

PROJECTS ON *EMYS ORBICULARIS* (REPTILIA: TESTUDINES: EMYDIDAE) IN LATVIA FOR THIRTY YEARS (1984–2014): BIOLOGICAL ASPECTS, RESULTS AND EFFECT ON POPULATION AND ECOSYSTEMS

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Emys orbicularis is the species of turtles that is the most distributed to the north in Europe the known at present extremely northern European edge of the species' area, where breeding was registered, passes through Latvia. Actions of *Emys*-connected projects can affect the state of *Emys orbicularis* natural population and its habitats and affect results of carried out and future studies of pond turtles in Latvia. 42 young adult *Emys orbicularis* were released in wild in Silene Nature Park, Latvia in 2014 for the first time. In the research 9 *Emys*-connected projects, carried out in 1984–2014, were described; their biological aspects, results and effect on *Emys orbicularis* population and ecosystems were estimated.

Key words: Emydidae, *Emys orbicularis*, nature conservation, genetics, Latvia, projects, LIFE, population.

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INTRODUCTION

Species populations have been forming for quite a long period of time; their peculiarities are subject matters for biological sciences. However, increasing man's impact and urbanization of environment can affect the results of such studies as well as their interpretation accuracy.

One of the European species popular for biological studies is an European pond turtle *Emys orbicularis* (Linnaeus, 1758) (Fritz 2003, Meeske 2006). *Emys orbicularis* is the species of turtles that is the most distributed to the north in Europe (Uetz 2006); the known at present extremely northern European edge of the species' area,

where breeding was registered, passes through Latvia (Meeske et al. 2006). Despite the fact that the records on first findings of *Emys orbicularis* in Latvia were published since 1820 (Silins & Lamsters 1934), this species is encountered in Latvia extremely rarely, up to now it is not known about any stably existing and regularly reproducing population. Probably, therefore, and also because of the insufficient study on distribution and ecology of *Emys orbicularis* on the territory of Latvia, during a long period of time a question about existence of *Emys orbicularis* in Latvia was insufficiently explained, there were also doubts concerning autochthonism of *Emys orbicularis* met in Latvia (Zirnis 1980).

Because of its rarity European pond turtle *Emys orbicularis* in 2000 was included into the official document No 396 of Cabinet council of Latvia "On the list of especially protected species and limitedly used species" (Ministru kabinets 2000), as well as in the list of species, for which it is permitted to create microreserves. But in the Red Book of Latvia, published in 2003, *Emys orbicularis* is located in "Zero" category as already extinct species in Latvia; on the map of Latvia the majority of old findings are noted as extinct (Bērziņš 2003). In spite of this, in the same book a single finding in Dobeles district (Apgulde) is marked as existing at present on the protected territory and it is suggested that, possibly, some separate individuals of *Emys orbicularis* are living in Latvia.

Thus, information about *Emys orbicularis* in Latvia, its distribution and even existence, ecology, threats for the species, were insufficient and contradictory, measures for protection of species had legislative nature in essence, and practical measures were insufficient. This made the systemic organization of the continuous and lasting complex of measures urgent for conserving *Emys orbicularis* in Latvia, which were realized in Latvia in some *Emys*-oriented and *Emys*-connected projects before and including 2014.

That is why to accurately assess and interpret the results obtained during research on the population of pond turtles in Latvia and neighbouring countries, pond turtles distribution vector, their genetics and history it is important for the researchers to know about the *Emys*-oriented and *Emys*-connected projects already realized and being realized on the territory of Latvia, as they can influence the results obtained by them. But at present there is no unified public data base of such projects in Latvia.

At the same time, actions of such projects can affect not only the state of the turtles natural population in Latvia, but also the results of carried out and future studies of pond turtles in Latvia for many decades: e.g. enforcement of turtles natural populations by zoocultural species can influence the results of their future genetic studies, studies

of dispersal vectors and genotypic evolution, age and reproductive structure; rehabilitation of turtles biotopes can influence the ecological assessment of succession speed of biotopes inhabited by turtles, etc.

All that makes the research and direction assessment of biological aspects, and effect of projects on *Emys orbicularis* in Latvia in 1985 – 2015 urgent.

MATERIAL AND METHODS

The research was conducted in 2012 – 2014. The territory of research included the whole territory of Latvia, and we also studied in detail the territories of projects on *Emys orbicularis*.

