

CURRENT STATE, ANTHROPOGENIC THREATS AND CONSERVATION OF THE EUROPEAN POND TURTLE (*EMYS ORBICULARIS*) IN BELARUS

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In the article the data on the current distribution, number, population composition and ecological traits of the European pond turtle (*Emys orbicularis*) in Belarus are presented. Population dynamics and human threats are analyzed. Effective conservation measures, such as creating micro reserves, clutch protection, environmental education, for the chelonian preservation in the country are proposed.

Key words: European pond turtle, *Emys orbicularis*, distribution range, nesting habitat, reproductive ecology, conservation, Belarus.

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INTRODUCTION

European pond turtle (*Emys orbicularis* Linnaeus 1758) is the single autochthonous freshwater species of the order Chelonii (Testudines) in Europe. Its populations have decreased in 20-th century and are in danger to extinction in most regions of the range. Presently, this chelonian is rare or already disappeared in 20 of 22 countries and a priority species in conservation programs most European states (Fritz 2003, Rogner 2009). In Belarus, in the north-east part of distribution range, *Emys orbicularis* also is a rare endangered animal, included in the Red Book list since 1981 (Pikulik et al. 1988, Drobenkov 2012). Analysis of the current threats and development term strategy for the European pond turtle conservation is very relevant due a pronounced trend of reduction its regional population in the country.

MATERIAL AND METHODS

Data on the geographical distribution and population number of the European pond turtle in Belarus were collected in 1982-2014 in the southern and central part of the country, in its current distribution area (Drobenkov 1995, 2000, 2004, 2012). Long term research of natural history and population structure were carried out on the 5 plots in different regions of Belarus, mainly in forest wetlands and floodplains. Conservation actions tested and implemented in several localities of the Pripiat River basin in water systems the Ubort and Tremliia small streams. The monitoring of the population state continues since 1990 in three wild areas and one big state reserve (National Park «Pripyatskij»). Methods of finding, capturing, measuring and other research approaches in detailing described in our monograph (Drobenkov 2012).



Fig. 1. Typical specimen of *Emys orbicularis orbicularis* from north-east part of the range in Belarus.

RESULTS AND DISCUSSION

Trends of distribution and population number

Present geographical range of the European pond turtle (Fig. 1) in Belarus is limited to the southern, southwestern and central parts of the country (approximately 40% of the whole territory) and includes the Pripiat, Western Bug, Dnepr and Neman river basins. The current range border is located approximately on a line along the cities of Belzersk, Telekhani, Kopatkevichi and Dobrush and coincides generally with the Polesye region covering large boggy lowlands and the edge of the mixed forest zone (Fig. 2) (Drobenkov et al. 2002). Single specimens and small groups of the turtles are often reported northward of this limit, in the central and northern parts of the country, but these records probably result from released turtles formerly caught in the Polesye region.

In accordance with data from the literature (Fedzushin 1928, Dehnal 1929, Sapozhenkov 1961, Voronin 1967, Baharev 1977, Pikulik et al. 1988) concerning the past and present situation of the species status, the northern border of its

range in the 20th century has moved to the north approximately 100-150 km. The Belarussian populations have been reduced very much almost everywhere in the country during the last 40-50 years. The most stable and numerous populations have survived in natural forest wetlands and in the national fish-breeding ponds.

Nevertheless, there is an interesting fact on the increase of turtle numbers and population recovery in the Radioecological Reserve «Poleskij» established in the fall-out zone of the Chernobyl Nuclear Power Station in 1986 (Pikulik & Drobenkov 1995, Drobenkov 1998). According to our estimates, the largest turtle population in the Pripiat river basin (with exception of the Radioecological Reserve «Poleskij») consists of about 6,000-7,000 specimens (Drobenkov 2004). The number of *Emys orbicularis* in the Reserve is at least 20,000 specimens. The recovery of this population has been linked with evacuating local residents, ceasing any economic activities, bogging of land and secondary succession. This shows that activities by man were the main cause for the decline of the turtle in this area and Belarus generally.



Fig. 2. Current range of distribution of the European pond turtle in Belarus (Red Data Book, 2004).

