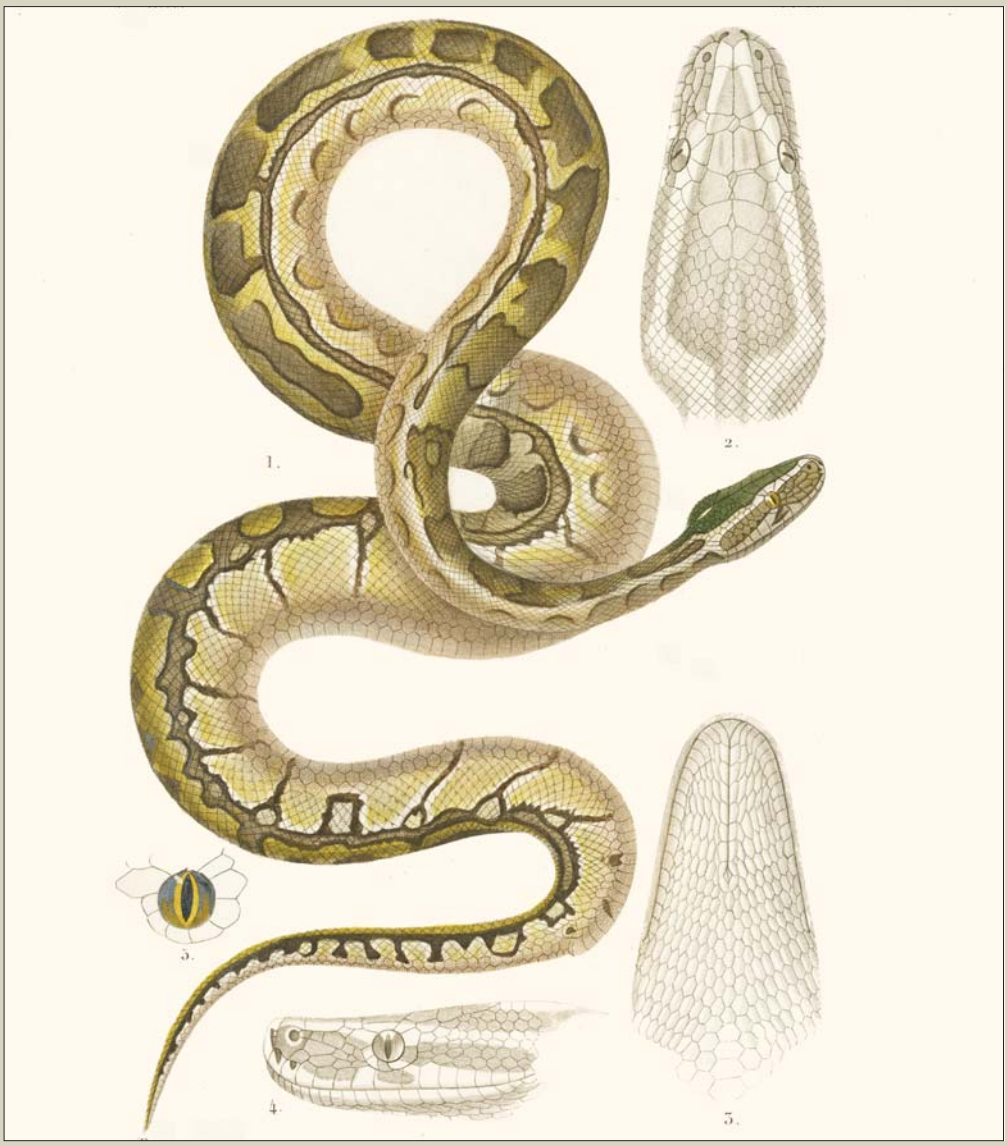
The HERPETOLOGICAL BULLETIN

Number 93 – Autumn 2005



PUBLISHED BY THE

BRITISH HERPETOLOGICAL SOCIETY

THE HERPETOLOGICAL BULLETIN

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ISSN 1473-0928

Printed by Metloc Printers Limited, Old Station Road, Loughton, Essex.

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All submissions and correspondence arising from the Bulletin should be sent to the Editor, Peter Stafford, c/o Dept. of Botany, The Natural History Museum, Cromwell Road, London, SW7 5BD. *E-mail: herpbulletin@thebhs.org*

Front cover illustration. *Python sebae*. From an original hand coloured lithograph in Duméril, A.M.C., Bibron, G. and Duméril, A. (1854). *Erpétologie Générale ou Histoire Naturelle complète des Reptiles*, plate 61. Reproduction courtesy of the Natural History Museum, London.

EDITORIAL

Leigh Gillett

Members who knew Leigh and have not already been informed will be saddened to hear of his death, on 6th October, following a lengthy illness. He was 47. An active and highly regarded member of the BHS Council, Leigh had many friends in the Society and his presence at meetings will be greatly missed. Over the years he provided much needed editorial assistance in preparing manuscripts for publication, both in the *Journal* and *Bulletin* (see *Herpetological Bulletin* no. 80, Summer 2002, page 2), and contributed to the running of the Society in many other ways. Details will follow in a future issue of *Herpetological Bulletin* of how his memory and dedicated service to the Society will be honoured.

Letter to the Editor

Dear Sir,

I have recently been given a copy of the Obituary to Michael Lambert in the BHS Bulletin and I felt that I should like to add my tribute to Michael both personally and on behalf of fellow members of the British Chelonia Group who knew him.

I first met Michael in about 1977 having been introduced by the late Oliphant Jackson and when I was a member of the BHS. Michael was very interested in studying the captive breeding of tortoises in the UK and came to our Tortoise Convention at my home every August to weigh, measure, and record progress on hatchlings to assess growth rate and shell formation. I have a film of him with calipers and scales hard at work! I started to hold these annual meetings in 1976. Having successfully bred a number of *T. graeca* in the early 60's I decided to contact other people who had also had a similar experience in order that we might meet and help each other, as breeding in those early days was something of a rarity. That first meeting just four families attended with two or three hatchlings each. Twenty years later over one hundred hatchlings of different species were brought by about thirty families.

Michael wrote a paper with his findings entitled 'Growth survivorship of some Mediterranean tortoises home-bred in southern England compared with wild'. He presented this paper at an international conference in Prague and was kind and generous enough to add the names of Peter Collings and myself as having helped with his work.

It was a privilege to have known Michael – a courteous gentleman, keen herpetologist, and true friend.

Mrs Pat Evans (address supplied).

Correction

A correction has been notified by the author of the following article published in *Herpetol. Bull*. 92 (Summer 2005): Preliminary notes on the amphibian fauna of Tanjung Puting National Park, central Kalimantan, Indonesian Borneo.

Page 2; instead of *Fejervarya limnocharis*:

Limnonectes paramacrodon
Lesser swamp frog (Figure 2)
(20/10/04) 1 male, 62 mm SVL, 1 female, 49 mm SVL, 1 juvenile, 26 mm SVL. Found in mud and grass areas on the bank of the Sekonyer kanan river, next to a jetty that marks the entrance to Camp Leakey. The male, larger than the female in this species, was distinguished via a black band across the throat. Other individuals, some larger than those caught, were seen. This species, along with *L. malesianus*, forms part of the monophyletic Limnonectes clade of Southeast Asian fanged frogs. Its relations within the group are unclear. Identification of *L. paramacrodon* was confirmed by Prof. Djoko Iskandar (Bandung, Indonesia).

The reptiles of the Southern Mikea Forest, Madagascar

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ABSTRACT – 59 species of reptiles (37 lizards, 19 snakes and 3 chelonians) are recorded from a site located on the eastern shore of Lake Ranobe in the Southern Mikea forest of southwest Madagascar. This study suggests that this site is particularly diverse as it contains 17% of the 346 species known from Madagascar. Importantly, 92% of these species are endemic to Madagascar and 14% are limited to the dry forests of southwest Madagascar. Five species (*Furcifer labordi*, *Phelsuma standingi*, *Acrantophis dumerili*, *Sanzinia madagascariensis* and *Pyxis arachnoides*) are listed as vulnerable on the 2005 IUCN Red List of Threatened Species. Located near to the city of Tuléar, the area is subject to numerous human-induced environmental problems (e.g. charcoal production, agricultural clearance, zebu grazing, the illegal collection of species) and therefore should be considered a high conservation priority.

THE herpetofauna of Madagascar is extremely species rich and diverse with a high level of endemism (Glaw & Vences, 1994). Despite this fact, detailed surveys focusing on Malagasy reptiles are relatively few in number when compared to other geographical regions. As part of the Frontier-Madagascar Forest Research Programme* the herpetofauna of the Southern Mikea forest was surveyed at a number of sites. This paper intends to provide a comprehensive and accurate survey of a site located on the South Eastern shore of Lake Ranobe in the Southern Mikea forest of southwest Madagascar.

The first intensive herpetological survey work focusing on this site was carried out by Raxworthy (1995) as part of a broader survey of the Toliara region with the intention of 'improving the status of the current research data and potentially facilitating the establishment of new protected areas'. Raxworthy spent a total of 27 days at several camps in various habitat types at the end of the wet season and encountered a total of 66 species of reptiles.

*For a full report of Frontier-Madagascar's Southern Mikea work, see Frontier-Madagascar (in prep.), *The Southern Mikea. A Biodiversity Survey*. Frontier-Madagascar Environmental Research Report XX. Society for Environmental Exploration, UK, and the Institute for Marine Sciences, University of Toliara, Madagascar).

It is the intention of this paper to both highlight and contribute to the existing literature regarding the composition, geographical, ecological and seasonal distribution of the numerous species found in the area surrounding Lake Ranobe. We highlight the herpetological importance of this area and reinforce the need for its inclusion as part of the proposed national park planned for the Mikea Forest eco-region (WWF 2003).