The methods of research were: 1) archival research: study of open access documents from Nature Conservation Agency of Latvia, public conservation organization Latgales Ecological Society, municipal Latgales Zoo of Daugavpils city council, Riga National Zoo, Daugavpils University; 2) search by keywords and word combinations in the Internet; 3) oral interview: questioning of employees and specialists of Nature Conservation Agency of Latvia, public conservation organization Latgales Ecological Society, Latgales Zoo of Daugavpils city council, Riga National Zoo, Daugavpils University, University of Latvia; 4) study of author's personal archives; 5) field expeditions to the projects realization sites; 6) study of literature data. While conducting the research we recorded the following data on *Emys*-connected projects: project name, project execution time, target territory, sponsoring organization, beneficiary, partner organizations, chief executives and experts of the project, project activities, biological aspects and effect of the project on *Emys orbicularis*, possible biological perspectives of the project on *Emys orbicularis*.

RESULTS

In connection with the insufficient study of sta-

tus and ecology of *Emys orbicularis* in Latvia, described complex of measures, organized in the Emys-connected projects, included not only strictly practical measures for conservation of the species ex-situ and in-situ, but also researches on distribution of the species, its ecology, possible negative factors; as well as psychology-pedagogical studies of awareness and attitude of local population to animals, development and implementation of the complex of special educational and educative measures. This complex was realized both in the nature-conservation and as a part of other projects (educational, social).

As a result of the research we found out and summarized information about 9 projects realized in Latvia, which are directly or indirectly, through influence on the population, connected with the impact on the natural population of turtles. Since 1984 a private project, conducted by the authors, serves as background constant basis for continuity and succession of other projects.

RESEARCH AND CONSERVATION EMYS-ORIENTED PROJECTS IN LATVIA

Project 1.

Full title of the project: RESEARCH AND CONSERVATION OF *EMYS ORBICULARIS* IN LATVIA

Acronym: “Emys-Latvia”

Registration number: none

Status of the project: private background project

Territory of the project: the whole territory of Latvia, the project is being realized more actively in the south-eastern part of Latvia (all Latgale, old Selia, Daugavpils and Daugavpils novads, border zone with Belarus and Lithuania), where the authors and executives of the project live.

Project duration: 1984 – present – future

Source for funding: conservationists’ private funds

Project responsible and involved target specialists: two private persons: Mihails Pupins, Aija Pupina (authors)

Historical background. For many decades it had been known about the rarity of turtles in Latvia, wherefore doubts were expressed on their existence in Latvia and their autochthony. In 1984 the authors for the first time got a very old adult female turtle with a 21.5 cm carapace caught by a local (Fig. 1). The turtle was caught in outskirts of Daugavpils, when it was searching for an egg-laying place. The dweller kept it at home for a number of days. The turtle laid 12 eggs, which were crushed when the dweller laid the turtle on them to sit. That finding and the fact of egg-laying encouraged the authors for a long-lasting private project Emys-Latvia on studies of the turtle in

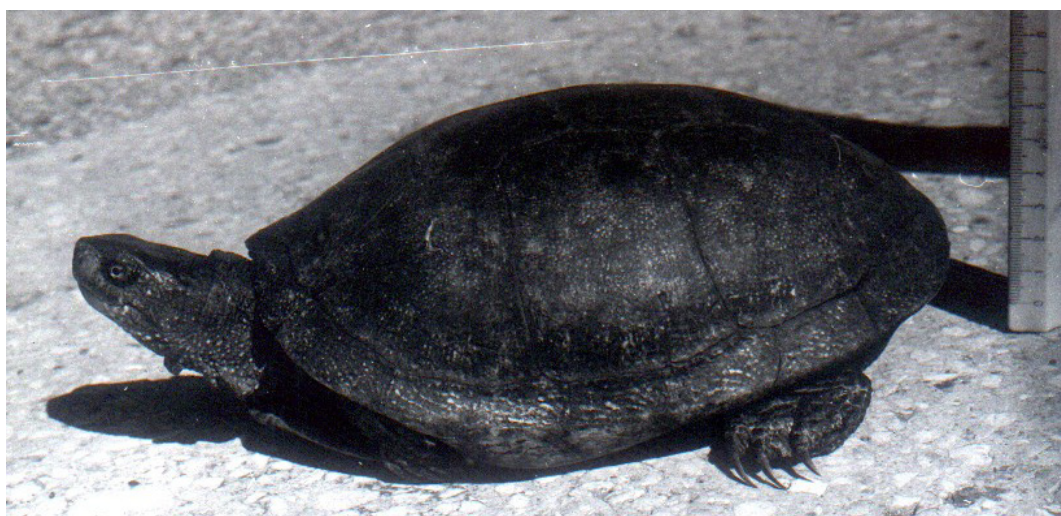


Fig. 1. Old *Emys orbicularis* female, found in 1984 in Daugavpils (Photo: 1990).

