CORALLUS HORTULANUS (Amazon tree boa) and ***LEPTODEIRA ANNULATA*** (banded cat-eyed snake): HABITAT. The boid snake *Corallus hortulanus* (Linnaeus, 1758) is widespread across Central and South America, ranging from southwestern Costa Rica, Panama, northern South America (east Andes), Venezuela, Guiana, Amazonian Colombia, Ecuador, Peru, Bolivia and Brazil. It is also known from wet forests in southeastern Brazil and islands off Venezuela, Trinidad and Tobago, St. Vincent, Grenada, and Panama (Henderson, 1993). Henderson (1997) reports two subspecies of *C. hortulanus*; *C. h. hortulanus* (from Guiana, Amazonia and Brazil) and *C. h. cooki* (from Central America, Colombia, Venezuela, Trinidad, Tobago, St. Vincent and Grenada). The dipsadid snake *Leptodeira annulata* (Linnaeus, 1758) is widely distributed across the neotropics, ranging from the Amazon Basin of South America (Ecuador, Peru and Bolivia) to the Atlantic coast of Brazil (Duellman, 1958; Peters & Orejas-Miranda, 1970). According to Vrcibradic et al. (1999), most of the published information on the ecology of *L. annulata* in South America originates from Amazonian populations.

Herein we report the occurrence of *Corallus hortulanus* and *Leptodeira annulata* at Restinga de Iquiparí (21º44'S, 41º01'W; at sea level), within the municipality of São João da Barra, Rio de Janeiro state, southeastern Brazil. The restinga is located next to the delta of Paraíba do Sul River, in a lagoon complex that measures ca. 4800 ha. Some authors have noted that this area harbours high ecological diversity (Lamêgo, 1946; Suguio & Tesler, 1984). During nocturnal fieldwork, we collected a specimen of *Corallus hortulanus* (Museu Nacional do Rio de Janeiro, MNRJ 20065 [Fig. 1]) on 09 November 2010 and a *Leptodeira annulata* (MNRJ 20396 [Fig. 2]) on 09 April 2011. Despite both species' morphological adaptations to an arboreal existence (enlarged vertebral and paravertebral scale rows and a laterally compressed body [Duellman, 1958]), both snakes were found on the ground, perhaps during migratory behaviour.

Corallus hortulanus has been reported from evergreen wet and rain forests, banana plantations, mangroves and fruit orchards (Henderson, 1993). Despite its widespread geographic distribution, this is the first time that *C. hortulanus* has been recorded in a restinga habitat. We are unaware of the occurrence of *Leptodeira annulata* in open areas and restinga habitats. Thus, our findings represent the first record of these species in restinga habitat.

Figure 1. *Corallus hortulanus* (MNRJ 20065). Photo by Caio A. Figueiredo-de-Andrade.

Figure 2. *Leptodeira annulata* (MNRJ 20396). Photo by Carlos Alberto Pereira Junior.

We thank Instituto Brasileiro do Meio Ambiente e Recursos Naturais Renováveis (IBAMA) and Instituto Chico Mendes de Conservação da Biodiversidade (ICMBio) for capture permits and Museu Nacional do Rio de Janeiro (MNRJ) for housing the voucher specimens.

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CORONELLA AUSTRIACA Laurenti (smooth snake): GRAVID OVERWINTERING. The smooth snake *Coronella austriaca* is a small, non-venomous snake that reaches the northwestern edge of its range in countries such as Norway and England. In the latter, its distribution is almost entirely restricted to lowland heath. Its secretive nature continues to hinder the understanding of even basic details of its behaviour.

An observation was made in April 2011 in Dorset, southern England, of a female smooth snake already showing signs of advanced gestation, namely; clear demarcation of the tail from the posterior part of the body, increased girth of the posterior two-thirds of the body (rather than a prey bulge) as well as a 'falling away' of the body from the backbone, which is associated with depletion of fat reserves in snakes during gestation (Fig. 1).

