VIPERA BERUS (adder): FEEDING. On 5 July 2010 at 14.30 hrs an adult adder was photographed consuming a fledgling in the garden of a house in Tangham Forest, Suffolk (OS grid reference TM 35 48) (Front cover & Fig. 1, op. pg.). The garden is surrounded by forestry plantation and adders regularly enter from there. Weather conditions were sunny, with occasional cloud and air temperature approximately 24°C. The bird appears to be great tit fledgling (Mike Toms, pers. comm.).

Adder diet includes a range of small mammals, reptiles and amphibians. Birds and their eggs are also taken, but there are few specific published examples. Appleby (1971) records a fully fledged bird, the size of a sparrow, regurgitated by an adder and Street (1979) relays a reliable report of an adder raiding a woodlark nest, although he does not record whether eggs or fledglings were involved. Frazer (1983) includes a photograph of an adder consuming a merlin chick. It is also repeatedly stated that the adder may climb to prey on birds or their eggs, in spite of the fact that this snake is not a habitual climber (Smith, 1964; Appleby, 1971; Street, 1979).

It is unclear whether, in this instance, the adder killed a fledgling, or whether it scavenged an already dead bird. On several occasions prior to this observation, however, this adder was seen on the edge of the garden's pond and under nearby shrubbery. Birds use the shallow edges of the pond to drink and bathe, so it is possible that the adder took a bird, alive, from there.

ACKNOWLEGEMENTS

I am grateful to Mike Toms (British Trust for Ornithology) for identifying the bird.

REFERENCES

Appleby, L.G. (1971). *British Snakes.* London: John Baker Publishers Ltd.

Frazer, D. (1983). *Reptiles and Amphibians in Britain.* London: Collins New Naturalist.

Smith, M. (1964). *The British Amphibians and Reptiles (3rd Edition)*. London: Collins.

Street, D. (1979). *The Reptiles of Northern and Central Europe.* London: B.T. Batsford Ltd.

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CROTALUS VIRIDIS (western rattlesnake) and ***PITUOPHIS CATENIFER*** (gopher snake): REPRODUCTION. Although successful interbreeding between closely-related species of snakes in captivity has been reported (Bechtel et al., 1960), the likelihood of inter-genus or inter-family hybridization in captivity or in the wild is negligible. To our knowledge, there is no documented account of inter-family reproduction in snakes. Herein, we report an observation of copulation between two species of snakes from two different families; *Crotalus viridis* (western rattlesnake), Viperidae, and *Pituophis catenifer* (gopher snake), Colubridae, and discuss why inter-family hybridisation may not be feasible.

On 14 May 2009 during a herpetological monitoring survey in the Briones Region, Contra Costa County, northern California, USA (37.950135°N, 122.217778°W, datum: WGS 84), we found four adult (two females and two males) gopher snakes (*Pituophis catenifer*) and one adult female western rattlesnake (*Crotalus viridis*) in a funnel trap associated with a drift fence placed at the edge of coastal scrub/chaparral and grassland habitats. Close examination of the captive snakes in the trap revealed that one male gopher snake and the female western rattlesnake were copulating (Fig. 1). The female *C. viridis* was quietly coiled in the corner of the trap facing the opposite direction to the male *P. catenifer*; the copulatory lock seemed to be carried out with both hemipenes. When the snakes were pulled out of the trap for photographic documentation and the pair placed on the ground, the female rattlesnake started dragging the male gopher snake away.

Despite the fact that the colour pattern and defensive behaviour of gopher snakes mimic those of rattlesnakes and in spite of their close karyotypic structure (Baker et al., 1972) hybrids between these higher taxonomic groups are not viable. Their differences are vast, which suggests that there is a long evolutionary history that separates them. For

Figure 1. *Pituophis catenifer* and *Crotalus viridis* copulating.

example, the reproductive strategy of gopher snakes is oviparous while that of rattlesnakes is viviparous. Furthermore, the two species' reproductive organs (i.e., hemipenes) are morphologically dissimilar and the sex-pheromones that are elicited during oestrus and courtship behaviour may differ (Mason et al., 1989; reviewed in Houck, 2009). Once copulation takes place, unique hormones (chemical messengers) that help sperm to penetrate an egg vary between species and the maternal immunorecognition system is activated effecting fertilisation probabilities (Olsson et al., 1997). Moreover, it has been considered whether females have the ability to discriminate between sperm –sperm choice– of different hetero- and conspecific males (Olsson et al., 1996) and sperm competition in snakes is prevalent female reproductive behaviour (Schulte-Hostedde & Montgomerie, 2006).

