TRACHEMYS DORBIGNI (Brazilian Slider Turtle): ALBINISM. The occurrence of albino turtles is widely disseminated in marine species (Godfrey & Mrosovsky, 1995), but reports about freshwater albino turtles are rare (Basu et al., 2003).

On 7 January 2005 three albino hatchlings of *Trachemys dorbigni* were collected from a total of 2,114 individuals, other hatchlings and eggs from an illegal trade apprehension. The apprehension was conducted in Capão Seco district, city of Rio Grande, RS, Brazil (UTM 22J 379079 E 6475207 N). The hatchlings were located next to each other in the collection and were probably from the same clutch.

The albino hatchlings were yellowish-white (Fig. 1), whereas all other *T. dorbigni* showed the characteristic colour pattern for this species. They all had red eyes and tail atrophy. Carapace and plastron morphometric comparisons were made between the normal (non-albino) animals (n = 100) and the albino hatchling (n = 3). The average size of the albino hatchlings was 31.9 mm CL; 34.6 mm CW; 34.0 mm PL and a carapace height (CH) of 15.5 mm. The average size in the normal hatchlings was 35.9 mm CL; 33. mm CW; 35.0 mm PL and 15.5 CH. In these hatchlings the length of the carapace always exceeded the width in a 1.06 ratio. In the albino hatchlings this proportion was inversed, with the carapace width being larger than the length (0.92). Bager (unpublished data) previously measured over a thousand normal hatchling *T. dorbigni* and none showed a larger carapace width than length. The albino hatchlings also presented variation in the pattern of carapacial scutation. One of the hatchlings had six vertebral scutes, another had five right costal scutes and the third had two cervical, six vertebral, five right costal and thirteen right marginal scutes. There was no variation on the plastron scutation. Changes in carapacial scutation is common for this species (Bujes & Verrasto, 2007) and therefore this observation is not an exclusive albino characteristic.

To the best of my knowledge this is the first known occurrence of an albino hatchling of *Trachemys dorbigni* collected from the wild.

Figure 1. Albino hatchling of *Trachemys dorbigni* from Rio Grande do Sul, Brazil.

REFERENCES

Godfrey, M.H. & Mrosovsky, N. (1995). Comment on albino sea turtle hatchlings in Brazil. *Marine Turtle Newsletter* **69**, 10-11.

Basu, D. Srivastava, S. & Singh, S. P. (2003). A case of albinism in *Kachuga tentoria circumdata* (Testudines: Bataguridae). *Hamadryad* **27**, 254.

Bujes, C. & Verrasto, L. (2007). Supernumerary epidermal shields and carapace variation in Orbigny's Slider Turtles, *Trachemys dorbigni* (Testudines, Emydidae). *Rev. Brasileira de Zool.* **24**, 666-672.

Submitted by: ALEX BAGER, *Departamento de Biologia, Universidade Federal de Lavras. Campus Universitário, 37200-000 Lavras, Minas Gerais, Brasil.* abager@dbi.ufla.br.

DENDROPSOPHUS DECIPIENS and ***DENDROPSOPHUS MINUTUS***: DEFENSIVE BEHAVIOUR. Amphibians are preyed upon by a vast array of invertebrates and vertebrates. As a result, amphibians have developed a wide variety of defensive behaviors (Duellman & Trueb, 1994; Wells, 2007). *Dendropsophus minutus* is a small sized frog belonging to the *D. minutus* group (Faivovich et al., 2005). It is widely distributed throughout South America (Frost, 2009). *Dendropsophus decipiens* is a small sized frog belonging to the *D. microcephalus* group (Faivovich et al., 2005). It occurs from southeastern

to northeastern Brazil, near the Brazilian Atlantic coast (Frost, 2009). On 9 November 2009 at around 19:30, MRM observed a defensive behaviour displayed by specimens of *D. decipiens* (Fig. 1) and *D. minutus* (Fig. 2) upon capture. Once individuals of these species were grasped with the hand or stimulated by tapping on the dorsal region they both exhibited a similar reaction behaviour, in which the hands of the frog were placed next to its face, close to the eyes, and with fingers outstretched. The observation took place in a permanent pond in the Serra do Brigadeiro State Park, a conservation unit in the municipality of Araponga, State of Minas Gerais, Brazil (20º43'19"S, 42º28'43"W, elev. 1320 m, datum SAD1969).

