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The HAA is dedicated to the study and conservation of African reptiles and amphibians. Membership is open to anyone with an interest in the African herpetofauna. Members receive the Association's journal, *African Journal of Herpetology*, which publishes review papers, research articles, short communications and book reviews – subject to peer review) and *African Herp News*, the Newsletter (which includes short communications, life history notes, geographical distribution notes, herpetological survey reports, venom and snakebite notes, short book reviews, bibliographies, husbandry hints, announcements and news items).

NEWSLETTER EDITOR'S NOTE

Articles shall be considered for publication provided that they are original and have not been published elsewhere. Articles will be submitted for peer review at the Editor's discretion. Authors are requested to submit long manuscripts by e-mail or on disc in Word 6.0 or 7.0, or Windows XP format. Shorter articles may be submitted as typescripts.

The views and opinions expressed in articles are not necessarily those of the Editor.

COVER PHOTO Spotted Shovel-nosed Frog, *Hemisus guttatus* (Rapp, 1842).
Photo: Angelo Lambiris

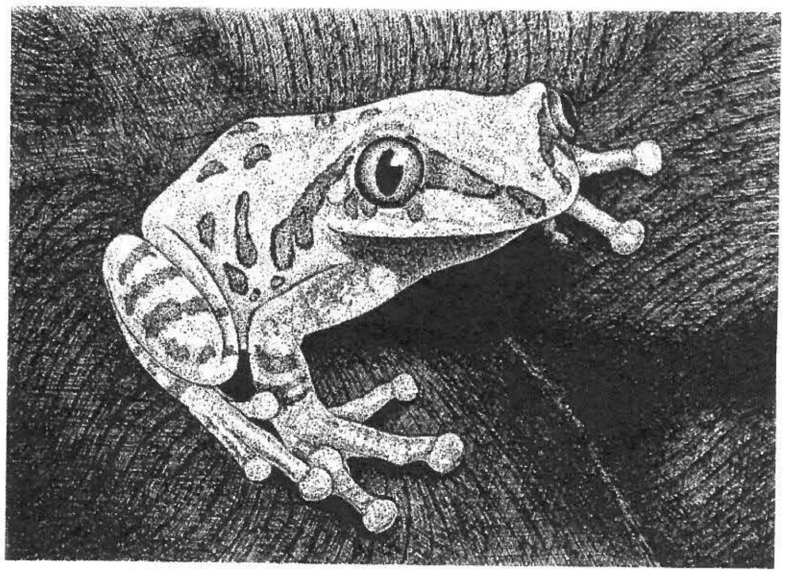
EDITORIAL

Another year has somehow disappeared, but it has been a productive one for the Newsletter—with this issue, the third this year, you will have contributed six long articles and 24 shorter contributions in the way of natural history notes and geographic distributions.

Please note the first announcement for the ninth H.A.A. Symposium, to be held at Sterkfontein Dam, near Harrismith, in Novermber 2008. All members who wish to attend and present papers or posters are requested to contact Dr. Michael Cunningham for further details.

I wish you all well over the festive season, and hope that next year will prove to be as exciting and as rewarding as this year has been!

Angelo Lambiris
Editor



African Herp News No. 43, pp. 2—10, November 2007

POSSIBLE STRESS-RELATED COLOUR CHANGES IN FOSSORIAL REPTILE SPECIES

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INTRODUCTION

Although physiological colour change is fairly common in certain reptiles, it has only recently been described in fossorial species (Jackson, 2002). A number of families within the suborder Lacertilia (e.g. members of the families Agamidae, Chamaeleonidae, Cordylidae, Gekkonidae and Scincidae) can change their colour to indicate dominance, reproductive status, for thermoregulatory purposes and for protection (Branch, 1998; Jacobsen, 1985; Whiting *et al.*, 2006). These colour changes are often as a result of changes in pigment intensity rather than an actual colour change and are rapidly reversible. These changes are usually initiated by visual stimuli, such as the presence of a rival or potential mate, but may also be initiated from stimuli detected in the dermis, such as cold (Jacobsen, 1985).

This paper deals with the recently-described phenomenon of colour change in fossorial reptile taxa, stating additional examples of taxa in which this phenomenon has been observed as well as discussing possible mechanisms that might be responsible for this phenomenon.

OBSERVATIONS

Feylinia

In her article, Jackson (2002) states that of the nine semi-fossorial Western Forest Feylinia (*Feylinia currori*) specimens she collected in Brazzaville in the Republic of Congo, five displayed the usual dark colouration typical of the species, while the remaining four were periwinkle blue, despite all nine specimens being collected in close proximity to each other. She described this phenomenon as an unusual and previously undescribed colour variation of this species.

Acontias

The giant legless skink (*Acontias plumbeus*) is said to be the world's largest legless skink, reaching a length of up to 490mm SVL. Their usual colouration is de-

scribed as being blue-black to black, with the rostral usually being lighter-coloured (Branch, 1998). 19 individuals were examined in the Lowveld region of South Africa, mainly in the central Kruger National Park (2431AD), Nelspruit (2530BD) and Klaserie (2431CA). All of the individuals examined were brown-black to black in colouration when first captured, but some individuals became periwinkle blue with a darker rostral while in captivity (Figure 1).

All individuals were kept in captivity for various periods of time prior to being released at the site of capture. The initial individuals were housed in transparent glass terrariums of varying dimensions, with a moderate layer of humic substrate. Individuals were not handled, and none showed any colour changes while in captivity.

Later individuals were kept in a black metal container with a transparent Perspex lid and humic substrate. They were handled frequently and within hours most individuals turned pale blue. The colouration would return to normal within ca. 12-24 hours of being placed back into the container with a deeper substrate layer and cessation of handling. Although this colour change was not observed every time the individuals were handled, it did occur after frequent handling and often spanned a number of "handling sessions". These colour changes were also witnessed by Malora Zeller, Lisa van Apeldoorn and John Davies.

The individuals that were captured at Klaserie (most recent individuals) were kept in a white plastic drawer system with a white towel or humic soil as substrate and were rarely handled. Most of these individuals retained their natural colouration, but at times individuals would not accept food and displayed the periwinkle-blue colouration after a period of fasting. The colour changes in these latter individuals were also observed by Errol Pietersen.

Amblyodipsas

The same colour change has also been noted in the Natal purple-glossed snake (*Amblyodipsas concolor*). This is also a uniform dark brown to black fossorial species, preferring moist humic soils in well-wooded and forested areas (Branch, 1998). A single female (TM 84634) was collected near Nelspruit (2530BD) and was housed in a white plastic terrarium (dimensions: 590mm x 380mm x 220mm) with a moist leaf substrate. The terrarium allowed very little light to enter the interior, which together with the moist substrate were intended to emulate this species natural environment. On one occasion the specimen contracted myiasis, presumably due to flesh-fly (Sarcophagidae) larvae which were accidentally introduced via the substratum, and resulted in it turning light blue. This loss of pigment was simultaneously observed by Errol Pietersen. The infestation was treated and as the specimen recovered so her colouration returned to normal.

Leptotyphlops

Distant's thread snake (*Leptotyphlops distanti*) is another species in which this colour change has been observed. An individual caught at Klaserie (2431CA) displayed the usual dark colouration but was seen to become pale soon after being unearthed. This phenomenon is regularly observed in this family of small fossorial reptiles and has frequently been documented before. Colour change by members of this genus has been attributed to moisture loss (N. Jacobsen, *pers. comm.*; W. Haacke, *pers. comm.*). *Leptotyphlops* spp. are known to retain moisture between their scales and it is this moisture that gives them their characteristic dark colouration. However, this moisture quickly evaporates when they are exposed to the drier conditions above ground and they thus attain a chequered effect, differing greatly from their initial uniform dark colour.

Lacertilia

Probably the best-known colour-changing reptiles are the chameleons, and to a lesser degree the agamas and some geckos. Chameleons have the ability to change their colour, within reason, to blend in with the colours of the environment in which they find themselves. They are also known to change colour with regard to their mood and for thermoregulatory purposes (Jacobsen, 1985). As such, chameleons are often darkly coloured on cool mornings (to absorb heat) and when stressed, whereas males attain bright colours during rivalry. The former colour change is as a result of visual and temperature stimuli and to a lesser degree the skin which detects light intensity. The colour change in male chameleons during rivalry may result from a visual stimulus, but is more likely also under hormonal control (Jacobsen, 1985).

Cape dwarf geckos (*Lygodactylus capensis capensis*) likewise are darker on cool mornings when they bask in the sun, this darker coloration aiding the absorption of heat.

POSSIBLE MECHANISMS

Ectotherms are known to change their colour according to light intensity, temperature, background colour and social behaviour, thus effecting thermoregulation, expression of behavioural signals and protection of the skin from radiation (Bagnara & Hadley, 1973; Whiting *et al.*, 2006).

Colour change can be either morphological or physiological, depending on the pathways and reactions involved [Morphological colour change here refers to the transfer of pigment granules to the surrounding cornified cells, such as hair, and is not readily reversible]. The majority of vertebrates exhibit morphological colour changes, measured in days or weeks, in response to environmental conditions such

as changing seasons. Morphological colour changes are dependant on the quantitative changes in pigments and/or the number of chromatophores present in the dermal cell layers (Bagnara & Hadley, 1973; Hadley, 1996; Parker, 1948).

