scavenging. This behavior is remarkable because ringed patterns of clay models are avoided by many wild avian predators (Brodie and Janzen 1995. Funct. Ecol. 9:186–190; Hinman et al. 1997. Evolution 51:1011–1014), although some birds still prey on coral snakes and their mimics (Brugger 1989. Copeia 1989:508–510; Pueta 2002. Herpetol. Rev. 33:215; DuVal, et al. 2006. Biotropica 38:566–568). Perhaps the protective function of mimicry breaks down in a scavenging context, possibly via subtle post-mortem changes to coloration detectable to avian vision, or because of the absence of movement (Titcomb et al. 2014. Curr. Zool. 60:123–130; Paluh et al. 2014. J. Herpetol. 48:249–254).

Fig. 1. *Cyanocorax chrysops* eating *Oxyrhopus guibei.*

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***PANTHEROPHIS OBSOLETUS* (Texas Ratsnake). VULNERABILITY DURING PREDATION.** At 1430 h on 15 April 2017, a juvenile *Pantherophis obsoletus* ca. 60 cm in length fell over 8 m from a large pecan tree into a grass lawn where children were playing (30.191065, -94.683373, 24.9 m elev.; WGS 84). Two children (GE and NB) immediately reported the event to CMW, who picked up the snake as it continued constriction of an adult male *Glaucomys volans* (Southern Flying Squirrel). CMW and IHW separated the two animals to show both species to the children and then released them into the nearby forest. During this attempted predation event, the *P. obsoletus* and *G. volans* were both vulnerable as the snake refused to yield its would-be prey. This report represents an instance where a semi-arboreal snake feeding upon an arboreal rodent fell a significant distance yet still refused to release its prey even when faced with molestation by a species known to routinely kill snakes.

Pantherophis are very careful to avoid falling while they are climbing in search of arboreal prey (Rudolph et al. 1990. Wilson Bull. 102:14–22), but observations on the behavior of other ratsnakes that have fallen while constricting prey suggest that falls between 5 m (*P. alleghaniensis* consuming *Lasiurus intermedius* [Northern Yellow Bat]; Hastings 2010. Herpetol. Rev. 41:371) and 10 m (*P. spiloides* consuming *Sciurus carolinensis* [Gray Squirrel]; Lott and Parker 2003. Herpetol. Rev. 34:149) do not dissuade the snakes from constricting, killing, and consuming their prey, even when human observers are present. Under similar circumstances, a *Chrysopelea ornata* (Paradise Flyingsnake) and its prey (Tokay Gecko; *Gekko gecko*) remained motionless for ca. 5 min while eight people observed at a distance of 1–3 m before trying to escape (Mebert and Durso 2014. Sauria 36:41–46). *Pantherophis alleghaniensis* are also known to use constriction in an anti-predator context (e.g., against a *Buteo jamaicensis* [Red-tailed Hawk]; Vandermast 1999. Herpetol. Rev. 30:169; *Buteo lineatus* [Red-shouldered Hawk]; Meshaka et al. 1988. Herpetol. Rev. 19:84), which may result in falls of > 10 m.

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***PHILODRYAS AESTIVA* (Brazilian Green Racer). HABITAT USE AND DEFENSIVE BEHAVIOR.** *Philodryas aestiva* has a large distribution in South America (Celsi et al. 2008. Check List 4:12–14; Sawaya et al. 2008. Biota Neotrop. 8:127–149) and is often found

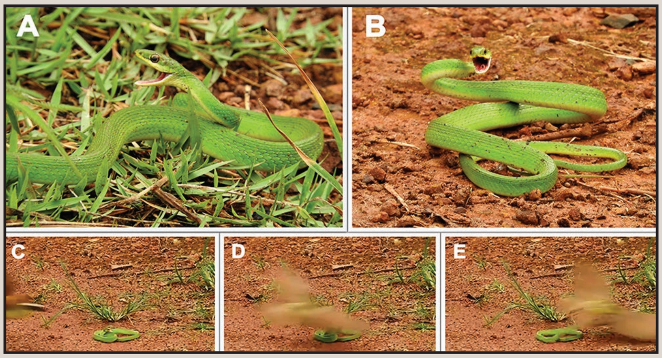

Fig. 1. Pre-strike and gaping behavior in *Philodryas aestiva* (A, B), and attacks by Great Kiskadees defending their nest (C, D, and E).