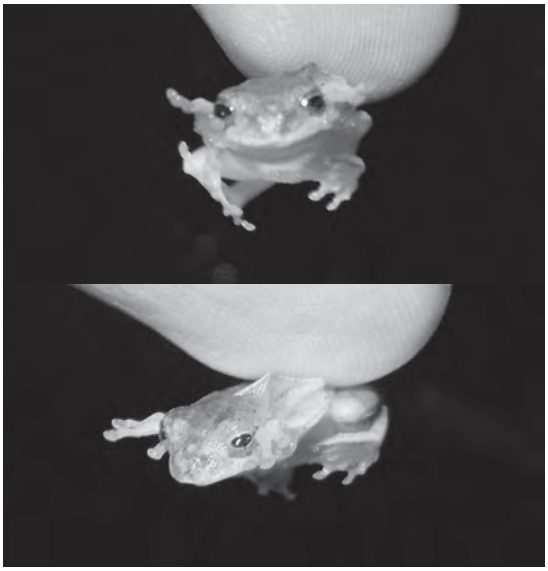

Figure 1. Defensive behaviour displayed by *Dendropsophus decipiens.*

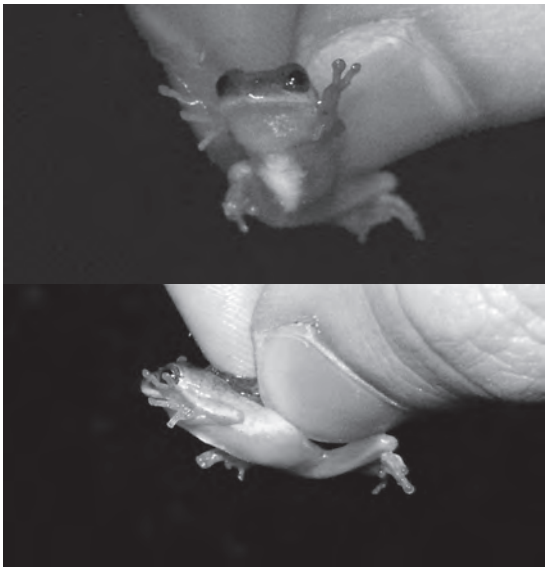

Figure 2. Defensive behaviour displayed by *Dendropsophus minutus.*

Angulo & Funk (2006) suggested the term "boo behaviour" for this kind of defense. It has been reported for other Hylinae species such as *Hypsiboas semilineatus* (Azevedo-Ramos, 1995), *Hypsiboas calcaratus* and *Hypsiboas fasciatus* (Angulo & Funk, 2006), and *Hypsiboas geographicus* (Angulo et al., 2007), although the term "boo behaviour" has not always been used.

Different functions have been suggested to explain the adaptive value of this behaviour in arboreal species. It has been proposed that it makes it difficult for a predator to rediscover a treefrog if its falls from the vegetation after an attack, that it serves to protect the eyes (Azevedo-Ramos, 1995), that it is used for sending an anti-signal to potential predators by changes in the familiar frog outline, or that it could challenge predator ingestion (Angulo & Funk, 2006). Angulo et al. (2007) verified that after a brief period of time some individuals that displayed "boo behaviour" modified their defensive position, moving the hands close to the body and scrunching fingers until reaching a death-feign position. Angulo et al. (2007) also suggest plasticity in anti-predator strategies, with the "boo behavior" strategy being a variant of a death-feigning posture. Voucher specimens were deposited at the herpetological collection of the Museu de Zoologia João Moojen, Universidade Federal de Viçosa, in Viçosa, Minas Gerais, Brazil (*D. decipiens*, MZUFV 10172-10173; *D. minutus* MZUFV 10174-176).

