NATURAL HISTORY NOTES

CAUDATA — SALAMANDERS

***ANEIDES AENEUS* (Green Salamander). POST EGG DEPOSITION.** Egg deposition and hatch date have been documented in many states throughout the range of *Aneides aeneus*; however, a better understanding of geographic variation within this species requires more data from other areas. At 1000 h on 29 August 2017, we found three *A. aeneus* egg masses, approximately 30 cm apart from one another in a rock crevice within Mountain Bridge Wilderness Area, Greenville County, South Carolina, USA (precise locality withheld due to conservation concerns). Each egg mass was guarded by a brooding female *A. aeneus* (Fig. 1). Little is known about breeding habits of *A. aeneus* in South Carolina, and communal nesting behavior in *A. aeneus* has only been documented once (Gordon 1952. Am. Midl. Nat. 47:666–701). In the same crevice at 1100 h on 10 October 2017 (presumably the hatch date), we found five *A. aeneus* neonates (several of which were upside down). At 1200 h on 20 December 2017, we found one *A. aeneus* neonate climbing ~2 m up a dead beech tree sapling located ~2 m from the same rock outcrop. Neonates have been seen on trees in association with tree-nesting (Waldron and Humphries 2005. J. Herpetol. 39:486–292); however, we believe this observation may represent dispersal away from the rock outcrop, as described by Gordon (1952, *op. cit.*).

In West Virginia and North Carolina, *A. aeneus* deposit eggs in June and eggs hatch late August through September (Snyder 1971. Ph.D. dissertation, University of Notre Dame, South Bend, Indiana. 140 pp.; Canterbury and Pauley 1994. J. Herpetol. 28:431–434). In Kentucky and Mississippi, *A. aeneus* deposit eggs in mid to late July and eggs hatch 70–80 days later (Woods 1969. Ph.D. dissertation, University of Southern Mississippi, Hattiesburg, Mississippi.182 pp.; Cupp 1991. J. Tennessee Acad. Sci. 66:171–174). In South Carolina, *A. aeneus* appear to exhibit reproductive timing similar to *A. aeneus* in Kentucky and Mississippi (as eggs were first observed in late August and hatched in October). To our knowledge, these are the first nesting and developmental data for this rare species in South Carolina.

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Fig. 1. One of the three *Aneides aeneus* egg clutches guarded by a female salamander in the brooding crevice.

***NOTOPHTHALMUS VIRIDESCENS* (Eastern Newt). DIET.** The diet of *Notophthalmus viridescens* consists primarily of terrestrial and aquatic invertebrates (MacNamara 1977. Herpetologica 33:127–132; Petranka 1998. Salamanders of the United States and Canada. Smithsonian Press, Washington, D.C. 587 pp.; Bliss et al. 2015. Herpetol. Rev. 46:609). Additionally, *N. viridescens* has been reported to consume vertebrate prey such as small fish, the eggs and larvae of amphibians (Petranka 1998, *op. cit.*), and carrion (Carlson 2014. Herpetol. Rev. 45:475). At 1600 h on 30 March 2018, I observed an adult *N. viridescens* consume a portion of an *Ambystoma maculatum* (Spotted Salamander) spermatophore within a vernal pool in Columbia County, Pennsylvania, USA (41.24040°N, 76.37049°W; WGS 84). Upon initial observation, the *N. viridescens* was within a shallow section of the vernal pool in which approximately 50 *A. maculatum* spermatophores had been deposited. The *N. viridescens* held the spermatophore in its mouth, and with a series of sharp, lateral jerking movements broke off and consumed a small portion of the spermatophore. This process was observed two more times during approximately five minutes of observation. The eggs and larvae of vernal pool-breeding amphibians may form an important, seasonal component of the diet of *N. viridescens* (Pitt et al. 2011. Herpetol. Rev. 42:263). This observation suggests the spermatophores of pond-breeding ambystomid salamanders might also be a seasonal component of the diet of *N. viridescens.*

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***OEDIPINA ELONGATA* (White-crowned Worm Salamander). ARBOREAL BEHAVIOR.** *Oedipina elongata* is a least concern species of worm salamander that occurs in tropical and subtropical wet forest of northern Chiapas, México, central and southern Belize, central and eastern Guatemala, and northwestern Honduras (Parra-Olea et al. 2008. http://www.iucnredlist.org/details/59312/0; 15 Jul 2018). At 2000 h on 20 October 2017, a subadult *O. elongata* was found on the leaf of a

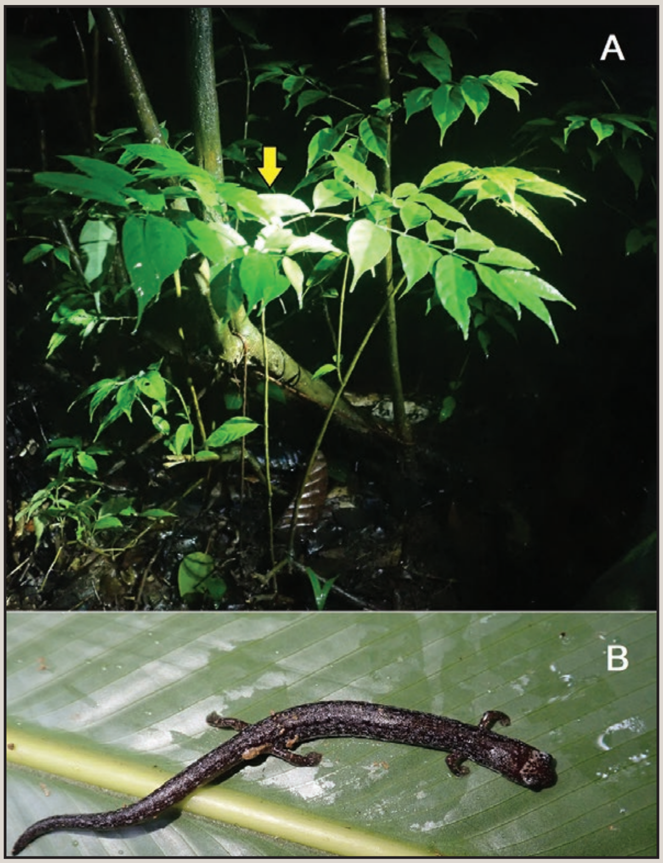

Fig. 1. *Oedipina elongata* arboreal behavior: A) location where the subadult *O. elongata* was found resting marked by the yellow arrow; B) *O. elongata* the day following the observation, posed for a photo on the plant.

plant (Piperaceae) approximately 1 m above the ground (Fig. 1) along a stream within the Cerro San Gil, Izabal, Guatemala (15.69056°N, 88.65269°W, WGS 84; 305 m elev.). This species is generally associated with moist microhabitats where there are abundant logs on the ground, and it is typically found in the channels of fallen logs, old termite nests on the ground, in leaf litter, in holes, and in tree stumps (Campbell 1998. Amphibians and Reptiles of Northern Guatemala, the Yucatán, and Belize. University of Oklahoma Press, Norman, Oklahoma. 400 pp.; Parra-Olea et al. 2008, *op. cit.*). Arboreal behavior in this species was reported by Townsend et al. (2006. Salamandra 42:61–62) in Honduras, where an adult *O. elongata* was found crawling on a broken branch within a log pile approximately 1 m above the ground; however, the authors suggested that the salamander could have been dislodged from one of the logs that they collected to make a wood fire, or to avoid the smoke and heat that their campfire radiated.

Arboreal behavior in other *Oedipina* is reported for *O. poelzi*, *O. pseudouniformis*, and *O. uniformis* (Brame 1963. Nat. Hist. Mus. Los Angeles Co. 65:3–12; Brame 1968. J. Herpetol. 2:2–64) but this is the first report of arboreal behavior without direct human intervention in *O. elongata*. This species may use the surface tension to climb to branches rather than specialized limbs and feet like arboreal salamanders (Wake 1987. Ann. Missouri Bot. Gard. 74:242–264). Facultative climbing *O. elongata* may be in response to variation in the availability of leaf litter versus arboreal prey (increased foraging potential), to increase detection of olfactory cues (increased chemosensory information), or to shelter in moss mats (McEntire 2016. Copeia 104:124–131).

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PLETHODON CINEREUS **(Eastern Red-backed Salamander). FLUORESCENCE.** Natural fluorescence is rare in terrestrial systems, and it has only been recently documented in amphibians (Taboada et al. 2017. Proc. Natl. Acad. Sci. 114:3672–3677). Between September and November of 2014, using a black light, I documented 45 individual salamanders exhibiting natural fluorescence during mark-recapture surveys. Five individuals were from one population in Centre County, Pennsylvania, USA (40.85670°N, 78.08580°W; WGS84), and the other 40 individuals were from Union County, Pennsylvania, USA (40.85570°N, 77.25500°W; WGS84), approximately 165 km away. Fluorescence occurred predominantly on the ventral side of the tail and around the cloaca, and they appeared as several dozen yellow-green dots (Fig. 1). Of the 45 fluorescent individuals caught, 33 were male and 12 were female. Of the total salamanders captured from that season, 18% of Union County and 6% of Centre County animals had fluorescent tails.

Animals were being marked using visual implant elastomer, an artificial fluorescent compound (see Muñoz et al. 2016. J. Herpetol. 50:570–581). Initially the tail markings were thought to

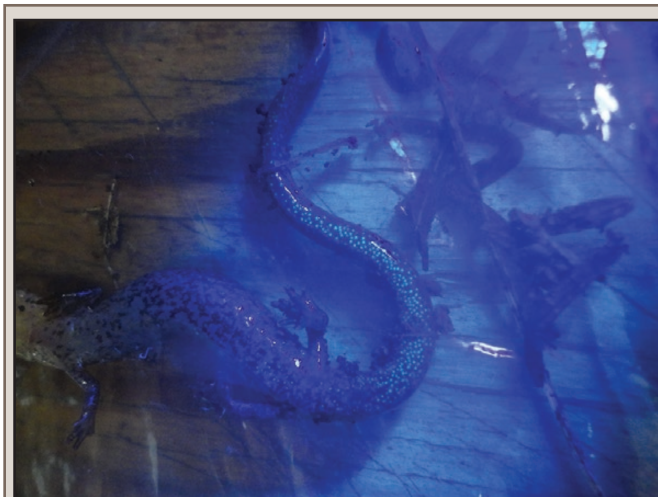

Fig. 1. A ventral view and the use of a common black light reveal several dozen fluorescent yellow-green markings on *Plethodon cinereus.*

be defective elastomer marks. Several pieces of evidence rule this out. Elastomer marks never break uniformly or into more than one or two small pieces, and no elastomer marks were given near the tail. Twenty-eight salamanders were previously marked with elastomer, but 24 of them did not have marks containing yellow elastomer—the only color that could have been confused with the natural fluorescence. Lastly, 17 of the individuals had never been previously marked and showed no evidence of marking (poorly injected marks still leave evidence at site of injection).

In treefrogs under twilight and nighttime light levels, fluorescence increased emergent light levels by 18–29%, and the extra light is hypothesized to aid treefrog vision (Taboada et al. 2017, *op. cit.*). Because salamander eyes are sensitive to green light (Chen et al. 2008. J. Photochem. Photobiol. 64:855–862), the compounds may be a similar adaptation to improve night vision (or subterranean vision), enabling enhanced vision of the surroundings or increased visibility of other salamanders. However, it is not known whether these compounds are generated by the salamander or are a byproduct of diet or infection. It is also unknown under what natural light conditions they fluoresce. Future lines of research should discern the source of the compounds and how common fluorescence is within the species. Even if this fluorescence is not important ecologically or evolutionarily, other scientists who use fluorescent marking techniques on salamanders should be aware that naturally fluorescent compounds can possibly create confusion.

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***PLETHODON YONAHLOSSEE* (Yonahlossee Salamander) and *PLETHODON GLUTINOSUS* (Slimy Salamander). INTERSPECIFIC COURTSHIP.** Courtship behaviors in intraspecific pairings of plethodontid salamanders have been well documented, though most of these observations have been made under laboratory settings (Pierson et al. 2017. Herpetol. Conserv. Biol. 12:1–15). In most plethodontids, courtship typically consists of various stages, beginning with the initiation of a behavior referred to as the tail-straddling walk, where a female follows a male while straddling his tail as it undulates and arches, until eventually he deposits a spermatophore which she collects into her oviduct (Arnold 1976. Ethology 42:247–300). Courtship can be disrupted and discontinued at any stage throughout this process.

Fig. 1. Courtship displays observed between *Plethodon yonahlossee* and *P. glutinosus*.

At approximately 2200 h on 22 September 2017, in Mitchell County, North Carolina, USA (36.09992°N, 82.28192°W, WGS 84; 930 m elev.), we observed courtship behavior involving the tail-straddling walk between a female *Plethodon yonahlossee* and a male *P. glutinosus* (Fig. 1; Video available at: https://youtu.be/3S8Ksosdoq4). Further, the male *P. glutinosus* appears to be in the "stationary with tail flexed" stage (described in Pierson et al. 2017, *op. cit.*), which is beyond the point at which most interspecific pairings often break down in a laboratory setting (Dawley 1986. Herpetologica 42:156–164; Kozak 2003. Southeast. Nat. 2:281–292). In Smyth County, Virginia, these species have been observed sympatrically, along with "probable" hybrid offspring, however this observation was not verified with genetic testing (Highton and Peabody 2000. *In* Bruce et al. [eds.], The Biology of Plethodontid Salamanders, pp. 31–93. Kluwer Academic/Plenum Publishers, New York).

To my knowledge, this is the first recorded occurrence of this interspecific pairing engaging in courtship behaviors, and could be indicative of potential hybridization between these species.

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ANURA — FROGS

***ALLOBATES FEMORALIS* (Pan-Amazonian Frog). ENDOPARASITES.** *Allobates femoralis* is a widely distributed frog in South America (Bárrio-Amoros et al. 2010. Check List 6:208–209). This species has diurnal and terrestrial habits and is commonly found in foliage (Simões et al. 2010. Zootaxa 2406:1–28). In the Neotropical region, the only species of helminths reported parasitizing frogs of the genus *Allobates* are *Cosmocerca podicipinus* in *A. femoralis* and *Cylindrotaenia americana* and *Physaloptera* sp. in *A. marchesianus* from Peru (Campião et al. 2014. Zootaxa 3893:1–93). In the present note, we provide a new host record for nematodes of the genus *Rhabdias.*

On 21 April 2017, a single specimen of *A. femoralis* was collected in the Cancão Municipal Natural Park, about 400 m E of the Amapari River and 2.5 km NW of the village of Pedra Preta, Municipality of Serra do Navio, Amapá, Brazil (0.90083°N, 52.01347°W; WGS84). As part of an unrelated study, the frog was dissected and examined for the presence of parasites. We found three nematodes infecting the lungs of the host and the helminths were fixed in 70% hot ethanol and cleared in Aman's lactophenol for light microscopic observation. The helminths collected in the lungs of *A. femoralis* were assigned to the genus *Rhabdias*, based on their morphology, site of infection, and known parasitism in anurans. Neither the frog nor the nematodes were deposited in a museum collection.

A study conducted by Kuzmin et al. (2016. Folia Parasitol. 63:015) reports *Rhabdias galactonoti* parasitizing the lungs of *Adelphobates galactonotus*, a dendrobatid frog, however, this study presents the first report of nematodes of the genus *Rhabdias* infecting anurans of the family Aromobatidae and for *Allobates femoralis* in the eastern Amazon.

Instituto Chico Mendes de Conservação da Biodiversidade granted permission to collect under license SISBIO #48102-2.

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***ANAXYRUS BOREAS* (Western Toad). HABITAT.** The vast majority of natural history data on *Anaxyrus boreas* is from inland and high elevation populations with little reference to coastal populations (Dodd 2013. Frogs of the United States and Canada. The John Hopkins University Press, Baltimore, Maryland. 460 pp.). Terrestrial habitat use by juvenile *A. boreas* is also poorly documented but this life stage is suspected to use wetland habitats during summer months in contrast to damp terrestrial or subterranean habitats used by adults (Muths and Nanjappa 2005. *In* Lannoo [ed.], Amphibian Declines: the Conservation Status of United States Species, pp. 392–396. University of California Press, Berkeley, California). Some of the terrestrial microhabitat cover reported in the Pacific Northwest includes logs, stumps, vegetation, loose soil, and rodent burrows (Olson 2005. *In* Jones et al. [eds.], Amphibians of the Pacific Northwest, pp. 162–165. Seattle Audubon Society, Seattle, Washington.). Here we report an observation of *A. boreas* in a Coastal Redwood (*Sequoia sempervirens*) forest utilizing an arboreal habitat.

At 1400 h on 8 August 2017, while searching cracks and crevices of old-growth redwood log cut-ends along a trail in the Lady Bird Johnson Grove, Redwood National Park, Humboldt County, California, USA (41.30342°N, 124.01813°W; WGS 84), we observed a juvenile (SVL ca. 30 mm) *A. boreas*. The log was located along a ridge, ca. 0.89 km to the nearest perennial stream. The toad was located at the opening of a crevice (opening: height = 20 mm, width = 45 mm, and depth ca. 280 mm). The crevice was 1.71 m above the ground and was the highest horizontal cavity on a 1.27-m diameter *S. sempervirens* log. The opening of the cavity was dry compared to the damp interior. Access to this microhabitat would have required the toad to climb. The toad presumably used the opening as a foraging site and demonstrated it provided suitable refuge habitat as it retreated from the opening and wedged itself into a narrow corner of the crevice while we inspected the dimensions of the cavity. This observation provides an example of an alternative above-ground summer foraging and refuge habitat for juvenile *A. boreas* in coastal old growth *S. sempervirens* forests compared to the subterranean habitats and cover types more commonly reported for the species elsewhere in the range.

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***DENDROBATES TRUNCATUS* (Yellow-striped Poison Frog). MALE PARENTAL CARE.** *Dendrobates truncatus* is a diurnal endemic Colombian species that occurs throughout the Caribbean lowlands of Colombia, towards the Magdalena River drainage, inhabiting both wet and seasonally dry forests from 70–120 m elev (Gualdrón-Duarte et al. 2016. *In* Kahn et al. [eds.], Aposematic Poison Frogs [Dendrobatidae] of the Andean Countries: Bolivia, Colombia, Ecuador, Perú and Venezuela, pp. 323–328. Conservation International, Arlington, Texas). Gualdrón-Duarte et al. 2016 (*op. cit.*) describe this species as reproducing year round but exhibiting a peak during the dry season. Females lay 1–8 eggs in the leaf litter on the ground or inside phytotelmata, and in captivity the species breeds inside artificial crevices provided by photographic film containers (Londoño and Tovar 2008. Int. Zoo. Yb. 42:71–77, Guayara-Barragan and Bernal 2012. Caldasia 34:483–496). In species of *Dendrobates*, tadpoles are transported by the male and deposited in forest pools or phytotelmata, where they fully develop without further parental care (Summers et al. 1999. Herpetologica 55:254–270). Observations of a closely related species (*D. auratus*) show that males carry tadpoles to water individually (Wells 1978. Herpetologica 34:148–155). The use of vertical microhabitats for breeding by *D. truncatus*, and the number of tadpoles a male can carry have not been previously reported.

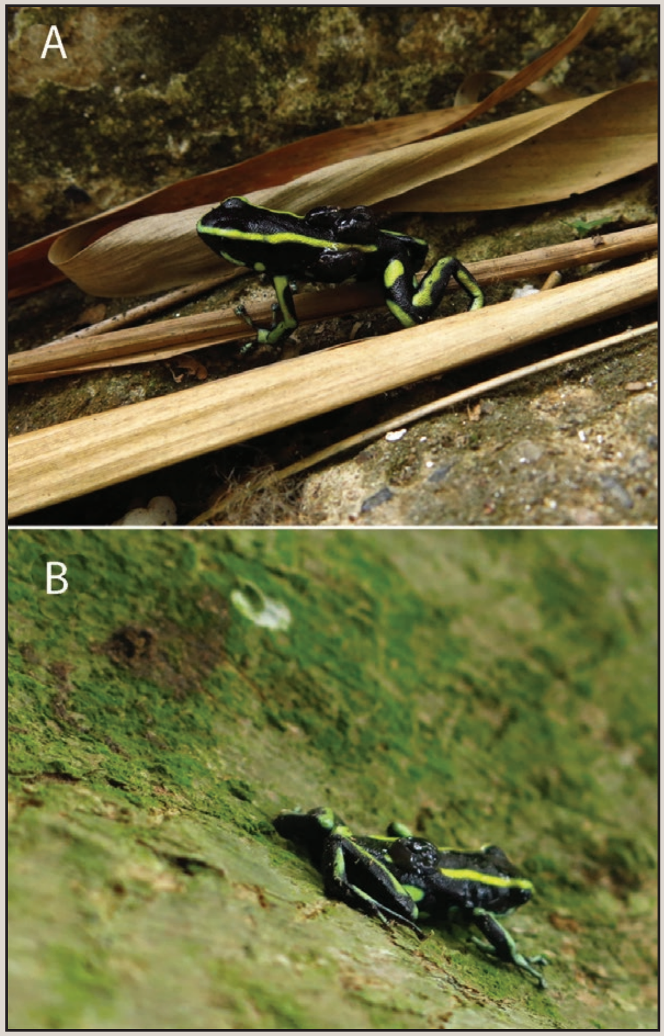

Fig. 1. Male *Dendrobates truncatus* carrying tadpoles at Jardín Botánico de Cartagena, Turbaco Bolívar, Colombia during May 2015; A) male carrying three tadpoles on its back; B) male carrying a single tadpole on its back.

During May 2015, biologist Mauricio Bernal photographed two different males carrying one and three tadpoles on their backs; these males were observed during morning hours while being active on the forest floor (Fig. 1). An additional adult male *D. truncatus* was also photographed on 5 May 2015 at Jardín

PHOTOS BY MAURICIO BERNAL

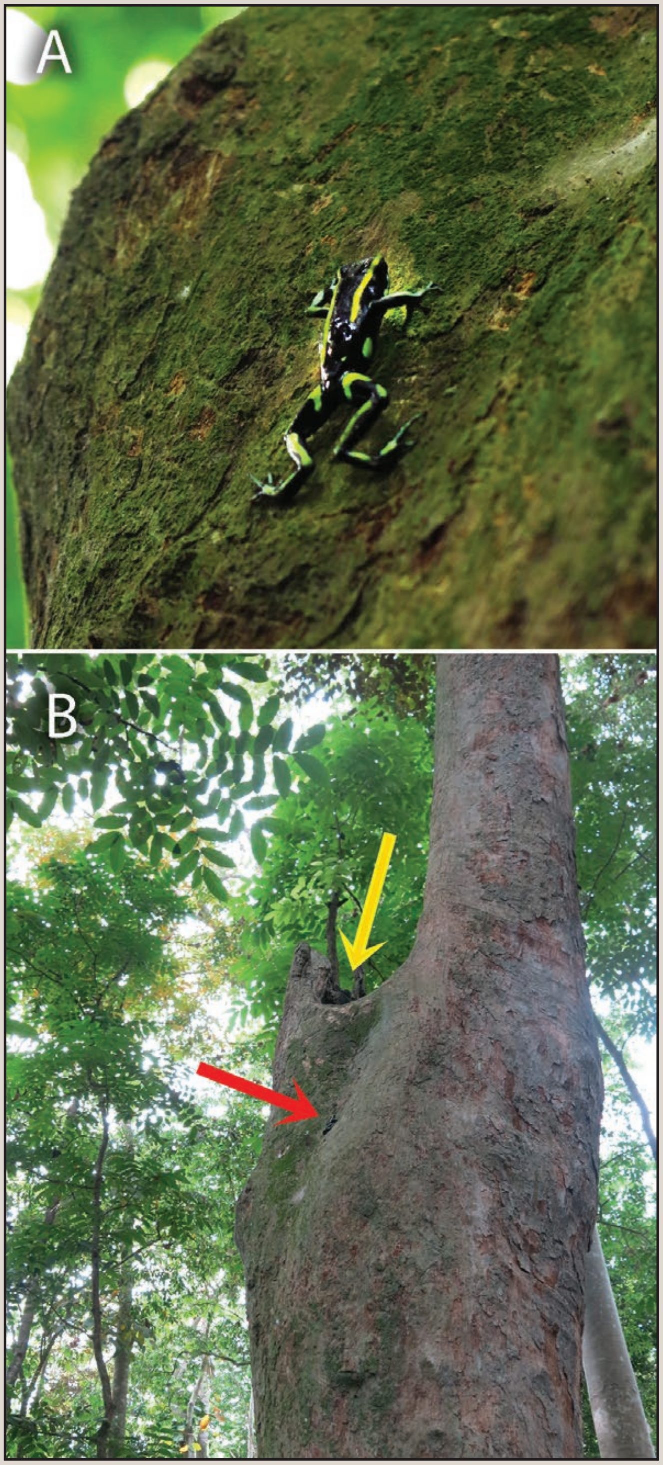

Fig. 2. A) Male *Dendrobates truncatus* climbing up a tree (*Brosimum alicastrum*) carrying a single tadpole; B) red arrow shows the male ascending the tree; yellow arrow shows the location of the pool inside the tree hole. Jardín Botánico de Cartagena, Turbaco Bolívar, Colombia, May 2015.

Botánico de Cartagena, Turbaco, Bolívar, Colombia (10.35447°N, 75.42803°W, WGS 84; 133 m elev). The frog was observed climbing the vertical surface of a Guaimaro (Breadnut) Tree (*Brosimum alicastrum*), carrying a single tadpole on its back (Fig. 2A). The tadpole was deposited in a small pool located inside a tree hole, 4 m above ground (Fig. 2B). Tadpoles from this species were also observed at this locality living in pools that formed inside holes on the buttress of *Ficus* trees, a few centimeters above ground. These observations suggest that the species may use a wide spectrum of vertical microhabitats to breed in, including small pools formed inside tree holes that are located several meters above ground. These microhabitats may play an important role in seasonally dry tropical forests, as they maintain a stable environment for the developing larvae.

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***DUTTAPHRYNUS MELANOSTICTUS* (Asian Common Toad) and *RHACOPHORUS DENNYSI* (Chinese Flying Frog). HETEROSPECIFIC AMPLEXUS.** Heterospecific amplexus in anurans is well known (Marco and Lizana 2002. Ethol. Ecol. Evol. 14:1–8). The behavior has been suggested to arise due to a lack of available females for male anurans, such that they will engage in amplexus with almost anything, from dead conspecifics (Ayers 2010. Herpetol. Rev. 41:192–193), to the fingers of human observers, to inanimate objects (Streicher 2008. Herpetol. Rev. 39:75). There has been documentation of *Duttaphrynus melanostictus* being amplexed by another species (Reilly et al. 2016. Herpetol. Rev. 47:114), but this is the first record of *D. melanostictus* amplexing another species. Here we report on the case of heterospecific amplexus by *D. melanostictus* on *Rhacophorus dennysi.*

At 1438 h on 6 April 2016, a male *D. melanostictus* was observed engaging in axillary amplexus with a *Rhacophorus dennysi* (Fig. 1) of undetermined sex in Duijiang village, northwestern Guangxi province, China (25.32818°N, 110.27071°E, WGS84; 164 m elev.). Though both species are primarily nocturnal, during the breeding season *D. melanostictus* will continue calling and breeding throughout the daytime (pers. obs). However, *R. dennysi* is usually hidden in the daytime. One possible explanation for finding this pair in mid-day is that the *D. melanostictus* was not releasing its grip on the *R. dennysi* and was impairing its movement to a daytime refuge. Interspecific amplexus can lead to impairment and even death in some cases (Cheong et al. 2008. Anim. Cells Syst. 12:93–96). The pair was found at the base of a small karst mountain on the outskirts of an agricultural farm.

A photographic voucher of the behavior was deposited with HerpMapper.org (HM 151097 and 151098, http://www.herpmapper.org/record/151097).

Fig. 1. Male *Duttaphrynus melanostictus* amplexing *Rhacophorus dennysi* in northwestern Guangxi, China.

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***ELACHISTOCLEIS CESARII* (Oval Frog). DEFENSIVE BEHAVIOR.** Frogs present several strategies to avoid predation (Duellman and Trueb 1994. Biology of Amphibians. The John Hopkins University Press, Baltimore, Maryland. 670 pp.). One of these defensive strategies, known as "body-tilting" consists of inflating and tilting the body toward the predator displaying its glands, cutaneous secretions, or aposematic coloration (Toledo et al. 2011. Ethol. Ecol. Evol. 23:1–25). For the genus *Elachistocleis*, this behavior was previously observed in *E. erythrogaster* (Kwet and Solé 2002. Herpetol. Rev. 33:45) and *E. ovalis* (Kokubum and Menin 2002. Herpetol. Rev. 33:198). We report here for the first time body tilting defensive behavior performed by *E. cesarii*, a species native to Brazil (Caramaschi 2010. Bol. Mus. Nac. Rio de Janeiro. 527:1–30). Around 2200 h in August 2014, in the municipality of Guapó, Goiás, Brazil (16.87596°S, 49.45314°W, WGS 84; 1021m elev.), an individual of *E. cesarii* was found vocalizing in a swampy environment associated with a Cerrado phytophysiognomy known as "Vereda." After manipulation the frog inflated and elevated its body exposing its inguinal and femoral characteristic coloration (Fig. 1). The individual remained inflated and elevated for approximately two minutes. We also observed that the individual shifted its position as we moved, and thus oriented the display in our direction.

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Fig. 1. Defensive behavior of *Elachistocleis cesarii* recorded in the municipality of Guapó, Goiás State, Brazil.

***FEIHYLA HANSENAE* (Hansen's Bush Frog). MULTIMALE AMPLEXUS.** *Feihyla hansenae* (Rhacophoridae) is a nocturnal treefrog that breeds in temporary ponds in Thailand and parts of Cambodia during the rainy season (Taylor 1962. Univ. Kansas Sci. Bull. 43:526–529; Aowphol et al. 2013. Zootaxa 3702:101–123). Males attract females by calling from emergent vegetation or vegetation at the edge of the pond. After forming an amplectic pair, females will move around the vicinity and select the final location for oviposition (S. Poo, pers. obs.). Eggs are deposited in hemispherical gelatinous masses attached to vegetation overhanging the pond. Once the last egg is laid, males leave, while females remain, finish constructing the egg mass, and provide parental care by maintaining egg hydration (Poo and Bickford 2013. Ethology 119:671–679) and deterring egg predators (Poo et al. 2016. Biol. J. Linn. Soc. 118:901–910) until the eggs hatch and fall into the pond below. Here we report the first record of multiple males forming an amplectic group with a single female in this species.

On 18 September 2015 between 2100 and 2200 h, we observed four *F. hansenae* males attempting to mate with one *F. hansenae* female (Fig. 1) at a seasonal pond at the Sakaerat Environmental Research Station in northeastern Thailand (14.5090°N, 101.9537°E; WGS 84). When first observed, the female was in the process of laying eggs and constructing the gelatinous egg mass, with eggs visible both in the female's abdomen and on the grass blade beneath the female's vent. Of the four males, one male (Male 1) was in the normal, axillary amplectic position with the female, holding on to the female's dorsum (Fig. 1). The second male (Male 2) was positioned to the right dorsolateral side of Male 1 (Fig. 1). The third male (Male 3) was positioned dorsal inferiorly to Male 1 (Fig. 1). Finally, the fourth male (Male 4) was positioned laterally to the left of Male 1 and had all four limbs extended to wrap around the female, Male 1, and Male 3 (Fig. 1). Vents of all males were positioned in close proximity to the vent of the female, and the female continued to lay eggs and construct the egg mass by kicking up gel and foam with her hindlimbs. Males made slight movements with their limbs and body without changing their relative position to each other within the amplectic group. Seven minutes after observation started, Male 4 left the group by moving to the opposite side of the grass blade (relative to the female) for one minute, then jumping away (all observations rounded to the nearest minute). Similarly, one minute later, Male 3 moved to the opposite side of the grass blade, paused for one minute, and then jumped away. After Male 3 left, Male 2 repositioned itself to the dorsal side of Male 1, forming amplexus with Male 1. Male 1 and Male 2 maintained their positions until the last egg was laid. Eight minutes later, both Male 1 and Male 2 exited amplexus and moved to the opposite side of the grass. Male 1 paused for two minutes before jumping away, while Male 2 stayed for another minute before jumping away. The female remained at the oviposition site and continued to construct the egg mass with its hindlimbs.

We observed another multimale amplectic group nearby (~3 m away) at the same time, with two males attempting to mate with one female. One male was in the normal, axillary amplectic position with the female and was using its hindlimbs to kick or

FIG. 1. Female *Feihyla hansenae* laying eggs while in amplexus with four males.

push the second male away. The second male was positioned laterally to the amplectic pair with one arm on the female and another on the side of the grass blade. The vents of both males were positioned in close proximity to the female vent, and the female was in the process of laying its eggs. No further observations were made for this amplectic group.

