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Contents

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The Herpetological Bulletin is produced quarterly and publishes, in English, a range of articles concerned with herpetology. These include society news, selected news reports, full-length papers of a semi-technical nature, new methodologies, natural history notes, book reviews, letters from readers and other items of general herpetological interest. Emphasis is placed on natural history, conservation, captive breeding and husbandry, veterinary and behavioural aspects. Articles reporting the results of experimental research, descriptions of new taxa, or taxonomic revisions should be submitted to *The Herpetological Journal* (see inside back cover for Editor's address).

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Front cover illustration. An adult male *Ameiva fuscata*. Photograph by Robert Powell ©. See article on page 17.

News Reports

DIVERSE NEW HERPETOFAUNA IN THE EASTERN HIMALAYAS REPORTED BY WWF

A report by WWF has revealed more than 350 new species, including a Flying-frog, from the Eastern Himalayas. The report, *The Eastern Himalayas – Where Worlds Collide*, highlights a host of new species found over the last decade in the remote mountain region spanning Bhutan, northeastern India, northern Myanmar (Burma), Nepal and southern parts of Tibet. They include 244 plants, 16 amphibians, 16 reptiles, 14 fish, two birds, two mammals and at least 60 invertebrates. “These exciting finds reinforce just how little we know about the world around us,” said conservation science advisor, Mark Wright. “In the Eastern Himalayas we have a region of extraordinary beauty and with some of the most biologically rich areas on the planet. Ironically, it is also one of the regions most at risk from climate change, as evidenced by the rapid retreat of the glaciers, and only time will tell how well species will be able to adapt – if at all.”

There have been 16 new amphibian discoveries in the Eastern Himalayas over the past 10 years. A caecilian and a diverse chorus of 14 frogs and a toad have revealed themselves for the first time. The eclectic mix of amphibians from Bhutan, India, Myanmar, Nepal and Tibet include a number of high-altitude dwellers, with many found more than 1,000 m a.s.l. The toad, *Pseudepidalea zamdaensis*, belonging to the ‘true toad’ family Bufonidae, was discovered at the extraordinary altitude of 2,900 m. Lowland discoveries include *Hylarana chitwanensis*, the Chitwan Frog of Nepal. Named after the Chitwan National Park, this frog inhabits the terai grasslands, bushes and tropical Shorea forest. Because of the closer proximity of the species to human populations than its cloud-dwelling cousins, populations of the Chitwan Frog in the Eastern Himalayas are decreasing and are already considered at risk by the IUCN, as a result of habitat destruction.

The status of the Chitwan Frog is close to being elevated to ‘Vulnerable’ from ‘Near Threatened’ according to the IUCN Red List of Threatened Species, on account of the declining quality and extent of habitat in its only known range, which is limited to 20,000 Km^2.

Most of the new amphibians are endemic to the Eastern Himalayas. Some of them are found only in a specific area. The bright green, red-footed tree frog *Rhacophorus suffry*, a so-called ‘flying-frog’ because long webbed feet allow the species to glide when falling, was described in 2007. The species is mainly found in swampy areas and is known only from five specific sites, including the Suffry tea estate in Assam, where it was originally found, and in neighbouring areas. Other new species from Assam include *Amolops assamensis*, a green and brown species also called named the Assamese Cascade Frog. Cascade Frogs or Torrent Frogs as they are also known as, have adapted to life amongst the torrents, waterfalls and wet boulders that cascade out of Asia’s rainforests.

The species *Philautus sahai* is perhaps the lead contender for the crown of ‘most endemic frog’ in the Eastern Himalayas. This frog was described in 2006 from specimens found in 1988 in a single tree hollow about 3 m above ground, in a dense forest on the bank of the Noa Dihing River, in Arunachal Pradesh. Very little is known about the species and there has been no more information about it since, indicating this elusive frog may be extremely rare.

Also among the new amphibian species discovered was a caecilian, *Ichthyophis garoensis*. These are interesting creatures; although classed as amphibians, they are completely limbless and look more like giant earthworms. As caecilians are subterranean, they are among the least studied of the amphibian species, making the latest species discovery from Assam particularly significant.

The Eastern Himalayas have yielded 16 new reptile species over the past 10 years. These include 13 lizards and three snakes. The most colourful snake discovery has been the emerald green pit-viper, *Trimeresurus gumprechti*. Officially discovered in 2002, Gumprecht’s Green Pit-viper is venomous and capable of growing to

Figure 2. Smith's Litter-frog (*Leptobrachium smithi*).
© Milivoje Krvavac.

Figure 1. Flying-frog (*Rhacophorus suffry*).
© Totul Bortamuli.

Figure 3. Gumprecht's Green Pit-viper (*Trimeresurus gumprechti*).
© Gernot Vogel.

130 cm in length. Scientists predict that larger specimens exist. The species is known to occur around Putao, at altitudes above 400 m in the far north of Myanmar. There are some striking differences between the males and females of this species; females reach a greater size, with a thin, white or whitish-blue streak on the head, and deep yellow eyes; males are shorter, have a red stripe on the head, and bright red or deep red eyes. This species is mainly found in rugged, forested areas, often in the vicinity of streams, as well as bamboo thickets. It also occurs near human settlements and along trails. Mostly nocturnal, this snake is arboreal, but can also be found on the ground. The largest known specimens were collected while they were resting on branches near a stream. Rodents and skinks have been recorded as prey, but the species has also been observed killing and eating other pit-vipers of a similar size.

Another nocturnal snake, Zaw's Wolf Snake (*Lycodon zawi*), was discovered dwelling in forests and near streams at elevations of less than 500 m high in Assam, India, including in the Garbhange Reserve Forest and in northern Myanmar. The black snake, with white bands, can grow to half a metre in length, and feeds mainly on geckos. The find increases the diversity of the *Lycodon* genus to four in Myanmar and to five in northeast India. In 1999, a new species of blind snake was officially described from Darjeeling, Assam, near India's border with Nepal. Also called the Darjeeling Worm Snake on account of its appearance, *Typhlops meszoeyli* was discovered in the forest-covered foothills of the Himalayas. As the name suggests, the snake's eyes and body are covered by smooth shiny scales, a sign of its adaptation to a subterranean life, allowing it to move easily through earth. The snake feeds mainly on the eggs and larvae of termites and ants, and can occasionally be found high in trees, having reached these heights by using termite galleries. *Typhlops meszoeyli* belongs to the super family Typhlopidae, which comprises more than 200 different blind-snake species worldwide. According to scientists, several new species of reptiles still await description, including a new species of pit-viper caught after a one-year hunt in the rainforests of northeast India. The new species can measure longer than two metres and is already the stuff of local legend. "Barta", as the snake is known by the local Nyishi tribesmen, is the most-feared creature among the tribes in Arunachal Pradesh. According to Nyishi folklore, sighting of a Barta, meaning the deadliest of all snakes, is a very bad omen.

One herpetological discovery was anything but new: a 100 million-year-old gecko fossil found in an amber mine in Myanmar. The now-extinct species is the oldest type of gecko known to science. The region harbours a staggering array of species: 10,000 plants, 300 mammals, 977 bird species, 176 reptiles, 105 amphibians and 269 freshwater fish. The Eastern Himalayas are also home to many of the remaining Bengal Tigers and are the last bastion of the Greater One-horned Rhino. Unfortunately, this globally-important hotspot of biological diversity is highly vulnerable to the effects of climate change. WWF have launched a Climate for Life campaign to bring the plight of the Himalayas to the attention of the world and are working with local communities to help them cope with the impacts of climate change. Tackling climate change in the region also depends on significant action from developed countries. WWF are calling on governments attending the climate change talks in Copenhagen this December to commit industrialised countries to a 40 % reduction in greenhouse gas emissions by 2020 (compared to 1990 levels). "There is no room for compromise on this issue," added Wright. "Without these cuts the Himalayas face a precarious future – impacting both the unique wildlife and the 20 % of humanity who rely on the river systems that arise in these mountains." The full report '*The Eastern Himalayas – Where Worlds Collide*' can be read at: www.wwf.org.uk

Adapted from WWF material and;

Salzberg, A. (2009). Hundreds of new species discovered in fragile Eastern Himalayas. *Herp Digest* **9** (37), 5.

Submitted by TODD R. LEWIS (EDITOR).

Bert Langerwerf

'The Lizard King'

BERT died on 11 August 2008 aged 64 after a long fight against cancer. The British Herpetological Society lost a good friend, prolific author and innovative breeder of Reptiles. I first wrote to Bert in 1981 as I had agreed to try and organise a trip to see the great man and observe his work 'in the flesh'. The late Dr. Anthony Millwood, another BHS member, well known for his work on breeding European amphibians, had also wanted to see Bert's breeding techniques and thus we organised a visit. Unfortunately email did not exist in those days. Pen and ink or telephone were the only means of communication. We had read Bert's articles regularly in the BHS Bulletin, and like many other captive breeding enthusiasts, had been inspired by the ground breaking new techniques he was using. I have provided some of the letters I received from Bert until we changed to email around 1995. I deliberately chose not to alter the letters because they may give readers some idea of how keen Bert was to pass on his knowledge.

6/5/1981

Dear Mr Thatcher,

Thank you much for your letter, showing your interest in my work. On 2nd June I will not be home, but I will be on 1st June. It would be better to come and visit me on the 9th of June. I would like it better if you and Mr. Millwood would come already on Monday or Sunday and stay here 1 or 2 nights. Just 1 ½ week ago Mr. Hazlewood was here and stayed with his wife for 2 nights. I know he knows Mr. Millwood. In the next 2 weeks John Pickett will visit me and take several Lacerta strigata *to England. Phone me! I hope to meet you soon,*

Best wishes,

Bert Langerwerf.
Benedenkerksti.36A
NL5165CC Waspik

This was one of the most inspiring trips of my life. Bert was at this time working as a Physics teacher in a local school and still managing to look after a large number of Lacertids and Agamids in his outdoor enclosures. The garden was on very sandy soil and comprised of several acres of cold frame like structures (Fig. 1), designed in such a way as to maximise the spring, summer and autumn sunshine. This was achieved by rows of south facing units set 12 to 18 inches into the ground, providing access to basking areas most of the day whilst allowing the lizards to thermoregulate in shade when needed. The lower section of the units also provided a dry and frost free hibernaculum. This is still a preferred design used to allow these lizards to survive cold northern European winter temperatures and often erratic spring weather of the UK. The vivaria often had garden compost piled against the rear walls to provide extra insulation in winter and to retain heat during summer. Old carpets were also used during extra cold snaps to cover the entire top area. While using these units Bert discovered that the glass cut out UVB rays and in doing so the lizards were unable to synthesise D3 naturally and were often

Figure 1. View from upstairs room of Bert's garden Terraria in Waspik. Nearly all structured vivaria in and around Bert's garden were hand made by himself.

