

## HERPETOCULTURE NOTES

### TESTUDINES — TURTLES

**CHITRA INDICA (Narrow-headed Softshell Turtle). CAPTIVE BREEDING.** The endangered *Chitra indica* is a large and highly aquatic softshell turtle native to the Indian subcontinent (Asian Turtle Trade Working Group 2000. The IUCN Red List of Threatened Species 2000: e.T4696A11088615. Accessed on 25 Nov 2015). Overharvesting for protein and traditional medicine are putative causes of continued population decline (Das and Singh 2009. *Chelon. Res. Monogr.* 05:027.1–027.7). Ongoing efforts for species recovery in parts of its range include protection of wild-collected nests and head-starting of emergent hatchlings (Singh and Horne 2011. *In* Turtle Survival, pp. 93–98. Turtle Survival Alliance, Fort Worth, Texas). This note provides an account of *C. indica* breeding at a captive facility in Guadalupe Co., Texas, USA, and we believe it represents the first report of a captive-raised (F1) individual of *Chitra* spp. breeding outside its known range. Other successful programs exist; for example, a captive breeding program was established for the congeneric *Chitra chitra* (Siamese Narrow-headed Softshell Turtle) at the Kanchanaburi Inland Fisheries Development Center (KIFDC), Thailand in



FIG. 1. A *Chitra indica* hatchling measuring 32.8 mm in length and weighing 6.8 g that emerged after 69 days of incubation on 27 September 2015 at a captive facility in Guadalupe Co., Texas. We believe this documents the first report of a captive raised individual (F1) of *Chitra* spp. successfully reproducing outside its known range.

2000 (Kuchling and Kitimasak 2010. *Trop. Nat. Hist.* 10:189–197). Breeding was documented at the onset of the program (Kuchling and Kitimasak 2010, *op. cit.*) indicating that wild-caught females were used in establishing the program and to date no published account of breeding by captive reared individuals exists.

On 18 July 2015, a 14-year-old *C. indica* (carapace length [CL] 53.6 cm; weight 14.5 kg) captive raised from a hatchling deposited a clutch of 26 spherical eggs in the water of its fiberglass tank. This female was raised in a circular raceway of 7 m × 5 m (diameter × depth) and had been recently moved to the new tank that was 5 m × 2 m × 1 m (length × width × depth) where a nesting beach was not available to her. Mean diameter of the eggs was 28 ± 0.25 mm and mean weight was 10.8 ± 0.22 g. The eggs were transferred to a 1:1 medium of vermiculite and water and incubated at 28°C using a thermal air incubator. The rationale for choosing this incubation temperature was that nests of the congeneric *C. chitra* were successfully incubated in captivity at weekly mean temperatures that fluctuated between 29–31°C (Kuchling and Kitimasak 2010, *op. cit.*) A single hatchling (CL: 32.8 mm, weight 6.8 g) emerged after a period of 69 days on 27 September 2015 (Fig. 1). Four completely developed hatchlings failed to emerge (mean CL: 24.3 ± 0.9 mm, mean weight 5.63 ± 0.48 g) while the remainder of eggs contained demonstrably developed juveniles (39%) that failed in development earlier or were infertile (42%). Captive care over a duration of 14 years yielded this first reported breeding in a captive-raised *Chitra* spp. Such long generation times should be a key consideration when creating and managing captive breeding and headstarting programs for chelonians.

**SHASHWAT SIRSI** (e-mail: s\_s477@txstate.edu), **SCOTT K. DAVIS**, and **MICHAEL R. J. FORSTNER**, Department of Biology, Texas State University, 601 University Drive, San Marcos, Texas 78666, USA (e-mail: MF@txstate.edu).

