

RESPONSIBLE HERPETOCULTURE JOURNAL

ISSUE 1 MARCH
2022

WHEN THE AMPHIBIANS AND REPTILES CONSERVATION IS NOT ENOUGH...

CONSERVATION OF
EUROPEAN POND
TURTLES
IN LATVIA

BIODIVERSITY DELUSION
AND INBREEDING
DEPRESSION IN
HERPETOCULTURE

ACCLIMATING SENSITIVE
SPECIES

BREEDING RARE
AMPHIBIANS FOR 25 YEARS

RH BASIC PRINCIPLES

KEEPING AND BREEDING THE
NORTHERN GUYANA
CAIMAN LIZARD

SELECTING INCUBATION
SUBSTRATES

COVER PHOTO BY PETR BAMBOUSEK





Figure 2. *C. scurrulus* female.

The behavior of individuals will often vary. More often than not, many wild-caught species will be way too shy to even eat in front of you, let alone eat at all for some time. Observe the animal from a distance. Better yet, use a camera. Find out their habits without interfering and their preferred spots to hide. Offer food without them knowing you are there and leave the room for the day/night, so they are comfortable. Again, use a camera to learn how they go about their business regarding feeding. If it's a potentially dangerous live meal, more reason to have a camera and not have to bother the snake. Another key in acclimating a species is quite simple - do not touch it. Even if you have the utmost urge...just don't! My Chironius and Boiga, even Ahaetulla, do not get touched unless mandatory. I have maybe touched my *C. scurrulus* three times in the last 18 months. That was to unbag, aid a shed and upgrade the enclosures.

I hope you learned some tips and tricks when acclimating wild-caught animals. There will forever be new knowledge to learn and things to change when it comes to specific species.

Preparing Animals for Expositions

We all have been to reptile expos and have seen how they are displayed. Clean container or deli cup with paper usually, nothing more. This is a common practice to display the animal without any viewing obstruction. It makes

sense; however, it will pose a bit of stress for the animals. In this day and age, with animal rights organizations, we must be careful how we display them in the shows as they have used photos of such containers as their "proof" of inadequate care to governing bodies. No matter what, displaying reptiles will pose some sort of stress, so I give them some options.

Species dependent, I always offer water in a small cup. Usually, this is a 1 oz plastic up hot glued to the side of the display container (Fig. 3). I also provide loose substrate to allow for some natural burrowing activities (though not to hide them completely) and/or a small piece of fake plant. This way, they are still visible to prospective buyers and allow the reptile to drink or feel more secure. Surprisingly, I do see reptiles use the water during shows. I ensure all containers allow for the reptile to reasonably stretch out and not touch more than two sides of the container while relaxing or coiled up.



Figure 3. Example of a container for transporting.

They also must have room to turn around comfortably. We have to remember that these are living, breathing animals and during all situations, they should be treated with the respect they deserve. Perhaps setting up expositions this way will take a little more time, but it will allow the animal to behave with less stress and show prospective buyers you genuinely care.



PRACTICAL CONSERVATION OF EUROPEAN POND TURTLE (*EMYS ORBICULARIS*) USING HERPETOCULTURE APPROACHES IN LATVIA

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As the matter of fact, Latvia is one of the countries where northern edge of the natural distribution of European pond turtle (*Emys orbicularis* (Linnaeus, 1758)) occurs (Fig. 1). Here these animals' nature habitat was anthropogenically transformed by local



Figure 1. *E. orbicularis* old female found in 1985 in Latvia, the first individual of the future breeding group.

inhabitants that in combination with cold climatic specifications made these species extremely rare in this country.

However as of now, situation became much better thanks to long lasting efforts of the Latvian *Emys* researcher group, Latgales Zoo, Latgales Ecological Society and Daugavpils University, Latvia.