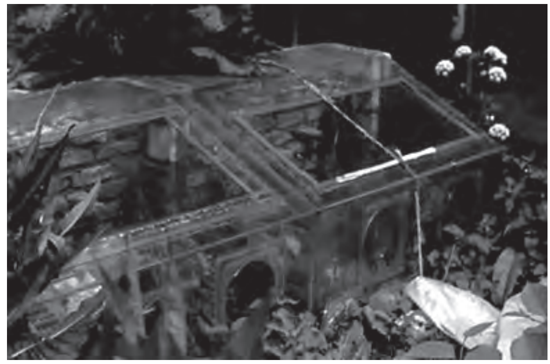

Figure 2. The glass units Bert used for the smaller Lacertids and hatchlings. Note circular openings on fronts with sliding glass covers for feeding and ventilation.

not strong enough to leave the eggs (Fig. 2). This problem was subsequently solved by spraying oily vitamin D3 on the crickets, then dusting Calcium Carbonate on to the insects in a bucket, providing additional nutrients to balance the natural Calcium cycle of the lizards. This style of nutrient addition is now a standard technique in a captive breeder's arsenal and have been fine tuned to species specificity over generations, but the principal was discovered by Bert.

Bert and Hester were excellent hosts to Anthony and myself, despite having to manage his cricket cultures before going off to teach Physics at a local school in the morning, and again during the lunch period and in the evening. Bert was enthusiastic and inspiring. The food cultures were kept warm by diverting the central heating pipes into the cellar under the house. In the evening after eating and doing a final round of the lizard collection we were treated to local folk songs around the piano, viewing the universe from Bert's telescope and browsing his impressive library. Amazingly, Bert spoke more than 14 foreign languages at this time and informed us that he was adding another language each year.

11/9/81

I thank you very much for the tape (Pink Floyd) and often play it in the car, which is a stereo installation. At this moment we are expecting born 1057 lizards (and some Natrix*). Born for instance* Ophisaurus apodus. *Never bred before! I cannot mention the whole list. Many* Lacerta strigata. *I still have some 200. So it will be 1200-1300 births. A new record. 14 days ago I was in Budapest and gave a lecture at the "1st Herp Conference of the Socialistic countries." They were amazed that I bred so many species. There is a possibility that I can speak in Leningrad, soon as I spoke in Russian in Budapest to show that I was able to speak in the Soviet Union. There were also three American professors there and they were also amazed at my work and it may be possible that in August 1982 I'll give a lecture in the U.S. (SU and US!). I have got permission from New Zealand to get a pair of* Sphenodon punctatus. *I must make a very good, less warm set up for them.*

4/5/82

Most of my lizards hibernated well. In my terraria I put a layer of about 4 inches of leaves and/or Hay. The sand in the terraria is not so deep in many places: often only about a foot deep. I reckon 5 to 10% deaths in winter. I hope to breed 1500 lizards this year, so what does it matter if yearly to 70 lizards die. You get stronger races. Vitamins and things are expressed in IU = International Units. On good package must be written how many I.U. it contains per ml (=cc). For instance I have bottles with 1000,000 I.U. per cc and also 1000 I.U. per cc. One drop of the first bottle is the same as 100 drops of the other! So you must note it for not overdosing! Often I see articles where they tell you to give so and so many *drops per litre. But don't tell the units. This is worthless!*

21/3/84

I had much trouble with my lizards this winter. Temperatures around 12°C are very bad. If lizards come out of hibernation they must be put warm immediately and given water to drink. Further they should be kept warm until spring. Normally lizards don't lose weight in winter, also Lacerta pater *don't. Most of my* L. pater *hibernate well and come out of hibernation as fat as they were in September. The bad climate is the main reason I want to leave. I might breed 1,500 lizards but because of the winter each year my heating costs are already 6300 gilders a year (over 1000 pounds!).*

Bert finally decided to move to warmer climes, due to the heating bills (mainly incubation and crickets) in the mid eighties. He moved to Gran Canaria where I visited him in the early days of development and met his business partner, Jim Pether, who now owns this company (Fig. 3 and 4). The units are now collectively called, Centro de Investigaciones Herpetologicas, Galdar. From Galdar, Bert moved on to Alabama and formed, Agama International and the International Herpetocultural Institute.

25/7/94

I look forward to seeing you in Orlando. Sunday afternoon we leave and drive through the night to Montevallo. There I can bring you to Atlanta a few days later. My first 150 Physignathus lesueri *were born again this year. I expect another 100-150 for this year. For 1995 I am keeping now all these subadults, mainly female, but I counted several male and about 150 female. So in 1995 there will be at least 1,000 young* P. lesueri.

I teamed up with my friend Steve Vanderhoeven and visited Bert in his final home in 1994. We met Bert at the Orlando Herpetological Show and were then driven through the night as promised and serenaded with manic Cajun folk music at quite a fair volume due to our host's hearing difficulties.

The stay with Bert and Hester was truly amazing. We were told how Bert had hand dug out all the partial underground rooms and cages to give protection from the sometimes violent weather conditions that crossed Alabama at certain times of the year and to protect the animals from extreme winter snows that were often followed by relatively mild sunny clear days. The cricket breeding room was a long building at least 5 feet underground and well insulated by its position. Bert must have singlehandedly moved hundreds of tons of soil while constructing this breeding area. Not to mention all the concrete and timber constructions. Bert announced enthusiastically that he would show us how he could catch rats that had found their way into his insect room with his bare hands! After disappearing under the cages and benches we heard a lot of scrambling and scratching and finally Bert reappeared with a rat

Figure 3. Construction of terraria in Gran Canaria.

Figure 4. Almost finished units, Gran Canaria.

Bert with a freshly caught, and well secured, rat.

held up in his hand (above). If that was not enough he then went on to demonstrate his speed of hand by plucking a wasp from the air outside his room. He told us that he was an excellent tree climber and that he was going to New Caledonia with some reptile friends to collect the giant *Rhacodactylus leachiana* geckos. He joked that only he would be good enough to climb these huge trees where they occurred. Bert was always good humoured and totally fearless. The seven acres of land was a haven for Black Widow Spiders and they could be found between many of the outdoor lizard units. Bert demonstrated how to kill them by rubbing his bare arm up the corner of the wall to squash them. His enthusiasm never faltered and many species of lizards were added to his list of successes. He bred Argentinean Tegu *Tupinambis merianae* in large numbers and due to their cooler requirements they were better suited to outdoor propagation. He also bred South African Dwarf Chameleons *Bradipodium thamnobates* (over 106 progeny) in 1992 and *Bradipodium pumilium*. Plumed Basilisks (*Basiliscus plumifrons*) (509) were also successful as were *Basiliscus galeriticus* and *Basiliscus basiliscus*. Lacertids did not fair quite so well in the Alabama climate as in Europe but some species such as Eyed Lizards *Timon lepida* flourished (337). *Lacerta strigata* was continually successful (318). In 1992 Bert bred 3,209 lizards crossing an impressive nine Genera and 46 species.

I have included a picture of Bert standing by a large tree trunk (Fig. 5). He requested I take this picture to illustrate the start of his lizard breeding cycle. He collected free sawdust from a local sawmill which was used to breed Giant Mealworms. It was Bert who established this food item on the

Figure 5. The start of the food chain. Here Bert exhibits the food source for his Giant Mealworm colonies.

Figure 6. Some of Bert's many outdoor vivaria created for a number of lizard species.

herpetological menu. It formed a major item in the diets of the various lizard species that he bred.

Bert was my Guru and friend in those early days of breeding lizards. His knowledge and humour were willingly shared with all who were interested. He will leave a gaping hole in the herpetological hobby and zoological world.

I thank Bert's son Timo who kindly sent this list of species and articles for use in the Bulletin.

Some of the species Bert left when he died;

100 *Shinisaurus crocodilurus,*
80 *Corucia zebrata,*
350 *Physignathus lesueurii,*
23 *Uromastyx acanthinura,*
75 *Timon lepidus* (+ 25 melanistic)*,*
40 *Lacerta strigata,*
60 *Tupinambis rufescens,*
200 *Tupinambis merianae,*
30 *Tupinambis merianae x T. rufescens,*
40 *Pseudocordylus melanotus,*
8 *Petrosaurus thalassinus,*
12 *Phrynops hilarii,*
20 *European turtles*
Various *Laudakia, Platysaurus,*
Ophisaurus and *Elgaria.*

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Nesting site, clutch size and development of *Atractus reticulatus* (Serpentes, Colubridae) from Corrientes, Argentina

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ABSTRACT - *Atractus reticulatus* is an oviparous semifossorial snake whose reproductive biology is barely known. In this work we present information about the nesting sites and egg characteristics of this species from two sites in the north of the province of Corrientes, Argentina. Differences in clutch size, egg size and sex ratio between the different clutches were observed. Hypotheses are considered about oviposition, developmental period of embryos and possible association of this snake with ants of the *Odontomachus* genus.

THE study of reproductive biology is essential to the understanding of life history and adaptation by organisms to different environments. In addition, it offers fundamental information that can assist the conservation state of a species (Ibargüengoytía, 2008). There is limited data about the reproductive habits of snakes, especially that of nesting sites and clutch characteristics. Gallardo & Scrocchi (2006) presented some comparable information about oviposition period, clutch size and characteristics of eggs and neonates for eight species of neotropical Colubrids and showed intra and interspecific variation in these parameters. Depite such previous work, there remains few details on embryonic develoment of neotropical snakes in the wild.