Ectothermic vertebrates [as well as a few endothermic vertebrates] exhibit physiological colour changes (measured in seconds or hours), which depend on the reversible redistribution of pigments into the dermal chromatophores as a response to neural, hormonal and other stimuli (Bagnara & Hadley, 1973; Hadley, 1996; Parker, 1948). Melanins, synthesised in melanophores, are the most conspicuous chromatophores in ectotherms. When melanosomes disperse throughout the chromatophore cell, the cell darkens and results in the skin of the ectotherm darkening. When these melanosomes aggregate in the centre of the cell, the pigments are drawn away from the cell surface and the cell lightens, as does the skin of the ectotherm (Sherbrooke *et al.*, 1988; Visconti & Castrucci, 1993). The stimuli that have been used to induce chromatophore pigment granule movements include changes in lighting, [exogenous] exposure to hormones (e.g. Melatonin and α-MSH) and changes in salt concentrations (Junqueira *et al.* 1974). The application of exogenous hormonal stimuli is predominantly restricted to amphibians, as the hormones are able to be absorbed through the moist, absorptive skin. The same effects probably would not be observed in reptiles, due to the presence of an impermeable keratinous epidermis which would block the absorption of the exogenous hormones.

In studies done on the movement of chromatophore pigment granules, the rate at which the pigments were redistributed and the reversibility of the process indicated that these processes probably are not under the control of gene activation and/or protein synthesis (Moellmann & McGuire, 1975).

Melatonin, which is produced by the pineal gland, usually induces lightening of teleost, amphibian and reptile skin (Binkley, 1988; Binkley *et al.*, 1987, 1988; Filadelfi & Castrucci, 1994; Kavaliers *et al.*, 1980; Reiter, 1991) and is known to operate under circadian rhythm in mole-rats (Richter *et al.*, 2003). However, melatonin secretion peaks under dark conditions (Richter *et al.*, 2003) and is thus unlikely to be involved in the colour changes described above. If melatonin was the main substance involved in this colour change, it would mean that all the individuals studied would have been pale when first unearthed, as melatonin secretion peaks in dark cycles and results in the lightening of the dermis.

Epinephrine (adrenaline) is known to be a pigment aggregating agent, i.e. in the presence of epinephrine, pigment granules aggregate in the centre of the cell thus resulting in the affected tissue (e.g. epidermal cells) becoming lighter in colour (McNiven *et al.*, 1984). Epinephrine is also known to result in a reduction in melanin synthesis, with the reduced levels of melanin resulting in a pale epidermal colouration. Epinephrine is furthermore known to stimulate guanine production, which when combined with melanin results in a pale blue to white colour (Jacobsen, 1985). Although epinephrine is often secreted in small quantities most of the time, when an animal is being handled it becomes stressed and may release epinephrine in sufficiently high quantities to effect a colour change. Fasting and myasis are also perceived to be stressful circumstances under which sufficiently high levels of epinephrine may be released to effect a colour change.

Due to the length of time it takes for the colour change to occur (a matter of hours), an epinephrine precursor, rather than epinephrine itself, is more likely to be responsible for this change. The most likely precursor molecule is nor-epinephrine (nor-adrenaline). Melanin and epinephrine production share similar biochemical pathways, with tyrosine being the starting molecule for the production of both substances (Datta & Ottaway, 1965; Diem & Lentner, 1970). As a result, during stressful times when nor-epinephrine or epinephrine is being produced, less tyrosine is available for melanin synthesis. The reduced levels of melanin result in the skin of the reptile lightening. Since it is known that epinephrine is a pigment aggregating substance, it is possible that one or more of its precursor molecules (e.g. nor-epinephrine) also have pigment-aggregating properties. It could thus be that either one of these mechanisms could be acting in isolation to effect the colour change, or a combination of the lower melanin levels together with the pigment molecules aggregating in the centre of the cell could result in the epidermal cells becoming lighter, thus effecting the colour change.

DISCUSSION

The above-mentioned case studies lead to the hypothesis that the colour changes observed are physiological rather than morphological in nature, and occur in response to environmental stresses such as disturbance and disease and physiological stresses such as starvation. It is further hypothesised that the interaction of the epinephrine and melanin producing biochemical pathways may be the dominant pathways that are responsible for the colour changes that have been observed in these reptiles.

The colour changes do not appear to be edaphically or geographically controlled (morphological colour changes), as in these latter cases the acquired colours are an adaptation to local conditions and cannot be altered in such short time intervals as were observed. In the above case studies it was the same individuals that displayed both the typical dark and the unusual light colour variations and thus this colour change also cannot be attributable to individual variation.

It is also not believed to be a camouflage technique as is the case in most chameleons, agamas and some geckos, as the background colour of the terrarium had

no influence on the colour of the individual housed in it (see observations above).

It is not believed that the individuals in these case studies responded to light intensity either. No individuals that were captured above ground were pale in colour when originally found (even though all were captured during the day), hence ruling out the light intensity theory.

The observed colour change is also not believed to be as a result of shedding as with most snake species. In the above case studies, the time interval from when the colour change appeared until it disappeared was too short for shedding (often only a day or two; reptiles that are about to shed usually display a milky colouration for a number of days preceding shedding) and a shed skin was never found in the cage after the colour change. The same individuals also changed colour too frequently for it to be as a result of shedding. Furthermore, Acontiinae are consistent with other lizards and skinks in that they shed their skin in pieces and not as an entire unit and therefore normally do not display the pale colour that snakes do before they shed.

The colour change is also unlikely to be as a result of moisture loss as is the case in the Leptotyphlopidae, as this phenomenon occurred both when there was and was not a water source readily available in the cage. Even individuals that were housed in cages that did not have a water source from whence to drink returned to their normal colouration after a period of time. The *A. concolor* was kept in a plastic drawer with a moist leaf litter substrate and a readily available water source, but it too showed this colour change after fasting and during myiasis.

CONCLUSION

It has been observed that a number of fossorial reptile species display a change in colour from dark browns and blacks to a pale blue colouration, usually in response to environmental and physiological stresses such as fasting and disease. This colour change may be attributable to the interaction of epinephrine and melanin synthesis, which share a common substrate molecule as the starting point for their respective biochemical pathways. It is suspected that the synthesis of epinephrine and its precursor molecules reduces the amount of tyrosine which is available for the production of melanin, leading to reduced pigmentation and a lightening of the epidermis. This epidermal lightening may be further enhanced by the aggregating properties displayed by epinephrine, and thus possibly also by some of its precursor molecules.

Further observations, experimentation and hormone level quantification over a wider sample of taxa are required to resolve the issue of colour-change in fossorial reptiles.

ACKNOWLEDGEMENTS

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[Figure 1 overleaf]

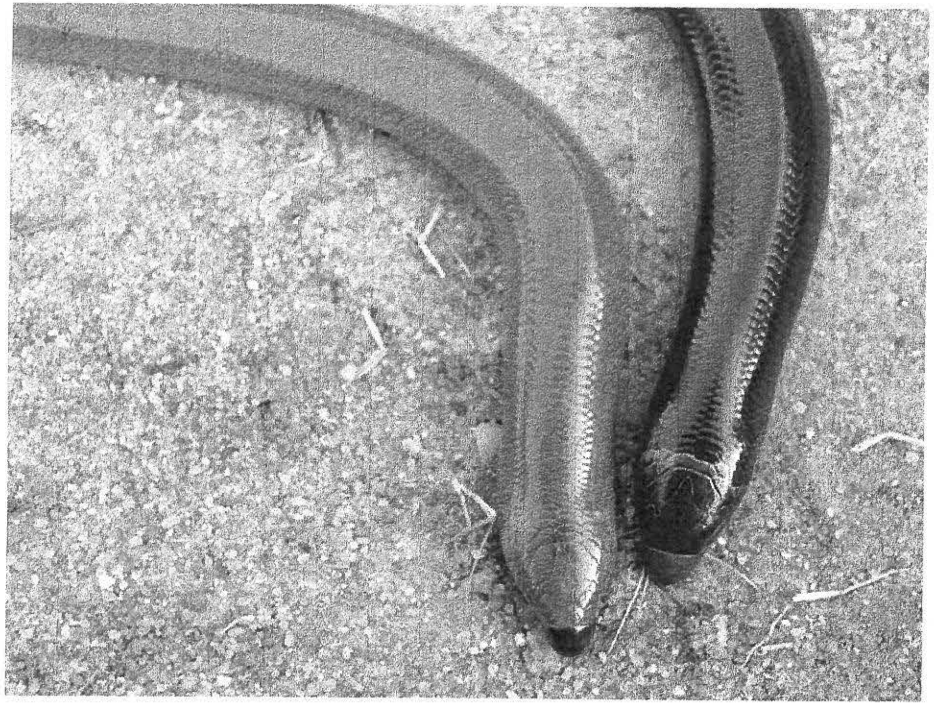

Figure 1. Pale *Acontias plumbeus* (left) and normal-coloured *Acontias plumbeus* (right). (Photo: D. Pietersen)

African Herp News No. 43, pp. 11—16, November 2007

RENAL CARCINOMA IN A BROWN HOUSE SNAKE, *LAMPROPHIS CAPENSE* DUMÉRIL & BIBRON, 1854

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INTRODUCTION

Although many cases of malignant neoplasms have been reported in the literature (Mauldin & Done, 2006: 299), the majority of accounts seem to refer to only one or a few individuals. Renal malignancies appear to have been only infrequently reported. Mauldin & Done list one case of renal adenocarcinoma in *Diporosaurus dorsalis* and two cases of renal adenoma, one in *Iguana iguana* and one in *Diporosaurus dorsalis.* Frye (1991:577) describes four cases of renal adenoma, in *Iguana iguana, Boa constrictor, Drymarchon corais* and *Walterinnesia aegyptiaca*, and one case (p. 588) of renal tubular papillary adenocarcinoma. In view of the paucity of reports on kidney tumours, it seems worthwhile to give an account of the present case.