According to the preliminary studies and assessment of findings of pond turtles in Latvia (Fig. 2) (a total amount of only 85 registrations since 1927 was collected): "Until 1927 *Emys orbicularis* had only been mentioned in Latvia in nine places located to the south of the river Daugava (Jatele in 1827, Pelci in 1847, Kuldiga in 1847, Zlekas in 1847, Liepaja in 1850, Ilukstein 1860, Platone in 1870, Kaleti in 1880 and Puze lake in 1920) (see review of Fritz, 2003) and three to the north of this river (Ungi in 1914, Priekuli in 1925 and Blome in 1927) (see review of Silins & Lamsters, 1934). Silins & Lamsters (1934), analyzing the information about the findings of

European pond turtle in the regions of Latvia from 1820 till 1934, noted that 11 individuals were found in Zemgale region, 21 in Kurzeme and six in the region of Vidzeme. In 1972 the *Emys orbicularis* female was caught in Jelgava, which had laid eggs (Knospe, 1972). Already in 1977 only one point of the presence of European pond turtle was marked for Latvia, moreover by a question mark (Bannikov et al., 1977). The checking of the existing information reliability about the observation of *Emys orbicularis* and the search for new findings was carried out by Zirnis (1980). After the carried out study, Zirnis (1980) made a conclusion, that many available communications about the observation of turtles in Latvia were not authentic others might be connected with turtles, which escaped from terrariums. In 1992 only one point of *Emys orbicularis* finding was marked near to Liepaja (Iverson, 1992). In 1999 a communication about the finding of *Emys orbicularis* juvenile in Dobeļe district appeared in Latvian press (Kocane, 1999). Despite these findings, in the Red Book of Latvia, in 2003 the *E. orbicularis* was marked as an extinct species of category Zero (Berzins, 2003). In 1972–2017 19 single individuals (mostly adults) of *E. orbicularis* in Latvia were found by the Latvian *Emys* researchers personally or confirmed by photograph (Pupins et al. 2019) (Fig. 2).

Such number of turtle findings (Pupins, Pupina, 2008) in Latvia can testify to the existence of *Emys orbicularis* population in Latvia. During

the study a tendency towards the decrease of number of found *Emys orbicularis* in Latvia in directions from south to north and from west to east was found. In general, this tendency coincides with the tendency of territorial and numeral decrease of *Emys orbicularis* population in directions from south to north, marked by other authors in neighboring to Latvia countries (Bozhansky & Orlova, 1998; Balciauskas et al., 1999; Drobenkov, 2006; Meeske, 2006). A part of *Emys orbicularis* findings' registration in Latvia was done 20–30 years ago, afterwards no turtles were found in those places. In general, this data coincides with the data from Belarus that says that some part of small populations on the north of the area would soon disappear (Pikulik et al., 1988; Drobenkov, 1991).” (Pupins & Pupina, 2008).

Since the first finding of *E. orbicularis* in 1985 Latvian *Emys* researchers and herpetoculturists group worked privately and won several grant projects for financial support of actions of the conservation and restoration of *E. orbicularis* populations and biotopes in Latvia. Using herpetoculture methods: legal obtaining of wild caught local breeding stock and creating adequate keeping conditions for turtles (including proper diet, system of artificial indoor and outdoor pools, construction of nesting places and organizing facilities for raising of turtles' hatchlings till they become adults and releasing them in restored biotopes in wild), - for now their work resulted in restoration of three turtles populations in Latvia which are stable since 2014. And this success is a result of a massive work done on different levels of many spheres of nature conservation, science, legislation and education, the most important from them are:

1. Creating of a Species conservation Plan. Official protection of any rare animal species in Latvia begins with the Conservation Plan (Pupins, Pupina 2008). The reason for this is quite simple: no protected animal could be really saved until there is a scientific and legislative base for this. Latvian researchers and herpetoculturists were initiators and creators of the Conservation Plan for the *E. orbicularis* in Latvia (Pupins, Pupina 2008). Writing of this Plan took about a year. According the legislation of Latvia besides writing of the Plan, authors

have to hold minimum two official meetings with specialists of different correlation organizations: nature conservation, environmental protection, biologists, other stakeholders (around 15 peoples). Their comments and remarks are recorded and implemented in the Plan. Then the Plan must be assessed and approved by the Ministry of Environment and Regional Development. The Plan becomes an official document after approving. It is published on the Latvian State Nature Conservation Agency site. From this moment, if any human activity has any connection with the protected species (for example, repairing the road in a place where the turtle was seen 15 years ago), this activity must be carried out in accordance with the Plan. The Plan coordinator or other Nature conservation agency certified expert in species group Amphibians and Reptiles should give out the “Atzinums” (expert certificate of examination) about this activity is in accordance with the plan or not. The Conservation Plan is the public policy of the species protection and it is not a performance document in itself. However, it contains strong recommendations how it can be done. The Conservation Plan of the *E. orbicularis* contains necessity in herpetoculture using. Existence of the Plan allows hold a competition of scientific and conservation projects of the species protection. So since such Plan is created and officially approved there is an opportunity for financial support of the herpetoculture species program single projects from Latvian funds for nature conservation.

