

from which they are drawn, probably by ciliary action, into the Jacobson's organs. Accordingly, tongue-flick rate can be used as an indication of vomeronasal sensory activity. Neural signals arising in these organs are conducted by the accessory olfactory nerves to the fore-brain (nucleus sphericus; Halpern, 1976).

(2) It is important to keep in mind that our snakes were housed individually. Group housing can result in quite different behavior as snakes compete for prey items. We suspect that individual housing best approximates the natural predatory situation in rattlesnakes. Also, SIIS may be more effectively induced by a single strike in adult rattlesnakes than in young ones. Finally, there may be a negative correlation between "nervousness" and the extent to which SIIS is observed in particular individuals or taxa.

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#### LITERATURE CITED

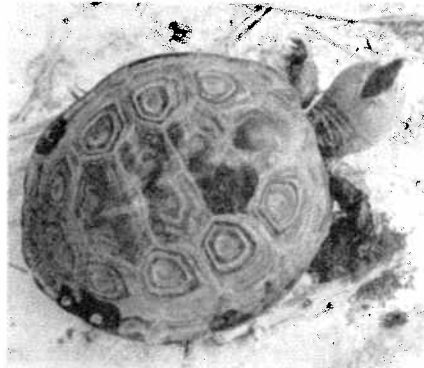
- Baumann, F. 1927. Experimente über den Geruchssinn der viper. *Rev. Suisse Zool.* 34: 173-184.
- Baumann, F. 1928. Über die Bedeutung des Geruchssinnes für den Nahrungserwerb der viper. *Rev. Suisse Zool.* 35: 233-239.
- Burghardt, G.M. 1969. Comparative prey-attack studies in newborn snakes of the genus *Thamnophis*. *Behavior* 33: 77-114.
- Burghardt, G.M. 1970. Chemical perception in reptiles. In: J.W. Johnston, Jr., D.G. Moulton, and A. Turk (Eds.), *Communication by Chemical Signals*. New York: Appleton-Century-Crofts, pp. 241-308.
- Chiszar, D. and C.W. Radcliffe. 1976. Rate of tongue-flicking by rattlesnakes during successive stages of feeding on rodent prey. *Bull. Psychonomic Society* 7: 485-486.
- Chiszar, D., Radcliffe, C.W. and Scudder, K.M. in press. Analysis of the behavioral sequence emitted by rattlesnakes during feeding episodes. I. Striking and chemosensory searching. *Behavioral Biology*.
- Cowles, R.B. and R.L. Phelan. 1958. Olfaction in rattlesnakes. *Copeia* 1958: 77-83.
- Dullemeijer, P. 1961. Some remarks on the feeding behavior of rattlesnakes. *Koninkl. Nederl. Acad. Van Wetenschappen Ser. C.*, 63: 383-

396.

Halpern, M. 1976. The efferent connections of the olfactory bulb and accessory olfactory bulb in the snakes, *Thamnophis sirtalis* and *Thamnophis radix*. *J. Morph.* 150: 553-578.

Taylor, S.V. 1976. Stimulus control of lingual air sampling in garter snakes (*Thamnophis r. haydeni*) and rattlesnakes (*Crotalus v. viridis* and *Sistrurus c. tergeminus*). Ph.D. thesis, University of Colorado, Boulder, Colorado, 72 pp.

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An adult female Florida East Coast Terrapin (*Malaclemys terrapin tequesta*) taken near Titusville, Brevard County, Florida. The dorsal view shows an unusual (round) carapace shape. The ventral view shows an extremely compressed, shortened plastron. Both photographs by R.A. Seigel, Florida Technological University, Orlando. Exposure data: f16 at 125th second, Plus X film, ASA 125.



## REPRODUCTION OF THE GRAY-BANDED KINGSNAKE, *LAMPROPELTIS MEXICANA ALTERNA*

Reproductive data of the Gray-banded Kingsnake, *Lampropeltis mexicana alterna* are scant in literature. Gehlbach & McCoy (1965) noted five large eggs ready for oviposition in a specimen found on 16 May 1964. They averaged 12 mm x 30 mm. Tanzer (1970) reported on a clutch of six eggs laid by an *alterna* color phase collected on 26 June 1969. The eggs averaged 18.3 mm x 35.1 mm. The young averaged 255.4 mm total length and exhibited both *alterna*- and *blairi* color phases. Turner (1977) reported on two *alterna* hatching from a single egg. No further information on reproduction in this species appears to be available. This report deals with captive breeding, time the female carried the eggs, oviposition and incubation period of the eggs. The measurements of the young are also included.

