Distribution of *Emys orbicularis* in Hungary with notes on related conservational and environmental education activities

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In 2001 an intensive herpetofaunal mapping project was launched to build a detailed data base for Hungary. Using different sampling methods, *Emys orbicularis* was found in semi-natural lentic and lotic waters as well as in canals, fishponds and other artificial water bodies. Viable populations exist even in forest ponds at high elevations, where suitable egg-laying sites are present. In total, it was recorded from 156 10 × 10 km UTM squares in the past 30 years, which makes it the reptile with the fourth largest known distribution area in the country. Both natural and anthropogenic factors endanger *E. orbicularis* causing local extinctions, e. g., through habitat destruction, fragmentation, drought, and isolation. Sporadic records of *Trachemys scripta elegans* in the wild are known as well but no evidence has been collected on its reproduction so far. Since the launching of the “1998 – The Year of *Emys orbicularis*” by the Toad Action Group and the Nimfea Nature Conservation Association, several national and international conservation and education programmes confirmed that the educational aspect of this species is also of special importance. Due to its biological characteristics, *E. orbicularis* has the potential to become not only a keystone species in biological monitoring but also a symbol of wetland conservation.

**Key words:** *Emys orbicularis*, distribution, conservation, environmental education, Hungary.

**Introduction**

*Emys orbicularis* (L., 1758) is a freshwater reptile with a large distribution area ranging from North Africa over most of Europe and the Middle East to the Aral Sea, having at least 13 subspecies with pronounced morphological and genetic differences (Fritz, 1996, 1998; Farkas et al., 1998; Fritz et al., 1998; Lenk et al., 1999; Ayres Fernandez & Cordero Rivera, 2001). While intensive re-
search is carried out on the species in some parts of its range, basic distribution data are still missing in others.

*E. orbicularis* is a native species in Hungary. Although it is protected under the Hungarian Environmental Act with a fine of 50,000 HUF (appr. 200 EUR) for harming or killing an individual (KÖRNYEZETVÉDELMI MINISZTER, 2001), little is known about the actual conservation status of the species. Several hundred years ago it was abundant in the lowlands, and former reports noted its collection and export even to the Netherlands and Great Britain indicating exceptionally high population densities (MÉHELY, 1895). However, most of its aquatic habitats have disappeared in the past 150 years.

With the exception of *Vipera ursinii rakosiensis* (Méhely, 1894), the herpetofauna of Hungary is only moderately studied. Even the most detailed distribution map compiled before contained information only from 36% of the 10 km × 10 km UTM squares (one species from a square means a covered square in the system) with an average of less than 4.7 species per investigated square (BAKÓ & KORSÓS, 1999).

At the beginning of 2001, IUCN SSC Declining Amphibian Populations Task Force Hungary (DAPTF Hungary) launched an intensive project to build a new, more detailed herpetofaunial distribution data base from its own existing data, a large-scale literature search and intensive herpetofaunal mapping. Results of the National Amphibian and Reptile Mapping Project regarding *E. orbicularis* are presented in this paper.

**Material and methods**

The literature search back to 1970 covered a diversity of reliable data sources and revealed several new publications in local or county museum journals. Research reports to the National Authority for Nature Conservation were also added to the literature. The revision of the literature resulted in a 2,900 item database. Several experts were contacted to participate in the data collection, which provided another 1,600 unpublished records. Besides the compilation of existing DAPTF Hungary data, surveys were made to expand our herpetological knowledge to new areas. The fieldwork was focussed around the study of probable NATURA 2000 sites.

Multiple sampling strategies were applied to confirm the presence of *Emys orbicularis*. Visual encounter surveys were made during daytime and in the nesting period also during the night, road transect surveys and searches for predated nests were also used to determine the presence of the species and electrofishing data of ichthyologists were also added to the data base (SAL-LAI & PUKY, 1998).

Parallel with the data collection, environmental education activities were carried out including traditional methods (e. g. talks, publication of posters and postcards) as well as new approaches (e. g. the Salamandra and Emys competition for housewives organized with “Házi Praktika”, a 150,000 circulation women’s magazine).

**Results and discussion**

As with other freshwater reptiles, like *Natrix natrix* (L., 1758) and *N. tessellata* (Laurenti, 1768), several methods are suitable for recording *Emys orbicularis*. More than 80% of the individuals, however, were detected by visual surveys. Electrofishing and road transects resulted in 8.6% and 4.6% of the data, respectively. A low number of records was obtained by looking for predated nests.

In total, *E. orbicularis* was recorded from 156 out of the 1,060 10 × 10 km UTM squares covering Hungary (Fig. 1), which is a 362% increase in comparison with the previous data base (BAKÓ & KORSÓS, 1999) and still nearly three times more than what was presented by FARKAS (2000). These localities spread into 38 50 km × 50 km UTM squares, which is the usual scale of European maps. In 16 of these squares (42%) *E. orbicularis* was recorded first in our survey (Fig. 2, note that there are five pairs of squares smaller than 50 km × 50 km each due to the curvature of the globe, which is projected in the more detailed, national grid of the map. At the continental level though, these are united in pairs, and thus it makes 58 squares in total for the country.).