Figure 1. Female smooth snake showing signs of being gravid, April 2011. Note the clear distinction of the tail from the posterior portion of body, increased girth of the posterior two-thirds of the body, and 'falling away' of the body from the spine due to depletion of fat reserves during gestation.

During the course of survey work the female was weighed and measured at the start of the season, and the ratio of her mass to length was found to be substantially higher than that of twelve other female snakes sampled early in the season, although two other females also shared similar (but less conclusive) signs of being gravid. Throughout the spring and summer, this female also showed high site fidelity (always being found under the same artificial refuge or within 1 m of it), characteristic behaviour of gravid animals. The girth also persisted, and slowly increased, confirming that this was indeed not due to the presence of an especially large prey item.

The indications of advanced gestation so early in the year suggest that mating had occurred in the previous spring, and that the animal in question had overwintered whilst gravid. The possibility that gravid snakes may retain embryos over winter was proposed by Spellerberg & Phelps (1977) although there are no records confirming its occurrence

(Beebee & Griffiths, 2000). Autumn mating has been recorded in the wild, including in England (Braithwaite et al., 1989; Bull, 2010), and this phenomenon could explain females showing early signs of gestation the following spring, but would not account for advanced gestation, such as in the female that is the subject of this note.

Typically, following spring mating, birth occurs three to five months later in August or September (Beebee & Griffiths, 2000). Records of individual snakes breeding biennially have therefore generally been attributed to the breeding year being followed by a fallow (non-breeding) year, presumably allowing females to build up reserves for the following season. Gravid overwintering, delaying birth until the year after mating, could also produce a pattern of biennial reproduction.

The current observation raises questions of whether overwintering in this state is common in England or elsewhere in the northern part of the species' range in Europe and whether it may also occur in the adder *Vipera berus*, which also gestates its young internally rather than laying eggs, and also has a biennial pattern of reproduction. Further work would be needed to answer these questions, including the possible use of X-ray or ultrasound examination to confirm gravid status, and the use of data from elsewhere in England and the species' northern (e.g. Norway) and core (e.g. central France, Italy) range, to allow comparison. Similar data could also be collected for adders. It has been reported that adders show some degree of true viviparity, i.e. that there is some direct transfer of nutrition from mother to young during their development within the female, but that smooth snakes are ovoviviparous, i.e. the young are entirely enclosed within egg membranes during development and presumably therefore receive less nutrition than adder embryos (e.g. Beebee & Griffiths, 2000). If transfer of nutrition to adder embryos is more efficient than in smooth snakes, it could be suggested as contributing to the observed difference in the species' northern limits.

A more thorough study involving a larger sample of biometric data is planned for the next season, but in the meantime the author would be pleased to receive any observations regarding the possibility of gravid overwintering in smooth snake or adder, whether in support or against.

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COLOBODACTYLUS DALCYANUS (NCN): REPRODUCTION. Gymnophthalmid biology is poorly known, being limited by the paucity of specimens in collections and observations in nature (Rodrigues et al., 2007; Jared et al., 2009). The gymnophthlamid genus *Colobodactylus* comprises two species, *C. taunayi* and *C. dalcyanus*, which occur throughout southeastern Atlantic rainforests of south America. *Colobodactylus dalcyanus* is a rare species known only from high altitudes (> 1000 m asl) in two localities; Serra da Mantiqueira, Brejo da Lapa in Rio de Janeiro (Vanzolini & Ramos, 1977) and Campos do Jordão in the state of São Paulo (Manzani & Sazima, 1997). To the

best of our knowledge there is no information on the biology of *C. dalcyanus*.

This note provides the first observations of *C. dalcyanus* reproduction. Notes were taken during a herpetological survey of Campos do Jordão State Park during spring, 15-18 October 2005. Additional observations were made in a laboratory. Specimens were obtained 1940 m asl in a forest near a small stream surrounded by "Campus Montanus" environment (IBGE, 1992) (22º43'01.3''S; 45º27'43.3''W). The climate was 18ºC and 55% RH.

