

## Does the red-eared slider (*Trachemys scripta elegans*) breed in Turkey?

### Da li se crvenouha kornjača (*Trachemys scripta elegans*) razmnožava u Turskoj?

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#### Abstract

Here, we report for the first time reproduction in a naturalized population of the red-eared slider (*Trachemys scripta elegans*) from Southern Anatolia (Anamur, Mersin). We detected a female laying 15 eggs in the morning of July 03. 2012 and a female digging nest on May 16. 2015. Moreover, two hatchlings 26.1mm and 28.4mm in length were observed on September 03. 2013. According to our observations, the Mediterranean coast of Turkey has the potential to provide the requirements of the species. The described impacts of the red-eared sliders on native turtles are competition for food and basking sites.

**Key words:** alien species, naturalized population, *Trachemys scripta elegans*, Anatolia

#### Sažetak

Po prvi puta izvještamo o reprodukciji u udomaćenoj populaciji crvenouhe kornjače (*Trachemys scripta elegans*) iz južne Anatolije (Anamur, Mersin). Opazili smo ženku koja je izlegla 15 jaja ujutro, 3. lipnja 2012., te ženku koja je kopala gnijezno 16. svibnja 2015. Dana 23. Rujna 2013 opazili smo i dva netom izvaljena mladunca, dužine 26.1 mm i 28.4 mm dužine. Sukladno našim opažanjima, Mediteranska obala Turske ima potencijal da ispunjava potrebe ove vrste. Utjecaj crvenouhe kornjače na nativne populacije kornjača je kompeticija za hranu i mjesta za sunčanje.

**Ključne riječi:** strane vrste, udomaćena populacija, *Trachemys scripta elegans*, Anatolia

The global introduction of non-native amphibians and reptiles has increased exponentially through the past 150 years, these mostly originated from North America, the numbers of turtle introductions are greater than other taxa (Kraus 2009). One of the main factors in the expansion of non-native species is commercial trade and about 64 turtles and tortoise species have been widely kept as pets by reptile enthusiasts (see Reptiles Magazine, 2015). *Trachemys scripta* (Slider) is a medium-sized semiaquatic turtle, currently

recognized as having three subspecies (*T. s. scripta*, *T. s. troostii*, and *T. s. elegans*, ERNST ET AL., 1994), The Red-eared Slider *T.s.elegans* is ranked among the world's 100 most invasive species (LOWE ET AL., 2000). The species is the most popular pet turtle worldwide since the 1950s due to its reasonably low price and simple husbandry (Ficetola et al. 2012). The red-eared sliders (*Trachemys scripta elegans*) have been generated on farms in the USA for pet trade since the 1970s and were the most widely traded species in Europe

(Scalera 2006). However the EU banned its trade starting in 1997 (Regulation 338/1997; Regulation 349/2003) due to the high risk of biological invasion (Ficetola et al. 2012). In this context, the trade of the other two subspecies (*T. s. scripta*, *T. s. troostii* and its hybrids) has rapidly increased after prohibition (Scalera 2006).

