

Notes on the Natural History, Husbandry, and Breeding of the Gray-banded Kingsnake

(*Lampropeltis alterna*)

By
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Introduction

The gray-banded kingsnake (*Lampropeltis alterna*) has been a fascination (obsession) of mine ever since my wife and I collected our first specimen in the hills due east of Lajitas, Texas. It had been a hot, muggy night in June of 1978 and perhaps, much to my wife's chagrin, my most memorable night on our honeymoon. Since that night, I've had the opportunity to capture over a dozen more specimens in the west Texas region.

With the discovery of the *blairi* morph of the gray-banded kingsnake in 1950 (Flury, 1950), reptile enthusiasts found a model animal to maintain and breed in captivity. *L. alterna* are beautiful and docile snakes that are hardy under most captive circumstances. Although the "Blair's phase" and "alterna phase" were long considered distinct subspecies (*L. mexicana blairi* and *L. m. alterna*), they are

no longer differentiated and are both referred to as simply *Lampropeltis alterna*, (Gartska, 1982). The alterna phase has as many as 23 narrow black bands with little or no red, alternating with 15 narrower black bands on a gray ground color (Mecham and Milstead, 1949). The Blair's phase has 12 to 15 wide red saddles bordered by narrow black bands with white edges (Miller, 1979). The gray ground color of both morphs varies from almost black, (known as the dark phase) to a very light gray (light phase) with varying degrees of color in between. An interesting characteristic of these snakes is their high degree of variability within the population. For a long time, *L. alterna* were considered to be among the rarest of American snakes. However, today many can be found in collections, as the result of refined collection strategies, better husbandry and extensive captive breeding.

The purpose of the present paper is to present: (1) some natural history (albeit, in very general detail; for more information, see Miller, 1979); and (2) some husbandry tips for long-term captive maintenance and

propagation of this beautiful species.

Natural History

Gray-banded kingsnakes range from Coahuila, Mexico north to the counties of the Trans-Pecos region and Edwards County of Texas. In Texas, preferred habitat includes dry, rocky hillsides and mountainous slopes of the northern Chihuahuan Desert (along the Rio Grande), in addition to the desert shrub of the Edwards Plateau (Miller, 1979). Tennant (1984) stated that the macrohabitat towards the eastern part of the snakes' range is associated with the acacia-lechugilla-sotol succulent community that is found in the limestone covered desert of that area. Rock piles seem to be the preferred macrohabitat of *L. alterna* in the Big Bend region of west Texas. The microhabitat in the eastern part of its range is thought to be the intricate passageways and air pockets below the surface. It is believed that gray-banded kingsnakes spend the majority of their lives in these passageways, venturing out onto the surface to find mates during the reproductive



Gray-banded kingsnake habitat, approximately three miles west of Langtry, Texas. Photo by Ron Garthwaite.



River Road, approximately 10 miles west of Lajitas, Texas. Photo by Ron Garthwaite.



Gray-banded kingsnake "Blair's phase" (*Lampropeltis alterna*). Photo by John Tashjian.



Gray-banded kingsnake "alterna phase" (*Lampropeltis alterna*). Photo by Thurgess Cranston.

season. These behaviors have allowed *L. alterna* collectors to employ a unique strategy to capture these tri-colored gems. During the late spring and early summer, deep road cuts can be illuminated to find gray-banded kingsnakes crawling about. *L. alterna* are almost always active nocturnally (Miller, 1979; Switak, 1984; Tennant, 1984; and others). Few, if any, records have been made during mid-day, although there have been several sightings on early overcast mornings (Turner, 1977; Wright and Wright, 1957) and in the late afternoon (Gehlbach and Baker, 1962; Miller, 1979). Periods right before evening thunder showers during May and June are often preferred by gray-banded kingsnakes. Under these conditions, they have been found from dusk to dawn (Tryon, 1979).

The majority of specimens I have observed were found between 10:00 P.M. and 12:00 midnight. The earliest sighting has been 9:40 P.M., and the latest sighting has been 3:30 A.M. As with many other snakes, nights with the least light from the moon are preferred, although I've captured three specimens when the gibbous moon was up.