Atractus reticulatus is a small, oviparous Colubrid with semifossorial habits. It occurs in Brazil, from the north of São Paulo State up to the south of Rio Grande do Sul, eastern Paraguay, and in the provinces of Misiones and north of Corrientes, in Argentina (Alvarez et al., 1992; Giraudo & Scrocchi, 2000; Carreira et al., 2005). *A. reticulatus* is scarce across most of its range and encounters are infrequent. Its ecology and biology have therefore remained poorly documented and there are few references made regarding its reproduction and development. Lavilla et al. (2000) referred to this species as 'Vulnerable' and its reproductive habits are unknown. Balestrin & Di-Bernardo (2005) documented some aspects of the reproductive biology of *A. reticulatus* but only for the populations in the south of Brazil.

This study presents information about the reproductive habits of *Atractus reticulatus* with reference to nesting sites and clutch characteristic at two sites on the oriental border of the Iberá System, Corrientes, Argentina. We also present previously unstudied information about the embryonic development of this species.

METHODS AND MATERIALS

Four clutches of *Atractus reticulatus* (numbered one to four) were collected on 28 December 2007. Two of them were found in Paraje Galarza (28° 06' 04" S and 56° 39' 46" W, Santo Tomé Department), and the other two in Colonia Carlos Pellegrini (28° 30' 25" S and 57° 07' 15" W, San Martín Department), in Corrientes, Argentina. At the time of collection, information on the biotic and abiotic characteristics of the nest sites was recorded. The collected eggs were incubated in the laboratory on the same substrate in which they were found. The length and maximum width measurements of eggs were taken and the egg volume was calculated using the spheroid formula (Dunham, 1983). One egg from each clutch was fixed in 10% formaldehyde at the time of collection and the remaining eggs were fixed one by one every 7 or 10 days, up to the complete development of embryos. The development

Clutch	Site	UNNEC N°	Clutch Size	EGGS Diameter Length (mm)	Diameter Width (mm)	Egg volume average (mm^3)	EMBRYOS DS on day collection	Sex-ratio ♂	♀	Sam-ples
1	Cnia C. Pelleg.	10.123	3	35.5	11.8	2599.36	E. 35	1	-	1
2	Pje. Galarza	10.124	6	26.7	12.6	2214.34	E. 34	2	4	6
3	Pje. Galarza	10.125	8	24.4	12.4	1961.54	E. 26	6	1	7
4	Pje. Galarza	10.126	8	23.1	12.4	1843.80	E. 31	1	6	7

Table 1. Details of clutches and embryos of *Atractus reticulatus*.

stage (DS) of embryos was estimated according to Zehr (1962). Embryo sex was determined by the presence/absence of hemipenis. Taxonomic identification was recorded from scale pattern of the advanced embryos. The analyzed embryos were deposited in the Herpetological Collection of the Universidad Nacional del Nordeste, Corrientes, Argentina (UNNEC).

RESULTS

Nesting Site

The landscape of both collection sites, Paraje Galarza and Colonia Carlos Pellegrini was characterised by a high degree of anthropogenic modification. This disturbance included grassland degraded by cattle, zones with plantation *Eucalyptus* spp. plantation and zones with scattered, felled tree-trunks and/or scrap. The eggs of *Atractus reticulatus* were found below *Eucalyptus* spp. trunks and were, in all cases, found inside anthills made by *Odontomachus* sp. (Formicidae: Ponerinae). The humidity recorded in the anthills varied between 40-50% and the temperature ranged from 27.4-27.8°C. Outside the anthills the ambient temperature was 32°C.

Clutch Characteristics

Table 1 summarises the information gathered. The eggs were found in groups, buried, or half buried in the substratum, cemented together at the margins or by the ends (Fig. 1). They were whitish in colour and had an elliptical form with a major average diameter of 25.3 mm and a minor average diameter of 12.4 mm. The average egg volume was 2079.8 mm^3. Egg volume was variable within clutches (SD ± 269.02, ± 200.66, ± 587.85 for clutches # 2, 3 and 4 respectively) and between clutches (SD ± 322.56) (see Table 1).

Embryo Development

The development stage (DS) of embyos was variable between clutchs. The embryos of clutch # 3 presented the least degree of development (DS 26) at the time of collection. Those in clutch # 4 were in intermediate stages (DS 31), whereas embryos of clutches # 1 and 2 were in the final stages of ontogenic development (DS 34 and DS 35, respectively). These embryonic stages were identified following morphologic characters according to Zehr (1962):

DS 26: maxillary and mandibulary processes clearly visible; external naris not yet formed, hemipenis anlagen present in male embryos, and trunk coils five and a half (Fig. 2).

DS 31: scales visibles on the trunk but absent on the head, lateral flank muscles of the trunk separated from the thin ventral body wall.

DS 34: lateral trunk muscle sheets have met along the ventral mideline in to the heart region, body pigmentation absent.

DS 35: body pigmentation visible but pattern not well developed, scales visible around the eyes and mouth, trunk muscles completely fused at the ventral midline, except on the region of the umbilical cord (Fig. 3).

The embryos of clutch # 4 incubated in the laboratory reached DS 37, which is considered close to hatching, by 23 January. These embryos showed little content of yolk and clearly exhibited the scale / pigmentation pattern that is typical of adult *Atractus reticulatus* (Fig. 4). The male-female ratio of embryos was variable in and between clutchs, exhibiting no clear pattern in this parameter.

Figure 1. *Atractus reticulatus* clutch in *Odontomachus* sp. ant nest.

Figure 2. *Atractus reticulatus* embryo at development stage 26.

DISCUSSION

Reptile clutch sizes can be divided into two basic types; variable or invariable (Kratochvil & Kubicka, 2007). In the former, the number of eggs depends on the size of the female and/or the environmental conditions, whereas in the latter the females produce a constant number of eggs (Kratochvil & Kubicka, op.cit.). According to Gallardo & Scrocchi (2006), the clutch size of some Colubrids is variable between conspecific individuals. Balestrin & Di-Bernardo (2005) proposed a case of low fertility for *Atractus reticulatus* on the basis of a number of the vitellogenic follicles in mature females (2-6) and the number of eggs in pregnant females (1-3). This may relate to the small size and fossorial habits of this species. Herein we report a minimal clutch size of 3 eggs and a maximum of 8 eggs, which clearly expands the known clutch size for *A. reticulatus*.

In many species of reptiles the size of a female and the clutch size are often positively correlated (Ford & Seigel, 1989). Sinervo & Licht (1995) compared three populations of *Uta stansburiana* and observed that females that lay large eggs tended to produce small clutches. Our data shows differences in the clutch size and egg volume among clutches of *Atractus reticulatus*. These variations could be related to differences in female size, suggesting variable fertility with a negative relationship between egg number and egg size per clutch.

The majority of oviparous reptiles retain eggs in the oviduct for approximately half of ontogenetic development (Shine, 1983). Nevertheless, embryonic retention in Squamata is a generalised condition and it has been stated that this circumstance has favoured the evolution and extension of viviparity in this clade (Shine, 1995). Studies on the embryonic development of *Liolaemus tenuis tenuis* (Lemus et al., 1981) and *Polychrus acutirostris* (Alvarez et al., 2005) have reported embryos in DS 27 on the first day of oviposition. A study of oviductal eggs of the snake *Mastigodryas bifossatus* has revealed that development occurs inside the uterus, at least up to DS 18 (pers. obs.). The snakes *Clelia rustica* and

Figure 3. *Atractus reticulatus* embryo at development stage 35.

Figure 4. Advanced embryo of *Atractus reticulatus* prior to hatching.

Liophis vanzolinii egg's were analyzed a few hours after oviposition and contained embryos in DS 25 and 26 respectively (pers. obs.). This variable evidence possibly suggests, for these species, that long embryonic retention may be frequent within the Colubridae. If *Atractus reticulatus* shares this embryonic retention character, the period of oviposition could be estimated. In clutch # 3, embryos were in the early stages of development, indicating recent oviposition, and were deposited by the end of December. By this time, embryos from clutches # 1 and 2 were in advanced development stages, thus we were able to predict that these eggs were deposited by the end of November. This information concurs with Balestrin & Di-Bernardo (2005) for *A. reticulatus* from the south of Brazil, where they observed eggs of this species seasonally from November until January. Data relating to embryonic condition at the moment of oviposition is scant and is a factor not always taken into account in reproductive biology studies.

We consider this information herein to be a useful tool for rough estimation of oviposition period and for furthering knowledge of the reproductive pattern of reptiles.

Fisher & Bennett (1999) hypothesized that in natural stable populations the ratio of sexes would be 1:1. The bias towards females, known for many turtle and crocodile populations, has been related to temperature dependant sex determination (Bull & Charnov, 1989), although this deviation has not yet been clearly explained in other reptile groups (Freedberg & Wade, 2001). The differences observed in proportion of sexes between and within the clutchtes in this study are interesting but we do not have substantial data with which to replicate observations and speculate about this factor.

The associations between reptiles and arthropods have been commonly characterised as a predator-prey relationship. Snakes of the families Colubridae, Elapidae and Leptotyphlopidae, and lizards of the family Teiidae and some Amphisbaenidae, live in nests of leaf-cutting ants of the *Acromyrmex* and *Atta* genus. In some circumstances they also use these nests as oviposition sites for incubation (Vaz-Ferreira et al., 1970, 1973; Agosti et al., 2000). A similar relationship of this kind could be postulated for *Atractus reticulatus* and *Odontomachus* spp. ants. These ants usually build their nests at ground level, in layers of fallen leaves, earth and decomposed wood or under trunks and stones (Fernandez, 2003). Such refugia would seem suitable for the development of the snake embryos. This is most likely due to the microclimatic conditions that facilitate a warm and humid environment that would possibly be more moisture retentive compared with the external ambient environment. This relationship invites further study. Additional data about the seasonal variations of the reproductive system and ontogenetic studies in *Atractus reticulatus* would greatly contribute to knowledge of its reproductive biology and ontogenetic development.

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APPENDICES

UNNEC 10123: Ea. “El Estribo”. Colonia Carlos Pellegrini, Dpto. San Martín, Corrientes, Argentina.

UNNEC 10124: Ea. “El Estribo”. Colonia Carlos Pellegrini, Dpto. San Martín, Corrientes, Argentina

UNNEC 10125: Ea. “El Guaruyá”. Paraje Galarza, Dpto. Santo Tomé, Corrientes, Argentina.

UNNEC 10126: Ea. “El Guaruyá”. Paraje Galarza, Dpto. Santo Tomé, Corrientes, Argentina.