HISTORY

The snake, an adult female weighing 464 g, was referred by Dr. Arthur Wright on 2 January 2007 as a case of suspected dystocia. She had laid several eggs some 36 hours previously, but a large firm swelling, presumed to be an egg, remained a few centimetres craniad to the cloaca. On examination she was found to be in excellent condition – well nourished, alert, responsive, moving and behaving normally. The clearly visible mass (Fig. 1) was estimated to measure about 3 x 1.5 cm on palpation, and was firm, clearly defined, and fixed. There was no clinical evidence suggestive of intestinal obstruction, nor of hypocalcaemia. 10 ml of half-strength Darrow's solution with 5% dextrose was given by slow infusion over a period of two hours, but six hours later there was still no evidence of labour and delivery by caesarian section was decided upon.

When the patient had been opened by a standard coeliotomy technique, it was immediately clear that the mass was not in fact a retained egg, but a large tumour, apparently associated with the left kidney (Fig. 2). Small secondary tumours were noted, and the case was clearly inoperable. With Dr. Wright's permission, the snake was euthanased and a post-mortem examination was carried out.

POST-MORTEM FINDINGS

Gross morphology

The ovoid tumour measured 4 x 3 cm. Beneath the renal capsule, swollen lobes heavily infiltrated with crystalline urates were clearly discernible (Fig. 3). The texture of the tumour was firm when incised, and the cut surface was pallid and slightly swollen; there was also extensive haemorrhagic infiltration.

Histology

On microscopy, the tumour was found to be a moderately well differentiated adenocarcinoma. There was little tissue showing normal cellular structure; for the most part there was considerable disorder in the arrangement of cells, great variation in cell size and in tubule diameter, and extensive infiltration (Figs. 4 – 7). While in many parts of the tumour some semblance of the normal architecture of the kidney could be discerned, yet in other portions the cells were very poorly differentiated, with bizarre morphology. Nuclei, were mostly normal in size and appearance. There was very little fibrous stroma. Staining with Crystal Violet and with Iodine failed to demonstrate amyloid, which is often present in such tumours.

DISCUSSION

Although most adenocarcinomata tend to metastasize principally by way of the lymphatics, at least initially, those derived from mesenchymal organs such as the kidney spread more frequently via the blood stream. This makes the prognosis, even when the tumour is detected at an early stage, guarded at best.

In the present case, with the tumour so far advanced, there was no hope whatever of successful treatment. It would seem that the tumour started developing at the same time as the eggs (though it is unlikely that there was any direct causal relationship) and therefore escaped notice until after oviposition. Had the snake not been gravid, it is possible that the tumour might have been detected early enough for partial or total nephrectomy to have offered some hope of effective treatment.

Renal carcinoma appears to be relatively uncommon; Frye (*pers. comm.*, 2007) informs me that he has he has come across only some dozen cases in his lengthy experience, and this was the first that I had encountered in some forty years. (Curiously enough, I saw a second case, barely a month later, in a juvenile male

Asian Cobra [*Naja oxiana* Eichwald, 1831], which was also at too advanced a stage to be operable.)

ACKNOWLEDGEMENT

I thank Professor Fredric Frye for commenting on photomicrographs of the tumour and confirming the diagnosis.

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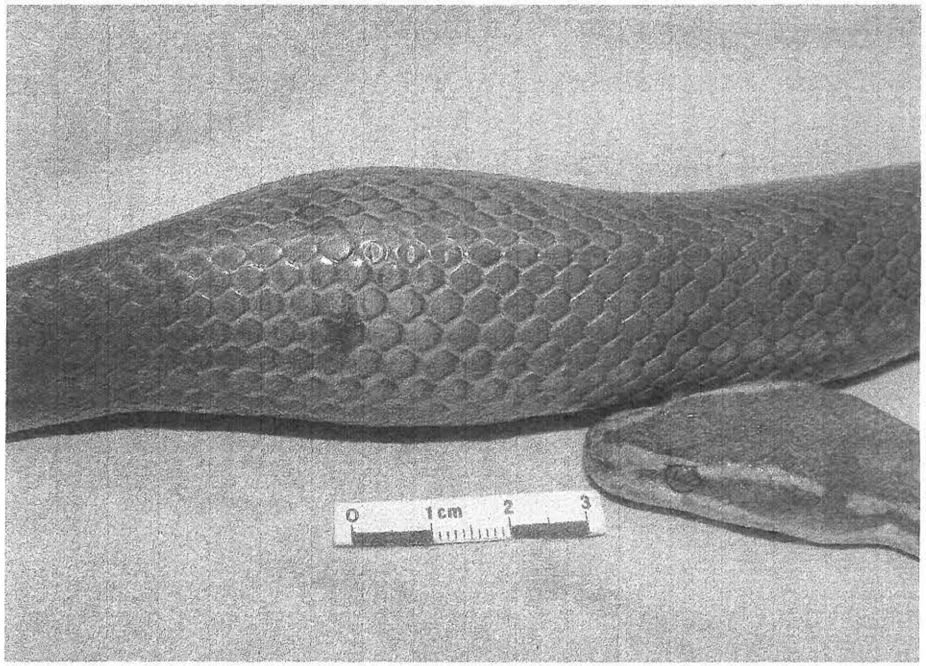
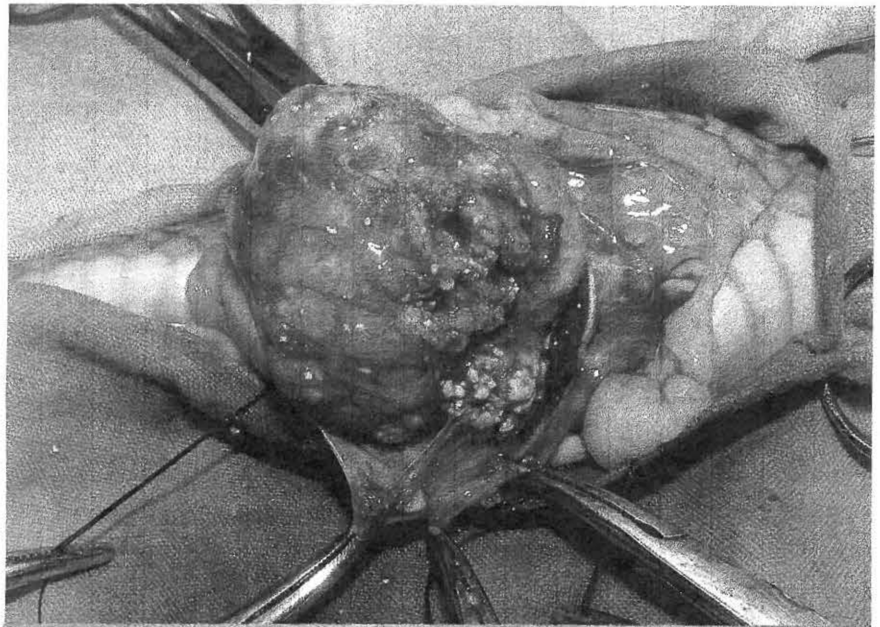


Figure 1. Brown House Snake showing the large precloacal swelling suggestive of egg retention.