The prey of *L. alterna* in the wild, as determined by both stomach contents and actual field observations, is as follows: (1) lizards: eastern fence lizard (*Sceloporus undulatus*) - Mecham and Milstead, 1949; crevice spiny lizard (*Sceloporus poinsetti*) - Wright and Wright, 1957; canyon spiny lizard (*Sceloporus merriami*) - Miller, 1979; and various whiptail lizards (genus *Cnemidophorus*); (2) amphibians: canyon tree frog (*Hyla arenicolor*) - Miller 1979; Tennant, 1984; (3) mammals: pocket mouse (Tennant, 1984); and (4) reptilian eggs (Miller, 1979). Captive gray-banded kingsnakes will sometimes display difficulty capturing live lizards and rodents in their enclosures. This has led some researchers to believe that in the wild, *L. alterna* capture sleeping or cornered prey in the underground catacombs in which these snakes and their prey live (Miller, 1979).

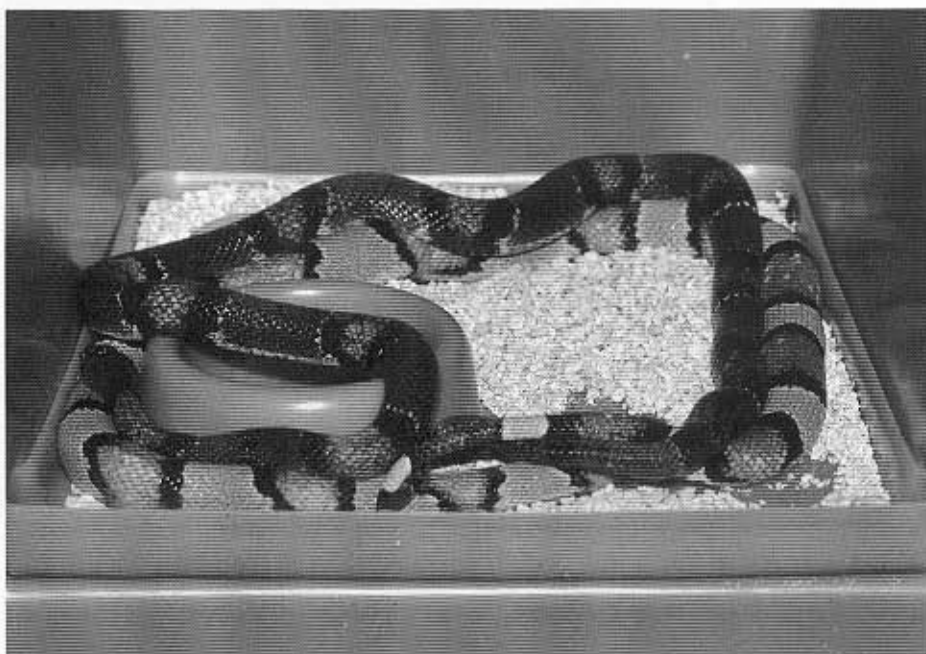
Parasites in the wild have been noted from several specimens. One very common type of parasite has been ticks. I have removed these ticks utilizing techniques outlined elsewhere (Mader, 1989). I have also found nematodes in three specimens through the tri-chrome staining method as discussed in my paper on the western green rat snake (Cranston, 1989). Ivermectin

was the drug used in the removal of these harmful parasites. As of now, no heavy bacterial or protozoan infestations have been found in newly wild-caught specimens; although, on occasion, I have had to provide treatment for these pathogens after my snakes have been in captivity for some time.

Lampropeltis alterna is oviparous. Females deposit 3-13 eggs that are approximately 1.2 inches (3 cm) wide and 2 inches (5 cm) long. Of the several wild-caught gravid females I've seen, most lay approximately four to eight eggs, with the average being six. Breeding notes from the wild are few and far between. Several people have noted copulation on road cuts

Captive Husbandry

Captive maintenance and husbandry of the gray-banded kingsnake is typical of that provided for most temperate climate species of the family Colubridae. Water should be provided at all times. Various substrates have been used including volcanic ash, soil, newspaper, gravel, pine shavings, and vermiculite (Miller, 1979; Tennant, 1984; Switak, 1984; and others). Switak (1984) suggests using a rough surfaced substrate to stimulate wild conditions to encourage breeding, although this idea has never been experimentally tested. Many successful breeders of *L. alterna*



A pair of breeding gray-banded kingsnakes. Note the variation in coloration.