It is not clear what led these two distinct species to copulate in this situation. We hypothesise, however, that the presence of two other female gopher snakes and their pheromones (during oestrus) may have elicited male sexual behaviour bringing the male gopher snake to copulate by "mistake" with the western rattlesnake whose reproductive season coincides with that of the gopher snake (Fitch, 1949; Ernst & Ernst, 2003). In garter snakes (*Thamnophis* spp.), males do not exhibit courtship behaviour unless they perceive specific pheromones on the female's skin (Noble, 1937; Mason & Crews, 1985; Mason et al., 1989). The female sex pheromones of the gopher snakes may have been transfered to the skin of the female rattlesnake. Male snakes are known to respond behaviorally and physiologically to sex pheromones (Huang et al., 2006). Given that female rattlesnakes remain passive during mating events with their conspecific males (Ernst & Ernst, 2003 and references therein) there may have not been any avoidance behaviour by the female rattlesnake. Instead, the presence of the female rattlesnake in the "courtship ball" may have been stressful for her and as a normal response she may have gaped her cloaca to express cloacal gland secretions (Graves & Duval, 1988; Moore et al., 2000; R. Mason, pers. comm.). This event could be considered a misguided copulation if the male gopher snake was searching for the female gopher snake's cloaca and happened upon the rattlesnake's instead.

In the Mediterranean climate of California, a "hybrid zone" may occur where the ranges of the two unrelated families meet (Fitch, 1949; Macartney et al., 1988; Yacelga, pers. obs.). The niches of these two species overlap to some degree and the onset of the reproductive season also overlaps (Fitch, 1949). This observation raises a number of questions. Does interbreeding occur in the wild? Do snakes interbreed up to the family level? This observation may not be of an adaptive behaviour of two species of snakes in the wild. It could be considered, rather, an isolated event or simply the result of the individuals being enclosed in the trap. Additional observations of this aberrant behaviour may elucidate the above questions.

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REFERENCES

Baker, R.J., Mengden, G.A. & Bull, J.J. (1972). Karyotypic studies of thirty-eight species of North American snakes. *Copeia* **2**, 257-265.

Bechtel, H.B. & Mountain, J. (1960). Interspecific hybridization between two snakes of the genus *Elaphe*. *Copeia* **2**, 151-153.

Ernst, C.H. & Ernst, E.M. (2003). *Snakes of the United States and Canada.* Washington: Smithsonian Institution Press.

Fitch, H.S. (1949). Study of the snake populations in central California. *Am. Midl. Nat.* **41**, 513-579.

Graves, B.M. & Duval, D. (1988). Evidence of an alarm pheromone from the cloacal sacs of prairie rattlesnakes. *Southwestern Naturalist* **33**, 339-345.

Houck, L.D. (2009). Pheromone communication in amphians and reptiles. *Ann. Rev. Physiol.* **71**, 161-176.

Huang, G., Zhang J.X., Wang, D., Mason, R.T. & Halpern, M. (2006). Female snake sex pheromone induces membrane responses in vomeronasal sensory neurons of male snakes. *Chem. Senses* **31**, 521-529.

Noble, G.K. (1937). The sense organs involved in the courtship of *Storeria*, *Thamnophis*, and other snakes. *Bull. Am. Mus. Nat. Hist.* **73**, 673.

Macartney, J.M. & Gregory, P.T. (1988). Reproductive biology of female rattlesnakes (*Crotalus viridis*) in British Columbia. *Copeia* **1**, 47-57.

Mason, R.T., Fales, H.M., Jones, T.H., Pannell, L.K., Chinn, J.W. & Crews D. (1989). Sex pheromones in snakes. *Science* **245**, 290-293.

Mason, R.T. & Crews, D. (l985). Female mimicry in garter snakes. *Nature* **316**, 59-60.

Moore, I.T., Lemaster, M.P. & Mason, R.T. (2000). Behavioural and hormonal responses to capture stress in the male red-sided garter snake, *Thamnophis sirtalis parietalis. Anim. Behav.* **59**, 529-534.

Olsson, M., Shine, R., Madsen, T., Gullberg, A, & Tegelström, H. (1997). Sperm choice by females. *Trends. Ecol. Evol.* **12**, 445-446.

Olsson, M., Shine, R., Madsen, T., Gullberg, A. & Tegelström, H. (1996). Sperm selection by females. *Nature* **383**, 585.

Schulte-Hostedde, A.I. & Montgomerie, R. (2006). Intraspecific variation in ejaculate traits of the northern watersnake (*Nerodia sipedon*). *J. Zool.* **270**, 147-152.