2. Popularization of European pond turtles conservation among local people. A big work since 1985 was done in Latvian media, news papers, TV, radio and movies in order to make Latvian people proud of being involved in conservation of turtles. Latvian *Emys* group's contacts are available on many Latvian web pages and as soon as anybody sees a turtle – this information immediately goes to right hands. In Daugavpils Zoo (Latgales Zoodars, ~50 000 visitors per year) these animals are popularized (here is also the plastic sculpture of a real pond turtle bred by Latvian *Emys* group) and mass educational work is provided. There is even a small granite monument of *E. orbicularis* (made on the base of the real bred and kept by the

Emys group young turtle) in Daugavpils centre established in terms of one of city European Union infrastructure and cultural projects. In addition, guidelines for the protection of turtles, planning of the turtles environment by any infrastructure action, textbooks, field guides and other materials were created, are in free access and are still used to train future herpetologists at universities.

3. Stages of conservation approach. Applying of herpetoculture as a species conservation tool is not that easy as it looks like. For example, in terms of the *E. orbicularis* protection project LIFE-HerpetoLatvia 2010–2014 (Ceirans et al. 2014) this process was divided into the following stages:

3.1. Firstly, complex study of distribution, state of populations and the presence of threats to this species in the country were conducted. This stage was very long and took a couple of decades. But this was a necessary step because it allowed to make adequate animal protection projects. Moreover, in EU countries releasing of captive bred animals into the wild without permission is prohibited. You always have to obtain the permission from the national Nature Conservation Department. The easiest way is to obtain such permission is for “strengthening of existing populations”, which, of course, requires

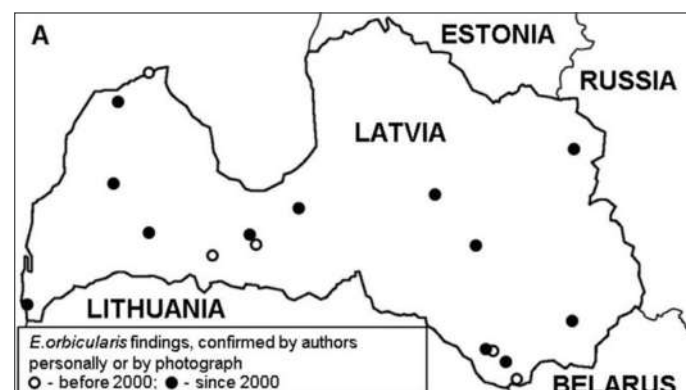


Figure 2. Location maps of 19 findings of *E. orbicularis* in Latvia in 1972–2017 of highest plausibility - found by the researchers personally or confirmed by photograph (Pupins et al. 2019).

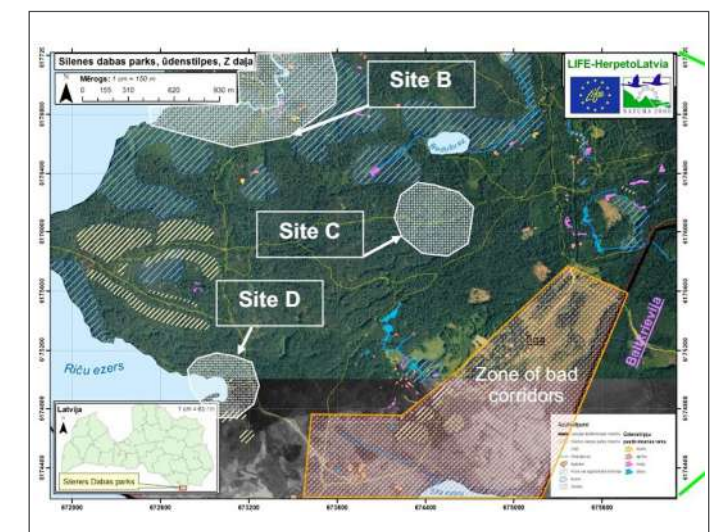


Figure 3. Study of the *E. orbicularis* population in the Silene Nature Park Natura 2000 (Project LIFE-HerpetoLatvia).

a good study of them. To obtain approval for introduction or re-introduction, it is necessary to go through much more complex authorization procedures. The Latvian *E. orbicularis* breeding group was created from the single turtles found by the *Emys* researchers group in Latvia since 1985 and the individuals were 3-times genetically blind-checked in Germany, Poland and France for their native for Latvia Haplotype.