Our observations of multimale amplexus occurred in a year where the onset of rainfall and accumulation of pond water was delayed in comparison to past years. At the time our observations were made (mid-September), water depth in the pond was less than 0.5 m compared to the average of 2.5 m in 2010–2013 (range = 1–5 m). The delay in heavy rain may have increased pressures on males to secure mates before the end of the breeding season. In comparison, multimale amplexus was not observed in over 200 night surveys performed in July–Oct from 2010 to 2013. To our knowledge, this is the first report of multimale amplexus in an arboreal-breeding species with a gelatinous egg clutch. Polyandrous behavior has been observed in the congeneric foam-nesting species *C. xerampelina* and *C. rufescens* (Coe 1974. J. Zool. 172:13–34; Jennions et al. 1992. Anim. Behav. 44:1091–1100), and in two other foam-nesting genera, *Polypedates*, and *Rhacophorus*, within the Rhacophoridae (Jennions and Passmore 1993. Biol. J. Linn. Soc. 50:211–220). In comparison, multimale amplexus appears to be more common in African rhacophorids compared to their Asian counterparts.

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***LITHOBATES CATESBEIANUS* (American Bullfrog). DIET.** *Lithobates catesbeianus* is highly aquatic and occurs across North America in many types of mesic habitats (Bury and Whelan 1984. USFWS Resource Publication 155:1–26; Dodd 2013. Frogs of the United States and Canada, Volume 2. The Johns Hopkins University Press, Baltimore, Maryland. 982 pp.). Numerous studies have examined the diet of *L. catesbeianus*, which includes many invertebrate and vertebrate species. Herpetofauna in the diet includes salamanders, lizards, frogs, and a few snakes. At least seven species of snakes are known in the diet of *L. catesbeianus*: *Crotalus atrox*, *Lampropeltis getula*, *Rena dulcis*, *Micrurus fulvius*, *Nerodia* sp., *Thamnophis eques*, and *T. sauritus*; Dodd 2013, *op. cit.*). Prey size often is proportional to body size (Bruneau and Magnin 1980. Can. J. Zool. 58:175–183), so adult bullfrogs consume a larger variety of prey items of greater sizes.

Here, we report the first record of *L. catesbeianus* consuming a *Pituophis catenifer sayi* (Bullsnake). An adult *L. catesbeianus* (ca. 16.5 cm SVL) was captured in late August or early September 2015 on Hackberry Lake, Valentine National Wildlife Refuge, Cherry County, Nebraska (42.56153°N, 100.67891°W; WGS 84). A dietary study of *L. catesbeianus* from the refuge did not document snakes in the diet (Lingenfelter et al. 2014. J. N. Am. Herpetol. 2014:81–86). *Pituophis catenifer sayi* is distributed largely west of the Mississippi River from southern Alberta and Saskatchewan into Mexico and west of the Rocky Mountains (Ernst and Ernst 2003. Snakes of the United States and Canada. Smithsonian Books, Washington, D.C. 668 pp.). The total length of the predated *P. c. sayi* was ca. 40 cm, a size corresponding to a hatchling. Known predators of this snake species include mid-sized mammals and predatory birds, but previously, no species of frog has been documented to predate *P. catenifer* (Ernst and Ernst 2003, *op. cit.*).

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***LITHOBATES SYLVATICUS* (Wood Frog). PREDATION.** *Lithobates sylvaticus* has the most extensive native range of any North American anuran and is common throughout this range (Martof and Humphries 1959. Am. Midl. Nat. 61:350–389). Typical avian predators of adult *L. sylvaticus* include wading birds, raptors, and ducks (Dodd Jr. 2013. Frogs of the United States and Canada Vol. 2. John Hopkins University Press, Baltimore, Maryland. 982 pp.). In June 2014 we witnessed an adult *Sterna paradisaea* (Arctic Tern) circling overhead and diving into a shallow, ephemeral wetland in the tundra and emerging with a single *L. sylvaticus* individual in its beak before flying away. This event occurred in Churchill, Manitoba, Canada, just a few kilometers inland from Hudson Bay (58.72919°N, 93.76882°W; WGS 84). This is the first record of *S. paradisaea*, a seabird, reported as predator of *L. sylvaticus*.

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OSTEOCEPHALUS TAURINUS **(Slender-legged Treefrog). ENDOPARASITES.** *Osteocephalus taurinus* is widely distributed in Brazil, Suriname, Guiana, and French Guiana (Lima et al. 2005. Guide to the Frogs of Reserva Adolpho Ducke, Central Amazonia. Atema Design Editorial, Manaus, Brazil. 168 pp.). In the Neotropical region, helminths reported parasitizing *Osteocephalus taurinus* are: *Ochoterenella vellardi*, *Physalopteroides venancioi*, *Polystoma naponensis*, *Kentropyxia hylae*, and *Parapharyngodon politoedi* (Campião et al. 2014. Zootaxa 3893:1–93; Feitosa et al. 2015. Syst. Parasitol. 92:251–259; Santos et al. 2018. J. Helminthol. :1–6; doi:10.1017/S0022149X18000093). In the present study, we provide a new host record for nematodes of the genus *Rhabdias*.

Three specimens of *O. taurinus* were collected in the Cancão Municipal Natural Park, on the right bank of the Amapari River, Serra do Navio municipality, Amapá, Brazil (0.90083°N, 52.01347°W; WGS 84), during a survey of amphibians and reptiles and their associated parasites conducted in March 2018 (collecting permit SISBIO/ICMBio #48102-2). We found one specimen of nematode infecting the lungs of one *O. taurinus*. The nematode was rinsed in saline and fixed in 70% hot ethanol. For morphological analysis, the nematode was cleared with Aman's lactophenol for light microscopic observation. The helminth collected in the lungs of *O. taurinus* is assigned to the genus *Rhabdias*, based on its morphology (presence of a body covered by a cuticular inflation, esophagus claviform, with a buccal capsule, intestines filled with a dark content), site of infection, and known parasitism in anurans. Neither the frog nor the nematode were deposited in a museum. This study presents the first report of these nematodes infecting frogs of the genus *Osteocephalus*.

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PELOPHYLAX SHQIPERICUS **(Albanian Pool Frog). ENDOPARASITE.** *Pelophylax shqipericus* is a ranid frog distributed from Skadar Lake in Montenegro to coastal regions of central Albania (Speybroeck et al. 2016. Field Guide to the Amphibians and Reptiles of Britain and Europe. Bloomsbury Natural, London, UK. 432 pp.). Little is known about its natural history and ecology (Uzzell and Crnobrnja-Isailovi 2009. http://www.iucnredlist.org/details/58715/0; 10 May 2018). In this note we report for the first time the occurrence of a helminth parasite in *P. shqipericus*. A parasitized frog was found among the 50 *P. shqipericus* individuals (males, females, and juveniles) sampled at a single locality: Nishaj (41.69°N, 19.59°E; WGS84), Lezhë district, northwestern Albania, on 26 April 2017. The frogs were assigned to the species on the basis of their morphological traits (Günther 1990. Die Wasserfrösche Europas. Die Neue Brehm-Bücherei, A. Ziemsen Verlag, Wittenberg Lutherstadt, Germany. 288 pp.; Plötner 2005. Die westpaläarktischen Wasserfrösche. Laurenti-Verlag, Bielefeld, Germany. 160 pp.).

A helminth was expelled from the cloaca of an adult *P. shqipericus* male during handling and was subsequently stored in 70% ethanol and shipped to CRB for identification. On the basis of its morphology (female; length 35 mm; body almost cylindrical, with slight widening toward anterior end; proboscis with 16 longitudinal rows of 5 hooks; eggs thin, fusiform, 0.13 mm in length, middle membrane of egg forming long, narrow protrusions at poles), the helminth was identified as *Acanthocephalus ranae* (Schrank, 1788) Lühe, 1911, Acanthocephala, Echinorhynchidae. The specimen is deposited in the Harold W. Manter Parasitology Laboratory, University of Nebraska, Lincoln, Nebraska, USA, as HWML 110367. *Acanthocephalus ranae* is a widely distributed species parasitizing the small and large intestines in European amphibians (Yildirimhan et al. 2006. Comp. Parasitol. 73:237–248), including water frogs (Günther 1990, *op. cit.*). *Pelopyhalax shqipericus* represents a new host for this parasite.

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PHILAUTUS PETERSI **(Peters' Bush Frog). ENDOPARASITES.** *Philautus petersi* is an upland forest inhabiting species that occurs in central Peninsular Malaysia and is found throughout Borneo (Grismer 2011. Amphibians and Reptiles of the Seribuat Archipelago [Peninsular Malaysia]—A Field Guide. Edition Chimaira, Frankfurt am Main. 239 pp.). We know of no published reports of helminths in *P. petersi*. In our note we report the presence of one cestode and three species of Nematoda, thereby establishing the helminth list for this rhacophorid frog.

Eight *P. petersi* (mean SVL = 24.0 mm ± 6.8 SD, range = 17–36 mm) were collected by hand during 2004–2011 from Peninsular Malaysia and deposited in the herpetological collection (LSUHC) of La Sierra University, Riverside, California, USA and examined for helminths. By state, they were: Kedah (LSUHC 10475), Pahang (LSUHC 6124, 8363, 9104, 10250, 10663, 10698), Perak (LSUHC 9720). The frogs were euthanized by soaking in Tricaine Methanesulfonate, fixed in neutral-buffered 10% formalin, and stored in 70% ethanol. The body cavity was opened by a longitudinal incision and the digestive tract was removed and opened. The esophagus, stomach, and small and large intestine were examined for helminths under a dissecting microscope. Helminths were placed on a glass slide in a drop of lactophenol, a cover slip was added, and identification was made from these temporary wet mounts. Identifications of nematodes were made utilizing Anderson et al. (2009. Keys to the Nematode Parasites of Vertebrates, Archival Volume. CAB International, Wallingford, Oxfordshire. 463 pp.), Gibbons (2010. Keys to the Nematode Parasites of Vertebrates, Supplementary Volume. CAB International, Wallingford, Oxfordshire, UK. 416 pp.), and by comparisons to original descriptions. The cysticercoid was identified utilizing Roberts et al. (2013. Gerald D. Schmidt & Larry S. Roberts' Foundations of Parasitology, Ninth Edition. McGraw Hill, New York, New York. 670 pp.). Parasitology terms are according to Bush et al. (1997. J. Parasitol. 83:575–583).

Found were one cestode cysticercoid in the small intestine, prevalence = 13% and three species of Nematoda, *Cosmocerca ornata* (in large intestine), N = 1, prevalence = 13%, *Falcaustra purchoni* (in small and large intestines), N = 6, prevalence = 25%, mean intensity = 3.0 ± 2.8 SD, range = 1–5 and *Foleyellides malayensis* (in body cavity) N = 1, prevalence = 13%. Voucher helminths were deposited in the Harold W. Manter Parasitology Laboratory (HWML), The University of Nebraska, Lincoln, Nebraska, USA: cestode cysticercoid (HWML 99969), *Cosmocerca ornata* (HWML 99966), *Falcaustra purchoni* (HWML 99967), *Foleyellides malayensis* (HWML 99968).

Cysticercoids are larval forms of cyclophyllidean cestodes which occur in intermediate hosts; development to the adult occurs when the cyst is ingested (Roberts et al. 2013, *op. cit.*). *Cosmocerca ornata* is widespread and occurs in Europe, Africa, Malaysia, China, India, and South America (Baker 1987. Mem. Univ. Newfoundland, Occas. Pap. Biol. 11:1–325). However, Moravec and Kaiser (1994. Parasitol. Res. 80:29–32) reassigned the South American specimens to *Cosmocerca paraguayensis.* The report of *C. ornata* in the microhylid frog, *Chiasmocleis capixaba* from Brazil by Van Sluys et al. (2006. Brazil J. Biol. 66:167–173) should perhaps also be reassigned. Recent lists of *C. ornata* hosts are in Yildirimhan et al. (2009. Comp. Parasitol. 76:247–257) and Halajian et al. (2013. Comp. Parasitol. 80:80-95). Additional hosts for *Cosmocerca ornata* include *Cnemaspis mcguirei* (Bursey et al. 2014. Acta Parasitol. 59:643–652), three bufonids, *Duttaphrynus melanostictus*, *Ingerophrynus parvus*, and *Phrynoidis asper* (Goldberg et al. 2017. Pac. Sci. 71:367–375), and four ranids, *Chalcorana labialis*, *Hylarana erythraea*, *Pulchrana picturata*, and *Sylvirana mortensi* (Goldberg et al. 2017. Pac. Sci. 71:229–235). *Falcaustra purchoni* was described from the bufonid *Phrynoidis asper* (as *Bufo asper*) by Yuen (1963. J. Helminthol. 37:241–250) from Peninsular Malaysia. To our knowledge, *P. petersi* is the second host to harbor *F. purchoni*. *Foleyellides malayensis* was originally described as *Waltonella malayensis* by Petit and Yen (1979. Bull. Mus. Nat. d'Histor. Nat., Paris, Sect. A. Zool. 1:213–218), but was moved to *Foleyellides* by Esslinger (1986. Proc. Helminthol. Soc. Washington 53:218–223). It was previously found in frogs from Malaysia: *Pulchrana glandulosa* (as *Rana glandulosa*) by Petit and Yen (1979, *op. cit.*), *Limnonectes macrodon* (as *Rana macrodon*), *Amolops larutensis* by Mak and Yong (1981. Asian J. Trop. Med. Publ. Health 12:617–618), *Limnonectes blythii* (Goldberg et al. 2017. Pac. Sci. 71:535–540), and *Philautus vermiculatus* (Goldberg et al. 2017. Herpetol. Rev. 48:113).

Cestode cysticercoid, *Cosmocerca ornata*, *Falcaustra purchoni*, *Foleyellides malayensis* in *P. petersi* are new host records.

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***RANA UENOI* (Ueno's Brown Frog). LEECH PARASITISM.** Leech infestation on tadpoles and adult amphibians may lead to weakness, sickness, or death (Berven et al. 2001. Copeia 2001:907–915). There are only a few studies on the ectoparasites of amphibians in the Republic of Korea. Only the leeches *Parabdella quadrioculata* and *Torix tagoi* are known to parasitize Korean species of *Rana* (Sim et al. 2012. Korean J. Herpetol. 4:1–7), but mortality has not been recorded. It is however possible for leeches to kill adult frogs (Merilä et al. 2002. Ann. Zool. Fennici 39:343–346).

FIG. 1. *Rana uenoi* parasitized by leeches (*Torix tagoi*).

At 1525 h on 7 May 2017, we observed a *Rana uenoi* parasitized by leeches (*Torix tagoi*) at Yumyeong Mountain, Republic of Korea (37.58909°N, 127.49077°E, WGS84; Fig. 1). The individual was found on the edge of a slow-flowing stream. It is not unusual for this species to be found in this habitat during the day. At the beginning of the observation, the individual was alive (Fig. 1), but it died within minutes, and we handled it only to confirm death. We counted 30 *T. tagoi* on the skin of the dead *R. uenoi* (Fig. 1). They were mostly located on its lateral sides. Leeches were blood-feeding, leaving wounds on the frog. We did not preserve the leeches or the frog.

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***RANA UENOI* (Prevernal Frog). PREDATION.** *Rana uenoi*, previously considered part of *Rana dybowskii* (Matsui 2014. Zool. Sci.31:613–620), is widespread in the Korean peninsula (Borzée et al. 2016. Herpetol. Rev. 47:421), where it lives in multiple habitats and often breeds in rice paddies. There is anecdotal evidence of birds preying on *R. uenoi*; however, published data on specific predators are lacking. One general frog predator is *Mustela sibirica* (Siberian Weasel; e.g., Tatara and Doi 1994. Ecol. Res. 9:99–107; McDonald et al. 2000. J. Zool., Lond. 252:363–371), although the specific frog species preyed upon are undocumented. We found a road-killed *M. sibirica* on a country road between rice paddies in South Gyeongsang Province, Republic of Korea (34.54899°N, 126.72664°E, WGS84; 12 m elev.). Upon dissection of the weasel's stomach, we found frog remains. We identified the frog species through DNA extraction (DNeasy Tissue Kit; Qiagen, Valencia, USA) and PCR with the 16S primer pair for DNA barcoding from Jeong et al. 2013 (Mol. Ecol. Res. 13:1019–1032). The sequencing results identified the consumed frog as *R. uenoi*; a BLAST search comparison with data from Genbank showed 99.7% similarity. This is the first record of *M. sibirica* preying upon *R. uenoi*.

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***RHINELLA MIRANDARIBEIROI*. PREDATION.** *Rhinalla mirandaribeiroi* is a medium-sized bufonid belonging to the *R. granulosa* group found in the Cerrado Biome and in Cerrado enclaves in the Amazon (Narvaes and Rodrigues 2009. Arq. Zool. 40:1–73). Here, we report predation of *R. mirandaribeiroi* by *Leptodeira annulata* (Banded Cat-eyed Snake; Fig. 1). At 2050 h on 15 August 2014, in a remnant of cerrado vegetation within a rock outcrop in the municipality of Iporá, state of Goiás, Brazil (16.45175°S, 51.38838°W, WGS 84; 460 m elev.), we observed an individual of *R. mirandoribeiroi* being consumed by *L. annulata* (Fig. 1). Intake of the prey started from the head and the ingestion process lasted approximately 15 min. This is the first record of *R. mirandaribeiroi* being preyed by *L. annulata*. This record contributes to the increase of knowledge about the potential predators of this species, as well for the diet of *L. annulata*.

Fig. 1. *Rhinella mirandaribeiroi* being preyed upon by *Leptodeira annulata*.

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***RHINELLA MARINA* (Cane Toad). PREDATION BY A CROCODILE.** The invasive *Rhinella marina* has been introduced to many countries and islands worldwide (Lever 2001. The Cane Toad. The History and Ecology of a Successful Colonist. Westbury Academic and Scientific Publishing, Otley, UK. 230 pp.), including the Philippines where it was introduced as a biological pest control agent in the 1930s (Merino 1936. Philipp. J. Agric. 7:283–286). *Rhinella marina* has large parotid glands that produce bufotoxins, which can cause cardiac distress when consumed; therefore, it is assumed that few predators can safely consume adult *R. marina* (Toledo and Jared 1995. Comp. Biochem. Physiol. A 111:1–29), especially in newly *R. marina*-invaded habitat.

In Australia, the interaction between the *R. marina* invasion and crocodilian populations is extensively studied. In some locations, *Crocodylus johnstoni* (Freshwater Crocodile) populations displayed mass mortalities after *R. marina* invaded their habitat (e.g., Letnic et al. 2008. Biol. Conserv. 141:1773–1782; Britton et al. 2013.Wildl. Res. 40:312–317). In contrast, negligible impacts were observed in other populations (Doody et al. 2009. Anim. Conserv. 12:46–53; Somaweera and Shine 2012. Anim. Conserv. 15:152–163). In line with the latter, *C. porosus* (Estuarine Crocodile) has shown tolerance towards *R. marina* ingestion (Smith and Phillips 2006. Pac. Conserv. Biol. 12:40–49). Previous studies indicate that predator size may play a substantial role in *R. marina* tolerance (Smith and Phillips 2006, *op. cit.*), with intermediate-sized (0.6–1.5 m) crocodiles most at risk (Letnic et al. 2008, *op. cit.*; Britton et al. 2013, *op. cit.*). Here, we suggest that some individuals of the relatively small, critically endangered *C. mindorensis* (Philippine Crocodile) may prey on introduced *R. marina* without ill effects.

PHOTO BY S. P. TELAN

Fig. 1. A juvenile *Crocodylus mindorensis* with an individual *Rhinella marina* in its mouth, grasping it by the head and parotid glands.

The Mabuwaya Foundation regularly monitors breeding sites of *C. mindorensis* in the Sierra Madre mountain range on Luzon, the Philippines, since 2001 (van Weerd and van der Ploeg 2012. The Philippine Crocodile: Ecology, Culture and Conservation. Mabuwaya Foundation, Cabagan, Philippines. 152 pp.). All these sites are located in human-dominated landscapes and have been colonized by *R. marina*, which occurs in high densities (pers. obs.) and is the only member of the Bufonidae on Luzon (Diesmos et al. 2015. Proc. California Acad. Sci. 62:457–539; Brown et al. 2013. ZooKeys 266:1–120). One of the sites is Dinang Creek, a small tributary to the Ilaguen River with a narrow riparian forest zone (ca. 2–5 m) and otherwise surrounded by agricultural lands and grassland. In 2010, a juvenile *C. mindorensis* (intermediate-sized, ca. 1 m total length) was observed mouthing an adult *R. marina* (Fig. 1) in Dinang Creek in the municipality of San Mariano (16.79329°N, 122.04489°E; WGS84). It is unknown whether the crocodile consumed the toad. However, it is suggested that some *C. johnstoni* die from just mouthing *R. marina* (Somaweera et al. 2013. Anim. Conserv. 16:86–96). Neither a deceased toad nor crocodile were found in the subsequent two days, which suggests that the *C. mindorensis* killed and consumed the *R. marina* without ill effects. In all surveys and at all survey sites, no *C. mindorensis* mortality without human interference was recorded even though *R. marina* is common in these sites.

Our observation of an intermediate-sized *C. mindorensis* mouthing a *R. marina* with no observed ill effects suggests some individuals are tolerant to bufotoxin but we do not know how variable this tolerance is between individuals and how that might translate to tolerance at the population level. Coevolution with other bufonids may have resulted in bufotoxin tolerance.

Crocodylus mindorensis overlaps in distribution with native toads in Mindanao and Calauit Island (Diesmos et al. 2015, *op. cit.*), although the latter population is likely introduced from the Visayas (Tabora et al. 2012. Zootaxa 3560:1–31). Luzon Island, however, does not have any native toad species (Diesmos et al. 2015, *op. cit.*). If bufotoxin tolerance has evolved in *C. mindorensis* in Mindanao, this trait could have spread throughout the Philippines when the *C. mindorensis* population was still large and contiguous (van Weerd and van der Ploeg 2012, *op. cit.*).

The potential resistance to bufotoxin of *C. mindorensis* deserves further study, due to the possibility of heterogeneity of bufotoxin tolerance between and within populations, as is shown in *C. johnstoni* (Somaweera et al. 2013, *op. cit.*). However, no crocodilian mass mortality was recorded in relation to the range expansion of *R. marina* in the Philippines. Nevertheless, *C. mindorensis* remains severely threatened by anthropogenic impacts such as hunting and habitat loss (van Weerd and van der Ploeg 2012, *op. cit.*).

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***TRACHYCEPHALUS MESOPHAEUS* (Golden-eyed Treefrog). MICROHABITAT.** *Trachycephalus mesophaeus* is an endemic species of the Atlantic Forest of Brazil and is generally associated with vegetation around temporary and permanent bodies of water (Haddad et al. 2013. Guia Dos Anfíbios da Mata Atlântica - Diversidade e Biologia. Anolis Books, São Paulo. 544 pp.), including inside bromeliads. Their eggs are deposited on the surface of temporary and permanent bodies of water (Prado et al. 2003. Bol. Mus. Nac., N.S., Zool. 510:1–11). Here we describe an observation of *T. mesophaeus* using the pitcher of the plant *Nepenthes ventricosa*, in a plant nursery greenhouse in the Atlantic Forest, Juquitiba, São Paulo, Brazil (23.54490°S, 46.59230°W; WGS 84). At 1200 h on 12 December 2017, a *T. mesophaeus* (SVL = 5 cm) was observed for the first time in a *Nepenthes* pitcher (opening = 4 cm, length = 14.4 cm; Fig. 1). Every time we approached, it retreated into the pitcher, with half of the body submerged. The liquid of the pitcher was full of dead invertebrates, and when the *T. mesophaeus* moved, there was a smell of decaying animals. The *T. mesophaeus* was seen in the pitcher for five days, and was last seen at 1340 h on 19 December 2017.

Carnivorous plants of the genus *Nepenthes* have leaves modified into pitchers. In the operculum (pitcher hood) there is a liquid used to attract vertebrates and invertebrates. The pitcher also contains liquid, which is responsible for digesting prey, however, these liquids are not able to kill all organisms and some animals use the pitcher as temporary or permanent habitat and for breeding (Adlassnig et al. 2010. Annal. Bot. 107:181–194). *Nepenthes ventricosa* is indigenous to the Philippines and lives in tropical forests, and can be found for sale in nurseries in Brazil. Some animals (e.g., amphibians) that use pitchers of carnivorous plants are opportunistic and can take advantage of the amount of prey attracted by the plant as a food source (Adlassnig et al. 2010, *op. cit.*). We did not observe the *T. mesophaeus* feeding, and instead we assume it was using the pitcher as a diurnal retreat.

Fig. 1. *Trachycephalus mesophaeus* inside the pitcher of *Nepenthes ventricosa*.

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TESTUDINES — TURTLES

***CHELODINA BURRUNGANDJII* (Sandstone Snake-Necked Turtle). MAXIMUM SIZE.** *Chelodina burrungandjii* is a medium-sized, long-necked chelid turtle native to tropical northern Australia, where it inhabits lotic waters and associated pools in

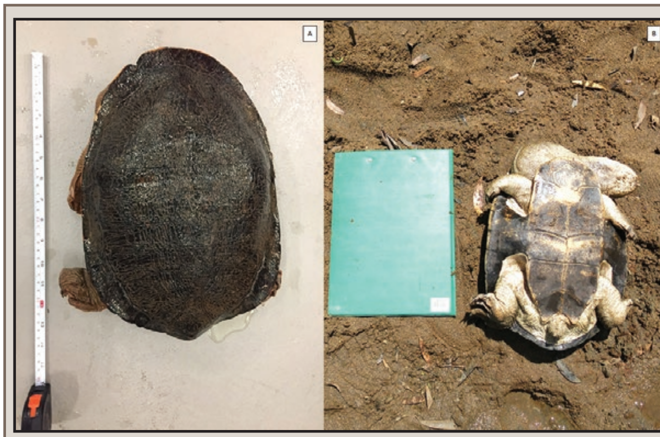

Fig. 1. Largest specimens of *Chelodina burrungandjii* on record.

Table 1. Size comparisons of different specimens of *Chelodina burrungandjii* from field measurements or museum collections. (CL - Carapace Length; CDL - Carapace Dome Length; CW - Carapace Width; CDW - Carapace Dome Width; TL - Total Length).

Origin	Current location	CL (cm)	CDL (cm)	CW (cm)	CDW (cm)	TL (cm)	Weight (kg)
-17.403875°, 124.910345° Captured during a survey by Department of Biodiversity, Conservation and Attractions on 10 May 2017 (Fig. 1B)	Voucher not collected	36	42	25.5	33.3	67	5.5
-17.41667°, 124.95° Collected by A. M. Douglas on 7 May 1966 (Fig. 1A)	WAM R26800	35.8	38.2	23.7	31	62	–

sandstone plateaus, and escarpments. The carapace is oblong with a recorded maximum size of 31.6 cm for a female from the Kimberley region of Western Australia (Thomson 2011. Chelon. Res. Monogr. 5:056.1–056.7). Here we report two individuals collected from Lennard River in the Kimberley that exceed the maximum size record (Table 1, Fig. 1).

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***CHELONIA MYDAS* (Green Sea Turtle). UNUSUAL TERRESTRIAL ACTIVITY AND OCCURRENCE.** On 9 April 2018, a subadult female *Chelonia mydas* was encountered at 0625 h on Habhakhana, an Olive Ridley nesting beach, Kujanga Forest Range, Odisha, India (20.118666°N, 86.489888°E; WGS 84). The turtle was crawling towards the high tide line. I estimated the weight of the turtle at 20–22 kg; Curved Carapace Length and Curved Carapace Width were 48.7 cm and 40.3 cm, respectively, corresponding with the presumption that this was a subadult turtle. Its carapace was almost completely covered by what appeared to be filamentous algae. Barnacles also were evident on many parts of the turtle's body, particularly the head and front limbs (Fig. 1). Taken together, these observations suggest that this turtle may have been in poor health, as most Green Sea Turtles use behavioral means to limit algal and barnacle growth (Losey et al. 1994. Copeia 1994:684–690; Mettee 2014. Parasites. Marine Turtle Trauma Response Procedures: A Veterinary Guide. WIDECAST Technical Report No. 16. Accessed online 2 Aug 2018). The turtle was followed up to 27 m above the high tide line and observed near the Olive Ridley nesting beach.

Fig. 1. Green Sea Turtle (*Chelonia mydas*) on Olive Ridley nesting beach, Odisha coast, India.

Nesting of Green Sea Turtles has not been recorded along the Odisha coast. To the best of our knowledge this is the first time a female subadult Green Sea Turtle has been recorded from this Olive Ridley nesting rookery. Four species of sea turtles are reported to occur in the coastal waters of Odisha: the Leatherback (*Dermochelys coriacea*), Hawksbill (*Eretmochelys imbricata*), Green (*C. mydas*), and Olive Ridley (*Lepidochelys olivacea*) sea turtles, of which the Olive Ridley is by far the most common (Kar and Bhaskar 1982. *In* Bjorndal [ed.], The Biology and Conservation of Sea Turtles, pp. 365–372. Smithsonian Institution Press, Washington D.C.). However, only nesting by the Olive Ridley has been confirmed along the Odisha coast, a distance of about 480 km. The remaining three species are extremely rare in these waters. Juvenile Hawksbill Sea Turtles were recovered stranded on the sea coast near the Devi River mouth on three occasions and a juvenile Green Sea Turtle was recovered from a monofilament gill net at the Rushikulya rookery during a study conducted by Wildlife Institute of India (WII, 1999). A Leatherback Sea Turtle was found dead and washed ashore the Gahirmatha coast. Anecdotal information was received from fishermen on observations of Green Sea Turtles in the coastal waters off Odisha. However, information on the occurrence of Green Sea Turtles in this area is inadequate and systematic surveys on the potential occurrence and nesting of this species in the coastal waters and on the beaches of Odisha are needed.

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***CHELYDRA SERPENTINA* (Snapping Turtle). DIET.** The diet of *Chelydra serpentina* is opportunistic, omnivorous, and extremely diverse, and includes insects, spiders, isopods, amphipods, shrimp, crayfish, crabs, water mites, clams, snails, earthworms, leeches, tubificid worms, planarians, freshwater sponges, fish (eggs to adults), amphibians, small turtles, snakes, birds, and mammals, as well as plants (including algae, duckweed, cattails,

Table 1. Frequency of occurrence of primary food types in the intestines of 49 *Chelydra serpentina* from Island Lake, Garden County, Nebraska, USA, in June 2008. Size indicates range of maximum carapace length in mm measured by the Cagle Method (1946. Am. Midl. Nat. 36:685–729).

Size (CL)	Sex	N	Bird	Salamander	Fish	Crayfish	Snails	Algae
270–275	M	3	1	0	0	0	1	2
	F	3	0	0	0	0	3	2
275–300	M	2	1	1	2	1	0	1
	F	5	0	0	0	0	2	3
300–325	M	4	2	0	1	1	1	4
	F	5	0	0	1	1	0	4
325–350	M	1	1	0	0	0	0	1
	F	8	6	0	2	1	2	7
350–375	M	5	4	0	3	2	1	5
	F	4	2	0	0	1	0	3
375–400	M	4	2	0	1	0	0	4
	F	1	1	0	0	0	1	1
400–425	M	4	2	0	0	3	1	3
	F	0	–	–	–	–	–	–
ALL	M	23	13	1	7	7	4	20
	F	26	9	0	3	3	8	20
Total		49	22	1	10	10	12	40

Table 2. Comparison of frequency of occurrence (in percent) of major food items in gastrointestinal tracts of *Chelydra serpentina*. NR = not reported.

		Vegetation						Birds		
State	N	w/ algae	algae	Crayfish	Mollusks	Fish	Amphibians	game	nongame	Source
PA	19	26.3	10.5	63.1	36.8	10.5	5.2	[total = 5.2]		Surface 1908 (State Dept. Agric. 6:105–196)
NY/MA	18	61.1	11.1	27.8	22.2	27.8	5.6	[total = 5.6]		Pell 1940 (Copeia 1940:131)
CT	470	60	17.2	27	0.6	40.4	2.5	0.4	0.2	Alexander 1943 (*op. cit.*)
MI	281	>93.5	NR	NR	NR	>51.7	NR	[total = <7.2]		Lagler 1943 (Am. Midl. Nat. 29:257–312)
MI*	21	>88.2	>88.2	>30.8	>47.1	>52.9	NR	>15.4	NR [total > 29.4]	Lagler 1943 (*op. cit.*)
ME*	157	80.2	NR	NR	37.6	65.6	15.9	<15.3 [total = 29.4]	<15.9	Coulter 1957 (J. Wildl. Mgmt 21:17–21), 1958 (Maine Field Nat. 14:53–62)
NE	22	>68.2	>36.4	0	95.4	>27.3	0	8.1 [total = 22.7]	4.5	Hammer 1969 (J. Wildl. Mgmt. 33:995–1005)
FL	59	100	NR	83	100	0	94.9	0	0	Punzo 1975 (J. Herpetol. 9:207–210)
NE	49	81.6	81.6	32.7	24.5	20.4	2	0	45	This study

*Only high density waterfowl areas sampled

pondweeds, bulrush, and water lilies) and carrion (Ernst and Lovich 2009. Turtles of the United States and Canada. The Johns Hopkins University Press, Baltimore, Maryland. 840 pp.). Substantial evidence indicates that Snapping Turtles include a diversity of game waterfowl in their diet (reviewed in Davis and Buckland 2017. Herpetol. Rev. 48:174–175); however, it is unclear whether this predation is frequent enough to compromise the work of waterfowl management agencies. Under the assumption that predation rates must be high, some managers cull Snapping Turtles as a preventative strategy (Alexander 1943. J. Wildl. Mgmt. 7:278–282; among others). Clearly, more data are needed that quantify the actual rates of predation of these turtles on game waterfowl populations.

