

# **P**ERSIAN RATSNAKE *ELAPHE PERSICA* (WERNER, 1913) NATURAL HISTORY, KEEPING AND BREEDING IN CAPTIVITY



*Sergei A. Ryabov, Director Exotarium,  
Oktyabrskaya, 26, 300002 Tula, Russia;  
E-mail: rept@tula.net*

## **INTRODUCTION**

A medium-sized, but a very interesting species – *Elaphe persica* has a rather limited distribution range: the south-east of Azerbaijan (the Talysh mountains) and the northern part of Iran, adjacent to the southern coast of the Caspian Sea to the north of the mountain system Elburz (Ananjeva et al., 1998).

For a long time this form was considered by scientists as a subspecies of the Aesculapian Ratsnake *E. longissima*. At the same time, distinct differences in the exter-

nal appearance of Azerbaijanian and Iranian specimens, their colour variability, smaller sizes and remoteness of the range from the zone of occurrence of the true Aesculapian ratsnake made the specific independence of this taxon quite probable. This was confirmed by Nilson and Andren (1984) when carefully studying this species.

## **EXTERNAL CHARACTERISTICS**

Usually *E. persica* attain a total length of only 70 – 90cm (Schulz, 1996), but larger specimens are also known. Thus, our female which was bred in captivity in 1995, at the end of the year 2000 had the size of 125cm (L – 104cm, Lcd – 21cm). The sexual dimor-



*Photo 1. Mating of Persian ratsnakes *Elaphe persica* (black male, brown female). Photo by S.A. Ryabov.*

phism in sizes, known for *E. longissima* in which males are usually larger than females, was not observed in *E. persica*. On the average specimens of both sexes have equal sizes, sometimes females are slightly larger. Colour variations known for this species are absolutely amazing.

Persian ratsnakes can have a very different colouration – it is even difficult to believe that all these snakes belong to one species from the same population.

In the wild specimens with various tinges of grey or brown colouration are not uncommon, sometimes snakes of a very bright red-brown tone are encountered. In most adult specimens narrow transverse saddle blotches on the back are completely unmarked or barely visible. At the same time, in young ratsnakes transverse blotches are clearly marked. Red eyes with a distinct round pupil are strongly pronounced, which are completely different from dark eyes with a barely visible pupil in *E. longissima*. In rare cases the iris can be light. The similar element of the colouration of these two species is the presence of light spots behind the head at the angles of the mouth, however, in *E. persica* they are located lower and less visible than in the Aesculapian ratsnake.

Specimens with a black colouration are also quite common. On the sides, neck and in the anterior portion of the body there are irregular light-grey areas, more or less distinct in different specimens.

It is interesting to point out that in captivity the black variation is more hardy and lives for a longer time than coloured specimens (personal data, K-D Schulz, pers. comm.).

## SOME DATA ON ECOLOGY

Habitats of Persian ratsnake are always attributed to montane deciduous forests at elevations between 500 and 1500m (Schulz, 1996).

In Azerbaijan this rare species was studied by Sergei Kudryavtsev and Sergei Mamet during their field observations (Kudryavtsev, Mamet, 1998). Some data was also reported by Sergei Tereshkin (pers. comm.). Here Persian ratsnake inhabits riparian forests, broad-leaved forests, more often it can be encountered on forest clearings and edges. One specimen was discovered in a rotten stump. Repeatedly Persian ratsnakes were encountered in the settlements situated not far from the forest.

However, the density of Persian ratsnake is not high and comprises 2 – 3 specimens on 10km of the route (Ananjeva et al., 1998). At catching these snakes are quite aggressive and actively bite. In the faeces of wild-caught specimens hair of rodents prevailed.

## KEEPING AND BREEDING

The work on keeping and breeding Persian ratsnakes was initiated in Tula Exotarium since 1992, when several wild-caught specimens from the vicinity of the town Lenkorani (Azerbaijan) and a pair of young snakes from the captive-breeding of the Moscow Zoo were received.

