

Notes on the Hatching of the Black Racer *Coluber constrictor*

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A clutch of 14 *Coluber constrictor* eggs was found July 20, 1953, by a man plowing a field south of Richmond, Ind. They were in sandy loam, buried approximately 8 inches below the surface, and in nearly the same place that similar eggs were found by the same man in 1951 and 1952.

In the laboratory, the eggs were kept under moistened paper toweling in a terrarium containing 2 inches of soil. The bulb in a gooseneck lamp about 9 inches above the eggs was kept lit between 8 a. m. and 6 p. m. each day to provide heat. Six black racers hatched from Aug. 26 to 27.

Of the remaining 8 eggs, 2 were deeply dented when found, and they were opened Aug. 8. The yolk was still quite moist. One shell was occupied by a male, the other by a female. Heartbeat and blood circulation through the vitelline vessels was evident in both. The male measured 18 cm. and the female was slightly smaller. The hemipenes of the male were exserted. Both specimens were preserved.

In the entire study, the snakes were weighed on a Welch triple beam platform scale, and measured by stretching until there were no spasmodic contractions of the body. Each snake was stretched on a piece of plain paper on a flat surface, and pencil marks were made by an assistant at the tip of the nose and tail. The marked distance was then measured.

On Aug. 29, 2 days after the sixth snake had emerged, the remaining 6 eggs were cut open. All of the young, 3 males and 3 females, were dead and the yolk remaining in the shells was dry and hard.

The measurements of these snakes are as follows, to the nearest centimeter: males, 29 (hemipenes exserted), 23 (1 hemipenis exserted), 22 (hemipenes inverted); females, 27, 24 (no eyeballs), 23.

All of these snakes were shorter than the shortest snake which hatched, which measured 30 cm. No egg teeth were seen on any of these snakes nor on the ones which hatched successfully.

One possible explanation for the eyelessness of one snake which did not hatch is offered by Lynn and Ullrich. They produced shell abnormalities and eyelessness experimentally in turtles by exposing the eggs to suboptimal moisture conditions for a few days during the period from the 35th to the 50th day of development.

The first snake to hatch did so the morning of Aug. 26 and escaped the incubator. It was found dead Sept. 2. A female, it measured 30 cm. The weight was not taken.

Number 2, a female, was born Aug. 26, weighing 12.09 grams and measuring 35 cm. She is not known to have eaten and on Oct. 27 weighed 5.35 gr., and measured 39 cm.

Number 3, another female, weighed 4.32 grams when hatched Aug. 26, and measured 31.3 cm. She refused toads, mealworms, grasshoppers and a new-born dead mouse, and died Sept. 12.

Number 4, a male, was born Aug. 27, when it weighed 9.26 gr. and measured 34 cm. On Oct. 27 it weighed 5.68 gr. and measured 39 cm.

Number 5, a female, weighed 8.6 gr. at hatching Aug. 27 and measured 34 cm. She shed Oct. 12, and was seen to eat a small cricket Oct. 19. Like the others, she also lost weight, weighing 5.77 gr. Oct. 27, when she measured 39 cm.

Number 6, a male, weighed 6.72 gr. at hatching Aug. 27, and measured 30 cm. It refused food and died Sept. 13.

The snakes were distinguished from one another by the differences in the dorsal saddle-shape markings.

The young emerged through longitudinal slits in the tough shells. In one shell there were 2, and in another, 3 parallel slits varying in length from 1 to 2 cm. The snakes emerged from the longer slits in these instances.

In two shells, the slits were observed to be open as long as 13 hours before the actual emergence of the young snake. One young snake, coiled in the shell, would alternately show its rostral plate at the opening, then its left eye. Breathing was evident as bubbles of amniotic fluid would expand and contract at the slit.

Number 3 was observed at 5:20 p. m. Aug. 26 with two-thirds of its body protruding from the shell. It struggled by throwing its body from side to side at two or three minute intervals. It struck several times with its mouth open, then wiggled its body out another few millimeters. The whole body came through at 5:40 p. m. with the observer bending the shell slightly, thus widening the opening.

Dangling from the umbilical opening was about 2 inches of yolk sac. The snake dragged this about as it roamed the terrarium. After 3 or 4 minutes, it slid between a small clod of dirt and the glass wall, dragging more of the sac out of its body until the vitelline vessels could be seen. Finally the yolk sac dragged enough that the vessels parted and the sac was left behind.

Viewing the interior of the other 5 shells, yolk sacs were seen within 4 of them. It seems probable that the yolk sac is sometimes ejected as the snake leaves the shell, by rubbing against the lower edge of the slit.

On the other hand, Number 6 had drawn up the yolk sac into the abdomen, which textbooks mention as customary in birds and reptiles. There is no obvious correlation between retention of the yolk sac and birth weight.

The three remaining snakes have been kept in a terrarium 39 by 19 by 16 inches, planted with ferns, hepatica, stonecrop and mosses. One 1½-inch salamander (*Ambystoma tigrinum*) and a rough green snake (*Opheodrys aestivus*) also inhabit the terrarium. Young toads (*Bufo* sp.) were present for from 3 to 4 weeks, then were removed when there was no evidence of feeding by the Colubers.

Such invertebrates as sow bugs, crickets, small grasshoppers and earthworms were placed in the terrarium in the hope that the snakes would feed on them. Feeding was observed only once, when number 5 ate one of the crickets. Force feeding with beaten egg was started Nov. 5 and carried on to date, Nov. 12.

Literature Cited

- LYNN, W. G., and SISTER MARY CORALIE ULLRICH. 1950. Experimental production of shell abnormalities in turtles. *Copeia* 1950 (4):253-262. Illus.