North-Western Journal of Zoology
P-ISSN: 1584-9074, E-ISSN: 1843-5629

Vol. 5, No. 1, 2009, pp.34-39
Article No.: 051105

Monitoring the Trade Turnover of Red - eared Terrapins (*Trachemys scripta elegans*) in Pet Shops of the Lublin Region, East Poland

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Abstract. One invasive species, the Red-eared terrapin *Trachemys scripta elegans,* was legally traded in Poland until mid 2002. Following the ban, work was done on the extent of trade in red-eared terrapins in pet shops in SE Poland in the year 2005 and 2007. Despite the trade ban, it was not fully eliminated from the market and was still available in 20.5% and 7.3% of the monitored stores in the 2005 and 2007 respectively. Red-eared terrapins comprised 43.4% and 14.8% of the number of all water turtles available for sale in the indicated years. On the market, the substitute for the Red-eared terrapin has presently become Troost's terrapin *Trachemys scripta troostii,* since other turtles are too expensive. Troost's terrapin may also pose a threat for the native European pond turtle *Emys orbicularis*.

Key words: Red-eared terrapin, Troost's terrapin, European pond turtle, invasive species, Poland

Introduction

Following social and political changes at the end of the previous century and the break down of the Soviet-based, centrally driven, economic system, the process of free economic development began in Poland. This caused an increase in the number of pet shops and the number of people engaged in animal trade as well as the expansion of offers of supplying products to pet shops. The expansion of the free economy in this sector in Poland at the beginning of the 20th century, resulted in as many as 326 species of exotic animals being available in pet shops, of which 22 species were turtles (Smielowski 2003). This trade has contributed to the increase in dangers due to the introduction of invasive species. The effects of invasive species are one of the greatest threats to the native biodiversity in the world. One of these invasive species is the red-eared terrapin *Trachemys scripta elegans*. This species is native to the South East of the United States (Bringsoe 2006) and has undergone significant global expansion of its distribution, through the introduction and release of animals purchased in pet shops. The growing flow of exotic animals on the market resulted in the red-eared terrapin reaching Poland. Taking into account the situation of dangers resulting from the appearance of this species in the natural ecosystem, authorities in Poland prohibited their trade on the 20th of May 2002 (Smielowski 2003). Previously (in 1996), the European Union banned the import of the *Trachemys scripta elegans* be-

cause of the negative impact on European pond turtles *Emys orbicularis* (Williams 1999).

However, this ban is being broken and in many stores in various parts of Poland the species is available in pet shops. The extent of the presence and availability of this species in pet shops is poorly known, despite such availability being the base for later introductions of animals to the natural ecosystem. A particular need to study the presence and availability of the species in pet shops exists in Eastern Poland, since the wetlands located there are one of the key breeding sites for native species of the European Pond Turtle, whose surviving population is decreasing in number (Jablonski 2001).

The goal of monitoring was to establish the extent of the trade in red-eared terrapins *Trachemys scripta elegans* within the Lublin region (east Poland) between 2005 and 2007.

Study area and Methods

The research was carried out during the period of January – May in 2005 and 2007. A control search at pet shops was done in cities of the Lublin region (51° 13′ N, 22° 34′ E, east Poland). In 2005, a total of 73 stores in 17 towns were searched and inspected. The number of stores is given in parenthesis: Lublin (33) – the biggest town and regional capital (*ca* 300 thousand inhabitants), Biala Podlaska (6), Pulawy (5), Chelm (4), Zamosc (4), Swidnik (3), Krasnik (3), Lukow (2), Radzyn Podlaski (1), Bilgoraj (2), Deblin (2), Krasnystaw (2), Lubartow (2), Poniatowa (1), Janow Lubelski (1), Opole Lubelskie (1), and Piaski (1). However, in 2007 a total of 55 stores were visitied in 6 towns in the Lublin region. The number of stores is given in parenthesis: Lublin (33), Biala Podlaska (5), Pulawy (4), Chelm (5), Swidnik (4), Zamosc (4). Every time, in order to make the interviewer trustworthy, the role of a potential client, who was interested in obtaining the red-eared terrapin, was taken on. In this study, only those cases in which the red-eared terrapins were available for sale are considered. In the report, we did not take into account the cases where individual specimens were verbally declared for sale. The price of turtles is given after converting Polish Zlotys (PLN) into US dollars: 1USD = 3.0 PLN.