These snakes adapt to the terrarium conditions quite rapidly. Of course, the keeping of captive-bred ratsnakes is much less problematic than that of wild-caught specimens. For the well-being of snakes it is first of all necessary to provide them with optimum conditions:





- 1: temperature +26 – 30°C during the day, +20 – 23 – at night;
- 2: humidity is moderate, somewhat lower than at keeping of *E.longissima*;
- 3: a substrate of wooden shavings or peat and dark hiding-places are desirable – in this way snakes are feeling themselves more calm;
- 4: a water-dish for drinking can be quite small;
- 5: young mice (up to the age of one month) or one-week old rats are offered as food. A small size of food items is recommended.

As S.A.Prohorchick reports (pers. comm.), Persian ratsnakes also eagerly eat Japanese quail (2 – 3 days old). During temperature rise in summer-time, Persian ratsnakes can refuse to take food for a long time, almost without losing their weight. In autumn they usually begin to actively feed again.

For a successful breeding a hibernation at temperature +10 – 13°C without the access of light during 2 – 3 months is required (Schulz, 1996; Kudryavtsev, Mamet, 1998; personal data). Matings usually begin in 2 – 3 weeks after emerging from hibernation, after snakes have eaten 1 – 4 times and after shedding.

The courtship behaviour of males is very vigorous, they pursue the female and sometimes bite her in the neck (Photo 1). If the female is willing, the copulation follows in several minutes. Usually it lasts for 25 – 40 minutes, rarely up to 55 minutes. It is interesting to note that the female which has readily mated with the male once, does not allow him to approach her any more, and she actively crawls away, coils herself up and vibrates with the tip of the tail.

Since the males of this species are always highly active

sexually, and the females allow them to approach not more than once, a separate keeping of the partners to avoid a mutual stress and putting them together for a short time during the reproductive period are required. However, it is possible that when keeping them separately, males preserve their sexual activity for a longer period, and when keeping them together in one terrarium they calm down more rapidly, because the fertilized female ceases to attract them.

After the mating females are feeding very eagerly, eating every 3 – 5 days 5 – 8 small (two-week-old) mice at each feeding. Usually the snake has time to take food 7 – 9 times. Gravidity lasts for 53 – 70 days depending on the stage of development of follicles at the moment of mating.

Eggs are laid in 6 – 8 days after the last shedding. A clutch contains from 2 up to 8 eggs. It is interesting to note that our largest female, in spite of her imposing sizes, was laying only 2 huge eggs every time during a long period – since 1997 till 1999, only in the year 2000 three eggs were received, and in 2001 – 5 eggs.

Naturally, the sizes of the eggs depend on the size of the female and the number of eggs in the clutch. Thus, for example, in 1999 in two large females the following sizes of eggs in the clutches were registered:

1<sup>st</sup> female – 2 eggs 52-54 x 20 mm  
the weight of each egg is 16,5g

2<sup>nd</sup> female – 6 eggs 46 – 48mm x 20 – 23mm  
the average mass is 14,8g

In the year 2000 in a young female (a clutch of 3 eggs) the average weight was 10,9g.

In the process of incubation eggs considerably gain weight and change their shape, becoming more rounded. Thus, in the year 2001 during 34 – 39 days of incubation each egg has increased its mass on 25 – 34% on the average.

The duration of the incubation period depends on the temperature to a considerable degree. The optimum (i.e. such at which an approximately equal number of males and females hatch) is the temperature 26 – 27°C. In this case young snakes hatch in 53 – 56 days. At rising of the temperature in the incubator the risk to receive a larger part of males in the offspring noticeably increases.

The sizes of young snakes changes from 31,9 to 35cm, with an average 32,5cm; the weight varies from 9 to 13,4g.

Young ratsnakes do not always begin to eat eagerly. But they begin to actively feed and rapidly grow immediately after the diapause. For stimulation of feeding of young snakes a cooling period of 1,5 - 2 months

at temperature 14 – 16°C is quite sufficient.

After that young Persian ratsnakes rapidly increase their weight and size, feeding on one-week old mice. Usually already at the age of 1,5 – 2 years, i.e. after two hibernations, *E.persica* become sexually mature, and it concerns both males and females.