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NATRIX NATRIX (grass snake): EGG-LAYING SITE. Grass snakes require warm, moist microhabitat for the successful incubation of their eggs, and decomposing vegetation provides such conditions (Beebee & Griffiths, 2000). Most egg-laying sites in Britain are made by humans, including compost or manure heaps, piles of sawdust and woodchips, hayricks and behind warm brickwork (Smith, 1964; Appleby, 1971; Street, 1979; Frazer, 1983; Beebee & Griffiths, 2000). Rotting wood may be a more natural egg-laying medium. Smith (1964) refers to cavities in old tree trunks, a survey carried out by the Fauna and Flora Preservation Society recorded two cases of 'rotting logs' among 31 egg-laying sites (Langton, 1986), and a photograph of many clutches of grass snake eggs in a rotten log, taken by Richard Revels, appeared in *British Wildlife* (Alexander at al., 2006). From continental Europe, Street (1979) found multiple clutches beneath a rotting tree trunk and Luiselli et al. (1997) found natural sites within rotting logs, as well as under large rocks and wet moss.

Given the relative lack of information on natural egg laying-sites in Britain, a description of a semi-natural site is provided from Thetford Forest, Norfolk (TL 95 91). The site was a cut hornbeam stump, in a bracken-dominated open area, within a mixed plantation managed for forestry and wildlife interest. The stump measured approximately 70 cm high with a diameter of 90 cm mid-way up the remaining trunk.

On 18 September 2009, hatchling grass snakes were found basking at the foot of the stump, indicating that it might be an egg-laying site. On investigation, the central core of the stump was found to be highly decomposed, comprising friable fragments of timber, with the consistency of damp sawdust. The outer layers were less decomposed and although these maintained the structure of the stump, it was easily broken open by hand. Five clutches of eggs were found within the central core of the stump. Two clutches had hatched, leaving empty egg shells. Snakes were hatching from the third clutch. The remaining two clutches had not hatched, but appeared viable. The wood fragments were replaced after locating the eggs.

The egg site was visited again on 23 September 2009. Of the two previously unhatched clutches, snakes had hatched from one, and the remaining clutch was in the process of hatching; some egg shells were empty and one hatchling was in the process of emerging.

There was no readily apparent heat generation from the decomposing wood. Air temperature and temperature within the core of the stump were recorded using a digital thermometer. On the first visit temperature in the centre of the stump, where the eggs were located, was similar to the external air temperature, both being 18°C. On the second visit air temperature was 20-21°C, but temperature within the stump was still 18°C. The stump was shaded by trees until mid-morning.

There are some similarities between the egg-laying site in Thetford Forest and that photographed by Richard Revels. The latter was within a beech log, measuring approximately 250 cm long, with a diameter of approximately 75 cm. Decomposition was such that the log was broken open by hand, which revealed approximately 100 hatched eggs, just under the upper surface, within decomposed material, the consistency of sawdust (Andy Darrington & Richard Revels, pers. comm.).

Both of the above are artificial egg-laying sites in the respect that they were created by cutting timber. However, large tree stumps and fallen logs, produced through natural senescence, may have been more common in the past than they are today. Forests in Europe have less than 5% of the deadwood expected to occur under natural conditions (Dudley & Vallauri, 2004). The microhabitat provided within dead wood in advanced stages of decomposition may have provided grass snakes with egg-laying sites prior to the human-made egg-laying heaps more commonly found today.

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REFERENCES

Alexander, K., Butler, J. & Green, T. (2006). The value of different tree and shrub species to wildlife. *British Wildlife* **18** (1), 18-28.

Appleby, L.G. (1971). *British Snakes.* London: John Baker Publishers Ltd.

Figure 1. Hornbeam stump used as grass snake egg-laying site.

Figure 2. Grass snake eggs in decomposing timber.

Beebee, T.J.C. & Griffiths, R.A. (2000). *Amphibians and Reptiles. A Natural History of the British Herpetofauna*. London: Harper Collins.

Dudley, N. & Vallauri, D. (2004). Deadwood – living forests. The importance of veteran trees and deadwood to biodiversity. Gland, Switzerland: World Wildlife Fund.

Frazer, D. (1983). *Reptiles and Amphibians in Britain.* London: Collins.

Langton, T. (1986). Snakes campaign 1985. Grass snake survey report. *Herpetofauna News* **3**, 2.

Luiselli, L., Capula, M. & Shine, R. (1997). Food habits, growth rates, and reproductive biology of grass snakes, *Natrix natrix* (Colubridae) in the Italian Alps. *J. Zool. Lond.* **241**, 371-380.