on the ground in open savannas (Sawaya et al., *op. cit.*). Terrestrial mammals, lizards, and frogs are prey items most commonly consumed, but bats and birds can also been eaten by *P. aestiva* (Carreira-Vidal 2002. Monografia de Herpetología. Asociación Herpetológica Española, Barcelona. 126 pp.; França et al. 2008. Copeia 2008:23–28). Here we report on the habitat use by this snake and its defensive behavior towards attacks by birds apparently defending their nest.

An individual of *Philodyras aestiva* (total length ca. 80 cm) was observed falling from a papaya tree after being attacked by a pair of Great Kiskadees (*Pitangus sulphuratus*) at 1556 h, on 10 December 2016 at a reforestation area in Cerrado near Parque Nacional da Emas (18.2986°S, 52.9887°W, SAD 69; 800 m elev.), Goiás, Brazil. The snake was in the tree, near a 2 m-high nest with one kiskadee nestling. The adult kiskadees were attacking the snake, which apparently launched from the tree, falling around 1.5 m from its base. After the snake fell on the ground, it kept observing the attackers, while adopting a pre-strike posture with open mouth (Fig. 1A, B). Despite this threatening posture, the snake suffered at least six attacks by both kiskadees (Fig. 1C–E), and rapidly escaped into the surrounding vegetation. A video of the observation is housed at Laboratório de Ecologia e Evolução of Instituto Butantan.

Philodryas are fast snakes and usually exhibit a poor defensive repertoire (Marques et al. 2015. Serpentes do Cerrado: Guia Ilustrado. Holos Editora, Ribeirão Preto, São Paulo. 248 pp.). However, the arboreal *P. viridissimus* exhibits a more complex defensive display including lateral compression of the body, pre-strike posture, open mouth, and striking (Marques 1999. Rev. Bras. Zool. 16:265–266). *Philodyras aestiva* and *P. viridissimus* belong to distinct clades (Grazziotin et al. 2008. Cladistics 28:1–23), thus open mouth defensive behavior may be more widespread within *Philodyras* than previously recognized. Although predominantly terrestrial, this report also confirms that *P. aestiva* may climb on vegetation to forage, a common habit among other terrestrial *Philodryas* (Hartmann and Marques 2005. Amphibia-Reptilia 26:25–31).

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PHILODRYAS NATERRERI **(Run-Snake). ENDOPARASITES.** *Phillodryas naterreri* is a common and widespread colubrid snake found in the Caatinga domain (step-savanna-forest) in northeastern Brazil. This species is terrestrial and feeds on small vertebrates such as toad and lizards (Vanzolini et al. 1980. Acad. Bras. de Cien. 1:1–161). Previous studies of endoparasites of *P. naterreri* have identified only pentastomids: *Cephalobaena tetrapoda* (Heymons 1922) and *Raillietiella furcocerca* (Diesing 1863) (Almeida et al. 2007. Braz. J. Biol. 67:759–763; Almeida et al. 2008. Braz. J. Biol. 68:201–205). Acanthocephalan parasites have not previously been reported in this species.

An adult female *P. naterreri* (SVL = 86 cm) was collected on 10 April 2017 in a rural area (7.5741°S, 39.7525°W, SAD 69; 456 m elev.) of the Exu municipality, Pernambuco State, Brazil. Dissection revealed the presence of the 107 conspicuous endoparasites in the large intestine, identified as *Oligacanthorhynchus* sp. based on Travassos (1917. Mem. Inst. Oswaldo Cruz 1:1–91). Acanthocephalans are heteroxenic parasites (indirect life cycle), but their biology is poorly known, especially for snakes. *Oligacanthorhynchus* have been reported from anurans and squamates from South America (Smales 2007. J. Parasitol. 93:392–398; Campião et al. 2016. Comp. Parasitol. 83:92–100). Thus, *P. naterreri* is a new host record for acanthocephalan *Oligacanthorhynchus* sp.