Latvia. That turtle became the first one in the breeding-group of turtles in Latvia created during further decades. It lived for 23 years in the group and took part in breeding (Fig. 2).

***E.orbicularis* research and conservation problems in Latvia, actual for the project:**

Distribution and ecology of *Emys orbicularis* in Latvia, factors that threaten population of the species in Latvia before 1984 were insufficiently studied that made conservation of the species insufficiently effective and formal.

Meanwhile, projects on studying the status and protection of *Emys orbicularis* in Latvia, carried out up to the present time, are discrete by their nature, in general they are directed towards the solution of concrete problems, and they are immobile in objectives and resources and are restricted in time. Whereas study on distribution and ecology of the species in Latvia, development and implementation of measures for protection of the extremely rare and becoming extinct species on the northern boundary of its area, especially forming and maintenance of breeding population ex-situ, as well as growth of the young to puberty

requires long-term guaranty, mobility and, the most important, systemic succession of separate actions, needs for long time in tens of years and continuity of the actions.

In connection with that, as well as due to the lack of guaranty of long-term legislative, financial and other support of projects on protection of *Emys orbicularis* in Latvia (since 1984 up to 2014 Latvia three times changed its status or position (Soviet Union republic, Independent Republic of Latvia, the country of European Union), system of legislation, nature-conservation laws, system of government institutions on nature protection, suffered financial and political crises, reduced means and changed orientation in supported nature-conservation projects, etc.), therefore only independent background private project Emys-Latvia can serve as a basis for continuity and succession for other projects since 1984 that it was founded and realized by the authors. At the same time, such a background project Emys-Latvia cannot permanently substitute other projects, financed from more solid sources, as soon as financial means of the authors are more than limited.



Fig. 2. Old *Emys orbicularis* female, found in 1984 in Daugavpils living for 20 years in a zooculture (Photo: 2005).

Project activities and main results: The main task of the background project Emys-Latvia is permanent implementation of small activities necessary for study and conservation of *Emys orbicularis* in Latvia that are not financially supported at the moment by other projects, as well as ensuring succession of such projects. Therefore, this private project includes basic activities on study and conservation of *Emys orbicularis* in Latvia that are not carried out by other projects at the moment, but that could not be interrupted between the projects and in years decades: 1) looking for information about *Emys orbicularis* found in nature; 2) removal from nature exotic species of turtles (Pupins & Pupina 2011); 3) forming and keeping of a breeding group of *Emys orbicularis*; 4) rearing of young *Emys orbicularis* in zooculture; 5) target educative and educational activity (Pupiņš et al. 2010); 6) study on ecology and development of technologies of *Emys orbicularis* zooculture.

At the same time, the results of this project Emys-Latvia are included in the results of other projects as far as they appear, and therefore it is difficult to assess them separately. The basic results of the background project before 2014 are the following: 1) information about 92 cases of encountering *Emys orbicularis* in Latvia is noted, including information about laying of eggs and findings of juvenile individuals, verification of communications is carried out, the 64 biotopes of places of findings are inspected; 2) the data base and map of distribution of *Emys orbicularis* in Latvia is prepared; 3) since 1984 a breeding group of single individuals of *Emys orbicularis* obtained in Latvia has been collected and is contained in zooculture, in 2014 it comprised 21 mature individuals, one of which is mature female - second age of breeding group; 4) technology of effective herpetoculture of *Emys orbicularis* under the climatic conditions of Latvia is developed and has been approving and improving; 5) posterity from the breeding group is regularly obtained, it is brought up to puberty: in 2014 total quantity of young *Emys orbicularis* of different age that were born and reared in the zooculture composed 98 turtles.

Biological aspects and effect of the project activities on population: 1) Sampling of *Emys orbicularis* single individuals caught by local people can influence existing populations number, age and sex structure. 2) Relocation of the individuals can influence *Emys orbicularis* gens distribution in Latvia. 3) Creating of breeding group influences natural sexual selection in the group. 4) Rearing of juveniles in a zooculture but no in wild conditions influences results of the selection.

Biological aspects and effect of the project activities on habitats: Direct influence: none. Indirect influence: Educated local people can be more careful using *Emys orbicularis* habitats' ecosystems services.

Project 2.

