

Re-introduction of European tree frog in Latvia

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Introduction

European tree frog was considered as extinct in Latvia since last decades of the 20th century. Data on the former distribution of this species are rather incomplete. Several faunists of German origin (Fischer, Seidlitz and Schweder) have mentioned the species as being present in Latvia in the 18th - 19th centuries (Silins & Lamsters, 1934). Several reports have even been received in the 1980s (Zvirgzds *et al.*, 1995). Intensive agriculture, rapid deterioration in total area covered mainly by wetlands, and extinction of beaver (*Castor fiber*) in Latvia in the end of 19th century, could be the main factors, which could cause the vanishing of *Hyla arborea* from Latvia. The re-introduction program was started by Riga Zoo in 1987, and a total of 4,110 juveniles in total were released in SW Latvia (Liepaja district), where protected area with total area of 350 ha was established in 1999. The area accommodates a large number of ponds, considerably changed by beavers. Before the re-introduction started, the European tree frog was listed in Red Data Book of Latvia under Category I (endangered species) (Latvijas PSR Sarkana gramata, 1985), at meantime Category II (vulnerable species) (Latvijas Sarkana gramata, 2003). The European tree frog is included in Appendix II of the Bern Convention.

Goals

- Goal 1: Creating sustainable populations of European tree frog in Latvia.
- Goal 2: Proving that creating sustainable populations of amphibians in nature is possible by releasing of specimens, bred under laboratory conditions.
- Goal 3: Proving that *Hyla arborea* can survive Latvia climatic conditions, therefore this species most likely was a natural part of Latvia nature during past centuries.

Success Indicators

- Indicator 1: Self-sustaining population established at re-introduction site, with more than 10 generations developed naturally.



European tree frog © Sergey Cicagov



Typical pond habitat © Andris Eglitis

- **Indicator 2:** The distribution of the population around the re-introduction site, as far as the suitable environment is available.

Project Summary

Feasibility: Laboratory of Ecology (Amphibian Department since 2006) was founded in Riga Zoo in 1987 with its main task to re-introduce the European tree frog in Latvia. The re-introduction was planned with captive-bred tree frog youngsters

in their first year of life.

The considerations were as follows:

- The translocation of a larger amount of adult specimens from other natural populations could place the donor population at risk, even if the population is considerably stable.
- The youngsters would have a considerably higher ability to adapt to wild conditions than adults, if captive bred specimens are released into wild (Dunce & Zvirgzds, 2005).
- The adult specimens for captive breeding were caught in Southern Belarus, near the confluence of Goryn and Pripyat rivers, what is geographically closest stable population (there is also small population in Lithuania).

Implementation: The adults were kept in outdoor terrariums and fed with artificially bred insects as well as meadow sweeps. At the end of October and early November the frogs were placed in wooden boxes, filled with sphagnum, and boxes were kept in refrigerator for hibernation (average temperature 5°C) till the end of January and early February. Later it was found out that an old cellar as a hibernation place is better for the amphibians welfare, despite greater fluctuations of temperatures (from 1°C - 7°C). After hibernation the temperature was raised gradually, and the artificial daylight period gradually lengthened, imitating the day length of the breeding period. The frogs were fed intensively and breeding was stimulated with hormone injections, using Surphagon, a synthetic analogue of Luliberin (produced by Bapex Co., Latvia). During the first year of breeding effort the hormone treatment was given in the beginning of May, in other years during the beginning of March. In both cases the results were virtually identical.

Two males and one female were usually placed in a 35 liter aquarium with a water level of about 5 cm and several plants. Each female produced 200 - 1,000

or even more eggs. Hatching usually started on the 8th - 10th day of development. The larvae were placed in aquariums with aerated water; temperature was maintained 24°C - 27°C at day, 20°C - 23°C at night. The density of tadpoles never exceeded 2 - 3 larvae per liter. Tadpoles were fed with dried and boiled nettles, meat, aquarium fish food (Tetra) and pollen. The natural photoperiod was simulated using luminescent lamps. The average amount of animals that

metamorphosed was 60% - 70% of the initial larvae; in some cases it even exceeded 90% (Zvirgzds *et al.*, 1995). The metamorphosis took 30 - 60 days (in the wild it usually takes 90 days). Froglets were fed with meadow sweeps and captive bred insects. About 2 - 6 weeks after metamorphosis the froglets were taken to the re-introduction site.



Amphibian experts at a potential release site in Latvia during 2004 © Elvira Hrscenovica

During 1988 - 1992 a total number of 4,110 juveniles, progeny from 14 - 17 breeding pairs, were released. All releases were conducted in one locality, enabling accurate further monitoring of population dispersal.

Post-release monitoring: The release site was chosen in SW Latvia (Liepaja district, ca. 56°30' N 21°42'E) where a protected area was established with total area of 350 ha. The first vocalizations of adult tree frog male in the re-introduction site were recorded in 1990 - two years since the start of the re-introduction program. This confirms that under particular conditions males can reach sexual maturity in 2 years. The first tadpoles in the wild were found in 1991, at the release site. The first calling males outside the release site were recorded in 1993. Further distribution progressed even faster and up to 2002, tree frogs were recorded already in 110 localities.

The distribution of the newly created population was monitored mainly on the basis of the spring mating calls. All new-recorded localities were registered by GPS and mapped till 2005. The local communities were informed about the project by dispersing booklets, giving lectures in schools, as well as cooperating with media (TV, radio). In later years the area of the population reached the size what made it practically impossible for accurate monitoring and further dispersal of tree frogs is followed up by reports of local people.

Amphibians

Major difficulties faced

- It is difficult to estimate the present size of population because of extended area. Despite of informational work with local people the reports about tree frogs are occasional and do not show the full picture of species occurrence.

Major lessons learned

- Under laboratory conditions the breeding can be effected to happen earlier than in the wild, and the larvae develop faster. Thus, the released froglets have more time to adapt to natural conditions as well as for feeding and growing. We hypothesize that it could result in a much higher survival rate during the first winter.
- Despite that the breeding of tree frogs was stimulated by hormonal injections in all cases, we did not face any problems regarding tadpole or froglet survival or growing rates.

Success of project

Highly Successful	Successful	Partially Successful	Failure
√			

Reason(s) for success/failure:

- After 14 of initiating the re-introduction program, monitoring data showed that total area of population dispersal covered 800 - 900 km² (Dunce & Zvirgzds, 2005). As it could be inferred from later reports, it continues to expand.

References

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