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PHILODRYAS OLFERSII **(Lichtenstein's Green Racer). DIET.** *Philodryas olfersii* is a semiarboreal (Barros et al. 2015. R. Bras. Bioci. 13:231–236) and diurnal (Martins et al. 2008. South Am. J. Herpetol. 3:60–69) dipsadid with generalist feeding habits. Studies report this species consuming frogs, lizards, snakes, small mammals, and birds (Hartmann and Marques 2005.

Fig. 1. *Philodryas olfersii* preying on a Bananaquit bird (*Coereba flaveola*, Thraupidae) in the municipality of Gurupi, Tocantins State, Brazil.

Amphibia-Reptilia 26:25–31; Lema 2002. Os Répteis do Rio Grande do Sul: Atuais e Fósseis. Puc/RS Co., Porto Alegre, Rio Grande do Sul. 264 pp.; França et al. 2008. Copeia 2008:23–38; Leite et al. 2009. North-Western J. Zool. 5:53–60; Winck et al. 2012. Herpetol. Rev. 43:151; Mesquita et al. 2013 Pap. Avul. Zool. 53:99–113). At 1350 h on 8 April 2017, an adult *P. olfersii* was observed consuming a juvenile *Coereba flaveola* (Bananaquit bird; Fig. 1), in the municipality of Gurupi, Tocantins State, northern Brazil (11.728091°S, 49.067643°W; WGS 84). To our knowldege, this is the first record of *P. olfersii* preying upon *C. flaveola*. We thank Rafael de Fraga (Universidade Federal do Oeste do Pará) for confirming the snake species.

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***PITUOPHIS CATENIFER SAYI* (Bullsnake). AGONISTIC MOBBING ATTACK.** Snakes have been observed as recipients of agonistic, non-predatory attacks by individuals from other taxa towards a presumed enemy (e.g., Engeman et al. 2009. Herpetol. Rev. 40:84–85; Kaiser et. al. 2013. Herpetol. Rev. 44:329). Mobbing, an attack involving multiple individuals, has been observed against many taxa of vertebrate predators (e.g., Altmann 1956. Condor 58:241–253; Owings and Coss 1977. Behaviour 62:50–69). Snakes appear to be frequent targets for this behavior and a variety of taxa have been documented to mob snakes (e.g., Owings and Coss 1976, *op. cit.*). Birds, probably more than any other taxa, have been commonly observed to mob snakes (e.g., Guthrie 1932. Wilson Bull. 44:88–113; Curio et al. 1978. Science 202:899–901), with mobbing sometimes simultaneously involving multiple bird species in the attack (e.g., Sieving et al. 2004. Auk 121:738–751; Suzuki 2016. J. Ethol. 34:79–84). Mobbing behavior can serve a variety of defensive purposes such as avoiding predation, drawing attention to the potential predator from others, defending a nest or young, and transmitting enemy recognition to others (e.g., Curio et al., *op. cit.*).

Here, we describe a mobbing attack by two Black-billed Magpies (*Pica hudsonia*) on a *Pituophis catenifer sayi*. The encounter between the two species was observed on 15 May 2017 at 1600 h on a warm, sunny day (26°C) near Berthoud, Colorado, USA (40.27178°N, 105.16736°W; WGS 84). A commotion from two magpies repeatedly diving from about 3 m above ground level into tall grass in an early growth hayfield was observed. After 3–5 min, the subject of the magpies' attention was revealed when an individual *P. c. sayi* became visible as it moved into shorter vegetation while attempting to escape the magpie attacks. Observations of the magpies diving and hitting the snake continued for another 2 min until the attack broke off when JDL edged closer for a better vantage point to observe the attack. After the mobbing attack, closer inspection of the bullsnake (which had recently shed its skin, total length >150 cm) revealed no apparent bleeding wounds on the snake.

