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Distribution of European pond turtle *Emys orbicularis* (Linnaeus, 1758) on the northern edge of its area in Latvia

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Abstract: European pond turtle *Emys orbicularis* is the extremely rare species in herpetofauna of Latvia, information about their findings in Latvia is scanty, some of which are insufficient or outdated. There were contradictory opinions about the possibility of *Emys orbicularis* population existence in Latvia. In connection with this the authors conducted the study of the *Emys orbicularis* distribution in Latvia over a period of time from 1982 till 2007. The primary method of the study was the interview of inhabitants about findings of European pond turtle. In the present article the precise and complete data about coordinates of findings of *Emys orbicularis* in Latvia, obtained in the period from 1982 till 2007, are published for the first time. Altogether 85 cases of finding of *Emys orbicularis* were registered in Latvia, for each finding the coordinates were fixed and its plausibility was determined. On the basis of the study the map of the distribution of *Emys orbicularis* in Latvia is compiled.
Key words: distribution, *Emys orbicularis*, Latvia.

Resumen: Distribución del galápago europeo *Emys orbicularis* (Linnaeus, 1758) en el límite septentrional de su área de distribución en Letonia. – El galápago europeo, *Emys orbicularis*, es una especie muy rara en la herpetofauna de Letonia, donde la información es escasa o anticuada, existiendo incluso opiniones contradictorias sobre su mera existencia. Los autores presentan los resultados de un estudio sobre su distribución llevado a cabo en el periodo 1982-2007, cuyo método primario fué la entrevista a los habitantes de la zona. Se presentan los datos precisos relativos a los 85 casos registrados, incluyendo sus coordenadas y su grado de certeza, componiendo a partir de ellos el mapa de distribución de *Emys orbicularis* en Letonia.
Palabras clave: distribución, *Emys orbicularis*, Letonia.

Introduction

European pond turtle *Emys orbicularis* (Linnaeus, 1758) is the most far extended to the north species of turtle in Europe (Uetz *et al.*, 2006). Latvia is located on the northern edge of the species distribution (Fritz, 2003; Meeske, 2006) and during a long period of time a question about the existence and distribution of European pond turtle *Emys orbicularis* in Latvia was insufficiently explained (Caune, 1992).

Until 1927 *Emys orbicularis* it 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, Ilukste in 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 1949 the southwestern part of Latvia was noted as the territory of *Emys orbicularis* distribution (TERENTYEV & CHERNOV, 1949). In 1959 a part of the territory of Latvia was noted as the constituent part of the area of European pond turtle distribution in Europe (FROMMHOLD, 1959). 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 Dobele district appeared in Latvian press (KOCANE, 1999).

There is an indication on the fact that *Emys orbicularis* species did not have the original Latvian name (see review of FRITZ, 2003). At the same time, Latvian researchers claimed that in Latvia the Latvian names for turtles are used: "brunu rupucis" (in metaphrase "armores toad"), "kaulu rupucis" (in metaphrase "bones toad"), also "rupucis" (in metaphrase "toad") (see review of SILINS & LAMSTERS, 1934). One of these names is used in a somewhat changed form in Latvia and at present: "brunurupucis" (in metaphrase "armourestoad").

In 2000 European pond turtle *Emys orbicularis* was officially registered in the document Nº 396 of Latvian Ministry "On the list of especially guarded and restrictedly used species" (MINISTRU KABINETS, 2000). In 2003 *Emys orbicularis* was noted in the Red Book of Latvia as the already extinct species of 0 category; the majority of findings are marked on the map of Latvia as extinct, at the same time the point in Dobele district is marked as existed at present on the guarded territory (BERZINS, 2003). Ibidem an opinion is advanced that, probably, there are separate individuals of *Emys orbicularis* preserved in Latvia.

Thus, there was no a common opinion about the existence of *Emys orbicularis* population (CAUNE, 1992) and its distribution in Latvia that makes the study on the distribution of European pond turtle on the northern edge of its area in Latvia topical.

In connection with this, since 1982, we, independently of other results authors, conduct the long-term investigation of *Emys orbicularis* distribution in Latvia. The materials about findings of *Emys orbicularis* in Latvia (PUPINS & SKUTE, 1992; PUPINA & PUPINS, 1996; MEESKE *et al.*, 2006; PUPINS & PUPINA, 2007a) are the publications of parts of data of this study. In the present article the precise and complete data about coordinates of findings of *Emys orbicularis* in Latvia, obtained in the period 1982-2007, are published for the first time.

MATERIALS AND METHODS

The study of *Emys orbicularis* distribution on the north edge of its area in Latvia was carried out on the whole territory of Latvia from 1982 till 2007 (this study would be continued).