Ameiva fuscata on Dominica, Lesser Antilles: natural history and interactions with *Anolis oculatus*

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ABSTRACT — In June 2008, we studied the natural history of *Ameiva fuscata* and interactions with sympatric *Anolis oculatus* in five adjacent habitats on the western (leeward) coast of Dominica, Lesser Antilles. *Ameiva* activity was positively correlated with mean temperature, peak activity corresponded to peak daily temperatures and we observed greatly reduced or no activity during overcast and rainy periods. Population densities in the five habitats were 138–344 lizards/ha, with the higher densities in areas with the deepest leaf litter and densest canopy cover. *Ameiva fuscata* is an active forager, with 100% of foraging attempts made while moving (either walking or actively digging or rooting in litter). Lizards foraged together in groups and the groups never entered each other's activity areas, suggesting the possibility of community structure. *Ameiva fuscata* is non-territorial, but chases among adult males appeared to be triggered by intersecting paths. Anoles spent significantly less time on the ground when *Ameiva fuscata* was active, presumably to avoid predation.

West Indian islands support abundant and diverse lizard communities. Common elements of many of these communities include an active foraging terrestrial lizard in the genus *Ameiva* and arboreal sit-and-wait ambush foragers in the genus *Anolis* (Simmons et al., 2005). Although West Indian anoline lizards are arguably the most intensely studied reptiles in the world (Losos, 2009), relatively little is known about most species of West Indian *Ameiva*, especially considering their visibility on the islands where they occur (Henderson & Powell, 2009).

Ameiva are typically heliothermic, active foragers, have relatively short activity periods, are not territorial and have overlapping home ranges (e.g., Hillman, 1969; Regal, 1978, 1983; Schell et al., 1993; Vitt & Colli, 1994; Simmons et al., 2005). *Ameiva fuscata* (Fig. 1; and front cover) is endemic to Dominica and occurs throughout the island in coastal woodlands, generally at elevations below 200 m, but occasionally higher in cultivated areas (Bullock & Evans, 1990; Malhotra & Thorpe, 1999).

Despite the number of islands on which both genera are represented, few studies have addressed interactions between *Ameiva* and *Anolis*. Meier & Noble (1991, Desecheo), Fobes et al. (1992, Hispaniola) and Eaton et al. (2002, Anguilla) suggested that anoles decrease time spent on the ground in the presence of *Ameiva*. Simmons et al. (2005) examined interactions between *Ameiva ameiva* and two species of *Anolis* (*A. aeneus* and *A. richardii*) on Grenada and concluded that both species of *Anolis* spend less time on the ground when *A. ameiva* is active. Kolbe et al. (2008) showed a niche shift by *Anolis wattsi* to lower perches and more terrestrial activity in the absence of *Ameiva griswoldi* on Antiguan satellite islands.

From 4–23 June 2008, we conducted a study on Dominica to describe activity, population densities, foraging behaviour and movements of *Ameiva fuscata* and to test the hypothesis that *Anolis oculatus* (Fig. 2) would spend less time on the ground when *A. fuscata* is present and active.

METHODS AND MATERIALS

Our study site was at the mouth of the Batali River on the leeward (western) coast of Dominica (N 15° 27.12', W 061° 26.76'). The site was characterised by habitats including beach,

Area	Size (m^2)	Insolation	Most Abundant Vegetation	Maximum Number	Estimated Density (#/ha)
1	1134	mixed	ground scrub	39	344
2	2035	sunny/mixed	Snake Plant	28	138
3	2554	mixed	Mango trees	62	243
4	873	shade/mixed	scrub, trees	15	172
5	1925	shade/mixed	Coconut trees	57	296

Table 1. Characterisation of areas/habitats (see text) and maximum numbers of *Ameiva fuscata* observed during any one survey.

beachside scrub with Sea Grape (*Coccoloba uvifera*) and dry forest interspersed with Mango trees (*Mangifera* sp.). Cleared paths passed between and extended into most areas. Open areas were characterised by grasses, herbaceous forbs and stands of ornamental vegetation, including extensive areas planted in "Snake Plant" (*Sanseveria* sp.).

The five habitat areas (Table 1) were identified after observing what appeared to be natural groupings of *Ameiva* associated with areas of high population densities and corresponding roughly to distinct habitat types. Areas/habitats were characterised by: (1) mix of native and orchard trees with a canopy coverage of 50–80% and a sparse 2–3 m high understory, canopy height of 5–15 m with litter depth of 2–4 cm and occasional human traffic; (2) beachside vegetation with 1–2 m-high understory, canopy coverage of 20–50%, canopy height 4–12 m, sandy substrate with some leaf litter and regular human traffic; (3) orchard trees with sparse 2–4 m-high understory in some areas, canopy coverage ca. 90% over part of the area and ca. 10% over the remainder, canopy height 5–20 m with litter depth of 1–2 cm, abundant fallen fruit and occasional human traffic; (4) mix of native and orchard trees with canopy coverage of 60–90% and a dense 1–2 m-high understory, canopy height of 5–20 m with a litter depth of 1–2 cm and occasional human traffic; and (5) orchard trees with canopy coverage of 70–90%, leaf litter depth 2–4 cm, abundant fallen fruit, sparse understory and little human traffic.

We conducted 17 45-min surveys at various times from 0700–1730 h, recording time, extent of cloud cover and any precipitation during each visit. Systematically covering each area in a manner designed to avoid multiple encounters with the same lizards, we counted the number of individual *Ameiva fuscata* observed in each of the five contiguous habitats and calculated estimated population densities (numbers of animals/ha) using the maximum number of lizards in any one area at one time relative to the areas (m^2) sampled. A data logger (HOBO® TidbiT® v2 Submersible Temperature Logger, Onset Computer Corp., Bourne, Massachusetts, USA) was placed in leaf litter at site 5 to record hourly temperatures during the extent of the study.

We conducted focal animal studies on *A. fuscata*. Observations ranged from < 1 min to 20 mins in duration. In addition to recording anecdotal observations of individuals or groups of lizards, we quantified behaviours using methods of Cooper et al. (2001), recording time spent moving, number of moves and number of feeding attempts while stationary or mobile. We used these observations to calculate moves per minute (MPM), percent time spent moving (PTM) and proportion of feeding attempts while moving (PAM).

Using a paint gun (Forestry Suppliers, Inc., Jackson, Mississippi, USA) and two colours of latex paint diluted 1:1 with water, we marked individual *A. fuscata* active in areas 2 and 5 (along the beach and in a densely shaded area among large boulders), attempting to paint all individuals in three sessions at each location. The two sites were only ca. 40 m apart and no evident barriers precluded movement between the areas. We then observed movements and behaviours of marked lizards to determine if lizards foraging in one area comprised a grouping distinct from those in the other.

In the same five adjacent habitats, at various times of day and under varying weather conditions, we

Figure 1. Adult male *Ameiva fuscata*. Photograph by Robert Powell.

Figure 2. Adult male *Anolis oculatus.* Photograph by Robert Powell.

conducted 43 10-min surveys of anoles, recording lizard position as either on the ground or on elevated perches (e.g. vegetation or rocks). Anoles were not marked and we may have encountered the same individuals more than once. However, we contend that perches at different times and on different days are independent events predicated by either the presence or absence of *Ameiva* and that we are not guilty of pseudoreplication of data. We recorded time, temperature and general weather conditions during each survey and noted whether *A. fuscata* was abundant and active (1), scarce (2), or absent (3).

We used StatView 5.0 (SAS Institute, Cary, North Carolina, USA) for statistical analyses. Means are presented ± one SE. For all tests, alpha = 0.05.

RESULTS

Ameiva activity (percent of the maximum number of *Ameiva* observed in a given area) was positively correlated with mean temperature (Spearman Rank Correlation, Z = 2.46, P = 0.01; Fig. 3), showing clearly that a single peak activity period corresponded with peak daily temperatures. We observed greatly reduced or no activity during overcast and rainy periods, even at times when *Ameiva* were usually active. Observed activity periods were from 08:00–16:00 at a mean surface temperature of 30.1 ± 0.7°C (26.4–33.3°C), with a peak during late morning (09:30–11:30). Temperatures were highest just as activity began to decline. The maximum observed population density in any one area was 344 individuals/ha (Table 1). That with the highest density had the deepest leaf litter and the densest canopy cover. Mean MPM for all *A. fuscata* was 2.1 ± 0.2 (0.2–4.9). Mean PTM was 43.8 ± 3.3% (3.0–98.2%). PAM was 100%, with 55.6% of feeding attempts occurring while animals were searching and 44.3% while in one location but actively digging.

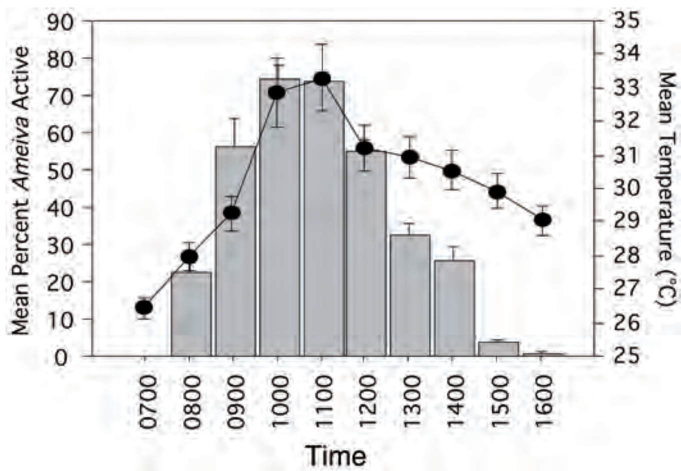

Figure 3. Mean percent of *Ameiva fuscata* active in all areas and mean ambient surface temperatures by time of day.

Painted individuals were observed daily. The two "subpopulations" were never observed to co-mingle and never found in areas other than where they were initially painted.

We frequently observed individuals of all sizes foraging together with few interactions between lizards. However, large males regularly chased one another. These chases would sometimes occur between individuals that had been foraging close together for several minutes. In most instances, no obvious cause could be discerned. However, based on five observations, the angle at which paths of moving individuals intersected appeared to trigger at least some chases (i.e., when a large male was about to intersect the path of another large male).