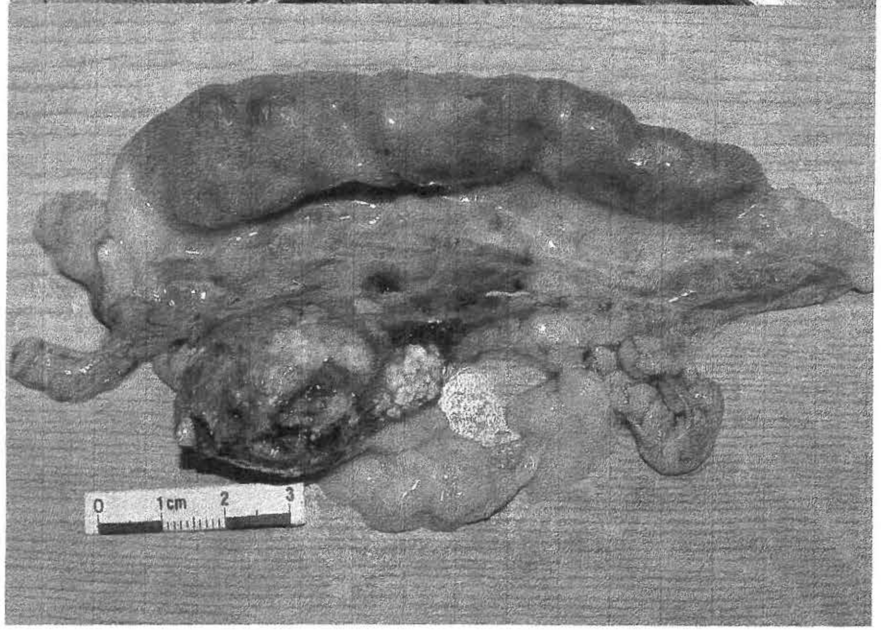
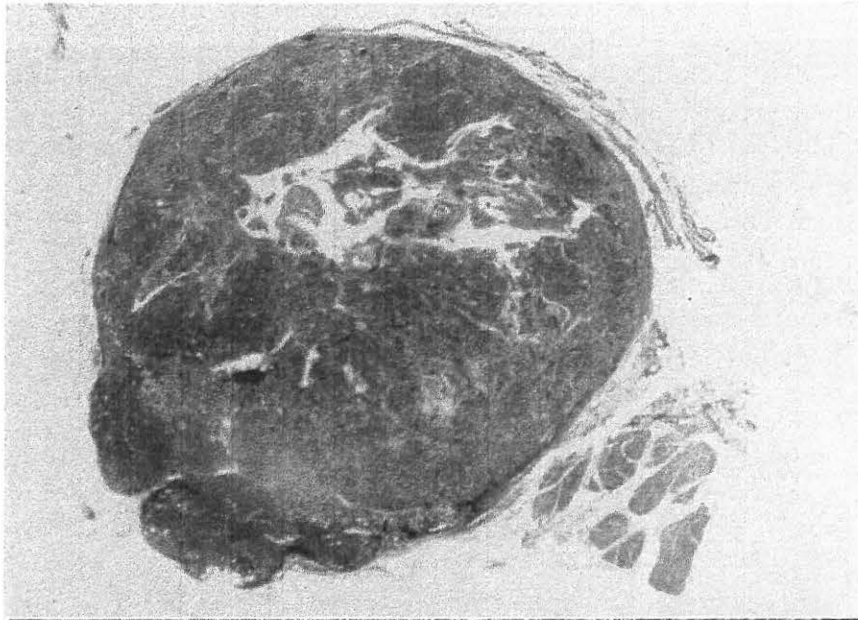


Figure 2 (above). The tumour exposed at operation.
Figure 3 (below). Necropsy specimen showing the tumour in relation to the kidney (above) and the distal portion of the small intestine. The tumour involves the posterior renal segment. Note the extensive renal gout also present.



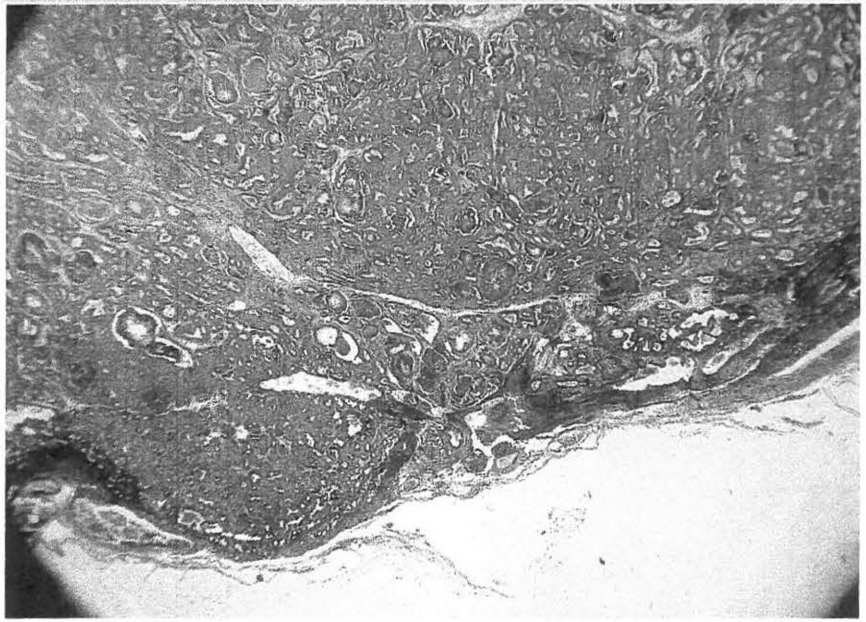
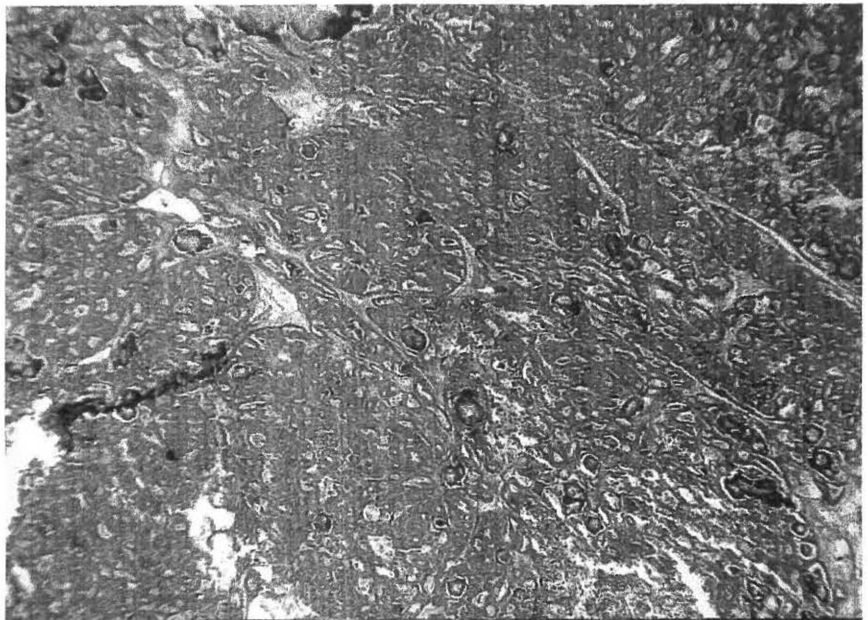


Figure 4 (above). Very low power section of the tumour (Trichrome stain).
Figure 5 (below). Low-power view of a portion of the tumour, showing poorly differentiated cells and abnormal tubule morphology (Trichrome stain).



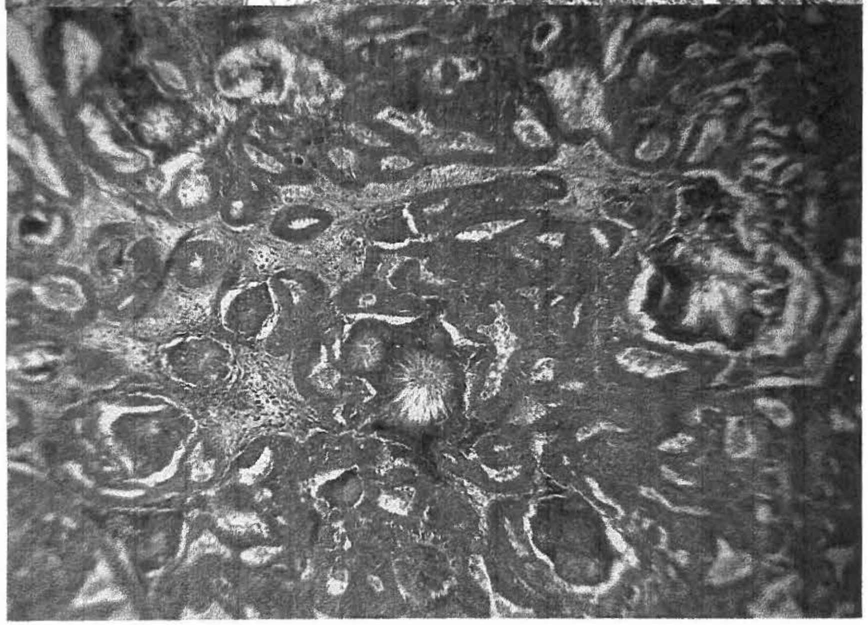


Figure 6 (above) and Figure 7 (below). Note the extensive areas of poor differentiation, bizarre cellular morphology and localised patches of fibrosis. "Starburst" tophi

FIRST ANNOUNCEMENT

THE NINTH SYMPOSIUM OF THE HERPETOLOGICAL ASSOCIATION OF AFRICA

NOVEMBER 2008

The Ninth Symposium of the Herpetological Association of Africa is provisionally scheduled to be held from the 21—26 November 2008.

The venue will be the Sterkfontein Dam Conference Centre, near Harrismith, Free State.