Stages of the study of *Emys orbicularis* distribution in Latvia

1. Interrogation of population of Latvia. – Taking into account the rarity of *Emys*

orbicularis in Latvia, the primary method of the study was the interrogation of inhabitants about the observation of European pond turtle in Latvia. Simultaneously with the interrogation via mass-media the wide informative campaign for Latvian inhabitants about the importance of preservation of European pond turtle in Latvia and the need for reporting the researchers about all cases of *Emys orbicularis* observation in Latvia took place. At the same time special attention was paid to the creation the positive attitude among the inhabitants of Latvia toward European pond turtle.

The interrogation was conducted in the following target groups of people: 1) professionally connected with nature protection, 2) regularly using natural resources, 3) interested in nature of Latvia and regularly being on nature, 4) professional biologists and employees of zoos and 5) the inhabitants of the territories, on which turtles were found earlier.

The following forms were used during the interrogation: 1) oral interrogation during the interviewing, 2) oral interrogation during television and radio broadcasts about the turtles in Latvia, 3) oral interrogation of Latgale Zoo visitors, 4) written interrogation in articles about turtles, published in newspapers and periodicals and 5) since 2005 written interrogation with the aid of the specially published booklet (Lidaka *et al.*, 2005), which was used both independently and distributed with the periodicals about nature. Altogether 33 024 people were orally interrogated from 1982 till 2007. The number of people, interviewed via television, radio, newspapers, and magazines is unknown.

2. Checking the plausibility of obtained data. – An obligatory personal and telephone interview with the respondent was carried out that lasted for 20-30 minutes after the obtaining of positive answer about the observation of turtle in Latvia. During the interview the plausibility of the report was checked with the aid of additional questions, as well as the observation point was specified and the additional data of ecological nature were obtained. Special attention was paid to a maximally possible determination of observed turtle species, if necessary the photographs of the most frequently met in Latvia species of turtles were demonstrated to respondent: *Emys orbicularis*, *Agrionemys horsfieldi*, and *Trachemys scripta* (Lidaka *et al.*, 2005; Pupins, 2007). The plausibility of each case was determined by the scale from 1 (the least plausibility) to 4 (the most plausibilty): 1) respondent did not find a turtle, but other people told him about the finding, 2) respondent, who is not a biologist saw a turtle, 3) a turtle was found in nature by the respondent, who is a biologist and 4) the authors of the present study saw a turtle or there is a photograph of a turtle.

3. Inspection of indicated finding points of turtles and the measurement of their coordinates. – The expeditions were organized in those finding points of *Emys orbicularis* in Latvia that were indicated by the respondents. In the cases of inaccurate indications of observation points the departures together with the respondents were conducted. GPS eXplorist 100 Magellan were used for registering the geographical coordinates of observation points. Google Earth programme was used for registering the coordinates of some observation points, which respondents could not indicate accurately (observation occurred many years ago; other people told about the observation). All coordinates were recorded to minutes.

4. Mapping. – The satellite map of Latvia on a scale of 1:50.000, published in 1999-2000 by the State Land Service of Latvia, was used for the mapping of European pond turtle findings in Latvia. This map in the Baltic coordinate system is divided into the standard

squares with the sides of 25 km, each of which consists of standard squares with the sides of 5 x 5 km. During the mapping of *Emys orbicularis* finding point the standard square of 5 x 5 km was noted, in the range of which a turtle was found.

5. Dynamics of European pond turtle observation in Latvia. – During the interrogation a year of observation for each finding of *Emys orbicularis* in Latvia was recorded. In the case of the impossibility of the precise indication of the year of observation by respondent, the average value of that indicated by the respondent time interval was recorded.

Results

As a result of the carried out study from 1982 till 2007, we obtained 85 communications from Latvian inhabitants about *Emys orbicularis* findings (Fig. 1) of different degree of plausibility (Appendix I). Out of which the high degree of the plausibility (3-4 points) had 21 communication, medium degree (two points) 44 communications and low degree of plausibility (one point) 20 communications.

Places of *Emys orbicularis* findings spread on the Map of Latvia in the following way (Fig. 2). The outermost coordinates of the distribution of *Emys orbicularis* in Latvia are to the north 57° 43' N, to the south 55° 42' N, to the east 27° 28' E and to the west 21° 07' E.

The quantity of registered communications about *Emys orbicularis* findings in Latvia in different years differs much, the most numerous observations were registered in 2000-2007 (n = 26), the least numerous in 1930-1939 (n = 1) (Fig. 3).

Discussion

We had registered 85 cases of *Emys orbicularis* findings in Latvia during the carried out purposeful 25 years study, the majority of which (n = 68) in the last 30 years. Such number of turtle findings in Latvia can testify to the existence of *Emys orbicularis* population in Latvia. During the

Figure 1. Plastron of *Emys orbicularis* male found in Latvia.

Figura 1. Plastrón de un macho de *Emys orbicularis* encontrado en Letonia.