Magpies are known to mob potential predators (e.g., Stone and Trost 1991. Anim. Behav. 41:633–638), especially mammalian and avian predators like cats (*Felis catus*), coyotes (*Canis latrans*), dogs (*Canis familiaris*), and raptors. The nearest tree to the scene where the mobbing was initially observed was ~ 45 m away, and there was not a magpie nest in the tree. To our knowledge this was the first observation of a Black-billed Magpie mobbing attack on a bullsnake, and its apparently agonistic nature was especially interesting because the snake did not appear to be a threat to the pair of birds and there was not an observable nest in the nearby vicinity that they might have been defending.

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***PYTHON BIVITTATUS* (Burmese Python). DIET AND PREY SIZE.** *Python bivittatus* are established over a large area of southern Florida, USA (Snow et al. 2007. *In* Henderson and Powell [eds.], Biology of the Boas and Pythons, pp. 416–438. Eagle Mountain Publishing, Eagle Mountain, Utah), where they have been strongly implicated as the cause of mammal population declines (Dorcas et al. 2012. Proc. Natl. Acad. Sci. 109:2418–2422) and at least one local extirpation (see McCleery et al. 2015. Proc. R. Soc. B. 282:20150120). While the mammals exhibiting declines were mainly medium-sized, Dorcas et al. (*op. cit.*) also reported apparent declines in White-tailed Deer (*Odocoileus virginianus*). Here we report a noteworthy instance of python predation of a deer.

At 1300 h on 07 April 2015, a female *P. bivittatus* (SVL = 294 cm, total length = 335 cm, 30.17 kg including prey) was located in Collier-Seminole State Park (26.00106°N, 81.61185°W; WGS 84), Collier County, Florida, USA. The snake was on the ground under a canopy of invasive Brazilian Pepper (*Schinus terebinthifolia*), and was greatly distended by a food bulge. After capturing the

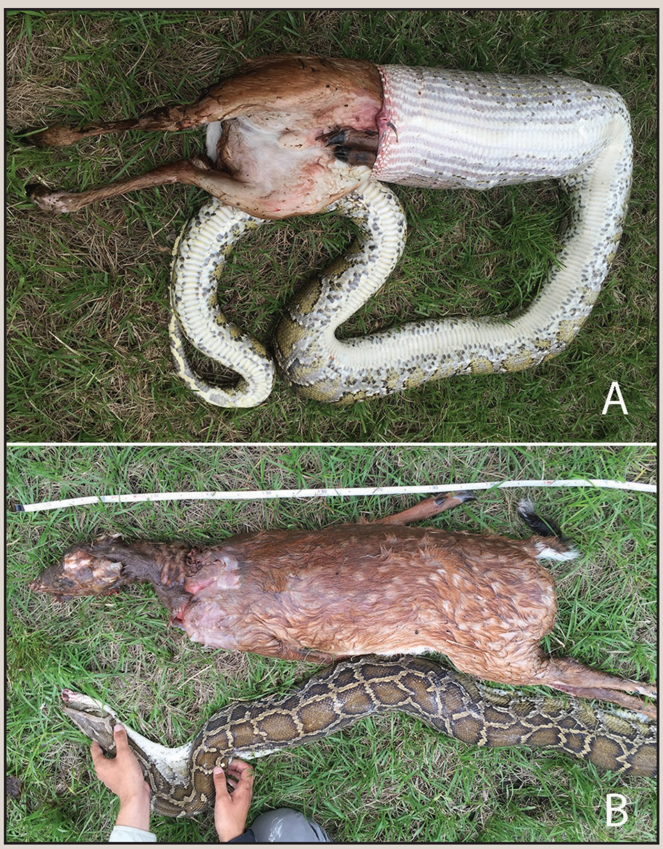

Fig. 1. A) *Python bivittatus* regurgitating prey item, an *Odocoileus virginianus* (White-tailed Deer) fawn. B) Python alongside regurgitated prey that was 111.1% of the snake's body mass.

