

## 10. ECOLOGY OF ROCK-VIPER (*VIPERA XANTHINA RADDEI* BOETTGER) IN THE NATURAL SURROUNDINGS OF ARMENIA

I. S. DAREVSKY

*Zoological Institute, Science Academy, Leningrad, U.S.S.R.*

The rock-viper (*Vipera xanthina raddei* Boettger) is one of the rare pretty poisonous snakes belonging to the Soviet Union Fauna; sparse reports concerning its biology and habits are to be found in literature. The following data on the biology of this snake have been collected by the author between 1951-1961 while doing field-work in the East Transcaucasus, particularly in the woods of mountainous Armenia.

**HABITS** — The most characteristic habitats of the rock-viper in this country are the rocky, at times steepy and scraggy slopes within the belt at 1500-1800 m above sea level, overgrown with thin oak forests, where they live particularly abundant among dry rocks, thin oaks and bushes, and in piles of rock fragments at the wooded slopes. Less frequently they may be met among the thinned out xerophite vegetation upon hill-sides, among the sparse growth of juniper and in the wide open, rocky and xerophite steppe. In some places the viper spreads out into cultivated fields where it keeps to stone heaps along the boundaries. They shelter in cavities under stones, rock crannies, between roots or in holes of rodents. Their winter retreats are deep fissures of rocks, almost too narrow for entrance. Numbers of them, up to 20 mature specimens seek their winter retreat in the same hole. If those holes really are in connection one with another in the middle of the rocks, we may indeed be right in concluding that the vipers hibernate in great number together.

**FREQUENCY** — Vipers varies in accordance with the different seasons of the year. After hibernation, between the end of April and the middle of May, they remain in the vicinity of their winter quarters and lie coiled up together en masse. In May 1953 the author could count up to 50-60 mature vipers, in groups of 4-6 specimens at an area less than 1 hectare, in the forested rocky surroundings of the Antharut village (Armenia). After coupling, about the end of June, higher up in the mountains even in its first week, the vipers disperse over adjacent areas, reassembling near winter quarters late in October, gradually increasing in number, not reaching however the amount of spring-time while the first comers already retire into their dens. There may be found perhaps 20-50 specimens per hectare in those areas.

**MIGRATION** — Migration from the area near winter quarters takes place in daytime: the single specimen may be seen crawling from one tree to another to disappear finally in the thick underwood. The direction is indicated by pieces of shedded skin, which are seen all over the bushes, bordering the winter retreat,

from the middle of June on, whereas the snakes themselves are nowhere to be found. In order to elucidate the believes that the snakes really return to the same place for hibernating, the author caught and marked 63 vipers in May 1952 on the southern side of the Aragatz mountain (Armenia). On the end of October of the same year, 7 of those were caught within a radius of 100-200 m from the place of the first capture. Thus, it is confirmed that at least a part of snakes return to the same winter quarters.

SEASONAL AND DAILY ACTIVITIES — Awakening from hibernation depends on the altitude above sea level of the retreats and takes place in the middle of April to the beginning of May. Only when the rocks have been sufficiently heated by the sun, around 11-12 o'clock, the vipers leave their retreat to lie on the bare rocks until more or less 6-7 o'clock, the loose folds of skin on their sides giving them an emaciated appearance. Approximately at the beginning of July, the mature specimens adjust to crepuscular and nocturnal activity and are not to be seen in daytime at all. The knowledge of this fact helps the population of those areas to take every precaution during springtime, not even turning out cattle to grass; everyone becomes careless in summer-time, since the return of the vipers does not occur before the end of October. In case of some evident danger, for instance when suddenly faced by its human enemy, the viper tries to dive into the nearest cover producing characteristic jerky hissing sounds in quick succession. Having succeeded in intercepting its retreat, the snake takes up a peculiar threatening posture raising the for-part of its body almost to an upright position, making rapid thrusts with a wide open mouth into the direction of its enemy. Large full-grown males are particularly aggressive in such cases.

FEEDING HABITS — After emerging from hibernation the vipers don't feed at all or only on some insects, explaining the remainders of some orthoperans found in the stomach contents of vipers, caught and opened by Chernov in May of 1939. Later on the snakes feed on mouse-like rodents. Many vipers caught by the author at the beginning of June disgorged the swallowed rodents of the day before, mostly *Microtus arvalis*, less frequently *M. nivalis*. The consumed number of rodents is very large. It was checked that a single snake during the season consumes not less than one hundred small rodents co-existing with them in the same region. Less frequently the snakes feed on lizards and young birds which nest on the ground. The very young ones feed on insects and small lizards.

REPRODUCTION — The mating of vipers coincides with the first shedding of skin, in springtime and may be prolonged til the end of May or even until migration starts. While the snakes bask in the sunshine the males crawl restlessly around until finding a female, gliding around her agitating the tail at high speed trying to hook the female's tail which by this time also begins to stir. Now and then the male succeeds in his endeavor but the female frees her tail immediately forcing the male to start all over again. At least both snakes move convulsively with interlocked tails, this movement spreading gradually with violence over the whole body. Frequently the female breaks loose, being pursued closely by the male, which body twitches violently from time to time. After protracted chase during which the male or leaves or seeks the female, both snakes interlace the posterior parts of the body. Both, one third of the body erected in "S" form, start swaying, the male trying now and then to push the female's head to the ground by violent thrusts. After succeeding to force the head down for several times both drop abruptly, intertwine their bodies rope-like leaving free

a small part near the head. Some time later they begin coupling their cloacas tightly joined together. Copulation often occurs about 1-2 hours after the beginning of courtship and lasts 20-30 minutes, the departure of the snakes following soon. The young ones are born in general during the first days of September, but birth may be delayed until the end of the month. Depending on size the females may give birth to 3-9 youngs which break the egg membrane while still in the womb, dispersing immediately into all directions after birth. Females of 504-560 mm length give birth to 3, oftener 4 or 5 youngs, while those of 570 mm and longer bring forth 6 youngs. In one case there were recorded 9 youngs. Data of Groubant and Roudneva (1956) discovered 10-13 eggs in the oviducts of examined females. An investigation proved however, that besides the living youngs the female cast off 1-2 unfertilized eggs. The youngs are born large in size, about 204-214 mm length of which 11-19 mm consist of the tail. They are of dull color until the first shedding, about a week later, acquiring the most brilliant color with the sharpest outline of the pattern, normal to mature snakes.

VENOM — Perfiliev (1941) made a number of experiments with *Vipera raddei* venom, applying it to various animals. His data show that bitten mice perish within few seconds or some minutes. A lizard *Lacerta agilis* lost its locomotion faculty after 2 minutes and died after 40 minutes. Rabbits died after 4 hours but it took 24 hours for a bitten dog to die. Records collected by the author during 1951-1953 in Armenia, show that the bite of those vipers are fatal in severe cases. One of those cases was a mature man, bitten on his right shoulder, death occurring within 12 hours. Two children aged 14, were bitten in the leg. There are no more data in literature on the action of rock-viper venom on humans.

#### REFERENCES

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