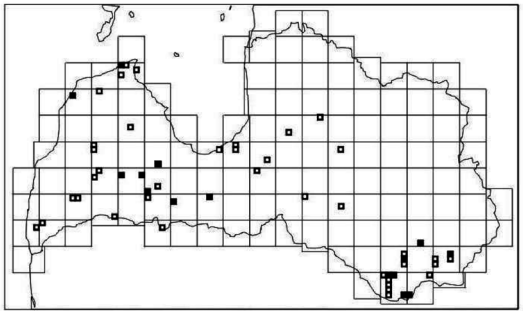

Figure 2. Distribution of the records of *Emys orbicularis* (n = 85) in Latvia using a 25 x 25 km grid divided in 25 squares of 5 x 5 km. (□ : number of rcords = 1, ■ : number of records > 1).

Figura 2. Distribución de las citas de *Emys orbicularis* (n = 85) en Letonia de acuerdo a una cuadrícula de 25 x 25 km dividida en 25 cuadrados de 5 x 5 km. (□): un sólo registro. (■): más de un registro.

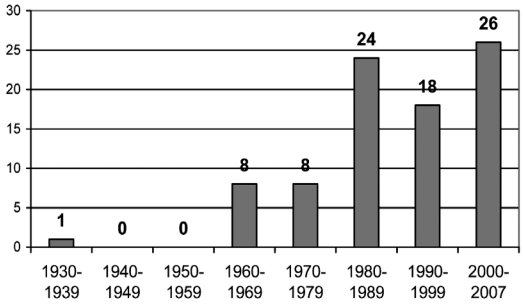

FIGURE 3. Temporary distribution of the observations of *Emys orbicularis* (n = 85) in Latvia during the period 1930-2007.

FIGURA 3. Distribución temporal de las observaciones de *Emys orbicularis* (n = 85) en Letonia durante el periodo 1930-2007.

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 established. 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).

Emys orbicularis dwells in the neighboring to Latvia southern countries in Lithuania and Belarus (MEESKE, 2006; UETZ *et al*., 2006). Four findings of *Emys orbicularis* registered during our study on the south of Latvia are located at a distance of 1-10 km from the edge with Lithuania and at a distance of 5-15 km from the nearest *Emys orbicularis* findings in Lithuania (BALCIAUSKAS *et al.*, 1999). This can testify to the possibility of contacts between the Latvian and Lithuanian groups of turtles and the possibility of existence of the trans-border *Emys orbicularis* populations in these regions.

It is obvious that not only the total number of turtle groups and their distribution in Latvia influences the quantity and distribution of *Emys orbicularis* finding points in Latvia, but also *Emys orbicularis* accessibility for the inhabitants to find them: the frequency of attendance and the use of biotopes by inhabitants; nature and the accessibility of biotopes; the awareness of inhabitants about the need for reporting about the obtained turtles; the social activity of respondents and others. Sufficiently large number of *Emys orbicularis* findings in Latvia in the environments of the populated areas can be explained by these factors.

Taking into account that a part of turtle findings in Latvia was done in the environments of the populated areas, as well as that in the course of the study the information about the import of several *Emys orbicularis* individuals into Latvia was obtained, it can be assumed that in Latvia they can exist both autochthonic and allochthonous *Emys orbicularis*, and also the groups of animals with the mixed origin as in other countries of Europe (BUDE, 1998; SCHNEEWEISS, 1998; DREWS, 2005). Undoubtedly, the studies in this field are necessary both for studying the *Emys orbicularis* origin in Latvia and for retaining the autochthonic *Emys orbicularis* groups in Latvia (PUPINS & PUPINA, 2007a, b).

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Appendix I

The complete list of the records of *Emys orbicularis* findings in Latvia, registered during the study from 1982 till 2007; their coordinates and the degree of plausibility.

Apéndice I

Listado completo de las citas de *Emys orbicularis* en Letonia registradas en el periodo 1982-2007, indicando sus coordenadas y el grado de plausibilidad.