The female *L. m. alterna* was received in July 1974, at which time the snake's length was 450 mm; her length at the time of writing was 915 mm. The 895 mm male has been in captivity since May 1975. The snakes are housed separately in 10 gallon Meta-frame slide-top reptile tanks. Newspaper is used for cage lining; room temperature varied from 24°C to 28°C prior to the snakes being placed together. Both snakes fed and were active all winter. The female was placed in the male's cage each night at 2000 hours on 1, 2 and 3 April 1976 and removed each morning. The male actively pursued the female around the cage; attempts to copulate were observed, but no actual copulation was seen.

The female shed on 8 May 1976 and refused food after this date. Her weight was recorded on 12 May 1976 at 227.1 grams. On 15 May 1976, the female was placed in a 5 1/2 gallon aquarium half filled with a mixture of three parts potting soil and one part water. The snake burrowed under the surface of the soil, forming a cavity which could be observed through the glass side of the cage.

At 17:10 hours on 17 May 1976, the female was observed coiled around a clutch of eight eggs. Seven eggs were adherent and white with a smooth texture. The egg which was not adherent was discolored and later proved to be infertile. An attempt to remove the eggs at this point resulted in a display of aggressive behavior by the female which included hissing and attempts to bite. At 19:30 hours, the snake had left the eggs and was crawling about the cage. At this point, all aggressiveness had disappeared and she was removed, weighed, and placed

in her normal cage; she immediately accepted a dead mouse. The female's weight was 139.6 grams.

The eight eggs were measured with a vernier caliper and weighed on a triple-beam balance. Egg diameter was 20 mm for each one; egg length varied from 37 mm to 43 mm (mean 39.8 mm) and clutch weight was 83.7 grams (Table I).

The eggs were placed in a medium of vermiculite and water (Tryon, 1975) in a plastic box, which was kept on a desk near a window where it received daylight exposure; temperature within the box varied from 28°C to 32°C.

On 23 July 1976 after 66 days, the non-adherent egg collapsed; when opened, it proved infertile. On 25 July 1976, slits appeared in the remaining eggs. By 28 July 1976, all the hatchlings had emerged from their eggs.

The young were weighed on a triple-beam balance and measured by use of a string and plastic rule calibrated in mm. The weight of the young varied from 7.6 grams to 9.5 grams (mean = 8.6) and the length of the young varied from 250 mm to 270 mm (mean = 257.1 mm (Table II)). Ecdysis first occurred on 5 August 1976. All accepted pieces of lizard (Sceloporus, Uta and Eumeces; Sceloporus was preferred) or dead pink mice rubbed with a lizard. Shortly after their first meal, the hatchlings were induced to accept newborn mice either live or dead.

Table I - Measurements of Eggs

| Length (mm) | Width (mm) |
|-------------|------------|
| 40          | 20         |
| 40          | 20         |
| 37          | 20         |
| 37          | 20         |
| 40          | 20         |
| 43          | 20         |
| 40          | 20         |
| 41          | 20         |