As part of a predator-control program, the Crescent Lake National Wildlife Refuge (Garden County, Nebraska, USA) removed 49 *C. serpentina* from Island Lake during June of 2008. With permission from refuge managers, we were allowed to dissect the carcasses of these turtles to examine their gut contents before disposal. Digestive tracts were removed and frozen for later study, and within two days the tracts were thawed, dissected, and the food types present were recorded (Table 1). Stomach contents were disregarded due to the possible presence of baitfish during trapping. Quantitative volumetric analysis was not possible due to time constraints.

Algae and bird material were the most frequent items found in the gastrointestinal tract (Table 1), although fish, snails, and crayfish were also common. A single neotenic *Ambystoma mavortium* was the only amphibian found. Algae was present in 40 of the 49 individuals (82%), and bird remains (primarily feathers) were found in 22 turtles (45%). Generally, the feathers found in the gut were from small, unidentifiable birds; all large identifiable feathers and/or legs or bones were from coots (*Fulica*). Birds increased in frequency in the diet when body size reached ca. 325 mm carapace length (Table 1). Only 4 of the 22 (18%) smaller turtles included bird remains whereas 18 of the 27 (67%) of larger turtles did ($\chi^2 = 26.5$; $P < 0.0001$).

A comparison of our data with previous studies (Table 2) confirms that Snapping Turtles are omnivorous and likely opportunistic in their diet, and hence diet varies considerably across their range. Except in habitats with dense waterfowl populations (Table 2), the frequency of game birds in the diet is quite low, supporting the statement by Breckenridge (1944. Reptiles and Amphibians of Minnesota. University of Minnesota Press, Minneapolis. 202 pp.) who noted: "It is probable that the seriousness of the snapper's preying upon our waterfowl has been greatly exaggerated."

We thank the staff at Crescent Lake National Wildlife Refuge for allowing us to salvage the gastrointestinal tracts from the culled turtles.

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***CHRYSEMYS PICTA* (Painted Turtle). MOUTH ANOMALY.** *Chrysemys picta* is a small omnivorous freshwater turtle common throughout much of the eastern and central United States (Carr 1952. Handbook of Turtles: The Turtles of the United States, Canada, and Baja California. Comstock Publishing Associates, Ithaca, New York. 542 pp.). There are few reports of anomalies in *C. picta* outside of occasional developmental malformations in juveniles, which may result in lower survival and low prevalence in adults. Facial deformities such as unfused premaxilla and maxilla bones, shortened jaws, or missing eyes in aquatic turtle embryos may have detrimental effects and are seldom observed in adults (Bell et al. 2006. Environ. Pollut. 142:457–465). However, proportions of injury from predation and deformity in other aquatic turtles such as the Northern Map turtle, *Graptemys geographica*, can be as high as 14% in some populations (Bennett and Litzgus 2014. J. Herpetol. 48:262–266) and recessed jaws have been observed in 3.8% of Snapping Turtles, *Chelydra serpentina* (Bishop et al. 1998. Environ. Pollut. 101:143–156). However, in *Chrysemys,* facial or jaw deformities have been observed to be relatively rare in studied populations, ~1% (Davy and Murphy 2009. Can. J. Zool. 87:433–439).

On 2 April 2018 at 1250 h, we observed an adult female *C. picta* (straight line carapace length = 133 mm, mass = 260 g) on the shore surrounding a small pond on the Wingate University Campus, Wingate, North Carolina, USA (34.9873°N, 80.4283°W; WGS 84) with facial deformities that included both eyes and the majority of the upper jaw missing and recessed (Fig. 1A). This individual *C. picta* was basking within five meters of the water and displayed normal behavior and movement upon our encounter and examination. Initially we assumed the turtle was recently injured but the individual showed no signs of recent trauma or injury and was released. We observed this same individual on two separate occasions (within one week) basking following the initial encounter. Therefore, we conclude this otherwise healthy individual may be able to forage successfully while lacking eyesight, diminished nostrils and the majority of the anterior upper jaw (premaxilla, maxilla, and prefrontal bones) as seen in Fig 1B. The observed anomalies could be developmental or result from previous injury (such as from mammalian predators or possibly even Snapping Turtles, *Chelydra serpentina*, often encountered in this same pond). However, despite these striking facial abnormalities, this turtle was apparently able to survive for an extended (but indeterminate) period of time. We thank North Carolina Wildlife Resources Commission for permits.

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Fig. 1. A) Adult female *Chrysemys picta*, as found near a pond, showing facial abnormality; B) same individual, medial view of head, missing eyes and upper jaw, but no signs of recent trauma.

***CHRYSEMYS PICTA* (Painted Turtle). BASKING BEHAVIOR.** It is not uncommon to find *Chrysemys picta* basking on natural structures extending from the water, including logs, rocks, small islands, sand bars, or the banks of water bodies (Ernst and Lovich 2009. Turtles of the United States and Canada. John Hopkins University Press, Baltimore, Maryland. 840 pp.). *C. picta* have also been observed basking on conspecifics and other turtle species, including *Chelydra serpentina* and *Apalone spinifera* (Moriarty and Hall 2014. Amphibians and Reptiles in Minnesota. University of Minnesota Press, Minneapolis, Minnesota. 370 pp.),

Fig. 1. A) *Chrysemys picta* basking on a dead *Castor canadensis*. B) *C. picta* basking on a dead *Cyprinus carpio*.

and even on the roofs of partially submerged automobiles (Ernst and Lovich 2009, *op. cit.*). At 1200 h on 14 May 2018, we observed *C. picta* basking on a dead *Castor canadensis* (American Beaver; Fig. 1A) and on a dead *Cyprinus carpio* (Common Carp; Fig. 1B) at Medicine Lake in Hennepin County, Minnesota, USA. To our knowledge, this is the first report of *C. picta* basking on animal carcasses.

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***CLEMMYS GUTTATA* (Spotted Turtle). HABITAT USE.** *Clemmys guttata* is known to inhabit a wide variety of wetland types, such as shallow grassy marshes, forest swamps, ponds, and even bays of large lakes (Ernst 1976. J. Herpetol. 10:25–33; Litzgus and Brooks 2000. J. Herpetol. 34:178–185; Stevenson et. al. 2015. Chelon. Conserv. Biol. 14:136–142). *C. guttata* populations inhabiting wetland complexes often display seasonal shifts in habitat use (Ward et. al. 1976. Herpetologica 32:60–64; Beaudry et. al. 2009. J. Herpetol. 43:636–645). Individuals have also been documented moving among wetlands over short time intervals, sometimes remaining within a wetland for only one day (Haxton and Berrill 2001. J. Herpetol. 35:606–614). Previous studies indicate that movement among wetlands typically involves walking through terrestrial habitat, sometimes traveling up to 250 m from water (Ernst, *op. cit.*; Litzgus and Brooks, *op. cit.*; Rasmussen and Litzgus 2010. Copeia 2010:86–96).

Few published studies have investigated the use of streams as habitat or as a factor influencing habitat connectivity for *C. guttata*. Individuals have been documented occupying slow-moving water systems such as drainage ditches and backwater areas of rivers (Stevenson et. al., *op. cit.*), and hibernating on the bottom of shallow (ca. 0.2 m) streams (Ernst 1982. J. Herpetol. 16:112–120). Streams with moderate or rapid flow rates bisecting wetlands could act as barriers to movement, but could also function as travel corridors among wetland patches. Here, we report radiotelemetry-based data showing that individuals in a *C. guttata* population often cross a moderate-flow stream while moving among wetland patches, as well as an observation of apparent use of the stream as a travel corridor.

In spring of 2018, we conducted a radiotelemetry study using six *C. guttata* in a 20-ha wetland complex in Hampshire County, West Virginia, USA (specific location withheld in compliance with state of West Virginia sensitive species data practices). The wetland complex consists of a matrix of seasonally flooded shallow grassy marshes, forest ponds, and dry upland grassland and forest. The wetland complex is bisected by a small, moderate-flow stream (2–4 m wide, 0.2–1.2 m deep, ca. 0.029 cm/s flow rate during the study period). *C. guttata* were outfitted with 3.6-g glue-on radiotransmitters (Advanced Telemetry Systems [ATS], Isanti, Minnesota), and tracked from 5 April to 7 May using a R410 scanning receiver (ATS) and 3-element folding yagi antenna. Each individual was located a minimum of three times per week.

During the study, five of the *C. guttata* made stream crossings to access additional wetlands. The females (N = 2) crossed the stream to access a wetland adjacent to the one previously occupied, whereas the males (N = 3) appeared to use the stream as a corridor to move to other wetlands. For example, on 1 May 2018, a male *C. guttata* was tracked into a shallow grassy marsh. On 3 May 2018, at ca. 1030 h, the same individual was tracked a straight-line distance of 0.04 km into the stream and located among a collection of wood and debris that had been trapped by a tree limb that had fallen across the water (Fig. 1). At ca. 1400 h on the same day, the individual was tracked 0.05 km downstream from its previously tracked location, into another wood and debris collection that had developed among the vegetation growing along the bank of the stream. On 4 May 2018, the individual was located in a temporary shrub-sedge wetland, a straight-line distance of 0.05 km from the previously tracked location. On 7 May 2018, the individual was then tracked back

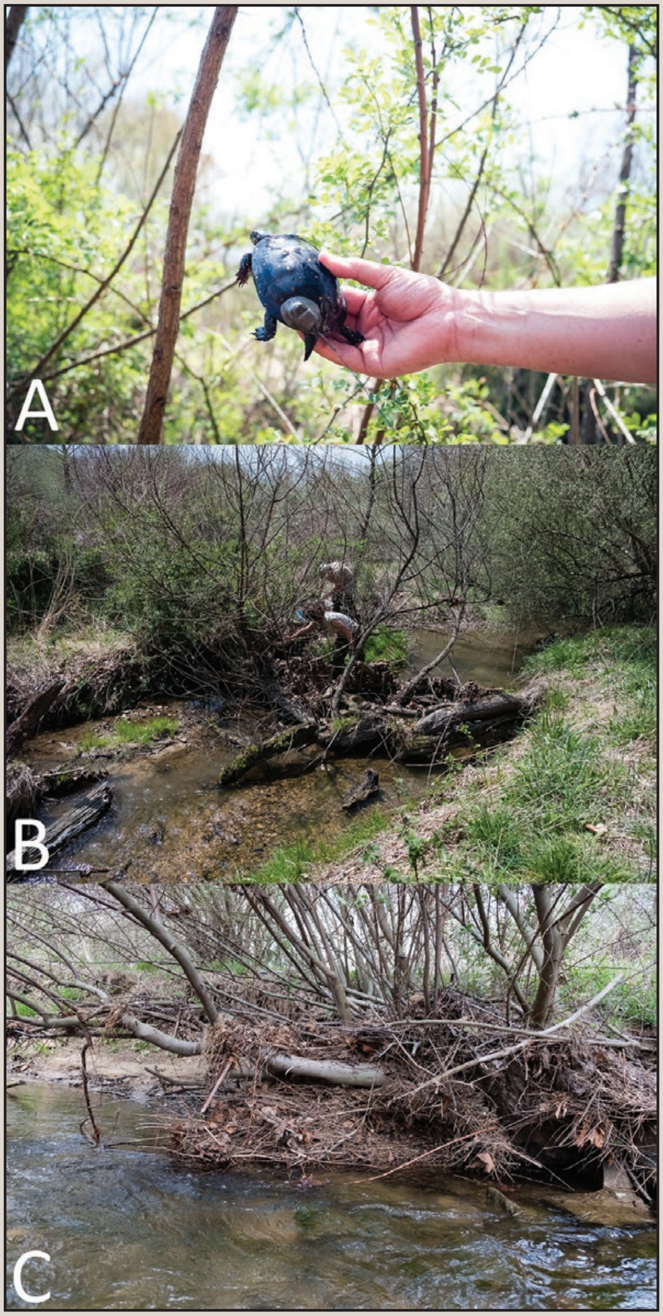

Fig. 1. A) Radiotracked *Clemmys guttata* captured in a stream on 3 May 2018 in Hampshire County, West Virginia, USA; B) Upstream detection location at ca. 1030 h; C) downstream detection location at ca. 1400 h. The individual moved 0.05 stream km between observations.

to the original shallow grassy marsh, 0.13 km from the previous location.

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***EMYDOIDEA BLANDINGII* (Blanding's Turtle). VOCALIZATIONS.** Traditionally it was generally presumed that all turtles were silent and deaf (Pope 1955. The Reptile World. Knopf, New York. 325+xiii pp.), and that any sounds they did produce were likely just noises made during breathing or nesting (Mrosovsky 1972. Herpetologica 28:256–258; Wever 1978. The Reptile Ear: its Structure and Function. Princeton University Press, Princeton, New Jersey. 1038 pp.; Cook and Forrest 2005. Herpetol. Rev. 36: 387–390). In 2009 this paradigm was broken by the description of purposeful vocalizations in *Chelodina colliei* (Giles et al. 2009. J. Acoustic Soc. America 126:434–443). The vocal repetoire of other species of freshwater and marine turtles has now been described, documenting the importance of underwater acoustic communication for both social and reproductive behavior (Ferrara et al. 2012. J. Comp. Psychol. 127:24–32; Ferrara et al. 2014a. Copeia 2014:245–247; Ferrara et al. 2014b. Chelon. Conserv. Biol. 13:110–114; Ferrara et al. 2014c. Herpetologica 70:149–156; Vogt 2014. The Tortoise 1:118–127; Ferrara et al. 2017 Copeia 105:29–32). For example, in *Podocnemis expansa,* postnatal parental care was documented using acoustic communication studies (Ferrara et al. 2012, *op. cit.*). Furthermore, several studies have demonstrated the ability of both marine and freshwater turtles to perceive aerial and underwater low-frequency sounds (Ridgway et al. 1969; Lenhardt et al. 1996. NOAA Technical Memorandum NMFS-SEFSC-387; Christensen-Dalsgaard et al. 2012. Proc. Royal Soc. B doi:10.1098/rspb.2012.0290). Although acoustic communication has been documented in marine turtles (above references) and the Pig-nosed Turtle (*Carettochelys insculpta*) (Ferrara et al. 2017, *op. cit.*), it has yet to be documented in other freshwater cryptodires. The purpose of this note is to document that another freshwater cryptodire, *Emydoidea blandingii,* also emits underwater vocalizations.

We recorded *E. blandingii* for 23 h during April 2009, where M. Pappas has been conducting a long-term population study of this species for the last 40 years, at McCarthy Wildlife Management Area near Weaver Dunes, Minnesota, USA. We initially recorded six individuals (three females and three males) for six hours in captivity to obtain a baseline of the sounds they were emitting (if they were emitting sounds, we needed to know the structure and frequency of the sounds so that we could detect these sounds in nature and distinguish them from the other environmental noises), and to help us adjust the recording equipment for recording these frequencies. We then recorded wild turtles for a total of 17 h during four sessions within the hours of 0900–1200 over a four-day period, in a vernal pool where Blanding's Turtles come year after year to court and copulate in the McCarthy Wildlife Management Area. We chose this area because it is one of the few times and places during the year where we are certain to find the turtles, and, presumably, they are more likely to produce sounds when they are in the presence of other turtles than if they are alone. All sound recordings were made using a Fostex FR-2 recorder adjusted to 48 kHz at 24 bits. The underwater recordings were made with a Reson (TC4043) omnidirecional hydrophone with sensitivity of 2 Hz-100 kHz ± 3 dB. Airborne sounds were recorded using a Sennheiser K6 unidirectional microphone with a Sennheiser ME-66 windscreen. While recording at the surface of the water, the microphone was positioned 30 cm above the water and pointed towards a floating log 40 cm away where the turtles were frequently noted basking (Figs. 1, 2), to capture the sounds as the heads of the turtles were breaking the surface and during basking. We inserted the hydrophone 0.5 m from the bottom of the pool (depths varied from 1 to 1.5 m) and 40 cm from the bank of the pool. We monitored the recordings in real time using Sony MDR-7506 headphones and adjusted the recording level manually to maximize the signal-to-noise ratio and to prevent distortions ("clipping") caused by excess gain.

Fig. 1. Adult *Emydoidea blandingii* on basking log in the breeding vernal pool in Hastings Wildlife area. Note male with inflated throat and elevated head posture.

Fig. 2. Adult *Emydoidea blandingii* on basking log in the breeding vernal pool in Hastings Wildlife area. Note male with open mouth posture.

Raven Pro 1.3 (Cornell Laboratory of Ornithology) was used to analyze the recordings using the following spectrographic parameters: window type—Hamming; window size—512 samples. Sounds with similar characteristics of published turtle sounds (Giles et al. 2009, *op. cit.*; Ferrara et al. 2012, *op. cit.*) and within the hearing range of turtles (Ridgway et al. 1969. Proc. Nat. Acad. Sci. 64:884–890) were detected manually by two experienced researchers using visual and aural inspection of the recordings.

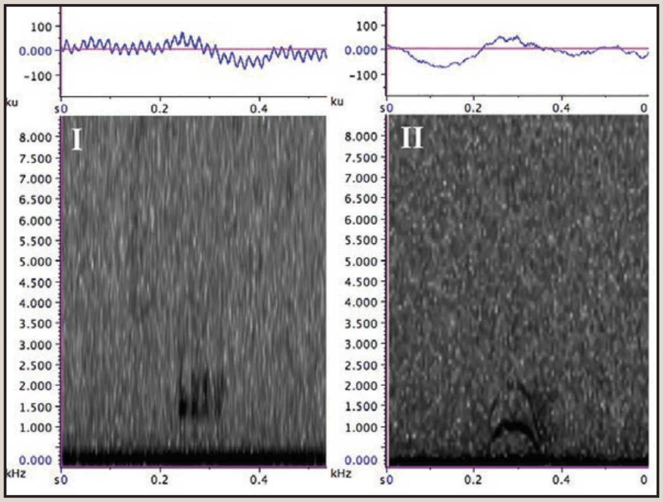

Fig. 3. Waveform and spectrogram views of the sounds produced by *Emydoidea blandingii* (window type: hamming, window size, and FFT = 512).

We detected 12 sounds produced by *E. blandingii* from the pond during the 17 hours we recorded. The lowest value recorded for peak frequency was 140 Hz and the highest was 3,656.2 Hz (mean = 1281.0 Hz and sd = 965.1). It is too early to describe the vocal repertorie of *E. blandingii*, but the sounds we found suggest a preliminary classification into two types according to their acoustic and spectral characteristics (Fig. 3). All sounds detected included sounds with harmonic and non-harmonic frequency bands modulated in amplitude and frequency and noisy aural quality.

Type I (N = 4).—Multiple frequency bands not harmonically related resulting in a noisy aural quality. The mean peak frequency was 2132.8 Hz and varied from 1500 to 3656.2 Hz, and the total duration varied from 0.03 to 0.10 s.

Type II (N = 8).—Is the most common sound in the repertoire of *E. blandingii*. These are harmonic and non-harmonic frequency bands with frequency modulated. Duration of the sound varies from 0.025 to 0.091 s, the peak frequency from 2062.5 to 140.6 Hz, and the number of harmonics from 2–10.

We wondered whether turtles with mouths open and gular region inflated (shown in Figs. 1 and 2), were vocalizing in the air, however we not did detect any airborne vocalizations in our recordings. It is possible they were emitting sounds in the infra- or ultra- sound range, rather than the frequencies we were monitoring, but we have never, to date, found turtles emitting sounds in the infra- or ultra- sound range in any of the marine turtles or pleurodires we have recorded.

Knowledge of the range of the vocal repertoire of species from different taxonomic groups is essential to understanding the evolution of the complexity of animal communication. Recordings of adult *E. blandingii* demonstrate that this species makes vocalizations with different structural characteristics that included harmonic and non-harmonic structures, as has been described for other species of freshwater and marine turtles such as *Dermochelys coriacea* (Ferrara et al. 2014b, *op. cit.*), *Chelonia mydas* (Ferrara et al. 2014a, *op. cit.*), *Carettochelys insculpta* (Ferrara et al. 2017, *op. cit.*), *Chelodina colliei* (Giles et al. 2009, *op. cit.*), and *Podocnemis expansa* (Ferrara et al. 2012, *op. cit.*).

Even though the number of samples and the diversity of sound types in the vocal repertoire of *E. blandingii* noted here was not as extensive as described for other aquatic turtles, it is sufficient to demontrate that this species is vocalizing underwater. Vocal repertoire surveys are important to document the taxonomic breadth of underwater vocalizations for comparative study with other species of turtles. We hope that these results will stimulate more bioacoustic studies of different life history stages of additional species of turtles, to elucidate the significance of underwater vocalizations in turtles.

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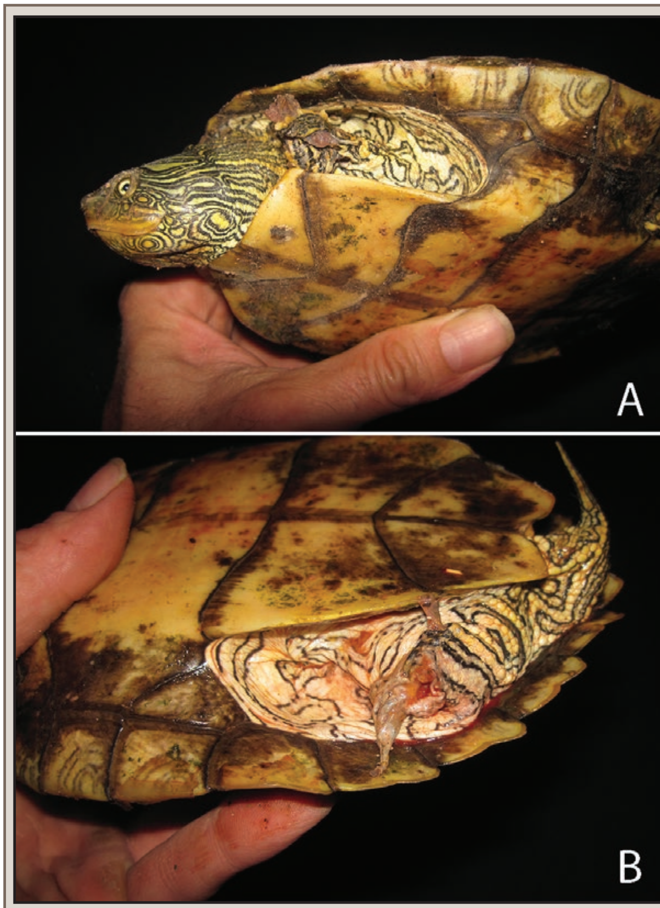
***GRAPTEMYS VERSA* (Texas Map Turtle). PREDATION.** Raccoons (*Procyon lotor*) are known predators for many turtle species and their eggs. Herein I report the first documentation of predation on *Graptemys versa* by a raccoon (Lindeman 2013. The Map Turtle and Sawback Atlas Ecology, Evolution, Distribution and Conservation. Oklahoma University Press, Norman. 460 pp.). On 20 May 2014 at 2247 h in Menard County, Texas, USA, at the San Saba River and Dunagan Road (30.86743°N, 100.02180°W; 616 m elev.), an adult female *G. versa* was out of the water and on the edge of Dunagan Road when it was encountered by a raccoon. I had just waded a short distance into the river from the aforementioned location when I heard a noise coming from the road and saw the raccoon attacking the turtle. Within a span of



PHOTOS BY CARL J. FRANKLIN

Fig. 1. A) Deceased *Graptemys versa* missing left front leg due to raccoon attack; B) showing missing right rear leg.

approximately two minutes the raccoon had already bitten and chewed off the turtle's left front leg and right rear leg before I was able frighten it away, causing it to drop the turtle (Fig. 1). The turtle died minutes later. The turtle and surrounding area on the road was dry suggesting that she was likely returning to the water when captured. Digital probing inside the body cavity post-mortem did not reveal any shelled eggs. Given the lack of palpable eggs and time of terrestrial activity, she may have been returning from nesting. Voucher photographs documenting the trauma were deposited in the digital collection at the University of Texas at Arlington Amphibian and Reptile Diversity Research Center (UTADC 9209, 9210; Fig. 1).

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MACROCHELYS TEMMINCKII **(Western Alligator Snapping Turtle). DEFENSIVE BEHAVIOR.** Alligator Snapping Turtles are well known for being able to defend themselves with a massive gaping mouth, large sharp beak, and a powerful bite. Adult specimens may occasionally lunge or move towards a perceived nuisance with their mouths wide open (Allen and Neill 1950. Spec. Publ. Ross Allen's Rept. Inst. 4:1–15). They are also renowned for being one of the largest species of freshwater turtles in the western hemisphere, with adult males achieving a mass of 113 kg (Pawley 1987. Bull. Chicago Herpetol. Soc. 22:134) and a straight carapace length of 80 cm (Pritchard 1980. Chelonologica 1:113–123). Herein we describe a previously unreported defensive behavior for a juvenile *Macrochelys temminckii*.

On 1 June 2018 at ca. 0900 h, we captured a juvenile specimen in at the Trinity River at Arlington, Tarrant County, Texas, USA. The specimen's general measurements were: carapace length = 13.7 cm, carapace width = 10.5 cm, shell height = 4.6 cm, plastron length = 8.7 cm, post cloacal tail length = 11 cm, and mass = 366 g. At approximately 0945 h the turtle was being positioned for photographic documentation (UTADC 9202). After the turtle was placed into a photogenic position it attempted to escape, whereupon the assistant repositioned it for the photographer. Upon the third attempt to escape, the assistant grabbed the posterior portion of the carapace and the turtle forcibly snapped its mouth shut while lunging in a counter-clockwise direction resulting in it spinning around and changing its entire body position by 180°. This resulted in the gaping mouth facing the assistant. Carefully, the assistant repositioned the turtle for the camera and once again it performed the previously described movement upon being contacted by the posterior portion of the carapace. Neither of these episodes were timed or captured on video, leaving us to speculate on the precise amount time required for the movement (estimated < 1 sec) and whether or not the turtle's body left the ground during the behavior. This defensive behavior would presumably be limited to young turtles due to their lighter mass. This described action could be an effective deterrent to a predator attempting to contact the turtle from the posterior of the carapace. Field work conducted under TPWD SPR-1017-201.

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MALACLEMYS TERRAPIN CENTRATA **(Carolina Diamondback Terrapin). NESTING BEHAVIOR.** *Malaclemys terrapin centrata* is the only one of the seven recognized subspecies of *M. terrapin* known to occur along the Georgia, USA, coast. Females emerge in late spring or summer in search of appropriate nesting sites, which include virtually any area with sandy soil. Nesting sites selected by this species include sandbars, spits, dunes, and creek banks provided the site is adjacent to marsh habitat and above the high tide line (Jensen et al. 2008. Amphibians and Reptiles of Georgia. University of Georgia Press, Athens, Georgia. 575 pp.). Here we describe the observation of a female *M. t. centrata* nesting in a Nine-banded Armadillo (*Dasypus novemcinctus*) burrow, which to our knowledge has not been previously documented in the literature.

On 17 June 2018 at 1204 h, an adult female *M. t. centrata* was documented nesting in a burrow via a remote infrared camera (Bushnell®, Overland Park, Kansas, USA) on Little St. Simons Island, Georgia, USA (Fig. 1). Cameras were positioned to capture photos and video of the commensal use of armadillo burrows by other species. The burrow was located in the dune system on the northeast end of the island (31.27179°N, 81.27753°W; WGS 84, 1 m elev.) and was approximately 170 m east from the nearest tidal creek and 370 m landward of the Atlantic Ocean. The camera recorded eight pictures and four 10-sec videos of the *M. t. centrata* using the burrow, illustrating that the individual turtle had spent approximately 37 min nesting inside the burrow (Fig. 1). Photos and video show that the nest was depredated a little over 10 h later by a Northern Raccoon (*Procyon lotor*) at 2257 h. Previous research has shown that terrapin nests are regularly preyed upon within 24 h of oviposition and that raccoons are the most significant predator of these nests (Butler et al. 2004. Am. Midl. Nat. 152:145–155).

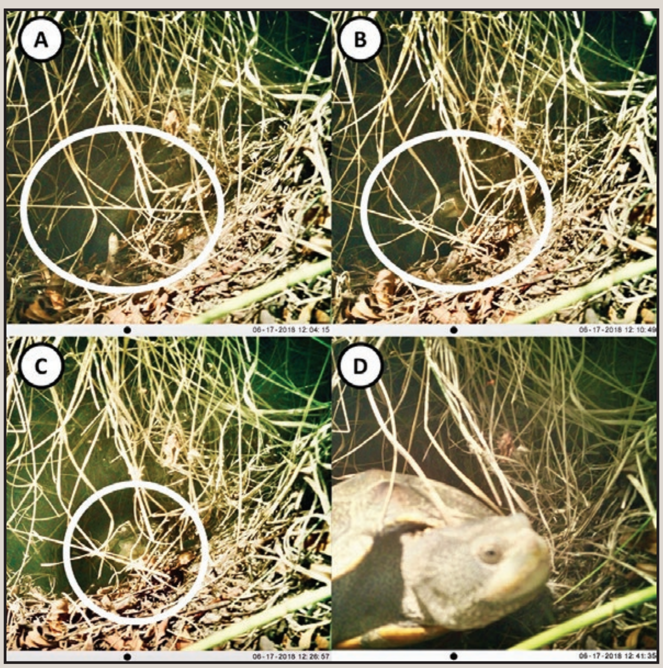

Fig. 1. The sequence of a female *Malaclemys terrapin centrata* nesting in an armadillo burrow on Little St. Simons Island, Georgia, USA on 17 June 2018. A) *M. t. centrata* entering the burrow at 1204 h; B) *M. t. centrata* digging in the burrow at 1210 h; C) *M. t. centrata* presumably nesting in the burrow at 1226 h; D) *M. t. centrata* leaving the burrow at 1241 h.

This observation is the first direct record of *M. t. centrata* using a burrow of a Nine-banded Armadillo. This is significant because armadillo burrows are documented providing shelter and forage for a variety of herpetofauna, including the Eastern Diamondback Rattlesnake (*Crotalus adamanteus*; Means 2017. Diamonds in the Rough: Natural History of the Eastern Diamnondback Rattlesnake. Tall Timber Press, Tallahassee, Florida. 390 pp.), Eastern Kingsnake (*Lampropeltis getula*; Steen et al. 2010. Copeia 2010:227–231), Furrowed Wood Turtle (*Rhinoclemmys areolata*) Neotropical Rattlesnake (*Crotalus durissus*), Tropical Rat Snake (*Spilotes pullatus*), Boa Constrictor (*Boa constrictor*), and Basilisk lizard (*Basiliscus vittatus*) (Platt et al. 2004. Mamm. Biol. 69:217–224). Additional reptile species found using armadillo burrows during this study that have not previously been documented include Coachwhip snakes (*Masticophis flagellum*) and Black Racers (*Coluber constrictor*). These observations indicate that armadillo burrows might function as important refugia for herpetofauna by facilitating protection against temperature extremes, fire, and predation. Furthermore, our observation suggests that these burrows provide suitable soil conditions for *M. t. centrata* nesting when located adjacent to the marsh habitats in which they reside. Additional research is needed to understand whether armadillo burrows could provide ideal nesting habitat for *M. t. centrata* in areas where they co-occur.

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***PSEUDEMYS GORZUGI* (Rio Grande Cooter). KYPHOSIS.** Kyphosis and kyphoscoliosis are deformations of the spine that can cause doming of the carapace in turtles. These two forms of shell deformities have been reported in many chelonian species, including *Trachemys scripta elegans* (Tucker et al. 2007. Herpetol. Rev. 38:337), *Emydura macquarii krefftii* (Trembath 2009. Chelon. Conserv. Biol. 8:94–95), *Podocnemis erythrocephala* (Bernhard et al. 2012. Herpetol. Rev. 43:639), *Graptemys oculifera* (Selman et al. 2012. Chelon. Conserv. Biol. 11:259–261), *Deirochelys reticulara chrysea* (Mitchell et al. 2014. Herpetol. Rev. 45:312), *Graptemys sabinensis* (Louque et al. 2015. Herpetol. Rev. 46:81), *Podocnemis sextuberculata* (Perrone et al. 2016. Herpetol. Rev. 47:287), and *Apalone ferox* (Taylor et al. 2017. Herpetol. Rev. 48:418–419). However, these conditions are generally rare, with only 0.93% of 216 *G. sabinensis* (Louque et al., *op. cit.*) and 0.06% out of 21,786 *T. scripta elegans* (Tucker et al., *op. cit.*) exhibiting kyphosis; kyphoscoliosis is even rarer with very few cases reported, including *Pseudemys suwaniensis* (Mitchell et al. 2016. Herpetol. Rev. 47:127–128) and *D. reticularia chrysea* (Mitchell et al., *op. cit.*). During our long-term population study of *Pseudemys gorzugi* in southeastern New Mexico, a female specimen exhibiting an obvious carapace deformation consistent with kyphosis was captured via snorkeling, representing the first reported case of kyphosis in *P. gorzugi* (Fig. 1A).

