



HUSBANDRY

Artificial Incubation of Buff-striped Keelback (*Amphiesma stolatum*) Eggs

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Buff-striped Keelbacks (*Amphiesma stolatum*; Fig. 1) are nonvenomous, oviparous natricids that are widely dis-



Fig. 1. An adult Buff-striped Keelback (*Amphiesma stolatum*) from Surat, Gujarat, India. Photograph by Dikansh S. Parmar and Vasudev P. Limbachiya.

tributed in India, Pakistan, Nepal, Bhutan, Bangladesh, and Sri Lanka (Whitaker and Captain 2008), where they occur in a variety of natural and altered habitats that include fields, grasslands, cultivated areas, scrub, and gardens, usually in the vicinity of water (Daniel 1983; Whitaker and Captain 2008). These are among the most abundant snakes in the state of Gujarat (Desāi 2017). Although common, they are encountered most frequently during monsoon seasons because they hibernate in the winter and aestivate in the summer (Daniel 1983; Whitaker and Captain 2008; Parmar and Tank 2019); consequently, opportunities to obtain gravid females or eggs are rare. Reports of clutch sizes and lengths of hatchlings vary. Daniel (1983) stated that clutch sizes are 1–14 and hatchlings measure 133–177 mm. Whitaker and Captain (2008) stated that 5–15 eggs are laid at a time and hatchlings measure 90–170 mm. Desāi (2017) listed clutch sizes of 5 to 10 and that hatchlings are as long as 177 mm.



Fig. 2. Two male Buff-striped Keelbacks (*Amphiesma stolatum*) mating with a single female. Note the bleeding that could be the result of aggression between the two males. Photograph by Dikansh S. Parmar.

Table 1. Mean (minimum and maximum) incubation temperatures (°C) of Buff-striped Keelback (*Amphiesma stolatum*) eggs.

Days	1–10	11–20	21–30	31–40	41–50
Mean	27.0	27.5	29.0	30.0	30.5
(Min–Max)	(26–28)	(26–29)	(28–33)	(27–32)	(29–32)

Buff-striped Keelbacks in Gujarat have been observed mating in August (Desāi 2017). In fact, on 27 August 2010, we rescued two males (total lengths 533 and 488 mm) attempting to mate with a single female (total length 732 mm) from the Citylight Area in Surat. The snakes continued mating for two hours during and after transport to the rescue center (Fig. 2). However, another female rescued in the Piplod Area of Surat laid five oval chalky-white eggs on 28 July 2009, indicating that mating had occurred much earlier in the year than had been reported.

We immediately released the female into natural habitat. We then marked and measured the eggs (in order of deposition: 19.0 x 10.0 mm, 1.23 g; 19.0 x 10.3 mm, 1.24 g; 17.0 x 8.0 mm, 1.02 g; 18.9 x 10.0 mm, 1.05 g; 16.4 x 8.9 mm, 0.76 g) before placing them in a pot filled with a 170-mm deep layer of mud sprinkled with water and covered with a wet cloth to maintain moisture and humidity. We moistened the cloth cover every day and, every three days, we sprinkled water on the substrate. Weather varied during incubation and temperatures fluctuated from a minimum of 26 °C to a maximum of 33 °C (Table 1). The smallest egg was infertile and two others were infected by fungi. After 49 days of incu-



Fig. 3. Hatchling Buff-striped Keelbacks (*Amphiesma stolatum*) from Surat, Gujarat, India. Photograph by Dikansh S. Parmar.

bation, on 15 September 2009, hatchlings (Fig. 3) emerged from the final two eggs. Both were females. Snout-vent lengths were 110.3 and 112.8 mm, tail lengths 32.8 and 34.2 mm, and midbody girths 18 and 20 mm, respectively.

Literature Cited

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