

NATURAL HISTORY NOTES

VARANUS FLAVESCENS (Yellow Monitor): DISTRIBUTION AND REPRODUCTION.

Varanus flavescens was first described in 1827 by Hardwicke and Gray as *Monitor flavescens* from its type locality, India. The current range for the species in southern Asia includes the floodplains of Indus, Ganges, and Brahmaputra rivers of Pakistan, Northern India, Nepal, Myanmar, and Bangladesh (Auffenberg et al., 1989; Zug et al., 2003; Visser, 2004; Islam 2009). The species is highly secretive and has proved to be difficult to locate (Visser, 2004). *V. flavescens* has been described as widely distributed in Bangladesh (IUCN, 2000; Khan, 2008). However, very few specific locations have been known due to its unclear distribution within the country and because virtually no published natural history information is available on the Bangladesh population. The species is categorized nationally as 'Endangered' (IUCN, 2000). This note confirms the distribution of a breeding pair in the Netrokona District of northern Bangladesh and is the first confirmed record for the Dhaka Division. The report also describes some reproductive activities of a breeding pair.

On 15 June 2009, a brightly coloured breeding pair of *V. flavescens* was observed displaying courtship behaviour at the entrance of a burrow close to a seasonally flooded water body (Fig.1). The site is in Chandpur Village (24°57'48" N, 90°52'21" E; WGS 84) of Netrokona District under Dhaka Division. The nearest records were from the hill forests of Sylhet (> 200 km east of the present locality) and Chittagong (> 450 km south) Divisions (Islam, 2009). No voucher specimen was collected because of the species' endangered status. Several photographs were taken as reference. Identification was verified by Bryan Stuart and photographs have been deposited at the USDZ, Raffles Museum of Biodiversity Research, National University of Singapore. The photographs are catalogued as ZRC [IMG] 2.122.

V. flavescens is a diurnal species active in the summer months between April and September (Ali Reza pers. obs.). The breeding pair in Chandpur Village was found on a mid June afternoon (14:00) close to a burrow. Breeding activity was observed

for approximately one hour. Chandpur Village in Netrokona District is situated in the northern part of Bangladesh on the foothills of the Himalayas. Seasonal flooding is common in the area but most of the plains are used for agriculture. Natural vegetation is altered by garden allotments, orchards and commercial plantations.



Figure 1. *Varanus flavescens* at the entrance of the burrow. © M.S.H. Sourav.

The male was observed mating with the female for about fifteen minutes. The male was differentiated from the females due to its slightly bigger body size and bright coloration. Although common in other varanids, this breeding pair of *V. flavescens* did not show any biting activity during courtship. The pair was calm and unaggressive when they engaged in copulation. When approached to take photographs, the pair remained alert and the female retreated into the burrow while the male stayed outside carefully observing us (Fig.1). After several minutes, the male followed the female into the burrow. Visser (2004) reported that courtship and mating in *V. flavescens* occurs in June and July, at the beginning of the wet season. This has also been documented for captive animals. The specimens observed herein displayed a similar seasonal breeding phenology.

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REFERENCES

- Auffenberg, W., Rahman, H., Iffat, F. & Perveen, Z. (1989). A Study of *Varanus flavescens* Hardwicke and Gray (Sauria Varanidae). *J. Bombay Nat. Hist. Soc.* **86** (3), 286-307.
- Islam, M.A. (2009). *Varanus flavescens*. In: *Encyclopedia of Flora and Fauna of Bangladesh, Vol. 25. Amphibians and Reptiles*. Pp. 103-104. Kabir, S.M.H., Ahmad, M., Ahmed, A.T.A., Rahman, A.K.A., Ahmed, Z.U., Begum, Z.N.T., Hassan, M.A. & Khondker, M. (Eds.). Dhaka, Bangladesh: Asiatic Society of Bangladesh.
- IUCN (2000). *Red Book of Threatened Amphibians and Reptiles of Bangladesh*. IUCN-The World Conservation Union. Bangladesh Country Office. Xii + 95 pp.
- Khan, M.M.H. (2008). *Protected Areas of Bangladesh - A Guide to Wildlife*. Dhaka, Bangladesh: Nishorgo Program.
- Visser, G. (2004). *Varanus flavescens*. In: *Varanoid Lizards of the World*. Pp. 179-183. Pianka, E. & King, D.R. (Eds.). Indiana: Indiana University Press.
- Zug G.R., Leviton, A.E., Vindum, J.V., Wogan, G.O.U. & Koo, M.S. (2003). Checklist of the Myanmar Herpetofauna from the Myanmar Herpetological Survey Project. <www.calacademy.org/research/herpetology/myanmar>. [Accessed: 2009].