3.2. Then one particular population was chosen for its gain. Coordinators and experts of the Conservation Plan made a justification for the choice of this population.

3.3. Next step was a preliminary study of the chosen population for 1-2 years (Fig 3). This study included research of all biotopes in the population area, the frequency of occurrence of turtles, threats that this population face, and so on.

3.4. When enough information was collected a specific Management Plan for this population was developed (taking into account the above mentioned Conservation Plan). In the Management Plan it was indicated that captive bred animals and herpetoculture methods for their obtaining will be used and what way.

3.5. Next step was the Management Plan implementation. Firstly, biotopes' (ponds and eggs-laying places) optimization (Fig. 4) and breeding of turtles in a herpetoculture were done.

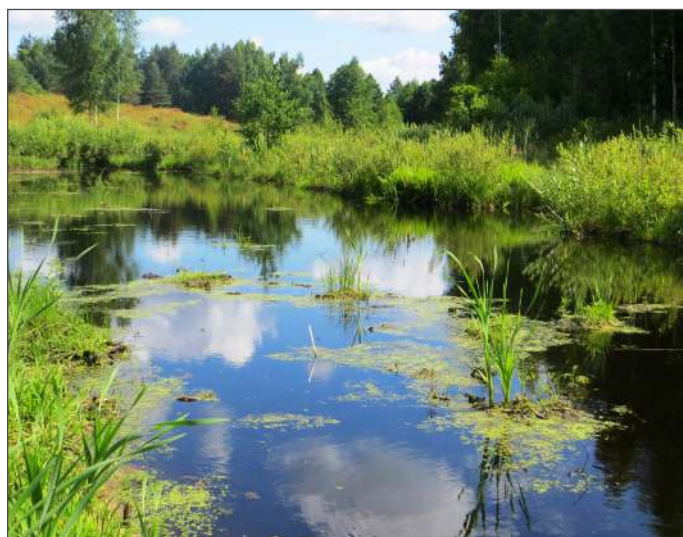


Figure 4. One of the pond restored and reconstructed for turtles' releasing in Silene Nature Park Narura2000.

3.6. Culmination of Management Plan was releasing of animals into wild. At this stage, several scientists must take part as independent experts. So far 42 captive bred semi-adult and adult turtles in the Project (and 20 in after-project activities) were released into specifically improved ponds in nature protected areas (Ilgas micro reserve and in Silene Nature Park, which are also a Natura 2000 territories).

3.7. After monitoring of the released populations and seasonal changings in the mentioned biotopes first reports were made highlighting first positive results of the projects, when released individuals survived their first winter and showed stable growth rate. The parallel scientific research was carried out: genetic studies, examination of their diets, regular catching of the released individuals for morphometric studies etc. with following publishing of the results in scientific journals and proceedings of international conferences.

3.8. The next step was creating of the Post-project Activities Plan. It included subsequent monitoring of the population we had strengthened and, if necessary, subsequent improvement of the population or biotopes.

3.9. The last step was the post-project Activities Plan implementation over more than ten years. For example, in these actions, shrubs were cut down around ponds and in places where eggs were laid, a fence for turtles was installed near the road as well as an electric fence protecting turtles from predators (LVAFA Project).

4. Herpetoculture part. As soon as Conservation Plan for was created and submitted Latvian *Emys* researchers' group started to create special European pond turtles' Conservation Center – a big and multifunctional herpetoculture facility in order to get healthy, captive bred generations of adult *E. orbicularis* for reintroduction purposes. As of 2022 its breeding stock consisted of about 20 mature turtles of both sexes inhabiting the big semi-outdoor pool. This pool is divided into several sections and is equipped with living water plants, filtering and aeration systems, egg-laying places and basking points. Eggs are incubated naturally in the egg-laying places and hatchlings are placed in a separate indoor terrarium afterwards. There they spend first 2-3 years until

being strong and big enough to be moved to one of the semi-outdoor pool for acclimatization and growing till maturity. When moved in the pool, every single turtle gets its own pit-tag injected near one of the hind legs. This tag is a small capsule that when being read by a special reader gives the unique code of this particular individual. This is necessary for further annual monitoring studies.