We observed 618 anoles during 43 10-min surveys (289 on the ground, 329 on elevated perches). The mean percent of anoles observed on the ground during all survey periods was 44.7 ± 4.4% (Fig. 4), but this percent varied considerably

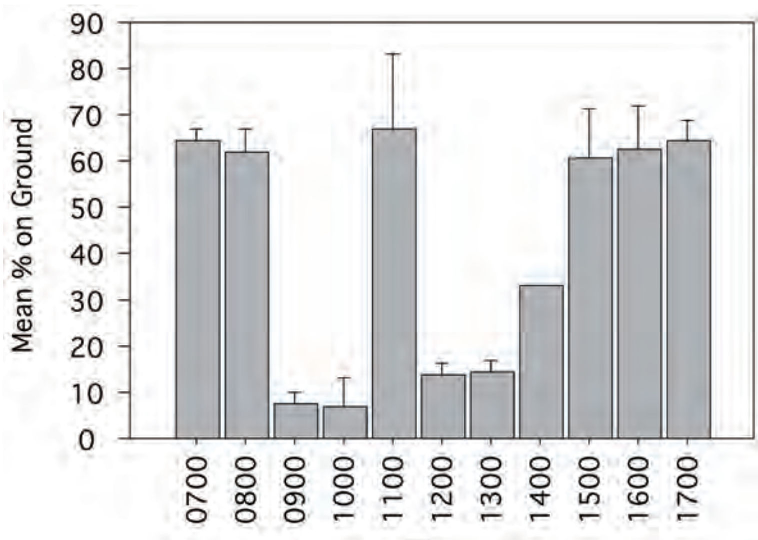

Figure 4. Mean percent of *Anolis oculatus* observed on the ground throughout the day.

throughout the day (Fig. 5). Significantly fewer anoles (12.2 ± 1.7%) ventured onto the ground when *Ameiva fuscata* was abundant and active than when few individuals were active (21.9 ± 6.7%) or when no *Ameiva* (66.9 ± 2.5%) were seen (one-way contingency tests, all $\chi^2 \geq 150.4$, all $P \leq 0.0001$). Anoles were found on the ground in high numbers at times of day when *Ameiva* were not active (07:00–08:00 and 15:00–17:00), but also during rainy/overcast periods, even at times when *A. fuscata* usually is active (the large number on ground at 11:00 in Fig. 4 reflects observations on rainy days).

DISCUSSION

Previous studies conducted at the same time of year have shown that some populations of *Ameiva* (*A. chrysolaema*, Schell et al., 1993; *A. ameiva*, Simmons et al., 2005) exhibit two activity peaks, but that was not evident in this population of *A.*

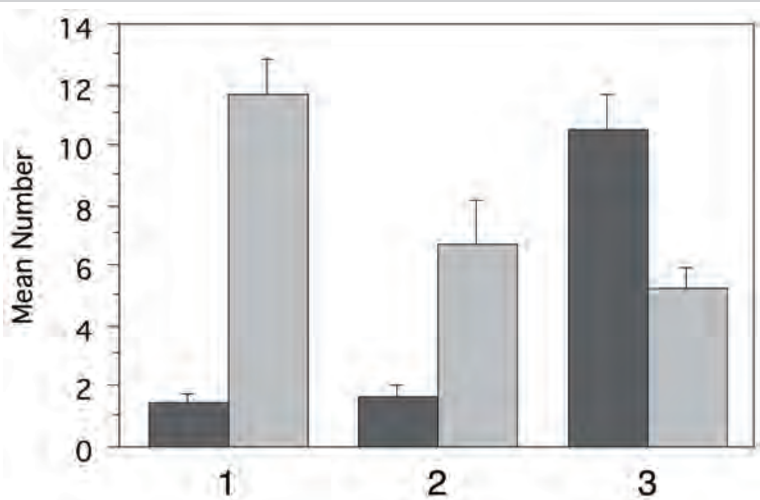

Figure 5. Mean number of *Anolis oculatus* observed on the ground (dark grey) and on elevated perches (light grey) per 10-min survey at different levels of *Ameiva fuscata* activity (abundant and active = 1, scarce = 2, or absent = 3).

fuscata. Observed activity periods and the maximum observed population density corresponded with activity periods and the maximum density (379/ha) observed by Bullock & Evans (1990) for *A. fuscata.* Although our estimates of density are undoubtedly conservative (as they are based on the maximum number of lizards seen at only one time), they are higher than most other population density estimates for West Indian species of *Ameiva*. Meier et al. (1993) calculated 73.7–81.1 *A. polops*/ha on Green Cay (U.S. Virgin Islands); Schell et al. (1993) presented an estimate of 136–144 *A. chrysolaema*/ha in an altered habitat in the Dominican Republic; Censky (1996) found 74 *A. pleii*/ha on Anguilla and 91/ha on Dog Island; McNair (2003) presented crude and ecological densities of 25 and 128 *A. polops*/ha, respectively, on Protestant Cay (U.S. Virgin Islands); and R. Powell & R.W. Henderson (unpubl. data) estimated 33.8–52.2 *A. exsul*/ha on Guana Island (British Virgin Islands). Only Simmons et al. (2005) calculated a higher density, 460 adult *A. ameiva*/ha in an "activity area" on Grenada. Because population sizes were estimated using different methods, however, direct comparisons may not be appropriate.

Maximum observed densities of *A. fuscata* presumably reflect the availability of resources in each area. Those with the highest density (Table 1) had the deepest leaf litter and the densest canopy cover. Abundant leaf litter may harbour more abundant prey. The high tolerance of shaded habitats is unusual in West Indian species of *Ameiva*, which generally are associated with open situations (Henderson & Powell, 2009). Historically, however, open habitats may have been present on Dominica only intermittently after hurricanes, forcing the species to adapt to areas with closed canopies, in which they exploit small sun-lit patches to bask.

Observed values for MPM, PTM and PAM are comparable to those observed by Simmons et al. (2005) for *A. ameiva* (MPM = 5.6 ± 0.5, PTM = 51.2 ± 3.9%, PAM= 96.0 ± 2.0%). Cooper et al. (2001) described PAM as a means of quantifying foraging methods in conjunction with MPM and PTM. Our data clearly indicated that *A. fuscata* employed an active foraging strategy, which is characteristic of teiid lizards in general (Cooper et al., 2001) and West Indian species of *Ameiva* in particular (e.g., Hodge et al., 2003).

Home ranges of West Indian species of *Ameiva* are known to overlap (e.g., Kerr et al., 2005; Simmons et al., 2005) and appear to vary considerably in size. Simmons et al. (2005) recorded mean home range sizes for *A. ameiva* on Grenada of 648 ± 252 m^2 (adult males) and 204 ± 55 m^2 (adult females). Censky (1995) noted larger home ranges for *A. plei* on Anguilla (1551 ± 566 m^2 for males, 864 ± 504 m^2 for females). However, those observed by Lewis & Saliva (1987) for *A. exsul* on Puerto Rico (377 m^2, 174 m^2) were slightly smaller and those reported by Schell et al. (1993) for *A. chrysolaema* in a partially confined habitat in the Dominican Republic (250 ± 122 m^2, 115 ± 102 m^2), by Meier et al. (1993) for *A. polops* on Green Cay off St. Croix (190 ± 86 m^2 for both sexes) and by Kerr et al. (2005) for *A. erythrocephala* on St. Eustatius (101 ± 36 m^2, 54 ± 12 m^2) were considerably smaller. The consistency with which marked *A. fuscata* were resighted only in those areas where originally seen during the current study suggests that groups of individuals have relatively small home ranges where population densities are high. That individuals with the same paint colour were consistently observed together also was suggestive of a previously undescribed community structure. In addition, individuals were frequently observed making foreleg movements that appeared to serve a communicative function and seemed to be directed at other lizards within the group. Furthermore, individuals often interrupted foraging behaviour and appeared to monitor the activity of nearby animals.

Ameiva fuscata and congeners in general have been described as non-territorial (e.g. Schell et al., 1993; Hodge et al., 2003) and observations of individuals of all sizes foraging together supported that contention. However, large males occasionally chased each other while foraging, which would indicate that defence of individual space may occur. This aggression appears to be triggered by the angle at which paths of actively foraging individuals intersect. Mate-guarding, which has been described for some populations of *A. pleii* (Censky, 1995), also might result in agonistic interactions, but we observed only one instance of what might have been construed as mate-guarding.

At our study site, *Anolis oculatus* was active from dawn to dusk (N.J. Vélez Espinet & E.A. Daniells, unpubl. data). Time spent on the ground by anoles was not dependent on the time of day or any single environmental condition, but instead appeared to be influenced primarily by the presence of *Ameiva*. As proposed by Simmons et al. (2005) and supported by our observations of successful predation on anoles by *Ameiva*, the principal cause of this behaviour by anoles appears to be predator avoidance.

In general, our observations suggest that the natural history of Dominican *Ameiva fuscata* is generally comparable to that of other West Indian congeners. These lizards are largely terrestrial, heat-loving, non-territorial active foragers. At our study site, however, they did not exhibit the bimodal activity period evident in at least some populations of some congeners and their predilection for foraging in heavily shaded areas was unusual. Observations of possible community structure and that aggression between adult males might be triggered by intersecting trajectories of moving lizards are new. Although these phenomena currently are supported solely by anecdotal data, they are worthy of further investigation. Also, despite warnings by Micco et al. (1997) that information pertaining to a single population might not be extrapolated accurately to other populations (much less to other species), responses by *Anolis oculatus* to *Ameiva fuscata* were essentially similar to those observed between anoles and *Ameiva ameiva* on the island of Grenada (Simmons et al., 2005).