Results

Seventy three pet shops were visited in 2005. In 15 (20.5%) of them at east one red-eared terrapin was available for sale. Two years later, when a control investigation was done n = 55, only 4 (7.3%) stores had a red-eared terrapin. The drop in frequency of shops offering red-eared terrapins was significant (Fisher exact text: P = 0.0302). Beside Red-eared terrapin individuals, stores offered Troost's terrapins *Trachemys scripta troostii* and other species of fresh water turtles including; Cooters *Pseudemys* sp., Helmet turtles *Pelomedusa subrufa,* Chinese soft-shelled turtles *Pelodiscus sinensis* and African mud turtles *Pelosius subniger*. In 2005, Troost's terrapins were available for sale in 8 stores (11.0%, n = 73), where two years later it could be bought in 9 (16.4%) of the 55 investigated stores. The difference in frequency was not significant (Fisher exact test: P = 0.263).

In 2005 a total of 53 individual turtles were offered for sale: 23(43.4%) were red-eared terrapins, 15 (28.3%) were Troost's terrapins and individuals of 15 other species of turtles (28.7%) were also for sale. Among the indicated number of red-eared terrapin, seven (30.4%) were offered by stores in Lublin city. In 2007, monitored pet shops had a total of 27 turtles for sale. It was then possible to buy: red-eared terrapins (n = 4, 14.8%), Troost's terrapins (n = 21, 77.8%) and two (7.4%) individuals of other species of fresh water turtle. This indicates a significant decrease in the num-ber of red-

eared terrapins in the pet shops of SE Poland (Fisher exact test: $P = 0.0088$) as well as a significant growth the frequency of Troost's terrapins offered for sale (Fisher exact test: $P = 0.0001$). In 2007, two out of the four red-eared terrapins were available in Lublin. In 2005 in monitored stores where the red-eared Terrapin was offered (n =15) an average of 1.5 ± 1.25 individuals were available (median: 1, range 1-5 individuals). However, two years later there was only one individual offered in each of the four shops in which it was present (median:1). Nevertheless, there was no statistical difference in the median number of turtles offered between 2005 and 2007 (Mann - Whitney U test: $Z = 1.122$, $n_1 = 15$, $n_2 = 4$, $P = 0.262$). In the years 2005-2007, the average price of a red-eared terrapin was 21.4 $ US (range: 7.2 - 35.8 $ US) whereas the average cost of a Troost's terrapin was 9.8 $ US (range: 7.8 - 11.9 $US).

Individuals of the Troost's terrapin were not statistically more expensive than individuals of the red-eared terrapin (Mann-Whitney U test: $Z = -0.859$, $n_1 = 17$, $n_2 = 8$, $P = 0.390$). However, there were at that time many more expensive turtles and tortoises than those two species offered in the stores. These included Hermann's tortoises (*Testudo hermanni*) and the Russian tortoise (*Agrionemys horsfieldii*), which ranged in price between 28.6 – 71.4 $ US (mean = 44.8 $USD, Mann -Whitney U test: $Z = - 3.55$, $n_1 = 8$, $n_2 = 10$, $P = 0.0004$).

Discussion

Detailed information on the number of individual red-eared terrapins which were imported into Poland prior to the trade ban is lacking. However, we know that in the years 1994 - 97, 448,000 red-eared terrapins were officially imported to Poland. The peak in trade occurred in 1994, when as many as 134,850 individuals were imported (Najbar 2001). The exact scale of smuggling of the species through Polish borders is also unknown (Mazur 2004, Pachol 2007).

This study has shown that within the Lublin region (close to about 8% of the territory and 5.8% of the population of Poland, SOL 2002) there has been a significant drop in availability of red-eared terrapins as a result of the trade ban. However, it must be noted that a complete elimination of this invasive species in pet shops within South East Poland has not occurred. Experience suggests that entire elimination of the trade in this species will be particularly difficult, especially since we dispose with information relating to the participation of the discussed species of turtles on the market in the territory of Warsaw (the capital of Poland), where it was possible to legally trade it. In 7 of the controlled stores in 2001 the red-eared terrapin accounted for 79.3% of all reptile sales (Maluta 2002). In addition, a significant quantity of transactions takes place through the Internet, as in the case of the CITES listed species. For example, in 2004 seven percent of illegal internet transactions of reptiles for sale in Poland related to *Trachemys scripta elegans* (Kepel et al. 2006).

Before estimating factors responsible for the spread of invasive species, it is not possible to avoid the question of the origin of red-eared terrapins appearing in pet shops in Poland. Currently the main source of red-eared terrapins available in Poland is private traders in the Czech Republic (Mazur 2004). Terrapins are also smuggled across the border from the Czech Republic

having been purchased at monthly zoological fairs in: Praha, Hradec Kralove and Tynishch (Maluta 2002, Mazur 2004, Pachol 2007). Currently there is a lack of data concerning the presence of breeding farms of this species in Poland (Maluta 2002, Mazur 2004, Pachol, 2007).