For further details, please contact Dr. Michael Cunningham
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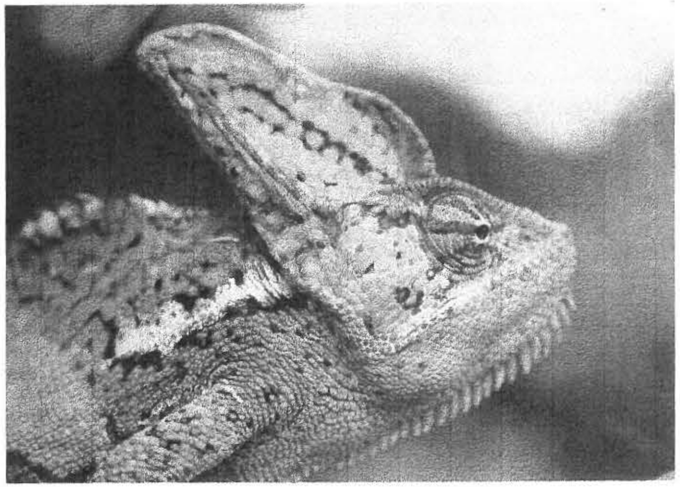

NATURAL HISTORY NOTES

AMPHIBIA: ANURA

HYPEROLIIDAE

Hyperolius mitchelli **Loveridge, 1953**
Mitchell's Reed Frog

AGE OF MATURITY

Although the age of maturity is a very important demographic parameter we are still lacking the data for the majority of amphibian species. Duellman and Trueb (1994. *Biology of Amphibians*. John Hopkins University Press, Baltimore and London) reported that anurans commonly mature at the age of one year. Extremely short time to maturity is known in *Sphaenorhynchus bromelicola* where metamorphosing individuals with visible ovulated eggs were observed (Haddad and Prado 2005. *Biotropica* **32**: 862-871). Here I report on exceptionally short time to maturity in *Hyperolius mitchelli*.

A pair of *Hyperolius mitchelli* (originated from Tanzania) kept in captivity laid a clutch of 140 eggs on 21st September 2006. Five days later 127 tadpoles emerged from the egg capsules. The tadpoles were reared in plastic boxes and fed *ad libitum* with commercial flake fish food. The first tadpole metamorphosed (more exactly emerged from the water) on 13thNovember 13 2006. On 11th January 11 2007 this individual was heard calling for the first time. At this time it measured 19 mm. As the calling activity in males indicates their sexual maturity, this individual of *Hyperolius mitchelli* was mature at the age of 60 days. This is one of the shortest times needed to achieve maturity ever reported for anurans.

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REPTILIA: SQUAMATA; SAURIA

CHAMELEONIDAE

Chamaeleo dilepis **(Leach, 1818)**
Flap-neckeded Chameleon

MORTALITY

On 28 June 2007 I was informed by my daughter that chameleons had been electrocuted on a security fence at her school – St Paul's College – in Windhoek, Namibia (22°34'32.9"S, 17°06'29.8"E, altitude 1720m). On visiting the site two sub-adult Flap-necked Chameleons (*Chamaeleo dilepis*) (SVL 100 mm) were found hanging from the electric strands surrounding a neighbouring residential property bordering St Paul's College. On inspection it was determined that they had been dead for a few days at most. These chameleons must have become active during a warm spell experienced during mid June with subsequent movement leading to their encounter with the electric fence.

The electrocution of reptiles has previously been documented by Boycott & Bourquin (2000) for Leopard Tortoises (*Stigmochelys pardalis*), and Cunningham & Strauss (2005) for Rock Monitor (*Varanus albigularis*) and Bushmanland Tent Tortoise (*Psammobates tentorius verroxii*) with an unconfirmed report of Cape Cobra (*Naja nivea*). Although the Flap-necked Chameleon (*Chamaeleo dilepis*) has been known to be electrocuted in residential gardens in Windhoek, Namibia, whilst attempting to negotiate electric security fences (Adank, *pers. comm.*, Roth, *pers. comm.*) this is the first time I have actually witnessed this.

These urban security fences usually transmit up to 6000-8000 volts (<1amp) and although not lethal to humans, for slow moving reptiles such as chameleons it is a fatal trap. Crime and the associated increase in electric security fences throughout Windhoek are not only socially disturbing, but may have an adverse effect on the reptile fauna, especially chameleons, and should be monitored closely.

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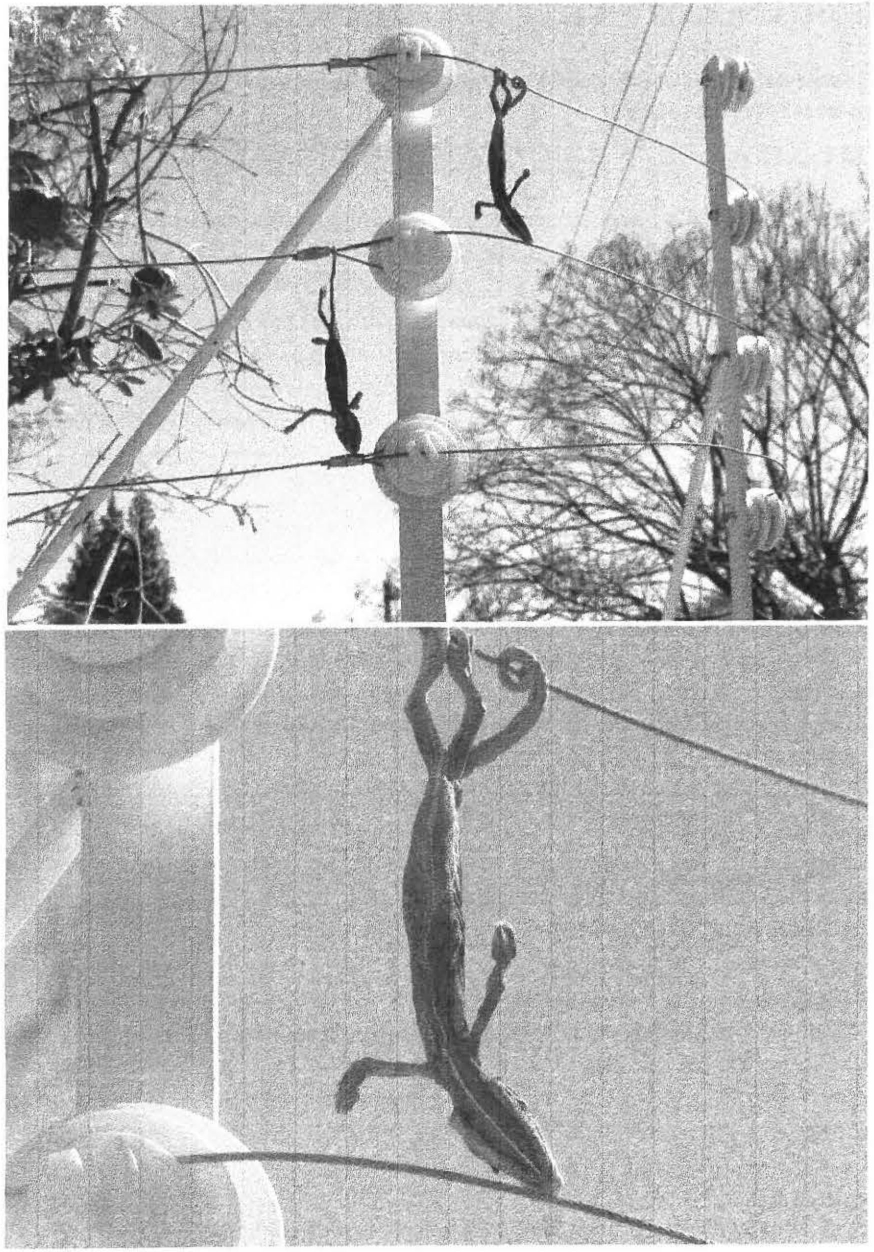

SCINCIDAE

***Acontias meleagris* (Linnaeus, 1758)**
Cape Legless Lizard

PREDATION/DEFENSE

In March 2000 five live specimens of thin-tailed legless lizard, *Acontias meleagris*, were kept temporarily in the laboratory at the University of the Free State, Qwaqwa Campus for later studies. The lizards were placed in one terrarium filled to a depth of about 10cm with fine white sand covered with dry leaf litter. At night the lights were switched off and the terrarium was left uncovered. On the morning of the third day one lizard was found dead on the surface, with several bite injuries along the length of the body. At first, we suspected that the lizard may have been attacked by its conspecifics. The four remaining lizards were then separated, each placed in its terrarium to avoid more deaths, but the terraria were still left open at night. On the sixth day another lizard was found dead with bad wounds. We then decided to cover the terraria of the three remaining lizards, leaving the one without lizards open. A few days later we noticed rat droppings on the covers of the occupied terraria and its tracks on the sand in the terrarium that was left open, pointing to a rat as the possible predator.

It was, however, not clear whether the rat deliberately attacked the lizards for a meal or to defend itself. On close examination, the dead lizards were only bitten to death with no pieces of flesh removed from their bodies, partially supporting the latter suggestion. Naturally, rodents have not been reported to prey on lizards, neither are the legless lizards such vicious predators to incite a defense from rodents. Branch (1998. *Field Guide to the Snakes and Other Reptiles of Southern Africa.* Struik Publishers, Cape Town) mentions burrowing snakes and carnivorous mammals as predators on lizards of the genus *Acontias*. I presume that the success of the attacks by the rat on the lizards was made possible by the restrictions of movement imposed by their confinement in the terraria.