MATERIALS AND METHODS

Fieldwork was carried out by Frontier staff and volunteers over a period of approximately one year with specimens stored at the University of Tuléar and the University of Antananarivo. For identification, specimens were sent to the American Museum of Natural History, New York. Frontier-Madagascar is an arm of the Society for Environmental Exploration, a UK based non-governmental organisation carrying out scientific and socio-economic survey work with a view to making informed conservation decisions. Fieldwork consisted of four sampling periods each lasting approximately nine weeks in length (two wet and two dry seasons) and can be summarized as follows: Wet 1: 14th January-14th March 2003; Dry 1: 13th April-4th June 2003; Wet 2: 13th October-11th December 2003; Dry 2: 4th July-30th August 2004.

Pitfall trapping and active searches were utilised to survey the reptile species. Pitfall traps were dug into the ground at 10 m intervals with drift fences along a transect line measuring 100 m. Daily searches lasting approximately one hour in length were carried out. Investigators searched under stones, amongst dead wood, and on tree trunks both day and night in order to gauge diversity of the full complement of species.

DESCRIPTION OF THE RANOBE AREA

All four periods concentrated on an area adjacent to Ranobe village at a base camp situated on the South Eastern edge of the lake at 23°02'S 043°36'E. Lake Ranobe is a freshwater lake measuring 3 km North-South and 1.5 km East-West at its widest point. The lake is situated approximately 30 km North of Tuléar, the administrative capital of the Toliara region in southwest Madagascar.

Physiography The study site is part of the Southern Mikea, a region of southwest Madagascar that is defined by four major geographic features: to the South the Fiherenana River; to the West the Mozambique Channel; to the North the Manombo River and to the East the Mikoboka Plateau, a tertiary calcareous limestone formation (Du Puy & Moat, 1996). The region is reasonably low lying and flat.

Climate

The Southern Mikea regon is located in one of the hottest and most arid parts of Madagascar. Rainfall averages 700 mm with the majority of rain falling between November and March (Goodman & Benstead, 2003). The average annual maximum temperature ranges between 30°C and 33°C with an average minimum temperature ranging between 15°C and 21°C (Goodman & Benstead, 2003).

Vegetation Types

The sandy plains immediately surrounding the study site at Ranobe give rise to two major types of vegetation that can be found throughout the Southern Mikea region: dry spiny forest and gallery forest. In addition to these natural vegetation types there is also a proportion of anthropogenically disturbed habitat.

Spiny Forest

This vegetation type is typified by a dense xerophytic assemblage of succulent and spinescent plants, reaching a maximum height of 8 m (Seddon *et. al*., 2000). The tree flora includes the endemic family Didiereaceae in addition to coralliform euphorbias and baobabs (e.g. *Andansonia fony*). Included in the lower strata are a wide variety of plants belonging to both the Euphorbiaceae and Leguminoseae families. The level of endemism to Madagascar has been estimated at 61.4% (Phillipson, 1996).

Gallery Forest

Found near to rivers and lakes, this vegetation is more verdant than the spiny forest with a far higher standing biomass. The canopy is dominated by tamarind trees, *Tamarindus indicus*, reaching up to 35 m with an understorey that includes a wide variety of broadleaf trees, epiphytes and lianas. In contrast to the Spiny Forest a moist leaf litter layer is typically present and the level of endemism to Madagascar is much lower at 28.3% (Phillipson, 1996).

Anthropogenically disturbed areas

Lake Ranobe is surrounded by several villages and a swathe of cultivated land running from the foot of the Mikoboka plateau. As a result substantial areas of both Spiny and Gallery Forest have been altered creating a distinct habitat characterized by cultivated and cleared village areas.

Microhabitats

Many microhabitats exist for the species found at this location. The vegetation offers a wide variety of arboreal niches that can be utilized by a large number of different species, such as those belonging to the genus *Furcifer* and *Langaha*. The accompanying shrub layer also provides shelter for terrestrial species such as *Chalarodon madagascariensis*. A layer of leaf litter is present in the gallery forest in which fossorial species such as *Amphiglossus igneocaudatus* occur and the lake provides a large body of water in which chelonians such as *Pelusios castanoides* can be found.

Composition

A total of 59 different species were encountered during this study (Table 1 and Table 2) and it is

Above: *Sanzinia madagascariensis*. Photograph © Neil D'Cruze. Below: *Furcifer labordi*. © Frontier staff.

Species	Primary Habitat	Ecological Distribution	Relative Abundance	Season			
				Wet 1	Dry 1	Wet 2	Dry 2
Chamaeleonidae							
Furcifer antimena	GF	AB	R	+		+	
*Furcifer labordi**	GF	AB	C	+		+	
Furcifer verrucosus	GF	AB	A	+	+	+	
Gekkonidae							
Blaesodactylus sakalava	GF, SF	AB	I	+	+	+	+
Geckolepis typica	GF, SF	AB	I	+	+	+	+
Hemidactylus frenatus	GF	AB	R	+		+	
Hemidactylus mabouia	GF	AB	R		+	+	
Hemidactylus mercatorius	GF	AB	I		+	+	
Lygodactylus tolampyae	GF	AB	I	+	+	+	
Lygodactylus tuberosus	GF	AB	C		+	+	+
Lygodactylus verticillatus	GF	AB	R			+	+
Paroedura androyensis	GF	AB	R			+	+
Paroedura bastardi	SF	AB, T	C	+			+
Paroedura picta	GF	AB, T	R	+	+	+	+
Paroedura vahiny	GF, SF	AB	I	+			
Phelsuma mutabilis	SF	AB	R	+	+	+	+
*Phelsuma standingi**	A, SF	T	R		+		+
Phyllodactylus brevipes	SF	AB	I		+	+	
Scincidae							
Amphiglossus andranovahensis	SF	T	C				+
Amphiglossus igneocaudatus	SF	T	R	+	+	+	+
Amphiglossus intermedius	SF	T	I				+
Amphiglossus ornaticeps	GF	T	C	+	+	+	
Mabuya aureopunctata	SF	T	R	+	+	+	+
Mabuya dumasi	SF	T	A			+	
Mabuya elegans	A, GF	T	I	+	+	+	+
Mabuya gravenhorstii	SF	T	I	+	+	+	
Mabuya vato	SF, GF	T	I	+	+		
Pygomeles braconnieri	SF	T	R	+	+	+	+
Voeltzkowia lineata	SF	T	I	+	+		+
Voeltzkowia petiti	GF, SF	T	R			+	+
Voeltzkowia rubrocaudata	SF	T	C			+	+
Gerrhosauridae							
Tracheloptychus madagascariensis	SF	T	C	+	+	+	+
Tracheloptychus petersi	GF	T	R		+	+	+
Zonosaurus karsteni	SF, GF	T	C			+	+
Zonosaurus quadrilineatus	SF	T	A	+	+	+	
Iguanidae							
Chalarodon madagascariensis	SF, GF	T	C	+	+	+	+
Oplurus cyclurus	SF	T	I	+	+	+	+

Table 1. Distribution of the lizard species found in the Ranobe area. Abbreviations include: Primary Habitat- GF = gallery forest, SF = spiny forest, A = anthropogenically disturbed areas; Ecological Distribution- AB = arboreal, T = terrestrial; Relative Abundance- A = abundant, C = common, I = infrequent, R = rare; Seasonal Data- + = present. *Listed as Vulnerable in the 2005 IUCN Red List of Threatened Species.

Species	Primary Habitat	Ecological Distribution	Relative Abundance	Season			
				Wet 1	Dry 1	Wet 2	Dry 2
Boidae							
*Acrantophis dumerili**	GF	T	I	+		+	
*Sanzinia madagascariensis**	GF	AB, T	R	+	+		
Colubridae							
Dromicodryas bernieri	SF, GF, A	T	I	+	+	+	
Heteroliodon occipitalis	GF	T	R	+	+	+	
Ithycyphus oursi	GF	AB	I	+	+	+	
Langaha alluaudi	SF	AB	R		+		+
Langaha madagascariensis	GF	AB	I		+		
Leioheterodon geayi	SF	T	I	+		+	
Leioheterodon modestus	GF	T	C	+	+	+	
Liophidium chabaudi	SF	T	I	+	+	+	
Liophidium torquatum	SF	T	R			+	+
Liophidium vaillanti	SF	T	I	+		+	
Lycodryas pseudogranuliceps	SF	T	R	+	+		+
Madagascarophis colubrinus	GF	T	I	+		+	+
Madagascarophis meridionalis	GF	T	I	+	+		+
Madagascarophis ocellatus	SF, GF, A	T	R		+		
Mimophis mahfalensis	SF	T	C	+	+	+	+
Typhlopidae							
Typhlops arenarius	SF	T	I	+		+	
Typhlops decorsei	GF	T	R	+		+	
Testudinidae							
*Pyxis arachnoides**	GF, SF	T	R	+		+	
Pelomedusidae							
Pelomedusa subrufa	GF	A	R	+			
Pelusios castanoides	GF	A	I			+	+

Table 2. Distribution of the snake and chelonian species found in the Ranobe area. Abbreviations include: Primary Habitat- GF = gallery forest, SF = spiny forest, A = anthropogenically disturbed areas; Ecological Distribution- AB = arboreal, T = terrestrial; Relative Abundance- A = abundant, C = common, I = infrequent, R = rare; Seasonal Data- + = present. *Listed as Vulnerable in the 2005 IUCN Red List of Threatened Species.

now known that the reptile fauna of the Ranobe area consists of at least 37 species of lizard (62.7%), 19 snakes (32.2%) and 3 chelonians (5.1%).

Primary habitat

With regards to primary habitat, 24 (40.7%) species were found solely in Gallery Forest and 23 (39%) were found to occur only in Spiny Forest (Tables 1 and 2). No species were found to occur solely in anthropogenically disturbed areas. Eight species (13.6%) were encountered in both Gallery and Spiny Forest, two (3.4%) in both Gallery Forest and Anthropogenically disturbed areas, one (1.7%) in both Spiny Forest and Anthropogenically disturbed areas and two (3.4%) in all three of the primary habitats.