The turtle was captured on 12 June 2018 in a pond near the Black River, Eddy County, New Mexico, USA (32.11447°N, 104.578°W, WGS 84; 1067 m elev.), with a straight-line carapace

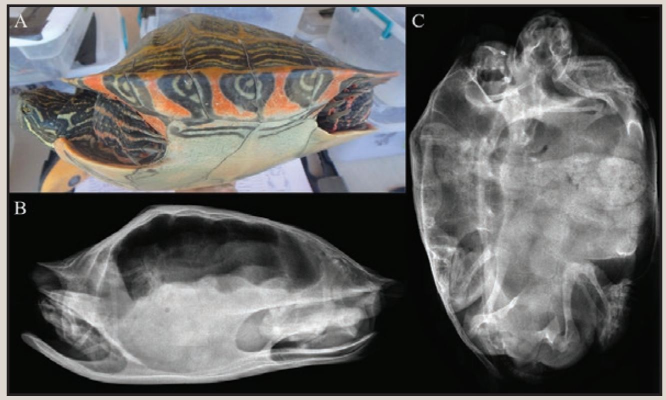

Fig. 1. Female *Pseudemys gorzugi* expressing typical spinal deformation associated with kyphosis: a lateral view photograph (A), a lateral view radiograph (B), and a dorsal view radiograph at 45-degree angle (C).

length (CL) of 220 mm and a body depth (BD) of 103 mm. The turtle was radiographed at Desert Willow Wildlife Rehabilitation Center, Carlsbad, New Mexico, which confirmed the spinal deformation (Fig. 1B and 1C.). Since 2016, we have marked 420 *P. gorzugi* along the Black River and the lentic water bodies in the surrounding area. To date, this is the only *P. gorzugi* found with kyphosis which is 0.24% of all marked individuals.

We thank the staff at Desert Willow Wildlife Rehabilitation Center for assistance with radiographs. This research was approved by New Mexico Department of Game and Fish (Permit Authorization No. 3621), and Eastern New Mexico University IACUC (Approval #04-27/2018). We thank US Fish and Wildlife Service and New Mexico Department of Game and Fish - Share with Wildlife Program for supporting this project (State Wildlife Grant T-32-5).

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***TERRAPENE CAROLINA CAROLINA* (Woodland Box Turtle). CLAW MORPHOLOGY.** Herein, I report observations of an individual female *Terrapene carolina carolina* with exceptionally long claws on the hind limbs from Columbia County, Pennsylvania, USA (exact locality information withheld due to conservation concerns). On 29 May 2015 at 1100 h, I observed an adult female *T. c. carolina* in the vicinity of a railroad right-of-way with strongly curved hind-limb claws approximately 3 cm in length. This same turtle, identified by color pattern and minor damage on the carapace (Dodd 2001. North American Box Turtles: A Natural History. University of Oklahoma Press, Norman, Oklahoma. 231 pp.), was observed in the same general area again on 1 June 2017 and on 9 June 2018 and retained these exceptionally long, curved claws on the hindlimbs (i.e., these structures did not shorten over an approximately three-year period). The hindlimb claws of other male and female *T. c. carolina* observed in this population typically ranged from approximately 1 to 1.5 cm in length.

Terrapene c. carolina exhibits a number of dimorphic secondary sex characteristics; among these, males typically have longer and more curved claws on the hindlimbs than females (Ernst and Lovich 2009. Turtles of the United States and Canada, 2nd ed. Johns Hopkins University Press, Baltimore, Maryland. 827 pp.). Thus, the length of the hindlimb claws of the individual reported herein appears to be unusual and exceptional, especially considering the gender of the turtle. When in captivity, the claws of box turtles can grow to exceptional lengths (often requiring trimming) because the claws may not experience the typical wear that would occur in the wild. Therefore, perhaps this individual in some way does not encounter the conditions within its home-range that typically wear the claws of conspecifics. However, because other *T. c. carolina* in this population do not display exceptionally long hindlimb claws, and the population occurs within a relatively small (ca. 40 ha) wetland and forest fragment bordered on all sides by developed areas (i.e., other individuals in the population likely have overlapping home ranges), the long, curved hindlimb claws of this female might alternatively be attributed to some unique genetic or developmental factor contributing to exceptional growth.

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***TERRAPENE ORNATA* (Ornate Box Turtle). LONGEVITY.** The captive longevity record for *Terrapene ornata* is 28 yrs for a female (Slavens and Slavens 1999. Reptiles and Amphibians in Captivity Breeding—Longevity and Inventory January 1, 1999. Slaveware, Seattle, Washington. 400 pp.), although another female lived 22 years in captivity and was estimated to be 20 yrs old when first acquired (Ernst, in Ernst and Lovich 2009. Turtles of the United States and Canada. The Johns Hopkins University Press, Baltimore, Maryland. 840 pp.). In the field, Legler (1960. Univ. Kansas Publ. Mus. Nat. Hist. 11:527–669) speculated that *T. ornata* in Kansas might live to 50 yrs, but he lacked long-term recapture data to confirm this. Based on a 23-year study in Texas, Blair (1976. Southwest. Nat. 21:89–104) estimated his three oldest box turtles to be 31–32 yrs of age. Similarly, following 26 years of fieldwork in Kansas, Metcalf and Metcalf (1985. J. Herpetol. 19:157–158) estimated their oldest box turtles to be about 28 yrs, and they explicitly rejected Legler's (1960, *op. cit.)* 50-yr longevity estimate. Finally, at a site in New Mexico, Germano (2014. Chelon. Conserv. Biol. 13:56–64) recaptured three box turtles over a 22-year period that he estimated to be >40 years old. We here report that our field data from Nebraska confirm Legler's speculation.

During our mark-recapture study of turtles at and around Gimlet Lake on the Crescent Lake National Wildlife Refuge (Garden County, Nebraska) from 1981–2018, we individually marked 609 Ornate Box Turtles (plus over 2073 recaptures). We used counts of plastral annuli to estimate the age of each turtle at first capture (following Legler 1960, *op. cit.* and Blair 1976, *op. cit.*), although for turtles with more than ca. 12 annuli, we could only estimate a minimum age. A number of adult box turtles that were so aged in the early years of our study were captured as many as 37 yrs later, allowing us to estimate longevity in our population (Table 1).

Furthermore, of 19 females first captured as adults in 1981 or 1982, five were never seen again (presumably transients: see Kiester et al. 1982. Evolution 36:617–619); however, four were recaptured in 2018, after 37–38 yrs. Similarly, of 10 males first captured as adults in 1981 or 1982, two were never seen again, and one was recaptured in 2015 after 33 yrs. Hence, of 22 "resident" adults present in 1981–1982, at least five (23%) survived at least 33 yrs (an annualized survival rate of 99.2%, and four survived at least 36 yrs (an annual rate of 99.4%; see also Converse et al. 2005. Ecol. Appl. 15:2171–2179). These data clearly suggest that Ornate Box Turtles at the northern end of the species' range live well beyond 50 years, that females may outlive males, and that some box turtles may survive to six decades.

Table 1. Maximum carapace length (CL in mm; following Cagle 1946. Amer. Midl. Nat. 36:685–729), maximum plastron length (PL in mm), and estimated age (in number of winters) of long-term recaptures of *Terrapene ornata* in western Nebraska. Ages at initial capture were estimated from counts of plastral annuli and represent minimum ages. Letters after ID numbers indicate sex (M, male; F, female).

	First capture				Last capture			
ID	Year	CL	PL	Age	Year	CL	PL	Age
2F	1981	111.1	118.1	>20	2018	110.3	119.9	>57
8F	1981	107.5	114.2	>20	2018	107.4	121.3	>57
129F	1981	104.9	115.9	>20	2018	104.9	118.9	>57
29F	1982	111.5	—	>20	2018	110.9	116.2	>56
138F	1983	116.8	120.5	>20	2017	115.2	120.7	>54
81M	1982	107.5	111.4	>20	2015	114.4	117.4	>53
233F	1988	110.5	116.3	>20	2018	110.3	122.0	>50
134F	1986	112.2	119.9	>20	2014	114.0	121.8	>48
132AF	1983	119.0	131.8	>20	2010	—	—	>47
538F	1990	105.2	114.0	>20	2017	109.8	116.3	>47
132BF	1985	119.0	126.4	>20	2010	—	—	>45

We thank the staff of the Crescent Lake National Wildlife Refuge (CLNWR) for allowing us to undertake this research. Turtles were captured and held under annual permits from the CLNWR as well as the Nebraska Game and Parks Commission. Our field methods adhered to the American Society of Ichthyologists and Herpetologists' Guidelines for use of Live Amphibians and Reptiles in Field and Laboratory Research, and in recent years to approved protocols from the Earlham College Institutional Animal Care and Use Committee.

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***TRACHEMYS ORNATA* (Ornate Slider). PREDATION.** *Trachemys ornata* is a large freshwater turtle endemic to the Pacific Coast region of western Mexico from southern Sinaloa and northern Nayarit (Parham et al. 2015. Proc. California Acad. Sci. 62:359–367). This species is listed as Vulnerable by the IUCN Red List (www.iucnredlist.org; 21 June 2018) and little is known about its natural history. Here I provide evidence of natural predation of an adult *T. ornata* by a Jaguar (*Panthera onca*) in Nayarit, western Mexico.

At 2307 h on 8 April 2018, a camera trap (Cuddeback Color C1) set by VHL at "El Pozo Chino" in the Municipality of Santiago Ixcuintla, Nayarit (21.69017°N, 105.45927°W, WGS 84; 8 m elev), captured an image of an adult female *Panthera onca* carrying an adult *Trachemys ornata* in its mouth (Fig. 1) in a seasonally flooded mangrove forest. With the exception of its head, the Jaguar was completely wet, which suggests that she had crossed a nearby body of water where she probably encountered the turtle. The presence of *T. ornata* in the area has been confirmed by VHL visually all across the Santiago River basin, including the wetland (El Pozo Chino) within 50 m of the location where the photo was recorded.

Fig. 1. A camera trap image of a female *Panthera onca* carrying an adult *Trachemys ornata*, Santiago Ixcuintla, Nayarit, western Mexico.

Jaguars are known to prey on turtles, with sea turtles (Veríssimo et al. 2012. Oryx 46:340–347), freshwater and terrestrial turtles (Emmons 1989. J. Herpetol. 23:311–314) having been documented as part of the Jaguar's diet. However, to our knowledge, this is the first evidence of Jaguar predation on *T. ornata*.

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CROCODYLIA — CROCODILIANS

***ALLIGATOR MISSISSIPPIENSIS* (American Alligator). NOVEL NESTING SITE.** *Alligator mississippiensis* occurs throughout Louisiana, USA, with abundant habitat and the highest nest densities being found in coastal marshes (McNease and Joanen 1978. Proc. Ann. Conf. SE Assoc. Fish Wildl. Agencies 32:182–186). In addition to nesting in the marsh proper, *A. mississippiensis* will also nest on levees (6.7% of 315 nests, Joanen 1969. Proc. SE Assoc. Game Fish Comm. Conf. 23:141–151) and spoil banks (9.4% of 53 nests, Platt et al. 1995. Proc. Annu. Conf. SE. Assoc. Fish Wildl. Agencies 49:629–639). In recent years, marsh restoration efforts have included construction of terraces, which are discontinuous narrow strips of created marsh, typically formed of dredge material from pond bottoms, often stabilized with emergent plants (O'Connell and Nyman 2011. Environ. Manage. 48:975–984, and references therein). Terraces might limit marsh losses, as they can increase marsh edge, presumably slow erosion, stimulate production of vegetation, and decrease excessive pond depths (O'Connell and Nyman 2010. Wetlands 30:125–135; O'Connell and Nyman 2011, *op. cit.*).

On 12 June 2107, aerial surveys were conducted by helicopter to locate *A. mississippiensis* nests on Rockefeller Wildlife Refuge in Cameron Parish, Louisiana, USA, to obtain eggs for various research studies. Due to time constraints and expense associated with helicopter surveys, we attempted to locate as many nests as possible in the best habitat, to limit flight time required, and work most efficiently. Thus, neither fixed transects nor systematic grids were flown; we simply focused searches on areas known to have the best quality nesting habitat, in one of the marsh management unit systems (Unit 6 off the Superior canal), and located approximately 150 nests in this and surrounding units. One *A. mississippiensis* nest was observed incidentally on a terrace (Fig. 1) while "deadhead" flying back to the refuge headquarters to refuel the aircraft. Construction of the earthen terrace was completed in November 2015, and it was subsequently planted with *Paspalum vaginatum* (Seashore Paspalum) and *Scirpus californicus* (Giant Bulrush or Bullwhip) in spring of 2016 (Louisiana Department of Wildlife and Fisheries 2015 – 2016 Annual Report. 144 pp.).

On 14 June 2017, we collected *A. mississippiensis* eggs from many of the nests found on 12 June, including the one located on the terrace. This nest contained 26 eggs, all of which were fertile, and approximately 6 days old. The female *A. mississippiensis* actively defended the nest. The eggs were collected and placed in a field incubator. On 20 June we returned to the nest site to collect an adult female *A. mississippiensis* for a research study. The female alligator again defended the nest, was captured, and measured 211 cm total length. The nest was constructed of *P. vaginatum* (Fig. 2) and dimensions were 145 cm x 152 cm across (slightly smaller than the average nest diameter of 182 cm in Joanen, *op. cit.*), and nest height was 43 cm. The surrounding *P. vaginatum* on the terrace measured approximately 53 cm high. The terrace was 6.7 m wide and approximately 290 m long.

The 26 eggs from the nest described were provided to a university researcher on 23 June. Three eggs died during incubation, two eggs were sacrificed, and the remaining 21 hatched successfully (hatch rate at least 80.8%, possibly 88.5% had the two eggs sacrificed hatched successfully).

Due to abundant wetlands habitat in Louisiana (2–3 million acres; Elsey and Kinler 2011. *In* P. S. Soorae [ed.], Global Re-introduction Perspectives: 2011. More Case Studies from around the Globe, pp. 125–129. IUCN/SSC Re-introduction Specialist Group, Gland, Switzerland and Environment Agency-Abu Dhabi, Abu Dhabi, UAE). *Alligator mississippiensis* may not "need" to nest on terraces, but an additional benefit of marsh restoration projects to conserve and protect fragile wetlands might also be to incidentally provide additional alternate nesting habitat sites

Fig. 1. Map illustrating location of *Alligator mississippiensis* nest (yellow circle) on a terrace in Cameron Parish, Louisiana. Note other terraces south and northeast of the one with the nest (white circles).

for *A. mississippiensis*. It is possible we might have observed more *A. mississippiensis* nests on the terraces had we conducted an intensive search of all terraces in the Superior marsh system. A land manager for an adjacent private property also reported seeing an *A. mississippiensis* nest on a similar terrace in the 2017 nesting season (T. Joanen, pers. comm.), but it is unknown if any eggs were present, or if eggs were fertile or viable. *Alligator mississippiensis* sometimes have incomplete nesting attempts that do not contain eggs (Joanen, *op. cit.*; Platt et al., *op. cit.*). Similar to our observation in Louisiana, a recent report noted the finding of an *A. mississippiensis* nest on a constructed tree island on Arthur R. Loxahatchee National Wildlife Refuge in Florida, USA; these tree islands are part of restoration efforts in the Florida Everglades and provide suitable habitat for certain vertebrates (Cline et al. 2016. Herpetol. Rev. 47:455–456).

Terraces have also provided nesting habitat for *Anas fulvigula* (Mottled Duck) in coastal Louisiana (Brasher et al. 2007. Occurrence of mottled duck nests on constructed marsh terraces in Louisiana and Texas – a pilot study. Final Report 14 November 2007. Gulf Coast Joint Venture. National Wetlands Research Center, Lafayette, Louisiana. 8 pp.) and might be used by other marsh birds; future studies are underway to document possible terrace use by other avian species on Rockefeller Wildlife Refuge (J. Marty, pers. comm.).

In addition to the unusual site for the nest described herein, the plant material of which the mound was constructed is also novel. *Paspalum vaginatum* was not noted as vegetation in any of the 315 *A. mississippiensis* nests in a prior study at this site (Joanen, *op. cit.*), nor in other studies in Louisiana (Carbonneau 1987. Nesting Ecology of an American Alligator Population in a Freshwater Coastal Marsh. Master of Science Thesis. Louisiana State University. 53 pp; Platt et al. 1995, *op. cit.*). This species was also not used in nests in other states, including a large series of 111 *A. mississippiensis* nests in Florida (Deitz and Hines 1980. Copeia 1980:249–258) or 767 nests monitored in South Carolina (Wilkinson 1983. Nesting Ecology of the American Alligator in Coastal South Carolina. Study Completion Report. August 1978 – September 1983. S.C. Wildlife and Marine Resources Dept. 114 pp.). A small study in Texas (Hayes-Odum et al. 1993. Texas J. Sci. 45:51–61) documented two nests at an inland site that were composed in part of *Paspalum floridanum* (Florida Paspalum).

Fig. 2. Adult *Alligaor mississippiensis* (211 cm total length) defending nest constructed on a terrace in Cameron Parish, Louisiana.

This finding of an *A. mississippiensis* nest on a narrow terrace illustrates how adaptable the species can be, and that they may use various new plant materials to construct nest mounds. Of particular interest, an extraordinary *A. mississippiensis* nest was found constructed on a sanitary landfill on New Orleans, Louisiana in 1991, and was composed almost entirely of plastic bags (Coulson and Coulson 1993. Herpetol. Rev. 24:58). The nest mound also contained a flip-flop sandal, a plastic baby doll, and a plastic vegetable oil container; and the clutch had 36 *A. mississippiensis* eggs; the following year another *A. mississippiensis* nest was found 4.6 m from the 1991 nest (Coulson and Coulson, *op. cit.*).

Crocodilians can nest on man-made and natural islands (Hayes-Odum, *op. cit.*; Platt et al. 2008. J. Zool. 275:177–189); terraces might serve as functional islands providing potential nesting habitat. Future studies are planned to determine if adverse habitat conditions such as flooding or drought in natural marshes lead to more use of terraces as nesting sites for *A. mississippiensis*.

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***ALLIGATOR MISSISSIPPIENSIS* (American Alligator). TOLERANCE OF POTENTIALLY TOXIC NON-NATIVE PREY.** American Alligators are opportunistic predators and their food habits have been well studied (Elsey et al. 1992. Proc. Southeast. Assoc. Fish Wildl. Agencies 46:57–66, and references therein). Composition of *Alligator mississippiensis* diet often varies due to regional prey availability (Gabrey 2010. Herpetol. Conserv. Biol. 5:241–250; Rosenblatt et al. 2015. Oecologia 178:5–16). Several studies conducted in Florida reported the native *Pomacea paludosa* as important invertebrate prey for *A. mississippiensis* (Fogarty and Albury 1967. Proc. Annu. Conf. SE. Assoc. Game Fish Comm. 21:220–222; Delany and Abercrombie 1986. J. Wildl. Manag. 50:348–353). A recent study conducted in southeastern and southwestern Louisiana on food habits of 448 adult *A. mississippiensis* reported unspecified "snails" were observed in some stomach contents (Gabrey, *op. cit.*). However, differential digestion rates can lead to over-representation of prey items such as keratinized scutes and scales which are resistant to digestion, or under-representation of rapidly digested soft-bodied prey items (Jackson et al. 1974. J. Herpetol. 8:378–381; Garnett 1985. J. Herpetol. 19:303–304; Delany and Abercrombie, *op. cit.*; Platt et al. 1990, Northeast. Gulf Sci. 11:123–130; Barr 1997. Food Habits of the American Alligator, *Alligator mississippiensis*, in

FIG. 1. *Alligator mississippiensis* stomach filled nearly to capacity with 453 *Pomacea maculata* opercula; specimen was a 328-cm male collected in Terrebonne Parish, Louisiana.

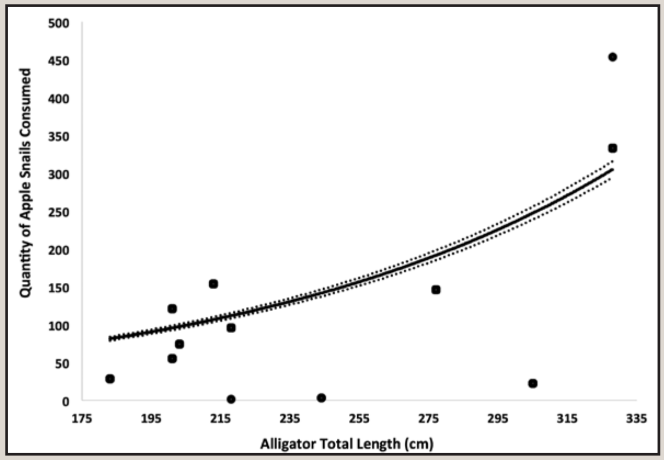

FIG. 2. *Alligator mississippiensis* size (cm) and quantity of opercula recovered in stomach contents.

the Southern Everglades. PhD dissertation. University of Miami, Florida. 244 pp; Nifong et al. 2012. Copeia. 2012:419–423; Rosenblatt et al., *op. cit.*). Fogarty and Albury (1967, *op. cit.*) reported that native *Pomacea paludosa* (Florida Apple Snail) were found to comprise 65.8% of the stomach contents (24 stomachs contained 119 *P. paludosa*) in a small study of 36 immature alligators conducted in a single night with samples collected from a single canal in the Florida Everglades; Rosenblatt et al. (2015, *op. cit.*) further discuss the prevalence of gastropods in the diet of *A. mississippiensis* across a wide range of habitats.

Pomacea maculata (Giant Apple Snail) is an invasive freshwater snail native to South America, and is now established throughout the southeastern United States (Monette et al. 2016. Southeast. Nat. 15:689–696), including Louisiana (Byers et al. 2013. PLoS ONE 8:e56812). This species can pose risks to agricultural crops as well as to human and wildlife health; laboratory studies demonstrated the neurotoxin linked to Avian Vacuolar Myelinopathy (AVM) can be transferred by *P. maculata* to its avian predators (Robertson 2012. Potential Threats of the Exotic Apple Snail *Pomacea insularum* to Aquatic Ecosystems in Georgia and Florida. Master of Science Thesis. University of Georgia, Athens, Georgia. 74 pp.; Byers et. al., *op.cit.*; Dodd et al. 2016. J. Wildl. Dis. 52:335–344). This could be a concern if the neurotoxin is transmittable to alligators by consumption of an affected bird, as *A. mississippiensis* prey on a variety of avian species (Gabrey and Elsey 2017. J. Louisiana Ornithol. 10:1–10); alternately, alligators might be directly susceptible to the neurotoxin.

To deter predation, the egg masses of *P. maculata* contain multiple toxins produced in the albumen glands of females, and when fed to experimental mice, observed effects were lethargy, paralysis, or death depending on the dose (Giglio et al. 2016. Can. J. Zool. 94:777–785). We recently documented an *A. mississippiensis* captured in southeastern Louisiana (in a region with *P. maculata*) with opercula in the stomach (Elsey et al. 2017. Herpetol. Rev. 48:627–628). If *A. mississippiensis* are shown to be susceptible to the toxins from *P. maculata*, it could have important ramifications for *A. mississippiensis* conservation in Louisiana. Thus, we initiated this study to expand our earlier report (Elsey et al. 2017, *op. cit.*) and determine prevalence of *A. mississippiensis* feeding on potentially toxic *P. maculata*, to quantify number of snails consumed, and investigate if snail consumption is related to *A. mississippiensis* size.

We collected stomachs from 12 *A. mississippiensis* from 31 August 2017 through 4 September 2017 from specimens taken in Louisiana's sanctioned alligator harvest. The adult *A. mississippiensis* (183–328 cm total length) were trapped on three properties in Terrebonne Parish and brought to a processing shed in Houma, Louisiana. Efforts were made to select *A. mississippiensis* caught in regions known to harbor *P. maculata*. The viscera or stomach was dissected from carcasses and frozen for later analysis; these were subsequently thawed and stomach contents sorted. When present, *P. maculata* opercula were quantified and each measured to the nearest 0.01 mm with digital calipers. General notes were recorded about other stomach contents present.

All 12 specimens examined had consumed *P. maculata*; one stomach contained only shell fragments, the other stomachs contained numerous (range 3–453) opercula (Fig. 1). Most contained a few opercula with some soft tissue remaining (2.6%, ca. 39 of 1487), indicating recent consumption (Barr 1997, *op. cit.*); that stomach clearance study noted *P. paludosa* opercula remained attached to soft-body tissue for up to 36 h in sub-adult (80–150 cm total length) *A. mississippiensis* stomachs. The size of opercula measured ranged from 10.73–61.59 mm. Other stomach contents included typical prey items found in *A. mississippiensis* stomachs, including insect parts, crustacean remains, fish bones, turtle bones, *A. mississippiensis* parts, bird feathers, fur, parasites, and woody debris and vegetation; as well as some non-food items (fish hooks, bullet fragments, and stones).

There was a statistically significant (albeit a poor fit to the observed data, based on goodness of fit statistic $\hat{c} = 2928.5$) direct relationship between *A. mississippiensis* total length and quantity of snails consumed (general linear model $F_{1,11} = 3139.4$, $P < 0.01$, $\beta = 1.7$ snails $mm^{-1} \pm 0.03$ SE, Fig. 2). When we excluded the two outlier samples with evidence of having consumed only one and only three snails (three rule; Pukelsheim 1994. Am . Statistician 2:88–91), a statistically significantly model with strong explanatory power and a better fit, although underdispersed and potentially exhibiting inaccurately large estimated standard errors ($\hat{c} = 0.66$), resulted for the relationship between *A. mississippiensis* total length and number of snails consumed (generalized linear model with log link and negative binomial probability distribution $F_{1,1028} = 1948.1$, $P < 0.01$, $\beta = 1.6$ snails $mm^{-1} \pm 0.006$ SE). Indeed, this model estimated approximately an increase of one additional snail consumed per 1-mm increase in total length. Also, we found a significant positive relationship between *A. mississippiensis* total length and size of opercula of snails consumed, for those specimens having consumed more than three snails (generalized linear model with a log link and Poisson probability distribution $\hat{c}$ = 1.53, $F_{1,1027}$ = 20.65, $P < 0.01$, = 0.99 ± 0.009 SE mm size of opercula per change in *A. mississippiensis* length).

Our results in this study are similar to a prior study on *Crocodylus moreletii* (Morelet's Crocodile) food habits in Belize, wherein a significant positive correlation occurred between *C. moreletii* SVL and mean, minimum, and maximum length of opercula of *Pomacea flagellata* (Golden Apple Snail) found in *C. moreletii* stomachs (Platt et al. 2006. Herpetol. J. 16:281–290). Interestingly, Platt et al. (2006, *op. cit.*) noted the occurrence of 618 *P. flagellata* in a single *C. moreletii* stomach; these are a large snail (ca. 60–70 g; Platt et al. 2006, *op. cit.*), although perhaps not as large as *P. maculate*, which have been reported with masses ranging from 55.6–135.3 g (Monette et al., *op. cit.*).

Of interest, contents of one stomach sample (277 cm total length male *A. mississippiensis*) contained a large amount of *Myocastor coypus* (Nutria) remains, in addition to 146 *P. maculata* opercula, vegetation, and roundworms. Thus, this *A. mississippiensis* fed almost entirely upon two non-native species (Nutria and Giant Apple Snail), illustrating its adaptability and utilization of available prey resources.

The current study corroborates our earlier finding (Elsey et al. 2017, *op. cit.*) of *A. mississippiensis* consuming *P. maculata*; we now provide details on large quantities consumed (despite potential toxicity) and correlations with alligator size. Thus far we have not noted nor received any reports of any wild alligator morbidity associated with consumption of potentially toxic Giant Apple Snails in Louisiana.

We recently conducted a short-term experimental feeding trial to determine if direct consumption of female Giant Apple Snails could have an adverse effect on alligators; the evidence thus far does not support cause for concern about alligators becoming poisoned by eating female Giant Apple Snails. (Carter et. al., unpubl.). It would be of interest expand the current study even further, and over a longer duration, to determine to what extent *A. mississippiensis* consumes *P. maculata*, as the snails are spreading across Louisiana. However, it is important to recognize the opercula are likely resistant to digestion and could be over-represented in stomach content analyses; Barr (*op. cit.*) noted opercula of *P. paludosa* remained in *A. mississippiensis* stomachs for up to 200 days after ingestion, after which time observations were discontinued. It might be beneficial to determine if *P. maculata* are energetically advantageous as a prey item, perhaps leading this species to consumed with greater frequency by *A. mississippiensis* and other large adult crocodilians. *P. maculata* might also be consumed in high quantity as gastropods might be considered an "easy-capture" prey item (Rosenblatt et al. 2015., *op. cit.*). Whether consumption of possibly toxic *P. maculata* consumed in larger quantities and for extended time periods has adverse effects on *A. mississippiensis* remains unknown. *A. mississippiensis* may possibly have adaptations to neutralize any toxins in the invasive Giant Apple Snails.

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SQUAMATA — LIZARDS

***AMEIVA FESTIVA* (= *HOLCOSUS FESTIVUS*). (Central American Whiptail Lizard). JUVENILE COLORATION.** A variety of reptiles and amphibians exhibit body coloration changes over maturation. A common ontogenetic trend among many lizard species is the loss of conspicuous tail coloration: juveniles bear bright tails that presumably direct predator attacks to a more expendable body region, whereas adults typically lose conspicuous tails as their activity patterns and habitat use (and concomitant selective pressures) change with age (Hawlena et al. 2006. Behav. Ecol. 17:889–896). *Ameiva festiva* is a neotropical, active-foraging lizard inhabiting a wide range of terrestrial habitats including forest interiors, small clearings, and disturbed areas throughout Central America. Juvenile *A. festiva* have bright blue tails, but adults (males > 85 mm; females > 78 mm) lose this trait (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.). Although the function of *A. festiva*'s ontogenetic color change has not been directly examined, it is plausible that differing predation pressures or escape abilities between life stages contribute to the maintenance of this ontogenetic shift in color.

We used spectrophotometry to document the spectral reflectance of a juvenile *A. festiva*'s tail to determine whether juveniles of this species might use ultraviolet signals. We opportunistically captured a juvenile *A. festiva* on a small stream bank within the pre-montane forests of Las Cruces Biological Station, Coto Brus County, Costa Rica, on 25 July 2016. During capture this individual autotomized its tail, which was in the juvenile-typical blue phase. We temporarily retained the autotomized tail and measured tail color within 60 seconds of tail separation. Spectrophotometric measurements were performed using a hand-held portable JAZ spectrophotometer (Ocean Optics, Dunedin, Florida). The tail was illuminated by a xenon-pulsed light source via a bifurcated optical fiber with a shielded probe held at a 90°-angle to the surface of the tail. Reflectance was recorded relative to a 99% Spectralon WS-2 reflectance standard (Ocean Optics). Four separate points were measured on the tail, and we used the average of the four spectra to characterize tail reflectance within the visible and ultraviolet range (300–700 nm). The spectra were mean-averaged and smoothed (Maia et al. 2013. Methods Ecol. Evol. 4: 906–913) using a LOESS smoother with a span parameter set to 0.1 in R (ver. 3.1.2; R Core Team 2014). The average reflectance spectrum (Fig. 1) shows a single major peak at 475 nm, indicating a high level of reflectance in the visible blue region of the spectrum. No reflectance peak was noted in the ultraviolet region.

Our observation suggests that juvenile *A. festiva* tails do not bear substantial ultraviolet colors; tail coloration appears to be limited to blue wavelengths. The blue coloration is most

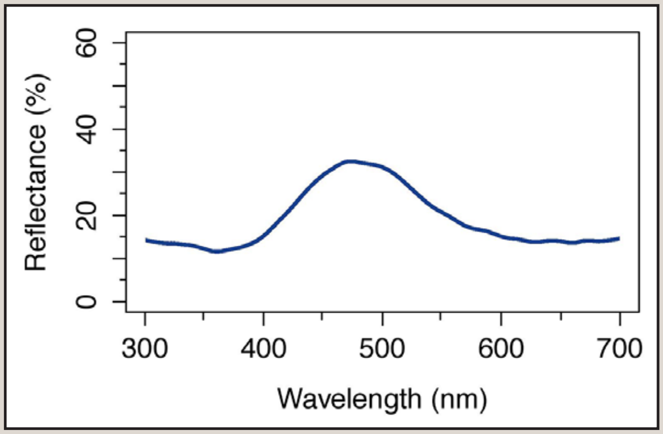

Fig. 1. Average tail reflectance spectrum of a juvenile *Ameiva festiva.*

likely generated via a structural mechanism (through blue light scattering as it passes through skin chromatophore cells). As blue tail coloration is restricted to juveniles, it is unlikely to serve a role in sexual signaling. Information about the primary predators of adult and juvenile *A. festiva* is generally lacking, although some studies report that snakes might be important predators of *A. festiva* (Sorrel 2009. Copeia 2009:105–109) and other co-occurring *Ameiva* species (Hirth 1963. Ecol. Monogr. 33:83–112). Nevertheless, if blue tails do indeed function to misdirect predator strikes in juvenile *A. festiva*, the tail's conspicuous coloration suggests that visual predators (e.g., birds) might also be important during this life stage.