Street, D. (1979). *The Reptiles of Northern and Central Europe.* London: B.T. Batsford Ltd.

Smith, M. (1964). *The British Amphibians and Reptiles (3rd Edition)*. London: Collins.

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ITAPOTIHYLA LANGSDORFFII (casque-headed treefrog): MALE COMBAT. *Itapotihyla langsdorffii*, of monotypic genus, has a wide distribution in the Atlantic Forest from the south of Sergipe State to Rio Grande do Sul State, Brazil, northeastern Argentina and central-south Paraguay (Arzabe & Loebmann, 2006; Lignau et al., 2006). It is a large treefrog (up to 100 mm SVL) that occurs in forested areas. Some of its populations are considered in decline, especially due to habitat loss (Aquino et al., 2004). Publications on the biology and ecology of this species are scarce (Vrcibradic et al., 2009). *Itapotihyla langsdorffii* belongs to the tribe Lophiohylini, a monophyletic group from south America which includes "casque-headed" treefrogs and currently contains 10 genera

Figure 1. *Itapotihyla langsdorffii* males after combat, Cerrado habitat, southeastern Brazil.

(Faivovich et al., 2005). Male-male combat among amphibians is common especially due to disputes over territories or mates and includes aggressive and violent fights (Wells, 2007). The most violent combat among anurans is reported for gladiator frogs, *Hypsiboas boans* group (Kluge, 1979). Most of these species have well developed prepollical spines that are used in combat, causing injury (Duellman & Trueb, 1994).

Here we report a combat between two *Itapotihyla langsdorffii* males in a Cerrado area, southeastern Brazil. The event was observed in the early evening (19:28; 20°C) on 1 October 2009 in a gallery forest located in Rio Pardo II Farm, municipality of Avaré, State of São Paulo (22º 50'12" S, 48º 58'54" W; 650 m a.s.l.). Approximately 25 individuals were found calling in a flooded area formed by rainwater, near Palmital River. Two males were perched on a bush, one metre above the water, in the forest edge. Below them was a larger individual that was not calling, most likely a female. One of the males (intruder) began to emit aggressive calls, approaching the other male (resident). Then, the intruder jumped onto the same perch as the resident male. One minute later, the resident male started the physical combat, physically shoving and beating the opponent's head with its forelimbs, in an apparent attempt to dislodge its rival from the perch. The resident male lost its equilibrium but did not leave the perch. Occasionally, the intruder male emitted aggressive calls. During one of the attacks by the intruder male, both individuals fell onto another perch below and combat ceased. The two individuals stood with their backs to each other (Fig. 1). After several minutes, the intruder male desisted and jumped onto another bush. The duration between the first agonistic interaction and the end of the combat was less than ten minutes. According to Vrcibradic et al. (2009), there is considerable sexual size dimorphism in *I. langsdorffii* with females (mean SVL 103 mm) being significantly larger than males (mean SVL 81 mm). Therefore, our record disagrees with that of Shine (1979), who stated that in species presenting male combat, males are often larger than females. Halliday & Verrell (1986) consider separation of amphibians into "combat" and "non-combat" species, and state that their phylogeny must be taken into account. In many cases, male-male combat occurs in species presenting prepollical spines (Faivovich et al., 2005), but this is not the case of *I. langsdorffii* and other species of the tribe Lophiohylini. Combat in species of such a tribe is not common; however, Silva (2006) reported disputes between *Trachycephalus mesophaeus* males over the possession of females during amplexus. These disputes include shoves and kicks in order to dislodge rivals and may involve up to 12 males per female. Our study represents the first record of combat between *Itapotihyla langsdorffii* males and enhances the knowledge about the natural history of species of the tribe Lophiohylini.

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REFERENCES

Aquino, L. Segalla, M.V., Faivovich, J. & Baldo, D. (2004). *Itapotihyla langsdorffii*. IUCN Red List of Threatened Species. Version 2010.3. <www.iucnredlist.org> [Accessed: 06 September 2010].

Arzabe, C. & Loebmann, D. (2006). Amphibia, Hylidae, *Itapotihyla langsdorffii*: distribution extension. *Checklist* **2**, 33-34.

Duellman, W.E. & Trueb, L. (1994). *Biology of Amphibians*. Baltimore: Johns Hopkins University Press.

Faivovich, J., Haddad, C.F.B., Garcia, P.C.A., Frost, D.R., Campbell, J.A. & Wheeler, W.C. (2005). Systematic review of the frog family Hylidae, with special reference to Hylinae: phylogenetic analysis and taxonomic revision. *Bull. Am. Mus. Nat. Hist.* **294**,1-240.