Ecological Distribution

In terms of vertical positioning within the primary habitat, 36 species (61%) were usually found only in terrestrial situations, 19 (32.2%) were typically found only in arboreal situations, and 3 (5.1%) were found in both (Table 1 and Table 2). Two of the chelonians (3.4%) were only found in aquatic situations.

Relative abundance

The 59 species recorded from the area are classified using a system similar to that used by Wilson & McCranie (2004) and can be summarized as follows: Abundant (large numbers encountered on a

regular basis), common (encountered on a regular basis), infrequent (unpredictable, few individuals seen), or rare (rarely seen). These classifications are based on data collected over all four study periods. Three species (5.1%) were abundant, 11 (18.6%) were common, 24 (40.7%) were infrequent and 22 (37.3%) were rare (Table 1 and 2).

Seasonal Variation

As this study was carried out over two wet and dry seasons we are able to present data detailing the seasonal occurrence of species. Of the species encountered, 12 (20.3%) were present during all four of the sample periods. Nine (15.3%) were found only during wet seasons and two (3.4%) were found only during dry seasons (Table 1 and 2).

IMPORTANCE OF THE AREA AS A HERPETOFAUNAL REFUGE

In a similar manner to Raxworthy (1995) and Seddon *et al*. (2000), the data collected in this study can be used to assess the conservation issues regarding the herpetological fauna present in the area surrounding Lake Ranobe in the Southern Mikea Forest. This paper has the additional advantage of intensively documenting the reptile fauna of one specific and previously only briefly studied site, in both wet and dry seasons.

The reptile rich fauna of the Mikea forest is already recognised as one of the more diverse areas of Madagascar, with species numbers comparable to those typical of the Western forests (Seddon *et. al*., 2000). This study shows that the area around Lake Ranobe is strikingly diverse as a total of 59 species were encountered, which is comparable to the total of 66 species previously recorded by Raxworthy (1995) in the whole of the Toliara region. The majority of these species are endemic to Madagascar and eight (*Furcifer antimena*, *Lygodactylus verticillatus*, *Phelsuma standingi*, *Pygomeles braconieri*, *Voeltzkowia petiti*, *Tracheloptychus petersi*, *Zonosaurus quadrilineatus* and *Liophidium chabaudi*) are endemic to the dry forests of southwest Madagascar. Five species encountered during the course of this study (*Furcifer labordi*, *Phelsuma standingi*, *Acrantophis dumerili*, *Sanzinia madagascariensis* and *Pyxis arachnoides*) are listed as vulnerable on the 2005 IUCN Red List of Threatened Species. On a broader scale, the results of this study indicate that the reptile fauna of this area (representing 0.004% of the total surface area of Madagascar) comprises 17% of the 346 species (Goodman & Benstead, 2003) known from Madagascar and reinforces the notion that the southwest ecoregion is of great herpetological significance.

As has already been stated the Southern Mikea is an area close to the city of Tuléar and thus is subject to numerous human-caused environmental problems. The ever increasing major threats to the integrity of the reptile fauna of this area include charcoal production (during which sites are either selectively logged or cleared of all trees), agricultural clearance, Zebu grazing and the illegal collection of species for the pet trade (e.g. *Phelsuma standingi* and *Pyxis arachnoides*) (Seddon *et. al*., 2000; Raxworthy & Nussbaum, 2001). We reinforce the view that the Southern Mikea should be considered as a high conservation priority (Raxworthy, 1995; Domergue, 1983; Nicoll & Langrand, 1989; WCMC, 1991 and ZICOMA 1999) and support its inclusion as part of the proposed national park planned for the Mikea Forest eco-region (WWF 2003).

ACKNOWLEDGEMENTS

We are grateful to the Ministére des Eaux et Forets for permitting us to carry out our research and to the Universities of Toliara and Antananarivo, to C. D. Hallam, Dr Chris J. Raxworthy, Achille Raselimanana and all the Frontier staff & volunteers who worked in the Ranobe area whose efforts greatly enhanced this study. We would also like to thank Dr. Alan Channing and Dr. John Measey for their comments made on an earlier version of the manuscript.

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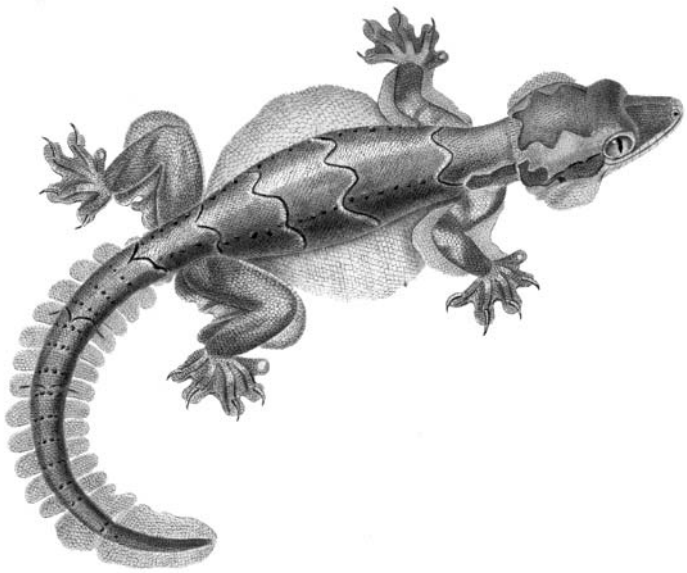

Platydactylus homalocephalus (= *Ptychozoon kuhli*). From an original lithograph in Duméril, A.M.C., Bibron, G. and Duméril, A. (1854). *Erpétologie Générale ou Histoire Naturelle complète des Reptiles*, plate 29. Reproduction courtesy of the Natural History Museum, London.

A report of hepatic granuloma in free-living Brown anoles (*Anolis sagrei*) in Taiwan: two cases

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ABSTRACT – Brown anoles (*Anolis sagrei*) were collected for stomach-content analysis from an area surrounding a plant nursery (23º25'51"N, 120º28'30"E) in Santzepu, Sheishan District, Chia-Yi County. Tissue sampling revealed liver lesions, which were later identified as hepatic granulomas, in two individuals. This appears to be the first record of hepatic granuloma in *A. sagrei* in Taiwan.

A granuloma is a mass or nodule of chronically inflamed tissue, with granulations, that is usually associated with an infection (*Merriam Webster's Medical Dictionary*, 1995), and often resembles true neoplasms (Jacobson, 1981). These lesions are usually due to infections by bacteria (e.g., Sohn *et al*., 2003), fungi (e.g., Juopperi *et al*., 2002; Speare *et al*., 1997; Silva, 1985) or parasites (e.g., Junker *et al*., 1999; Weiss *et al*., 1987; Silva *et al*., 2000; Fogaca *et al*., 2000; Goldberg & Bursey, 1988), and may occur in almost any organ system (Jacobson, 1981). Viral, fungal, bacterial, protozoan and metazoan parasites can induce hepatitis in reptiles, a fairly common occurrence in captive individuals, and the formation of focal or multifocal granulomata is a typical chronic reaction to such infections (Frye, 1991).

The Brown anole (*Anolis sagrei*), also known as *Norops sagrei* (Köhler, 2000; Lee, 2000), is native to the Bahamas and Cuba (Campbell, 1996) and certian islands such as Swan Island (Rodriguez Schettino, 1999), Cayman Brac, and Little Cayman (Losos *et al*., 1993). An introduced population has also been reported from Taiwan (Norval *et al*., 2002) as well as some other localities, which have been reported elsewhere (Calderon *et al.,* 2003; Campbell, 2003; Conant & Collins, 1991; Goldberg & Bursey, 2000; Greene *et al*. 2002; McAllister *et al*., 2003; Landwer *et al*., 1995; Rodriguez Schettino, 1999; Roughgarden, 1995; Schwartz & Henderson, 1991; Steven & Lance, 1994), and these papers should be consulted for details. At present the population in Taiwan is being studied and here what appears to be the first report of hepatic granuloma in *A. sagrei* from this area will be discussed.

MATERIALS AND METHODS

Between the 10th of January 2002 and 28th of March 2003 a sample of about 30 Brown anoles (*Anolis sagrei*), consisting of males and females, was collected monthly for a stomach content study on these exotic lizards. The lizards were captured by hand or with a fine-meshed fishing scoop-net. At the point of capture, the GPS location was recorded with a GARMINI 2 PLUS handheld reader, the specimen was allocated a field number, and the date and time was recorded. Upon returning from the study area, each lizard was killed with ether; the snout-vent length (SVL) and tail length (TL) were measured to the nearest mm; the tail was scored as complete or broken; the specimen was weighed to the nearest 0.1g with a YC e68 digital scale and dissected by making a

mid-ventral incision. The stomach was removed for stomach content analysis, and from March 2002, to the end of the study period, the abdominal fat and the liver, as well as the right testis of the males, were also removed as part of a reproductive cycle study.

On the 18th of January 2002 (GN0020 - case 1) and on the 12th of December 2002 (GN0397 - case 2) lizards were collected that had liver lesions. The livers of these two individuals were submitted to the pathology laboratory of Chia-Yi Christian Hospital for examination. In addition to the livers, the brain, heart, tail, stomach, left testis, abdominal fat, pancreas and lungs of GN0020, as well as the pancreas and left lung of GN0397, were removed and submitted for examination. All the organs and tissue samples were fixed in 10% formalin, embedded in wax, sectioned at 5µ and stained with Ehrlich's haematoxylin and eosin (HE), Periodic-Acid-Schiff (PAS) and Ziehl-Nielsen (ZN) acid-fast stains. In addition to that, samples of the liver and pancreas of GN0397 were stained with Mayer's Mucicarmine and Grocott's Methenamine Silver Nitrate (GMS) stains.