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***ANOLIS UNILOBATUS*. SURFACE TENSION.** *Anolis unilobatus* is a small anoline lizard that ranges from southern Mexico to Costa Rica (Köhler and Vesely 2010. Herpetologica 66:207–228). They can often be found on fences where they are usually perched head down on the posts, especially near bushes. At some locations they can reach high densities (Köhler and Vesely, *op. cit.*). Several species of *Anolis* exhibit aquatic activity, perching near bodies of water to either hunt or escape from predators by swimming or diving (Robinson 1962. Copeia 1962:640–642; Brandon et al. 1966. Herpetologica 22:156–157; Beuttell and Losos 1999. Herpetol. Monogr. 13:1–28; Leal and Losos 2000. J. Herpetol. 34:318–322; Birt et al. 2001. J. Herpetol. 35:161–166). Herein, I report for the first time use of water as an alternative mechanism against threat in *A. unilobatus.*

At 1054 h on 29 November 2017, in ejido Copoya, Municipio de Tuxtla Gutiérrez, Chiapas, México (16.71730°N, 93.12820°W, WGS 84; 868 m elev.), I observed a subadult male *A. unilobatus* perched on a fallen branch at 1 m above ground level. The vegetation in the area is tropical dry forest, with temporary bodies of water during the rainy season. When I approached, the lizard jumped and fell onto the surface of a small pond, remaining suspended by its limbs and tail on the water's surface. After remaining immobile for less than a minute and suspended on the water surface, the lizard swam ca. 60 cm in a straight line on the surface to the shore. Swimming motions consisted of rapid undulatory movements of the body and tail with adpressed limbs. Although *A. unilobatus* is not an inhabitant of aquatic habitats, this could imply that the use of water as a refuge is a facultative phenomenon as Powell and Parmerlee (1993. Herpetol. Rev. 24:59) mention for *A. chlorocyanus*, and the small size at the subadult stage might facilitate suspension on water and surface swimming.

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***CHALCIDES OCELLATUS* (Ocellated Skink). DIET.** A specimen of *Chalcides ocellatus* was collected at Mishor Yamin, Israel (31.00397°N, 35.10713°E) on 22 June 2012. The specimen, an adult male with a total length of 132 mm (snout–vent length 82 mm, tail length 50 mm, mass 11.8 g), was deposited in the Steinhardt Museum of Natural History (Tel Aviv, Israel) as TAU 16357. Dissection of the *C. ocellatus* specimen revealed a *Mesalina guttulata* (Small-spotted Lizard, TAU 17847) within its digestive tract (Fig. 1). The head and tip of the tail of the *M. guttulata* are missing (presumably digested during the intervening period between initial predation and time of collection). The total length of the remaining *M. guttulata* specimen was 44 mm from base of neck to broken tail tip (base of neck to cloaca: 22.7 mm; cloaca to broken tip of tail 21.3 mm). This means the *M. guttulata* was no less than a third of the total length of the *C. ocellatus*, and in all likelihood larger with the inclusion of its head and, potentially, its tail.

In Israel *C. ocellatus* is noted to primarily feed on various arthropods, occasionally supplementing its diet with fruit (Bar and Haimovitch 2011. A Field Guide to Reptiles and Amphibians of Israel. Pazbar LTD, Herzliya. 246 pp.). In other parts of its distribution, instances have been reported of it preying on *Podarcis filfolensis* (Filfola Wall Lizard) and conspecific juveniles (Carretero et al. 2010. Bonn Zool. Bull. 57:111–118). However, saurophagy has not been reported for this species from Israel. This new finding strengthens our understanding of *C. ocellatus* as an opportunistic omnivore.

Fig. 1. *Chalcides ocellatus* (left) with a partially digested *Mesalina guttulata*, removed from its stomach (right).

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***CYRTODACTYLUS PULCHELLUS* (Malayan Forest Gecko). ENDOPARASITE.** *Cyrtodactylus pulchellus* ranges from southern Thailand throughout much of Peninsular Malaysia; it is nocturnal and scansorial, restricting its activity to rocks, trees, or root systems (Grismer 2011. Lizards of Peninsular Malaysia, Singapore and their Adjacent Archipelagos. Edition Chimaira, Frankfurt am Main, Germany. 728 pp.). We know of no reports of endoparasites from *C. pulchellus*. Here we report the presence of one species of Nematoda, thereby establishing the helminth list for this gecko.

One female *C. pulchellus* (SVL = 111 mm), from Peninsular Malaysia, Penang State, Pulau Pinang. Air Terjun Titi, Kerawang (5.40388°N, 100.22333°E, WGS 84; 257 m elev.) and deposited in the herpetological collection of La Sierra University (LSUHC), Riverside, California, USA as LSUHC 10022 was examined. The specimen had been collected in March 2011 by hand, was euthanized within 12 h of capture, preserved in 10% formalin, and stored in 70% ethanol. The body cavity was opened by a longitudinal incision, and the digestive tract was removed and opened. The esophagus, stomach, small intestine, and large intestine were examined for helminths under a dissecting microscope. Only one nematode was found (small intestine) which was placed on a glass slide in a drop of lactophenol, a coverslip added, and identification made from this temporary wet mount utilizing Anderson et al. (2009. Keys to the Nematode Paraasites of Vertebrates, Archival Volume. CAB International, Wallingford, Oxfordshire. 463 pp.) and Gibbons (2010. Keys to the Nematode Parasites of Vertebrates, Supplementary Volume. CAB International, Wallingford, Oxfordshire, UK. 416 pp.). The nematode was identified as a male *Rhabdocona* sp. and subsequently deposited in the Harold W. Manter Parasitology Laboratory (HWML), The University of Nebraska, Lincoln, Nebraska, USA as HWML 92091.

We have assigned our specimen to *Rhabdochona* because the cylindrical, elongated pharynx is dilated anteriorly to form a well-defined funnel-shaped buccal cavity armed with sclerotized rods projecting anteriorly as teeth. In addition, caudal alae are absent, gubernaculum is absent, and spicules are unequal and dissimilar.

Rhabdochona is a speciose genus considered by Asmatullah-Kakar et al. (2012. Pakistan J. Zool. 44:95–99) to contain over 160 species. Members of *Rhabdochona* are commonly found as parasites of freshwater fishes, less frequently in marine fish from all zoogeographical realms (Bilqees 1979. Zool. Scripta 88:107–110; Lakshmi 2001. Bol. Chileno Parasitol. 57:3–4; Moravec 2007. Folia Parasitol. 55:144–160; Moravec 2010. Acta Parasitol. 55:144–160).

Rhabdochona sp. in *C. pulchellus* is a new host record and the first report of this genus from a lizard.

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***HOLBROOKIA LACERATA* (Spot-tailed Earless Lizard). BURYING BEHAVIOR.** Burying behavior is well documented within the phrynosomatid sand lizards, but no literature exists on the burying habits of *Holbrookia lacerata*. Other members of this clade prefer sandy soils and are known to bury in soft soils to avoid extreme temperatures and predation, and to lay eggs (Axtell 1956. Bull. Chicago Acad. Sci. 10:163–179; Brennan and Holycross 2009. A Field Guide to the Amphibians and Reptiles in Arizona. Arizona Game and Fish Department, Phoenix. 150 pp.; Hibbitts and Hibbitts 2015. Texas Lizards: A Field Guide. University of Texas Press, Austin. 351 pp.). *Uma notata* (Colorado Desert Fringe-toed Lizard) have been documented burying themselves in coarse pebbly sand (Pough 1970. Copeia 1970:145). However, clay soils are preferred by *H. lacerata* (Hibbitts and Hibbitts, *op. cit.*).

Over the course of a telemetry study on *H. lacerata* from May to July 2017, a number of individuals were discovered buried in multiple substrates and under varied weather conditions. All lizards used in the study were adults. Two sites were used for this study: one located in Crockett County, Texas, USA (ca. 30.9300°N, 101.1916°W; WGS 84) and another located in Val Verde County, Texas, USA (ca. 29.3712°N, 100.7722°W; WGS 84). Lizards from these sites represent two separate subspecies: *H. l. lacerata* (Northern Spot-tailed Earless Lizard) at the Crockett County site and *H. l. subcaudalis* (Southern Spot-tailed Earless Lizard) at the Val Verde County site. The Crockett County site consists of a mixture of Chihuahuan thornscrub and arid grasslands. The Val Verde County site is heavily modified and consists of a mowed airfield surrounded by Chihuahuan thornscrub. Both sites are primarily clay soils intermixed with varied amounts of limestone.

In Val Verde County, eight individual lizards were observed at least partially buried a combined total of 37 times. Many of these events were sequential encounters in the exact same location. Assuming these represented times the lizards did not become active and then rebury themselves at the same location, lizards were discovered buried 17 times. Five lizards were female, two of which were gravid during and after our observations. With respect to weather, 78% of encounters with buried lizards occurred during overcast or rainy conditions, while the remaining observations were made during sunny conditions. Lizards never buried more than 1 cm deep, and were occasionally partially exposed. One female lizard was documented twice buried into a harvester ant (*Pogonomyrmex* sp.) mound. Four lizards were recorded buried along caliche roads in shallow, relatively loose gravel. Two lizards were discovered buried in the detritus and shallow soil occupying cracks in an abandoned asphalt runway. Additionally, 325 of 578 total observations (56.2%) of lizards were found completely hidden underneath thick forbs or grass bunches but not buried. Most of these lizards were hiding in detritus, primarily dead grass, beneath the plants. In total, lizards were hidden 62.6% of encounters.

In Crockett County, 10 individual lizards were observed at least partially buried a combined total of 82 times. Excluding sequential encounters in the same exact location, lizards were observed buried 40 times. Six of these lizards were female, and four were male. Five of the females were gravid during burying observations. In contrast to Val Verde County, only 25% of encounters with buried lizards in Crockett County occurred under overcast or rainy conditions. Lizards were recorded buried, or actively burying, in caliche roads 13 times. Additionally, 144 of 475 total observations (30.3%) of lizards were found completely hidden beneath thick forbs or grass bunches, and under dry cattle feces in three cases. Similar to the Val Verde County site, detritus beneath the plants were used as cover. In total, lizards were hidden 47.6% of encounters. Burying behavior at both sites seemed to coincide with longer periods of inactivity (i.e. cool, overcast days). Short-term refuge use was most often just the cover of vegetation or detritus.

Other members of this genus have been shown to be extremely wary, readily sprinting away when approached (Cooper 2000. Behaviour 137:1299–1315). This wariness, in conjunction with their cryptic pattern and the burying habits described here, suggest that the detection probability of this species could be extremely low.

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***HOLBROOKIA LACERATA* (Spot-tailed Earless Lizard). PREDATION.** *Holbrookia lacerata* is a small phrynosomatid lizard that inhabits short-grass prairies in central and south Texas (USA) and adjacent Mexico. Populations of this species are thought to be in decline, but little is known about its natural history, especially sources of predation. Here we report an observation of predation on *H. lacerata* by a Rio Grande Ground Squirrel, *Ictidomys parvidens*.

At 1325 h on 4 June 2017, during a telemetry study of *H. lacerata* on Laughlin Air Force Base in Val Verde County, Texas, USA, while attempting to locate a study lizard on the airfield, we received a signal, and approximately 30 m ahead a ground squirrel was eating a food item. Upon further inspection through binoculars, the food item was determined to be the telemetered study lizard in question (Fig. 1). The lizard was still alive when first sighted. The squirrel shook the lizard a few times, and then began eating it, headfirst. When approached, the squirrel retreated to a nearby burrow with the lizard. The lizard was a gravid female (SVL = 58 mm, mass = 6.4 g). The lizard had two missing toes and a partially regrown tail, perhaps contributing to its capture.

Sciurid consumption of animals, particularly small vertebrates, has been well documented (Callahan 1993. Great Basin Nat. 53:137–144) but little literature exists on the specific predatory habits of *Ictidomys parvidens*. This squirrel is native to southern and western Texas, southeast New Mexico, and adjacent Mexico. It occupies grass and shrublands, and shares much of this habitat with *H. lacerata*. These two species are commonly encountered on the airfield portion of the base. Both also exist in above-average numbers (as compared to surrounding habitat) and interactions between species are likely not uncommon.

Fig. 1. *Ictidomys parvidens* preying upon *Holbrookia lacerata*. The radiotransmitter can be seen affixed to the back of the lizard.

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***LYGODACTYLUS KLUGEI* and *TROPIDURUS COCOROBENSIS*. DEATH FEIGNING**. *Lygodactylus klugeii* is a small, diurnal, and arboreal lizard occurring in the areas of Caatinga domains, in northeastern Brazil. *Tropidurus cocorobensis* is a medium-sized and diurnal lizard with a relictual distribution in the northeastern semi-arid zone, occurring in the states of Bahia, Alagoas, and Pernambuco (Uetz et al. 2018. The Reptile Database; http://www.reptile-database.org; accessed 8 January 2018). Information about its natural history remains scarce. Here, we describe defensive behavior of *L. klugei* and *T. cocorobensis* in an area of caatinga, Brazil.

At 0953 h on 18 October 2017, during fieldwork in the Catimbau National Park, Pernambuco, Brazil (8.34150°S, 37.14385°W, WGS 84; 764 m elev.), a *T. cocorobensis* was captured by hand. Immediately after capture the lizard displayed death feigning behavior, remaining immobile for about three minutes.

The second observation occurred at 0923 h on 21 December 2017, also in Catimbau National Park. Here we captured two *L. klugei*; each displayed similar death feigning behavior. The lizards remained on their back, with eyes open and feet up, both for about a minute, after which time each returned to its usual position.

Our observations are consistent with thanatosis in response to the percevied threat of predation. Thanatosis has been reported in lizards including species of Tropiduridae: *Tropidurus montanus* (Machado et al. 2007. South Am. J. Herpetol. 4:136–140), *Eurolophosaurus nanuzae* (Galdino and Pereira 2002. Herpetol. Rev. 33:54), *E. divaricatus* (Gomes et al. 2004. Amphibia-Reptilia 25:321–325), *T. torquatus*, *T. hispidus*, and *T. cocorobensis* (Bertoluci et al. 2006. Herpetol. Rev. 37:472–473). Our observations are the first record of this defensive behavior for *L. klugei* and the second for *T. cocorobensis*.

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***MICROLOPHUS ATACAMENSIS* (Atacamen Pacific Iguana). DIET.** *Microlophus atacamensis* (Tropiduridae) lives in the intertidal zone of the Pacific Coast in the Atacama Desert region of northern Chile (Farina et al. 2008. J. Anim. Ecol. 77:458–468). Although it has a catholic diet that includes conspecifics, as well as insects, marine algae, crustaceans, and mollusks, there are no published records of capturing or consuming fish (Donoso-Barros 1948. Bull. Mus. Nac. Hist. Nat. Chil. 24:213–216; Farina et al., *op. cit.*; González et al. 2011. Oikos 120:1247–1255). At 1450 h on 15 January 2018, when conducting a separate study along the coast of northern Chile, approximately 9 km N of Chañaral, Region III (Atacama), Chañaral Province (26.29549°S, 70.67402°W; WGS84), we observed a medium-sized *M. atacamensis* (subadult, SVL ca. 85 mm; Vidal et al. 2002. Rev. Chil. Hist. Nat. 75:283–292) carrying a small fish (a "blenny" or "borrachilla") from a tide pool up onto the rocks. As we approached, the lizard dropped the fish and fled; we did not witness actual consumption of the fish. The fish was dead when we inspected it. We also do not know if the lizard captured the fish alive or scavenged it. This species of fish is known to cause gastric distress and drowsiness in humans that consume them (Méndez-Abarca and Mundaca 2016. Rev. Biol. Mar. Oceanogr. 51:475–481).

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***PINOYSCINCUS JAGORI* (Jagor's Sphenomorphus). PARASITES.** *Pinoyscincus jagori* is widely distributed in the Philippines (Uetz et al. 2018. The Reptile Database. http://www.reptile-database.org, accessed 29 June 2018) where it is endemic (Gaulke 2011. The Herpetofauna of Panay Island, Philippines. Edition Chimaira, Frankfurt. 390 pp.). We know of no reports of helminths from *P. jagori* and herein establish the helminth list for this skink.

Eight *P. jagori*, collected March 2017 from the Philippines, Albay Province, Municipality of Tabaco, Barangay Mariroc, Sitio Nagsipit (13.32471°N, 123.70018°E; WGS 84) and deposited in the herpetology collection of the Sam Noble Natural History Museum (OMNH), University of Oklahoma, Norman, USA (as OMNH 46152, 46306, 46307, 46310, 46311, 46314, 46315, 46318), were examined. The skinks were fixed in neutral buffered formalin and stored in 70% ethanol. The body cavity was opened by a longitudinal incision and the digestive tract was removed and opened. The esophagus, stomach, and small and large intestine were examined for helminths utilizing a dissecting microscope. Nematodes were placed on a glass slide in a drop of lactophenol, a coverslip was added and identification was made from these temporary wet mounts. Identification was made utilizing Anderson et al. (2009. Keys to the Nematode Parasites, Archival Volume. CAB International, Wallingford, Oxfordshire. 463 pp) and Gibbons (2010. Keys to the Nematode Parasites of Vertebrates, Supplementary Volume. CAB International, Wallingford, Oxfordshire, UK. 416 pp.).

We found cysts containing larvae of two species of Nematoda (*Physocephalus* sp. and larvae assignable to the Ascaridiidae) as well as adult female individuals assignable to the Superfamily Trichostrongyloidea (perhaps *Oswaldocruzia* or *Bakeria* [males necessary for determination]); 4/8 lizards had stomach cysts containing *Physocephalus* sp. (55 total cysts); 2/8 lizards had stomach cysts containing 17 ascaridiid larvae; 3/8 lizards had 4 female trichostrongyloid adults in the stomach or small intestine.

Ascaridiid nematodes are common intestinal parasites of gallinaceous birds (Anderson 2000. Nematode Parasites of Vertebrates Their Development and Transmission, 2nd ed., CABI Publishing, Oxfordshire, U.K. 650 pp.). *Pinoyscincus jagori* are presumably infected by consuming ascaridiid eggs while feeding in fecal contaminated soil. Since development beyond ascaridiid larval stages does not occur in *P. jagori*, they are best considered as paratenic (= transport) hosts. Adults of *Physocephalus* sp. occur in the stomachs of wild and domestic pigs and less commonly in tapirs, horses, cattle, and rabbits; beetles serve as intermediate hosts (Anderson, *op. cit.*). *Pinoyscincus jagori* presumably acquires *Physocephalus* sp. by feeding on infected beetles. As development beyond larval stages of *Physocephalus* does not occur in lizards, we consider them to be paratenic hosts. Goldberg et al. (1994. J. Wild. Dis. 30:274–276) described the pathology caused by *Physocephalus* larvae in the stomachs of *Sceloporus serrifer*.

Members of the Superfamily Trichostrongyloidea are found as parasites of the stomach and intestine in all terrestrial vertebrate groups; infection is acquired by ingestion of larval stages (Anderson, *op. cit.*). Ascaridiidae cysts, *Physocephalus* sp. cysts, and adults of Trichostrongyloidea in *P. jagori* are new host records. Voucher helminths were deposited in the Harold W. Manter Laboratory (HWML), University of Nebraska, Lincoln, USA as: Ascaridiidae cysts (HWML 110422), *Physocephalus* sp. cysts (HWML 110421), and Trichostrongyloidea (HWML 110420).

We thank Cameron D. Siler (OMNH) for permission to examine *P. jagori* and Jessa Watters (OMNH) for facilitating the loan. *Pinoyscincus jagori* were collected under the following permit to CDS: Republic of the Philippines, Department of Environment and Natural Resources, Biodiversity Management Bureau, Gratuitous Permit #260.

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***PLESTIODON LATICEPS* (Broad-headed Skink). REPRODUCTION.** *Plestiodon laticeps* is an arboreal skink that occupies deciduous forests of the southeastern United States. Eastern Kansas comprises the northwestern periphery of its range. Only a single nest has been documented in this portion of the range (Miller and Collins 1993. History, Distribution, and Habitat Requirements for Three Species of Threatened Reptiles in Eastern Kansas. Kansas Department of Wildlife, Parks and Tourism, final report. 30 pp.). Here we report three new nest observations that are the result of a three-year survey in forests of eastern Kansas.

One nest was found on 6 July 2017 at Marais des Cygnes Wildlife Area (38.24080°N, 94.70074°W; WGS 84) in a decayed oak log (*Quercus palustris*). The nest was under bark approximately 0.75 m above the soil surface and consisted of a clutch of 12 eggs. No adults were present at the time of the observation. The dimensions of one egg were 16 mm × 11.5 mm. The nest was checked on 10 July 2017, revealing hatched eggshells.

Two nests were found in Bourbon County (37.71031°N, 94.63465°W; WGS 84) on 12 July 2017 (Fig. 1). The nests were in the same decayed log (*Q. palustris*). Both clutches had 19 eggs and each had an adult female in attendance. The first female weighed 19.5 g and had an SVL of 9.7 cm. The dimensions of one egg from her clutch were 17.5 mm × 12 mm. The second female weighed 19 g and had an SVL of 8.6 cm. The dimensions of one egg from

Fig. 1. Two nests of *Plestiodon laticeps* on a decayed log (*Quercus palustris*).

her clutch were 17 mm × 13 mm. These nests reflect communal nesting at the level of the log, which might or might not be due to limited nest sites. Communal nesting in *P. laticeps* has not been reported in the literature (but see Vitt, pers. comm. in Doody et al. 2009. Quart. Rev. Biol. 84:229–252). The nest reported in 1993 was found under a railroad tie and surrounded by tall trees with thick understory. The nests found in 2017 were in mature forest with little understory and within 60 m of the forest edge.

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PRISTIDACTYLUS CF. SCAPULATUS **(Burmeister's Anole). SAUROPHAGY.** *Pristidactylus cf. scapulatus* is a poorly known lizard that inhabits rocky environments of the Andean Cordillera of San Juan, Argentina (Etheridge and Williams 1985. Breviora 483:1–18). This species feeds on invertebrates (Cei 1993. Reptiles del Noroeste y Este de la Argentina Herpetofauna de las Selvas Subtropicales, Puna y Pampas. Museo Regionale di Scienze Naturali. Torino. 949 pp.) including scarabs (Scarabaeidae), darkling beetles (Tenebrionidae), fruits of *Lycium chañar* and *Ephedra breana* (Acosta et al. 2004. Herpetol. Rev. 35:171–172), and occasionally other lizards (Villavicencio et al. 2009. Herpetol. Rev. 40:225–226; Sanabria and Quiroga 2009. Herpetol. Rev. 40:349–350). Although saurophagy has been documented for *P. cf. scapulatus*, details of those events remain poorly known. Herein, we expand the knowledge of saurophagy by providing a record of predation of *Liolaemus parvus* by *P. cf. scapulatus.*

In December 2010, during a diet study of *P. cf. scapulatus*, we collected 10 adults (mean SVL = 100.2 mm), from Quebrada Vallecito (31.1791°S, 69.7092°W, WGS84; 2860 m elev.), Calingasta Department (San Juan Province, Argentina). We then collected lizard feces until the intestines were completely empty. After feces collection, the animals were released at their original points of capture. We obtained two types of samples: 49 complete fecal boli and a group of disintegrated feces. Samples were preserved in 75% isopropyl alcohol, and analyzed with a dissecting binocular microscope.

We found remnants of *L. parvus* in 30.6% of the analyzed feces (bones, skin, scales, etc.). It was possible to identify four *L. parvus* jaws, belonging to one juvenile (SVL ca. 31 mm) and three adults (SVL ca. 63 mm, 62 mm, and 58 mm). We were able to identify the prey species by comparing jaws with voucher material of *L. parvus* from the herpetological collection of the Facultad de Ciencias Exactas, Físicas y Naturales, Universidad Nacional de San Juan. The remnants of *L. parvus* found were deposited in this collection.

To our knowledge this is the first record of predation of *L. parvus* by *P. cf. scapulatus.* We thank the Secretaría de Ambiente y Desarrollo Sustentable of San Juan for granting us permission to conduct research.

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SALVATOR RUFESCENS **(Argentine Red Tegu). DIET.** *Salvator refescens* is one of the largest lizards in South America, distributed in Argentina, Bolivia, Paraguay, and Brazil (Montero et al. 2004. Cuad. Herpetol. 18:17–32; Cabrera 2009. Lagartos del Centro de la Argentina. Fundación de Historia Natural, Córdoba, Argentina. 120 pp.). It is mainly omnivorous, feeding on a diversity of prey (Williams et al. 1993. Neotrópica 39:45–41; Lopez Juri et al. 2015. South Am. J. Herpetol. 10:132–142). Herein we describe new dietary items for *S. rufescens.*

In January 2018 a juvenile *S. rufescens* (SVL = 24 cm; mass = 1.5 kg) was found dead on the road at Encón (32.18283°S, 67.82437°W), 25 de Mayo Department, Province of San Juan, Argentina, with the Monte phytogeographic formation. It was deposited in the Herpetology Collection, Universidad Nacional de San Juan (UNSJ 4309). The body cavity was opened by a mid-ventral incision and the digestive tract was removed. The stomach and intestines were longitudinally slit and their contents were examined using a microscope. The dissection revealed four types of prey items: two classes of native seeds—*Prosopis flexuosa* (69%, by number) and *Ximenia americana* (6%)—as well as Coleoptera (Scarabaeidae) (24%) and an adult *Pleurodema nebulosum* (Anura: Leptodactylidae) (1%).

Dietary records of *S. rufescens* are detailed in reports by Williams et al. (1993. Neotrópica 39:45–41), Donadio and Gallardo (1994. Rev. Mus. Arg. Cs. Nats. B. Rivadavia Zool.

13:117–127), and Lopez Juri et al. (2015. South Am. J. Herpetol. 10:132–142). Our findings include the first records of *Pleurodema nebulosum* and *Prosopis flexuosa* seeds in the diet of *S. rufescens.*

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***TRACHYLEPIS SECHELLENSIS* (Seychelles Skink). DIET.** *Trachylepis* (previously *Mabuya*) *sechellensis* is a species of skink endemic to the Republic of Seychelles whose diet is known to include arthropods, fruit, bird feces, and dead seabird chicks (Le Maitre 1998. M.Sc. Thesis, University of Natal, South Africa). Here we present the first definitive record of predation of Gekkota by *T. sechellensis.*

At 0856 h on 6 June 2016, we observed an adult *T. sechellensis* consuming a Pacific Gecko (*Gehyra mutilata*) inside a private residence on Denis Island, Seychelles (3.804167°S, 55.6625°E). The *G. mutilata*—which was large in comparison to the skink—was alive and struggling through much of the process, which lasted for several minutes (Fig. 1). A videographic record of the event is also available at https://tinyurl.com/yc32ey9q. Although records exist of *T. sechellensis* preying upon conspecifics and the congener *T. wrightii* (Brooke and Houston 1983. J. Zool., Lond. 200:179–95), we believe this to be the first conclusive record of *T. sechellensis* preying upon a species of gecko.

Fig. 1. Seychelles Skink (*Trachylepis sechellensis*) preying upon a Pacific Gecko (*Gehyra mutilata*).

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***UTA STANSBURIANA* (Common Side-blotched Lizard). INTERSPECIFIC AGONISTIC BEHAVIOR.** *Uta stansburiana* has a large range within the deserts of North America, extending from the Pacific Coast to Texas, and from the northern reaches of the Great Basin south into Mexico. This species is also one of the most commonly encountered lizards within that geographic area. Consequently, Side-blotched Lizards have been used extensively as research subjects to study phenomena as diverse as thermal biology (e.g., Waldschmidt and Tracy 1983. Ecology 64:476–484) and reproductive physiology (e.g., Sinervo and Licht 1991. Repro. Biol. 257:252–264). They have been described as one of the best understood lizards in the world with regards to their ecology (Parker and Pianka 1975. Copeia 1975:615–632). Side-blotched Lizards have been noted for their territoriality and their frequent aggressive intraspecific interactions (Irwin 1965. Copeia 1965:99–101). Herein we report an apparent interspecific aggressive interaction between a *U. stansburiana* and a galliform bird.

Fig. 1. *Uta stansburiana* having righted itself after an attempted attack of a Gambel's Quail.

At 0942 h on 23 July 2017, CH was observing birds in the vicinity of Ivins, Utah, USA (37.16860°N, 113.67501°W, WGS 84; 939 m elev.). While photographing a pair of Gambel's Quail (*Callipepla gambelii*), CH observed an adult male *U. stansburiana* emerged onto a rock near the subjects. Seemingly unprovoked, the lizard lept from its position on the adjacent rock toward the cervical region of the male quail. The lizard then slipped from the back of the bird and fell near the bird's feet. Although unable to photograph the jumping component of the interaction, Fig. 1 shows the lizard righting itself at the bird's feet. The quail seemed unphased by the encounter.

There are three apparent hypotheses regarding the motivation for this behavior, with varying levels of viability. First, the lizard may have been attempting to attack the bird as a potential prey item. This seems unlikely given the dramatic size difference between the two animals and the typical diet (insects) for *U. stansburiana*. Second, the lizard may have been jumping to catch an insect on or near the quail. While this seems to be a plausible hypothesis, the observer did not note the presence of any insects near the birds. Third, the lizard may have been attempting to intimidate the bird in defense of its territory. Given the territorial nature of *U. stansburiana*, and the fact that this was a mature male during breeding season (Medica and Turner 1976. J. Herpetol. 1976:123–128), this third hypothesis seems the most plausible. We are not aware of any other reported accounts of *U. stansburiana* exhibiting agonistic behavior toward an avian species.

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SQUAMATA — SNAKES

***AGKISTRODON PISCIVORUS* (Western Cottonmouth). PREDATION.** Previous to the following observation, the known natural predators of *Agkistrodon piscivorus* include wading birds, birds of prey, alligators, and other ophiophagous snake species including *Lampropeltis getula* (Common Kingsnake) and *A. piscivorus* (Gloyd and Conant 1990. Snakes of the *Agkistrodon* Complex: A Monographic Review. Society for the Study of Amphibians and Reptiles, Oxford, Ohio. 614 pp.). On 16 October 2017, at 1139 h, we radio tracked a large (SVL = 103.4 cm, tail length = 16.0 cm, 1490 g) male *A. piscivorus* to a mammal burrow (33.26849°N, 95.801719°W; WGS 84) 120 m away from a small tributary of the South Sulphur River located on the Cooper Lake Wildlife Management Area in northeastern Texas, USA. The individual was in ecdysis (eyes completely opaque) and was basking ca. 60 cm from the burrow's entrance. On the following day (1226 h), we radio tracked the individual to the same location. Upon approaching the immediate area, we observed a single *Canis latrans* (Coyote) depredating the snake prior to retreating into the woods and carrying off most of the carcass.

Canis latrans is known to prey on venomous snakes (Rubio 1998. Rattlesnake: Portrait of a Predator. Smithsonian Institution Press, Washington DC. 240 pp.); however, to our knowledge this is the first detailed account of predation on *A. piscivorus* by *C. latrans*. We speculate that the successful predation event on such a large venomous snake may be attributed to the snake's ecdysis state. During ecdysis snakes lose visual acuity (King and Turmo 1997. J. Herpetol. 31:310–312) and increase basking behavior for thermoregulation which may incur greater risks for predation (Gibson et al. 1989. Can. J. Zool. 67:19–23).

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***BOIRUNA MACULATA* (Mussurana). COLORATION.** *Boiruna maculata* is a medium-sized dipsadine colubrid found in southern Brazil, southern Bolivia, Paraguay, Uruguay, and northwestern Argentina. Some specimens of *Boiruna maculata* (as well as *Clelia clelia*, *C. plumbea*, and species of *Pseudoboa*) are irregularly spotted with white, in some cases being almost completely white with some black patches (Boulenger 1896. Catalogue of the Snakes in the British Museum. Vol. III. xiv+727 pp.; Cei 1993. Mon. Mus. Reg. Sci. Nat. Torino. 14:1–949; Giraudo 2001. Serpientes de la Selva Paranaense y del Chaco Húmedo. Literatura of Latin América, Buenos Aires. xiv+289 pp.; Scott et al. 2006. Pap. Avul. Zool. 46:77–105). In the literature, just one specimen of *B. maculata* with white is known from Uruguay (Carreira et al. 2005. Reptiles de Uruguay. DIRAC. Fac. Ciencias. 639 pp.), deposited in the vertebrate collection of the Faculty of Sciences (State University) as ZVC-R 5459 (Fig. 1). It was collected by A. Olmos on Route 3, km 415, Dpto. Paysandú (31.85000°S, 57.86666°W; WGS 84) on 19 December 1997. This specimen was found dead on the road and parts of its body are partially destroyed. It is an adult male measuring 885 mm in SVL (head = 31.82 mm; tail = 193 mm), with 223 ventrals, 63 subcaudals, dorsal scales in –/19/15 rows.