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REFERENCES

Angulo, A. (2006). *Hyla calcarata* (Rana de Espolones) and *Hyla fasciata* (NCN). Defensive Behavior. *Herpetol. Rev.* **37** (2), 203-204.

Angulo, A. Acosta, A.R. & Rueda-Almonacid, J.V. (2007). Diversity and frequency of visual defensive behaviors in a population of *Hypsiboas geographicus*. *Herpetol. J.* **17**, 138-140.

Azevedo-Ramos, C. (1995). Defense behaviors of the neotropical treefrog *Hyla geographica* (Anura, Hylidae). *Rev. Bras. Biol.* **55**, 45-47.

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

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

Frost, D.R. (2009). Amphibian Species of the World: an Online Reference. Version 5.3. <http://research.amnh.org/herpetology/amphibia>. [Accessed: November 2009].

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

Submitted by: MARIO RIBEIRO DE MOURA*, JUSSARA SANTOS DAYRELL and RENATO NEVES FEIO. *Museu de Zoologia João Moojen, Departamento de Biologia Animal, Universidade Federal de Viçosa, Vila Gianetti 32, CEP 36570-000 Viçosa, Minas Gerais, Brazil.* *mariormoura@gmail.com.

LEPTODACTYLUS OCELLATUS (Butter frog): DIET. *Leptodactylus ocellatus* is a large frog species, widely distributed throughout South America, east of the Andes, occurring from Venezuela to Argentina (Cei, 1980). It inhabits a wide variety of aquatic environments and is often found in altered landscapes (Solé et al., 2009). Information about its diet is available for populations from Argentina (Gallardo, 1958; Gallardo, 1964; Lajmanovich, 1996; Sanabria et al., 2005), Uruguay (Maneyro et al., 2004) and Brazil (Teixeira & Vrcibradic, 2003; França et al., 2004; Kokobum & Rodrigues, 2005; Solé et al., 2009), and indicate that the species is a generalist predator (Teixeira & Vrcibradic, 2003; Solé et al., 2009). Arthropods and vertebrates of different groups have been reported as prey of *L. ocellatus* and also other amphibian species (Gallardo, 1964; Solé et al., 2009). Here we present information about the diet of *L. ocellatus* from a locality in the southeast of Brazil.

The stomach contents of eight specimens (six females and two males) were analyzed from frogs collected at an artificial pond near the urban area of Coimbra municipality, Minas Gerais state, Brazil (20°52'31"S, 42°48'26"W) on 2 December 2008, 9 and 15 January 2009. All specimens were found on the ground near pond margins. Five of them were housed as voucher specimens at the herpetological collection of Museu de Zoologia João Moojen (MZUFV), Universidade Federal de Viçosa, Viçosa municipality, Minas Gerais state, Brazil under the register numbers MZUFV 9046-9050. The prey items were identified to the lowest possible taxon, weighed to the nearest 0.01 g and separated as "intact" and "fragmented". The snout vent length (SVL) of frogs ranged from 66.99 mm to 103.38 mm, and frog's mass ranged from 30.09 g to 124.16 g. A total of eight prey categories were found among the intact prey items, and four among the fragmented ones, along with non identified arthropod remains (Table 1). Coleopterans, both intact and fragmented, were the majority of prey items (25%), followed by Formicidae (21.43%) and Gastropoda (Pulmonata) (10.71%).

Two adult specimens of *Physalaemus cuvieri* (Anura, Leiuperidae) (Fig. 1) were identified among the stomach content of a female *L. ocellatus* collected on 2 December 2008 (MZUFV 9046). This anuran prey item was the dominant prey in relation to the content mass (42.59%). The *P. cuvieri* specimens were dissected and revealed that they were a couple (possibly amplectant at the time of death). The female had numerous cream to white coloured oocytes and the testicles of the male were dark pigmented, indicating sexual maturation