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XENOCHROPHIS PISCATOR (Checkered Keelback): PREDATION. All snakes are predators, and as a whole, they prey on a very large variety of organisms (Mattison, 1995). But since some are generalists, while others are opportunists, and because there may be a variation between different populations of the same species (Mattison, 1995), it is important to state the locality, as well as the prey species in snake diet reports. Additionally, prey should be identified to the lowest taxonomical classification possible to develop not only an understanding of the ecology of the snake species in question, but also to provide information which could contribute to the understanding of the ecology of the prey species. Here, we report on Checkered Keelback, (*Xenochrophis piscator* [Schneider, 1799], formerly *Natrix piscator*) predation on a Heymonsi's Narrow-mouthed Toad (*Microhyletta heymonsi* [Vogt, 1911], formerly *Microhyla heymonsi*), and Asian Snake-head Fish (*Channa asiatica* [Linnaeus, 1758]).

At ca. 10:30 on 07 July 2006, a male *X. piscator* (197 mm SVL, 89 mm tail length, 8.3 g) was observed moving along the bottom of the fence on the inside of a 6 x 6 m enclosure, constructed of 3 mm plastic mesh, erected in a Betelnut Palm (*Areca catechu*) plantation in Santzepu, Sheishan District, Chiayi County, Taiwan (23°28'23"N, 120°29'15"E; datum: WGS84). The vegetation on the inside of the enclosure was very dense and consisted of *Ageratum catechu*, *A. conyzoides*, *Bidens pilosa* var. *radiata*, *Ipomoea cairica*, *I. obscura*, *Ludwigia octovalvis*, *Mikania micrantha* and *Panicum maximum*. The *Xenochropis piscator* was captured and it was noted that the mid-body was greatly enlarged. After gentle palpation of the enlarged area of the mid-body, the snake regurgitated an anuran, along with a large number of anuran ova. The prey item was identified as a female *Microhyletta heymonsi* (ca. 25mm SVL, 1.6 g). Since it was regurgitated head and forelimbs first, combined by the fact that parts of the hind limbs were already partly digested, it is believed it was ingested in a vent first position. Although *M. heymonsi* is a common species in lowlands and foothills of central and southern Taiwan, it is listed under the Wildlife Conservation Laws of Taiwan as a protected species due to the destruction of its

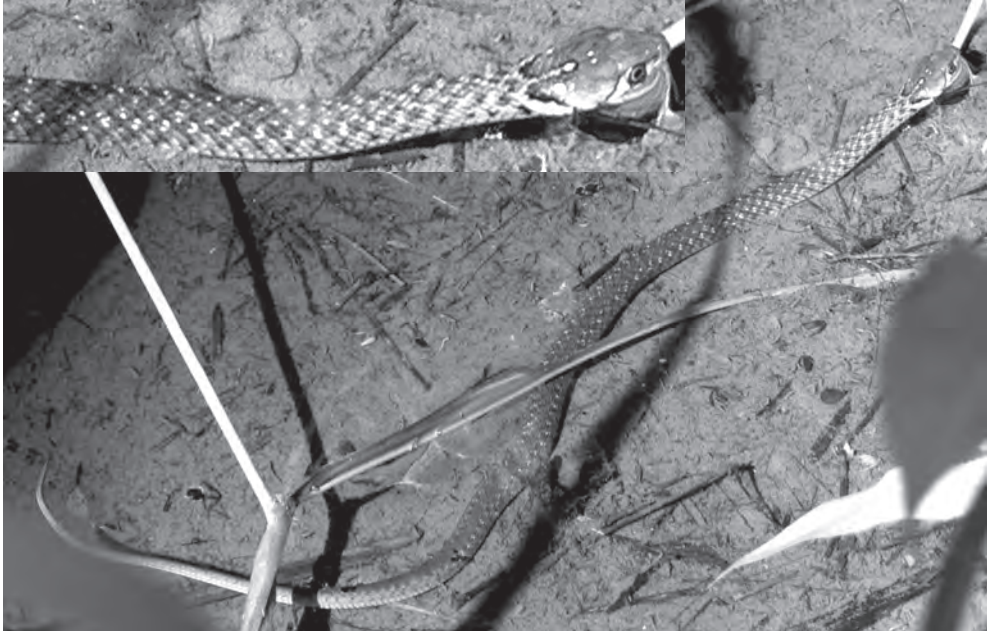


Figure 1. *Xenochrophis piscator* in a drainage ditch in an *Areca catechu* plantation in Santzepu, Sheishan District, Chiayi County, Taiwan (Photographed by G. Norval).