snake and moving it to an open setting for examination, the snake regurgitated a juvenile *O. virginianus* (Fig. 1). The fawn (15.88 kg) was 111.1% of the mass of the python (14.29 kg post-regurgitation), and had a spotted coat and curdled milk in its rumen. It had been ingested headfirst, and some digestion of the skin of the head had occurred. Wounds from the snake's teeth were apparent on the anterior thorax at the base of the neck, and necropsy results indicated that some fractures of the fawn's vertebrae and ribs had occurred (also see Rivas 2004. Herpetol. Rev. 35:66–67). The snake was in good body condition and did not have any wounds, but the skin of the lower jaw was extremely loose.

Odocoileus virginianus fawns have been recorded as prey of *P. bivittatus* in Florida (Rochford et al. 2010. Herpetol. Rev. 41:97). In a remarkable example, Boback et al. (2016. BioInv. Rec. 5:197–203) recovered remains of two fawns and one adult deer from a single python. The present record confirms that python predation of deer occurs across the breadth of the invaded range in Florida (100 km between this record and the previous fawn predations). In the native range, Wall (1912. J. Bombay Nat. Hist. Soc. 21:447–475) mentioned an instance of *P. bivittatus* predation of a fawn of a Sambar Deer (*Rusa unicolor*), an elk-sized cervid. Even if adult deer are consumed only rarely, *P. bivittatus* may be able to depress the White-tailed Deer population in Florida by lowering juvenile recruitment. In contrast to previous records of predation on fawns, the snake in the present record was not an especially large individual (14.29 kg). Murphy and Henderson (1997. Tales of Giant Snakes: A Historical Natural History of Anacondas and Pythons. Krieger Publishing Company, Malabar, Florida. 221 pp.) reviewed instances of pythons eating large prey, but no predator:prey size ratios were provided. Indeed, quantification of prey size is rare in the literature on pythons. Greene (1983. Am. Zool. 23:431–441) reviewed prey sizes consumed by various snake taxa and concluded that relative prey masses > 1.0 are only regularly seen in viperids and elapids. We propose that our observed predator:prey ratio of 1:1.11 represents the largest well-documented relative meal size reported for *P. bivittatus*, and possibly for any species of python.

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RHABDOPHIS SUBMINIATUS HELLERI **(Red-necked Keelback). REPRODUCTION / CLUTCH SIZE.** The clutch size of *Rhabdophis subminiatus sensu lato* is reported to be 5–17 (Ahmed et al. 2007. Amphibians and Reptiles of Northeast India. Aaranyak, Guwahati, India. 169 pp.; Whitaker and Captain 2008. Snakes of India, The Field Guide. Draco Books, Chennai, India. 385 pp.; Das 2012. Snakes of South-East Asia. John Beaufoy Publishing, Oxford, England. 160 pp.). Two subspecies are recognized, *R. s. subminiatus* and *R. s. helleri*, which can be differentiated by their nuchal scales and nuchal groove (Das 2010. A Field Guide to the Reptiles of South-East Asia. New Holland Publishers, London, England. 376 pp.). A specimen of *R. s. helleri* was rescued from a residential area in Aizawl, Mizoram, India, on 9 March 2017 and was kept in a terrarium at the Department of Zoology, Pachhunga University College, College Veng, Aizawl prior to its release in the wild. On 10 March 2017 at ca. 0930 h we found a clutch of 27 eggs in the terrarium. The length of the eggs ranged from 22.0–26.6 mm (mean = 24.5 mm) and the diameter ranged from 15.8–18.3 mm (mean = 16.8 mm). This record represents a new maximum clutch size for *R. subminiatus*.