Stomach contents	N	%N	mass (g)	% mass
Intact prey				
Gastropoda (Pulmonata)	3	10.71	1.16	10.95
Araneae	2	7.14	2.95	27.86
Blatodea	1	3.57	0.03	0.28
Coleoptera (Cicindelidae)	3	10.71	0.59	5.57
Hemiptera (Cercopidae)	1	3.57	0.04	0.38
Hymenoptera (Formicidae)	6	21.43	0.36	3.40
Lepidoptera (larvae)	2	7.14	0.14	1.32
Anura (*Physalaemus cuvieri*)	2	7.14	4.51	42.59
Fragmented prey				
Coleoptera	4	14.29	0.09	0.85
Araneae	1	3.57		
Orthoptera	1	3.57		
Hemiptera	2	7.14		
Arthropod remains	---	---	0.07	0.66
Plant remains and sediments	---	---	0.65	6.14

Table 1. Summary of stomach contents of *Leptodactylus ocellatus* from Coimbra, Minas Gerais, Brazil. N = number of prey items; % N = percentage of prey items.

Figure 1. Couple of *Physalaemus cuvieri* ingested by a female *Leptodactylus ocellatus* (see text). White vertical bar = Scale: 1 cm.

(Moresco & Oliveira, 2009). As Gallardo (1964) stated that amphibians gathering for reproduction can be preyed upon by *L. ocellatus*, it is possible that the couple were ingested while mating or attempting to mate.

Physalaemus cuvieri is widespread in Brazil, south of the Amazon rainforest and like *L. ocellatus*, is well adapted to a wide variety of aquatic habitats, breeding in temporary and permanent puddles, streams or swamps (Bokermann, 1962; Eterovick & Sazima, 2004). Males of this species call mainly at night, floating in water (Bokermann, 1962; Eterovick & Sazima, 2004), making them a susceptible prey for *L. ocellatus*. *P. cuveri* has also been reported as prey of water bugs and snakes (Toledo, 2003; Pombal Jr., 2007) but this is the first record of its presence in the diet of *L. ocellatus*.

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REFERENCES

Bokermann, W.C.A. (1962). Observações biológicas sobre *Physalaemus cuvieri* Fitz., 1826 (Amphibia, Salientia). *Rev. Bras. Biol.* **22** (4), 391-399.

Cei, J.M. (1980). Amphibians of Argentina. *Mon. Zool. Ita. N. S. Mon.* **2**, 1-609.

Eterovick, P.C. & Sazima, I, (2004). *Anfíbios da Serra do Cipó, Minas Gerais – Brasil.* PUC Minas: Belo Horizonte. 150 pp.

França, L.F., Facure, K.G. & Giaretta, A.A. (2004). Trophic and spatial niches of two large-sized species of *Leptodactylus* in South-eastern Brazil. *Stud. Neotrop. Fau. Env.* **39** (3), 243-248.

Gallardo, J.M. (1958). Observaciones sobre el comportamiento de algunos anfibios argentinos. *Cien. Inv.* **14** (7), 291-302.

Gallardo, J.M. (1964). Consideraciones sobre *Leptodactylus ocellatus* (L.) (Amphibia, Anura) y especies aliadas. *Physis Tomo* **24**, 373-384.

Kokobum, M.N.C. & Rodrigues, A.P. (2005). *Leptodactylus ocellatus* (Rã-manteiga). Cannibalism. *Herpetol. Rev.* **36** (3), 303.

Lajmanovich, R.C. (1996). Dinámica trófica de juveniles de *Leptodactylus ocellatus* (Amphibia, Leptodactylidae), en una isla del Paraná, Santa Fe, Argentina. *Cuad. de Herpetol.* **10** (1-2), 11-23.

Maneyro, R., Naya, D.E., Canavero, A. & Camargo, A. (2004). Diet of the South American frog *Leptodactylus ocellatus* (Anura, Leptodactylidae) in Uruguay. *Iher. Ser. Zool.* **94** (1), 57-61.

Moresco, R.M. & Oliveira, C. (2009). A comparative study of the extracutaneous pigmentary system in three anuran amphibian species evaluated during the breeding season. *S. Am. Jour. Herpetol.* **4** (1), 1-8.