Fig. 1. First individual of *Boiruna maculata* with white color reported for Uruguay (ZVC-R 5459).

Fig. 2. New specimen of *Boiruna maculata* with white spots collected in 2017 (MNHN 9531).

On 25 August 2017 we collected an additional specimen, killed by local people 5 km NE of Lorenzo Geyres (32.04530°S, 57.88955°W; WGS 84), Dpto. Paysandú, Uruguay. This is the second known specimen with white patches for the country (Fig. 2), and deposited in the herpetology collection of the Natural History Museum as MNHN 9531. It is an adult male measuring 986 mm in SVL (head = 25.23 mm; tail = 183 mm), with 211 ventrals, 53 subcaudals, and dorsal scales in 19/19/15 rows.

There are now 24 specimens of *Boiruna maculata* in reference collections in Uruguay (Natural History Museum and Faculty of Sciences). White-spotted patterns are scarce in Uruguay and are not taken into account in some published descriptions of the species (Meneghel et al. 2001. Clave para la Determinación de los Reptiles del Uruguay. 56 pp.; Achaval and Olmos 2007. Anfibios y Reptiles del Uruguay. Biophoto, Montevideo. 160 pp.; Carreira and Maneyro 2013. Guía de Reptiles del Uruguay. Ediciones de la Fuga, Montevideo. 285 pp.). This new specimen shows that this variation exists at least in the west-central part of Uruguay, where the two reports are ca. 20 km away from each other.

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BOTHROCOPHIAS MICROPHTHALMUS **(Small-eyed Toad-headed Pitviper). HABITAT USE and DIET.** *Bothrocophias microphthalmus* is a medium-sized, heavy-bodied terrestrial pitviper that occurs mainly on the Amazonian slopes of the Andes in Colombia, Ecuador, and Perú (Campbell and Lamar 2004. Venomous Reptiles of the Western Hemisphere. Vol. I. Comstock Publishing Associates, Ithaca, New York. 475 pp.). It is thought to feed on anurans, lizards, and small rodents (Prado and Hoge 1948. Mem. Inst. Butantan 20:283–296; Cisneros-Heredia et al. 2006. Herpetozoa 19:17–26). Here we report the use of arboreal habitats by *B. microphthalmus*, as well as predation on two new prey items.

At 2135 h on 2 November 2011, we observed an adult *B. microphthalmus* (FHGO 9983) perched on a tree ca. 3 m above the ground (Fig. 1A). Another juvenile specimen (not collected) was observed at 1943 h on 9 November 2017 moving through a shrub ca. 1.9 m above ground level (Fig. 1B). Both specimens were found at La Zarza (3.75964°S, 78.53747°W, WGS84; 1447 m elev.), province of Zamora Chinchipe, Cordillera del Cóndor, Ecuador.

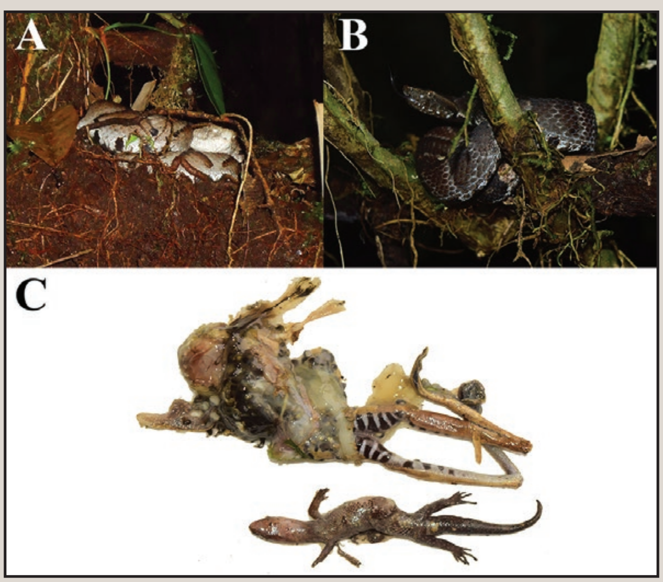

Fig. 1. A–B) Arboreal habitat use by *Bothrocophias microphthalmus*; C) regurgitated prey *Boana fasciata* and *Lepidoblepharis festae* from a juvenile *B. microphthalmus*.

Additionally, we collected a juvenile *B. microphthalmus* at 2023 h on 25 January 2017 (Fig. C; SVL = 510 mm, tail length [TL] = 72 mm), also at La Zarza (3.75600°S, 78.51041°W, WGS84; 1554 m elev.), province of Zamora Chinchipe, Cordillera del Cóndor, Ecuador, which regurgitated two prey items. The first prey item was an adult *Lepidoblepharis festae* (Brown Dwarf Gecko; SVL = 38 mm, TL = 28 mm) and the second was a gravid adult female *Boana fasciata* (Gunther's Banded Treefrog; SVL = 45 mm; Fig. 1C). All specimens (snakes and prey) were deposited at the Herpetological Collection, Fundación Herpetológica Gustavo Orcés, Quito, Ecuador.

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BOTHROPS ERYTHROMELAS **(Caatinga Lancehead). ENDOPARASITES.** Snakes are parasitized by a wide variety of endoparasites (Silva et al. 2001. Rev. Bras. Parasitol. Veter. 10:91–93). *Bothrops erythromelas* is endemic to the Caatinga biome in eastern Brazil (Nery et al. 2016. Rev. Soc. Bras. Med. Trop. 49:680–686). In October 2015, a female *B. erythromelas* (SVL = 230 mm, tail length = 45 mm, mass = 15 g) was found dead on the road at Colonia, Exu, Pernambuco, Brazil (7.5119°S, 39.7241°W; WGS 84). The specimen was taken to the laboratory of Zoology of the Universidade Regional do Cariri-URCA, where it was measured, fixed in 10% formaldehyde, and preserved in 70% alcohol. The gastrointestinal tract was removed for dissection and examined for endoparasites using a stereomicroscope. A parasite identified as *Physaloptera* sp., larval stage, was found in the large intestine.

The only known parasites of *B. erythromelas* are pentastomids (*Cephalobaena tetrapoda*; Oliveira et al. 2015. Herpetol. Rev. 46:444); thus, our finding is the first record of the nematode *Physaloptera* sp. parasitizing *B. erythomelas*. Nematodes of the genus *Physaloptera* have been recorded in amphibians (Teles et al. 2017. Herpetol. Notes. 10:525–527), birds (Dixon and Roberson 1967. Avian Dis. 11:41–44), mammals (Saad and Nour 2012. J. Egypt. Soc. Parasitol. 42:675–690), and reptiles (Pereira et al. 2012. J. Parasitol. 98:1227–1235). Nematodes of the genus *Physaloptera* rely on insects (e.g., crickets, grasshoppers, cockroaches, and beetles) as intermediate hosts (Gray and Anderson 1982. Can. J. Zool. 60:2134–2142), which likely require subsequent consumption by a lizard or amphibian, before ultimate consumption by *Bothrops* (Costa et al. 2015. Herpetol. Notes. 8:69–98; Oliveira et al., *in press*. Herpetol. Rev; Rodrigues et al. 2016. Zool. 33:1–13; Santos-Costa-Pereira et al. 2016. Herpetol. Rev. 47:142).

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***BUNGARUS FASCIATUS* (Banded Krait). DIET.** The diet of *Bungarus fasciatus* is fairly well known. The species feeds mainly on other snakes, but it is also known to eat fish, frogs, skinks, and snake eggs. Among the snakes taken by *B. fasciatus* are *Xenopeltis unicolor* (Sunbeam Snake), *Xenochrophis piscator* (Checkered Keelback), *Amphiesma stolatum* (Buff Striped Keelback), *Ptyas mucosa* (Dhaman), *P. korros* (Indo-Chinese Rat Snake), *Boiga trigonata* (Common Cat Snake), *Daboia russelii* (Russel's Viper), *Enhydris enhydris* (Rainbow Water Snake), and *Cylindrophis ruffus* (Red-tailed Pipe Snake) (Daniels 2002. Book of Indian Reptiles and Amphibians. Oxford University Press, London. 238 pp; Tyler Knierim et al. 2017. Herpetol. Rev. 48:204–205). Here we report a new viperid snake species in the diet of *B. fasciatus*.

At 2000 h on 13 June 2017, in a small stream of Tam Thanh Commune, Quan Son District, Thanh Hoa Province, Vietnam, very close to boundary of Vietnam and Laos (20.18322°N, 104.80339°E, WGS 84; 979 m elev.), we observed an adult female *B. fasciatus* (SVL = 119.1 cm; tail length = 12.5 cm) in the process of consuming an adult female *Ovophis tonkinensis* (Tonkin Pitviper) (SVL = 68.4 cm; tail length = 12.1 cm; Fig. 1). When we found them, the *B. fasciatus* was swallowing the *O. tonkinensis* headfirst and had consumed one-fourth of it body length. The *O. tonkinensis* was dead with many bites on the body and eggs were exposed from one of the bite wounds (Fig. 2). Such severe wounds are uncommon as a result of snake predation; it is unclear if the wounds reflect a prolonged struggle between the two snakes, or perhaps are an indication that the *O. tonkinensis* was previously injured or was scavenged after being killed by a different predator. When we approached, the *B. fasciatus* quickly released the *O. tonkinensis* and began to crawl away. We collected both animals and deposited them in the collections of the Vietnam National University of Forestry (VNUF), Hanoi, Vietnam (*B. fasciatus* [VNUF RTH 2017.25]; *O. tonkinensis* [VNUF RTH 2017.24]).

Fig. 1. An adult female *Bungarus fasciatus* consuming an adult female *Ovophis tonkinensis* in a small stream of Tam Thanh Commune, Quan Son District, Thanh Hoa Province, Vietnam.

Fig. 2. Dead *Ovophis tonkinensis* with many bites and its exposed eggs.

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***CEMOPHORA COCCINEA* (Scarletsnake). PREDATION.** At 1750 h on 14 June 2016, CWC discovered a juvenile *Cemophora coccinea* (total length ca. 16 cm) in the web of an adult female Brown Widow (*Latrodectus geometricus*) at a private residence on Whitemarsh Island, Chatham County, Georgia, USA (32.03390°N, 81.01440°W; WGS84). The snake was hanging in the spider's web, which was located ca. 1.5 m below a porch and 1.2 m off the ground. The snake didn't appear to have been dead long and the spider appeared to be feeding on it. Insofar as we are aware, this is the first report of *L. geometricus*, a spider native to Africa that has become widely established around dwellings in the southeastern United States, feeding on *C. coccinea*. Although most of their diet consists of other arthropods, widow spiders (Family Theridiidae, genus *Latrodectus*) are known predators of small vertebrates, including amphibians and reptiles (McCormick and Polis 1982. Biol. Rev. 57:29–58; Tinoco et al. 2016. Herpetol. Rev. 47:641–642).

PHOTO DANIEL R. CROOK

Fig. 1. An adult female Brown Widow spider (*Latrodectus geometricus*) with a juvenile *Cemophora coccinea*.

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***CHIRONIUS SEPTENTRIONALIS* (South American Sipo). DIET.** On 8 January 2010, while conducting daytime fieldwork in the Heights of Guanapo watershed on the south slope of Trinidad's Northern Range Mountains, we encountered an adult *Chironius septentrionalis* along a first-order stream (Taylor River) in closed canopy second growth forest (10.70831°N, 61.271583°W; WGS84). The snake was on the ground attempting to swallow an adult *Hypsiboas boans* (Giant Gladiator Treefrog) headfirst. In response, the frog had inflated its body and was apparently grasping a corner of the snake's jaw in each forefoot (Fig. 1). After several minutes of unsuccessful swallowing attempts, the snake worked its left mandible around the frog's right forelimb, at which point the other limb quickly followed. Immediately, the frog emitted distress vocalizations and gave two powerful kicks with its hind-limbs that elevated the snake's fore-body off the substrate. The snake completed swallowing in a matter of minutes. We thank John Murphy for helping us identify predator and prey.

Fig. 1. An adult *Chironius septentrionalis* in the process of consuming an adult *Hypsiboas boans* along a first-order stream in Trinidad's Northern Range Mountains.

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***CHRYSOPELEA ORNATA* (Ornate Flying Snake). DIET.** *Chrysopelea ornata* is a diurnal snake that is distributed in and around forests and human settlements from India to the Philippines. It is capable of gliding long distances from tree to tree (Socha 2011. Integr. Comp. Biol. 51:969–982) and feeds chiefly on lizards, especially geckos, but also on frogs, small birds, rodents, small bats, fish, and small snakes (Das 2010. A Field Guide to the Reptiles of Southeast Asia. New Holland Publishers Ltd., London. 376 pp.; Hasan et al. 2014. Amphibians and Reptiles of Bangladesh—A Field Guide. Arannayk Foundation, Dhaka, Bangladesh.144 pp.; Melvinselvan and Nibedita 2016. Russ. J. Herpetol. 23:311–314), which they subdue using a combination of constriction and venom (Murphy 1977. Copeia 1977:182–184). Here we present records of novel prey items and foraging behaviors for *C. ornata*.

Fig. 1. *Chrysopelea ornata* feeding on *Polypedates leucomystax* at Satchari National Park, Bangladesh.

Fig. 2. *Chrysopelea ornata* feeding on *Gekko gecko* at Satchari National Park, Bangladesh.

At 1330 h on 26 August 2017, we observed a *C. ornata* (Fig. 1) feeding on a *Polypedates leucomystax* (Four-lined Tree Frog) at a general store near Satchari National Park, Bangladesh (24.12529°N, 91.44194°E, WGS84; 850 m elev.). The *C. ornata* was hanging from a wire and consumed the *P. leucomystax* headfirst over a period of 34 min.

At 1714 h on 31 July 2016, we observed a *C. ornata* (Fig. 2) feeding on a *Gekko gecko* (Tokay Gecko) at Satchari National Park (24.12661°N, 91.44240°E, WGS84; 800 m elev.) in a clay house. Presumably the *G. gecko* was attracted to the insects around the electrical light, although this observation took place ca. 1.5 h before sunset. We observed the *C. ornata* chase, catch, and constrict the *G. gecko*, which it then swallowed over a period of 41 min. There are several reports of other species of *Chrysopelea* preying or attempting to prey on oversized prey items that can take a long time to consume (Lim and Peral 1959. Malayan Nat. J. 14:33–34; Leong and Foo 2009. Nature in Singapore 2:311–316; Grossmann 1999. Sauria 21:3–6).

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***CROTALUS VIRIDIS* (Prairie Rattlesnake). REPRODUCTION: MALE-MALE-MALE COMBAT.** Male-male combat is an important component of rattlesnake reproductive behavior and has been documented in numerous species, including *Crotalus atrox, C. horridus* (*atricaudatus*), *C. viridis,* and *Sistrurus catenatus edwardsii* (Gillingham et al. 1983. J. Herpetol. 17: 265–270; Klauber 1972. Rattlesnakes: Their Habits, Life Histories, & Influence on Mankind. University of California Press, Berkeley. 1553 pp.; Wastell and Mackessy 2016. J. Herpetol. 50:594–603; Senter et al. 2014. PLoS ONE e107528.). In all of these species, male combat shows a conserved, stereotypic pattern: two males will lift their heads high above the ground, approximate one another and then attempt to pin the other individual's head to the ground by hooking the second individual's neck and rapidly forcing it downward, attempting to topple the other individual (Klauber, *op. cit.*; Carpenter 1979. Copeia 1979:638–642; Gillingham et al., *op. cit.*). The winner of this combat will then typically gain access to a female for courtship and mating. Lab studies have demonstrated that after combat, the losing male will not mate with the female, even if the winning male is removed (Gillingham et al., *op. cit.*); a similar suppressive effect on mating was observed with *Agkistrodon contortrix* (Schuett 1996. Zoo Biol. 15:209–221). However, published observations of male combat have only recorded two males in combat simultaneously. Here we report an incidence of three male *Crotalus v. viridis* in concurrent combat at the entrance to a den site utilized by hundreds of individuals.

Fig. 1. Three male *Crotalus viridis* in combat at the entrance of a hibernaculum.

Fig. 2. Three *Crotalus viridis* in combat one hour after the initial image was captured.

Crotalus viridis is a wide-ranging species found in a variety of habitats throughout the western United States, and there have been multiple observations of *C. viridis* combat in the wild (e.g., Gloyd 1947. Nat. Hist. Misc. 12:1–4; Holycross 1995. Herpetol. Rev. 26:37–38). Our photographs were captured as a result of an unrelated study where two time-lapse cameras were placed outside of a known *C. viridis* hibernaculum in Weld County, Colorado, USA. Cameras were set to take a photograph every minute from two angles at the entrance of the hibernaculum. On 14 April 2016, eight photographs were captured showing male-male combat, three of which have three individuals clearly in combat. The first two photographs, taken at 0801 and 0804 h (air temperature = 21°C), show three individuals in combat (Fig. 1). The next two photographs that capture this combat bout were at 0805 h and 0807 h, and both showed two individuals. A final photo was captured at 0855 h (26°C), and showed three individuals intertwined again (Fig. 2); between these photographs there was an additional image of three individuals intertwined; however, it cannot be clearly distinguished as combat. We believe that this is the first evidence of triple-male combat, based on the ritualized nature of the combat, in which only males are known to engage. There has only been one recorded case of a female raising her head in a manner similar to that in male combat, but this was in *Crotalus atrox* and she was the only individual present (Gillingham et al., *op. cit.*). In retrospect, it seems unusual that 2+ male combat has not been observed in species with massive denning aggregations, such as *C. viridis*, as competition for mates under such conditions should be intense. However, we have not observed copulation at this den site, in spite of hundreds of hours of observation over 15 years, so the interaction observed may simply be male dominance displays, rather than courtship-related dominance.

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***DRYMARCHON MELANURUS* (Central American Indigo Snake). DIET.** *Drymarchon melanurus* is distributed from southern Texas, USA, through Mexico in the states of Sonora, Sinaloa, Nayarit, Tamaulipas, Hidalgo, Guerrero, Oaxaca, Veracruz, Tabasco, Yucatan, and Quintana Roo, to Guatemala (Ramírez-Bautista et al. 2014. Los Anfibios y Reptiles de Hidalgo, México: Diversidad, Biogeografía y Conservación. Sociedad Herpetológica Mexicana. Pachuca, México. 387 pp.). This snake is recognized for its generalist and opportunistic diet, which includes eggs, fish, frogs, turtles, snakes, birds, and small mammals (e.g. Costa et al. 2014. Herpetol. Notes 7: 99–108; Irwin et al. 2003. J. Kansas Herpetol. 7:13–18). Nevertheless, the species of fishes preyed upon by *D. melanurus* have seldom been identified.

On 13 December 2017, at 1504 h, we encountered a *D. melanurus* (apparently an adult female) that had caught a *Rhamdia guatemalensis* (Pale Catfish; Fig. 1) in a temporary stream in the agricultural fields of the Colegio de Postgraduados campus Córdoba (18.85856°N, 96.86268°W, WGS84; 649 m elev.), Municipality of Amatlán de los Reyes, in the region of Altas Montañas of Veracruz, México. Upon noticing our presence, the snake abandoned its prey and later moved away from the site. To our knowledge this represents the first record of *R. guatemalensis* in the natural diet of *D. melanurus.*

Fig. 1. *Drymarchon melanurus* and its prey, *Rhamdia guatemalensis*, from Veracruz, México.

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DRYMOLUBER DICHROUS **(Northern Glossy Racer) and *TANTILLA MELANOCEPHALA*** **(Black-headed Centipede Snake). PREDATOR-PREY RELATIONSHIP.** *Drymoluber dichrous* is a widespread colubrid snake that occurs along the eastern versant of the Andes, in the Amazon forest, on the Guiana Shield, in the Atlantic forest, and transitional areas between the Caatinga and Cerrado in northern South America (Costa et al. 2013. Zootaxa 3716:349–394). Although widely distributed, its biology remains poorly known. The species is diurnal and terrestrial, sleeping on vegetation at night (Cunha and Nascimento 1978. Publ. Avul. Mus. Par. Emílio Goeldi 31. 218 pp.; Dixon and Soini 1986. The Reptiles of the Upper Amazon Basin, Iquitos Region, Peru. Milwaukee Public Museum, Milwaukee, 154 pp.; Duellman 1978. Univ. Kansas Mus. Nat. Hist. Misc. Publ. 65:1–352). The species is known to feed mainly on lizards; amphibians and snakes (including a case of cannibalism) are rarely recorded (Cunha et al. 1985. Bol. Mus. Par. Emilio Goeldi 40:9–17; Martins and Oliveira 1998. Herpetol. Nat. Hist. 6:78–150; Borges-Nojosa and Lima 2001. Bol. Mus. Nac. Rio de Janeiro 7:1–5; Abbeg et al. 2015. Herpetol. Brasil. 4:60–63). Because of the diurnal and terrestrial habits of most of its lizard prey, it is likely that *D. dichrous* feeds mainly on the ground or at most in the lower strata of the forest.

On 8 September 2012 at the Floresta Nacional de Saracá-Taquera, central Amazonia, Pará state, Brazil (1.5186°S; 56.3750°W, WGS 84; 85 m elev.), a *D. dichrous* was found dead on a road. The specimen was collected and deposited in the herpetological collection of Museu de História Natural Capão da Imbuia in Curitiba, Paraná state (MHNCI.14248). In its stomach, we found one specimen of *Tantilla melanocephala*, a fossorial colubrid snake that lives most of time under the soil or in the leaf-litter, coming to the surface at night (Fraga et al. 2013. Guide to the Snakes of the Manaus Region-Central Amazonia. Editora INPA, Manaus. 303 pp.). This is the first record of predation of *T. melanocephala* by *D. dichorus.*

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EUNECTES MURINUS **(Green Anaconda). DRY SEASON HOME RANGE.** Studies on *Eunectes murinus* have focused mostly on populations in the Venezuelan Llanos (Rivas et al. 2007. *In* Henderson and Powell [eds.], Biology of the Boas and Pythons, pp. 128–138. Eagle Mountain Publishing, Eagle Mountain, Utah; Rivas et al. 2016 Copeia 104:402–410), but little is known about this species in other habitats. In a study of the natural history of *E. beniensis* within the Sirionó Indigenous Territory in Bolivia (14.8031°S, 64.4352°W; WGS 84), we captured a single female *E. murinus* (total length = 205 cm). We equipped the snake with a radio transmitter (~27 g; Model F1850B, Advanced Telemetry Systems, Inc.), implanted subcutaneously using standardized procedures (Raphael et al. 1996. Proc. Wildl. Dis. Assoc. 1996:82), and radio-tracked it for 90 days (September to December 2010). We located the snake daily by foot until we either saw the animal or located it via triangulation within 2 m. We obtained 50 locations and calculated its home range using Minimum Convex Polygon (MCP) with 95% to avoid the effect of extreme data (Bath et al. 2006 J. Wildl. Manage. 70:422–434). The total home range was 0.091 ha and the core area was 0.006 ha. This home range size is much smaller than the average reported for *E. murinus* during the dry season in the Venezuelan Llanos (25.1 ha; N = 48 snakes; Rivas 2015. Natural History of the Green Anaconda with Emphasis on its Reproductive Biology. CreateSpace Independent Publishing Platform, North Charleston, South Carolina. 205 pp.), but similar to the average dry season home range of similarly sized *E. beniensis* at the same study site in Bolivia (0.29 ha, N = 4; De la Quintana et al. 2017. Amphibia-Reptilia 38:547–553).

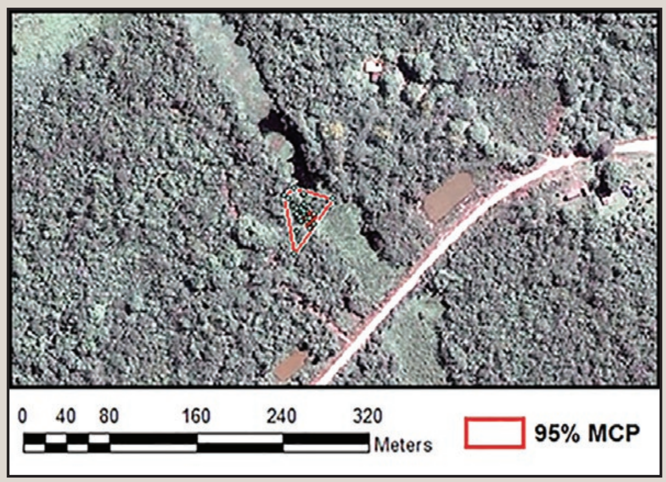

Fig. 1. Home range of *Eunectes murinus* (95% Minimum Convex Polygon) during the dry season in Bolivia.

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***EPICRATES MAURUS* (Brown Rainbow Boa). DICEPHALISM.** Dicephalism (axial bifurcation) has been documented in *Epicrates maurus* previously (Wallach 2007. Bull. Maryland Herpetol. Soc. 43:57–95), but it is unclear if a specimen exists and whether it was captive bred or wild-caught. Here we present an overlooked prodichotomous *E. maurus* neonate that was collected by W. L. Burger on 24 June 1950 in Cumanocoa, Sucre, Venezuela (10.25°N, 63.92°W, WGS 84; Figs. 1, 2). The specimen (UIMNH 63587, University of Illinois Museum of Natural History Herpetology Collection) measures 362 mm in total length (SVL = 319 mm; ventrals = 124; subcaudals = 55) and exhibits remarkably similar scalation between both heads as well as numerous partial ventral scales.

Fig. 1. Dorsal view of the dicephalic *Epicrates maurus* specimen (UIMNH 63587).

Fig. 2. Lateral (top), dorsal (middle), and ventral (bottom) views of the dicephalic anomaly in the *Epicrates maurus* specimen (UIMNH 63587).

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***HETERODON NASICUS* (Western Hognose Snake). EARLY ACTIVITY.** On 9 February 2018 at 1130 h, in Otero County, New Mexico, USA (32.09998°N, 105.66660°W, WGS 84; 1523 m elev.), we found a sub-adult male *H. nasicus* (SVL = 263 mm; tail length = 59 mm) underneath a large rock. One week prior to this encounter, on 2 February 2018, one of us (FP) inspected beneath this same rock and did not find any evidence of snake activity. Further, we did not observe burrows or tunnels under the rock that the snake could have used as a hibernaculum. As a result, the snake we encountered was likely active on the surface and sought the rock as a refuge. Average daytime air temperatures between these two observations from the nearby town of Chaparral, New Mexico, ranged 18.3–24.4°C, including six days with averages > 20°C. The seasonal activity of *H. nasicus* varies predictably along a latitudinal gradient across its distribution: 10 May–20 September in Alberta, Canada (Ernst and Ernst 2003. Snakes of the United States and Canada. Smithsonian Press, Washington, D.C. 668 pp.); 25 April–31 October in Kansas; 25 March–23 October in south-central Texas (Werler and Dixon 2000. Texas Snakes: Identification, Distribution, and Natural History. University of Texas Press, Austin. 437 pp.); and March–October in New Mexico (Degenhardt et al. 1996. Amphibians and Reptiles of New Mexico. University of New Mexico Press, Albuquerque. 431 pp.). November to February is considered a dormant period for *H. nasicus*, and for Chihuahuan Desert snake activity in general (Degenhardt et al., *op. cit.*; Werler and Dixon, *op. cit.*). To the best of our knowledge, this observation of a presumably surface active *H. nasicus* in early February from southern New Mexico is the earliest reported activity for this species.

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***HETERODON SIMUS* (Southern Hog-nosed Snake). USE OF POCKET GOPHER MOUNDS AND GOPHER TORTOISE BURROWS.** *Heterodon simus* is endemic to sandy habitats (e.g., xeric longleaf pine sandhills) of the southeastern Coastal Plain, USA, where it is strongly fossorial and adept at digging burrows and retreats in friable soils. Here, we report the use of *Geomys pinetis* (Southeastern Pocket Gopher) mounds and *Gopherus polyphemus* (Gopher Tortoise) burrows by *H. simus*.

On 25 September 1991, DJS unearthed a hatchling *H. simus* while raking by hand the sand of a newly created *Geomys pinetis* mound in intact sandhill habitat on Lake Panasoffkee Wildlife Management Area, Sumter County, Florida, USA. Similarly, on

7 January 2016, WSK found two juvenile *H. simus* while raking *G. pinetis* mounds (the snakes were in different mounds) in disturbed sandhill habitat near Lecanto, Citrus County, Florida. On 14 January 2016, WSK found an adult female (ca. 38 cm total length [TL]; UF 181095) in a *G. pinetis* mound at the same site.

Heterodon simus has not been previously reported using *Geomys* mounds. Funderburg and Lee (1968. J. Herpetol. 1:99–100) reported five species of snake, including *Heterodon platirhinos* (Eastern Hog-nosed Snake), in *Geomys* mounds in Florida, but the three sites searched were outside the range of *H. simus*. Mount (1963. Am. Midl. Nat. 70:356–385) reported finding *Tantilla relicta* (Florida Crowned Snake) and *Lampropeltis elapsoides* (Scarlet Kingsnake) in *Geomys* mounds in sandhill habitat while searching for *Plestiodon egregius* (Mole Skink). Like *P. egregius*, we suspect *H. simus* occasionally uses *Geomys* mounds for subsurface thermoregulation, particularly on cool, sunny days (Mount, *op. cit.*).

In the morning on 14 April 1990, DJS observed an *H. simus* (ca. 30 cm TL) enter an adult *G. polyphemus* burrow in disturbed sandhill habitat near Mount Dora, Lake County, Florida. In May 2011, TWH observed an adult male *H. simus* (UF 170515) ca. 1 m from the entrance of a *G. polyphemus* burrow in an active cattle pasture in Pasco County, Florida. The snake retreated toward the mouth of the burrow when approached. At 1845 h on 15 July 2017, TD and CP observed an adult *H. simus* (ca. 40 cm TL; UF 181111) at the mouth of an abandoned tortoise burrow in sandhill habitat on the Ashton Biological Preserve, 6 km W of Archer, Alachua County, Florida. The snake immediately crawled into the burrow when approached. At the same locality, an *H. simus* (ca. 25 cm TL) was photographed by a motion-activated camera at 1330 h on 21 October 2017 as it crawled across the apron of a subadult tortoise burrow toward its entrance.

Heterodon simus has not been listed as one of the many species using *G. polyphemus* burrows (e.g., Jackson and Milstrey 1989. *In* Diemer et al. [eds.], Gopher Tortoise Relocation Symposium Proceedings Technical Report No. 5, pp. 86–98. Florida Game and Fresh Water Fish Commission, Tallahassee, Florida). In addition to our observations, two records exist from Georgia of *H. simus* found at *G. polyphemus* burrows (Williamson and Moulis 1994. Herpetological Specimens in the Savannah Science Museum Collection: Volume 2 – Reptiles. Savannah Science Museum Special Publication No. 2, Savannah, Georgia). An adult female (GSU 5840) and an adult male (GSU 5841) *H. simus* were found on the surface at *G. polyphemus* burrow entrances on 27 April 1975 in intact sandhill habitat in Effingham County, Georgia (Williamson and Moulis 1994, *op. cit.*). We do not know whether these snakes were using tortoise burrows as refuges. We suspect that *H. simus* uses *G. polyphemus* burrows for refugia and to forage for *Anaxyrus* spp. and *Scaphiopus holbrookii* (Eastern Spadefoot), which are commonly found in tortoise burrows (Jackson and Milstrey 1989, *op. cit.*). *Heterodon simus* has undergone significant declines in portions of its range (Tuberville et al. 2000. J. Elisha Mitchell Sci. Soc. 116:19–40). To what extent these declines may be related to declining *G. polyphemus* and *G. pinetis* populations in areas of sympatry is unknown.

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***HYPSIGLENA OCHRORHYNCHA* (Coast Nightsnake). DIET.** *Hypsiglena ochrorhyncha* (formerly part of *H. torquata*) is a small (< 60 cm total body length), secretive dipsadine occurring from around the Central Valley of northern California, USA, south to the Cape Region of Baja California, Mexico (Mulcahy 2008. Mol. Phylogenet. Evol. 46:1095–1115). This species is considered a habitat generalist and is reported to be both crepuscular and nocturnal (Stebbins 2012. Field Guide to Amphibians and Reptiles of California, University of California Press, Berkeley, California. 538 pp.). The diet of *H. torquata* includes mainly phrynosomatid lizards and squamate eggs and occasionally insects, salamanders, anurans, other lizards, and small snakes (Rodríguez-Robles et al. 1999. Copeia 1999:93–100; Ernst and Ernst 2003. Snakes of the United States and Canada. Smithsonian Books, Washington, DC. 668 pp.). Although the majority of specimens examined by Rodríguez-Robles et al. (1999, *op. cit.*) are from the range of what is now *H. ochrorhyncha*, the only *Sceloporus* identified to species in this study was *S. graciosus*. Weaver (2010. J. Herpetol. 44:148–152) reported *S. occidentalis* in the diet of *H. chlorophaea*.