Halliday, T.R. & Verrell, P.A. (1986). Review: sexual selection and body size in amphibians. *Herpetol. J.* **1**,86-92.

Kluge, A.G. (1979). The gladiator frogs of Middle America and Colombia - A re-evaluation of their systematics (Anura: Hylidae). *Occ. Pap. Mus. Zool. Univ. Michigan.* **688**,1-24.

Lingnau, R. Zank, C. Colombo, P. & Vinciprova, G. (2006). Amphibia, Hylidae, *Itapotihyla langsdorffii*: distribution extension. *Checklist* **2**, 38-39.

Shine, R. (1979). Sexual selection and sexual dimorphism in Amphibia. *Copeia* **1979**, 297-306.

Silva, M.O. (2006). História natural de *Trachycephalus mesophaeus* (Hensel, 1867) (Anura : Hylidae) no Parque Florestal do Rio da Onça, município de Matinhos, estado do Paraná. M.Sc. Thesis. Univ. Fed. Paraná, Brazil.

Vrcibradic, D. Teixeira, R.L. & Borges Jr., V.N.T. (2009). Sexual dimorphism, reproduction and diet of the casque-headed treefrog *Itapotihyla langsdorffii* (Hylidae: Lophiohylini). *J. Nat. Hist.* **43**, 2245-2256.

Wells K.D. (2007). *The Ecology and Behavior of Amphibians.* Chicago: University of Chicago Press.

CLELIA PLUMBEA (mussurana): PREY. The genus *Clelia* currently comprises eight species of medium to large size Pseudoboini snakes found in almost all Neotropical regions, from Mexico to Argentina: *Clelia clelia* (Daudin, 1803), *Clelia equatoriana* (Amaral, 1924), *Clelia errabunda* (Underwood, 1993), *Clelia hussami* Morato, Franco & Sanches, 2003, *Clelia langeri* Reichle & Embert, 2005, *Clelia plumbea* (Wied, 1820), *Clelia rustica* (Cope, 1878) and *Clelia scytalina* (Cope, 1867) (Zaher, 1996; Reichle & Embert, 2005; Zaher et al., 2009). Seldom seen, these snakes are probably suffering population decreases making natural history information important (Pizzatto, 2005).

Clelia plumbea occurs from south of the Amazon river in the Brazilian Amazon basin, through the Cerrados of central Brazil and the Atlantic Rainforest in Brazil, Argentina and

Paraguay (Zaher, 1996; Scott-Jr. et al., 2006). It can be easily distinguished from its congeners by a completely spineless hemipenis and the presence of 19 dorsal scale rows at midbody. It also lacks a left lung and dorsally convex Duvernoy's glands (Zaher, 1996).

Species of the genera *Boiruna*, *Clelia* and *Mussurana* are known as snake predators but there is still much to learn about their diets. Pinto & Lema (2003) examined the stomach contents of 42 specimens and identified the non-venomous snakes *Echinanthera cyanopleura* (Cope, 1885) and *Liophis miliaris* (Linnaeus, 1758), the pit-viper *Bothrops jararaca* (Wied, 1824), and the four-eyed opossum *Metachirus nudicaudatus* (E. Geoffroy, 1803) as prey items. Teixeira & Vrcibradic (2003) reported scavenging behaviour after collecting a specimen that ingested an apparently road-killed *Liophis miliaris*. Bernarde & Abe (2010) documented the rainbow boa *Epicrates cenchria* (Linnaeus, 1758) as prey of *C. plumbea* in southwestern Amazon. Herein, we report the predation by *C. plumbea* on another snake species, the pit-viper *Bothrops moojeni* Hoge, 1966.

On 02 May 2008, at 22:00, on a road at Cavalcante (GO-241), state of Goiás, in Cerrado area of central Brazil (13°47'13.04" S, 47°23'38.18" W) LOD found a male *C. plumbea* (107.4 cm SVL; 25.2 cm Tail L) ingesting a dead *Bothrops moojeni* (male; 70.3 cm SVL; 12.6 cm Tail L) (Fig. 1). The predator was collected and induced to regurgitate its meal, which was likely road-kill, determined by having a wound near the cloacal region, and some exposed viscera. The ground was also stained with blood, probably from the pit-viper.