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Record of *Oligodon travancoricus* Beddome, 1877 (Serpentes, Colubridae) from Grizzled Squirrel Sanctuary, Western Ghats, Tamil Nadu, India

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OLIGODON TRAVANCORICUS Beddome, 1877 is endemic to the Western Ghats, south of Palghat. Precise locality records are known from, High Wavy Mountains, Valliyoor and Kalakkad in Tamil Nadu and Olavakode, Munnar and High Ranges in Kerala (Anonymous, 2001; Ferguson, 1895; Hutton, 1949; Murthy, 1990; Sharma, 2003; Smith, 1943; Whitaker, 1978). The most recent field studies on this species were in 1996. Its IUCN status is Endangered (EN) and this is based on: restricted distribution, limited location, continuing decline in extent of occurrence, severely fragmented area of occupancy and quality of habitat. However, the Indian Wildlife (Protection) Act, 1972, list the species in Schedule IV (Anonymous, 2001). Previously only male specimens are reported (Sharma, 2003; Smith, 1943). Herein, we present data from four live examples, two males and two females, observed in Grizzled Squirrel Sanctuary, a part of the Cardamom hills. Previous surveys conducted approximately two decades ago in this region did not record *O. travancoricus* (Malhotra & Davis, 1991). This paper also illustrates *O. travancoricus* in life for the very first time.

METHODS AND MATERIALS

Meristic, metric and morphological data were recorded from live specimens that were released back into the wild. Meristic data included scalerows around body, which was counted at one head length posterior to neck (near neck), in the middle of snout-vent length (at mid-body) and at one head length anterior to vent (near tail) (David & Vogel, 1998). Scales after the preventrals, up to the scale before the anal scale were counted as ventrals (Dowling, 1951) and those after the anal, up to the penultimate scale (i.e., excluding terminal scale) were counted as subcaudals. Scales between rostral and the final scale bordering the jaw angle were counted as supralabials, and those touching eye, given within parenthesis. Scales between mental and the scale bordering last supralabial were counted as infralabials, those touching genials given within parenthesis. Scales surrounded by supralabials, postoculars and parietals were counted as temporals (Whitaker & Captain, 2004). Symmetrical head scalation character values were given in left, right order. Morphologic data included coloration and pattern on the dorsum, venter and tail. Metric data included snout-vent and total lengths, which were measured with a string and a standard measuring tape (L.C = 1 mm; Butterfly brand) and the values were given in mm. Sex was determined by using a thin, smooth, metallic probe. Photographic documentation was done prior to release. All photographs of the snake were taken in life, in situ, using a Canon Powershot A620® camera. Geographic coordinates and altitude of sighting localities were recorded by using Garmin® 12 channel Global Positioning System. Habitat type followed Champion & Seth (1968).

Coloration in Life (Figs. 1-4)

Dorsum greyish brown with dark brown bands that sometimes became paired spots on the tail; bordered by thin black inner and off-white outer linings; the bands widest and best visible on dorsum and then tapering or failing to reach the laterals. Each band 1-2 scales wide and the inter-band distance 6-9 scales wide; a few narrow, less prominent,

Figure 1. Adult male *Oligodon travancoricus*. Photographs by S.R. Ganesh.

Figure 2. Lateral view of head showing chevron markings.

Figure 3. Ventral view of hind body showing checkered markings.

Figure 4. Dorsal view of head markings showing white parietal spots.

Figure 5. Wet Evergreen Forest: the habitat of *Oligodon travancoricus*.

dark brown streaks without outer linings, present between two conspicuous bands. Venter heavily patterned, with black checkered markings on a white background, both the colours being in equal proportions. Head with three, chevron markings, the first one occupying prefrontal-ocular-anterior supralabial region; the second occupying parietal-temporal-posterior supralabial region; the third occupying occipital-nuchal region. Second chevron the broadest with a pair of white, parietal spots.

Habitus
Body moderately stout, slightly depressed, without distinct neck.

Ecological Notes (Fig. 5)
All four examples were found in Tropical Evergreen Forests at 800-1000 m altitude. Microhabitats recorded were dense leaf-litter and rock aggregations. They were encountered on the move during daytime, between 12.10-18.18 hrs, in post monsoon season (i.e. February-March). The snakes were sighted in and around human habitation; the first one was from a building and the rest were from forest paths. *Oligodon venustus* was recorded to be syntopic with this species in this hill range.

Locality
Specimens 1 and 2 were from Periya Kavu (N 09°25.044' E 077°21.240'; 813 m). Specimens 3 and 4 were from Kottai Malai (N 09°29.543' E 077°24.231'; 987 m). Both were within Grizzled Squirrel Sanctuary in Virudunagar district of Tamil Nadu state, India.

Variation
Details for all four specimens observed are given in Table 1 (n=4): labials 6-7; preventrals 3-4; ventrals 150-154; subcaudals 31-39; snout-vent length 313-375; total length 365-439; relative tail length 0.11-0.15; bands 23-27 on body, 5-6 on tail.

DISCUSSION

Our specimens agreed with literature describing the species and our scale counts, though consistent, outrange the literature records, thus slightly expanding the characterization of this species. This was based on providing intraspecific variations from novel conspecifics. In almost all aspects, our materials were consistent with literature values except for ventral counts (see below). Labials of our materials were 6-7 (vs. 7 [Sharma, 2003; Smith, 1943]). Ventrals we recorded were 150-154 (vs. 154-155 [Smith, 1943; Murthy, 1990]). Subcaudals of our specimens were 31-39 (vs. 34-37 [Smith, 1943; Murthy, 1990]; 37 [Sharma 2003]). The number of bands on body and tail were also consistent (23-27, 5-6 vs. 25, 5 [Sharma, 2003; Smith, 1943]). Sharma (2003) recorded ventral count as 145, which is far lower than Smith's and ours, even if preventrals are

Characters	**Specimen I**	**Specimen II**	**Specimen III**	**Specimen IV**
Sex	Female	Male	Female	Male
Scales (smooth)	17:17:15	17:17:15	17:17:15	17:17:15
Supralabials (enters orbit)	7 (3,4)	6,7 (3,4)	7 (3,4)	7 (3,4)
Infralabials (touch genials)	7 (4)	6,7 (4)	7 (4)	7 (4)
Preocular	1	1	1	1
Postocular	2	2	2	2
Temporals	1+2	1+2	1+2	1+2
Preventrals	3	3	4	3
Ventrals	151	154	150	151
Anals	2	2	2	2
Subcaudals (paired)	39	31	33	39
Snout-vent length	373	313	375	371
Total length	420	365	423	439
Relative tail length	0.11	0.14	0.11	0.15
Bands on body, tail	26, 5	23, 5	26, 5	27, 6

Table 1. Sex, meristic, metric and morphologic data of four live *Oligodon travancoricus.*

excluded. Since there was no explicit mention of the source material (= specimen) for this variation and given its discrepancy with all other literature and our materials, the ventral count value 145 should be currently regarded as dubious. Sharma (2003) and Smith (1943) (implicitly) reported relative tail length to be 0.14 which agrees with our male specimens. The value of this character is known only from males (see Sharma, 2003; Smith, 1943). Murthy (1990) reported a single specimen SRSS 118, as a male of 450 mm length but no mention of snout vent length or tail length values exist. Thus, we provide the first record of relative tail length values for female conspecifics, whereby the body-tail ratio was lower (0.11), indicating typically shorter tail in females. The record in Anonymous (2001) from Olavakode was an adult, from a lower elevation forest near Palghat but its scalation and ecological data is not available (Gerry Martin, pers. comm.). Malhotra & Davis (1991) did not record this species in Grizzled Squirrel Sanctuary. Murthy (1990) lists only one specimen but gives length values and subcaudal counts in min-max ranges, perhaps repeating those in literature. Ferguson (1895) remarked that several specimens were sent to him from the High Range; while Hutton (1949) mentioned that five specimens, two being juveniles measuring 100-120 mm were found during April in evergreen forests. Ferguson (1895), Hutton (1949) and Sharma (2003) state this species to be ‘fairly common’ but Murthy (1990) describes it as ‘rare’. As our short-survey produced four more specimens, its ‘rare’ status may arguably be unwarranted.

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The turtle *Trachemys scripta elegans* (Testudines, Emydidae) as an invasive species in a polluted stream of southeastern Brazil

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ABSTRACT - The north American freshwater turtle *Trachemys scripta elegans* has been recently reported as an exotic species in several regions of the world. During an investigation on the ecology of the Chelid turtle *Phrynops geoffroanus* in a Brazilian anthropogenically altered stream, we captured four *T. s. elegans* (two males and two females) and observed several other individuals basking. Reproduction was recorded for captive individuals. The occurrence of feral *T. s. elegans* in southeastern Brazil is considered and aspects that could favor the long term persistence of *T. s. elegans* at the study site are discussed.

INTRODUCTION of alien species can alter the organization and functioning of resident communities by various ecological processes such as predation, parasite transfer, or competitive exclusion (Cadi & Joly, 2004). For these reasons, introduction of exotic species is considered one of the leading causes of biodiversity loss in the world (Clavero & García-Berthou, 2005).

The freshwater turtle *Trachemys scripta elegans* (Wied, 1838) occurs naturally in the Mississippi Valley, from Illinois to the Gulf of Mexico (Ernst & Barbour, 1989). Since the 1970s, the species has been farmed in large numbers in the USA for pet trade (Cadi et al., 2004). Pet owners inadvertently release grown turtles in the wild and also in urban areas. As a consequence, the species has been introduced in several countries, including Italy (Luiselli et al., 1997), France (Cadi et al., 2004; Prévot-Julliard et al., 2007), Spain (Gómez de Berrazueta et al., 2007), Taiwan (Chen & Lue, 1998), Australia (Burgin, 2006), South Africa (Newbery, 1984), British Virgin Islands (Perry et al., 2007) and Chile (Iriarte et al., 2005). For this reason, *T. s. elegans* has been included in the top 100 "World's Worst" invaders (ISSG, 2008). This species has been reported to compete with the European Pond Turtle *Emys orbicularis* (Cadi & Joly, 2003; 2004). Biological characteristics that favor *T. s. elegans* as an invasive species are its early sexual maturity, high fecundity rate and relatively large adult body size (Arvy & Servan, 1998). From November 2005 to August 2007, we studied the ecology of a native south American freshwater turtle, *Phrynops geoffroanus* (Chelidae), in anthropogenic water courses in the state of São Paulo, in southeastern Brazil. During that study, we incidentally captured individuals of another native species, *Hydromedusa tectifera* (Chelidae), and the exotic *T. s. elegans*. This is the first report of the occurrence of this species in feral state in Brazil. We discuss possible implications and management measures.