RESULTS

Case 1: This male was collected at 23º25'44"N, 120º28'54"E, and had a SVL of 59 mm, TL of 45 mm, and a mass of 5g. The average SVL and mass of the other males collected in January 2001 were 51.87 mm and 3.71g respectively. As GN0020 experienced tail-loss its TL could not be compared with that of the other males that had complete tails, and because this individual was not part of the reproductive cycle study that was initiated in March 2001, its abdominal fat and liver were not weighed before tissue sampling and can thus not be reported on. The seminiferous tubules of the left testis contained spermatogonia, primary spermatocytes, secondary spermatocytes, and transforming spermatids with few spermatozoa.

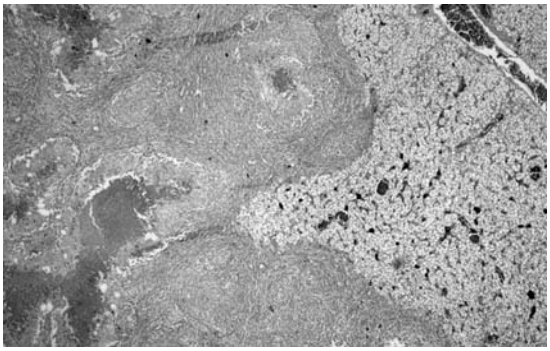
The stomach of the lizard contained the following: Hymenoptera (Apidae) x1, Coleoptera x1, Hemiptera (Lygaeidae) x2, Diptera (Dixidae) x1 and Mollusca x1.

The whitish nodule was focal on the ventral side of the liver, and slightly raised (Fig. 1). Histological examination of the liver nodule revealed a granulomatous reaction (Fig. 2), composed of pleomorphic histiocytes, with occasional central necrosis and haemorrhages (Fig. 3). In the PAS stained sections, fungal spores and hyphae were observed in the granuloma, morphologically similar to those of an *Aspergillus* species (Fig. 4). No acid-fast bacillus was observed in the ZN stained sections.

Case 2: This female was collected at 23º25'47"N, 120º28'53"E, and had a SVL, TL, mass, abdominal fat weight (AFW) and liver weight (LW) of 39 mm, 74 mm, 1.7g, 0.09g and 0.16g respectively. The average SVL, TL (n=5, excluding the individuals that suffered tail-loss), mass, AFW and LW of the other females collected in December 2001 were 39.17 mm, 73.4 mm, 1.64g, 0.09g and 0.11g respectively. In order to minimize variances due to different SVLs, the LW

Figure 1. The nodule on the surface of the liver of the *A. sagrei* male, as observed during dissection of this specimen.

Figure 2. A section of the liver, with the nodule on the left of the image and normal tissue on the right (40 x magnification, HE stain).



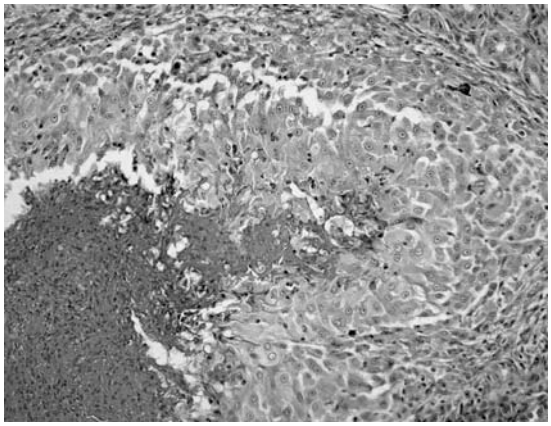


Figure 3. An enlarged section of the liver nodule (200 x magnification, HE stain).

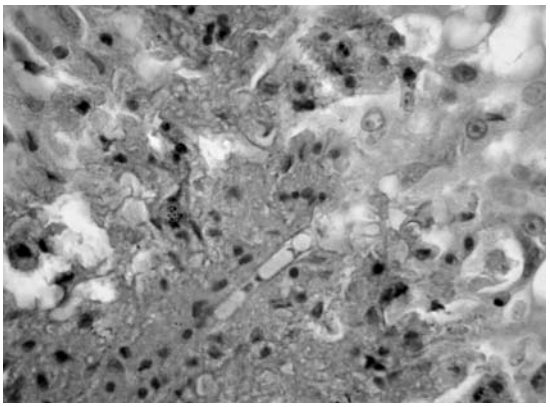


Figure 4. Fungal hyphae are visible in the centre lower portion of the image (400 x magnification, HE stain).

Figure 5. The dorsal (top) and ventral (bottom) views of the liver of the *A. sagrei* female, as observed during dissection of this specimen.

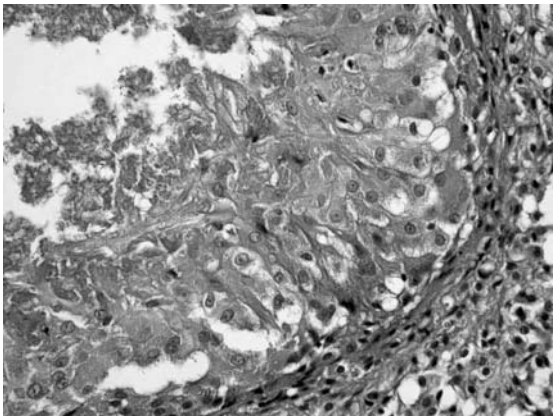


Figure 6. A section of the nodule of the *A. sagrei* female's liver, in which necrosis is visible in the top left hand corner of the image (400 x magnification, HE stain).

was also expressed as a proportionate liver weight (PLW = LW/SVL X 100); this female had a PLW of 0.41% while the monthly mean was 0.27%.

The stomach of the lizard contained the following: Coleoptera x1 and Lepidoptera (Noctuidae) x1. This female had one enlarged follicle and a contralaterally located oviducal egg.

The nodule was diffused, creamish in colour and not raised as in case 1 (Fig. 5). Histological examination of the liver nodule revealed the same chronic inflammatory pattern as in the granuloma described in case 1, but with central necrosis (Fig. 6). However, neither fungal hyphae or spores, nor acid-fast bacilli could be identified in the PAS and ZN stains.

DISCUSSION

Except for the presence of melanomacrophages, which are absent in avian and mammalian livers, the reptilian liver is similar in function and structure to that of other vertebrates, and the liver and biliary tree are sites of diseases similar to those found in mammals (Schaffner, 1998). The *A. sagrei* described herein were part of other studies, necessitating that the organs be treated as required for those investigations (i.e. fixation), and therefore culture of fungi and bacteria was not possible.

Reports of granulomata and abscesses associated with micro-organisms in reptiles are not uncommon (Huchzermeyer & Cooper, 2000). An

early account was by Reichenbach-Klinke & Elkan (1965) who reported a fungal infection of the liver of a Two-banded chameleon (*Chamaeleo bitaeniatus*). They stated that the animal was euthanised as it was not able to maintain a hold on branches. Dissection of this animal's liver revealed that it contained foci of necrotic material, surrounded by granulation tissue, which in turn was surrounded by fibrous tissue. A PAS stain showed the granulation zone to be heavily permeated by a yeast-like fungus – most likely *Candida albicans* (Reichenbach-Klinke & Elkan, 1965). In both the cases described in the present study, the *A. sagrei* appeared to be in good health when they were collected and did not seem particularly easier to capture. That both *A. sagrei* were probably, as active as the other brown anoles in the area is supported by the types of prey items in their stomachs; prey such as Hymenoptera and Diptera are highly mobile and generally not easy to capture.

In addition to the various functions of the liver, such as the part it plays in carbohydrate, protein, and hormone metabolism, the reptilian liver plays a vital part in fat metabolism, during which stored abdominal fat is used to provide material for vitellogenesis during the reproductive cycle of the females (Schaffner, 1998; Zug *et al.,* 2001). The fact that both the *A. sagrei* described here were in a reproducing state, with stored abdominal fat, is another indication that these lizards were in a relatively good condition.

Although detailed laboratory investigations of the lesions were not feasible, it is worth noting that this appears to be the first report of hepatic granulomata in free-living *A. sagrei* from Taiwan, and indicates that hepatic granulomata occur naturally in this population.

A plea to readers: The occurrence of pathological conditions in free-living reptiles and amphibians is poorly understood, and the majority of published cases of these conditions are from captive animals. We would thus like to encourage researchers – even if it is not part of the in study – to investigate lesions, or at least to submit them for examination, and to report the findings.

ACKNOWLDEGEMENTS

Special thanks are extended to Mei-Hsiu Cheng and the other laboratory technicians of the Chia-Yi Christian Hospital's cytology laboratory for preparing the microscope slides. Also, the kind assistance of Dr. Yuan-Chang Dai and Dr. Jiann-Der Wu with the pathology is acknowledged. The authors would also like to thank Dr. Rod Suepaul for his comments and for reviewing this paper.

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Incidence of *Lacerta dugesii* Milne-Edwards, 1829 (Sauria, Lacertidae) in the diet of kestrels (*Falco tinnunculus canariensis* Koenig, 1889; Aves, Falconidae) in a semiarid zone of Madeira

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ABSTRACT – This work is intended as a preliminary study on the incidence of the Madeiran lizard *Lacerta dugesii* in the diet of the Kestrel, *Falco tinnunculus canariensis*, an endemic subspecies of Madeira and Canary Islands. A total of 120 pellets of this bird of prey, collected in the easternmost part of Madeira (Caniçal) during July and August of 1993 and 1994, were analysed. The data clearly shows the importance of lizards as a food item in the kestrel's diet.

THE kestrel *Falco tinnunculus canariensis*, is probably the most abundant bird of prey of the Madeira archipelago (Bannerman & Bannerman, 1965; Câmara, 1997), in the Canary Islands (Moreno, 1988). It inhabits almost all kinds of habitats, from sea level to high, mountainous areas. Kestrels are predominantly small-mammal predators in Northern Europe, also feeding on a wide variety of other small prey, including birds, lizards, insects, and earthworms (Village, 1990). In Spain and Portugal its diet largely consists of insects (Valverde, 1967).