### SQUAMATA — LIZARDS

**XANTUSIA RIVERSIANA (Island Night Lizard). CAPTIVE DIET.** *Xantusia riversiana* has seldom been kept in zoological institutions, and very little is known about its diet in captivity. In the wild, *X. riversiana* has the broadest diet of all *Xantusia* species (Brattstrom 1952. *Copeia* 1952:168–172). Brattstrom (1952, *op. cit.*) studied the stomach contents of 67 *X. riversiana*, which included plant material, insects such as ants and other arthropods, and their own shed skins. A more recent dietary study of 26 food samples and 268 fecal pellets from wild-caught *X. riversiana* showed ground spiders (*Drassylus barbatus*), ground beetles (*Amara* sp.), terrestrial isopods (*Porcellio* and *Porcellionides* sp.), and ants (*Aphaenogaster patruelis*) as the most common prey items (Fellers and Drost 1991. *Herpetol. Monogr.* 5:28–78). Fruits of the Australian Saltbush (*Atriplex semibaccata*), flowers, fruits and leaves of Boxthorn (*Lycium californicum*), and fruits of the ice plant (*Mesembryanthemum* sp.) comprised the majority of plant material taken by *X. riversiana* (Fellers and Drost 1991, *op. cit.*).

The San Diego Zoo currently maintains three wild-caught adult *X. riversiana* (presumed to be 1,2), and five unsexed juveniles that were born in captivity at the zoo. The adults arrived in July 2014 and females were presumed to have been gravid when

received into the collection. Two offspring were born on 19 September 2014 from one female, and three were born on 27 September 2014 from another female. Since their arrival, the adults have been weighed monthly, and have maintained constant weights of 23.78, 16.88, and 23.35 g, respectively. These weights are consistent with those of wild adult *X. riversiana*, which range from 15–25 g (Fellers and Drost 1991, *op. cit.*; Goldberg and Bezy 1974. *Herpetologica* 30:350–360). The five offspring have consistently been weighed since birth and have shown body mass increases of 32.5%, 40%, 53.8% and 105% since September 2014.

At the San Diego Zoo, the diet offered to captive *X. riversiana* is comprised of a finely-chopped salad and a mixture of finely-chopped vegetables and fruit, which is offered three times a week (Monday, Thursday, Saturday). The salad, fruit and vegetable mixes are diced into very small pieces using a blender and served on a small plate. The chopped salad is comprised of a mix of collards, bok choy, dandelion, mustard, romaine, kale and Swiss chard. The fruit and vegetable mix contains yam, carrot, squash, apple, tomato, papaya, banana and grapes. A vitamin and mineral supplement consisting of 94.5% ground herbivore supplement (Western Milling, Goshen, California, USA), 3% dicalcium phosphate, and 2.5% calcium carbonate by weight, is mixed into the salad mix for added nutrition. On Fridays, Sundays, and Wednesdays, individuals are offered two- to three-week-old crickets (*Acheta domestica*) dusted with Reptivite vitamin D<sup>3</sup> supplementation (Zoo Med Laboratories, San Luis Obispo, California, USA), termites (*Reticulitermes flavipes*), and soldier fly larvae (*Hermetia illucens*). Every other month, live baby house mice (*Mus musculus*) weighing 3–6 g each, are offered to the adult *X. riversiana*. This is based on observations of adult *X. riversiana* depredating 5-day-old San Clemente Bell's Sparrow (*Artemisiospiza belli clementeae*) chicks, which weigh approximately 10–12 g each (Bridges et al. 2015. *West. North Amer. Nat.* 75:248–249). The captive *X. riversiana* have been observed consuming all of the dietary items offered.

*Xantusia riversiana* could be considered a dietary generalist, and captive individuals should be offered as varied a diet as possible. The captive diet offered at the San Diego Zoo has enabled body weights to be maintained in all three adults, and has supported growth in the five offspring. The growth rates observed are in accordance with monthly weights taken in field of wild caught *X. riversiana* by Fellers and Drost (1991, *op. cit.*). This information may prove useful to other zoological institutions housing *X. riversiana*, and possibly other species of *Xantusia* in captivity.