Reg. No	Date	Longitude	Latitude	District	Plausibility
0001	1984	55° 52’	26° 30’	Daugavpils	4
0002	1978	55° 55’	26° 35’	Daugavpils	2
0003	1982	57° 3’	24° 14’	Riga	2
0004	1995	55° 41’	26° 45’	Daugavpils	4
0005	1997	55° 53’	27° 10’	Kraslava	2
0006	1982	55° 42’	26° 51’	Daugavpils	2
0007	1989	56° 3’	26° 47’	Daugavpils	2
0008	1996	57° 25’	21° 37’	Ventspils	2
0009	1985	57° 25’	21° 36’	Ventspils	2
0010	1996	57° 24’	21° 38’	Ventspils	1
0011	1996	56° 34’	21° 42’	Liepaja	2
0012	1938	56° 32’	23° 13’	Dobele	1
0013	1997	56° 31’	23° 13’	Dobele	4
0014	2004	57° 01’	24° 10’	Riga	1
0015	2003	56° 56’	25° 53’	Madona	4
0016	1983	55° 42’	26° 46’	Daugavpils	2
0017	1968	55° 59’	26° 45’	Daugavpils	2
0018	2004	55° 54’	26° 31’	Daugavpils	4
0019	2005	55° 54’	26° 27’	Daugavpils	2
0020	1964	56° 2’	26° 48’	Daugavpils	2
0021	1996	56° 1’	26° 46’	Daugavpils	2
0022	1997	55° 53’	26° 30’	Daugavpils	2
0023	1983	57° 35’	22° 20’	Talsi	1
0024	1985	57° 39’	22° 15’	Talsi	3
0025	1988	57° 8’	22° 31’	Talsi	3
0026	1989	57° 42’	22° 22’	Talsi	3
0027	2003	57° 38’	22° 34’	Talsi	3
0028	1972	56° 36’	23° 47’	Jelgava	4
0029	2005	56° 1’	27° 27’	Kraslava	4
0030	1998	57° 42’	22° 22’	Talsi	4
0031	1980	56° 20’	23° 3’	Dobele	3
0032	1985	56° 49’	24° 35’	Ogre	2
0033	1986	56° 37’	23° 46’	Jelgava	1
0034	1968	55° 53’	26° 34’	Daugavpils	3
0035	1960	55° 42’	26° 45’	Daugavpils	3
0036	1981	56° 58’	21° 58’	Kuldiga	3
0037	1986	56° 57’	21° 57’	Kuldiga	3
0038	1989	55° 52’	26° 35’	Daugavpils	2
0039	2005	55° 49’	26° 28’	Daugavpils	2
0040	2001	55° 52’	26° 30’	Daugavpils	2
0041	2000	56° 43’	22° 16’	Saldus	1

.../...

Appendix 1 / **Apéndice I** (cont.)

Reg. No	Date	Longitude	Latitude	District	Plausibility
0042	2002	56° 43’	22° 16’	Saldus	2
0043	1996	56° 2’	27° 28’	Kraslava	2
0044	1986	55° 58’	27° 15’	Kraslava	1
0045	2006	56° 31’	23° 13’	Dobele	2
0046	2002	55° 41’	26° 31’	Daugavpils	2
0047	2001	55° 53’	26° 30’	Daugavpils	2
0048	2002	55° 53’	26° 31’	Daugavpils	2
0049	2004	56° 17’	21° 7’	Liepaja	2
0050	1968	56° 48’	22° 3’	Kuldiga	2
0051	1980	56° 35’	21° 44’	Liepaja	1
0052	2001	55° 59’	27° 16’	Kraslava	2
0053	1996	56° 3’	27° 28’	Kraslava	2
0054	2002	56° 3’	27° 27’	Kraslava	2
0055	1998	56° 2’	27° 27’	Kraslava	2
0056	2007	57° 29’	22° 3’	Ventspils	4
0057	2002	56° 29’	25° 52’	Jekabpils	1
0058	2007	55° 53’	26° 33’	Daugavpils	2
0059	2004	57° 9’	25° 0’	Cesis	3
0060	1979	56° 55’	24° 43’	Riga	2
0061	2004	56° 7’	27° 0’	Preili	2
0062	1977	56° 7’	27° 0’	Preili	2
0063	1981	55° 46’	26° 32’	Daugavpils	2
0064	2007	57° 1’	24° 0’	Riga	2
0065	1980	56° 2’	27° 28’	Kraslava	1
0066	1995	57° 0’	22° 1’	Kuldiga	2
0067	2007	57° 16’	25° 30’	Cesis	3
0068	1995	56° 39’	22° 46’	Saldus	1
0069	1977	56° 39’	22° 47’	Saldus	1
0070	1965	56° 39’	22° 54’	Dobele	1
0071	1997	56° 24’	22° 22’	Saldus	1
0072	1967	56° 34’	22° 50’	Dobele	1
0073	1987	56° 46’	22° 41’	Saldus	1
0074	1987	56° 45’	22° 42’	Saldus	1
0075	1997	56° 32’	23° 14’	Dobele	1
0076	1997	56° 32’	23° 14’	Dobele	1
0077	1987	56° 32’	23° 14’	Dobele	2
0078	1988	56° 31’	23° 14’	Dobele	4
0079	2002	56° 35’	25° 16’	Aizkraukle	2
0080	1992	57° 43’	22° 28’	Talsi	1
0081	1975	56° 19’	21° 12’	Liepaja	2
0082	2007	56° 50’	22° 56’	Tukums	2
0083	1965	56° 50’	22° 56’	Tukums	2
0084	1975	56° 50’	22° 56’	Tukums	2
0085	1975	56° 50’	22° 56’	Tukums	2