habitats (Yang, 1998). During the breeding season (March to September), males usually call from within vegetation or leaf-litter along the edges of pools and marshes (Yang, 1998). In the *A. catechu* plantations in Santzepu, *X. piscator* can often be seen in drainage ditches and puddles (G. Norval, pers. obs.) (Fig.1). Since *M. heymonsi* is mostly terrestrial and only enters water for oviposition, and because the *M. heymonsi* described herein still contained ova, it is likely that the predation event took place on land. This is consistent with earlier observations that *X. piscator* tends to capture anuran prey on land (Mao, pers. obs.).

On 3 October 2006, a female *X. piscator* (655 mm SVL, 200 mm tail length, 209.7 g) was collected by Mao from a wetland at the Youth Industrial Park, Taoyuan County, Northern Taiwan, where he is conducting wildlife monitoring. Soon after being captured, the snake regurgitated a *Channa asiatica* (182mm TL [total length], 52 g) tail first and it was noted that the head was partially digested. Snakehead Fish (Genus *Channa*) are well known aquatic predators in Asia and are considered to be exotic invasive species of serious concern in the U.S.A. (Courtenay & Williams,

2004). In a previous study, it was found that the presence or absence of the alien *Channa striata* affected the abundance of sympatric Chinese Water Snakes (*Enhydryis chinensis*) in several fishponds in northern Taiwan (Mao, unpubl. data). However, in some of our field observations we found that the large semi-aquatic snakes of Taiwan (e.g. *Sinonatrix annularis* and *S. percarinata suriki* [Mao, 2003]) seem to prey on the indigenous Snakehead Fish (e.g. *C. asiatica*). In captivity, *C. asiatica* has been observed to spontaneously approach, and even attempt to attack, the small water snakes in neighboring tanks. There is thus a possibility that Snakehead Fish and water snakes in natural conditions in Taiwan have prey/predator switching interactions.

Xenochrophis piscator, is a common species in the areas where it occurs, which extends over most of sub-Himalayan Asia (Kuntz, 1963; Cox et al., 1998; Das, 2002; Das & De Silva, 2005). Although it has been stated that *X. piscator* occasionally preys on smaller snakes (Kuntz, 1963) and mice (Cox et al., 1998), our observations differ. Instead, we have found that these snakes prey on amphibians and fish, as reported by Pope (1929), Das (2002) and Das

& De Silva (2005). As well as some unidentified amphibians and fish, Pope (1929) reported *Barbus snyderi*, Rhodein Carp (*Rhodeus spinalis*), and *Rana limnocharis* as prey of *X. piscator*.

Colubrids commonly prey on creatures about 20% of their own mass (Greene, 1997), and the prey/predator weight-ratios for the *M. heymonsi* and *C. asiatica* described herein were 19.28% and 24.80% respectively. Even though the prey sizes were not out of the ordinary for this type of snake, to our knowledge, this is the first description of *X. piscator* preying on *M. heymonsi* and *C. asiatica*.