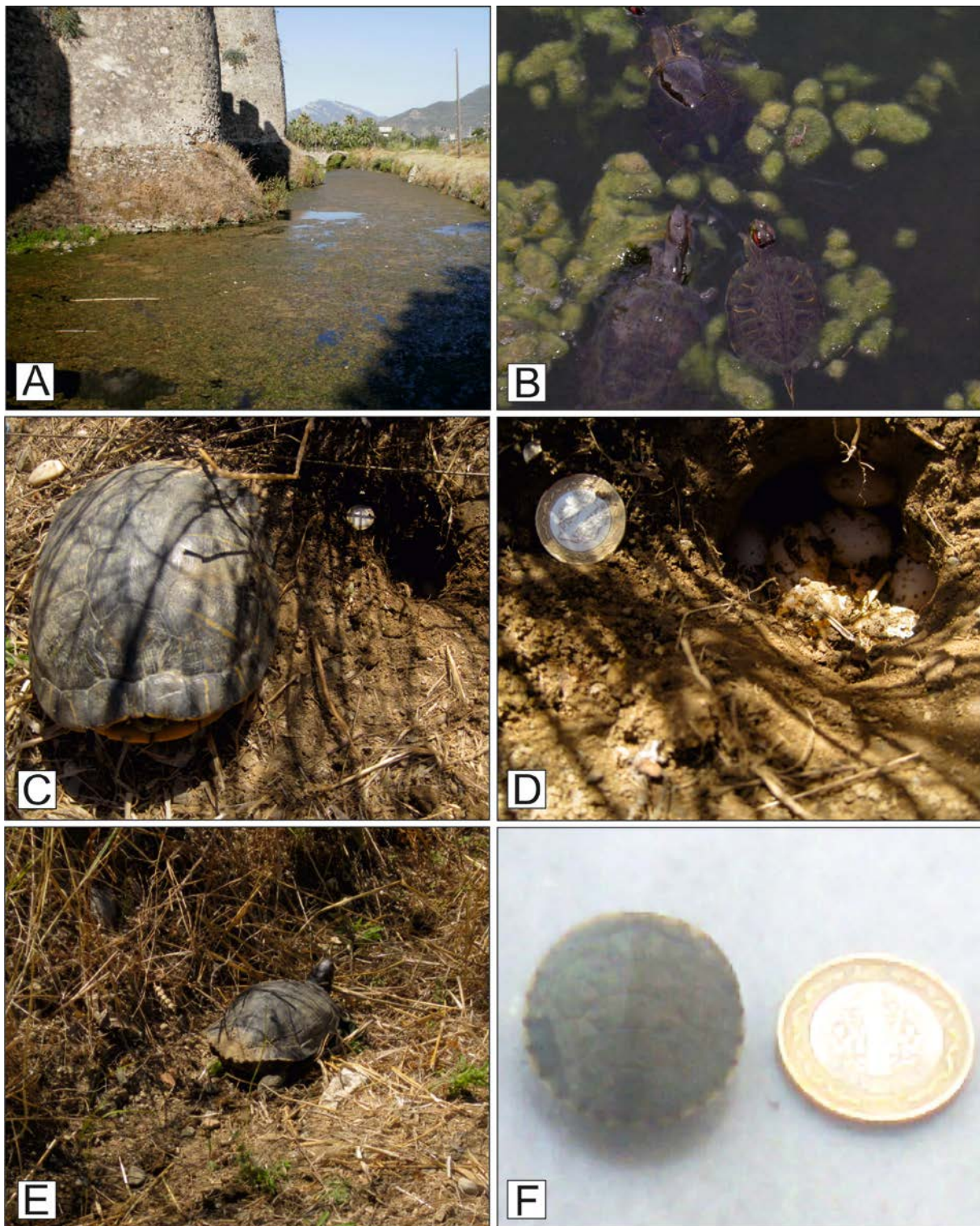
The red-eared sliders have been released or escaped into natural or semi-natural wetlands in many parts of the world (Scalera 2006) and its naturalized populations are reported in at least in 73 countries or overseas territories in Europe, Africa, Asia, Central and North America, South America and Oceania (Lever 2003; Scalera 2006; Pupins 2007; Kraus 2009; Pendlebury, 2009; Kikillus et al. 2010, Ficetola et al. 2012; van Dijk et al. 2013). However, populations in some introduced areas are unable to reproduce because of low temperatures or limited precipitation (Bringsøe 2001; Ficetola et al. 2009). Few naturalized populations have been reported in Spain, France, Italy, Germany, Austria, Slovenia, Japan and southeast Asia, Australia, New Zealand, in the West Indies and in the introduced range in the US (Pleguezuelos 2002; Lever 2003; Cadi et al. 2004; Scalera; 2006, Ramsay et al. 2007; Kikillus et al. 2010).

In our field trips all around Turkey from 2003 to 2015, we observed the red-eared sliders which had been released by their owners to natural or semi-natural wetlands in many cities in Thrace (Kırklareli, Istanbul) and western Anatolia (Izmir, Muğla) and southern Anatolia (Antalya, Mersin and Adana). In interviews with the local people, we could not obtain satisfactory data about proven reproduction of the sliders.