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REPTILIA: SQUAMATA; SERPENTES

COLUBRIDAE

***Psammophis brevirostris* Peters, 1881**
Short-snouted Grass Snake

DIET

As part of a broader study of psammophiine snake diets we dissected and measured an adult female *Psammophis brevirostris* TM 85394 (600 mm SVL, 243 mm TL, 64.0 g) from the Ezemvelo Game Reserve, western Mpumalanga (2528DB) near Bronkhorstspruit. A *Dendromus melanotis* (Grey Climbing Mouse) was extracted from the hindgut. Although identification to species was unambiguous based on key diagnostic features (Skinner & Smithers, 1990), the remains were too fragmentary for accurate weighing and measuring. The specimen was preserved with an incision already in the foregut revealing a distended stomach, which suggests that a more obvious prey item had been previously removed.

Psammophis brevirostris is a diurnal, terrestrial to partly arboreal whipsnake, which ranges from the temperate coast of KwaZulu Natal through the former Transvaal to southeastern Botswana, with a disjunct population in the eastern highlands of Zimbabwe (Branch, 1998; Brandstätter, 1996). This species is reported to have a catholic diet of snakes, lizards, frogs, rodents and birds (Auerbach, 1987; Marais, 2004); however, the seven previously published dietary records identified to the familial level and below imply lizards (five items), especially scincids (four items), are preferred prey items (Shine *et al.*, 2006). The only other non-lizard prey item previously identified to species is the diurnal *Rhabdomys pumilo* (Striped Mouse) (Marais, 1993). This new prey record is the first report of *D. melanotis*, or any nocturnal species, in the diet of *P. brevirostris*. This account, as well as a previous discovery of *Acontias* sp. (burrowing legless skink) in a *P. brevirostris* stomach (Branch & Haagner, 1999), suggest that *P. brevirostris* can locate and capture visually concealed prey.

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Naja n. nigricollis Reinhardt, 1934
Black-necked Spitting Cobra

CONSUMPTION OF MUSEUM VOUCHER SPECIMENS

Scientific voucher specimens (or "Museum specimens") make up a critical aspect of various studies of organismal biology. Such specimens that involve mammalian pelage typically consist of the skin with some stuffing inserted, such that the skin can dry on the form. Documented threats to such vouchers include insects, ultra-violet light, fluctuations in humidity and temperature, mold, water, dust, fire and abusive handling by human researchers (Williams, Laubach & Genoways, 1977), but snakes have never been cited as potential threats. We report here the first record of the consumption of a museum voucher specimen by a cobra.

In June, 2006, the second author (Gara) was involved in a biological inventory of the Simanjiro plains on the eastern edge of Tarangire National Park, Tanzania, which required the collection and preservation of some smaller mammals to document the fauna of the study area. The specimens were prepared following the protocol outlined in Martin, Pine & DeBlase (2001), where cotton is placed inside the skin which is subsequently pinned in position to dry. These resulting "study skins" were prepared in a temporary laboratory located at the ranger post at Boundary Hill on the border of Tarangire National Park. On 13 June 2006 at 2000 hours the second author returned to the laboratory to find a female black-necked spitting cobra (*Naja nigricollis*) on the table where specimens had been left to dry after preparation as voucher specimens. The snake had the study skin of a *Cryptomys hottentotus* (Lesson, 1826) (specimen number IJG 53) in its mouth with approximately one half of it consumed (head first). Mr. Gara killed the snake and found another specimen inside the snake, a *Myomyscus brockmani* (Thomas 1908) where the identification tag had been lost (we presume digested), which the snake had also consumed head first. The *Cryptomys* had been collected and prepared on 8 June 2006. Both rodent specimens still had the pins through the front and back feet that had been inserted to secure the specimens to the drying tray. The snake had a total length of 2000mm, and a tail length of 295mm and is now catalogued at the University of Dar es Salaam Department of Zoology (UDSM 2359).

While the prey items of snakes have been previously documented (Marx & Olechowski, 1970, for example), we know of no previously documented occurrence of a snake ingesting preserved specimens. Both the fact that both voucher specimens were consumed head-first and the collection data associated with the *Cryptomys* specimen, suggest that whatever cues *Naja nigricollis* uses for recognizing prey and orientation during ingestion were still evident in a preserved skin prepared five days previously.

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***Causus rhombeatus* (Lichtenstein, 1823)**
Rhombic Night Adder

AUTUMNAL MATING

On 21 March 2007 at 15h15 a pair of adult night adders were discovered copulating in a garage in a house in Linkside, Port Elizabeth. Weather conditions were still and warm (26°C) at the time. The snakes were tolerant of disturbance, which is often the case with mating snakes. The snakes were captured, photographed and the female relocated to the adjacent Barkens Valley on to which the garden of the house overlooks. The male (PEM R17284) measured 542 + 78 = 610 mm and was retained as a voucher specimen for genetic material.

As with most southern African snakes, mating in Night Adders usually occurs in early spring (Broadley, D.G., 1983, *FitzSimons' Snakes of Southern Africa*, Delta Books, Johannesburg). Autumnal mating, prior to snakes entering winter dormancy, has been observed in wild Puff Adders in the Port Elizabeth region (Branch *pers. obs.*), but details were not recorded. This appears to be the first record of autumnal mating in wild Night Adders in South Africa. Winters in the Eastern Cape coastal region have become noticeably warmed within the last decade, presumably in response to global climate change. Associated changes in the behavioural responses of reptiles in the subcontinent due to seasonal climate shifts can be expected and should therefore be documented.

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GEOGRAPHICAL DISTRIBUTION

REPTILIA: CHELONIA

TESTUDINIDAE
***Homopus signatus* subsp.**
Speckled Padloper

On 11 September 2006 a small Speckled Padloper (*Homopus signatus*) was collected on the dirt road between Pofadder and Onseepkans, Northern Cape province, South Africa (29°04'51"S, 19°24'50"E, 920 m; 2919AB). The specimen, an adult male, was retained in the Port Elizabeth Museum herpetological collection (PEM R17307). Morphology: measurements (mm) - carapace length straight 89, plastron length 70, carapace width middle 63, depth midbody 33, plastral sutures midline, gular 6.4, humeral 14.4, pectoral 7.4, abdominal 25.6, femoral 6.8, anal 10.9; scutellation (right/left) – vertebrals 5, costals 4/4, marginals 12/12, axillaries 2/2, inguinals 1/1. The nuchal is broad and the rear marginals are recurved, but only slight serrate. The beak is bicuspid and a single buttock tubercle is present on the rear surface of each thigh. The penis is everted. The coloration consists of an orange background, yellowing towards the centre of the scutes, with a heavy dark speckling that does not coalesce to form blotches or rays.

The coloration is characteristic of the southern race *H. s. cafer,* even though this race is considered to be restricted to western South Africa, from Klawer south to Piketberg and Citrusdal (Boycott & Bourquin 2000, *The Southern African Tortoise Book. A Guide to Southern African Tortoises, Terrapins and Turtles*. rev. ed., privately published, Hilton. 228 pp.). The serration of the rear marginals, although reduced, is greater than usually found in *H. s. cafer,* and is intermediate with that found in typical *H. s. signatus.* It is possible that the specimen represents a translocation, although it was found nearly 6km north of Pofadder in a sparsely inhabited area and is unlikely to represent a captive escapee. Assuming the specimen represents the species natural distribution, it is the most easterly record, and found some 160 km ENE of records from Springbok.

We have deliberately avoided assigning the specimen to either subspecies due to its intermediate morphology, and that it may be a translocation or a range extension

out of the range of both putative races. Tissues were collected and may resolve the issue in a future phylogeographic study.

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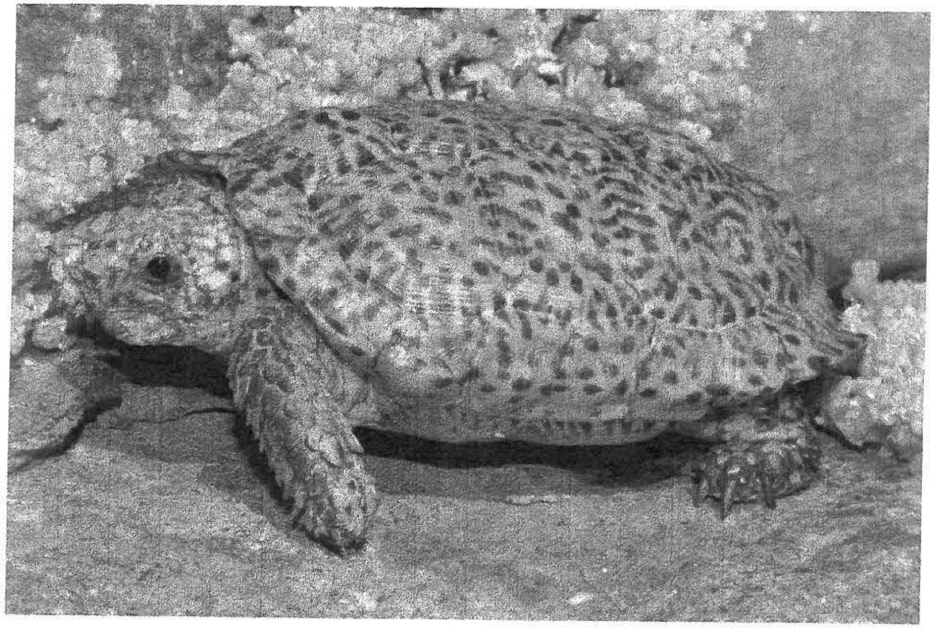

Fig. 1: Speckled Padloper (*Homopus signatus* subsp.) on road from Pofadder to Onseepkans, Northern Cape Province. (Photo: Bill Branch)

BOOK REVIEWS

BOOK REVIEWS

Evolutionary Pathways in Nature. A Phylogenetic Approach.

