THE ALBINO QUERETARO KINGSNAKE
(Lampropeltis ruthveni)

By Glen R. Young and Rosemary A. Babcock

This is the story of how Terry Heuring made a trade, raised and bred his new snakes, and--to his great surprise--became the first owner of albino Queretaro kingsnakes *(Lampropeltis ruthveni)*.

Back in the summer of 1986, Heuring chanced across herpetologist Dr. William Garstka buying feeder crickets at a bait store in Huntsville, Alabama. Their conversation led to working out a trade: Heuring would collect enough local milksnakes *(L. triangulum)* to provide a small research colony for Garstka in return for a couple of *L. ruthveni* hatchlings that were currently in incubation.

Gartska, it turned out, had a special relationship to the scientific history of *L. ruthveni*. A single specimen of this kingsnake of the rocky upland woods of the Mexican Plateau had been described by F.N. Blanchard in the 1920s as *L. ruthveni*,then synonymized with *L. triangulum arcifera* by K. Williams in 1978. Gartska, in a study of the complex systematics of Mexican kingsnakes for Harvard's Museum of Comparative Zoology, then reintroduced the species epithet "*ruthveni*" on the basis of a number of specimens he discovered in the central Mexican state of Queretaro--hence the common name (Garstka, 1982). Some of the Queretaro specimens became Gartska's breeding stock.

In September, Garstka visited Heuring bearing two large jars of newly hatched *L. ruthveni*. The little snakes were marked red and gray--the same as adults. Heuring selected two from one jar, plus an unwanted runt from the other. Each jar, Garstka explained, contained the offspring from one of this two breeding trios, each consisting of one male and two females.

Careful probing determined that the two larger hatchlings were females, and the runt was male. Heuring set them up in clear plastic sweater boxes with small water dishes and a ground corn cob substrate about 1 in (2.5 cm) deep, obtained from the local co-op.

The snakes refused to feed on pinkie mice. Though they might have fed on lizards, Heuring thought, he opted instead for the Pinkie Pump (BJ Specialties, 2802 Melody Lane, Columbia, Mo 65203); locally caught lizards posed a problem to stock and might have contained parasites.

For the next 12 weeks, the snakes were tube-fed pinkie mice from the Pinkie Pump. By the 14th week, they had begun to feed on their own, and the male was nearly as large as the others. At 12 months, the snakes were about 30 in (76.2 cm) in snout-vent length; the male was now the largest.

Heuring did not bruminate (hibernate) the snakes the first year, as he planned to breed them at 18 months, using procedures based on information Garstka had provided on courtship, light cycles, and winter cool down.

Accordingly, in November the snakes were taken off food for two weeks and were then cooled to 50 F (10 C). They were maintained in a darkened room at that temperature until March, when all three animals were moved into another room; the temperature was brought up to between 78 and 82 F (25.5-27.8 C). They were given 12 hrs. of light per day with a broad-spectrum fluorescent bulb (Gro-Lux, Sylvania Crop., Danvers, MA).

About the middle of April, breeding activity began. The male mated repeatedly with both females. There was no elaborate courtship ritual, but both pairing snakes would move in jerking motions until the male had positioned his tail properly for the insertion of a hemipenis.

After breeding took place, the females were receptive to more frequent feedings. By the middle of June, both were clearly gravid, and it was time to prepare nest boxes. Heuring drilled drainage holes in small opaque plastic boxes, lined them with damp sphagnum moss, and set them in the cages.

The eggs were laid at the end of June and beginning of July. One female laid five eggs, the other six. Each clutch was laid in a single group that stuck together. Heuring removed the eggs from their respective nest boxes and half buried them in damp vermiculite in clear plastic sweater boxed which had ventilation holes drilled in the tops. Temperatures were maintained between 85 and 95 F (29.4-35 C). The eggs were moistened about every three days with a mist bottle. During the incubation period, no unusual characteristics were recorded. The eggs did not sweat, crinkle or mold.

Around the end of August, Heuring made a routine check of the eggs and noticed a small black nose peeking out of an egg from the clutch of five. The next morning, to his surprise, there were three black noses and two pink noses--thus two albino *L. ruthveni* from two normally colored parents. Upon closer examination, no differences were found in the egg shells, and their placement in the group was apparently random. Heuring checked his daily log, looking for a possible environmental reason for the lack of pigmentation, but he had recorded nothing unusual.

Garstka initially suspected that the eggs had been mixed with some albino California kingsnake *(L. getulus californiae)* eggs that Heuring was also incubating. The parents of the snakes Heuring selected, after all, had been captive bred for a number of years. Their offspring were dispersed with collectors all over the United States with no reports of albino coloration in subsequent generations. On the other hand, Heuring knew he had been careful with the eggs; the five-egg clutch had stuck together and had not been separated. Nevertheless, Garstka remained skeptical until he saw the animals for himself.