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RHADINAEA DECORATA **(Striped Forest Snake). DIET.** *Rhadinaea decorata* is a small, slender-bodied dipsadine snake that is widely distributed throughout forested regions of Central America (Köhler 2003. Reptiles of Central America. Herpeton, Verlag Elke Köhler, Offenbach, Germany. 367 pp.). Although common in many areas throughout its range, the natural history of *R. decorata* remains poorly characterized, and dietary information is particularly scarce (Scott 1983. *In* Janzen [ed.], Costa Rican Natural History, pp. 416. University of Chicago Press, Chicago, Illinois). Documented prey items include earthworms (Taylor 1949. Univ. Kansas Sci. Bull. 33:169–215), small amphibians, including *Bolitoglossa rufescens* (Northern Banana Salamander; Scott 1943. Proc. U.S. Nat. Mus. 93:393–504), *Eleutherodactylus* sp. (rainfrogs) and their eggs (Myers 1974. Bull. Amer. Mus. Nat. Hist. Novit. 153:1–262), *Oophaga pumilio* (Strawberry Dart Frog; Lenger et al. 2014. Herpetol. Notes 7:83–84), and the lizard *Ameiva festiva* (Central American Racerunner; Lewis and Grant 2007. Herpetozoa 20:91). Although the eggs of amphibians have been suggested to be commonly consumed by *R. decorata* (Savage 2002. Amphibians and Reptiles of Costa Rica: a Herpetofauna between Two Continents, between Two Seas. University of Chicago Press, Illinois. 934 pp.; Heimes 2016. Herpetofauna Mexicana Volume I: Snakes of Mexico. Edition Chimaira, Frankfurt am Main, Germany. 572 pp.), there are no published accounts documenting such a dietary component for this species beyond two specimens that were reported to contain *Eleutherodactylus* eggs (Myers, *op. cit.*). Here, I present an observation of an adult *R. decorata* feeding on the eggs of *Agalychnis moreletii* (Morelet's Leaf Frog).

On 22 July 2017, at 1526 h, I encountered an adult *R. decorata* at the edge of an artificial pool near the community of Nahá, Municipality of Ocosingo, Chiapas, México (16.98024°N, 91.58507°W, WGS 84; 840 m elev.). The rectangular pool was lined by a stone wall ca. 1 m high. The snake was perched on top of the stone wall and was motionless, presumably aware of my presence. After taking a few photographs, I left the area without disturbing the snake. Five minutes later, I slowly made my way back to the pool in an attempt to observe the snake. I found the snake on top of the stone wall ca. 1 m from where I had originally observed it, in the process of swallowing amphibian eggs. The eggs presumably were taken from a gelatinous mass that was attached to the inner surface of the stone wall 20 cm below the snake's location. This clutch of eggs was deposited by *A. moreletii*, a frog that is known to commonly oviposit on vegetation and stone surfaces by this pool. After swallowing the eggs, the snake began to flick its tongue rapidly while it made its way back to the gelatinous mass. The snake attempted to remove additional eggs from this clutch but quickly gave up, perhaps due to my presence. The snake then crawled down the outer surface of the stone wall and disappeared into the leaf litter, leaving three eggs in the clutch unconsumed. Because clutches of *A. moreletii* eggs, as well as those of other frog species, can be laid at any time of year, amphibian eggs might be a key dietary component for this species during rainy times of the year. However, more foraging observations are needed to determine how important amphibian eggs are in the diet of *R. decorata* generally.

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THAMNOPHIS ELEGANS VAGRANS **(Wandering Gartersnake). MELANISTIC COLORATION.** Ranging from southern Canada to central Arizona and New Mexico, and from the Pacific Coast to the plains of eastern Colorado, *Thamnophis elegans* exists as a number of documented subspecies, including the most widespread form *T. e. vagrans.* Noted for its proclivity for constriction (de Queiroz et al. 2001. J. Herpetol. 35:450–460), which is unusual among natricines, as well as its production of venom causing mild transient local effects in humans (Gomez et al. 1994. Ann. Emerg. Med. 23:1119–1122), this subspecies exists in a number of variable color morphs, ranging from hypo- to hyper-melanistic (Tanner 1950. Herpetologica 6:194–196). Herein we report low levels of hyper-melanism in populations of this species from Cache County, Utah.

