

THE EXOTARIUM - SNAKE CENTRE IN RUSSIA

The Exotarium was opened in Tula in 1987, specialising in keeping, breeding and studying reptiles. Tula is situated not far from Moscow and is known primarily for its excellent hunting guns, beautiful samovars and delicious teacakes. There are many different museums in Tula. The famous Yasnaya Polyana, the former estate, and now museum of the famous Russian writer Leo Tolstoy, is situated nearby.

And now, in one of the houses of this ancient Russian town, snakes from all parts of the world have taken up residence. The total number of reptiles at the Exotarium has increased from 3 to 5 thousand specimens encompassing approximately 330 species and subspecies. It is possibly one of the largest collections in the world.

In our snake zoo there is a popular exhibit that is open to visitors. There are not many zoos in Russia, which is why the Exotarium plays an important role in the popularisation of ecological knowledge. About one hundred thousand adults and children become acquainted with the exotic inhabitants of far-away countries every year, and learn many useful and interesting things here. The collaborators of the Exotarium often conduct lectures about snakes in schools and other educational institutions. Small thematic exhibitions such as 'Reptiles and Amphibians of the Tula Region', 'Reptiles, Born in Tula', 'Diversity in a Single Species' (for example, *Lampropeltis* or *Elaphe guttata*), 'Venomous Snakes', 'Reptiles of Indonesia' and others are conducted every month.

But scientific work is the main focus of activity of the Tula Exotarium, and is carried out in the 16 research

laboratories. Programs on the study of taxonomy of various groups of reptiles, investigation of their reproductive biology, surveys of regional fauna are amongst the topics researched in collaboration with leading scientists – Russian herpetologists from the Zoological Institute of the Russian Academy of Sciences (St. Petersburg): Ilja Darevsky, Natalia Ananjeva, Nikolay Orlov.

For many years we have been in collaboration with such famous specialists and scientists as Klaus-Dieter Schulz and Andreas Gumprecht (Germany), Notker Helfenberger (Zoologisches Museum der Universität Zurich, Switzerland), Prof. Er-mi Zhao (Chengdu Institute of Biology, China), Cao Van Sung (Institute of Ecology and Biological Resources, Vietnam), Dr. Theodore Papenfuss (Museum of Vertebrate Zoology, University of California, Berkeley, USA), Prof. Akira Mori (Kyoto University, Japan), and many others.

Initially the main focus of investigation was the representatives of the *Elaphe*, *Lampropeltis*, *Boiga*, *Spalerosophis*, *Viper* and *Trimeresurus* genera, as well as of the *Boidae* family. We have been able to collect the majority of species of rat snake (*Elaphe*) occurring in the world fauna. As a result of observations of their life and reproduction, data from many years on: conditions of maintaining, duration of copulation, courtship behaviour, period of gravidity, temperature and duration of incubation, juvenile colouration, growth rate and attainment of sexual maturity has been assimilated.

We succeeded in making a number of interesting observations on well-known king and milk snakes. All the





Rhynchophis boulengeri, a rare and very beautiful snake from China and North Vietnam. It was bred in Tula in 1995 for the first time in the world terrarium practice. Photo: I. Lozinsky.



A rare colour phase of *Chondropython (Morelia) viridis*, bred in Tula. Photo: S. Ryabov

species of *Lampropeltis* and the majority of sub-specific forms have been collected. Some data are received that allow us to assume that this small genus still has many surprises for taxonomists and requires a more complete complex investigation.

Among the *Boiga*, *Vipera* and *Trimeresurus* kept in our laboratories there are many unique species either only described by scientists during the last few decades, or as yet undescribed. Among them there are such species as *Boiga guanxinensis*, *Trimeresurus karanshachi*, *Vipera darevskii*, *Vipera lotievi* and others.