The Madeiran lizard *Lacerta dugesii* is a medium-sized endemic lacertid of the Madeira archipelago. It is a diurnal and heliothermic species that inhabits a great variety of habitats (pers. obs.). Both the lizard and kestrel often coexist in a broad variety of habitats but to date, few attempts have been made to study the trophic ecology of the Madeiran Lizard, particularly its importance as a component in the diet of predators such as the kestrel.

In the Canary Islands, remains of lizards in kestrel pellets have been found (Martin, 1987; Moreno, 1998). In Madeira it has been suggested that the kestrel's diet consists basically of insects and lizards (Bannerman & Bannerman, 1965; Câmara, 1997).

In the present work we have studied the diet composition of the kestrel in the easternmost peninsula of Madeira – Caniçal and Ponta de São Lourenço (Fig. 1), a semiarid zone occupied by a '*stratum herbacium*', mainly composed of gramineae. Our aim is to present a preliminary approach to the incidence of *L. dugesii* in the diet of the kestrel.

Pellet analysis is the method most frequently used to assess the diet of kestrels (Village, 1990). The present study was made on 120 pellets collected from a sea cliff, frequently visited by kestrels, located in the easternmost peninsula of Madeira – Ponta de São Lourenço (Fig. 1). The field work was undertaken during July–August of 1993 and 1994. The shape and size of the pellets were not considered since our aim was to provide an assessement of presence/absence of lizards. Pellets were carefully dissected under a binocular microscope.

The hard parts and other indigestible matter were removed and identified, and the 'Index of Relative Presence' (Pilorge, 1981) was calculated as $I_i = P_i \times 100 / SP_i$, with $P_i = n_i \times 100 / N$, where P_i is the degree of presence, n_i the number of pellets containing the items of class I, and N is the total number of pellets.

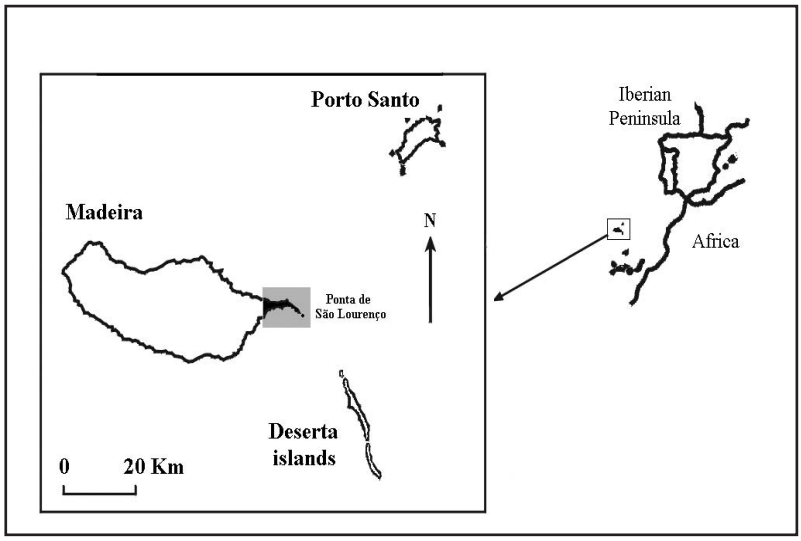

Figure 1. Geographic location of the study area (Ponta de São Lourenço) in the East of Madeira Island.

Food items identified in pellets could be grouped into four main categories, as listed in Table 1. Mammals were the predominant prey group, with 'relative presence' values of 29% and 30% in the years of 1993 and 1994, respectively. A significant percentage of pellets containing lizards was also found ('relative presence' values of 23% and 29%, for 1993 and 1994), representing the second most frequent group. Arthropods (23% and 21%) and birds (15% and 10%) also occur in the diet with lower percentages. Plant matter remains in pellets had similar values to that of birds (Fig. 2).

Ecological studies based on the knowledge of trophic relationships of natural vertebrate populations, becomes an issue of some importance, as they provide fundamental data in evaluating conservation programs.

Kestrels may select each prey species according to its abundance. Regional studies on the variation in kestrel diets in European countries have shown that diets reflect the available prey. The proportion of lizards among vertebrate prey increases further south in Europe, a correlation due to the great abundance of lizards in warm and dry climates of southern Europe (Village, 1990).

Table 1. The main groups of food items identified in pellets of *Falco tinnunculus canariensis*.

Food item	**Nº of pellets containing the food item (n_i)**	**Degree of Presence (P_i)**	**Index of Relative Presence (I_i)**	**Nº of pellets containing the food item (n_i)**	**Degree of Presence (P_i)**	**Index of Relative Presence (I_i)**
Arthropods	40	74,0 %	22,8	40	60,6 %	21,3
Reptiles (*L. dugesii*)	**41**	**75,9 %**	**23,4**	**56**	**84,8 %**	**29,8**
Birds	26	48,1 %	14,9	18	27,2 %	9,6
Mammals	50	92,5 %	28,6	56	84,8 %	29,8
Plant matter	18	33,3 %	10,3	18	27,2 %	9,6
	1993 (*N*= 54)			1994 (*N*= 66)		

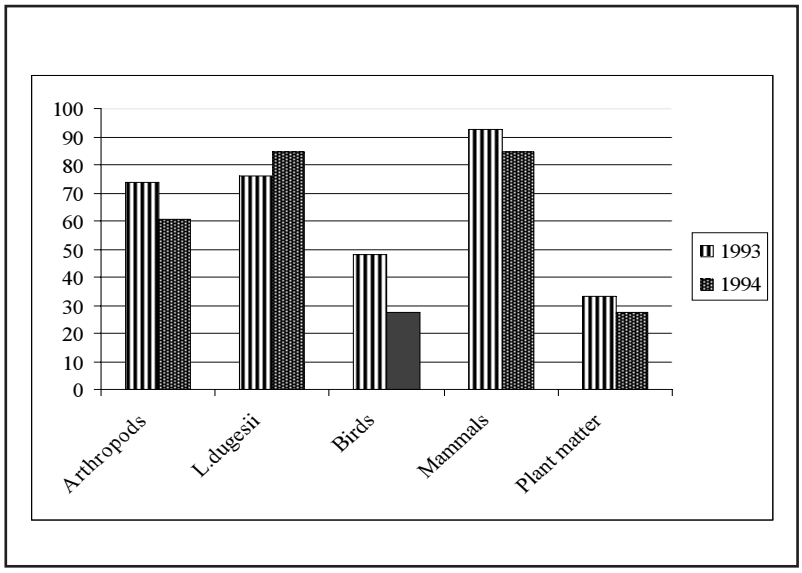

Figure 2. 'Degree of presence' (*P*i) of the different prey groups detected in pellets of *Falco tinnunculus canariensis*, in the years of 1993 and 1994.

The present study provides some information on the importance of Madeiran lizards in the diet of kestrels. From the Degree of Presence and the Index of Relative Presence in pellets (Figure 2), it is possible to say that lizards are an important constituent food item in the diet of kestrels in this particular region of Madeira Island. However, comparisons between food items based simply on the presence/absence of *taxa*, as reported here, cannot show that kestrels prefer or select lizards, because of the lack of abundance estimates of potential prey in the study area.

It is probable that the Index of Relative Presence values change during the year. They must be lower in winter for lizards when cooler, cloudy days reduce reptile activity. It is also likely that these values vary according to the differing ecological conditions locally, for example the degree of vegetation density and the effect this has on the kestrel's hunting ability.

To obtain a reliable assessment of the lizard's importance in the kestrel's diet, it will be necessary, in any future work, to measure the biomass involved as well as the variation of the diet composition, throughout the year. This will necessitate a different approach to the analysis of pellets.

ACKNOWLEDGEMENTS

For his help in preparing and this manuscript for publication the authors extend grateful thanks to Trevor Rose.

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New data on the distribution of the Sardinian brook salamander (*Euproctus platycephalus*) in the southern and western Limbara mountain complex (Sardinia).

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THE Sardinian brook salamander (*Euproctus platycephalus*) is an endangered species of newt, endemic to the island of Sardinia (Italy), where it is still present mainly in the eastern part of the island, in the mountains of Limbara (north), Gennargentu (centre), and Sette Fratelli (south). Grossenbacher (quoted by Andreone & Luiselli, 2000) considered this species to be the rarest and most threatened salamander in Europe. It is listed as critically endangered on the IUCN Red List (2000), is protected by the Bern Convention (1998), is included in Appendix IV of the Habitat Directive, and is protected by Regional Law n° 23/1998. From the early 1980s, however, the species has severely declined both in the number of populations and in the number of mature individuals per population (Puddu *et al.,* 1998; Van Rooy & Stumpel, 1995; Giacoma *et al.,* in press). The building of dams and excessive water catchments predominantly for agricultural or home use can increase both fragmentation and disappearance of habitat for this species (Van Rooy & Stumpel, 1995; Giacoma *et al.,* in press). Other factors also detrimentally affecting small Sardinian streams include water pollution (mainly pesticides and other chemicals for agricultural use) and illegal fishing methods (electric batteries, poisons and pool drainage) still in use in many wild areas on the island (Schenck *et al*., 1995).

Among the causes responsible for the decline of the Sardinian brook salamander, the introduction of allochthonous fish (*Salmo trutta* and *Oncorhynchus mykiss*) for angling purposes, which began around 1900 and continued for almost a century (Regione Sardegna, 1997), can represent another serious hazard for newt populations, as reported for *E. asper* (Serra-Cobo *et al.,* 2000). In order to investigate fish-salamander interaction, we obtained a grant from the Declining Amphibian Population Task Force and began a study in 2004 in the Limbara mountain complex, where allochthonous Brown trout (*Salmo trutta*) had recently been introduced. In this paper, we report on the occurrence of *E. platycephalus* in this area and present some new records and ecological remarks.