Currently, the European pond turtle is known only in the south, southwest and central parts of Belarus, where the nominative subspecies of this species, *Emys orbicularis orbicularis*, is found. It is characterised by very large body size, black or dark coloration, indistinct shell patterns, and specific body proportions.

The aquatic habitat of this species is provided by a variety of natural and artificial shallow stagnant ponds or slow flowing streams, such as small lakes, lowland bogs, fish ponds, drainage channels, and forest rivers (Table 1, Fig. 3). As breeding habitats in the Polesye Region, the turtle uses small sites of open sandy hills or moraine ridges facing south or southeast, from 1-2 up to 13-17 m in height (Fig. 4). Generally, such areas

are covered with grassy vegetation; only rarely one comes across areas of pines (*Pinus silvestris*) with dry grassy vegetation.

Main threats

As show our research, most serious threats for the pond turtle population in Belarus are next: Destruction of the water and nesting habitats, predation on juveniles and adult females, road traffic, casual capture during fishing, and some other forms of human activity.

Water and nesting habitat destruction

The Belarussian population of the European pond turtle is reduced by the destruction or



Fig. 3. Water habitat of the European pond turtle in Belarus («National Park Pripiatskij»).



Fig. 4. Nesting habitat of *Emys orbicularis* in the country.

Table 1. Structure of *Emys orbicularis* water habitats in Belarus

Water body	Share	
	n	%
<i>Natural ponds</i>		
Small and middle rivers	7	5,6
Floodplain ponds and oxbow lakes	18	14,3
Open lowland bogs	5	4,0
Forest bogs	21	16,7
Creeks	3	2,4
Lakes	4	3,2
Temporary puddles of rainwater	2	1,6
<i>Artificial ponds</i>		
Channels of drainage systems	24	19,1
Channeled sections of rivers	4	3,2
Water-filled pits and roadside ditches	16	12,7
Man made ponds (including fishponds)	19	15,1
Treatment ponds of livestock farm	3	2,4

radical transformation of aquatic and terrestrial habitats like large-scale drainage of bogs for land-reclamation, straightening of rivers and destruction of sandy hill nesting sites. Open sandy hills are rare in the Polesye lowlands and turtle nesting sites are frequently used as sources of sand for building drainage channels, dams, pumping stations and sluices (Drobenkov 2000). Some turtles live in semi-natural habitats, for example in drainage channels, if the conditions for breeding have been saved. *Emys orbicularis* is very sensitive to disturbance by man and rarely lives near cities or villages. Probably, the species is also sensitive to chemical pollution of water with herbicides and pesticides because it is very rarely found in the ponds and drainage channels of actively used agrocenoses. The dynamics of the turtle numbers in the Radioecological Reserve «Polesskij» show that large-scale territory reservation, secondary succession of landscapes, bog formation and habitat restoration are favouring the rapid increase of the chelonian population.

Nest destruction

During the reproduction season the female turtles of the Polesye region in optimal breeding

habitats form aggregations of 5-20 up to 60-70 and more individuals (Drobenkov 2003, 2005, 2012). Preferred egg-laying sites are slopes of xeric open sandy hills and moraine ranges from 3-5 m up to 15-17 m height exposed to the southeast, south or sometimes southwest. Such hills are very rare in the boggy forest lowlands of the Polesye region. Terrestrial vertebrate predators destroy from 15 to 80-90% of the clutches in the breeding betopes (Drobenkov 2000, 2012). Fox (*Vulpes vulpes*), Raccoon Dog (*Nyctereutes procyonoides*), Wolf (*Canis lupus*), Badger (*Meles meles*) and Hedgehog (*Erinaceus europaeus*) prey on turtle eggs, but the main predator being the Fox (Drobenkov 2012). As a result of wetland drainage, land-reclamation and escalating agriculture, the number of Foxes has considerably increased recently.

Predation on juveniles

Raven (*Corvus corax*) and Hooded Crow (*Corvus corone cornix*) sometimes prey on turtle hatchlings on open hills during their migration to pond habitats in August or April (young turtles frequently hibernate in their nests). Small passeriform birds peck at the eyes of juvenile turtles during their land migrations and following



Fig. 5. Cadaver of the female turtle on the country road.

their death, ants and other insects eat their cadavers. Turtles have not been found to be part of the diet of the aquatic predators American mink and otter (pers. comm. V. Sidorovich).