Complex work is also carried out with *Morelia viridis*. This beautiful arboreal species was first given to Tula as a gift from the Dallas Zoo (USA). Since 1993 Green tree pythons have reproduced at the Exotarium every year, and via exchange programs, distinctly different forms from various habitats have been collected, and now data on their morphological and physiological features have been accumulated.

Similar factual material is noted and described on every group of reptiles kept and bred in Tula. Several thousand young snakes and lizards hatch from eggs or are born every year. Repeatedly species produce offspring under captive conditions in the Tula Exotarium for the first time in the world.

We were the first to breed *Calabaria rheinhardtii* in 1990, as well as such rare species as *Rhynchophis boulengeri*, *Boiga kraepelini*, *Boiga guanxinensis*, *Boiga dendrophila gemmicincta*, *Elaphe hohensackeri*, *Trimeresurus puniceus*, *Goniurosaurus murphy*, *Teratoscincus bedrijagi* and others. For many consecutive years we have been breeding: *Elaphe climacophora*

and *Elaphe quadrivirgata* from the island of Kunashir and from mainland Japan, various subspecies of Stripe-tailed ratsnake: *Elaphe taeniura taeniura* from China, *Elaphe taeniura mocquardi* from Hong-Kong, *Elaphe taeniura friesei* from Taiwan, *Elaphe taeniura yunnanensis* from North Vietnam, the Persian rat snake *Elaphe persica* from Azerbaijan, Diadem snakes *Spalerosophis diadema atriceps* from Pakistan and *Spalerosophis diadema cliffordi* from North Africa, dozens of subspecies of various *Lampropeltis*, American *Elaphe*, Caucasian vipers and others. Many species are kept in large groups of between 3 to 15 pairs.

But the most impressive number of snakes in our laboratories belongs to two species: Dione's ratsnake *Elaphe dione* and the Four-lined snake *Elaphe quatorlineata*. We have tried to obtain specimens for our live collection from all parts of their range, and ensure we have several pairs from every habitat. Thus, we have *Elaphe dione* from the Ukraine, the Volga region, North Caucasus, Kazakhstan, the Altai Mountains, Far East, Central and Southern China and from Korea; *Elaphe quatorlineata* from Italy, Yugoslavia, the Ukraine, Moldova, Russia, Georgia, Armenia and Kazakhstan. Observations of live animals and study of their reproductive cycles allow us to examine more objectively all the complications of intraspecific taxonomy of these widely distributed species that show variable appearance. More than 150 *Elaphe dione* and about 70 *Elaphe quatorlineata* comprise our main breeding groups, among them there are a lot of specimens with an unique colouration: orange, red, bright-yellow, black.

Investigation of the reproductive potential of some species is also interesting. For example, under the





maximum favourable conditions a female Copper-headed rat snake *Elaphe radiata* laid 9 clutches during one year, a total of 100 eggs. The same ability to multiple clutch was seen at the Tula Exotarium in Helena's ratsnake *Elaphe helena*, Malayan ratsnake *Elaphe flavolineata*, Green tree snake *Boiga cyanea* and Large-toothed tree snake *Boiga cybodon*. Second clutches are produced in several dozens of species; mechanisms of this phenomenon are being analyzed. Of course, we investigate not only the artificial stimulation of reproduction, but also how completely the potential of reproduction of a given species can manifest itself when simulating natural cycles and stable feeding.

Collaborators of the Exotarium with the help and support of Russian scientists together with well-known specialists from the USA, Canada and Germany have over many years taken part in the complex program of investigation of the herpetofauna of Vietnam and China. Field observations in natural habitats give a possibility to select the most adequate conditions for adaptation of inhabitants of rain tropical forests. Owing to this we were able to achieve reproduction of such species as *E. porphyracea vaillanti*, *Elaphe prasina*, *Elaphe mandarina*, *Rhynchophis boulengeri*, *Boiga kraepelini*, *Trimeresurus steinegeri* and others.