The Limbara Mountain Complex is a palaeozoic granite massif in N.E. Sardinia which ranges in altitude between 400 and 1353 m a.s.l.. One of the peculiarities characterising the Limbara area is the presence of numerous springs. Although the area has been plagued by forest fires, the vegetation, mostly represented by Mediterranean maquis, is remarkably rich with cork oak, lentisc trees, holm oak, *Cistus* spp., myrtle, strawberry trees and juniper plants.

The data herewith reported were collected during two surveys undertaken in June (1st to 7th) and in September (10th to 16th), 2004 on southern and western versants of the limbara mountain complex. Using cartographic and field reconnaissance, bibliographical data, and

Site	Research stretch and altitude range	Type of site	June records	September records	Preceding record	Presence of fish	Serious dangers
Rio Pisciaroni	2.3 km (550-910 + 1009-1025 m a.s.l.)	stream pools	-	larvae < 5	Lecis & Norris (2003)	-	summer drainage
Rio Sa Mela	3.2 km (597-1010 m a.s.l.)	stream pools	adults < 5	adults < 10 larvae < 10		*Salmo trutta*	summer drainage
Rio Pagghiolu	1.7 km (600-910 m a.s.l.)	canalised stream	adults < 5	-	-	*Anguilla anguilla*	summer drainage, water catchments, illegal fishing methods
Rio Li Reni	1.4 km (725-800 m a.s.l.)	Slow flowing streams	adults < 5	-	-	*Anguilla anguilla*	summer drainage, water catchments, illegal fishing methods
Rio Val di Musca	1.8 km (730-880 m a.s.l.)	-	-	-	Forest Guards (1996)	-	summer drainage
Rio Lu Frassu	1.5 km (544-830 m a.s.l.)	-	-	-	Forest Guards (1996)	*Salmo trutta*	summer drainage
Rio Contra Manna	1.3 km (960-1000 m a.s.l.)	-	-	-	Forest Guards (1995)	*Salmo trutta*	summer drainage

Table 1. Occurrence of *Euproctus platycephalus*, *Salmo trutta trutta* and *Anguilla anguilla* in southern and western Limbara.

information from the Forest Guards of the Ente Sardo delle Foreste and local people, we searched in brooks and other water bodies in areas where salamanders and fish were likely to inhabit. Initially we looked for animals in the water by sight. We then overturned underwater rocks and one of our party, Giuseppe Sotgiu, snorkelled and dived.

We located *Euproctus platycephalus* at four sites, which are listed in table 1. With the exception of Rio Pisciaroni (Lecis & Norris, 2003), the other three sites represent new records for this species. We failed to find the species at three historical sites suggested to us by the Forest Guards. Rio Sa Mela populations were observed for the first time by GS in 1993 (unpublished data) and, following the negative results of the Lecis & Norris (2003) expedition, we can reconfirm the presence of *E. platycephalus* in this area. All sites were either pools or streams with slow-running water. However, in one case, we observed salamanders in a heavily canalised stream. During the June survey, water levels were high and streams were flowing rapidly while, in September, summer drought brought about the isolation of ponds and water shrinkage. At all sites only a low population density was observed.

It is possible that the number of salamanders found was negatively influenced by the rapid water flow in June. In September, when we predominantly observed larvae, the water level of the streams was very low and several pools, observed to contain water in June, were completely dry. During the same months, we conducted a survey in the Gorroppu Valley (east side of central Sardinia) and found a large number of adults in the water. The Gorroppu populations live in deep, permanent pools in a very harsh environment, where wet refuges are nearly absent. The Limbara populations live in streams where the water level rises and falls with the seasons but the surrounding Mediterranean maquis permits the presence of refuges. We hypothesise that the species has different adaptive strategies depending

on the environment in which the populations are located. Natural terrestrial phases such as hibernation and aestivation, although as yet not documented for this species, may occur in contexts where access to water is not available all year round (Limbara streams for example). Bovero *et al.* (2003) suggest the occurrence of terrestrial phases in *E. platycephalus*, and, indeed, terrestrial phases are documented for the other two species of the same genus, *E. asper* (Montori, 1990) and *E. montanus* (Alcher, 1978). Moreover, Alcher (1980) observed that some *E. platycephalus* adults, in lab conditions, had terrestrial phases.

Nevertheless, the small number of larvae we found, taking into account that they can take up to 15 months to metamorphose, leads us to believe that Limbara populations are decreasing in individual numbers. Additionally, we failed to locate the species in Rio Val di Musca, Rio Lu Frassu and Rio Contra Manna. And in Rio Pagghiolu and Rio Li Reni where the Forest Guards recalled seeing *E. platycephalus* up until 1996, we observed a distinctly lower number of individuals than expected. Finally, Lecis & Norris (2003) reported a 'high density' of salamanders in Rio Pisciaroni – we only found a few larvae in this area.

We consider extraordinary summer drainage, such as that which occurred in the last few years (Decree of the 3rd of June 2002 of the Ministero delle Politiche Agricole e Forestali) to be a serious threat to the Limbara populations. Furthermore, we discovered two water catchments for agricultural purposes located alongside two different streams inhabited by *Euproctus*. Water catchments reduce and fragment water habitat (Van Rooy & Stumpel, 1995; Giacoma *et al*., in press). The use of chloride to capture eels and trout presents yet another serious threat as this illegal method of fishing can kill all newts for several hundred metres along the stream (pers. obs.).

With regards to fish-salamander interaction, the significant decrease of *E. platycephalus* in Rio Pisciaroni and its apparent disappearance in Rio Val di Musca where there are no fish is interesting, particularly as in Rio Sa Mela we observed a relative abundance of salamanders co-habiting with fish in brooks. During our surveys in Limbara, we flushed the stomachs of some *Salmo trutta* specimens that were living alongside the salamanders. We did not find any trace of predation on *E. platycephalus* eggs, larvae or metamorphosed specimens in the stomach contents (Bovero *et al.,* in prep.). Nevertheless, when intense stream drainage (due both to severe summer droughts and water catchments) reduces food resources, fish could potentially feed upon salamanders as well as compete for food in restricted habitat (Serra-Cobo *et al.,* 2000).

Consequently, as a conservation measure, we suggest the limitation of water catchments, especially in areas inhabited by salamanders. Furthermore, the introduction of fish should be limited, or at least regulated, to ensure that current fish biomass does not increase. Most importantly, the introduction of alien fish species such as Rainbow trout or Brown trout from non-Mediterranean stock should be avoided.

Lastly, we wish to point out the importance of employing snorkelling and diving as an investigative technique. This method enabled us to find the greatest number of salamanders and could, therefore, be essential in the research of not only *E. platycephalus*, but also other species sharing similar behavioural traits and/or rarefaction trends.

ACKNOWLEDGEMENTS

We wish to thank the D.A.P.T.F. organisation for its financial contribution; Mr. Gian Piero Serra and all the other Ente Sardo Foreste workers who helped us locate many of the sites; and the geometrician, Mr. Sussarello, who assisted us with logistics and obtaining permission to operate in protected areas.

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NATURAL HISTORY NOTES

Natural History Notes features articles of shorter length documenting original observations of amphibians and reptiles mostly in the field. Articles should be concise and may consist of as little as two or three paragraphs, although ideally will be between 500 and 700 words. Preferred contributions should represent an observation made of a free-living animal with little human intrusion, and describe a specific aspect of natural history. Information based on a captive observation should be declared as such in the text and the precise geographical origin of the specimen stated. With few exceptions, an individual 'Note' should concern only one species, and authors are requested to choose a keyword or short phrase which best describes the nature of their observation (e.g. Diet, Reproduction). The use of photographs is encouraged, but should replace words rather than embellish them. Contributions are accepted on the premise that they represent a previously unreported observation, and may be edited prior to acceptance. Standard format for this section is as follows:

SCIENTIFIC NAME (Common Name): KEYWORD. Text (there are no constraints on how information is presented but the date, time, and locality – with full map co-ordinates if possible – must be included, as should precise details on the nature of the observation with some discussion of its significance, and references to pertinent literature). If the information relates to a preserved specimen, its catalogue number and place of deposition should also be given. REFERENCES. Then leave a line space and close with name and address details in full.

***CNEMASPIS MYSORIENSIS* (Mysore dwarf gecko): REPRODUCTION.** *Cnemaspis* or Oriental dwarf geckos are a diverse group of primarily diurnal geckos distributed in Africa, south and Southeast Asia, with 51 currently recognized species (Bauer, 2002; Das, 2005; Das & Grismer, 2003; Das & Leong, 2004; Kluge, 2001). Of these, 20 and 19 species are distributed in south and Southeast Asia respectively. However, our knowledge of ecology and life history characteristics of these geckos is meagre at best (Werner & Chou, 2002). Here, I report observations on communal egg-laying, incubation period and reproduction in *C. mysoriensis* (Smith, 1935) from Bangalore, south India.

Communal egg-laying has been recorded in few species of the genus *Cnemaspis* (Bhupathy & Nikon, 2002; Biswas & Ishwar, *in press*) but not in *C. mysoriensis*. On 6th August 2005 two sites containing egg clutches of *C. mysoriensis* were located in a degraded scrub habitat in the outskirts of Bangalore city (13º04'14''N, 077º35'13"E; WGS84; elevation 914 m). The sites were located at a height of *ca*. 12 ft from the ground under a bridge over which a railway track passed. The walls under the bridge were damp, covered in places with growths of moss, and with water leaking from the roof. The sites were placed *ca*. 20 cm apart on the wall close to where it met the ceiling. Each site was spread over an area of approximately 6 cm x 2 cm. One site contained at least 30 hatched egg shells from previously deposited clutches, while the other contained about 18 and 2 unhatched eggs. Three other non-communal sites, two containing a single clutch of paired unhatched eggs and another with a clutch of one egg were also located under the bridge. The egg shells were counted using binoculars and are minimum estimates as it was not possible to reach the egg-laying sites to make accurate counts. Fragmental remains of more recently deposited eggs were found on older ones that may have resulted in counts being underestimated. *Cnemaspis mysoriensis* individuals were found on the same wall and the eggs were definitely of this species, as no other geckos occurring in Bangalore lay eggs of such size and *C. mysoriensis* is the only *Cnemaspis* recorded from in and around the city. *Hemidactylus brooki*, a common nocturnal gecko, was also found on the same wall and seems to use it as a retreat for resting during the day.