during early summer (Hollister, pers. comm.). Freshly captured pairs of gray-banded kingsnakes readily breed in June under most circumstances (e.g., in a cardboard box or an ice chest, pers. obs.). The young are about 10 inches (25 cm) at hatching. Juveniles are rarely found in the wild, possibly due to ultra-secretive habits. Miller (1979) mentioned that only about 4% of all wild-caught *L. alterna* were juveniles. As adults, *L. alterna* average around 32 inches (82 cm), although animals over 40 inches (100 cm) have been found in the wild, especially towards the eastern part of their range (Tennant, 1984).

have utilized a cage which includes a false floor drilled with appropriately sized holes to allow the snakes to live in a fossorial-type microhabitat (Miller, 1979; Tennant, 1984). However, countless people have successfully bred these colubrids without such modifications to their cages. As with most snakes, a hidebox is frequently used by these secretive animals and promotes better feeding.

Food in captivity includes both lizards and mice, although the latter are by far the superior diet due to their convenience and general lack of harmful parasites and bacteria. Most adults will maintain body mass

on a diet of one to two fuzzy or small mice per week. Juveniles have successfully reached breeding size in 18 months, although 30 months is the normal age for reproductive activity. Obviously, the sooner juveniles are eating, the faster is their growth rate.

Inducing juveniles to eat pinkies is often difficult, since less than 50% of all hatchlings eat pink mice after their first post-hatch shed. Placing pinkies in a container with lizards and then in the young snake's cage will often induce immediate feeding. The split brain methodology of slicing a dead pinkie mouse's head and offering it to the hatchling is also a proven technique for inducing difficult feeders to eat. More often, juveniles will only feed on lizards initially, although virtually 100% of the babies I've produced have been induced to feed on pinkies by approximately nine months of age. Juvenile *L. alterna* are also not hard to force-feed day-old mice (especially with a pinkie pump), although this should be a last resort only after all other avenues have been attempted.

The captive propagation of the gray-banded kingsnake has been a common place occurrence in the U.S. for the last ten to fifteen years. Specific techniques for captive breeding have been outlined in detail in Wagner, 1976; Murphy et al., 1978; Miller, 1979; Tennant, 1984; Switak, 1984. Perhaps the most important variable is a winter cool down (brumation) period. The two years (1979 and 1980) that I attempted to breed *L. alterna* without a cooling period met with zero success. The four years (1981-1984) I varied the photoperiod and used a brumation period, the success rate was comparable to the five years (1985-1989) when I used the brumation period alone. These results indicate that the brumation period is highly important to the captive propagation of this species, but that the photoperiod is not.

Brumation temperatures below 59 F (15 C) have been reported by a number of authors (Miller, 1979; Murphy et al., 1978). The snakes should be cooled in early December and gradually warmed during late February or early March. Mating takes place in April, May, and June with eggs being laid in May, June, or July. I've had the best success keeping the sexes separate and introducing females into the male's cage during the breeding season. Double-clutching does occur, usually in June, July or August. The second clutch is almost

always smaller, with fewer eggs going full term (which is 60-75 days, depending on temperature). My incubation temperature is approximately 82 F (28 C), and most of the eggs have pipped at 70 days. Eggs, once laid, can be incubated in vermiculite or a peat moss/sand mixture. One to two weeks prior to hatching, some eggs change shape dramatically (e.g., sink in at various points). Once the baby snake has pipped, it usually takes 24 hours or longer for the neonate to convert from a yolk sac respiratory surface to an internalized respiratory structure (the lungs). During this process, the yolk sac is absorbed into the body. Shortly after this occurs, the baby will leave its egg shell. Polymorphism has been shown to occur in a single clutch (Tanzer, 1970; Murphy, pers. comm.). In other words, both true *alterna* morphs and blair's morphs can come out of the same clutch. Ten to fifteen days after hatching, all offspring undergo a post-hatch shed, at which time they are ready for their first meal of a lizard or pink mouse. With proper care, these young gray-banded kingsnakes can live up to 20 years (I've personally had an adult for 12 years).

In conclusion, much has been learned about the natural history and captive management of the gray-banded kingsnake over the past 20 years. Although infrequently encountered in the wild, *L. alterna* breed fairly readily in captivity, and many of these offspring can be found in private and zoological collections across the nation. Following appropriate husbandry techniques will insure that these *L. alterna* live and reproduce on a multiple generation level.

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