*E. orbicularis* inhabits different water types in Hungary. Besides semi-natural lentic and lotic waters, it is also present in canals, fishponds and other artificial water bodies. Most data are from lowland sites in Hungary. This is in agreement with DELY’s (1983) findings, who regarded *E. orbicularis* as a primarily lowland species present in standing or slowly running waters and in fish ponds. However, several mountain records were also collected, usually up to approximately 300 m a.s.l. (e. g. by SOLTI & VARGA, 1984). In some exceptional cases these data indicated viable populations in forest ponds, where suitable egg-laying sites are also present, such as at Lake Bajdázi in the Börzsöny mountains, north of Budapest. Several mountain occurrences (up to 490 m a.s.l.) can easily be the result of artificial introductions and are under considerable human pressure (e. g. disturbance) as they are along popular hiking trails like the sites de-
scribed earlier by SZABÓ (1956). As a consequence, mountain populations often became extinct several years after they were described, such as the last known population in the Bakony moun-
tains near Veszprém, north of Lake Balaton (Marian, 1988).

Both natural and anthropogenic factors endanger *E. orbicularis* causing local extinctions, e. g., through habitat destruction or fragmentation causing a national decline of the species (Pečhý, 2000) coupled with drought over large areas, e. g., in the Kiskunság National Park Directorate (Farkas, 2000). As in other countries (Moravec, 1999; Najbar & Maciantowicz, 2001; Miquet & Cadi, 2002; etc.), reintroduction could be an important conservation tool to counteract this process. A recent example at the Nyírkai Hany – Keleti Mórétek wetland restoration area in the northwest part of the country proves that released individuals can successfully colonize newly created wetlands in Hungary (Puky, 2003). However, besides the aquatic habitat, nesting sites are also needed and parts of both the aquatic and the terrestrial habitat must be managed according to the biological requirements of *E. orbicularis* to safeguard its long-term survival.

Isolation due to the accelerated development of the national road network after joining the European Union and increasing traffic, which has also been recorded as causing mortality in other European countries (Miquet & Cadi, 2002), is another threat. As technical solutions were successfully used to lower tortoise and turtle road kills and isolation both in Europe and North America (Guyot & Clobert, 1997; Areasco, 2003), including mitigation measures for *E. orbicularis* (Scoccianti, 1997), technical details and experience are already available in this field.

Mähn (2003) suggested *E. orbicularis* as an optimal animal to keep in garden ponds and occasional collection from the wild was also noted in Hungary, even if it is illegal. Sporadic records of the introduced competitor *Trachemys scripta elegans* (Schoepff, 1792) are also known from different regions (Fig. 3). When occurring in mixed groups, this species is known to interfere with *E. orbicularis* in several ways, e. g., by outcompeting it from preferred basking places in France (Cadi & Joly, 2003). However, at present it is unclear how it influences *E. orbicularis* populations in Hungary.

*E. orbicularis* was attractive for the general public in environmental education activities. More than 60,000 people visited conservation exhibitions since “1998 – The Year of *Emys orbicularis*” was launched by the Toad Action Group and the Nimfa Nature Conservation Association. More than 150 children’s groups from three countries (Hungary, Romania, Ukraine) entered the “Little Lizard” competition on reptiles in 1999–2000, which also dealt with the life history and conservation of *E. orbicularis*. Entries for the Salaman-

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Fig. 3. 10 km × 10 km UTM distribution of *Trachemys scripta elegans* in Hungary (the edge of the squares represent 10 km). Empty square: no data; solid circle: data available.
dra and *Emys* competition for housewives resulted in an exhibition at the Natural History Museum with more than 200 items ranging from bookmarks to jewel boxes and clothes all decorated either with more than 200 items ranging from bookmarks to jewel boxes and clothes all decorated by either of the animals. These examples confirmed that *E. orbicularis* is not only an animal with suitable characteristics for environmental education purposes (widespread, readily visible from a greater distance, can be handled without risking to harm the animal or the interested people, etc.) but also increasingly captivates human attention, as is evidenced by ancient mythology and modern art as well (Künst & Gemel, 2000). The environmental conservation potential of the species was utilized well in Austria, where an *Emys* centre was opened in 2001 in the Lower Danube Floodplain National Park near Vienna with opportunities to watch several turtles in their natural environment (Rößler, 2002). Such projects are important not only in the conservation of the species but also in wetland conservation in general, as *E. orbicularis* has the potential to become not only a keystone wetland conservation in general, as *E. orbicularis* has the potential to become not only a keystone species in biological monitoring but also a symbol of wetland conservation, and thus play an important role in raising public awareness about this issue.

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References