A female *C. mysoriensis* was caught on the afternoon of 8th March 2005 in a building in Bangalore (13º02'11"N, 077º35'24"E; datum: WGS84; elev. 924 m), India. The individual was not noticed to be gravid, but laid two eggs in the cloth bag in which it was kept, between 10th March and 11th March 2005. The eggs were white in colour, almost round in shape with a flattened side

attached to the cloth and measured 6.28 mm and 5.76 mm in length. The eggs were maintained in the same bag at a site 1 km away from the collection locality and were monitored every 2 to 3 days thereafter. Between 28th April 2005 and 2nd May 2005 a hatchling emerged from the larger of the two eggs. The hatchling had a snout to vent length of 13.58 mm (tail length 12.68 mm) and was released the next day in the same building after photographing. The other egg failed to hatch and was opened on 29th July 2005. While breaking open the egg under a binocular stereo microscope, a crack was observed on the egg shell. Inside was found a desiccated juvenile that seemed to have stopped developing at a very advanced stage. The above observation on the hatching of the intact egg suggests an incubation period of 49 to 53 days. Daily temperature in Bangalore during this period ranged between 36ºC and 18ºC. This seems to be the first report of incubation period for any of the south Asian species of *Cnemaspis*. However, more detailed observations on incubation time and ambient temperature in this and other species (after controlling for temperature, egg mass and probably body size) will shed further light on the ecology of their eggs. Incubation time is variable within the Gekkonidae but occupies around the middle of the time range recorded for squamate reptiles (Birchard & Marcellini, 1996).

Internal examination of the preserved female revealed two fully developed eggs (approximately of same size but without calcium egg shell deposition) suggesting that multiple clutching occurs in this species. Multiple clutching is useful to interpret communal egg-laying behaviour in *Cnemaspis* species (Bhupathy & Nikon, 2002; Biswas & Ishwar, *in press*) as it is currently unknown how many individuals contribute to such egg aggregations. Activity of these geckos throughout the year in Bangalore (pers. obs.) may also allow individuals of this species to reproduce more than once or through most of the year, although this evidently requires verification.

ACKNOWLEDGEMENTS

I thank Basudev Tripathy for comments and monitoring the eggs in my absence, Shomita Mukherjee for lending binoculars and Divya B U for procuring literature.

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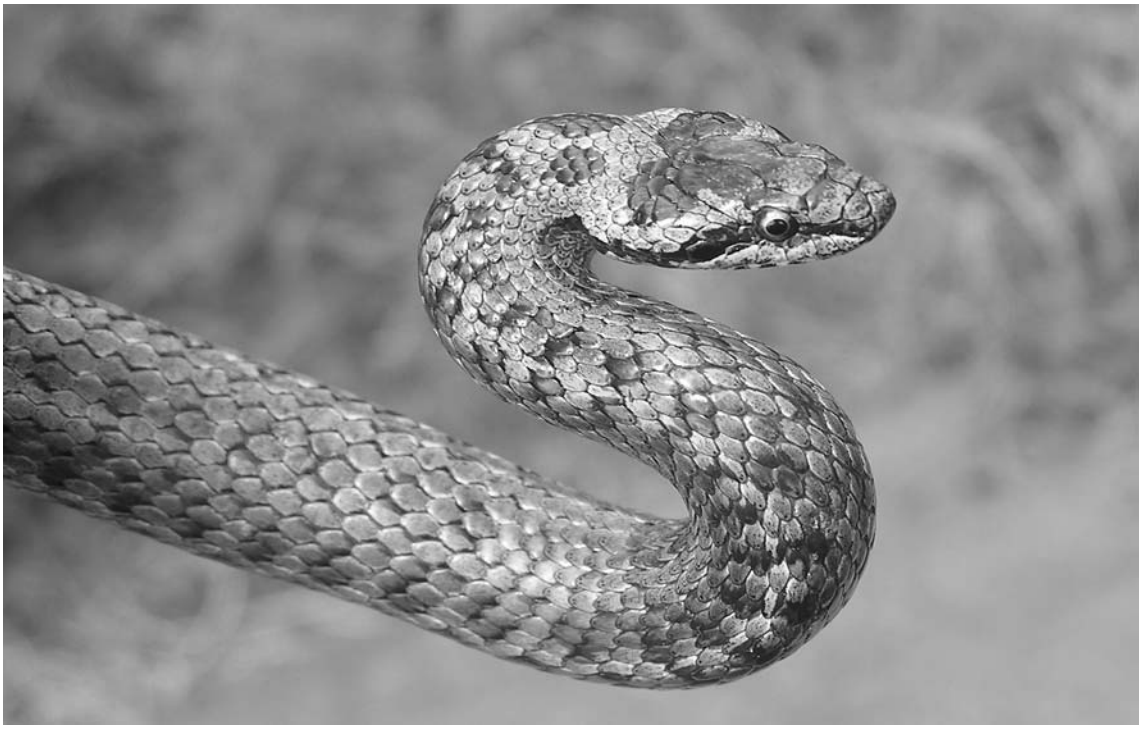

***CORONELLA AUSTRIACA* (Smooth snake): BEHAVIOUR.** The Smooth snake is the rarest of the three British snakes, being restricted almost entirely to the heathlands and neighbouring habitats of southern England. Its cryptic behaviour and secretive lifestyle make it difficult to assess its distribution and status. It is not venomous, but engages in several defensive strategies, including biting with a chewing action that sometimes draws blood and appears to inhibit coagulation. The Smooth snake is often considered a specialist in reptile prey, but is known to take small mammals and other prey (Beebee & Griffiths, 2000; Goddard, 1984). A study by the Nature Conservancy Council (1983) of Smooth snake prey species found in faecal and regurgitated matter listed a diverse suite of reptile items totalling 60% of the prey, but also found that small mammals constituted 28% of prey, nestling birds 10%, and amphibians 2%.

On 18th May 2004, at Parley Common (SZ 08 99) in Dorset, UK, an adult female Smooth snake was captured for use (under licence) in a Herpetological Conservation Trust (HCT) training event. The weather was sunny with scattered cloud, the air temperature was 20°C, there was a slight westerly breeze, and the several preceding days had been sunny. The time of capture was 18:25 (BST), and the snake was found coiled under a corrugated iron artificial refuge or 'tin'. It did not bite when handled, but flattened its head posteriorly and took up a striking position (a fairly common response in Smooth snakes) to mimic *Vipera berus* (Adder) (see photograph above). The evolution of this 'adder head' defence mechanism suggests that the Smooth snake has inhabited Europe syntopically (or at least sympatrically) with species that are wary of vipers, and presumably with vipers themselves, for a long time.

The snake was photographed (dorsal head and neck pattern) and measured (SVL = 480 mm, VTL = 100 mm) for subsequent entry onto the HCT's Rare Species Database. The snake displayed a slight bulge suggesting that it may have recently fed, but it was not considered a problem to keep the animal overnight. It was kept in a cloth sack for the next forty minutes, until transfer off-site to a plastic vivarium with water and vegetation for the following day's event.

The following day, due to an odour coming from the empty cloth sack, it became apparent that the snake had regurgitated the corpses of two small mammal neonates whilst held in the sack. The corpses were somewhat squashed but otherwise intact. They were later identified (by John Buckley of the HCT), using dental morphology, as either *Sorex minutus* (Pygmy shrew) or *Sorex araneus* (Common shrew). They were too young to be identified to species, being blind and hairless, and were clearly predated in the nest. These species of shrew make grass-woven nests below ground; therefore this smooth snake must have entered a shrew's nest and eaten the neonates underground and in darkness.

Smooth snake populations are notoriously difficult to monitor, and Breeds (1973) showed that even in intensively-studied populations, individuals can evade detection for extended periods (up to seven years) before re-appearing. The movement and home range of smooth snakes is also difficult to generalise upon, as some animals are virtually sedentary, whilst others move large distances (Gent, 1988; Gent & Spellerberg, 1993; Phelps, 1978, 2004). Phelps (pers. comm.) has found that males tend to be the most mobile, whilst females are more sedentary and can be detected in the same place for many years. It is known that Smooth snakes spend much of their time underground (Beebee & Griffiths, 2000), which accounts for their relative invisibility when compared to *Natrix natrix* (Grass snake) and Adders. The subterranean feeding habits described here corroborate this picture of a secretive lifestyle, and make it conceivable that some individuals in a study population may never be detected, even when artificial refugia are checked regularly and other individuals are captured repeatedly.

ACKNOWLEDGEMENTS

I am grateful to John Buckley for identifying the neonate shrews, and to Tony Phelps and Tony Gent for sharing their knowledge on Smooth snake behaviour and ecology.

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***ZOOTOCA (LACERTA) VIVIPARA* (Common or Viviparous lizard): MARKINGS AND COLOURATION.** The Common lizard is well known for its variable upper body markings and colouration. Although they are typically brown in background colour, green colouration sometimes occurs (Beebee & Griffiths, 2000; Frazer, 1983; Palmer, 2005; Simms, 1970). Most green Common lizards seem to be a dull dark green, but Bowles (2000) reported turquoise Common lizards, and Frazer (1983) mentioned an olive phase. The dorsal, lateral and dorsolateral markings of Common lizards are highly variable, but do not normally form distinct ocelli (eye-shaped markings) like those in *Lacerta agilis* (Sand lizard). However, occasional very bold markings

Figure 1. *Zootoca vivipara* from Ynyslas dunes, Ceredigion. Photograph by author.