Pombal Jr., J.P. (2007). Notas sobre a predação em uma taxocenose de anfíbios anuros no sudeste do Brasil. *Rev. Bras. Zool.* **24** (3), 841-843.

Sanabria, E.A., Quiroga, L.B. & Acosta, J.C. (2005). Dieta de *Leptodactylus ocellatus* (Linnaeus, 1758) (Anura: Leptodactylidae) en un humedal del oeste de Argentina. *Rev. Peru. Biol.* **12** (3), 472- 477.

Solé, M., Dias, I.R., Rodrigues, E.A.S., Marciano-Jr, E., Branco, S.M.J., Cavalcante, K.P. & Rödder, D. (2009). Diet of *Leptodactylus ocellatus* (Anura, Leptodactylidae) from a cacao plantation in southern Bahia, Brazil. *Herpetol. Notes* **2**, 9-15.

Teixeira, R. & Vrcibradic, D. (2003). Diet of *Leptodactylus ocellatus* (Anura, Leptodactylidae) from coastal lagoons of Southeastern Brazil. *Cuad. de Herpetol.* **17** (1-2), 113-120.

Toledo, L.F. (2003). Predation on seven South American anuran species by water bugs (Belostomatidae). *Phyllomedusa* **2**, 105-108.

Submitted by: EMANUEL TEIXEIRA DA SILVA, Departamento de Biologia Animal, Universidade Federal de Viçosa, Campus Universitário, CEP 36570-000, Viçosa, MG, Brazil. etsbio@yahoo.com.br, PATRICIA DA SILVA SANTOS, Departamento de Zoologia, Universidade Federal de Minas Gerais, Av. Antônio Carlos 6627, CEP 31270-901, Belo Horizonte, MG, Brazil, and OSWALDO PINTO RIBEIRO FILHO, Departamento de Biologia Animal, Universidade Federal de Viçosa, Campus Universitário, CEP 36570-000, Viçosa, MG, Brazil.

GAVIALIS GANGETICUS (Indian Gharial): BEHAVIOUR. *Gavialis gangeticus* is one of the more recognisable and iconic species on our planet which is presently in decline and at immediate risk of extinction (Loh et al., 2008). Currently, it is listed as critically endangered under the IUCN Red List with population levels dropping drastically in recent years to just 220 breeding adults in the wild (Choudhury et al., 2009). Declines are attributed to: illegal hunting for its prized snout ('Ghara'), skin and eggs; accidental trapping from illegal fishing; and habitat loss from a variety of sources including sand-mining, agriculture, dams, and siltation. All of these are major threats that show no sign of abating (Whitaker, 2007). Limited surveillance of the number of wild animals hampers population monitoring and detailed information on its ecology is still relatively sparse (Sharma & Basu, 2004).

The Gharial (*G. gangeticus*) and False Gharial (*Tomistoma schlegelii*) have distinct morphological characteristics which differentiate them from all other crocodilians. These traits, in particular the elongate and narrow jaw, have long been regarded as an adaptation to aid their ichthyophagous diet (Singh & Bustard, 1982; Whitaker & Basu, 1982; Thorbjarnarson, 1990). Recent molecular advances suggest that convergent adaptation has not shaped morphological characters in *T. schlegelii* but rather it should be placed into Gavialidae with *G. gangeticus*, becoming a sister family to the Crocodylidae (Norell, 1989; Poe, 1996; Gatesy et al., 2003, 2004, 2008; Willis et al., 2007). This taxonomic shift suggests the morphological characters observed in the Gavialidae likely evolved early on in the radiation of the family.