Full title of the project: RESEARCH OF POND TURTLE (*EMYS ORBICULARIS* L.) ECOLOGY IN LATVIA [Latvijas purva bruņurupuča (*Emys orbicularis* L.) ekoloģijas izpēte]

Registration number: 1-08/470/2000

Status of the project: governmental structures of Latvia supported project

Territory of the project: whole territory of Latvia

Project duration: 2001

Source for funding: Latvian Environmental Protection Fund Administration

Project responsible organization: Non-governmental organization (NGO) Latgales Ecological Society

Involved target specialists: Mihails Pupins, Aija Pupina

***E. orbicularis* research and conservation problems in Latvia, actual for the project:** Research and protection activities, carried out in the framework of the background project (see above) developed by 2001 and demanded financial means that the private project Emys-Latvia lacked. Thus, numerous reports about findings of *Emys orbicularis* in Latvia demanded many field expeditions to confirm plausibility of communications and investigate biotopes of findings. The breeding group of *Emys orbicularis*, formed

in the background project, became comparatively big and new pool was necessary for its keeping and carrying out of further studies. This made the first non-private, but government supported *Emys orbicularis* oriented project in Latvia urgent.

Project activities and main results: In the course of the project the following actions took place: 1) establishing of basins for keeping of breeding group of *Emys orbicularis*, 2) field researches in the places of findings of *Emys orbicularis* in Latvia.

Consequently, it resulted in the following: 1) 23 biotopes of the places of findings in Latvia were described; 2) internal and external basins for breeding group were created; 3) some important peculiarities of ecology and needs of *Emys orbicularis* under their keeping in regulated conditions indoor and in natural climatic conditions of Latvia were studied (Pupinsh & Pupina 2005).

Biological aspects and effect of the project activities on population: Created basins for keeping differ from wild conditions, thus, rearing of juveniles in the basins will influence results of the selection: natural selection will be replaced with artificial one.

Biological aspects and effect of the project activities on ecosystems: none.

Project 3.

Full title of the project/its part: DEVELOPMENT OF BROCHURE “LOOKING FOR POND TURTLE IN LATVIA” [Meklējām purva bruņurupuci Latvijā]

Registration number: KK-12.2-5.3/25

Status of the project: governmental structures of Latvia supported project

Territory of the project: whole territory of Latvia

Project duration: 2005

Source for funding: Latvian Environmental Protection Fund Administration

Conservation project responsible: Riga National Zoo

Involved specialists: Ingmars Līdaka (brochure idea), Mihails Pupins (content), Daiga Leimane

(text); Valerijs Vahrusevs (photo), Zanda Milzaraja (design)

***E. orbicularis* research and conservation problems in Latvia, actual for the project:** In the course of realization of the background project hundreds of residents were questioned, basically, those were residents of south-eastern part of Latvia; by that it turned out that the majority of the residents do not have any idea about the fact that *Emys orbicularis* could be met in Latvia, they also cannot observe and distinguish between the species of turtles, they do not know how to act, noticing *Emys orbicularis* in nature, as well as do not know about the danger for existence of autochthonous *Emys orbicularis* by releasing of exotic turtles in nature. This made the broadening of geography of population's interrogation and its education actual, exactly which have been done in the present project.

Project activities and main results: The main activities of the project were the following: 1) development and publishing of informative brochure-questionnaire “Looking for pond turtle in Latvia” (Līdaka et al. 2005); 2) interrogation and education of target groups with the help of the questionnaire – readers of journals about nature (hunters, fishermen, friends of nature) on the whole territory of Latvia.

In the result of the project: 1) some new communications about findings of *Emys orbicularis* in Latvia were received from the target groups of residents; 2) the level of awareness of population of Latvia, especially target groups, about *Emys orbicularis* and about actions that one should take encountering it in nature was increased; 3) in general, attitude of residents towards *Emys orbicularis* became more positive; 4) population was taught how to act in cases of finding of exotic turtles in nature of Latvia. The effect will be resulted in next projects.

Biological aspects and effect of the project activities on population: Direct influence: none. Indirect influence: Educated local people can be more careful on *Emys orbicularis* found in wild.

Biological aspects and effect of the project activities on ecosystems: Indirect influence: Educated people will not release exotic turtles in wild in Latvia.

Project 4.

Full title of the project: RESEARCH AND CONSERVATION OF *EMYS ORBICULARIS*, *BOMBINA BOMBINA*, *DYTISCUS LATISSIMUS* IN LATVIA [Purva bruņurupuču, sarkanvēdera ugunskrupju, plato ūdensvaboļu ekoloģijas pētīšana un aizsardzība Latvijā]

Registration number: 1-08/30/2006

Status of the project: governmental structures of Latvia supported project

Territory of the project: whole territory of Latvia

Project duration: 2006

Source for funding: Latvian Environmental Protection Fund Administration

Project responsible: Latgales Zoo

Involved specialists: Aija Pupina (*Bombina bombina*), Mihails Pupins (*Emys orbicularis*)

***E. orbicularis* research and conservation problems in Latvia, actual for the project:**

As a result of the carried out background and “Looking for pond turtle in Latvia” projects, a piece of information was received from residents about some new places of findings of *Emys orbicularis* in Latvia, which made verification of communications and investigation of mentioned biotopes necessary.