Figure 2. *Zootoca vivipara* from Aberdyfi dunes, Gwynedd. Photograph by author.

can take on a superficial sand lizard-like appearance. Two examples are described here that show unusual variations in colour and markings.

On 1st May 2004, on coastal sand dunes at Ynyslas in Ceredigion, Wales, UK (SN 60 93), a pale olive greenish Common lizard (Figure 1) was seen basking in *Ammophila arenaria* (Marram grass). This was during a survey visit to investigate whether Sand lizards might still be present naturally in west Wales; hence specific identification was crucial. The dorsal patterning of this lizard was only vaguely discernible, and not enough to determine its sex confidently. The overall extent of green colouration, the lack of ocellated markings, and the general shape and build confirm its identification as a common lizard. Twenty-seven Common lizards, no Sand lizards, and thirteen indeterminate lizards were seen during the visit. According to Beebee & Griffiths (2000), there is a higher incidence of green Common lizards in north Wales than other parts of Britain.

On the same day at Aberdyfi dunes in Gwynedd, Wales, UK (SN 60 95), another Common lizard, of typical brown colouration but strikingly patterned, was photographed in Marram grass (Figure 2). Its lateral markings formed distinct ocelli, and were almost mistakable as those of a Sand lizard. The lack of dorsal ocelli, as well as its size, build and colour, easily identified it as a Common lizard though, but it is conceivable how this might not be such an easy identification with only a fleeting glimpse. Twenty-two Common lizards, no Sand lizards, and nine indeterminate lizards were recorded overall.

There is some scope for confusing green or boldly-marked Common lizards with Sand lizards; hence there is a practical reason for discussing such variation and how misidentification might be avoided. Despite the Sand lizard's larger size (in adults), stockier build, larger head, and narrower habitat preferences (normally only sand dunes and heaths are inhabited by both), misidentified Common lizards result in a number of reported Sand lizard sightings submitted to the Herpetological Conservation Trust every year. Tantalisingly, some of these reported sightings are from parts of the country with suitable 'Sand lizard habitat' and historical records of populations that could conceivably survive today. Such reports are not usually accompanied by photographs, and only follow-up survey visits can confirm or refute them. Some simple rules would therefore be useful if they could help prevent misidentification.

Green colouration in Common lizards is certainly not as vivid as that seen in male Sand lizards. Common lizards are green all over their back and sides, whereas (male) Sand lizards only have green flanks and their ocelli are still distinctly visible. As well as varying degrees of dorsal and lateral 'stripyness', Common lizards generally display irregular flecked and dashed markings, typically consisting of triplets of dark and pale dashes, but these rarely form the pale-centred ocelli that characterise Sand lizards. Sand lizard ocellations take the form of dark irregular blobs with pale centres that are normally enclosed. These form continuous dorsal and lateral strips separated by unmarked greyish dorso-lateral strips. Even juvenile Sand lizards have small but distinct ocelli, whereas Common lizard juveniles quickly develop the dashed and striped markings of adults.

The example in Figure 2 from Aberdyfi is the nearest I have ever seen a Common lizard's markings approach those of a Sand lizard, and it would have been very frustrating if the lizard had not cooperated long enough to observe it and photograph it. I have yet to see a Common lizard whose colouration alone was sufficient to prevent specific identification, but the variability in their markings certainly allows room for error in identification.

ACKNOWLEDGEMENTS

The Herpetological Conservation Trust is grateful to Countryside Council for Wales, particularly Liz Howe, for funding survey work in Wales.

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***PTYCHADENA MASCARIENSIS* (Mascarene ridged frog): PREDATION ON AN ENDEMIC MALAGASY CHAMELEON.** *Ptychadena mascariensis* is a medium-sized frog [male SVL 40 mm, female SVL up to 50 mm (Glaw & Vences, 1994)] which can be readily identified by its sharply pointed snout, the presence of six to eight longitudinal rows of granular tubercles running along the dorsum, and its 'typical ranid-like appearance' (Henkel & Schmidt, 2000).

This frog is extremely abundant in Madagascar with a wide distribution ranging from the humid forest of Montagne d' Ambre in the North to the arid spiny forest of Tsiombe in the South (Blommers-Schlosser & Blanc, 1991). However, it is one of only two species (together with *Hoplobatrachus tigerinus)* which are not endemic to Madagascar (Glaw & Vences, 1994) with populations found on the African mainland, the Seychelles and Mascarene islands (Goodman and Benstead, 2003). In contrast to Mascarene and Seychellean populations, molecular evidence suggests that Malagasy populations were not introduced from the African mainland by man and colonized the island naturally (Vences *et al.,* 2004).

Previous studies have focused on the feeding ecology of *P. mascariensis* and have found that this species is typically known to feed on invertebrates

such as snails, grasshoppers and beetles (Goodman & Benstead, 2003). However, it has been known to take conspecifics and other frogs (McIntyre & Ramanamanjato, 1999). In an attempt to provide more information regarding its feeding ecology, we provide natural history observations detailing the predation of a juvenile endemic Malagasy species of chameleon by this non-endemic frog.

Frontier-Madagascar is a collaboration between the Society for Environmental Exploration and the Insitute of Marine Sciences, University of Toliara, Madagascar. The Frontier-Madagascar Forest Research Programme carries out scientific and socio-economic survey work with a view to informing conservation decisions. In January 2005 field staff were conducting a biodiversity survey in the Sept Lacs region (S 23° 28' – S 23° 31', E 44° 04' – E 44° 10') which is a core area of gallery forest found in the Parc Regional de Belomotse, South West Madagascar.

On the 20th of January field staff encountered a relatively large female frog (SVL 48 mm) during a casual collection along the banks of a relatively fast flowing stream. Upon collection this individual promptly regurgitated a juvenile *Furcifer lateralis* (SVL 33 mm). *Furcifer lateralis* is a medium sized chameleon species (adults reaching 200–250 mm in total length) and is characterised by the presence of a white medioventral line and three dark circles on the flanks (Glaw & Vences, 1994). The unfortunate individual must have been ingested moments before regurgitation as it was still breathing (although weakly).

Although this particular predation event itself is not too concerning [*F. lateralis* is a common species found all over Madagascar with an affinity towards degraded habitat (Glaw & Vences, 1994)] it is unlikely that *P. mascariensis* discriminates between the species upon which it predates. If offered the opportunity it may also feed upon the juveniles of threatened species such as *Furcifer labordi*, *Furcifer minor*, *Furcifer campani* and the dwarf chameleon *Brookesia perarmata* which are listed as vulnerable on the IUCN Red List (2005).

Although previous studies have brought attention to its relatively broad diet, this study is the first to describe *P. mascariensis* feeding upon a species of reptile. Therefore no research has been conducted in order to determine the impact that this species of ranid has or will continue to have on the highly endemic Malagasy herpetofauna [estimated at 96% (Goodman & Benstead, 2003)]. We conclude that in order to achieve this, further research investigating its feeding ecology and behaviour is required.

ACKNOWLEDGEMENTS

We are grateful to the Ministére des Eaux et Forets for permitting us to carry out our research and to the Universities of Toliara and Antananarivo. We also thank Enanatse Alfred, Achille Raselimanana and all the Frontier staff & volunteers whose work and effort in the Sept Lacs area helped make this observation possible.

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BOOK REVIEWS

Elsevier's Dictionary of Herpetology and Related Terminology

by David C. Wareham

Published by Elsevier B.V., Radarweg 29, P.O. Box 211, 1000 AE Amsterdam, The Netherlands.

ISBN 0-444-51863-0. Price: £59

Many readers will already be familiar with the work of David C. Wareham from his previous book, *The Reptile and Amphibian Keeper's Dictionary*, published by Blandford Press in 1993. This book has long been out of print, and David has spent the past several years compiling a new dictionary, adding over one thousand definitions and terms.

Bound in leather-grain olive green hardback, one can immediately ascertain on handling that this book is of a high quality finish. Over 3,100 terms and definitions adorn the pages, listed in two columns per page, over 227 pages. As well as the entries you would expect to find in a dictionary of this sort, i.e. biological features of reptiles and amphibians, their anatomy, ecology, behavioural and veterinary terms, there are also herpetological families, selected biographies, synonyms, abbreviations, acronyms and symbols. All make for a valuable reference source as well as a very good read.

The book includes an interesting and lively Foreword written by Mark O'Shea, who will be familiar to many. Acknowledging that herpetology has become yet another platform for the regurgitation of specialised terms and phrases, Mark states 'People are afraid to use them in case they pronounce them incorrectly, use them improperly or alienate their audience', but equally and quite rightly mentions that often there is no alternative in 'everyday' language to convey the same message. His conclusion is that this book is a valuable resource to everyone with an interest in herpetology; a fact that is, frankly, undeniable.

Herpetology, in common with many other sciences, moves on apace. New discoveries and observations are being made and with them, new descriptive terms are created. It is fitting, therefore, that this dictionary has been resurrected and maintained to cater for the changing times. Apart from serving as a useful reference guide to herpetological language, the fascination for me is far more basic. It is a book that is difficult to put down; one can become totally absorbed in its pages, browsing over the terms you know (or thought you knew!) and more importantly discovering those which are unfamiliar.

It is difficult, however, to review the new dictionary without reference to David's previous book. One of the attractive features of the 1993 work was the fine line drawings which accompanied some of the definitions. It is a pity that the new book does not contain any of David's excellent illustrations.

In summary, this is a fine book well deserving of a place on the keen herpetologist's bookshelf. At £59, those who have the 1993 dictionary may not feel inclined to obtain the update too hastily, but those who do not have a glossary of terms in their possession should at least consider it. The book is available now from most good book shops in the UK and Europe, the Middle East and Africa, and also from Elsevier, Customer Service Department, Linacre House, Jordan Hill, Oxford OX2 8DP. Available in the USA and Canada from Elsevier, Customer Service Department, 11830 Westline Industrial Drive, St. Louis, MO 63146, USA.

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