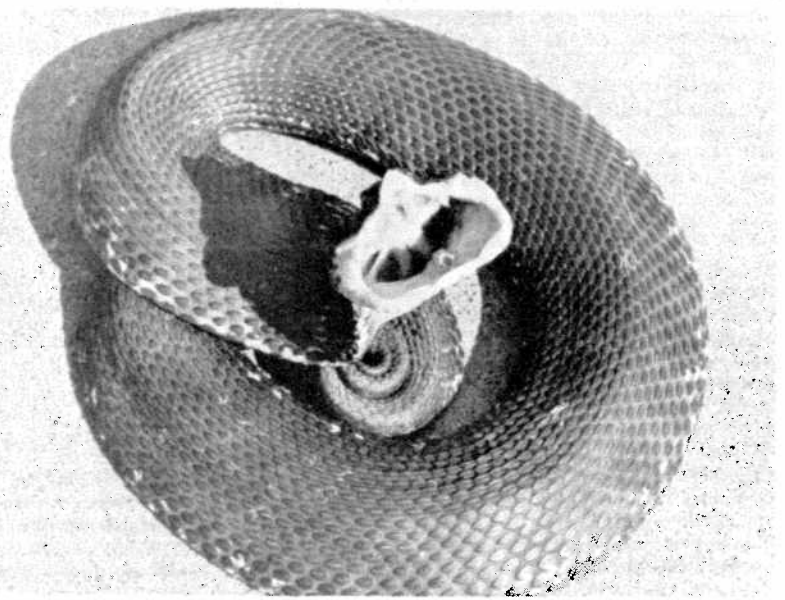
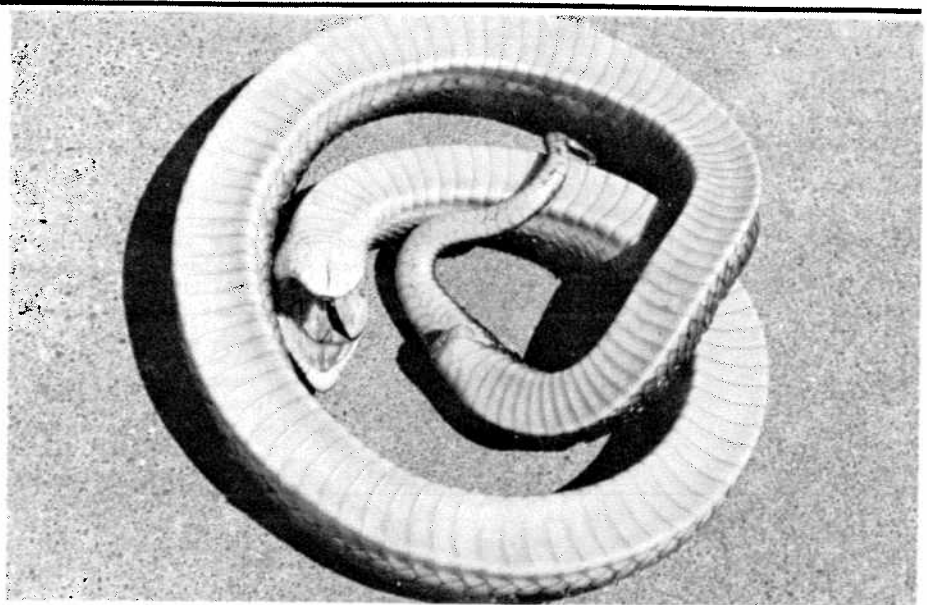
Table II - Measurements and Weight of Young

| Length (mm) | Width (mm) |
|-------------|------------|
| 270         | 8.6        |
| 250         | 9.5        |
| 260         | 9.0        |
| 260         | 8.5        |
| 250         | 7.6        |
| 260         | 8.1        |
| 250         | 8.6        |

LITERATURE CITED

Gehlbach, R.F. and McCoy, J.C. 1965. Additional observations on variation and distribution of the gray-banded kingsnake, Lampropeltis mexicana. Herpetologica 21:35-38.

Tanzer, Ernest C. 1970. Polymorphism in the Mexicana complex of kingsnakes, with notes on their



An adult eastern hognose snake from near Garrett's Lake, Pottawatomie County, Oklahoma, engaging in "bluffing" and "death-feigning" behavior. Photographs by Jeffrey H. Black.

natural history. Herpetologica 26:419-428.

Tryon, Bern W. 1975. How to incubate reptile eggs; a proven technique. Bulletin New York Herpetology Society. 11(3-4):33-77.

Turner, Earl H. 1977. Colorful kingsnake of the Trans Pecos. Texas Parks and Wildlife. January 1977: 10-11.

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SPINY CHUCKWALLAS BRED AT THE FORT WORTH ZOO

The spiny chuckwalla (Sauromalus hispidus) inhabits Isla Angel de la

Guarda and adjacent islands in the Gulf of California. On July 29, 1977, one of (our) specimens laid 21 eggs. Twenty of the eggs were incubated in a five-gallon aquarium on a substrate of vermiculite. Temperature was maintained at 34°C. Five eggs (three of which were fertile) were discarded within a few days due to infection. After 94-99 days incubation, 15 chuckwallas hatched.

This is believed to be a first captive hatching. Since little is known about the young or behavior of S. hispidus, we are looking forward to studying growth and ontogeny of behavior in this species. (G. Carl)

...from AAZPA Newsletter, 19(1): 5.