When the turtle is released and then re-caught many times this tag will help to identify every captive bred turtle that was reintroduced into the wild (Fig. 5). These turtles were released and successfully adapted in the wild nature. Only those turtles that underwent health check are released. The turtles are specially trained to be afraid of humans before being released into the wild. Every captive bred individual is recorded in an electronic database that highlights general information about it: year of hatching, sex,



Figure 5. Captive bred individuals of *E. orbicularis* at facilities constructed by M. Pupins with special markings on carapace parts.

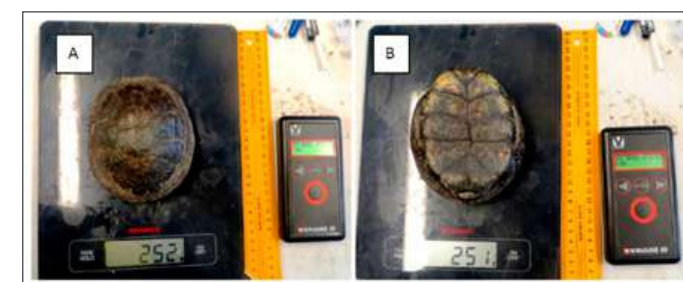


Figure 6. *E. orbicularis* measurements monitoring during raising after hatching in captivity.

length at the moment of birth, weight, etc. Later the data is used in the monitoring of released individuals for statistical analysis and for writing scientific and nature conservation publications (Fig. 6).

As a result of many years of development and adaptation of herpetoculture techniques, there are known currently 4 stable populations in Latvia, where *E. orbicularis* is registered annually both visually, and using e-DNA methods. In the releasing places eggs were found. The monitoring of the released populations is minimal for the turtles' prevention from any disturbance. There are still several ongoing projects aimed on repeating of previous successes in captive breeding of European pond turtles, their release into the



Figure 7. *E. orbicularis* measurements monitoring during raising after hatching in captivity.

wild within nature conservation territories and popularization of related activities among local people. Thanks to herpetoculture current situation with wild *E. orbicularis* is much more stable and promising. Regular registration of released animals (market with pit-tag) (Fig. 7) and registration of their eggs-laying confirms that conditions for their survival are rather favorable and in these terms global climate change probably will have positive effects on expanding of turtles' distribution in Latvia (Nekrasova et al., 2021).

Figure 7. Adult *E. orbicularis* released in Silene Nature Park in 2014 (Photo 2019).

Consequently, mass and stable usage of herpetoculture of rare species as a source of health and adapted individuals for strengthening of remaining wild populations resulted in stabilization and good predictions for *E. orbicularis* – a species that requires special protection in Europe – in places, where it had almost disappear.

As a result of such a system of the conservation activity supported by the Latvian *Emys* researchers' group privately, by many European and Latvian grants, fellowships, international and native programs in Latvia, a huge amount of scientific works that support the breeding and reintroduction activities, highlighting their peculiarities and achievements were published in numerous works about Latvian populations of *E. orbicularis* (Pupins & Pupins, 2008; Pupins & Pupins, 2013 a, b; Pupins & Pupins, 2014; Pupins & Pupins, 2015 a, b; Pupins & Ceirans, 2018 etc.). Moreover, thanks to the projects aimed on conservation of *E. orbicularis* in Latvia a mutual cooperation between Latvian and Ukrainian scientists has become possible resulting in numerous scientific works of high quality and importance (Nekrasova et al., 2019; Nekrasova et al., 2020; Pupins et al., 2020; Marushchak et al., 2019; Nekrasova & Marushchak, 2020;

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The work on the restoration and conservation of the Latvian *E. orbicularis* population is actively developing and will continue in the future.

Acknowledgements

All these studies and works with *E. orbicularis* were carried out in accordance with the legislation of Latvia. The Latvian *Emys* researchers' group thank for the cooperation and support the realized projects of LIFE, LVAFA, and the ongoing Biodiversity project "A socio-ecological evaluation of wetlands restoration and reintroduction programs in favor of the emblematic European pond turtle and associated biodiversity: a pan-European approach (EMYS-R; Proposal number: BiodivRestore-324), all the scientists, conservationists, herpetoculturists from many countries, and inhabitants of Latvia, who helped to save the *E. orbicularis* in Latvia. We mourn the loss of one of the founders and leaders of the Latvian *Emys* researchers' group Dr. Biol. Aija Pupina, thanks to her titanic work, the European pond turtle was investigated and restored in Latvia.

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