We are only beginning to attempt to maintain some species under captive conditions. Some successes have been achieved. Since 1995 in collaboration with Nikolay Orlov we have been able to keep a unique species *Azemiops feae*. In 1999 our only female, after a single mating, laid several unfertilized eggs. Two wonderful *Pseudoxenodon bambusicula* have been living in Tula for 3 years. For several years, specimens of se-

veral species from *Oligodon*, *Lycodon*, *Rhabdophis*, *Dinodon*, *Xenopeltis*, *Ahaetula*, *Zaocys* genera are also surviving well.

At present we have many more unsolved problems than solved ones. And the more deeply we study a given problem, the more new questions appear that we did not suspect. Different zoos, animal suppliers and specialists help us form our collection. For many years we have been in cooperation and continue our cooperation with: Ron Tremper (USA), Dallas and Saint-Louis Zoos (USA), Michel Guillod (Ophiofarm, Switzerland), Moscow and St. Petersburg Zoos (Russia), Alma-Ata Zoo (Kazakhstan), Jersey Wildlife Preservation Trust (Great Britain), Skansen-Akvariet (Sweden), Frankfurt Zoo (Germany), Royal Melbourne Zoological Gardens (Australia). We also have good partnership relations with Mr. Buntje Soetanto, Director of the Indonesian Centre on breeding of reptiles 'C. V. Prestasi' (Indonesia), Mr. Ludwig Trutnau (Germany), Mr. Ivan Dolzhan-sky (France) and many others. Workers at the Exotarium express their deep gratitude to all those who helped and help us in obtaining animals, medical treatments and special literature. However, currently not all species are paired, and this is a great problem for us.

Nowadays it is very complicated and expensive to be engaged in complex scientific research. Especially in Russia where the standard of living is so low. But in spite of all difficulties we are supported by the Department of Culture of the Tula Regional Administration — our parent organization. The Exotarium is financed from the budget of the Tula region, and this allows us to cover expenses for electric power, means of communication, part of the salary of the workers and food

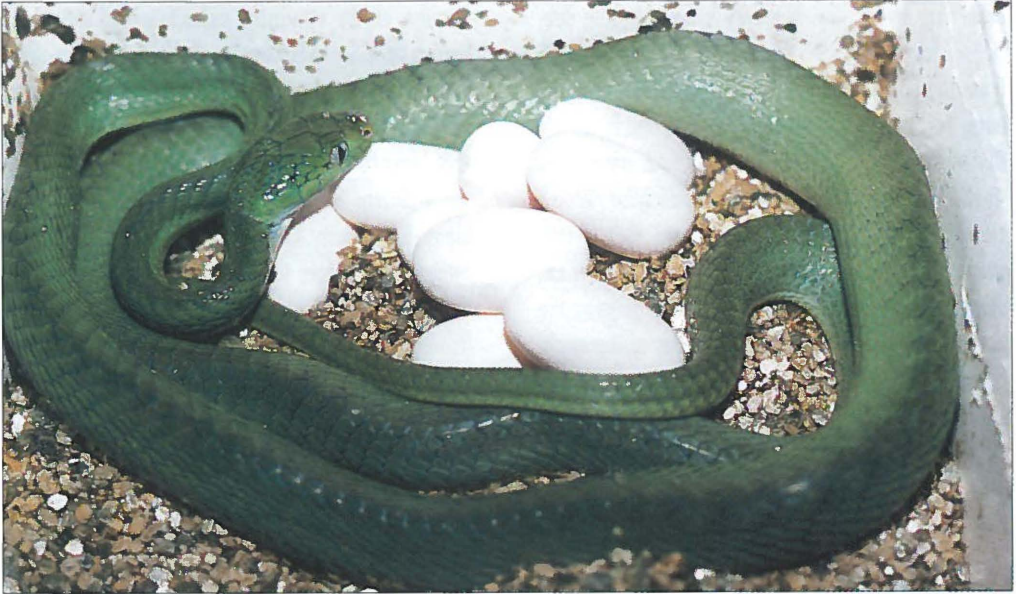


A young 1fi years old *Elaphe porphyracea vaillanti* on its first clutch of eggs. Photo: S. Ryabov.