Our observation represents a new prey record for *C. plumbea* and contributes a second record of scavenging by this species. Although poorly reported for most snake species, scavenging behaviour is apparently widespread in the group, since carrion provides a food source that can be obtained relatively safely and with low energetic costs compared to live prey (Sazima & Strüssman, 1990; DeVault & Krochmal, 2002). Additionally, dead animals can often be found in predictable places like roadsides (DeVault & Krochmal, 2002). In the case of reptiles, sun-warmed roads are attractive for thermoregulation, that may result in high rates of road-kill (Shine et al., 2004). During four days of fieldwork (from April 30 to May 03), when the record herein was made, four other road-killed reptiles were found along along 13 km of the GO-241 road; *Crotalus durissus* Linnaeus, 1758, *Leptodeira annulata* (Linnaeus, 1758) and *Oxyrhopus guibei* Hoge & Romano, 1978, and the lizard *Tupinambis quadrilineatus* Manzani & Abe, 1997.

The pit-viper *Bothrops moojeni* occurs in riparian areas in central and southeastern Brazil, throughout the Cerrado morphoclimatic domain (Nogueira et al., 2003). Records of pit-vipers as prey items of *Clelia* and the known resistance of *C. clelia* to the venom of some viperids and elapids suggest a possible adaptive evolutionary relationship between members of this genus and highly venomous serpents (Delia, 2009).

Due to its under-represented status in our collections, *C. plumbea* and its prey (*B. moojeni*) was deposited in the Museu de Ciências Naturais, Pontifícia Universidade Católica de Minas Gerais, Belo Horizonte, MG, Brazil (*C. plumbea* MCN-R 3185; *B. moojeni* MCN-R 3186).

REFERENCES

Bernarde, P.S. & Abe, A.S. (2010). Hábitos alimentares de serpentes em Espigão do Oeste, Rondônia, Brasil. *Biota Neotrop.* **10**, 167-173.

Delia, J. (2009). Another crotaline prey item of the Neotropical snake *Clelia clelia* (Daudin 1803). *Herpetol. Notes* **2**, 21-22.

DeVault, T.L. & Krochmal, A.R. (2002). Scavenging by snakes: an examination of the literature. *Herpetologica* **58** (4), 429-436.

Nogueira, C., Sawaya, R.J. & Martins, M. (2003). Ecology of the pitviper, *Bothrops moojeni*, in the Brazilian Cerrado. *J. Herpetol.* **37** (4), 653-659.

Pinto, C.C. & Lema, T. (2002). Comportamento alimentar e dieta de serpentes, gêneros *Boiruna* e *Clelia* (Serpentes, Colubridae). *Inheringia* **92** (2), 9-19.

Pizzatto, L. (2005). Body size, reproductive biology and abundance of the rare Pseudoboinae snakes, genus *Clelia* and *Boiruna* (Serpentes:

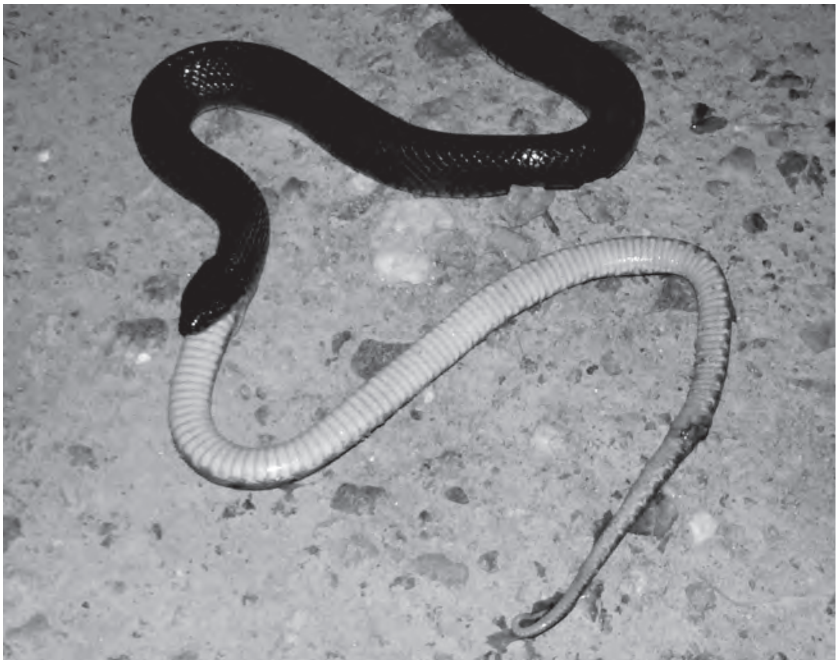

Figure 1. A male *Clelia plumbea* (MCN-R 3185) regurgitating a road-killed *Bothrops moojeni* (MCN-R 3186) at Cavalcante, state of Goiás, in a Cerrado area of central Brazil. Photograph by L.O. Drummond.