John C. Avise. 2006. Cambridge University Press, Cambridge and New York. x + 286 pp. Paper cover. ISBN 0-521-67417-4. Available in South Africa from Cambridge University Press South Africa (Pty) Ltd. (www.cambridge.org). R640.00 incl. VAT.

Molecular biology plays a crucial rôle in modern systematics, and establishing phylogenetic relationships from DNA analysis promises (or threatens, depending on one's outlook) to revolutionise approaches to naming and classifying organisms in a paradigm shift greater than anything since Linnaeus's *Systema Naturae*. Some thirty-eight years ago, Angus Bellairs (1969: x) wrote about "... the attitude current among modern biologists who are often more concerned with processes and activities than with animals; indeed there is a danger in some quarters of the zoological establishment that the animals will be forgotten altogether." Not a few recent textbooks and research papers make one suspect that Bellairs was disagreeably prescient, but John Avise's *Evolutionary Pathways in Nature* is a sovereign remedy to anyone who wants to get back to the really important thing, the animals themselves. This book is intended for the university student, the professional biologist and for naturalists who wants an informed, intelligent and intelligible understanding of this wide-ranging, all-pervasive branch of modern biology.

The first chapter gives a relatively brief but clear, comprehensive account of phylogeny, comparative phylogenetics and (also discussed more rigorously in an Appendix) phylogenetic character mapping. The limitations of comparative molecular phylogenetics are dealt with frankly, and the important caveat is given that they can be applied, to some extent, to most of the cases discussed in the rest of the book.

Chapters 2 – 7 deal with Anatomical structures and morphologies; Body colorations; Sexual features and reproductive lifestyles; more behaviors and ecologies; Cellular, physiological and genetic traits; and Geographical distributions. Each chapter includes from eight to 13 topics, of which a sample includes: Whence the Toucan's bill? Hermits and kings; True and false gharials; Loss of limbs on the reptile tree; Fishy origins of tetrapods (Chapter 2); Sexual dichromaticism; Dabbling into duck plumages; Warning colouration in poison frogs; Caterpillar colors and cryptic species (Chapter 3); The chicken or the egg? Piscine placentas; Male pregnancy; Parthenogenetic lizards, geckos, and snakes (Chapter 4); Magnetotaxis in bacteria; Evolutionary reversals of salamander lifecycles; Adaptive radiations in island lizards (Chapter 5); Foregut fermentation; Snake venoms; Warm-bloodedness in fish; The phylogenomics of DNA repair; Roving nucleic acids (Chapter 6); Afrotheria theory; Madagascar's chameleons; Overseas plant dispersal; Bergmann's rule (Chapter 7).

These comprise just a small sample of the fascinating topics that Avise discusses and which capture the joy and wonder of biological science that is all too often forgotten. His style is lucid and easy, yet there is no trace of the "dumbed down" writing that is found in so many present-day undergraduate texts. Here is a book by an intelligent man for intelligent readers, yet there is nothing beyond the capabilities of anyone with an interest in biology who is prepared to read carefully – and, let it be said again, with enjoyment. For here is, in truth, a book that was written to be enjoyed, not grimly mastered as the kind of onerous course requirement that seems to be designed to weed out the less determinedly motivated student. Indeed, this is a book that will kindle interest and enthusiasm in all but the most stultified reader, and even he (or she) would never be likely to look at the living world in the same way again.

The book is well laid out, with a clear type-face and generous margins, on good quality paper. There are no fancy typographical gimmicks to distract the eye from shoddy content or presentation (there is neither!) and the illustrations are beautifully designed. The art-work is superb, both in design and in draughtsmanship, and I spent hours studying and enjoying the illustrations in their own right.

This is the sort of book that, even after fifty years of studying animals in the field and laboratory, is still immensely wonderful and exciting. My only regret is that it had not been published while I was still teaching – I would love to have shared it with all my students!

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REFERENCE

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The Evolution and Extinction of Dinosaurs. Second edition.

David E. Fastovsky and David B. Weishampel. Illustrations by John Sibbick. Cambridge University Press, Cambridge and New York. x + 485 pp. Hard cover. ISBN 0-521-81172-4. Available in South Africa from Cambridge University Press South Africa (Pty) Ltd. (www.cambridge.org). R680.00 incl. VAT.

The preface to the second edition of this book describes it as "a unique, comprehensive treatment of a fascinating group of organisms. It is a detailed survey of dinosaur origins, their diversity and their eventual extinction. … It will appeal to non-specialists and all dinosaur enthusiasts, treating such diverse subjects as birds as 'living dinosaurs,' the new feathered dinosaurs from China, and 'warm-bloodedness.' " This, I think, is a very fair summary of the scope and content of the book, which also addresses in some detail functional morphology, physiology and systematics. The book is illustrated by John Sibbick, who specialises in extinct life forms. (The striking cover illustration reflects an intriguing influence of Mauritz Escher's 1943 lithograph, "Reptiles".)

Quite what is meant by "non-specialists" is perhaps open to question, and is very likely that no two people will agree on a definition. I have therefore tried to look at the book from the perspective of, *seriatim*, a (retired) zoology lecturer; a student taking an undergraduate course in vertebrate biology; an amateur herpetologist; and a layman with an informed interest in natural history.

The book is laid out in four main sections. Part I, "Setting the stage", deals with the general nature of fossils, the Mesozoic world, classification, vertebrates and the origins of the dinosaurs. Part II deals with "Ornithischia: armored, horned and duck-billed dinosaurs", Part III with "Saurischia: predators and giants", and Part IV with "Endothermy, environments and extinction".

In Part I, fossils and taphonomy are discussed rather briefly – although these topics are perhaps marginal to the main theme of the book, I felt that a more comprehensive treatment would be especially valuable to the non-professional reader who would, after all, then be far better able to appreciate just what lies behind the exhibits in the public galleries of museums. Even though the "Important Readings" (which follow each chapter) does lead the interested reader to further literature on these subjects, that presupposes access to a good library – something that is likely to be true for university students, but not necessarily so for the non-specialist reader.

Mesozoic palaeogeology, geomorphology and plate tectonics, and climatology are also described rather too succinctly for comfort. If these topics are deemed sufficiently important to be included in the book, then they should be discussed in sufficient depth to be really useful to the interested reader who wants more than a "gee

whiz!" appreciation of such vital matters. There seems to be a rather distressing tendency in modern texts, at this level, to lower the standards that were required in the remote antiquity of my own student days and this is a matter of both regret and serious concern.

In chapter 2 the authors give the derivation of Phanerozoic as being "*phaneros* – light, meaning visible; *zoo* – life", and perhaps this is an appropriate place to address one particularly irritating aspect of the book, the slovenly derivation of scientific names. *Phaneros* means "visible, open or evident", and is derived from *phaino*, "to show"; it is not derived from *phanos*, "a light"! Similarly, *zoe* is the word meaning "life"; "zoo" is an anglicisation from *zoon*, "animal". To take a few random examples from elsewhere in the book, "*ornith* – bird" should be *ornis* (genitive, *ornithos*); "*dira* – neck" should be *deire*; "*morpho* – shape" should be *morphe*; "*erpet* – a creeper" should be *herpes*; "*cephal* – head" should be *kephale*; "*derm* – skin" should be *derma* (genitive, *dermatos*); "*donto* – tooth" should be *odous* (genitive, *odontos*). Greek and Latin are regrettably no longer taught to students of the life sciences, but there is no excuse for the authors of a text book to further undermine the standards of general education, and it is unfortunate that this should have slipped past the publishers, who have a high reputation for excellence.

Chapters 3 to 5 cover the topics of classification and the origins and evolution of tetrapods. The approach is "explicitly phylogenetic", and although "multiple viewpoints" are presented, these are really little more than different views on cladistics rather than on alternative approaches to classifications. Here, again, I feel rather uncomfortable. Mayr (1969: 70) points out that cladistics is only one of several phylogenetic processes and in this review I prefer to use the more precise term "cladistic" rather than the potentially ambiguous "phylogenetic" when discussing classification. Cladistics is a very powerful tool in determining and understanding the relationships between organisms, but has some drawbacks at the undergraduate level that, current opinion notwithstanding, the more old-fashioned evolutionary approach to classification does not – at least from the didactic perspective, and we must remember that this book is aimed specifically at the non-specialist. I have emphasized this point because while the cladistics approach is essential to the specialist, the student is likely to be very confused by the often major differences that he will see in different text-books. Taking some books almost at random off my shelf, the interpretations given in the book under present review and those in Carpenter & Currie (1990), Dingus & Rowe (1998), and Benton (2005) differ so much from one another in a number of details as to be potentially quite confusing to the student – and even more so when a comparison is made with the more traditional (and more accessible, at this level!) classifications in, for example, Ivanov, Hrdličková & Gregorová (2001) and Cranfield (2004)

Having said that, the discussion of cladistics is clear and informative, as is the discussion of vertebrate interrelationships (Chapters 3 – 5). Nevertheless, I cannot agree that a cladogram that will be well known to most readers – that demonstrating that a lungfish is more closely related to a cow than to a salmon – is "universally regarded as correct for the salmon, the cow and the lungfish." This is a concept that the majority of my students rejected out of hand as being thoroughly counter-intuitive, despite accepting the premises on which the argument is founded! And perhaps they have a point – despite birds being widely regarded as dinosaurs, we have yet to see a revised edition of Roberts' Living Dinosaurs of South Africa!