Project activities and main results: The main target activities of the project were field expeditions to the places of findings of *Emys orbicularis*. As a result: 1) communications about findings of *Emys orbicularis* in Latvia were verified (Meeske et al. 2006); 2) some biotopes of *Emys orbicularis* in Latvia were investigated and described; 3) probable threats for *Emys orbicularis* in the investigated biotopes in Latvia were described; 4) technology of zooculture was developed (Pupins 2007b).

Biological aspects and effect of the project activities on population: Direct influence: none.

Biological aspects and effect of the project activities on ecosystems: Direct influence: none. Indirect influence: Threats for *Emys orbicularis* habitats were defined, what is base for nature conservation planning.

Project 5.

Full title of the project: SUPPORT TO REALISATION OF DAUGAVPILS UNIVERSITY DOCTORAL STUDIES [Atbalsts Daugavpils Universitātes doktora studiju īstenošanai]

Registration number: 2004/003/VPD1/ESF/PIAA/04/NP/3.2.3.1./0003/0065

Status of the project: governmental structures of Latvia supported project

Territory of the project: Daugavpils University

Project duration: 2004-2007

Source for funding: European Structural Funds

Project responsible: Daugavpils University

Involved target specialists: Arturs Skute (Scientific supervisor), Mihails Pupins, Aija Pupina

***E. orbicularis* research and conservation problems in Latvia, actual for the project:**

In the course of realization of the background and the following projects for development of adequate and effective measures for protection of *Emys orbicularis* in Latvia arose the need in local knowledge about urgent for protection of the species peculiarities of ecology of *Emys orbicularis* on the extreme northern boundary of the area in nature of Latvia, especially interesting were the following: 1) biotopes where *Emys orbicularis* were met in Latvia; 2) peculiarities of growth and development of *Emys orbicularis* in wild in Latvia and in zooculture; 3) sexual, age and quantitative structure of findings of *Emys orbicularis*; 4) study on possibility of laying of fecundated eggs of *Emys orbicularis* female in Latvia; 5) possibility of hatching of young *Emys orbicularis* in Latvia and conditions for that in zooculture; 6) estimation of predators' influence on *Emys orbicularis* in Latvia; 7) estimation of anthropogenic influence on *Emys orbicularis*; 8) peculiarities of thermoregulation and sun-basking of *Emys orbicularis* in natural climatic conditions of Latvia etc.

Project activities and main results: In the course of the project the research on distribution

(Pupins, Pupina 2008a), peculiarities of ecology of *Emys orbicularis* in nature and in zooculture in natural climatic conditions of Latvia was carried out. As a result of the carried out research it was determined that: 1) *Emys orbicularis* is the most frequently met in Latvia in eutrophic lakes (41% of findings) and fishy ponds (20% of findings); 2) in general there are mostly adult single individuals that are met in Latvia (>90% of findings), out of which 73 % are females; 3) females of *Emys orbicularis* can lay fecundated eggs in nature of Latvia; 4) juvenile *Emys orbicularis* are very rarely met in nature of Latvia; 5) 53 % *Emys orbicularis* found in Latvia get shell injuries by predators; 6) 25 % *Emys orbicularis* get carapax injuries from transport; 7) in 44% of cases while finding *Emys orbicularis* in nature residents catch animals, but in 33% of these cases remove them from nature for ever; 8) sun-basking activity of *Emys orbicularis* in Latvia positively correlates with the maximum level of UV and solar radiation (Pupins & Pupina 2009); 9) in 2006 the competitive invasive species *Trachemys scripta elegans* was registered in nature of Latvia for the first time (Pupins 2007a).

Biological aspects and effect of the project activities on population: Direct influence: none.

Biological aspects and effect of the project activities on ecosystems: Direct influence: none. Indirect influence: Ecology of *Emys orbicularis* in Latvia was studied in detail, what is base for nature conservation planning and for estimation of other influences.

Project 6.