Colubridae) in Brazil. *Phyllomedusa* **4** (2), 111-122.

Reichle S. & Embert, D. (2005). New Species of *Clelia* (Colubridae) from the Inter-Andean Dry Valleys of Bolivia. *J. Herpetol.* **39** (3), 379-383.

Sazima, I. & Strüssmann, C. (1990). Necrofagia em serpentes Brasileiras: exemplos e previsões. *Rev. Bras. Biol.* **50** (2), 463-468.

Scott-Jr., N.J., Giraudo, A.R., Scrocchi, G., Aquino, A.L, Cacciali, P. & Motte, M. (2006). The genera *Boiruna* and *Clelia* (Serpentes: Pseudoboini) in Paraguay and Argentina. *Pap. Avul. Zool.* **46** (9), 77-105.

Shine, R., Lemaster, M., Wall, M., Langkilde, T. & Mason, R. (2004). Why did the snakes cross the road? Effects of roads on movement and location of mates by garter snakes (*Thamnophis sirtalis parietalis*). *Ecology and Society* **9** (1), 9.

Teixeira, R.L. & Vrcibradic, D. (2003). *Clelia plumbea* (mussurana): Necrophagy. *Herpetol. Rev.* **34** (3), 248.

Zaher, H. (1996). A new genus and species of Pseudoboine snake, with a revision of the genus *Clelia* (Serpentes, Xenodontinae). *Bol. Mus. Reg. Sci. Nat. Torino* **14** (2), 289-337.

Zaher, H., Grazziotin, F.G., Cadle, J.E., Murphy, R.W., Moura-Leite, J.C. & Bonatto, S.L. (2009). Molecular Phylogeny of advanced snakes (Serpentes, Caenophidia) with an emphasis on South American Xenodontines: a revised classification and descriptions of new taxa. *Pap. Avul. Zool.* **49** (11), 115-153.

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LACERTA BILINEATA (western green lizard): FIELD INJURY. Reptiles sustain natural injury for many reasons including attacks by predators, accidents and intrasexual conflicts (Borczyk, 2004; Gregory & Isaac, 2005; Meek, 2007). Injuries have important consequences for population ecology, including loss of body condition, reduced mobility and decreased alertness to predators, factors that may ultimately impact on survival (Harris, 1989). This note reports on a field injury in a western green lizard *Lacerta bilineata*. On 31 April 2010 an adult male *L. bilineata* was found alive, but apparently immobile, on a minor road near the village of Chasnais in the Vendee, France (46°27'N). The road was bordered by a hedgerow and woodland on one side and agricultural land and a grassy clearing on the other. The weather was sunny with air temperature approximately 20°C. The lizard presented no resistance and was easily collected. It measured 105 mm snout to vent length and had a partly regenerated tail. It had sustained head trauma with lacerations to the right eye and jaw musculature that appeared to have been caused by the teeth of another animal (Fig. 1A).

The lizard was housed in a vivarium and given basic medical treatment (antibiotics and wound care) and after three days began feeding on wax worms and mealworms dusted with a multivitamin supplement. General recovery was relatively rapid, healing taking no more than 14 days, with improvement to the eye wound noticed on 20 May. General recovery was apparent by 6 June. Perhaps unexpectedly, the lizard appeared to have regained use of the injured eye, although vision may have been impaired to some extent since it did not open fully (Fig. 1B). The lizard was released on 26 June. Reptiles frequently suffer head injuries in the field and survive (Borczyk, 2004; Meek, 2007), although in this instance possible limited eye use would surely limit survivorship potential, reducing abilities to detect predators and secure prey items.

Predators of *L. bilineata* are numerous in the locality, as indicated by the frequency of individuals with tail loss, which has been related to the abundance of *Hierophis viridiflavus* (Rugiero & Luiselli. 2004; Luiselli et al., 2005), a common species in the area. Other potential predators include mustelids and birds of prey. Given the lizard's immobile condition and location when found, however, it might be expected that a predator would have followed up the attack. A second possibility is intraspecific combat. This species is highly territorial, particularly during April and May when male combat is intense, with serious injury and even death resulting from encounters (Beebee & Griffiths, 2000). Adult males in this area measure up to 119 mm snout to vent length (Meek, 2009; Meek pers. obs.) and a smaller male might be expected to fare poorly in such encounters. If the injury did indeed result from male combat, it highlights the consequential costs of such behaviour by increasing the probability of additional life threatening situations, including mortality from road traffic (Lebboroni & Corti, 2006; Meek, 2009) and increased vulnerability to predators.