Figure 1. *Colobodactylus dalcyanus* female (MZUSP 95598).

Four female *C. dalcyanus* with eggs in their oviducts were collected during this survey. Two of them were preserved (MZUSP 95601, 95602) while the remaining two specimens (MZUSP 95598, 95603) were kept alive and transferred to the laboratory where they laid eggs. All four specimens retained two eggs, one in each oviduct, fitting the clutch size pattern of two eggs recorded for most Gymnophthalmidae (Pianka & Vitt, 2003). One female (MZUSP 95598) (Fig. 1) was found under leaf litter, curled around its laid eggs. This female did not show any defensive behaviour. When disturbed it reacted by moving the body without loosening the curl around the eggs and remained inactive when left in-situ. A second female (MZUSP 95603) was collected by pitfall trap from the same forest area and laid two eggs in a plastic container. This specimen was transferred with the eggs to a terrarium covered with the litter vegetation from its capture area. After approximately one hour the female curled around the eggs and kept this position for 30 hours.

These two records suggest initial parental care of eggs by *C. dalcyanus*. Parental care is rare in reptiles and possibly evolved independently in several lineages (Shine, 1988; Greene et al., 2006). The behaviour described herein for *C. dalcyanus* has also been observed for *Leposoma puk* (M. Dixo, pers. comm.). This suggests that parental care may be more common among gymnophthalmids than expected.

The two eggs laid in captivity were subsequently fixed at different day intervals to provide embryological data. Developmental stages of the embryos were established by an approximation with the developmental table for

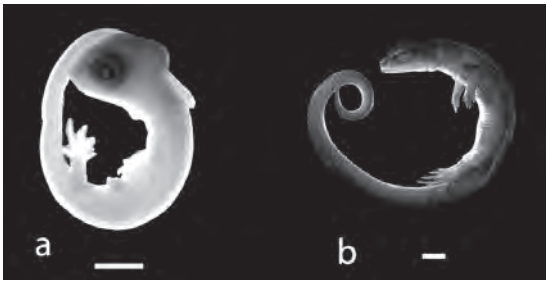

Figure 2. Embryos of *Colobodactylus dalcyanus* from female MZUSP 95603. a) Embryo MZUSP 99608 at stage 36 (Dufare & Hubert, 1961). b) Embryo MZUSP 99609 at stage 40. Scale bar = 1.0 mm.

Lacerta vivipara (Dufaure & Hubert, 1961). The first egg was opened 32 days after oviposition and revealed an embryo (MZUSP 99608; SVL= 12,6 mm) in stage 36. Digits were already differentiated but the interdigital membrane was still in the process of being absorbed (Fig. 2a). The second egg was opened after 56 days and revealed an embryo (MZUSP 99609; SVL = 26.7 mm) in stage 40 (Fig. 2b). According to Dufare & Hubert (1961), stage 40 is one of the latest stages before hatchling, being characterised by pigmented scales, closed parietal fontanel and the presence of an egg tooth. The presence of an embryo with 56 days pre-hatchling morphology indicates a period of embryological development of approximately 60 days, under controlled conditions.

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ODONTOPHRYNUS CARVALHOI (Carvalho's escuerzo): MALFORMATION. Amphibians' permeable skin, poorly protected eggs and embryos, and biphasic life cycle make them particularly sensitive to environmental change. The occurrence of malformations in a few individuals is expected in healthy populations and may be related to natural mutations, developmental errors or predation (Blaustein & Johnson, 2003). Trematoda parasites, UV radiation, environmental pollutants, and/or the synergism between these variables may also increase abnormalities among natural populations (Loeffler et al., 2001; Kiesecker, 2002; Ankley et al., 2004; Burton et al., 2008). The commonest types of malformation in amphibians are the absence of limbs or the presence of extra ones (Ankley et al., 2004; Meteyer, 2000). Abnormalities in vital organs are less common and drastically reduce chances of survival during the larval period (Loeffler et al., 2001).