**JEREMY FONTAINE** (e-mail: jfontaine@sandiegozoo.org), **KIM LOVICH**, and **BRETT BALDWIN**, Department of Herpetology, San Diego Zoo Global, 2920 Zoo Drive, San Diego, California 92101, USA

## SQUAMATA — SNAKES

**PHILODRYAS OLFERSII** (Lichtenstein's Green Racer). **FEEDING BEHAVIOR.** *Philodryas olfersii* is a predominantly diurnal snake species with terrestrial and semi-arboreal habits (Hartmann and Marques 2005. *Amphibia-Reptilia* 26:25–32). It is widely distributed throughout most of the cis-Andean region in South America (Thomas and Dixon 1975. *Herpetol. Rev.* 6:108–109), inhabiting a large variety of vegetation types (Costa et al. 2010. *Biota Neotrop.* 10:353–377; Guedes et al. 2014. *Zootaxa* 3863:1–93). *Philodryas olfersii* are diet generalists, preying upon a variety of small vertebrates (Leite et al. 2009. *J. Zool.* 5:53–60). In this note we report the predation by *P. olfersii* on a Banded Calico Snake (*Oxyrhopus petolarius*) in captivity.

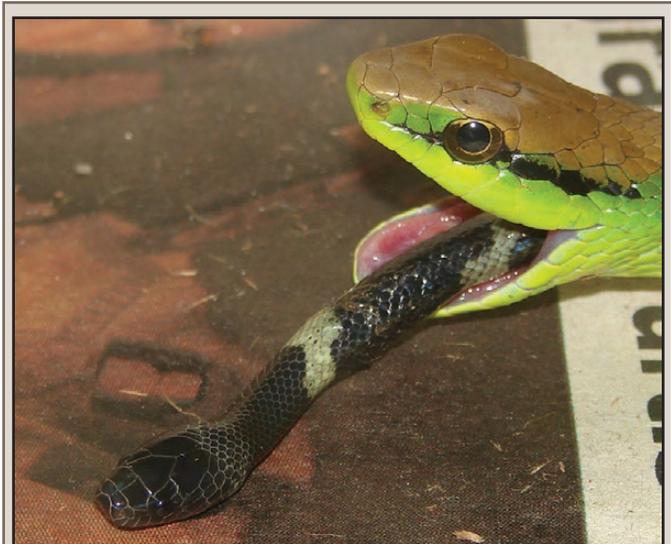


FIG. 1. Individual of *Philodryas olfersii* preying on a young *Oxyrhopus petolarius* in captivity at Cataguases, Minas Gerais, Brazil.

On 2 June 2011, an adult male *P. olfersii* (TL: 857 mm) was collected during the morning in the urban area of Cataguases (21.392254°S, 42.690417°W, WGS 84; 174 m elev.), state of Minas Gerais, Brazil. The snake was kept in a terrarium with a young *O. petolarius* previously captured in the same region. The terrarium was made of wood and glass, measuring 67 × 30 × 35 cm. It was lined with newspaper, and there was a wooden shelter inside, measuring 28 × 10 × 16 cm. On 1107 h of the following day, the *P. olfersii* specimen was observed preying on the young *O. petolarius*. The *P. olfersii* began flicking its tongue tracking the *O. petolarius* and when found, the *P. olfersii* bit it at mid-body and began to swallow (Fig. 1). The predator completely swallowed its prey tail-first at 1126 h, with the prey still alive and relatively weak (presumably due to envenomation). Soon after, the *P. olfersii* hid in the shelter and remained immobile. Nine days later, the *P. olfersii* specimen was euthanized by ventral application of lidocaine, fixed in 10% formalin, and was deposited in the herpetological collection of the Museu de Zoologia João Moojen, at Universidade Federal de Viçosa, Minas Gerais (MZUFV 1928).