Elaphe climacophora van het eiland Kunashir. They have been breeding in Tula since 1984. Photo: S. Ryabov.






Boiga cyanea on the clutch of eggs. Photo: S. Ryabov.

for animals. Of course, for the time being our salaries, as everywhere in budgetary organizations in Russia, are very low, our collaborators receive up to \$100, but it allows us to survive and guarantees some stability. All our scientific research, acquisition of animals and new equipment, reconstruction and expansion of the laboratories and expeditions can be carried out only if we cover the expenses ourselves. That is why we offer some of our offspring that we do not use in our scientific work for exchange or sale, so that we can have a means to continue our program.

In our every day work we try to create the best conditions for our animals. Our terraria and boxes are not large, but an ideal day and night temperature gradient is maintained in them which is different for different groups of reptiles. The most suitable substrate and system of ventilation for ensuring of the required humi-

dity are selected: form, height, size and other features such as hiding-places and lighting conditions are modified. Periodically, radiation with ultra-violet lamps is carried out. During the summer in good weather the majority of the animals goes outside in specially equipped areas outside the building. Every day all the snakes are inspected, faeces removed, water-bowls changed, spraying is carried out, etc. Temperature regime in the laboratories is maintained by means of conditioners.

The workers try to treat each specimen individually though it is not always easy for them, because every keeper takes care of 300 – 400 specimens of various species. The Tula Exotarium is the only of the Russian zoos to establish its own feeding base. At the moment it is not large and cannot meet all the demands, but thousands of rats and mice of different lineages are



born here every day. The rest is bought from specialised nurseries of the Academy of Medical Sciences. From the poultry-farm we receive chickens, quail and eggs. For feeding oligophagous species and for diversity in the diet of the other snakes such animals as small passerine birds, geckos *Hemidactylus*, lizards *Lacerta*, snails *Achatina*, crickets and locust, rain worms, hamsters and jirds (*Meriones*) are bred at Exotarium. This diversity of feeding objects gives us the potential to keep practically any species of the world fauna.

Unfortunately, all the space in our building is already occupied. All our 610 square meters are completely occupied with many-tier constructions of boxes and terraria, and we need to expand considerably. Our town and the region lack resources, and we hope to receive support at Government level. Certainly, if we have more appreciable state and international support, we could make much more. Our dream is to create a large Centre of Reptiles that could be the Institute of Herpetological Investigation and at the same time the Gene-bank for Conservation of the Representatives of the World Fauna. It could therefore be possible to conduct unique scientific experiments, and the received numerous offspring that would serve as a guarantee of conservation of endangered species.

It is not a secret to anyone that unfortunately the ecological situation on our planet is becoming worse, and

because of the increasing exploitation of nature by human activity, primary forests and other natural landscapes continue to disappear from the surface of the Earth together with their inhabitants. At the same time, scientists until now continue to discover and describe dozens of new species of reptiles and amphibians. But nobody knows how many species had become extinct before they were discovered by science. The moral aspect is awful: the human race annihilates its neighbours on the planet, without pity to anyone and without thinking of tomorrow.

But the time is not far off when ecological chains will tear to such a degree that nature in spite of its colossal self-restoring potential will not be able to maintain the balance. It is quite possible that institutions similar to the Tula Exotarium will be able to preserve these tiny but important links that in the future will help restore some of these ecological chains and save nature and the Earth in general.

We will be delighted to have professional communication with any organizations similar to ours, collaborators of zoos, specialists and amateur-keepers interested in our work. We are open to cooperation and hope that you will take part in the further development of our common cause.

*Translation from Russian into English: Oksana Tishenko.
Corrections: Lawrence Smith*