REFERENCES

Beebee, T.J.C. & Griffiths, R.A. (2000). *Amphibians and Reptiles.* London: HarperCollins.

Borczyk, B. (2004). Causes of mortality and bodily injury in grass snakes (*Natrix natrix*) from the 'Stawy Milickie' nature reserve (SW Poland). *Herpetol. Bull.* **90**, 22-26.

Gregory, P.T. & Isaac, L.A. (2005). Close encounters of the worst kind: patterns of injury in a population of grass snakes (*Natrix natrix*). *Herpetol. J.* **15**, 213-219.

Harris, R.N. (1989). Nonlethal injury to organisms as a mechanism for population regulation. *Am. Nat.* **134**, 835-847.

Luiselli, L., Angelici, F.M., Di Vittorio, M., Spinnato, A. & Politano, E. (2005). Analysis of a herpetofaunal community from an altered marshy area in Sicily; with special remarks on habitat use (niche breadth and overlap), relative abundance of lizards and snakes and the correlation between predator abundance and tail loss in lizards. *Contributions to Zoology* **74** (1/2) (2005) <http://dpc.uba.uva.nl/ctz/vol74/nr01/art03>.

Meek, R. (2007). Non-lethal injury in Hermann's tortoise, *Testudo hermanni*, in Croatia and Montenegro. *Herpetol. Bull.* **100**, 23-29.

Meek, R. (2009). Patterns of reptile road-kills in the Vendee region of western France. *Herpetol. J.* **19**, 135-142.

Lebboroni, M. & Corti, C. (2006). Road killing of lizards and traffic density in central Italy. *Herpetologia Bonnensis: Proceedings of the 13th Ordinary General Meeting of Societas Europaea Herpetologica*. Pp. 81-82. Vences, M., J. Köhler, T. Ziegler & W. Böhme (Eds.). SEH.

Rugiero, L. & Luiselli, L. (2004). Ecological notes on two colubrid snakes (*Coluber viridiflavus* and *Elaphe longissima*) in a suburban habitat (Rome, central Italy). *Herpetol. Bull.* **87**, 8-12.

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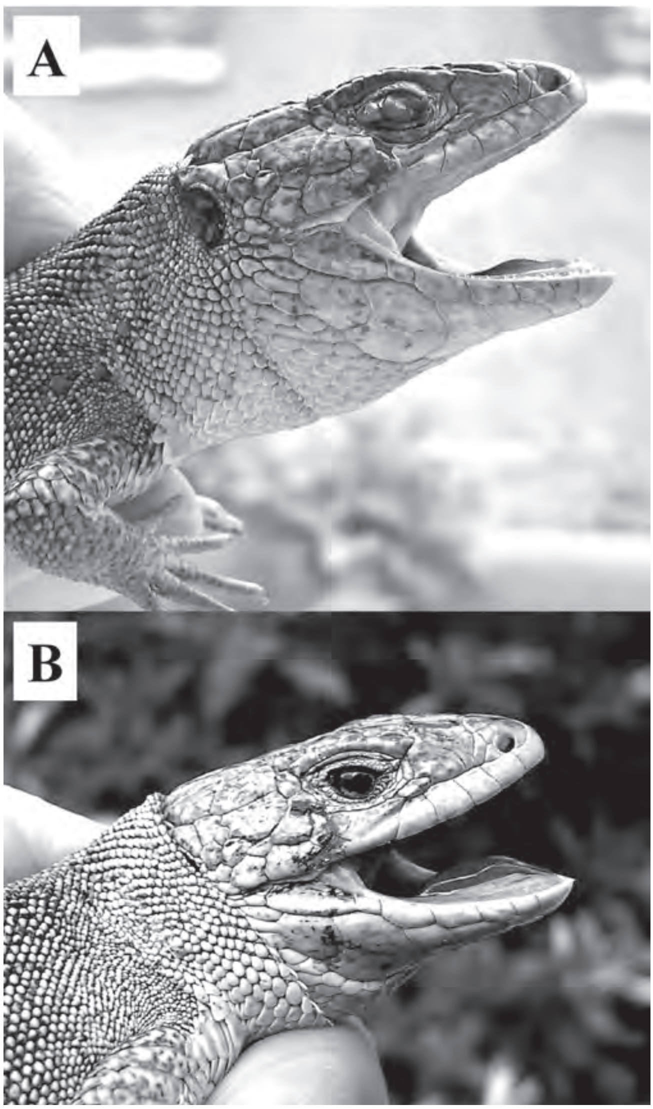

Figure 1. Western green lizard *Lacerta bilineata* showing lacerations to right eye and jaw musculature (A) and after recovery (B).