*Philodryas olfersii* uses envenomation and constriction to subdue its prey (Sazima and Haddad 1992. *In* L. P. C. Morellato [ed.], *História Natural da Serra do Japi: Ecologia e Preservação de uma Área Florestal no Sudeste do Brasil*, pp. 212–236. UNICAMP/FAPESP, Campinas). However, during the observed predation event constriction was not observed. The behavioral sequence was similar to one report of *Philodryas patagoniensis* eating an *O. petolarius*, where the prey was swallowed alive tail-first (Martins et al. 2010. *Herpetol. Rev.* 41:370–371). To the best of our knowledge this is the first report of ophiophagy in *P. olfersii*. We suggest this species may sometimes include snakes in its diet under natural conditions, a behavior which has been more frequently observed in *P. patagoniensis* (e.g., Martins et al. 2010, *op. cit.*; Marques et al. 2012. *Herpetol. Notes* 5:315–317).

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**CLODOALDO L. ASSIS** (e-mail: clodoassis@yahoo.com.br), **HENRIQUE S. G. FOLLY**, and **JHONNY J. M. GUEDES**, Museu de Zoologia João Moojen, Departamento de Biologia Animal, Universidade Federal de Viçosa, CEP 36570-000, Viçosa, MG, Brazil; **RAMOM DOMINATO**, Programa

de Pós-Graduação em Zoologia, Universidade Estadual de Santa Cruz, CEP 45662-900, Ilhéus, BA, Brazil; **RENATO N. FEIO**, Museu de Zoologia João Moojen, Departamento de Biologia Animal, Universidade Federal de Viçosa, CEP 36570-000, Viçosa, MG, Brazil.

**TACHYMENIS PERUVIANA. UNDERWATER HUNTING BEHAVIOR.** Snakes of the genus *Tachymenis* are known to feed mainly on amphibians and lizards (Walker 1945. Publ. Mus. Comp. Zool. Harvard College 55:1–55; Greene and Jaksic 1992. Rev. Chil. Hist. Nat. 65:485–493). Stomach contents suggest that *T. peruviana* feeds mainly on frogs (Walker, *op. cit.*).

On 13 December 2014, we captured a female *T. peruviana* (435 mm snout–vent length, 70 mm tail length) in Ciudad de Piedra region, La Paz, Bolivia (17.46°S, 68.77°W, WGS 84; 3877 m



FIG. 1. *Tachymenis peruviana* feeding on *Pleurodema cinereum* tadpoles underwater.

elev.). The snake was maintained in captivity in a glass terrarium measuring 600 × 300 × 350 mm (length × width × height) at Colección Boliviana de Fauna laboratory for further behavioral and thermoregulatory studies. It was fed on the tadpoles and small frogs of *Pleurodema cinereum* released into a 210 × 140 × 40 mm water container partially filled with small stones and placed in the center of the terrarium (Fig. 1). On 13 March and 31 October 2015, we observed the snake actively searching for tadpoles and small frogs for several seconds underwater, until it grabbed them by mouth and swallowed them while still underwater. The observed behavior included the approach to the water container, immersion of the head, underwater tongue flicking, movement and direction of the head following the prey, attempts at prey capture underwater, emergence of the head to breathe, re-immersion of the head, searching for the prey among stones via the muzzle, capture of the prey, curling of the anterior body underwater to prevent the prey from escaping, and swallowing prey inside the water container.

Previous studies have not reported underwater prey searching behavior for this species, but Baudoin and Pacheco (1992. *In* Baudoin and Forno [eds.], *Historia Natural de un Valle en los Andes: La Paz*, pp. 421–452. Servicio Gráfico Quipus, La Paz, Bolivia) reported on a captured specimen near an irrigation ditch that regurgitated several small native fishes (*Orestias* sp.) that are common in streams and rivers across the Andes. This suggests that the behavior described here may also be carried out in the wild.

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**MARITA PAREDES** (e-mail: marita.paredes.r@gmail.com), **BRUNO MIRANDA** (e-mail: abrunomirandac@gmail.com), and **JAMES APARICIO**, Colección Boliviana de Fauna, Área de Herpetología, Casilla 8706, Correo Central, La Paz, Bolivia; **LUIS F. PACHECO**, Instituto de Ecología, Universidad Mayor de San Andrés, Casilla 10077, Correo Central, La Paz, Bolivia.