Full title of the project: DEVELOPMENT OF PLAN OF CONSERVATION OF POND TURTLES *EMYS ORBICULARIS* (L.) [Purva bruņurupuču *Emys orbicularis* (L.) Sugas aizsardzības plāna izstrādāšana]

Registration number: 1-08/663/2006

Status of the project: governmental structures of Latvia supported project

Territory of the project: whole territory of Latvia

Project duration: 2007

Source for funding: Latvian Environmental

Protection Fund Administration

Project responsible: Latgale Ecological Society, Nature conservation agency

Involved target specialists: Mihails Pupins, Aija Pupina (LES), Martins Kalnins (Supervisor, NCA)

***E. orbicularis* research and conservation problems in Latvia, actual for the project:**

In the course of implementation of researches projects on study and protection a sufficiently large quantity of actual information about problems of *Emys orbicularis* protection was gathered in Latvia. Yet, in spite of existing protective status of *Emys orbicularis*, in 2007 in Latvia there was not a single officially asserted strategy on species conservation. This made a project on creation and assertion of the Plan on *Emys orbicularis* protection in Latvia actual.

Project activities and main results: The main activities of the project were the following: 1) analysis and generalization of data about *Emys orbicularis* in Latvia (Pupins & Pupina 2008b); 2) development and discussion of the Plan on *Emys orbicularis* protection in Latvia. As a result of realization of the project: 1) the threats for *Emys orbicularis* in Latvia were analysed and ranged (Meeske & Pupins 2009); 2) concrete measures for conservation of *Emys orbicularis* in Latvia were proposed; 3) the Plan on *Emys orbicularis* protection in Latvia was developed, discussed, and officially accepted by the Ministry of Environment of Latvia and officially published by Nature conservation agency in a free access (Pupiņš & Pupiņa 2007b).

Biological aspects and effect of the project activities on population:

Direct influence: none. Indirect influence: all actions on *Emys orbicularis* population (sampling, creation of breeding group, releasing etc.) in Latvia should be planned and realised in accordance with the Plan.

Biological aspects and effect of the project activities on habitats:

Direct influence: none. Indirect influence: all actions on *Emys orbicularis* habitats (restoration, creation of new water basins, planning of human activities in the habitats

etc.) in Latvia should be planned and realised in accordance with the Plan.

Project 7.

Full title of the project: DEVELOPMENT AND PRINTING OF TWO BROCHURES ON FIRE-BELLIED TOADS, POND TURTLES AND ITS CONSERVATION IN LATVIA [Divu brošūru par sarkanvēdera ugunskrupjiem, purva bruņurupučiem un to aizsardzību Latvijā izveidošana un drukāšana]

Registration number: 1-08/185/2007

Status of the project: governmental structures of Latvia supported project

Territory of the project: whole territory of Latvia

Project duration: 2007

Source for funding: Latvian Environmental Protection Fund Administration

Project responsible: Non-governmental organization (NGO) Latgales Ecological Society

Involved target specialists: Mihails Pupins, Aija Pupina

***E. orbicularis* research and conservation problems in Latvia, actual for the project:** Established Plan on *Emys orbicularis* protection in Latvia became the document that determined state strategy and concrete arrangements on conservation of the species in Latvia. Yet, the given Plan and, especially, suggested by it measures required popularization among wide population of Latvia.

Project activities and main results: The main activities of the project were the following: 1) adaptation of the Plan on *Emys orbicularis* protection for the population of Latvia; 2) development of simple and intelligible arrangements for population, especially landowners, on conservation of *Emys orbicularis* in Latvia; 3) writing and publishing of a brochure on the issue. As a result of realization of the project: 1) a brochure about condition and the Plan on *Emys orbicularis* protection in Latvia was developed (Pupiņš & Pupina 2007a); 2) the brochure was distributed among population of Latvia and libraries, as well as published in free access in the Internet.

Biological aspects and effect of the project activities on population: Direct influence: none. Indirect influence: Educated local people can be more careful on *Emys orbicularis* found in wild.

Biological aspects and effect of the project activities on habitats: Direct influence: none. Indirect influence: 1) Educated local people can be more careful using *Emys orbicularis* habitats' ecosystems services. 2) Educated people will not release exotic turtles in wild in Latvia.

Project 8.

Full title of the project: DEVELOPMENT OF BUSINESS (SMALL TRADING) AS AN ELEMENT OF FORMING OF CITY ENVIRONMENT [Uzņēmējdarbības (mazumtirdzniecības) attīstība kā pilsētvidi veidojošs elements]

Registration number: 1-08/663/2006

Status of the project: governmental structures of Latvia and local authorities supported project

Territory of the project: Daugavpils

Project duration: 2008

Source for funding: European commission program INTERREG III B, Daugavpils city council

Project responsible: Daugavpils city council

Involved target specialists: Krivina Daina (head of development department of the Daugavpils city); Ivo Folkmanis (sculptor)

Consultants: Mihails Pupins, Aija Pupina

***E. orbicularis* research and conservation problems in Latvia, actual for the project:** In the course of realization of the projects many residents were questioned, basically, those were residents of south-eastern part of Latvia; it turned out that the majority of residents and politicians of Latvia do not have any information about *Emys orbicularis* in Latvia, this species isn't popular in south-east part of Latvia (territory of most *Emys orbicularis* findings). This made the long-time popularization of *Emys orbicularis* actual in south-east part of Latvia.