Predation on adults

Predatory birds (*Circus aeruginosus*, *Buteo buteo*), Fox, Wolf, Raccoon Dog, Badger, White Stork (*Ciconia ciconia*), Black Stork (*Ciconia Nigra*) and Grey Heron (*Ardea cinerea*) sometimes attack adult turtles, however, rarely kill them. From 10 to 40% of the turtles in various areas of Belarus had shell, leg or tail injuries (Drobenkov 1999). Almost all turtles caught by fishing or in recreational ponds are initially kept as pets to be finally returned to alien suburban habitats. Turtles frequently get injured by fishing tackle. During their reproductive migrations some turtles, particularly females, perish on roads.

Human consumption

Nowadays, the pond turtle is not being consumed, but from the 16th to the 18th century the Catholics

in Belarus used this species as food during Lent instead of the usual meat (Baharev et al. 1996). Sometimes local residents use turtle shells for making souvenir ashtrays. There are no data on import or export of the pond turtles in Belarus. Because the species is rare in the country export numbers evidently are not high. Sometimes the turtles are sold in city markets or contained in zoological school classes without the necessary permits.

Road traffic

In the most critical period, from late May to mid June, on some sections of country roads to 2-3 corpses of adult turtles per 10 km are registered (Fig. 5). In small populations intensive traffic can lead to high elimination females and yearlings, and to the population extinction very soon. The analysis of mortality in the Belarusian population of the turtle in the water habitats and on the nesting migration ways showed that automobile traffic play most important role among all reasons (Table 2).

Table 2. Identified reasons of *Emys orbicularis* mortality in semi-natural landscapes of Belarus

Factors of mortality	Share	
	n	%
Death on the roads during female breeding migrations and juvenile dispersion	15	44,1
Killing during drainage channel cleaning	8	23,5
Casual capture at fishing	8	23,5
Freezing due low temperatures in the winter	3	8,8

Actual conservation tasks

Emys orbicularis is listed in the last edition of the Red Book of Belarus (2004) as a threatened species, category LR:nt. The species occurs only in two of the country's five largest national parks and reserves: National Park «Pripiatskij» (rare species) and Radioecological Reserve «Poleskij» (common species). The most numerous and viable population exists in the «Poleskij» Reserve established 20 years ago on the territory of the Chernobyl accident zone where the radioactive pollution level at present is 30-3,500 microroentgen/hour. The number of turtles in this population is not less than 20,000 and they inhabit almost all ponds, bogs, rivers and channels. The species is protected also numerous biological and landscape reserves in the southern part of the republic, however, the number of populations is very small. Belarus has no special governmental or private institutions, programs or funds to protect this turtle species. The Ministry of Conservation and Resources does not focus special attention on its conservation. Research on distribution and ecology of the pond turtle in the country as well as the development of a conservation plan have been financed by several foreign foundations, i.e. the Linnaeus Foundation (USA), the Rufford Small Grant for Nature (UK) and the British Ecological Society (UK).

The utilization of a wide variety of epy ponds and trophic resources is the most important life-history traits of the pond turtle in Belarus, which promotes its successful adaptation to semi-natural fragmented landscape. On the other, segregation of aquatic and reproductive habitats, small area of nesting habitats, as well as high sensitivity to disturbance events contribute to

decreasing tolerance of the population in modern environmental conditions.

Most urgent tasks

Important issues concerning the conservation of the Belarussian populations are:

- a) inventory and preservation of the largest populations and, especially, numerous nesting aggregations of females and their preferred breeding habitats;
- b) elaboration of turtle micro reserve networks including the breeding habitats and neighbouring ponds;
- c) environmental management in the unprotected habitats and micro reserves (water level stabilization, limitation of human activities, restriction of movement of motorized transport and people);
- d) regulation of predator numbers on nesting sites (scaring away of predators, protection of clutches during breeding season).

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