The juvenile snakes remained in the opened eggshells 1-24 hr, withdrawing into the shells if a shadow crossed them. Movement that did not cast a shadow or create an air current did not seem to bother them. The albinos did not seem any more or less secretive than their normally colored siblings.

Once the hatchlings left their shells, Heuring determined that they were approximately 6 in (15.24 cm) in snout-vent

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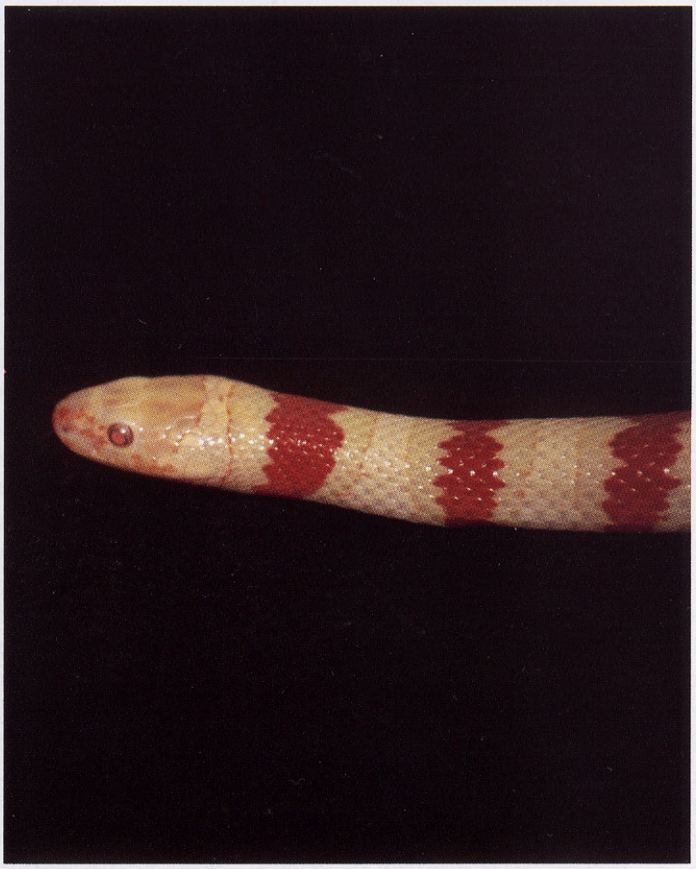
The Albino Queretaro kingsnake shown with a normal individual.

Queretaro kingsnake *(Lampropeltis ruthveni)* close-up of head. Photo courtesy of Terry Heuring and Glenn R. Young.



Albino Queretaro kingsnake *(Lampropeltis ruthveni)* close-up of head. Photo courtesy of Terry Heuring and Glenn R. Young.

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length. Yolk sacs had been completely absorbed. The normal animals were colored the same as the adults; the albinos were marked in red, yellow and pink, with pink eyes as well as pink noses. Heuring telephoned some of the California snake breeders to ascertain if anyone had ever produced albino *Lampropeltis ruthveni*; these, it seemed, were the first.

Four days later, the second clutch began to hatch. Within 24 hours, five of the six had cut the shells; they all showed black noses. When the sixth egg finally opened, its occupant showed a pink nose. The same characteristics observed in the first clutch (regarding time spent in the opened eggs, coloration, and yolk sac absorption) were observed again.

Thus, 11 eggs from two separate females had yielded three albinos--a 40 percent rate from the clutch of five eggs and a 16.7 percent rate from the clutch of six eggs. Combined, the trio of snakes had produced 27.3 percent albino offsprings.

Presumably, a gene for albinism (probably a defective tyrosinase responsible for the conversion of tyrosine to melanin) was present in one member of each of Garstka's original breeding groups. By chance, Heuring had selected three hatchlings heterozygous for albinism from the original offer, that is, each snake had inherited the recessive defective form of the gene from one parent and the healthy gene from the other. Bred with each other, about a quarter of the snakes produced the recessive albino phenotype; in other words, some individuals of the third generation inherited the defective recessive form from each parent and developed as albinos. Only when the snakes that had inherited the same recessive gene type combined genetics forces could the hidden characteristic emerge.

To date, Heuring's trio has produced albinos for three years. Over the long term, the expectation for albino versus normal coloration from the pairs of this generation should continue to be about one out of every four hatchlings.

The albinos, now of breeding age, all possess recessive genes from both parents, that is, they are homozygous for albinism; they can be expected to produce all albinos when bred with each other. Though recent breeding attempts have not succeeded, Heuring has good hopes for the future.

Literature Cited

Garstka, W.R. 1982 Systematics of the species group of the colubrid genus *Lampropeltis*, with an hypothesis mimicry. Breviora 466: 1-35.