All these criticisms notwithstanding, the book as a whole is an excellent introduction to dinosaurs. It not only covers what is known of dinosaur structure as revealed by fossil remains, but also deals quite extensively with what has been deduced from modern techniques in biomechanics, palaeoclimatology and a whole host of other disciplines, regarding dinosaur biology. The style is clear and easy, and the book is really enjoyable to read. What makes it even more accessible to the interested layman is the series of boxes scattered throughout, which present fascinating snippets and insights not only into the dinosaurs themselves, but also into the people behind it all. The very complex and controversial topic of the evolution of birds and the feathered dinosaurs from China is dealt with clearly and thoroughly, and there is a very useful discussion of dissenting opinions that will materially help the student unravel the intricacies of this problem.

Part IV, Endothermy, environments and extinction, brings fossils to life in a rather different way. Here we see them not as bones in a museum, but as living organisms in a dynamic environment – how they lived, diversified to a degree unparalleled elsewhere among tetrapods, and eventually (for the most part) died out. The mechanisms of background and mass extinctions are discussed clearly and informatively, as is their bearing on higher taxa. This is just the kind of text that I, as a lecturer, would love to have my students read thoroughly – it is guaranteed to provoke a lot of thought and discussion and, hopefully, lots of different opinions!

Despite the criticisms that I have given, this book is a valuable and informative guide to an important group (or groups) of vertebrates. It is very well written, equally well illustrated, and well presented. It is definitely a book that should be on the shelves of anyone interested in dinosaurs, and in all university biology department libraries.

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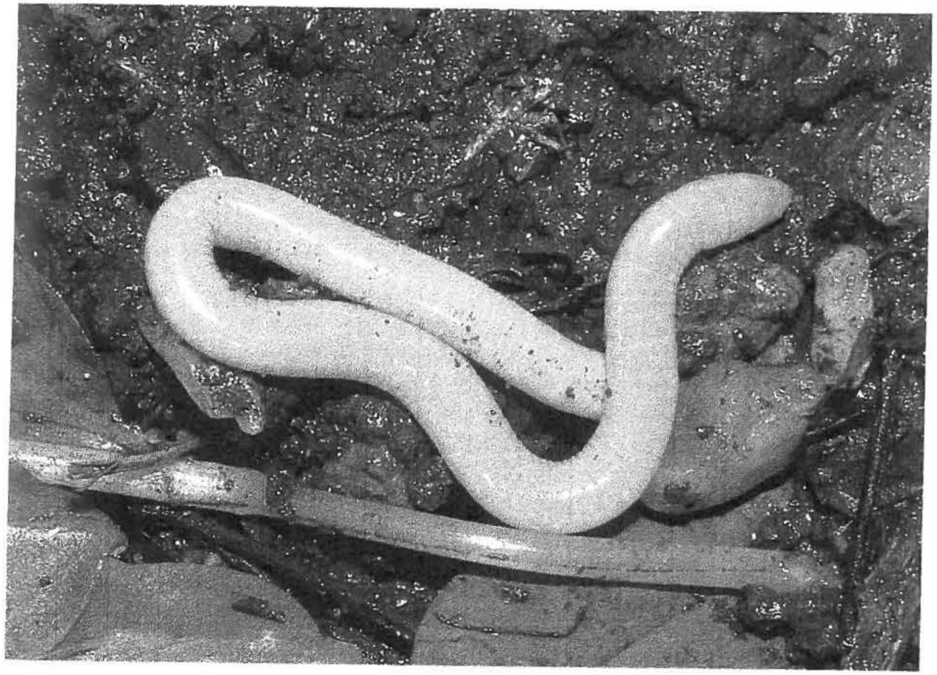

Schistometopum thomense (Bocage, 1873). Photo: Angelo Lambiris

INSTRUCTIONS TO AUTHORS

Contributions (preferably in Word 6.0, 7.0 or Windows XP) submitted in an incorrect style (see guide-lines below) will be returned to the authors.

ARTICLES

African Herp News publishes longer contributions of general interest that would not be presented as either Natural History Notes or Geographical Distributions.

A standard format is to be used, as follows: **TITLE** (capitals, bold, centred); **AUTHOR(S)**[(1,2)] (bold, centred); Author's address(es) (use superscripts with authors' names and addresses if more than one author); **HEADINGS** (bold, centred) and **SUBHEADINGS** (bold, aligned left) as required; **REFERENCES**, following the formats given below:

BRANCH, W.R., 1998: *Field Guide to the Snakes and Other Reptiles of Southern Africa.* Third edition. Struik, Cape Town.

BROADLEY, D.G. 1994: The genus *Scelotes* Fitzinger (Reptilia: Scincidae) in Mozambique, Swaziland and Natal, South Africa. *Ann. Natal Mus.* **35**: 237-259.

COOK, C.L., & MINTER, L.R., 2004: *Pyxicephalus adspersus* Peters, 1854. pp. 303-305, *in* Minter, L.R., Burger, M., Harrison, J.A., Braack, H.H., Bishop, P.J., and Kloepfer, D. (eds.), *Atlas and Red Data Book of the Frogs of South Africa, Lesotho and Swaziland.* SI/MAB Series #9. Smithsonian Institution, Washington, DC.

NATURAL HISTORY NOTES

Brief notes concerning the biology of the herpetofauna of the African continent and adjacent regions, including the Arabian peninsula, Madagascar, and other islands in the Indian ocean.

A standard format is to be used, as follows: **Scientific name** (including author citation); **Common name** (using Bill Branch's *Field Guide to Snakes and Other Reptiles of Southern Africa*, third edition, 1998, for reptiles; and Passmore & Carruthers' *South African Frogs*, 1995, for amphibians as far as possible): **KEYWORD** (this should be one or two words best describing the topic of the note, e.g. Reproduction, Avian predation, etc.); the **Text** (in concise English with only essential references quoted and in abbreviated form); **Locality** (Country; Province; quarter-degree locus; location; latitude and longitude if available; elevation above sea level); **Date** (day, month, year); **Collector(s); Place of deposition and museum accession number** (required if specimens are preserved). **References**, if only one or two, should be incorporated into the text; three or more references should be placed after the main text, as for Articles. **Submitted by**: **NAME**, Address.

GEOGRAPHICAL DISTRIBUTION

Brief notes of new geographical distributions (preferably at least 100 km from the nearest published the nearest published record) of amphibians and reptiles on the African continent and adjacent regions, including the Arabian peninsula, Madagascar, and other islands in the Indian Ocean.

A standard format is to be used, as follows: **Scientific name** (including author citation); **Common name** (for sources, see Natural History Notes); **Locality** (Country; Province; quarter-degree locus; location; latitude and longitude; elevation above sea level); **Date** (day, month, year); **Collector(s); Place of deposition and museum accession number** (required if specimens are preserved); **Comments**, including data on the size, colour and taxonomic characters, eg. scalation, webbing, especially for taxonomically problematic taxa; and nearest published locality record(s) in km; **References**, if only one or two, should be incorporated into the text; three or more references should be placed after the main text, as for Articles. **Submitted by**: **NAME**, Address.

Records submitted should be based on specimens deposited in a recognised collection.

HERPETOLOGICAL SURVEYS

African Herp News publishes sparsely annotated species lists resulting from local surveys of amphibians and reptiles on the African continent and adjacent regions, including the Arabian peninsula, Madagascar, and other islands in the Indian Ocean. The area surveyed may be of any size but should be a defined geographic unit of especial relevance to the herpetological community. For example, surveys could address declared or proposed conservation reserves, poorly explored areas, biogeographically important localities or administrative zones. The relevance of survey results should be judged by the extent that these records fill distributional gaps or synthesise current knowledge.

Survey results should be presented in the following format: **TITLE, including an indication of the survey area or locality** (country, province or state, location, quarter-degree units, or bounding latitude and longitude); **AUTHOR(S)** (format as for long articles, above) **Dates** (day, month, year); **Statement of relevance**; and **SPECIES LIST**, in tabular form comprising ***Scientific name*** (including author citation), **Location / Habitat**; **Evidence** (including registration numbers and location of vouchers); and **Comments** (where required). The note should end with a **SUMMARY** statement and **REFERENCES**.

As far as possible survey records should be based on accessible and verifiable evidence (specimens deposited in public collections, photos submitted illustrating diagnostic features, call recordings and sonograms, or DNA sequences accessioned into international databases).

PHOTOGRAPHS AND FIGURES

Photographs and figures should be submitted as separate JPEG files, and not embedded in the text. The name of the photographer should be given, if not taken by the author or senior author of the article.

HERPETOLOGICAL ASSOCIATION OF AFRICA
(Founded in 1965)

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