On 13 September 2017, at approximately 1845 h, an adult *H. ochrorhyncha* (ca. 35 cm total length) was observed in the early stage of consuming a freshly killed adult *Sceloporus occidentalis* (ca. 7 cm SVL) head first (Fig. 1). The event occurred near a rubble rock wall in the front yard of the home of one of us (BMA) located in the rural community of Del Dios, San Diego County, California, USA (33.06656°N, 117.02027°W; WGS84; elev. 104 m). After 5 min, the snake, still gripping the lizard, was removed from the front yard and relocated about 25 m to a lot consisting of native coastal sage scrub habitat. Despite being handled, the snake completely consumed the *S. occidentalis* in about 30 min. To our knowledge, this is the first report of *S. occidentalis* in the diet of *H. ochrorhyncha* and represents a diurnal-crepuscular predation event by *Hypsiglena* (Rodríguez-Robles, et al. 1999, *op. cit.*; Lance 2012. Son. Herpetol. 25:99–100). Photographic vouchers were deposited at the San Diego Natural History Museum herpetology photographic collection (SDNHM-HerpPC 5360–5364).

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Fig. 1. Adult *Hypsiglena ochrorhyncha* consuming an adult *Sceloporus occidentalis* in the community of Del Dios, San Diego County, California, USA.

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***INDOTYPHLOPS BRAMINUS* (Brahminy Blindsnake) and *DINODON RUFOZONATUM* (= *LYCODON RUFOZONATUS*) (Red-banded Snake). PREDATION and DIET.** *Indotyphlops braminus* and *Dinodon rufozonatum* are both native species that are widely distributed in Taiwan. *Indotyphlops braminus* is known to be a ground-dwelling species and *D. rufozonatum* is considered a terrestrial generalist, preying on insects, fish, frogs, toads, snakes, lizards, and birds (Kidera and Ota 2008. Current Herpetol. 27:23–27; Tu 2004. Big Surprise of Snakes. Yuan-Liou Publishing Co. Ltd., Taipei. 279 pp.). Here we report an unusual case of predation by *D. rufozonatum* on *I. braminus* and excretion of the *I. braminus* through the cloaca without digestion.

The *Dinodon rufozonatum* (female; SVL = 582 mm; 47 g) was captured at Chinyang Farm, Shoufeng Township, Hualien County, Taiwan (23.90632°N, 121.50896°E; WGS84) at 1910 h on 20 August 2017 while crawling across a cement floor. When we palpated its stomach, we noticed a small item that seemed like the head of a blindsnake emerging from its cloaca. After confirming that the item was not a part of an organ of *D. rufozonatum* and was not moving, we used forceps to gently remove the item. The item was identified as an adult *I. braminus*, which was ca. 155 mm in total length (Fig. 1). In addition to the *I. braminus*, two leathery egg shells fell out of the cloaca. Although the *I. braminus* was already dead before being pulled out, the individual was almost uninjured except for a few body parts that seemed to be compressed, causing slight damage. The evidence suggests that *I. braminus* passed through the stomach and intestine of *D. rufozonatum* without digestion.

As far as we know, our observation is the first case of this phenomenon confirmed in a snake that had fed on an *I. braminus*. Amazingly, similar cases have been reported in which *I. braminus* have been swallowed by a predator and remained intact after passing through the digestive system. Two species of toads, *Duttaphrynus melanostictus* (O'Shea et al. 2013. Herpetol. Notes 6:467–470) and *Rhinella marina* (Zlotnik et al. 2017. Herpetol. Rev. 48:675), excreted intact *I. braminus*. In the *D. melanostictus* case, the *I. braminus* remained alive for a while after struggling out of the cloaca under its own power. Based on these cases, we assume that *I. braminus* may have specialized scale structures that delay digestion by predators, which gives it limited time to escape the predator's digestive system. Further work on the morphological and physiological adaptations of *I. braminus* are required to test this hypothesis.

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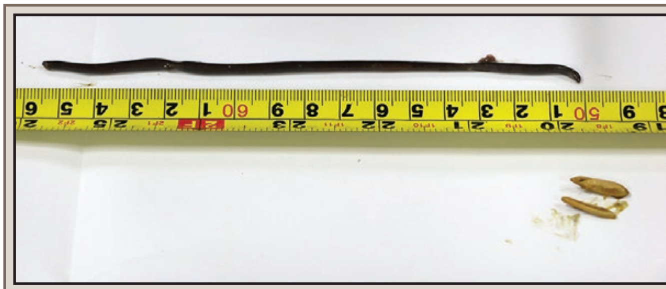

Fig. 1. *Indotyphlops braminus* excreted from the cloaca of *Dinodon rufozonatum*. Two leathery egg shells were also excreted from the cloaca after pulling out the *I. braminus*.

***LAMPROPELTIS MICROPHOLIS* (Ecuadorian Milksnake, Falsa Coral Interandina). DIET.** *Lampropeltis micropholis* is a member of the *L. triangulum* complex and is distributed from eastern Costa Rica, throughout Panama, and south to Ecuador (Ruane et al. 2014. Syst. Biol. 63:231–250). In Colombia, *L. micropholis* occurs between the Caribbean Coast and the western flank of the Cordillera Occidental (Western Cordillera), occupying the inter-Andean valleys of the Cauca and Magdalena rivers basin, and both Occidental and Central cordilleras (Dunn 1944. Caldasia 3:155–224; Rojas-Morales 2012. Phyllomedusa 11:135–154). Species in the *L. triangulum* complex in Mexico and the United States are known to consume a wide array of small mammals, lizards, snakes, birds and their eggs, and occasionally amphibians, fish, and invertebrates (Ernst and Ernst 2003. Snake of the United States and Canada. Smithsonian Books, Washington, D.C. 668 pp.; Rodríguez and Drummond 2000. J. Herpetol. 34:139–142; Aguilar-López and Pineda 2013. Herpetol. Notes. 6:89–90), but information on the ecology and diet of *L. micropholis* is lacking. Herein we present the first record of consumption of *Mus musculus* (House Mouse; Rodentia: Muridae) by *L. micropholis*.

On 15 April 2016, a female *L. micropholis* (total length = 730 mm; SVL = 630 mm; Fig. 1), was killed by a farmer at the Tesorito farm (5.03156°N, 75.44865°W, WGS 84; elev. 2164 m), Manizales, Cordillera Central of Colombia. The specimen was deposited at the Museo de Historia Natural de la Universidad de Caldas (MHNUC-0302). There, MSCO and JMHL opened the specimen and found a mouse consumed headfirst. The mouse was identified by HERC as a juvenile (last molars not erupted) *Mus musculus*, based on the presence of molars with cusps organized in three longitudinal rows, and small body size (head and body length = 60 mm; tail length = 63 mm). *Mus musculus* is an exotic species in Andean ecosystems of the Cordillera Central of Colombia.

We thank Viviana Ramírez-Castaño for support, information, and museum assistance.

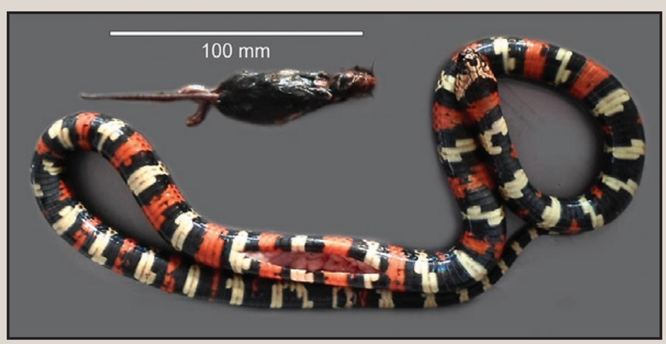

Fig. 1. House mouse (*Mus musculus*) preyed upon by a female *Lampropeltis micropholis* from the Cordillera Central of Colombia.

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***MASTICOPHIS FLAGELLUM* (Coachwhip). DIET.** *Masticophis flagellum* feeds on a variety of prey, including invertebrates, frogs, turtles, snakes, lizards, birds, and small mammals (Ernst and Ernst 2003. Snakes of the United States and Canada. Smithsonian Institution Press, Washington, D.C. 668 pp.). We dissected specimens of *M. flagellum* and noted two novel prey items for this species. SRSU 5641, a 104.3 cm SVL *M. flagellum* collected 29 April 1985 on Hwy 385, 29 km S Marathon in Brewster County, Texas, USA (approximate coordinates: 29.96246°N, 103.25664°W; WGS 84), contained an individual of *Aspidoscelis gularis* (Texas Spotted Whiptail). SRSU 6799, a 95.6 cm SVL *M. flagellum* collected DOR on 15 April 2016 in Brewster County, Texas, USA (29.74698°N, 103.16012°W; WGS 84), contained a small *Bogertophis subocularis* (Trans Pecos Rat Snake) (SVL = 31.4 cm). To the best of our knowledge this represents the first record of *M. flagellum* feeding upon *A. gularis* or *B. subocularis* (Ernst and Ernst, *op. cit.*).

Specimens examined for this study were from the James F. Scudday Vertebrate Collections at Sul Ross State University. Stomach contents were retained and stored in 70% EtOH. This research was supported by the Ronald E. McNair Post-Baccalaurete Achievement Program at Sul Ross State University.

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***MICRUROIDES EURYXANTHUS* (Sonoran Coralsnake). BEHAVIOR.** *Micruroides euryxanthus* is presumably common, but secretive, and therefore infrequently encountered. Though it is occasionally seen abroad during the day, it is primarily nocturnal in activity. *Micruroides euryxanthus* is found at elevations ranging from ca. 58 m to > 1500 m encompassing habitats from low deserts to oak/pine woodlands. Drainages including dry washes are frequented by this species. Here, we report three observations of *M. euryxanthus* entering harvester ant (*Pogonomyrmex* sp.) nests. All observations occurred within a few hundred meters of each other in the same dry wash traversing a bajada in Arizona Upland Subdivision Sonoran Desert (Brown 1994. Biotic Communities: Southwestern United States and Northwestern Mexico. University of Utah Press, Salt Lake City, Utah. 342 pp.), Superstition Mountains, Pinal Conty, Arizona, USA.

At 2047 h MST on 1 July 2016, we observed an *M. euryxanthus* (total length [TL] ca. 380 mm) with the posterior two thirds of its body protruding from a harvester ant nest. The snake was lifted from the nest; it appeared alert and healthy and was released. Interestingly ants were neither attacking the snake, nor did they appear agitated by the snake's presence.

At 2024 h MST on 11 August 2017, a large adult *M. euryxanthus* (SVL = 422 mm; 23 g) was observed exiting a harvester ant nest. The posterior few cm were still in the nest when sighted. The snake was disturbed by the light from a headlamp and retreated into the ant nest. It emerged again 2 min later but again retreated into the nest when disturbed by the light of the headlamp. The snake exited the nest 3 min later and was captured. As before, none of the ants attacked the snake or appeared to be agitated by its presence.

At 2019 h MST on 26 August 2017, a presumably recently hatched (TL ca. 127 mm) *M. euryxanthus* was observed outstretched near (ca. 24 cm) a harvester ant nest. The snake was positioned in a manner that gave the impression it had just exited the nest. We watched the snake for about 5 min. It moved slowly, circling the ant nest's entrance. The snake paused each time it contacted an ant but as before, the ants paid no attention to the snake. The snake soon entered the nest, passing among numerous ants moving the opposite direction, none of which molested the snake.

These are the first documented observations of *M. euryxanthus* entering ant nests. *Micruroides* preys primarily on small snakes and threadsnakes (*Rena* spp.) are favored among these (Lowe et al. 1986. The Venomous Reptiles of Arizona. Arizona Game and Fish Dept., Phoenix, Arizona. 113 pp.; Vitt and Hulse 1973. Herpetologica 29:301–304). Approximately a third of the diet of *Rena humilis* (30.1%) and *R. dulcis* (29.8 %) is comprised of ant larvae and pupae (Punzo 1974. J. Herpetol. 8:153–156). Both of these *Rena* species are sympatric with *M. euryxanthus* in southeast Arizona (Brennan and Holycross 2009. A Field Guide to the Amphibians and Reptiles in Arizona. Arizona Game and Fish Dept., Phoenix, Arizona. 150 pp.). *Micruroides euryxanthus* may enter ant nests in search of foraging *Rena* sp.

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***MICRURUS DUMERILII* (Dumeril's Coralsnake, Coral de Dumeril). DIET.** *Micrurus dumerilii* is a medium-sized coralsnake (maximum total length = 954 mm; Meneses-Pelayo and Caicedo-Portilla 2015. Herpetol. Rev. 46:647) that inhabits lowland (0–600 m) wet/moist forest in northwestern Venezuela, northern, central, and eastern Colombia, and the Pacific Coast from southeastern Panama to northern Ecuador (Campbell and Lamar 2004. The Venomous Reptiles of the Western Hemisphere. Comstock Publishing Associates, Cornell University Press, Ithaca, New York. 976 pp.; Praire et al. 2015. Mesoam. Herpetol. 2:253–259). The species is poorly studied, but is thought to feed on small vertebrates like lizards and fishes (Campbell and Lamar 2004, *op. cit.*). Here we present the first record of predation of *Caecilia thompsoni* (Gymnophiona: Caecilidae) by *M. dumerilii.*

At 1051 h, on 03 of May of 2017, in the Reserva Río Manso (5.67169°N, 74.77786°W, WGS 84; elev. 217 m) in the department of Caldas, Colombia, we found a *M. dumerilii* (total length = 720 mm) ingesting a specimen of *C. thompsoni* (SVL = 923 mm) headfirst (Fig. 1). The snake was released, but the *C. thompsoni* was deposited in the Museo de Historia Natural de la Universidad de Caldas (MHN-UC 0835). This is the first record of predation of a caecilian by *M. dumerilii.*

We thank the Vertebrate Zoology course (2017-1 period) of the Biology program of the Universidad de Caldas for support in the field.

Fig. 1. *Micrurus dumerilii* ingesting a *Caecilia thompsoni* in the Reserva Río Manso, Colombia.

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***MICRURUS IBIBOBOCA*. ENDOPARASITES.** The genus *Micrurus* occurs from Argentina to the southern United States (Campbell and Lamar 2004. The Venomous Reptiles of the Western Hemisphere. Cornell University Press, Ithaca, New York. 774 pp.). *Micrurus ibiboboca* is widely distributed in Brazil (south of the Amazon, Bahia, Sergipe, S Ceará, Alagoas, Maranhão, Paraíba, Pernambuco, Piauí, Sergipe, Rio de Janeiro, Rio Grande do Norte) (Uetz et al. 2017. http://www.reptile-database.org. Accessed on 21 February 2018). Several studies have examined helminthofauna of snakes from northeastern Brazil (Almeida et al. 2006. Brazil. J. Biol. 66:559–564; Almeida et al. 2007. Brazil. J. Biol. 67:759–763; Almeida et al. 2008. Brazil. J. Biol. 68:193–197; Araujo Filho et al 2013. Herpetol. Rev. 44:43–43; Oliveira et al 2015. Herpetol. Rev. 46:444–444), but the only known infection for *M. ibiboboca* is Pentastomida: *Raillietiella* sp. (Almeida et al. 2007, *op. cit.*).

In December 2015, a female *M. ibiboca* (SVL = 94 mm, TL = 30 mm, 130 g) was found dead on the road in the municipality of Farias Brito (39.533194°W, 06.783278°S, WGS84; 309 m elev.), Ceará, Brazil. The specimen was deposited in the collection of the laboratory of Zoology of the Regional University of Cariri-URCA. The gastrointestinal tract was removed and endoparasites were examined using a stereomicroscope. A parasite identified as a larval stage *Physaloptera* sp. was found in the stomach of the *M. ibiboboca.*

Nematodes are the major endoparasites of the digestive tract of snakes; most commonly found in snakes are those of the genus *Physaloptera* (Barbosa et al. 2006. Revista Biología Ciências da Terra 6:1–19). The intermediate hosts of *Physaloptera* are invertebrates, including crickets (Orthoptera), locusts (Orthoptera), cockroaches (blattodea), and beetles (Coleoptera) (Gray and Anderson 1982. Can. J. Zool. 60:2134–2142). The present study establishes the first record of the nematode *Physaloptera* sp. parasitizing *M. ibiboboca.*

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***MICRURUS NARDUCCII MELANOTUS* (Andean Black-backed Coralsnake). MAXIMUM LENGTH.** On 26 July 1964, J. Bowerman collected a large female *Micrurus narduccii melanotus* from Limoncocha, Sucumbíos Province, Ecuador (0.41°S, 76.63°W; WGS 84). The specimen (UIMNH 61058, University of Illinois Museum of Natural History Herpetology Collection) measures 1173 mm total length (SVL = 1131 mm). The previous reported maximum length for *M. n. melanotus* was 1157 mm total length (SVL = 1117 mm) and belongs to USNM 232473 (National Museum of Natural History, Smithsonian Institution, Department of Vertebrate Zoology, Washington D.C.) collected from Río Corrientes, Pastaza Province, Ecuador (Roze and Bernal-Carlo 1987. Boll. Mus. Reg. Sci. Nat. Torino 5:573–608). Accordingly, UIMNH 61058 represents a new maximum length record for *M. n. melanotus*, the larger of the two allopatric subspecies (Campbell and Lamar 2004. The Venomous Reptiles of the Western Hemisphere. Comstock Publishing Associates, Ithaca, New York. 962 pp.; Valencia et al. 2016. Serpientes Venenosas del Ecuador. Fundación Herpetológica Gustavo Orcés, Quito, Ecuador. 653 pp.).

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***OXYRHOPUS GUIBEI* (False Coralsnake). DEFENSIVE BEHAVIOR.** Thanatosis (death feigning) is one of the most well-known and widespread defensive tactics in different animal groups (Mendonza 2009. Herpetotropicos 5:67; Miyatake et al. 2009. Proc. R. Soc. Lond. B 276:2763–2767; Toledo et al. 2010. J. Nat. Hist. 44:31–32; Brauder et al. 2015. Herpetol. Conserv. Biol 10:559–571) that depresses predatory behavior and stimuli (Pasteur 1982. Annu. Rev. Ecol. Syst. 13:169–199). However, its effectiveness is still controversial and debated in the literature (Gregory et al. 2007. J. Comp. Psychol. 121:123–129). Thanatosis occurs most frequently after an animal is manipulated or disturbed (Muscat et al. 2016. Herpetol. Notes 9:95–97), and has been recorded in a variety of snakes, mostly within the Colubridae and Dipsadidae (e.g., Mendonza, *op. cit.*; Brauder et al., *op. cit.*; Muscat et al., *op. cit.*; Costa-Expósito et al. 2017. Bol. Asoc. Herpetol. Esp. 28:2017). Herein, we provide the first report of thanatosis in *O. guibei.*

On 6 October 2017, in a disturbed area of Cerrado (17.1325°S, 46.5447°W, WGS84; 542 m elev.), one of us (FDS) captured an *O. guibei* (total length = 96.3 cm; SVL = 78 cm) in the Municipality of Paracatú, state of Minas Gerais, Brazil (Fig. 1). When the animal was manipulated to be released, it kept its body extremely rigid and when placed on the ground, it remained motionless with its ventral region facing upward while keeping its mouth open. The animal was then handled again, but the behavior continued. The

Fig. 1. Death-feigning behavior in an *Oxyrhopus guibei* from Paracatu, Minas Gerais, Brazil.

behavior was maintained for approximately 3 min, thereafter the animal quickly restored to the upright position.

The defensive behaviors previously reported in the literature for *O. guibei* include struggling and discharging cloacal secretions (Gaiarsa et al. 2013. Pap. Avul. Zool. 53:261–283). Additionally, defensive behaviors previously reported for the genus *Oxyrhopus* include body thrashing and lateral compression, biting, tail vibration, and cloacal secretion (Martins and Oliveira 1998. Herpetol. Nat. Hist. 6:78–150; Sawaya et al. 2008. Biota Neotrop. 8:127–149; Gaiarsa et al., *op. cit.*). Thus, this is the first study to report thanatosis in the genus *Oxyrhopus*.

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***OXYURANUS MICROLEPIDOTUS* (Inland Taipan). DIET.** The Australasian elapids of the genus *Oxyuranus* (taipans) are well-documented for their partiality to mammalian prey (Shine 1993. Australian Snakes: A Natural History. Reed Publishers, Chatswood, New South Wales. 210 pp.). *Oxyuranus microlepidotus* is a large (total length [TL] = 2 m), diurnal, terrestrial, elapid endemic to arid Australia, inhabiting sparsely-vegetated cracking plains associated with drainage systems in south-western Queensland and north-eastern South Australia (SA); and with an isolated population in central SA (Read 1994. Trans. R. Soc. S. Aust. 118:143–145; Wilson and Swan 2017. A Complete Guide to Reptiles of Australia. Reed New Holland, Sydney. 518 pp.). *Oxyuranus microlepidotus* appears to be a specialized feeder on *Rattus villosissimus* (Long-haired Plains Rat) and as such, the distribution and population ecology of both predator and prey are intimately correlated (Read, *op. cit.*). Although the diet of *O. microlepidotus* is widely documented, observations of foraging or predator-prey interactions appear unrecorded in the field due to the remote distribution and secretive nature of the species. Herein, we report a predator-prey interaction and a novel dietary item of *O. microlepidotus*, in an isolated population of the species' range.

On 16 December 2015 at 0725 h (light cloud cover; road surface temperature = 29°C), a large (TL = ca. 170 cm, taken from track markings) *O. microlepidotus* was located active on the Mt Barry Road to Oodnadatta northeast of Coober Pedy, South Australia, Australia (28.8781°S, 134.8539°E, WGS84; 144 m elev.). The individual was observed on the side of the road beginning to consume a deceased adult (SVL = ca. 6.0 cm) female *Sminthopsis crassicaudata* (Fat-tailed Dunnart). The snake released the prey and fled as our vehicle approached. The *S. crassicaudata* appeared to have died very recently, as indicated by the five live joeys still attached to it. We suspect that the *S. crassicaudata* was bitten by the *O. microlepidotus* shortly before we arrived and perished on the road following envenomation. There appeared to be no physical injury to suggest death from an alternate cause.

Being nocturnal, it is likely that the *S. crassicaudata* was sheltering in a nearby soil crack at the time it was bitten, and later succumbed to the effects of envenomation after fleeing to the road. This is plausible given that *Oxyuranus* are known to strike-and-release their prey, allowing it to escape and succumb to the venom, and the corpse later tracked through chemoreception (Shine and Covacevich 1983. J. Herpetol. 17:60–69). Previous reports indicate the absence of *R. villosissimus* at this locality, and postulate that *Pseudomys australis* (Plains Rat) constitutes a primary prey item substitute (Read, *op. cit.*). Given that *S. crassicaudata* extensively utilize the same soil cracks as *O. microlepidotus* (Read, *op. cit.*; Waudby and Petit 2017. Integr. Zool. 12:237–249), it is likely that *S. crassicaudata* constitutes a major, if not opportunistic, food source for *O. microlepidotus* at this locality. To the best of our knowledge, this record provides the first account of foraging behavior in a wild *O. microlepidotus* and further documents interest in prey items other than *R. villosissimus*.

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***PSAMMOPHIS PUNCTULATUS TRIVIRGATUS* (Southern Speckled Sand Snake). DIET.** Although *Psammophis punctulatus* is a very common species in East Africa, its natural history is poorly known (Cottone and Bauer 2009. Afr. J. Herpetol. 58:126–130). The distribution of the eastern African subspecies, *P. p. trivirgatus*, is reported to comprise Somalia, Tanzania, and Kenya, where it occurs in dry savanna and semi-desert from sea level up to 1400 m. The nominate form occurs in Ethiopia, Eritrea, South Sudan, Sudan, Uganda, Egypt, and Djibouti (Spawls et al. 2004. A Field Guide to the Reptiles of East Africa. A & C Black Publishers Ltd., London, Great Britain. 543 pp.; Baha El Din 2006. A Guide to the Reptiles and Amphibians of Egypt. The American University in Cairo Press. Cairo, Egypt. 359 pp.). Parker (1949. Zool. Verh. 6:1–115) suggested that the nominate form might meet *trivirgatus* near Lake Turkana based on a specimen from northwestern Kenya. Morphologically and genetically, *P. punctulatus* sensu lato (s.l.) has been placed into the *P. schokari* group (Broadley 1977. Arnoldia 8:1–29; Broadley 2002. Afr. J. Herpetol. 51:83–119, Kelly et al. 2008. Mol. Phylogenet. Evol. 47:1045–1060). Nevertheless, a thorough reassessment of *P. punctulatus* (s.l.) is needed to clarify whether *P. p. trivirgatus* deserves full species status. The number of subcaudal scales (Largen and Rasmussen 1993, *op. cit.*; *P. p. punctulatus* 158–178, *P. p. trivirgatus* 143–163) is unreliable since *P. punctulatus* can autotomize its tail to escape from predators and subsequently regenerate a terminal point at the truncated tip (Broadley 1987. J. Herpetol. Assoc. Afr. 33:18–19).

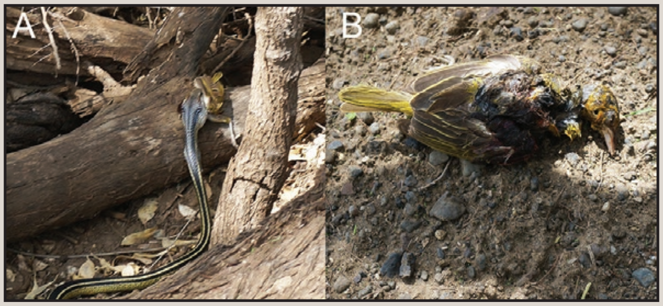

Fig. 1. A) *Psammophis punctulatus trivirgatus* in the process of swallowing a *Ploceus intermedius* (Lesser Masked Weaver); B) bird after it was dropped by the snake.

At 1015 h on 04 April 2017, during a survey of the fauna and flora of the Sibiloi National Park on the eastern shore of Lake Turkana, a medium-sized *Psammophis punctulatus trivirgatus* (SVL = 103.8 cm; tail length = 41 cm; subcaudal scales = 105 [tail mutilated and regenerated], ventral scale rows = 194, midbody scale rows = 17) was observed preying upon an adult *Ploceus intermedius* (Lesser Masked Weaver) in a riverine gallery forest near Alia Bay, Lake Turkana, Marsabit County, northern Kenya (3.68374°N, 36.29167°E, WGS 84; 387 m elev.). When we detected the snake it had already begun to swallow the bird headfirst. When the snake saw us approach, it dropped the freshly dead bird and tried to hide under the fallen tree stem it was sitting on. We captured the snake and collected the *P. intermedius* (Fig. 1). The voucher specimen of the *Psammophis punctulatus trivirgatus* was accessioned into the collection of the National Museums of Kenya, Nairobi (NMK S4604). Our observations match with previous publications stating that *P. punctulatus* (s.l.) is diurnally active and partially arboreal (Spawls et al. 2004, *op. cit.*). However, *P. punctulatus* (s.l.) preying on a bird has never been documented before.

There is only limited information regarding the diet of *Psammophis* snakes in general and *Psammophis punctulatus trivirgatus* in particular. *Psammophis punctulatus* (s.l.) is known to feed on lizards (lacertids such as *Heliobolus* or *Latastia* spp., agamids, scincids) or other snakes, and it is big enough to be able to capture other vertebrate prey (Loveridge 1936. Bull. Mus. Comp. Zool. 79: 207–337, Spawls et al. 2004, *op. cit.*, Largen and Spawls 2010. The Amphibians and Reptiles of Ethiopia and Eritrea. Edition Chimaira. Frankfurt am Main, Germany. 693 pp.). Birds are rarely reported to be prey of *Psammophis* species. An analysis of the stomach contents of nine *Psammophis* (and one *Psammophylax*) species from southern Africa (700 specimens) revealed that prey consists mainly of lizards and other snakes as well as rodents (Shine et al. 2006. Copeia 2006:650–664). Luiselli et al. (2004. Amphibia-Reptilia *25*:415–423) only found reptiles, small mammals, and sporadic arthropods in the diet of two taxa of the *Psammophis 'phillipsi'* complex from southern Nigeria. Stomach contents of 242 dissected *Psammophis crucifer* specimens from southern Africa also exclusively contained reptiles and very few arthropods (Cottone and Bauer 2010. Copeia 2010:578–590). Schmidt and Branch (2005. Ostrich 76:80–81) report a specimen of *Psammophis* cf. *phillipsii* with an egg presumably from a bee-eater (*Merops breweri*) in its stomach. Various field guides state that birds are prey of *Psammophis mossambicus* (Spawls et al. 2004, *op. cit.*), *Psammophis orientalis* (Branch 2005. A Photographic Guide to the Snakes and Other Reptiles and Amphibians of East Africa. Struik Nature, Cape Town, South Africa. 144 pp.), *Psammophis schokari* (Baha El Din 2006, *op. cit.*), *Psammophis subtaeniatus* (Branch 1998. Field Guide to the Snakes and Other Reptiles of Southern Africa. Struik Nature, Cape Town, South Africa. 399 pp.; Marais 2004. A Complete Guide to the Snakes of Southern Africa. Struik Publishers, Cape Town, South Africa. 312 pp.; Branch 2016. Pocket Guide: Snakes and Other Reptiles of Southern Africa. Third reworked edition. Struik Nature, Cape Town, South Africa. 160 pp.), *Psammophis brevirostris,* and *Psammophis leopardinus* (Marais 2004, *op. cit.*), but we cannot say whether this information is anecdotal or based upon published sources. Although we did not observe how the bird was caught it would be most unusual for a *Psammophis* to scavenge on a dead bird. To our knowledge, our observation represents the first verified documentation for *P. punctulatus trivirgatus* preying upon an adult bird.

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PSEUDOERYX PLICATILIS **(South American Pond Snake). DIET.** The aquatic snake *Pseudoeryx plicatilis* (Colubridae, Dipsadinae) is associated with flooded forests, forest lakes, and streams in South America (Dixon and Soini 1986. The Reptiles of the Upper Amazon Basin, Iquitos Region, Perú. Milwaukee Public Museum, WI, USA. 154 pp.; Mertens 1965. Senckenbergiana Biologica 46:279–285). Previous diet items reported for this snake include frogs and fishes (Dixon and Soini, *op. cit.*; Kaefer and Montanarin 2010. Herpetol. Rev. 41:372).

On 30 January 2007, at 1500 h, I observed an adult female *P. plicatilis* (SVL = 1070 mm; tail length = 130 mm) ingesting an eel-like freshwater fish *Synbranchus marmoratus* (Teleostei: Synbranchidae; total length = 900 mm) in a flooded area in a palm swamp forest dominated by *Mauritia flexuosa* (locally known as *Aguaje*). The snake had captured the fish headfirst and had ingested approximately 1/4 of the fish body. Both individuals were placed in a large snake bag, and the snake regurgitated the prey 15–20 min later. The site was located 1.5 k NW of Los Amigos Biological Station, Manu Province, Madre de Dios Region, Perú (12.5597°S, 70.1103°W, WGS 84; 244 m elev.). Both specimens were deposited in the Museo de Historia Natural Universidad Ncional Mayor de San Marcos, Lima, Peru (*P. plicatilis* = MUSM 24359; catalog number not available for *S. marmoratus*). This is the first record of a large prey item for *P. plicatilis*; in this case, measuring almost the size of its adult predator. A previous diet record of *P. plicatilis* included a smaller individual of *Synbranchus* sp. (total length = 349 mm) in Brazil (Kaefer and Montanarin, *op. cit.*). Also, this record extends the known geographic distribution of *P. plicatilis* in the Madre de Dios Region by approximately 98 km to the west; only one locality, Puerto Maldonado, was included in the most recent geographic distribution map of this species (Scartozzoni et al. 2010. Check List 6:534–537), even though additional localities east and south from Puerto

Fig. 1. Dorsal (A) and ventral (B) views of adult female of *Pseudoeryx plicatilis* (MUSM 24359) and dorsal (C) and ventral (D) views of its prey, *Synbranchus marmoratus*.

Maldonado have been reported in the literature (Duellman 2005. Cusco Amazónico: The Lives of Amphibians and Reptiles in an Amazonian Rainforest. Comstock Publishing Associates. Ithaca, New York. 433 pp.).

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PTYAS MUCOSA **(Oriental Ratsnake). COLORATION / ALBINISM.** *Ptyas mucosa* is the most widely distributed diurnal snake species found in and around human habitation through South and Southeast Asia (Auliya 2010. Conservation status and impact of trade on the Oriental Rat Snake *Ptyas mucosa* in Java, Indonesia. TRAFFIC Southeast Asia, Petaling Jaya, Selangor, Malaysia. 39 pp.).The body color of this species may vary from yellow, olive, or brown to black with brown or black reticulated markings on the dorsal side and dark crossbars on the ventral side. A single orange-colored morph of the species has been reported from Gujarat, India (Vyas 2013. Reptile Rap 15:43–45).