METHODS AND MATERIALS

The Piracicamirim stream is 24.6 km long from its headwaters to its mouth, at Piracicaba River, with a mean width of 4.26 m and a mean depth of 1.56 m (Ometo et al., 2000). Its final portion is located in a heavily urbanized area of Piracicaba City (Ometo et al., 2004). Piracicamirim drainage (133 Km^2) spreads over three counties in the state of São Paulo, in southeastern Brazil: Piracicaba, Rio das Pedras, and Saltinho (Ometo et al., 2000), with about 95,000 inhabitants (Toledo & Ballester, 2001). The region is intensively altered due to non-planned urban settlements and ethanol production. Sugar Cane crops occupy approximately 80% of its area, and the stream conserves only 2% of its original riparian forest (Ometo et al., 2004). In 1985 Piracicamirim was considered the most polluted tributary of Piracicaba River. Although a sewage treatment station had been established in 1997, this stream is still considered heavily polluted (Ballester et al., 1999). Its main pollution sources are domestic untreated sewage and fertilizers used in Sugar Cane production (Ometo et al., 2004).

In this study, turtles were captured inside the University of São Paulo campus (22º 42’51”S, 47º 37’36”W), in the suburban area of Piracicaba City (Fig. 1). We used four gill nets (nylon; mesh size 3-5 cm; 1.5-2 m deep; 15 m long) extended transversely in the stream (as suggested by Souza & Abe, 2000) and checked them every three hours. Captures occurred from November 2005 to August 2007 for a total of 39 days of field work.

RESULTS

During the investigation, we captured four *T. s. elegans* (two males and two females) (Fig. 2). Turtles were sexed by the following characteristics: carapace length, tail length, cloacae position and plastron concavity (Ernst & Barbour, 1989; Pritchard & Trebbau, 1984). Mean body mass (±SD) was 900 ± 141 g (range: 800-1000 g) for males and 1250 ± 352 g (1000-1500 g) for females. Mean straight-line carapace length was 179 ± 5.6 mm (175-183 mm) for males and 184.5 ± 3.5 mm (182-187 mm) for females (Table 1).

DISCUSSION

The most likely cause of *T. s. elegans* occurrence in the Piracicamirim stream was release by pet owners, as previously reported in literature (Cadi & Joly, 2004). Piracicamirim stream crosses an urbanized area of Piracicaba City and its final portion is located inside of the University of São Paulo Campus, with easy access by local people.

Moll (1980) registered the occurrence of *T. s. elegans* within its natural range, but in the polluted Illinois River. Its occurrence in a tropical urban polluted river in Brazil supports evidence of its capacity to use anthropogenic environments. *T. s. elegans* is omnivorous, feeding on a variety of items such as filamentous algae, macrophites, snails, Diptera (larvae and pupae), terrestrial insects, crustaceans and small vertebrates (Chen & Lue, 1998; Prévot-Julliard et al., 2007). Polluted rivers can offer a high amount of organic residues and food items, which can represent an advantage for such a generalist freshwater turtle species (Moll, 1980; Lindeman, 1996; Souza & Abe, 2000). *Phrynops geoffroanus* feeds mainly on Chironomidae larvae (Souza & Abe, 2000), which could possibly also be a prey for *T. s. elegans*.

After release, one of the main limiting factors to a successful invasion is reproductive success (Cadi et al., 2004; Gibbons & Greene, 1990). Successful reproduction of *T. s. elegans* has been reported for temperate regions, outside of its natural range (Cadi

	Body mass (g)	SLCL (mm)	Date of capture
♂1	1000	183	24 May 2006
♂2	800	175	15 August 2006
♀1	1000	182	6 June 2006
♀2	1500	187	21 November 2006

Table 1. Biometry of *Trachemys scripta elegans* captured in Piracicamirim stream, São Paulo State, southeastern Brazil. SLCL= straight-line carapace length.

Figure 1. The polluted Piracicamirim stream. Turtles basking in bottom left hand corner.
All photographs by Bruno Ferranoto ©.

et al., 2004; Ficetola et al., 2002; Luiselli et al., 1997). However, it is likely that the local tropical climate may not prevent the survival of hatchlings (Ciiagro, 2008).

During survey we observed one *T. s. elegans* female laying six eggs, in a platform placed in the middle of an artificial pond, at the University of São Paulo Campus. In addition, other females exhibited nesting behaviour in other ponds at the same area. *P. geoffroanus* nests have also been found in the remaining anthropogenic gallery forest of Piracicamirim stream. This area could be suitable as nesting habitat for *T. s. elegans* as well. We observed signs of predation of *P. geoffroanus* nests possibly by Coatis (*Nasua* sp.), Opossums (*Didelphis* sp.) or Tegu lizards (*Tupinambis* sp.). *T. s. elegans* nests can be located at great distances from the water (Mount, 1975) and their eggs can be laid 140 cm deep (Packard et al., 1997). These characteristics could act defensively against local predators.

Cadi & Joly (2003; 2004) suggested that there may be some competition for basking sites between European Pond Turtles (*E. orbicularis*) and introduced *T. s. elegans* caused a loss of body mass and an increase in mortality rate of *E. orbiculares* when both species are raised together under experimental conditions. Although some individuals of *T. s. elegans* have been seen basking in Piracicamirim stream we have no evidence of competition with native species (*Hydromedusa tectifera* and *P. geoffroanus* [Figs. 3 and 4]) as water temperature is considerably milder than in temperate areas like southern Europe. There is little information on the natural history of *H. tectifera* (Souza, 2004; Ribas & Monteiro-Filho, 2002). Demography of this species is virtually unknown, especially for polluted rivers. However, *P. geoffroanus* is recorded to be abundant in polluted rivers and streams of southeastern Brazil (Souza and Abe, 2000; Souza, 2004).

T. s. elegans has a large dispersal (Gibbons, 1990) and dispersion capacity (Bodie & Semlitsch, 2000). It also seems to be more aggressive than

Figure 2. A captured *Trachemys scripta elegans.*

Figure 3. A native *Hydromedusa tectifera.*

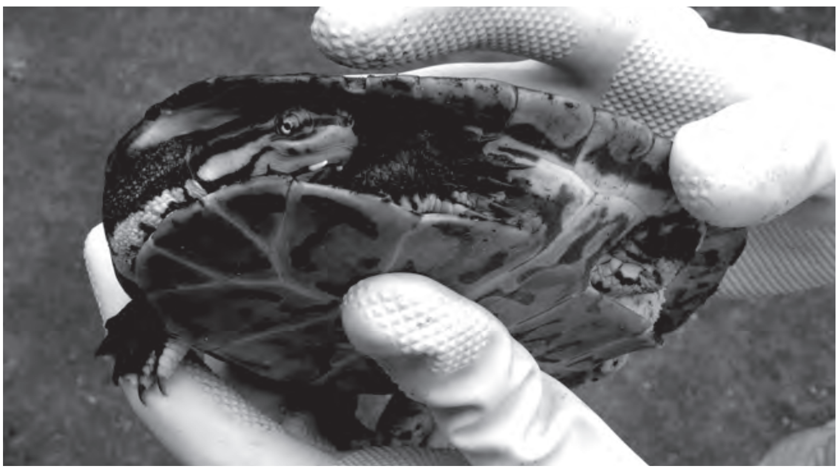

Figure 4. A native *Phrynops geoffroanus.*

other freshwater turtles (Bels et al., 2008). These characteristics can enable it to outcompete native species. For these reasons, future studies on the possible influence of the introduction of *T. s. elegans* on Neotropical freshwater turtles should be prioritized.

Although Brazilian Law prohibits the trade of exotic reptiles, the release of exotic pets is still common. A survey carried out by the Brazilian Environmental Agency (IBAMA) in 2004 revealed that 1,300 *T. s. elegans* individuals were received by zoos and wildlife centres in Brazil from private donors or as a result of law enforcement (Instituto Hórus, 2008).

The illegal trade of *T. s. elegans* should be halted by law enforcement in Brazil and neighbouring countries. In addition, education efforts aimed at the general public may help to elucidate the potential environmental impacts of exotic species. Last but not least, individual control of this and other exotic species should commence, even in polluted rivers, as such areas may serve as meta-population cetnres for the species and promote migration into native pristine habitats (Cadi et al., 2004). In Brazil, such control action would require a change in the Wildlife Law as paradoxically, even exotic species are currently fully protected (Verdade, 2004).

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HELICOPS MODESTUS (Water Snake): PREY. The genus *Helicops* currently comprises 15 species of aquatic xenodontine snakes widely distributed in south America, occurring from Colombia to Argentina (Rossman, 1970; Frota, 2005). Published data show that these snakes feed mainly on fishes and tadpoles (the most commonly available prey in the habitats they live), but also prey on frogs and lizards (Martins & Oliveira, 1998; Aguiar & Di-Bernardo, 2004; Ávila et al., 2006). The Water Snake *Helicops modestus* Günther, 1861 inhabits water bodies of the Brazilian Cerrado biome (Rossman, 1970; Nogueira, 2001). It feeds on fishes and amphibians, (Lema et al., 1983; Sawaya et al., 2008) and is considered a habitual scavenger (Sazima & Strüssmann, 1990). Despite this information, we are unaware of any specific accounts of anuran species that are prey of *H. modestus*. Herein we report here an observation of a juvenile *H. modestus* (175 mm SVL) preying on a small Leiuperid frog, *Physalaemus cuvieri* (male; 26.58 mm SVL). The observation took place on 22 September 2008, on a temporary swamp located in a pasture area in Betim municipality, Minas Gerais State, Brazil (44º 07'12" S, 19º 59'40" W; elev. 802 m). The snake was found on the shore of the swamp, with the frog in its mouth, ingesting it head first. The presence of the researchers disturbed the snake, which subsequently released its prey (Fig. 1) and hid under the water. The snake and the frog were collected and deposited in collections at the Museu de Zoologia João Moojen, Universidade Federal de Viçosa, in Viçosa, MG, Brazil (MZUFV 1617) and Museu de Ciências Naturais, Pontifícia Universidade Católica de Minas Gerais, Belo Horizonte, MG, Brazil (MCNAM 10947).

Physalaemus cuvieri is widespread in Brazil south of the Amazon, adapting itself well to anthropic habitats and breeding in temporary puddles, streams or swamps, where males call nocturnally (Bokermann, 1962; Eterovick & Sazima, 2004). The species habits contribute to its susceptibility as a potential prey item for *H. modestus*. We thank SETE Soluções e Tecnologia Ambiental Ltda. for financial and the field support, Michael Rudolf Cavalcante Lindemann for the assistance in the field and IBAMA for collection permits (140992-2).