Fig. 1. Dorsal view of melanistic adult *Thamnophis elegans vagrans.*

Fig. 2. Ventral view of melanistic adult *Thamnophis elegans vagrans.*

At approximately 1400 h on 15 April 2017, DB examined two adult female *T. e. vagrans* (SVLs = 350, 445 mm; 21, 37 g) in the vicinity of Logan, Utah, USA (41.73549°N, 111.83439°W, WGS 84; 1381 m elev.), where the species is well known and broadly distributed. Both had likely only recently emerged from brumation, but were found to be in good body condition, and were discovered while basking on a relatively cool (approx. 12°C), but sunny day. Both snakes were very dark in coloration, with the striping and checkering pattern, characteristic of this species, greatly reduced. With the exception of light lateral stripes (Fig. 1), the only well-developed patterning was restricted to the anterior end of each animal. The ventral surface of both specimens was solid black (Fig. 2). The above observations are consistent with those from a long-term mark-recapture study, where 2.5% (29 out of 1179) individuals marked at three Cache Valley sites by LNL and AMD over six years were partially or completely melanistic. At one site, 1.18% of females and 6.56% of males were melanistic ($\chi^2 = 7.04$; p-value = 0.008), and at another, 3.26% of females and 0.43% of males were melanistic ($\chi^2 = 4.30$; p-value = 0.038). No χ^2 test was possible at a third site because no melanistic females were captured there (2.31% of males melanistic).

Melanism is likely to be a recessive trait in *Thamnophis sirtalis* (King 2003. Herpetologica 59:484–489), and this could also be the case for *T. elegans.* This trait seems to be well established in these populations. Given the relative thermal lability of this site, and early spring emergence (surface activity was first documented at least as early as 29 March in 2012, 30 March in 2013, 9 March in 2014, 21 March in 2015, and 28 February in 2016; LNL, unpubl. data and HerpMapper [HM] 129229) the prevailing hypothesis regarding melanism and increased thermoregulatory fitness (Trullas et al. 2007. J. Therm. Biol. 32:235–245) may be applicable.

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XENODON GUENTHERI **(Günther's False Fer-de-lance). DEFENSIVE BEHAVIOR.** *Xenodon guentheri* is a dipsadid snake distributed from Paraná State to northeast of Rio Grande do Sul State in Brazil. This species occurs above 600 m and is considered endemic to the Araucaria Forest (Bérnils et al. 2007. Ciênc. Amb. 35:101–136; Abegg et al. 2016. Bol. Soc. Zool. Uruguay 25:2–84). Little is known about its behavior or natural history.

During fieldwork in an area of grassland at São Joaquim National Park (28.9168°S, 49.39418°W; WGS 84), Santa Catarina State, Brazil, on 12 March 2014, we observed a sequence of defensive behaviors of *X. guentheri.* When handled, the individual performed a body-flattening behavior and tail display at the same time. Then, the snake tried to escape and exhibited head triangulation (Fig. 1). These defensive behaviors are known for other species of the genus (Tozetti et al. 2009. Biota Neotrop. 9:157–163; Alves et al. 2013. Salamandra 219–222) and they are common among diurnal species associated with open habitats (Tozetti, *op. cit.*).

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Fig. 1. Defensive repertoire exhibited by *Xenodon guentheri*, including body-flattening, tail display, and head triangulation.