The red-eared terrapin is known to compete with indigenous species for food and basking sites in the United States (Williams 1999, Salzberg 2000). Presently we have very scarce data on the topic of the effects of red-eared terrapins on native European pond turtles in Poland. However, research done to date on the effects of red-eared terrapins on other turtle species shows that the native species cannot compete, since the invasive species is more aggressive and can move more quickly, which is important when competing for optimum basking sites and exploiting a wider spectrum of food resources. The red-eared terrapins also reach sexual maturity faster and are characterized by higher fecundity in comparison with the European pond turtle (Bringsoe 2006).

Data concerning the appearance of red-eared terrapins in the wild is known from several regions of Poland, but the most comprehensive are those for the Lubuskie Province (western Poland) (Najbar 2001) and Lublin region (Duniec 2004). Fifteen sites within Lubuskie Province have been recorded as having red-eared terrapins in the years 1995-2000. Several of these sites have both European pond turtles and red-eared terrapins occurring (Najbar, 2001). Red-eared terrapins have also been recorded at several other locations in Poland including major cities and their surroundings that are the capitals of regions. These include; Wroclaw (*ca* 600 thousand inhabitants, capital city of *Lower Silesia* region, West Poland) and Krakow (*ca* 750 thousand inhabitants, capital city of *Minor Poland* region, South Poland) (Najbar 2001, Kopka 2003, Bringsoe 2006). In addition to this, it is worth pointing out that red-eared terrapins have become established in some sites which are not subject to freezing over-winter since they include warm water discharges from hydro-electric power plants (Duniec 2004, Pachol 2007).

Between 1998 and 2003 a total of 30 locations within the Lublin region have been recorded as having red-eared terrapins present. Of these, as many as 15 (50%) of the localities were near to the capital of the region – Lublin, with red-eared terrapins being primarily found in the Bystrzyca River and Zemborzyce Water Reservoir. At the latter of these, two red-eared terrapins were caught by hook, during a fishing competition (Duniec, 2004). It is worth noting that the 30 locations at which red-eared terrapins have been found in the Lublin region comprises 75% of all known records of feral individuals in Poland at the present time (Duniec 2004). This confirms, which is indicated in this work, the essential role of pet shops in the regional capitals in the spreading of the species in Poland.

The essential problem in the context of threats from introduced red-eared terrapins, Troost's terrapins, or other invasive species are shown by the results of a survey carried out in 54 pet shops of Poland. From these, only 20% of the salespeople are qualified to manage stores and are familiar with the laws and regulations in regards to running such stores. The remaining 80% of these people often lack even the most basic biological knowledge (Smielowski 2003). Red-eared terrapins are often released by owners primarily as a result of the difficulties in breeding these reptiles. Also, the

aquaterrarium required by adult individuals must be substantial in order to allow the animals to swim. Heaters are also needed in order to maintain optimal water temperatures. Young individuals also require a large amount of food, which cause frequent fouling of their water, requiring exchange of a large quantity of water and cleaning of the equipment. All these factors result in owners (often young children) losing interest with their pets and releasing them into the wild. Sometimes individual terrapins escaped from poorly constructed garden ponds, since they are able to dig tunnels in the ground (Duniec 2004, Pachol 2007). In addition some individuals are released from captivity for religious reasons in other countries such as Singapore (Goh & O'Riodan 2007).

This study points to a process of the replacement of red-eared terrapins by Troost's terrapins on the shelves of zoological stores. Several processes influenced the replacement; a lack of price differences between the two species, which was shown during monitoring. At the same time there is a very large difference in price when compared with Hermann's tortoise and the Russian tortoise. The high percentage for these tortoises is a result of the legal limitations on import for both species afforded by the *CITES* Convention. This was particularly shown in the case of the Russian tortoise. Individuals of this species comprised 3953 (78.9%) of the live reptiles (5012 individuals) seized by Polish customs officers between 1998 and 2006 (Pachol 2007).

Since the ban of importation of red-eared terrapins there has been an increase in the demand for Troost's terrapins since the prices of other mostly desired turtles are too high. Unfortunately the consequence of this will be cases of Troost's terrapins being introduced into the wild.

Summarizing, the undertaken research shows: 1) despite a ban on trade, red-eared terrapins remain in the trade 5 years later. However, there has been a decrease in numbers found in the pet shops of Southeastern Poland. 2) The presence of the Red-eared terrapins in pet shops shows the lack of efficiency in the activity of customs services on the borders of Poland. 3) There is an increase of the availability of Troost's terrapins, which are replacing the red-eared terrapin in the marketplace, bringing an increased threat of their introduction to Southeastern Poland.

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Submitted: 10 May 2008
/ Accepted: 17 October 2008

Published Online: 31 October 2008