REFERENCES

- Cox, M.J., van Dijk, P.P, Nabhitabhata, J. & Thirakhupt, K. (1998). *A Photographic Guide to Snakes and Other Reptiles of Peninsular Malaysia, Singapore and Thailand*. London: New Holland Publishers (UK) Ltd.
- Courtenay, Jr., W.R. & Williams, J.D. (2004). Snakeheads (Pisces, Channidae): A Biological Synopsis and Risk Assessment. U.S. Geological Survey circular; 1251.
- Das, I. (2002). *A Photographic Guide to Snakes and Other Reptiles of India*. London: New Holland Publishers (UK) Ltd.
- Das, I. & De Silva, A. (2005). *A Photographic Guide to Snakes and Other Reptiles of Sri Lanka*. London: New Holland Publishers Ltd.
- Ernst, C.H. & Zug, G.R. (1996). *Snakes in Question: The Smithsonian Answer Book*. Washington: Smithsonian Institution Press.
- Greene, H.W. (1997). *Snakes: the evolution of mystery in nature*. California: University of California Press.
- Kuntz, R.E. (1963). Snakes of Taiwan. *Quart. J. Taiwan Mus.* **16**, 15-17.
- Lee, W.J. & Lue, K.Y. (1996). The preliminary study on the food habits of snakes in Taiwan. *Biol. Bull. NTNU.* **31** (2), 119-121. (In Chinese)
- Lue, K.Y., Tu, M.C. & Shang, G.S. (2002). *The Transition World - Guidebook of Amphibians and Reptiles of Taiwan*. Taipei: SWAN.
- Mao, J.J. (2003). Population ecology of genus *Sinonatrix* in Taiwan. Ph.D. Thesis in Biogeography, Trier University, Germany.
- Mattison, C. (1995). *The Encyclopedia of Snakes*. New York: Checkmark Books.
- Pope, C. H. (1929). Notes on reptiles from Fukien and other Chinese provinces. *Bull. Amer. Mus. Nat. Hist.* **58** (8), 335-487.
- Yang, Y.J. (1998). *A Field Guide to the Frogs and Toads of Taiwan*. Taipei: Nature and Ecology Photographer's Society.

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LEPTODACTYLUS OCELLATUS (Butter Frog): DIET. *Leptodactylus ocellatus* is a large anuran, widely distributed throughout South America, east of the Andes (Ceil, 1980). It inhabits a wide variety of aquatic habitats, being found even in altered areas (Solé et al., 2009). It has a generalist diet (Teixeira & Vrcibradic, 2003; Solé et al., 2009), with adults preying upon small vertebrates and other anurans, although the latter prey item comprises a minor part of its diet (Gallardo, 1964; Solé et al., 2009). Here we report an event of predation on another species of *Leptodactylus* by *L. ocellatus* from a locality in the Southeast of Brazil.

During a field expedition near the urban area of the municipality of Carangola (20°42'35"S, 42°01' 54"W), State of Minas Gerais, Brazil, on 25 November 2009, at 20:42, we witnessed an adult female *L. ocellatus* (SVL 93.90 mm) preying upon an adult female *Leptodactylus* aff. *mystaceus* (SVL 44.82 mm) that was hidden among grass (Fig. 1) near a small temporary pond. The frogs were located by the distress calls emitted by the prey. After approximately 10 minutes the predator attempted to escape. We then collected both frogs. The specimens were housed at the collection



Figure 1. A female *Leptodactylus ocellatus* (MZUFV 10187) attempting to ingest a female *Leptodactylus* aff. *mystaceus* (MZUFV 10188). Photo by R. C. Heitor.

of Amphibians at the Museu de Zoologia João Moojen (MZUFV), Universidade Federal de Viçosa, Viçosa municipality, State of Minas Gerais, Brazil, under the registration MZUFV 10187 (*Leptodactylus ocellatus*) and 10188 (*Leptodactylus* aff. *mystaceus*). Besides the occurrence of cannibalism (Teixeira & Vrcibradic, 2003; Kokobum & Rodrigues, 2005), the only other *Leptodactylus* spp. previously reported as prey of *L. ocellatus* was *Leptodactylus furnarius* (França et al., 2004).

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REFERENCES

- Cei, J.M. (1980). Amphibians of Argentina. *Mon. Zool. Ita. N. S. Mon.* **2**, 1-609.
- França, L.F., Facure, K.G. & Giarretta, A.A. (2004). Trophic and spatial niches of two large-sized species of *Leptodactylus* (Anura) in Southeastern Brazil. *Stud. Neo.trop. Fau. Env.* **39** (3), 243-248.
- Gallardo, J.M. (1964). Consideraciones sobre *Leptodactylus ocellatus* (L.) (Amphibia, Anura) y especies aliadas. *Physis Tomo XXIV* (68), 373-384.
- Kokobum, M.N.C. & Rodrigues, A.P. (2005). *Leptodactylus ocellatus* (Rã-manteiga). Cannibalism. *Herpetol. Rev.* **36** (3), 303.
- 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. Herpetol.* **17** (1-2), 113-120.
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