Project activities and main results: The real goal of the project was development of business (small trading) as an element of forming of city environment. An *Emys*-connected activity of the project was creation of a sculpture of *Emys or-*

bicularis in Daugavpils city, Latvia. Emys- connected out-comes of the project: 1) sculpture of *Emys orbicularis* was created and placed in center of Daugavpils city, Latvia; 2) *Emys orbicularis* became popular and more known for people, tourists and regional politicians in Latvia; 3) attitude of residents and regional tourists towards *Emys orbicularis* became more positive emotional.

Biological aspects and effect of the project activities on population: Direct influence: none. Indirect influence: Educated local people can be more careful on *Emys orbicularis* found in wild.

Biological aspects and effect of the project activities on habitats: none.

Project 9.

Full title of the project: LIFE+ PROJECT “CONSERVATION OF RARE REPTILES AND AMPHIBIANS IN LATVIA” [Retu rāpuļu un abinieku aizsardzība Latvijā]

Acronym: LIFE-HerpetoLatvia

Registration number: LIFE09NAT/LV/000239

Status of the project: European commission supported project

Territory of the project: Silene Nature Park (Daugavpils novads, Latvia)

Project duration: 08.2010-08.2014

Source for funding: LIFE Programme of European Commission, Ministry of Environment, Daugavpils City Council, Nature conservation agency, Latgales Ecological Society

Project responsible organizations: Latgales Zoo, structural unit of Daugavpils city council (beneficiary); Nature conservation agency (partner), Latgales Ecological Society (partner)

Involved target specialists: Mihails Pupins, Aija Pupina, Andris Ceirans (LZ), Valdis Pilats (NCA)

***E. orbicularis* research and conservation problems in Latvia, actual for the project:** Created in the result of realization of previous projects Plan on protection urgently required implementation in Latvia, for which there were no means of the background private project. The most important problems were the following: 1) problems of forming and long-term keeping of a breeding group of *Emys orbicularis*; 2) problems of regular rearing and releasing into nature of breaded young *Emys orbicularis* for supporting of becoming extinct populations; 3) problems of restoration of degraded biotopes and creation of green corridors for vanishing populations of *Emys orbicularis*, especially for contacting with stronger southern populations in Belarus and Lithuania; 4) problems of popularization of protection



Fig. 3. Location of zones of influences of Project LIFE-HerpetoLatvia.

of *Emys orbicularis* among population of Latvia.

Project activities and main results: The main target activities of the project were the following: 1) preliminary investigation of becoming near to extinct population on the territory of Nature 2000 Silene Nature Park; 2) development of the Plan on management of the population for Silene Nature Park; 3) renovation of an old Centre for conservation of rare reptiles and amphibians; 4) rearing of *Emys orbicularis* and long-term keeping of juvenile turtles for their releasing into nature; 5) restoration of biotopes of *Emys orbicularis* on the territory of Silene Nature Park; 6) education of population of Latvia. The main results of the project are the following: 1) renovated and entirely functioning Centre for conservation of rare reptiles and amphibians of Latvia; 2) restored biotopes of *Emys orbicularis* in Silene Nature Park that create a green corridor for transborder contacts of *Emys orbicularis* populations; 3) for the first time in the history of Latvia 42 young adult turtles and semi-adults turtles, reared in the Centre, were released into Silene Nature Park in

2014 for restoration of the population of *Emys orbicularis* (Fig. 3); 4) international cooperation for research of northern *Emys orbicularis*; 5) a wide network of educational arrangements for population. The project has apparent very long-term after-LIFE effectiveness and sustainability.

Biological aspects and effect of the project activities on habitats: 1) Natural succession of the ponds ecosystems is changed (Fig. 4, 5, 6. 2) Natural development of eggs-laying ecosystems is changed (Fig. 7).

Biological aspects and effect of the project activities on population: 1) Rearing of juveniles in new created basins but no in wild conditions influences results of the selection. 2) Releasing of reared juveniles, received from relatively small breeding group, can influence general genetics of *Emys orbicularis* in Latvia and its gens distribution. 3) Releasing of juveniles can influence existing distribution and number of *Emys orbicularis* in Latvia (Fig. 8, 9).



Fig. 4. *Emys orbicularis* habitats 1 and 2 in Silene Nature Park before (a) and after (b) restoration (Google Earth service, SAS services).