Figure 1. Adult male *Physalaemus cuvieri* from Betim, MG, Brazil, preyed by a juvenile Water Snake, *Helicops modestus*. The deep wound indicated that the frog was first bitten in the abdomen.

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TUPINAMBIS MERIANAE: OPHIOPHAGY. The *Tupinambis* genus is distributed almost entirely throughout south America. They are found east of the Andes ranging from the north of the continent to northern Patagonia; specifically in the Amazonia Basin, along costal waters in the Guianas, Venezuela, Colombia, in addition to northern Brazil and areas in southern Paraguay, Uruguay, and northern Argentina (Presch 1973). *Tupinambis merianae* Dumeril & Bibron, 1839 is a terrestrial lizard found throughout Brazil, mainly in open areas in the central Cerrado and southeastern forest regions, but they are also found in Argentina and Uruguay (Carvalho & Araújo, 2004; Haddad et al., 2008; Colli, 2009). They are omnivorous and their diet consists of: invertebrates (millipedes, arachnids, insects and mollusks), vertebrates (birds, fishes, amphibians, lizards and small mammals), bird and turtle eggs, fruits, carrion and mushrooms (Presch, 1973; Sazima & Haddad, 1992; Tortato, 2007; Carvalho & Araújo, 2004; Colli, 2009; Toledo et al., 2004 and references within). They can act as potential seed dispersers (Castro & Galetti, 2004) and may have a profound impact on ground nesting birds on islands and possibly in forests fragments (Bovendorp et al., 2008).

The Swamp Racer Snake *Mastigodryas bifossatus* Raddi 1820 is a large neotropical Colubrid that occurs in south America. They feed on frogs, small mammals, lizards, birds and snakes (Leite et al., 2007; Marques & Muriel, 2007). These snakes live mainly in open areas in the Brazilian Cerrado, Pantanal and the grasslands of southern Brazil. They also occur in low abundances in the Amazon and Atlantic forests (Hoogmoed, 1979; Strüssmann & Sazima, 1993; Lema, 2002; Argôlo, 2004; Marques et al., 2004). The adults average ca. 1,100 mm snout vent length (SVL) and there is a lack of sexual dimorphism (Marques & Muriel, 2007).

On 7 December, 2006 around 10:00 to 12:00 an adult *T. meriane* (ca. 400 mm SVL) ate a *M. bifossatus* (ca. 1000 mm SVL) in the grasslands of Pantanal's Nhecolandia Region (19º 14'59" O; 57º 01'45" S), at the Fazenda Nhumirim, Mato Grosso do Sul State (Fig. 1). This type of predation is not common in lizard species. Normally, lizards are eaten by snakes. Furthermore, detailed records of prey-predator inter-specific relationships are limited in the literature for many species (Lima & Colombo, 2008). This observation represents the first documented record of snake predation by a Tegu Lizard species. From now, snakes may be considered a prey category for the lizard *T. merianae* in the Brazilian Pantanal area. We are grateful to C. Strüssmann, V. L. Ferreira and A. B. Outeiral for identifying the snake species, to A. Peres Jr. for information about *Tupinambis* and A. Gainsbury for reviewing the text.

Figure 1. *Tupinambis meriane* preying *Mastigodryas bifossatus* in the Pantanal's Nhecolandia Region, Brazil. (Photograph by V.L. Camilotti).

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ELAPHE OBSOLETA SPILODES (Grey Rat Snake): BODY-BENDING BEHAVIOUR. The behaviour of "body-bending" in arboreal snakes has recently been described as a cryptic defensive behaviour by Marques et al. (2006). This behaviour consists of a snake, usually (but not necessarily) with arboreal affinities, going to ground level, spreading out along the ground with its body contorted into many small bends. Marques et al. (2006) proposed that such behaviour was a behavioural camouflage, imitating fallen vines, to prevent detection by predators such as birds or mammals, while at the same time enabling the snake to sit and wait for prey or to thermoregulate. This behaviour was recorded in two arboreal Colubrid snakes in south-eastern Brazil: *Philodyas viridissimus* and *Spilotes pullatus*. This observation was only preliminary, with the occurrence of this behavioural trait in other snakes and other limbless vertebrates unknown. Records of other species displaying body-bending would therefore be useful in testing the ecological and evolutionary significance of this behaviour.

Here, I describe an incidence of body bending in the Grey Rat Snake, *Elaphe obsoleta spilodes*. This animal was encountered in Wakulla County, northwest Florida on the 21 July 2003. The animal was observed outside an infrequently used bunkhouse, adjacent to hardwood hammock swamp forest on the edge of the St. Marks National Wildlife Refuge. This region has fairly low levels of urbanization compared to other regions of the world, though there was a busy highway not far from this site. The animal was approximately 1 m long and was observed on a substrate of stone slabs that were part of a small patio. Its body was stretched out straight with over 20 bends in its body (Fig. 1). It is not known if this animal was basking or waiting to ambush prey. Anthropogenic influence is assumed to be negligible as this animal was discovered immediately after arrival in a jeep, assuming bending the body is not a spontaneous reflex for this species on the approach of a predator. This species is distributed throughout the Carolinian forest zone of eastern north America (forming five sub-species, Conant & Collins, 1998), and is renowned for its arboreal affinities, particularly for preying upon birds and squirrels nesting in trees (Weatherhead et al., 2003, references therein). This does not rule out terrestrial foraging being the cause of this behaviour, with terrestrial voles (*Microtus* sp.) and mice (*Peromyscus* sp., *Zapus* sp.) recorded from faecal samples of snakes captured in the north of this species' range in Ontario, Canada (Weatherhead et al., 2003). Fig. 1 shows that this animal was not in direct sunlight, though the thermoregulatory state of the animal at the time is uncertain. Future encounters with snakes or other limbless vertebrates displaying such behaviour should take the opportunity to measure: the body temperature of the animal; the ambient temperature; the temperature of the specific microhabitat; the presence of potential prey; the presence of potential predators and monitoring of the animal to observe any interactions with predators or prey. Further investigations could take place to see if *Elaphe obsoleta spilodes* displays this behaviour frequently, and if so, could be a model species to test hypotheses on the significance of body bending. This is feasible based on research on the ecophysiology of this species in the field in Ontario, using temperature-sensitive radio-transmitters (Blouin-Demers & Weatherhead, 2001).

Body bending is recorded in another member of the family Colubridae, with the ecological causes for this behaviour still uncertain. Deciphering the phylogenetic consistency of this behavioural trait will be important in the assessment of the ecological and evolutionary significance of this strategy.

Figure 1. *Elaphe obsoleta spilodes* **(**Grey Rat Snake) displaying body-bending behaviour.

species and lineages of snake, and other terrestrial limbless vertebrates, is therefore necessary to measure this phylogenetic consistency. This observation was recorded whilst interning with the United States Fish and Wildlife Service at St Marks National Wildlife Refuge.

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SCINAX ALTER (NCN): PREDATION. The Hylid *Scinax alter* (Lutz, 1973) is widely distributed on the Brazilian coastline, occurring in open areas from Bahia to Rio Grande do Sul, including Minas Gerais state (Silvano & Pimenta, 2001). It can be found calling on the vegetation near permanent, semi-permanent and temporary waterbodies (Izecksohn & Carvalho-e-Silva, 2001; Carvalho-e-Silva & Kwet, 2004). Although occurring in abundance along its distribution area, we are unaware of records of predation on *Scinax alter* (previous work reported this species as prey of invertebrates only [Marra et al., 2003]). On 1 February 2009, an adult female *Liophis miliaris* (550 mm snout-vent length [SVL]; 17-17-15 dorsal, 151 ventral and 56 subcaudal scales) was collected on a residential condominium located at Campos dos Goytacazes municipality, Rio de Janeiro state, Brazil (21º 47'05" S, 41º 19'12" W; elev. 13 m). The snake was killed by a local and consigned to one of us (CAFA) on 2 February 2009. By checking the stomach content, two anuran species were found: a juvenile *Leptodactylus ocellatus* (ca. 24 mm SVL: based on other specimens), mostly digested, with only the head, one leg and one arm intact; and an intact juvenile *Scinax alter* (19.5 mm SVL).

The water snake *Liophis miliaris* (Linnaeus, 1758) is a medium sized Xenodontine with a wide distribution, occurring from the Guianas to northeastern Argentina, being common in southeastern Brazil (Dixon, 1983; Dixon, 1989). This semiaquatic snake has diurnal and nocturnal activity (Sazima & Haddad, 1992), and inhabits moist areas, like swamps, lagoons, streams and even brackish water environments (Sazima & Haddad, 1992; Marques & Souza, 1997; Marques & Sazima, 2004). It is a generalist, actively foraging to find potential preys, like fish, amphibians and reptiles (Lema et al., 1983; Michaud & Dixon, 1989; Sazima & Haddad, 1992; Machado et al., 1998; Marques & Sazima, 2004; Bonfiglio & Lema, 2006; Braz et al., 2006; Lingnau & Di-Bernardo, 2006; Toledo et al., 2007), and also exhibits scavenger habits (Sazima & Strüssmann, 1990). Previous work reported *Leptodactylus ocellatus* (including its nests) as prey of *Liophis miliaris* (Lema et al., 1983; Michaud & Dixon, 1989; Lingnau & Di-Bernardo, 2006), but this note represents the first case of predation on *Scinax alter*. Due to its habits, this anuran is an uncommon prey of *Liophis miliaris* and usually both species occur in syntopy. However, anurans are well cited as an important food resource for snake communities (Vitt, 1983; Vitt & Vangilder, 1983; Sazima & Haddad, 1992; Strüssmann & Sazima, 1993). The snake and the frogs are deposited in the herpetological collection of Museu de Zoologia João Moojen, Universidade Federal de Viçosa, at Viçosa municipality, Minas Gerais state, Brazil under the following register numbers: MZUFV 1680 (*Liophis miliaris*); MZUFV 9744 (*Scinax alter*) and MZUFV 9745 (*Leptodactylus ocellatus*). We thank Kátia Valevski Sales Fernandes for collecting the snake and Diego J. Santana for the assistance on frog identification.

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