In this note, we report a case of anophthalmia in *Odontophrynus carvalhoi* Savage and Cei, 1965, an anuran species found in rainforests of eastern Brazil. Observations took place at Parque das Trilhas, municipality of Guaramiranga, state of Ceará, northeast Brazil (04º16'S, 38º56'W; 880 m asl). The area comprised 70 ha of conserved tropical rainforest that was continuous with surrounding 1,584,836 ha of forest within an area of environment protection under the State's responsibility. On 10 April 2009 at 11:15 an *O. carvalhoi* (SVL 64.18 mm; 34 g) was found dead near a small stream inside a conserved forested area. Upon inspection we found that the anuran's left eye was missing. There was a lack of scars or sign of injury, suggesting this was a case of

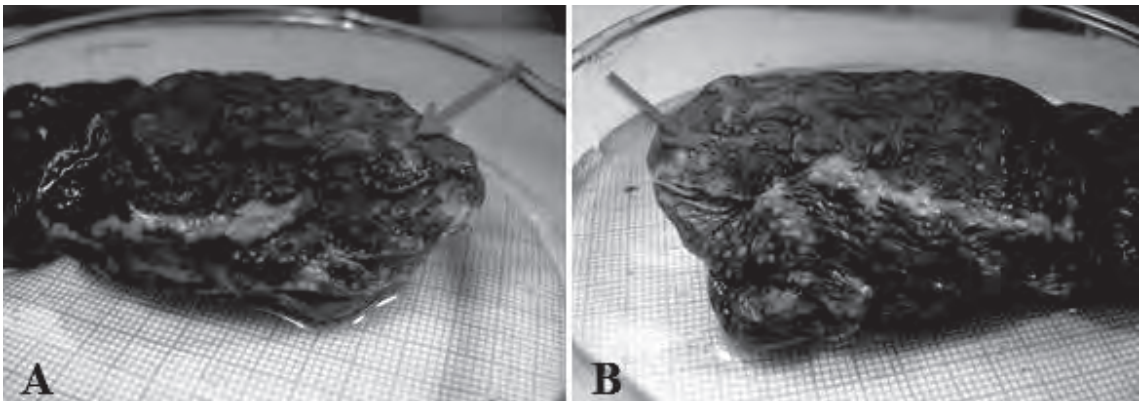

Figure 1. *Odontophrynus carvalhoi* with anophthalmia found in Guaramiranga, Ceará. A – Right side with arrow pointing to closed eye; B – Left side with arrow pointing to where eye should be.

anophthalmia (*sensu* Meteyer, 2000) (Fig. 1).

McCallum & Trauth (2003) after analyzing 1,464 *Acris crepitans*, found that 104 of them presented malformations, with only 1% of these being anophthalmia. A similar proportion of malformed individuals with missing eyes was reported by Quellet et al. (1997) in a study of four anuran species from Canada. Cases of anophthalmia in anurans have been attributed to the presence of pesticides, UV-light and viruses (Quellet et al., 1997; Blaustein & Johnson, 2003; Burton et al., 2008). The area where the observation took place has been regularly visited by the authors (LBMB and FAA) and from 500 individuals (11 species), only two others (*Leptodactylus* gr. *pustulatus* and *L. vastus*) presented some type of malformation. Both these were limb related. Among total numbers of *O. carvalhoi* found this single case of anophthalmia represents 1.85% of all individuals (1/54). This low incidence of deformities indicates that the case is probably natural (Blaustein & Johnson, 2003).

To the best of our knowledge this is the first report of malformation in the genus *Odontophrynus*. Monitoring cases of malformation may help better understand the dynamics of abnormalities in the species and could be useful in the evaluation of the environmental health in the area. It is also important to monitor new incidents of malformation as some cases can expand as in the United States, where some 54 species have been registered with malformations in 44 states. Some of these areas have as many as as 80% of the individuals with some form of abnormality (Blaustein & Johnson, 2003; McCallum & Trauth, 2003; Schoff et al., 2003). We hope that this report will encourage other researchers working in the region and in other developing countries to monitor and publish such findings. This would assist mapping of occurrences of malformations in amphibians globally.