Fig. 5. *Emys orbicularis* habitat 3 in Silene Nature Park before restoration (Google Earth service, SAS services).



Fig. 6. *Emys orbicularis* habitat 3 in Silene Nature Park after restoration (Google Earth service, SAS services).



Fig. 7. Restored habitat 3: ponds system and eggs-laying places.



Fig. 8. Semi-adult turtles were released in wild in Silene Nature Park.



Fig. 9. 42 Semi-adult and young adult turtles were released in wild in Silene Nature Park in 2014.

DISCUSSION

Analysing the results obtained and the information about the projects connected with *E. orbicularis* studies and protection in Latvia, we came to the conclusion that to some extent they all are related to our own activity in the sphere concerned. It is not surprising taking into account the rarity of *E. orbicularis* in Latvia and a small quantity of Latvian herpetologists and ecologists studying reptile ecology there. However, this research does not consider the projects on development and implementation of environment conservation plans for conservation areas, which could increase the general relative role of activities connected with planning.

In our research we analysed mainly the materials from open data bases of Latvian conservation organizations. It is possible to assume that apart from the given projects other ones could have been realized in Latvia, for example with financial

support from foreign funds or private persons. At the same time, it is necessary to mention that any practical activity capable of affecting the state of protected species populations, including *E. orbicularis*, in Latvia must be supported by permitting documents from Nature Conservation Agency and also must be known to this organization. Therefore, if any projects could have been left out of account in our research, they are likely to have been realized in Latvia in contravention of the environmental legislation and are illegal.

Comparison of the studied projects activity direction based on percentage distribution of the projects budget seems to show significant dominance of educational and research activities in Latvia (Fig.10). But this is just percentile fund distribution in the projects, without including the sums invested in *E. orbicularis* protection. At the same time, despite a small quantity of the projects on realization of conservation ex-situ and in-situ

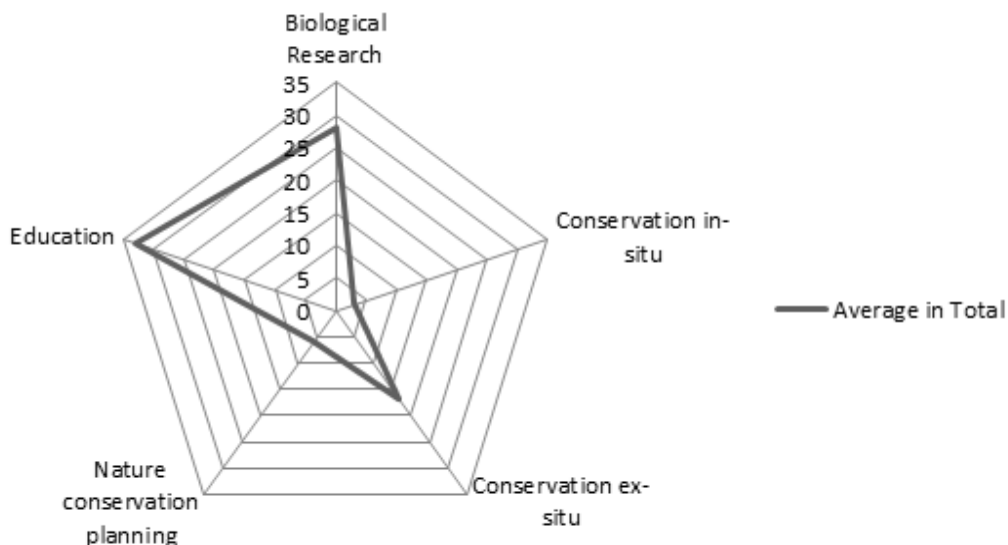


Fig. 10. Distribution of main actions of *Emys*-connected 9 projects in percent.

(Projects 1, 2, 4, 9), their total budgets were much larger and were aimed at direct conservation measures: restoration of the biotopes, *E. orbicularis* breeding, rearing, and releasing. In spite of the fact, that some of the projects under study presupposed only educational activity (Projects 3, 7, 8), they are also considered environment-oriented, as their aim was to educate the population on *E. orbicularis* and they were financed from conservation funds.

CONCLUSIONS

The research describes nine projects connected with *E. orbicularis* study and protection in Latvia. Changes in *E. orbicularis* populations and their biotopes, which have emerged as a result of such projects, especially those connected with *E. orbicularis* displacing and dispersal in Latvia, harvesting animals from nature, creating populations in zooculture, rehabilitation of biotopes, can affect the results and their interpretation for various biological studies. Therefore the information can be useful for correct interpretation of researches in *Emys orbicularis* distribution, genetics and habitats on northern edge of its European distribution in Latvia.

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