Second clutches during one season are characteristic for Persian ratsnakes. Once a second clutch, which followed after the first clutch, was achieved (the dates of the clutches – 16.04.96 and 18.06.96) (Bochkarev, Mamet, 1999). However, this success was not repeated, and possibly such clutches occur under occasional circumstances, extremely rarely.

At the same time, second clutches in autumn are typical for *E.persica* (Bochkarev, Mamet, 1999; Ryabov, 1999). Unfortunately, data on autumn clutches in the wild is not available. In the terrarium after more dry and warm summer months the increase of sexual activity is observed at the end of August - September. If favourable conditions preserve, females lay eggs at the end of October – November. Accordingly, young



Photo 2. To the left: A brown morph of *E.persica* (a juvenile colouration). In the middle: a hybrid of *E.persica* x *E.situla*. To the right: *E.situla*. Photo by S.A.Ryabov



Photo 3. A black variation *E. diene var. nigrita*. Photo by A.V.Kirenkov

snakes hatch in winter. Autumn clutches often contain a larger number of unfertilized eggs than spring clutches. Young *E.persica*, hatched in winter, immediately after the first shedding were put into hibernation, since none of them began to feed on its own.

In spring females, which have laid autumn clutches, are always eating for a longer period of time and mate later.

It is stated that the Japanese Ratsnake *Elaphe climacophora* and the Japanese Four-lined Ratsnake *E.quadrivirgata* also breed in a similar fashion (personal data).

### TAXONOMIC REMARKS

In our laboratories in 1998 an experiment on inter-specific hybridization was carried out with the purpose

to determine closely-related for *E.persica* species of the *Elaphe* genus. We succeeded in receiving the offspring from a female of the Leopard ratsnake *E.situla* after we had mated it with a male of the Persian ratsnake (Ryabov, 1998). In the result from the 3 laid eggs (the size is 78 x 20mm) in 50 – 51 days hatched 3 hybrid specimens more than 40cm long, with an intermediate colouration between the two parent species (Photo 2). This successful experiment permits to assume that in spite of the geographical remoteness from each other, the Leopard ratsnake *E.situla* and the Persian ratsnake *E.persica* are related species, and, probably, they form a common group with *E.hohenackeri* and the more remote from these 3 species *E.longissima*.

Also, it is interesting to mention that during the last years on the North Caucasus in the vicinity of the Mozdok town a black variation of the Dione ratsnake

*Elaphe dione* var. *melanistic* was discovered (Maliev, pers. comm.). In its outer appearance this ratsnake is very similar to *E. persica*, however, it is a rather remote relative of the Persian ratsnake (Photo 3).

## CONCLUSIONS

New data on *E. persica*, not published earlier and different from the data given in the works of other authors, is presented in this article: duration of copulation, duration of gravidity of females, characteristic features of the reproductive cycle, dependence of sizes of eggs upon different factors, sizes of newly-born ratsnakes. A comparison with some species of the *Elaphe* genus is done, and the species most closely related to *E. persica* are determined.

In general, the Persian ratsnake is a very interesting and beautiful for the terrarium species, and further work with it will certainly bring more new data.

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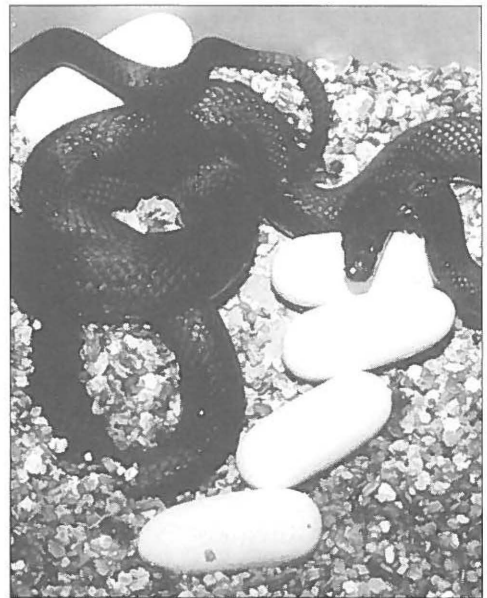


Photo 4: Clutch of eggs of *Elaphe persica*