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RHINELLA JIMI (cururu toad): PREDATION. Several studies show that anurans help maintain energy flow in biological systems by being prey items (Ranvestel et al., 2004; Toledo, 2005; Altig et al., 2007; Toledo et al., 2007). *Rhinella jimi* (Stevaux, 2002) is a Bufonid distributed throughout Atlantic Forest and Caatinga in northeast Brazil (Frost, 2010). It belongs to the *Rhinella marina* group, distributed throughout south America (Maciel et al., 2010). The toads are easily identified because of broad parotoid glands used in defence (Wells, 2007). Ingestion of its bufotoxin may cause tremors, paralysis, convulsion and even death in predators (Fearn, 2003; Sonne et al., 2008; Jared et al., 2009).

Athene cunicularia (Molina, 1782) is a burrowing owl of the Strigidae and is widely distributed throughout the Americas (Korfanta et al., 2005; Salazar, 2007). Its diet includes small vertebrates and invertebrates (Tyler, 1983; Martins & Egler, 1990; Wiley, 1998; York et al., 2002; Motta-Júnior, 2006).

On 23 September 2010, we witnessed a predation attempt on a *R. jimi* by *A. cunicularia*. The observations occurred at Emendadas Village, Poço Redondo, Sergipe State, northeastern Brazil (09º48'34.1''S, 037º41'20.4''W; 198 m asl), Caatinga biome. We witnessed three attacks between 19:00 and 22:00. On two occasions, the bird flew to other perches carrying the anurans in their claws. On one occasion at 20:20 the owl ran away across the ground and left the *R. jimi* (SVL 115.09 mm). The attacks were performed mostly with the claws followed by pecks to the dorsal region and head. The toad was collected and housed in the Universidade Federal da Paraíba (CHUFPB 00105).

Occurences of predation on *Rhinella jimi* are scarce in literature and this rarity of documented predation possibly reflects its noxious toxicity to predators (Jared et al., 2009). Despite this there is a range of animals such as snakes, birds, mammals and invertebrates, including species of the *R. marina* group (Toledo, 2005; Toledo et al., 2007) that do consume toads containing bufotoxin.

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OXYBELIS FULGIDUS (green vine snake). DIET. *Oxybelis fulgidus* is an arboreal and diurnal snake with a distribution ranging from southern Mexico to northeastern Argentina. On 18 May 2011 at 15:26 one of us (ERV) observed an adult *O. fulgidus* capture and feed on a clay-coloured thrush *Turdus grayi*. The snake was perched at a height of 3 m in a *Ficus colubrinae* tree outside the offices of the pre-montane tropical forest of Tirimbina Biological Reserve, Heredia Province, Costa Rica. Shortly after (ERV) first noticed the snake, an adult *T. grayi* landed on the tree less than a metre away from the snake and within 20 seconds the snake

successfully struck and captured it, whereupon the bird remained alive for approximately ten minutes (Fig. 1). The snake had difficulty ingesting the bird since the bird's shoulder width was wide relative to the snakes gape, however, the snake successfully consumed the bird and the entire feeding event lasted 2 hours and 45 minnutes (Fig. 2). After fully consuming the bird, the snake descended from the tree and moved away. *O. fulgidus* is known to prey upon a wide variety of lizards and a variety of birds (Scartozzoni et al., 2009) but this observation marks the first documentation of *O. fulgidus* feeding on *T. grayi*. We thank Tirimbina Biological Reserve.

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Figure 2. *Oxybelis fulgidus* consuming *Turdus grayi*, Tirumbina, Costa Rica.

Figure 1. *Oxybelis fulgidus* capturing *Turdus grayi*, Tirumbina, Costa Rica.