At 1800 h on 18 September 2015, an albino *P. mucosa* (SVL = 38.8 cm; tail length = 15.2 cm) was rescued by one of us (BM) from a residential area at Nalconagar in Angul District of Odisha, India (20.8519°N, 85.1622°E; WGS84). The specimen was a subadult female, approximately two months old, with a slight bruise on the anterior part of the body. The snake had pink eyes and white and yellow body scales with no dark pigment (Fig. 1).

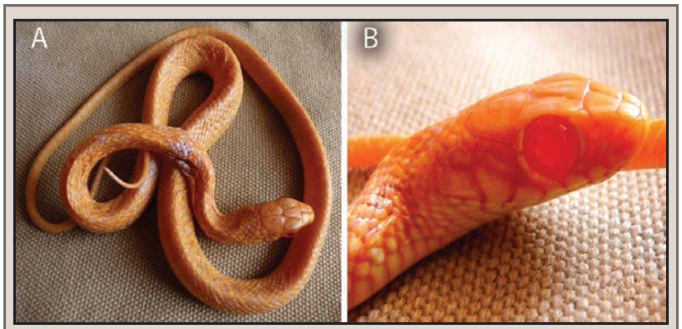

Fig. 1. Albino *Ptyas mucosa* showing lack of melanin pigmentation in the body (A) and iris and cornea of the eye (B).

Even though there are several records of albinism in snakes from India, there is so far no mention of an albino *P. mucosa* in available scientific publications (Mahabal and Thakur 2014. Russ. J. Herpetol. 21:80–88; Vyas and Thakur 2015. Sauria 37:59–61; Kumbaret al. 2017. Reptile Rap 32:29–31).

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PYTHON BIVITTATUS **(Burmese Python). DISPERSAL / MARINE INCURSION.** *Python bivittatus* is an established invader in 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). Appreciation of the dispersal abilities and ecological tolerances of *P. bivittatus* will help conservationists to better anticipate future expansions. Although they inhabit terrestrial and freshwater ecosystems in South Asia, Southeast Asia, and the East Indies, *P. bivittatus* likely have some capacity for marine dispersal. The recently proposed subspecies *P. bivittatus progschai*, an insular endemic of Sulawesi (Jacobs et al. 2009. Sauria 31:5–16), seems to have colonized that island via transoceanic dispersal in the Pleistocene. The Kinmen Islands, lying at minimum 2.1 km off the coast of China, have been naturally recolonized by *P. bivittatus* after the species was

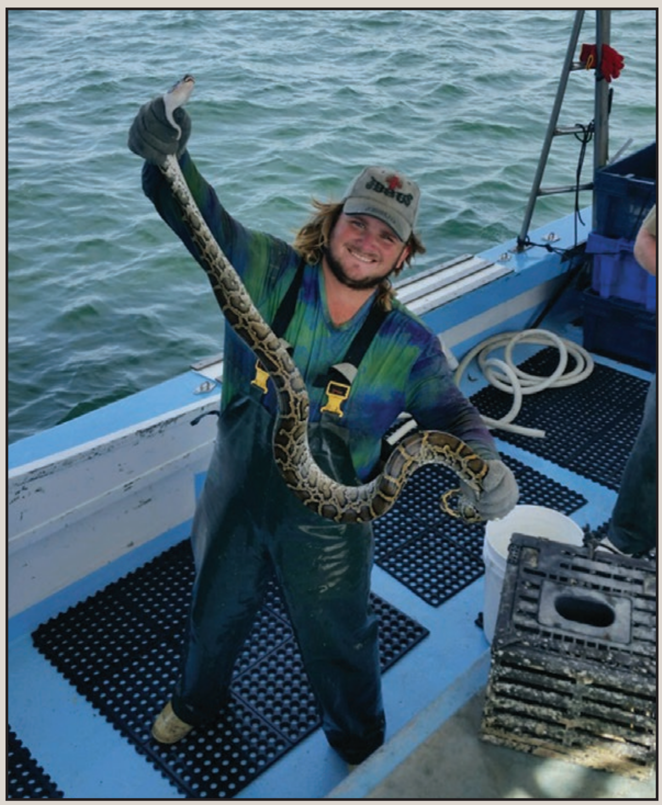

Fig. 1. Photograph of *Python bivittatus* found 25.1 km offshore in Florida on 17 October 2017.

Fig. 2. Photograph of *Python bivittatus* found swimming through open water 10.3 km off the shore of southwest Florida on 8 November 2017.

apparently extirpated there by Cold War military campaigns (You et al. 2013. Zool. Stud. 52:8). A python actively swimming between the Kinmen Islands has also been reported (Chung et al. 2016. Herpetol. Rev. 47:153). Here, we report on two lengthy marine incursions by *P. bivittatus* in Florida. These instances are the furthermost offshore marine observations for this species to date.

At 1000 h EST on 17 October 2017, a boat captain in the Gulf of Mexico observed a *P. bivittatus* tightly coiled around the buoy of a crab trap. The trap location (25.4250°N, 81.4417°W; WGS 84) is 25.1 km from the closest landfall at Highlands Beach, off the west coast of Everglades National Park. The snake, which was killed by the captain and used for crab bait, was estimated to be approximately 2.5 m in total length (Fig. 1). On 8 November 2017, a *P. bivittatus* was collected by another crab boat captain in the Gulf of Mexico, 10.3 km off the west coast of Everglades National Park (25.2928°N, 81.2647°W; WGS 84). The captain observed this second python swimming in open water (Fig. 2), and noted that the snake appeared to be near exhaustion when captured. The latter snake was provided for our examination, and found to be an adult male (SVL = 193 cm; 5 kg).

Three previous records of *P. bivittatus* in offshore locations of coastal Florida have been deposited in an online invasive species location database (https://www.eddmaps.org/distribution/viewmap.cfm?sub=20461; 15 Dec 2017). The database records are all within 1.3 km of the closest land, and within 5.8 km of the mainland; these snakes ranged in size from 0.46–2.74 m total length. Therefore, the present observations greatly increase the oceanic distance that pythons have been documented to traverse. Further, Hart et al. (2012. J. Exp. Mar. Biol. Ecol. 413:56–59) reported that hatchling *P. bivittatus* could survive up to one month when supplied only with seawater for drinking. *Malayopython reticulatus* (Reticulated Python) are found on numerous Indonesian islands, and have been known to cross large stretches of seawater (Murray-Dickson et al. 2017. PLoS ONE 12:e0182049).

One possible explanation for how snakes reached these locations is by being transported as stowaways on boats. However, to the extent that the present observations represent unaided dispersal, a meteorological event might be the underlying cause. One of the most destructive Atlantic hurricanes on record, Hurricane Irma, crossed the Florida Keys with a westerly track, turned northward, then made landfall near Marco Island on 10 September 2017 (37 and 59 d prior to the present observations), bringing sustained winds of 185 kph. Most coastal areas of southern Florida experienced major rain and storm surge flooding. After the storm, river outflows to the sea were increased dramatically and took several weeks to return to normal levels. It is possible that this increased outflow and the subsequently stronger coastal currents may have driven pythons further seaward than they may have swum otherwise. The capacity for *P. bivittatus* to disperse across saltwater should be noted by land managers of Florida's offshore islands, including in the Florida Keys.

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***RHABDOPHIS NIGROCINCTUS* (Black-banded Keelback). DIET.** *Rhabdophis nigrocinctus* is a semi-aquatic, diurnal snake that is often detected near streams (Stuart et al. 2012. The IUCN Red List of Threatened Species 2012: e. T192024A2029525). The main diet of *Rhabdophis nigrocinctus* is thought to be anurans. Here we report the predation of an adult *Fejervarya limnocharis* (Asian Grass Frog) by an adult *R. nigrocinctus.*

At 1300 h on 11 March 2017, in dry season, on pebbles near a forest stream in Pha Xong region (17.599°N, 105.832°E, WGS 84; 280 m elev.) within Hin Nam No National Protected Area, Khammouane Province, central Laos, we witnessed an adult *R. nigrocinctus* eating an adult *F. limnocharis.* When found, the *R. nigrocinctus* was capturing the *F. limnocharis* by grasping its lower body and two legs. Next, the snake continued moving across a fallen tree trunk and swallowed the frog vertically from the legs to the head in about 3 min.

We thank the German International Cooperation (GIZ) Hin Nam No National Project for giving the financial support.

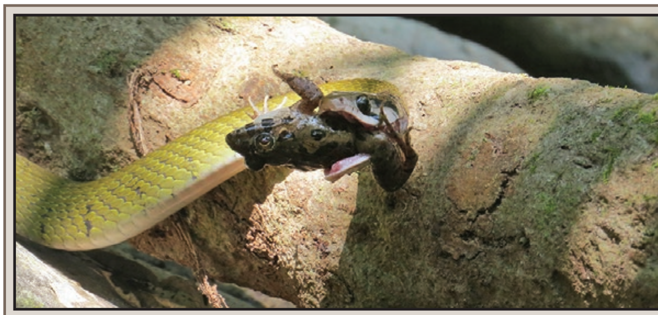

PHOTO BY KHIEUSOMPHONE VANHNABUAOSY

Fig. 1. Adult *Rhabdophis nigrocinctus* consuming an adult *Fejervarya limnocharis* in Hin Nam No National Protected Area, Laos.

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***RHADINAEA FLAVILATA* (Pinewoods Snake). DIET and DEFENSIVE BEHAVIOR.** *Rhadinaea flavilata* is a small dipsadine snake found in the Coastal Plain of the southeastern United States (Ernst and Ernst 2002. Snakes of the United States and Canada. Smithsonian Institution Press, Washington D.C. 661 pp.). Prey of *R. flavilata* include amphibians, small mammals, earthworms, other snakes, and lizards, including skinks, anguids, and *Anolis carolinensis* (Ernst and Ernst, *op. cit.*). Here we report predation on *Anolis sagrei* (Brown Anole) by *R. flavilata*.

At ca. 1600 h on 2 December 2017, two of us (LS, SW) found an adult *R. flavilata* (SVL ca. 28 cm; HM 208107) that had eaten an adult male *A. sagrei* (SVL = 14 cm; HM 208108) under a coverboard at a private residence in Alachua County, Florida (29.65892°N, 82.37920°W; WGS84). The *R. flavilata* had a large food bolus and an odd "kinked" appearance to the lower neck (the tail of the *A. sagrei* was kinked side to side and was visible as separate from the food bolus; see also Jackson et al. 2004. Zoology 107:191–200). Immediately after capture, the *R. flavilata* held its body in a fixed posture and extended its tongue from its mouth for ca. 5 seconds. This is the only time any of us have seen behavior resembling thanatosis in *R. flavilata*, and could have been influenced by the limited mobility conferred by the large food bolus (Ford and Shuttlesworth 1986. Copeia 1986:999–1001; Mehta 2006. Ethology 112:649–656). Defensive behavior in this species is poorly known; Brode and Allison (1958. Herpetologica 14:37–40) mentioned the "offensive" odor of the anal gland secretions, and the species has a tail that is easily broken (Myers 1967. Bull. Florida Mus. Nat. Hist. 11:47–97).

This observation represents further documentation that *R. flavilata* can prey on non-native species (Durso and Smith 2017. Herpetol. Rev. 48:606), and native snakes are also known to prey on *A. sagrei* in Taiwan (Norval et al. 2007. Herpetol. Bull. 101:13–17), despite the observation that some species of snakes respond more strongly to the smell of sympatric than allopatric *Anolis* (Cooper et al. 2000. Amphibia-Reptilia 21:103–115). Other predators of *A. sagrei* in its non-native range include birds (Franz 2001. Herpetol. Rev. 32:253; Bartareau and Leblanc 2006. Herpetol. Rev. 37:462; White and Cove 2016. Herpetol. Rev. 47:460), cats (Bateman and Fleming 2011. Biol. J. Linn. Soc. 103:648–656), crabs (Cates et al. 2014. Herpetol. Rev. 45:491–492), and other *A. sagrei* (Cates et al. 2014. Herpetol. Rev. 45:491).

Finally, Myers (*op. cit.*; N = 123) found that just 0.8% of *R. flavilata* specimens had been collected in December. Comparable modern data from HerpMapper (2.7% of records from December, N = 184; accessed 16 March 2018) also suggest limited but not non-existent winter activity. Thus, our observation of an individual feeding in December, especially on such a large prey item, is noteworthy.

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***SALVADORA GRAHAMIAE* (Eastern Patch-nosed Snake). DIET.** *Salvadora grahamiae* is a small diurnal colubrid of the southwestern U.S. and adjacent Mexico. Previous knowledge of its diet suggests it is a lizard specialist, however, few specific prey items have been reported (Ernst and Ernst 2003. Snakes of the United States and Canada. Smithsonian Institution Press, Washington, D.C., 668 pp.). We dissected specimens of *S. grahamiae* and noted two novel prey items for this species. SRSU 3226, a 33.3 cm SVL specimen collected on 30 May 1973, 27.4 km S of Alpine in Brewster County, Texas, USA (approximate coordinates: 30.17523°N 103.58511°W; WGS 84), contained an *Aspidoscelis exanguis* (Chihuahuan Spotted Whiptail) (SVL = 10.4 cm). SRSU 4732, a 48.5 cm SVL specimen collected 2 November 1977 in Black Gap Wildlife Management Area, Brewster County, Texas, USA, 16.1 km N La Linda (approximate coordinates: 29.55507°N 102.81907°W; WGS 84), contained an *A. marmorata* (Marbled Whiptail) (SVL = 23.5 cm). Both of these lizards constitute new prey records for *S. grahamiae* (Ernst and Ernst, *op. cit.*).

Specimens examined for this study were from the James F. Scudday Vertebrate Collections at Sul Ross State University. All stomach contents were retained and stored in 70% EtOH. This research was supported by the Ronald E. McNair Post-Baccalaurete Achievement Program at Sul Ross State University.

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***SALVADORA INTERMEDIA* (Oaxacan Patch-nosed Snake). DIET.** Snakes in the genus *Salvadora* are diurnal active foragers that feed on small rodents (*S. bairdi*: Setser et al. 2009. Herpetol. Rev. 40:442; Carbajal-Márquez et al. 2014. Herpetol. Rev. 45:344), birds (*S. grahamiae*: Lemos-Espinal and Dixon 2013. Amphibians and Reptiles of San Luis Potosí. Eagle Mountain Publishing, Eagle Mountain, Utah. 300 pp.), and diverse lizard genera (*S. deserticola*: Barker and Sawyer 2011. Herpetol. Rev. 42:304; Gatica-Colima and Córdova-Reza 2012. Herpetol. Rev. 43:350–351; *S. grahamiae*: Ramírez-Bautista et al. 2000. Herpetol. Rev. 31:180). For *S. intermedia*, only one record of the diet is known (*Plestiodon brevirostris*: Santos-Bibiano et al. 2016. Mesoam. Herpetol. 3:159–160).

Fig. 1. *Salvadora intermedia* with a *Sceloporus jalapae* captured at the time of observation (A) and finishing ingesting the prey (B). Image of the full body to confirm species identification (C).

On 28 January 2018, at 1318 h, we observed a *S. intermedia* (SVL = 382 mm) in desert-scrub habitat in Tehuacan Valley, Municipio de Atexcal, Puebla, Mexico (18.38647°N, 97.68616°W, WGS 84; elev. 1920 m). At the time of the encounter, the snake had captured a male *Sceloporus jalapae* (Jalapa Spiny Lizard; Fig. 1A and B; SVL ca. 50 mm). The snake was subsequently collected and photographed to confirm its identity (Fig. 1C) before being released. This record represents a new prey item for *S. intermedia*, and the first record of predation on *S. jalapae*.

This work was supported by the Mohamed Bin Zayed Species Conservation Fund, grant number 172516436 to VHJA. The snake was photographed under permit FAUT-0322 issued by the Secretaría de Medio Ambiente y Recursos Naturales. We thank the communal property authorities of San Nicolas Tepoxtitlan for allowing us to make observations within their territory.

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TAENIOPHALLUS POECILOPOGON **(Cope's Forest Snake). REPRODUCTION.** *Taeniophallus poecilopogon* is a small dipsadid snake, distributed in the Pampa biome, from Uruguay and Argentina, to southern Brazil (Etchepare and Zaracho 2009. Check List 5:770–772). It presents terrestrial and diurnal habits, preying on lizards (Carreira et al. 2005. Reptiles de Uruguay. DI.R.A.C., Facultad de Ciencias, Universidad de la República, Montevideo, Montevideo. 640 pp.). Natural history data for this species are scarce; there are no records regarding reproduction. Here we present the first data on morphometry and clutch size of *T. poecilopogon*.

Fig. 1. *Taeniophallus poecilopogon* (CHFURG 2308) with four developing eggs.

While examining specimens at the Coleção Herpetológica Universidade Federal do Rio Grande (CHFURG), we encountered an adult female (Fig. 1; CHFURG 2308; SVL= 23.5 cm, tail length = 8.83 cm, 6.52 g) specimen of *T. poecilopogon*, collected on 19 October 2012, at Estação Ecológica do Taim (32.7425°S, 52.5744°W; WGS 84). During necropsy, we encountered four elliptical ova that were early in development. Ova measured 20.9, 22.8, 24.9, 25.1 mm in length, 5.27, 5.28, 5.88, 5.61 mm in width, and 0.53, 0.54, 0.56, 0.65 g in weight.

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THAMNODYNASTES **AFF.** ***NATTERERI*** **(Jararaca-de-tapete). DIET.** *Thamnodynastes* is a group of dipsadid snakes associated with forested areas and occasionally edge habitats. They are nocturnal and crepuscular, although they can also be active during daytime (Hartmann et al. 2009. Biota Neotrop. 9:173–184). The genus *Thamnodynastes* has a confusing taxonomic history (Bailey et al. 2005. Phyllomedusa 4:83–102; Bailey and Thomas 2007. Mem. Fund. La Salle Cien. Nat. 166:7–27; Bellini et al. 2013. Herpetologica 69:67–79) and literature on the distribution, ecology, and natural history of species in this genus is likewise confused (Barbosa et al. 2006. Rev. Biol. Cienc. Terra 6:73–82; Franco and Ferreira 2002. Phyllomedusa 1:57–74). Trevine (2017. Sistemática da tribo Tachymenini Bailey, 1967 [Serpentes, Dipsadidae, Xenodontinae]. PhD dissertation. Universidade de São Paulo) found that *Thamnodynastes* is paraphyletic and proposed taxonomic changes that should clarify the status of the species in this genus in the near future. Here we use the name *T. nattereri sensu* Costa and Bérnils (2015. Herpetol. Brasil. 4:75–93).

Thamnodynastes aff. *nattereri* is frequently found near aquatic environments, and feeds mostly on anurans (Marques and Sazima 2004. *In* Marques and Duleba [eds.], Estação Ecológica Juréia-Itatins: Ambiente Físico, Flora e Fauna, pp. 257–277. Holos, São Paulo, Ribeirão Preto). Both arboreal and terrestrial frogs are eaten (Marques et al. 2001. Serpentes da Mata Atlântica: Guia para a Serra do Mar. Holos, São Paulo, Ribeirão Preto, 184 pp.; Dorigo et al. 2014. Herpetol. Notes 7:261–264).

At 1700 h on 18 October 2016, an individual *T. nattereri* (total length = 47.0 cm; Fig. 1A) was collected at the Parque Estadual do Forno Grande, Municipality of Castelo, State of Espírito Santo, southeastern Brazil (20.51644°S, 41.091846°W; WGS84; 1345 m elev.). In the laboratory, the snake was dissected and an adult *Scinax* aff. *hayii* (SVL = 2.8 cm; Fig. 1B) was found in its stomach that had been swallowed legs first. *Scinax* aff. *hayii* is an arboreal

FIG. 1. *Thamnodynastes* aff. *nattereri* (A) and anuran prey *Scinax* aff. *hayii* (B) found in its stomach. Scale bar = 1 cm.

anuran endemic to the Brazilian Atlantic Forest, where it inhabits forested swamps and fragment edges (Haddad et al. 2013. Guia dos Anfíbios da Mata Atlântica: Diversidade e Biologia. Anolis Books, São Paulo, São Paulo. 544 pp.). *Thamnodynastes* aff. *nattereri* has been reported to prey on other *Scinax* species, such as *S. cardosoi* and *S. alter*, as well as on other frogs in the subfamily Scinaxinae, such as *Ololygon trapicheiroi* (Dorigo et al. *op. cit.*). Our finding supports the idea that semi-arboreal *T. nattereri* often prey on arboreal anurans, such as scinaxine tree frogs.

The specimen of *T.* aff. *nattereri* (MBML 3960) was deposited, with prey, at the Zoological Collection of Museu de Biologia Prof. Mello Leitão, Instituto Nacional da Mata Atlântica, Municipality of Santa Teresa, State of Espírito Santo, southeastern Brazil.

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***THAMNOPHIS PROXIMUS ORARIUS* (Gulf Coast Ribbonsnake). MAXIMUM SIZE.** *Thamnophis proximus orarius* has a geographic distribution that includes coastal regions of Louisiana and Texas (USA) southward to Tamaulipas, Mexico. Werler and Dixon (2000. Texas Snakes: Identification, Distribution, and Natural History. University of Texas Press, Austin. 437 pp.) report a maximum total body length of 123.2 cm for *T. p. orarius*. Ernst and Ernst (2003. Snakes of the United States and Canada. Smithsonian Books, Washington, D.C. 668 pp.) report a maximum total body length of 126.8 cm for *T. proximus*.

On 27 July 2016, at 0250 h, on FM 490 near Hargill, Hidalgo County, Texas, USA (26.44829°N, 98.05131°W; WGS 84) a road-killed adult female *T. p. orarius* was found that measured 115 cm (SVL), with a tail length of 33 cm (total length = 148 cm). The specimen was collected and deposited in the Amphibian and Reptile Diversity Research Center at the University of Texas at Arlington (UTA R63535). This represents the largest documented specimen of *T. proximus*.

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***THAMNOPHIS RADIX* (Plains Gartersnake). DIET / OPHIOPHAGY.** On 27 June 2017, a gravid adult female *Thamnophis radix* (SVL = 41.3 cm; tail length = 9.6 cm; 50.5 g) was captured under a rubber artificial cover object in a remnant mesic sand prairie in Green River State Wildlife Management Area, Lee County, Illinois, USA. This was the initial and only capture of this individual during a mark-recapture study. Upon handling and marking with a unique identification code, the female regurgitated a partially digested segment (5.5 cm) of an adult *Storeria dekayi* (Fig. 1). To our knowledge, ophiophagy has not been reported in *T. radix*, although it has been documented in the genus *Thamnophis* (Mitchell 1986. Cannibalism in Reptiles: A Worldwide Review. SSAR Herpetol. Circ. 15. 37 pp.; Ernst and Ernst 2003. Snakes of the United States and Canada. Smithsonian Books, Washington, D.C. xi + 668 pp.). Environmental stress may be to blame (Polis and Myers 1985. J. Herpetol. 19:99–107). Conceivably harboring lower abundances of more typical prey items (e.g., annelids and amphibians), arid sand prairies may present a unique set of conditions that elicit trophic niche expansion in *T. radix*.

FIG. 1. Remains of a *Storeria dekayi* recovered from a *Thamnophis radix* from Illinois, USA.

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***TROPIDOCLONION LINEATUM* (Lined Snake). HABITAT / ELEVATION.** *Tropidoclonion lineatum* is primarily a species of the Great Plains states of the USA where it occurs widely in grassland and sparsely wooded habitats below ca. 1500 m. However, at the western limits of its geographic range, it occurs at higher elevations along the eastern versant of the southern Rocky Mountains and other disjunct mountain ranges farther south. In Colorado, Hammerson (1999. Amphibians and Reptiles in Colorado. 2nd ed. University Press of Colorado, Niwot. 484 pp.) reported *T. lineatum* from the eastern part of the state below 1830 m. In New Mexico, Williamson and Degenhardt (1984. Herpetol. Rev. 15:21) reported a record from "above 2000 m," whereas Degenhardt et al. (1996. Amphibians and Reptiles of New Mexico. University of New Mexico Press, Albuquerque. 431 pp.) identified the known elevation range in the state as 1200–2000 m. Herein we report a high-elevation record for *T. lineatum* in central New Mexico, near the extreme western edge of its known geographic range.

On 12 October 2009, an adult *T. lineatum* (unsexed) was captured by S. Cox at midday as it was crawling on the surface in a grassy area just below the summit of Capilla Peak at ca. 2810 m elevation in the Manzano Mountains, Torrance County, New Mexico (34.69933°N, 106.40445°E; WGS84). The specimen was photographed by C. Hathcock immediately after it was captured and then released. The location was a grazed montane meadow (ca. 4.3 ha) straddling the ridge just south of Capilla Peak. Dominant grasses and forbs of the meadow were: Blue Grama (*Bouteloua gracilis*), Spidergrass (*Aristida ternipes*), Penstemons (*Penstemon* spp.), and Fleabane (*Erigeron* sp.). Surrounding the meadow were stands of trees and shrubs, primarily Ponderosa Pine (*Pinus ponderosa*), Gambel Oak (*Quercus gambelii*), Quaking Aspen (*Populus tremuloides*), Southwestern White Pine (*Pinus strobiformis*), and Douglas-fir (*Pseudotsuga menziesii*).

The species has been previously documented from sites on the east side of the Manzano Mountains (Williamson and Degenhardt 1984, *op. cit.*; Degenhardt et al. 1996, *op. cit.*), although all such records are from lower elevations. The nearest other record to the Capilla Peak site that we are aware of is from ca. 24 km to the NE at "NM 14 [= NM Hwy 337], 3.5 mi [5.6 km] S of Chilili," Torrance County (Museum of Southwestern Biology, University of New Mexico, MSB 39935) at an elevation of ca. 2035 m. Our record indicates that *T. lineatum* occurs at higher elevations than previously reported and suitable habitat for the species in New Mexico apparently extends into montane areas from more typical habitat at lower elevations.

A voucher photograph of the *T. lineatum* was verified by Charles W. Painter and is deposited in the University of Kansas Digital Archives (KUDA 012535). We thank J. Tomasz Giermakowski at the Museum of Southwestern Biology, University of New Mexico for support with museum queries.

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***VIPERA BERUS* (Common Adder). EARLY SPRING ACTIVITY.** *Vipera berus* has the most northerly distribution of any snake in the world, with a comparatively prolonged activity period. In Somero, southern Finland (60.6299°N), the earliest spring record was on 27 March (Viitanen 1967. Ann. Zool. Fen. 4:472–546). In northwestern Russia, at a latitude of 60°N, in the vicinity of St. Petersburg, *V. berus* usually start to emerge from hibernation in the middle of April. In the Vologda Region, in Darwin Natural Reserve (between 58.5647°N and 58.8834°N) the date of earliest activity is 30 March (Kaletskaya 1953. Rybinskoe Water Reservoir, vol. 1, MOIP, Moscow. 214 pp.). In southern Karelia, on the Kizhi Archipelago, the earliest emergence recorded is 24 April (Korosov 2010. Ecology of Common Adder in the North. PetrGU, Petrozavodsk, Russia. 262 pp.).

On 12 March 2017, at 1425 h, active *V. berus* were recorded in abandoned quarries near Petrovschina Village, Kirovsk District, St. Petersburg Region, Russia. Two adult males (Fig. 1) were basking 2 m from each other on the thawed southern slope of a small ravine (59.8744°N, 31.5025°E, WGS84; Fig. 2A). The air temperature was 4.0°C, and the surface temperature of the soil in the sun was 7.5°C. One additional male was found 300 m from others, also on a south-facing slope under a small bush (59.8761°N, 31.5066°E, WGS84; Fig. 2B), where it was actively moving. The air temperature was 4.5°C, and the surface temperature of the soil in the sun was 9.0°C.

These abandoned limestone quarries were dug in the 19th century into the Putilovo Ridge, a geologic formation stretching along the northern edge of the Baltic-Ladoga coastal escarpment characterized by local outcrops of Ordovician solids. The Putilovo Ridge is a well-drained plateau formed by limestone dumps and

Fig. 1. Male *Vipera berus* basking in the sun, 12 March 2017.

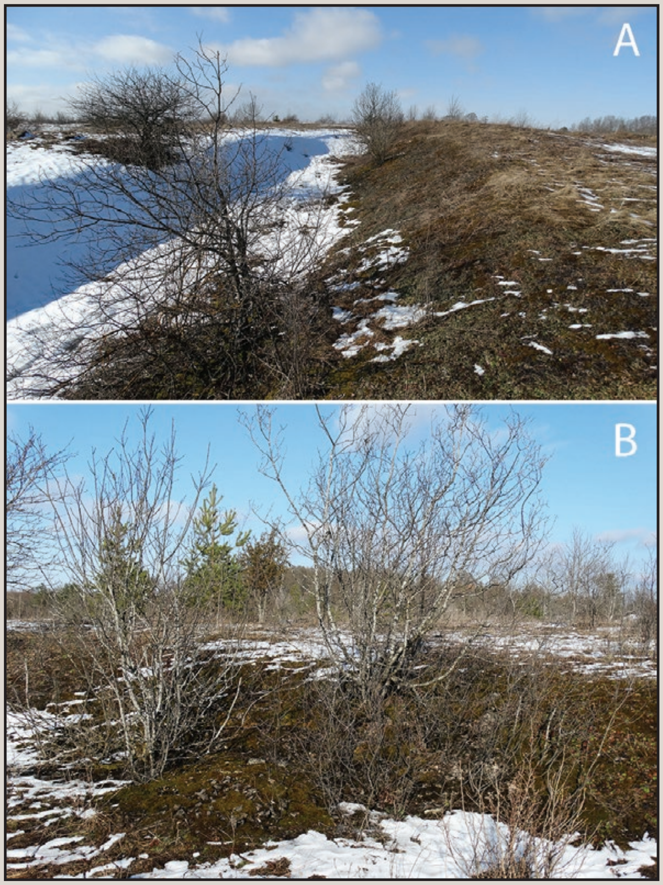

Fig. 2. A-B) Hibernation and basking sites of *Vipera berus* near Petrovschina Village, Russia, 12 March 2017.

covered by meadows and scrubby bushes with junipers, apple trees, pines, and others. The dissected landscape, dry soil, and the abundance of cavities in gravelly ground provide ideal habitat for overwintering *V. berus*. This species is present here during the whole year in high densities, and numerous wintering dens are present. Dryness and high soil temperatures are conducive to early snowmelt on the southern slopes in the spring and very early emergences of snakes. This is the earliest date reported for this latitude and location, earlier than the previous record by 12 days (on 24 March 2016, unpubl. data) and earlier than the previous published record from southern Finland by 15 days (on 27 March 1967).

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***XENOPELTIS UNICOLOR* (Asian Sunbeam Snake). DIET.** *Xenopeltis unicolor* is known to feed on a variety of prey, including frogs, lizards, snakes, small mammals, birds, and even reptile eggs (Rooij 1917. The Reptiles of the Indo-Australian Archipelago, vol. II. Ophidia. E. J. Brill, Leiden, Holland. 334 pp.; Bergman 1955. Zool. Mededelingen, XXXIII, No. 22:209–225; Martins and Rosa 2012. Taprobanica 4:48–51; Milto 2014. Herpetol. Rev. 45:522). In this note we report the predation of an adult *Hypsiscopus plumbea* (Boie's Mud Snake) by an adult *X. unicolor.*

At 2130 h on 19 March 2017, on a trail near a stream of Vang Khon Village, Bualapha District, Khammouane Province, Lao PDR (17.5046°N, 105.7247°E, WGS 84; 166 m elev.) within Hin Nam No National Protected Area, we observed an adult *H. plumbea* being eaten by an adult female *X. unicolor* (SVL = 66.3 cm; tail length = 7.2 cm; Fig. 1). When found, the *X. unicolor* was coiled around the *H. plumbea*. Remarkably, even though we collected both specimens, the *X. unicolor* continued to constrict its prey and had no response to our presence. Upon arrival at the lodge, the *X. unicolor* had completely swallowed the *H. plumbea*. Specimens were deposited in the collections of the Vietnam National University of Forestry (VNUF), Hanoi, Vietnam (VNUF RL.2017.08).

Fig. 1. An adult female *Xenopeltis unicolor* consuming an adult *Hypsiscopus plumbea* near a stream of Vang Khon Village, Boualapha District, Khammouane Province, Laos.

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Erratum

In a recent issue of *Herpetological Review*, a natural history note by Jarvie et al. on *Sphenodon punctatus* (Tuatara)(2017. Herpetol. Rev. 48:840–841), contained typographical errors introduced during print production to the printed and online versions. The typographical errors include the deletion of letters that have macrons, which are used in the Māori language to indicate long vowels: the correct spelling of rokonui is Ōrokonui, Ngti Koata is *Ngāti Koata*, and Kti Huirapa Rnaka ki Puketeraki is *Kāti Huirapa Rūnakaki Puketeraki*. In addition, the plural for *tuatara* was changed to tuataras in one place (tuatara, a Māori name, is the same in both singular and plural).