In this note I present preliminary observations of male combat by *G. gangeticus*, involving its unusual morphological characters that may be unique among Crocodylia. On 1 June 2007 between 14:30 and 15:00 at the Madras Crocodile Bank Trust (MCBT), 40 km south of Chennai, Tamil Nadu, India, two large adult male *G. gangeticus* (approximately 4-5 m) were observed showing typical territorial signs of chasing each other and displaying to females by arching their dorsum out of the water. During these displays the two males presented an unrecorded behaviour that the staff and I at the MCBT have named 'fencing'. The males moved towards each other (head on), propelled themselves out of the water, and using their jaws like swords, tried to push each other to the water's edge (Fig. 1). No biting or mouth gaping was observed, only strong swipes to the jaw of the opponent. The fight continued for approximately 30 minutes before one male retreated to the far side of the enclosure whilst the winner (in this case, also the larger) male moved closer toward the females. Several unconfirmed reports of this behaviour have been recorded at MCBT. Due to this style of territorial fighting, I recommend that males be housed independently of each other with a small group of females (between 5-7) when specimens are held in captivity for essential conservation breeding programmes.

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REFERENCES

Choudhury, B.C., Singh, L.A.K., Rao, R.J., Basu, D., Sharma, R.K., Hussain, S.A., Andrews, H.V., Whitaker, N., Whitaker, R., Lenin, J., Maskey, T., Cadi, A., Rashid, S.M.A., Choudhury, A.A., Dahal, B., Win Ko Ko, U., Thorbjarnarson, J. & Ross, J.P. (2007). *Gavialis gangeticus*. In: IU CN 2009. IUCN Red List of Threatened Species. Version 2009.2. <www.iucnredlist.org>. [Accessed: 19 November 2009].

Gatesy, J., & Amato, G. (2008). The rapid accumulation of consistent molecular support for intergeneric crocodylian relationships. *Mol. Phylogenetics & Evol.* **48**, 1232-1237.

Gatesy, J., Amato, G., Norell, M., DeSalle, R. & Hayashi, C. (2003). Combined support for wholesale taxic atavism in Gavialine crocodylians. *Syst. Biol.* **52**, 403-422.

Gatesy, J., Baker, R. & Hayashi, C. (2004). Inconsistencies in arguments for the supertree approach: supermatrices versus supertrees of Crocodylia. *Syst. Biol.* **53**, 342-355.

Figure 1. *Gavialis gangeticus*, male-male combat ('fencing'). © Simon T. Maddock.

Loh, J., Collen, B., McRae, L., Carranza, T.T., Pamplin, F.A., Amin, R. & Baillie, J.E.M. (2008). Living Planet Index. In: Living Planet Report 2008. C. Hails (Ed.). Pp. 6-20. Glandt, Switzerland: WWF International.

Norell, M.A. (1989). The higher level relationships of the extant Crocodylia. *J. Herpetol.* **23** (4), 325-335.

Poe, S. (1996). Data set incongruence and the phylogeny of crocodilians. *Syst. Biol.* **45**, 393-414.

Sharma, R. & Basu, D. (2004). Recent reversals in the population of Gharial in the National Chambal Sanctuary in North India; implications and a suggested strategy for the conservation of one of the world's most endangered crocodilians. In: Crocodiles: Proceedings of the 17th Working Meeting of the Crocodile Specialist Group. Crocodile Specialist Group (Ed.). Pp. 180-186. Gland, Switzerland: IUCN.

Singh, L.A.K. & Bustard, H.R. (1982). The snout of the Gharial *Gavialis gangeticus* (Gmelin). *British J. Herpatol.* **6**, 253-258.

Thorbjarnarson, J.B. (1990). Notes on the feeding behavior of the Gharial (*Gavialis gangeticus*) under semi-natural conditions. *J. Herpetol.* **24** (1), 99-100.

Whitaker, R. & Basu, D. (1982). The Gharial (*Gavialis gangeticus*): a review. *J. Bombay Nat. Hist. Soc.* **79**, 531-548.

Whitaker, R. (2007). The Gharial: going extinct again. *Iguana* **14**, 24-33.

Willis, R.E., McAliley, L.R., Neeley, E.D. & Densmore III, L.D. (2007). Evidence for placing the False Gharial (*Tomistoma schlegelii*) into the family Gavialidae: Inferences from nuclear gene sequences. *Mol. Phylogenetics & Evol.* **43** (3), 787-794.

Submitted by: SIMON T. MADDOCK, *School of Biological Sciences, Bangor University, Bangor LL57 2UW, UK*. natureboyuk6@btinternet.com.