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***XENOPHOLIS UNDULATUS* (Jensen's Groundsnake). DIET.** *Xenopholis undulatus* is a small cryptozoic snake distributed in the South American "diagonal of open formations" (Caatinga, Cerrado, and Gran Chaco; Santos et al. 2012. Ecol. Evol. 2:409–428), but especially in the Cerrado biome in Brazil (Jansen et al. 2009. Zootaxa 2222:31–45; Guedes et al. 2014. Zootaxa 3863:1–93). As for most species that have secretive habits, many aspects of the general biology of *Xenopholis* are poorly known (Jansen et al., *op. cit.*; Pyron et al. 2015. Zookeys 541:109–147). It is known that snakes of this genus have a preference for anurans as prey (Cunha and Nascimento 1978. Mus. Par. Emil. Goeldi. Pub. Avul. 31:1–218; França and Araújo 2007. Braz. J. Biol. 67:33–40; Jansen et al., *op. cit.*). However, until now, only one report of *X. undulatus* feeding on anurans in nature is known (Kokubum and Maciel 2010. Herpetol. Rev. 41:480–481). Here we report additional documentation that *X. undulatus* feeds on frogs in nature.

At ca. 0800 h on 27 December 2005, an adult male *X. undulatus* (SVL = 16.0 cm; tail length = 3.0 cm; 3 g; Fig. 1A) was collected alive on the ground in a forested area close to the Center of Agrarian Sciences of the Federal University of Paraíba, in the municipality of Areia, State of Paraíba, Brazil (6.966916°S, 35.714716°W, SIRGAS-2000; 600 m elev.). When dissected, its stomach contained a frog of the genus *Haddadus* (family Craugastoridae), ingested headfirst. The prey was found in a late stage of digestion and had only the posterior legs preserved (length ca. 5.0 cm; less than 1g; Fig. 1B). *Haddadus* is a genus of common leaf litter frogs that are distributed in the Brazilian Atlantic Forest and some forested enclaves inside the Caatinga, found mainly at dusk and at night, and prey on a variety of arthropods (Hedges et al. 2008. Zootaxa 1737:1–182; Coco et al. 2014. An. Acad. Bras. Ciênc. 86:239–249). Other anurans that live in leaf litter might also be potential prey of *X. undulatus*.

Fig. 1. A) Specimen of *Xenopholis undulatus* (IBSP 89418) collected in the municipality of Areia, Paraíba State, Brazil. B) Specimen of *Haddadus* sp. removed from the stomach of *Xenopholis undulatus*.

Both specimens were deposited in the Herpetological Collection "Alphonse Richard Hoge" at the Butantan Institute (IBSP 89418) and were collected under permission of Brazilian Institute for the Environment and Natural Resources (IBAMA 02021.000075/2006-71). Funding was provided by FAPESP (2013/04170-8 and 2014/18837-7).

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Errata

In the last issue of *Herpetological Review* (2017. 48:862), we reported a field observation of defensive hooding behavior in *Micrurus ibiboboca*. However, the snake was subsequently correctly identified as *Erythrolamprus aesculapii*. Neck-spreading behavior is widespread in some genera of New World snakes including *Erythrolamprus* (Menezes et al. 2015. Herpetol. Notes. 8:291–293). Although documented defensive behaviors of *E. aesculapii* include elevation and dorsoventral compression of the body and neck and body thrashing (Martins and Oliveira 1998. Herpetol. Nat. Hist. 2:78–150; Sazima and Abe 1991. Stud. Neotrop. Fauna Environ. 3:159–164), our observation appears to be the first record of hooding (lateral neck spreading) in this species. The observation occurred in a fragment of Atlantic Forest in National Park Serra de Itabaiana (10.7488°S, 37.3419°W; WGS 84), Sergipe, Brazil. We thank Otavio A. V. Marques for pointing out the correct identification of the snake.

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In a recent natural history note concerning predation of *Python molurus* (Indian Rock Python) by *Spilornis cheela* (Crested Serpent Eagle; Goel et al. 2017. Herpetol. Rev. 48:866–867), we inadvertently interchanged the figure captions. The image in Figure 1A was taken at Ranthambore Tiger Reserve in Rajasthan, and the image in Figure 1B was taken at Dudhwa National Park in Uttar Pradesh.

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