In 2005, we detected a naturalized population consisting of 10 – 15 adult, semi-adult and juvenile individuals in Mamure Castle, Anamur

[province of Mersin, Lat: 36.081789, 32.894666, sea level] on the Mediterranean coast of southern Turkey (Figure 1A, B). Along the front of the castle walls is a moat 1.5 – 2m in depth, 3m in width, 500m<sup>2</sup> in area, and containing dense aquatic vegetation, the red-eared sliders share the biotope with about 20 European pond turtles (*Emys orbicularis*) and 400 Western Caspian turtles (*Mauremys rivulata*). The turtles are in an overcrowded space with a ratio of 1-2 turtles/m<sup>2</sup> and have limited food, basking and nesting sites. The nesting site of the turtles is limited to the space next to the moat. However, it was observed that some females build their nests in some areas inside the castle, 20 - 30 m away from the moat. The sliders may move up to 1.6 km to find a suitable nesting place and the nests are jug-shaped and up to 12 cm deep (Ernst et al. 1994; Bringsøe, 2006)

Local people stated that the red-eared sliders successfully breed in the moat; however we could not observe hatchling individuals from fieldwork up to 2012. In our fieldwork on July 03, 2012, we observed an egg-laying female in the morning (Figure 1C, D). The female laid 15 eggs with an average size of 36.0mm in length (SD= 1.53, range= 33.58 – 37.66), 23.7mm in width (SD= 1.01, range= 22.70 – 25.54). We also detected a female digging a nest on May 16, 2015. The eggs of the red-eared sliders are ovoid in shape, 30.9-43.0 mm long, and 19.4-25.6 mm wide (Ernst et al. 1994). The nest is jug-shaped, 14cm in depth, 8cm wide at the mouth and 17cm wide at the base (Figure 1D). The female had straight carapace length of 204mm, plastron length of 216mm and weight of 1735g (Figure 1E).



**Figure 1.** A: general view biotope of the red-eared sliders, B: native species of *E. orbicularis* and *M. rivulata* in the habitat, C: nesting female, D: nest, E: egg-laid female, and F: hatchling

**Slika 1.** A: Generalni pogled na stanište crvenouhe kornjače, B. nativne vrste *E. orbicularis* i *M. rivulata* u staništu, C: ženka koja polaže jaja u gnijezdo, D: gnijezdo, E: ženka koja polaže jaja u gnijezdo i F: mladunac.



Females could lay up to six clutches every year, varying 2-30 eggs in a clutch, incubation period is 59 - 112 days and is extended in low temperatures (Ernst et al. 1994; Bringsøe 2006). We were not able to observe the hatchlings; however, the employees of the castle photographed two hatchlings with 26.1mm and 28.4mm SCL in

September 2013 (Figure 1F). In the native range, the red-eared sliders hatchlings have carapaces of 25.4-41.8 mm (Moll 1994; Ernst et al. 1994). According to our interviews, hatchlings emerged at end of August and mid-September and thus within the approximate incubation duration 60 – 75 days.

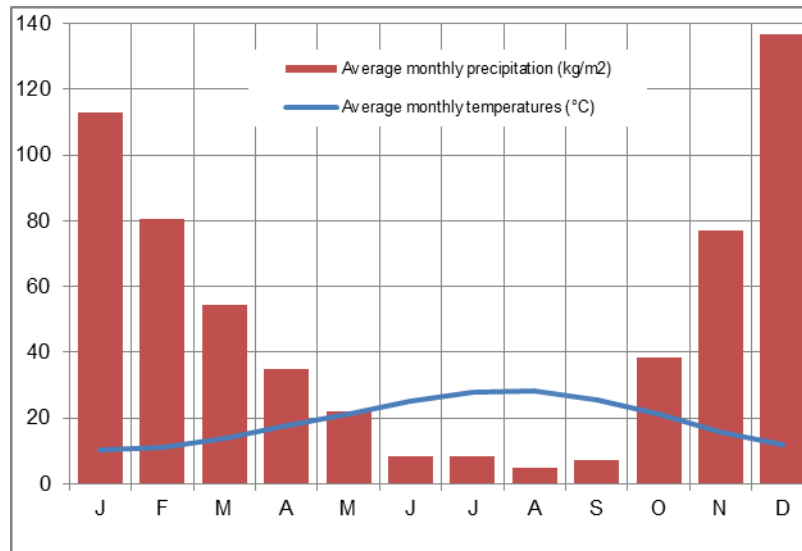


Figure 2. Climatogram of province Mersin from southern Turkey. (Turkish State Meteorological Service, 2015)  
Slika 2. Klimatogram provincije Mersin iz južne Turske. (Turkish State Meteorological Service, 2015)

Anamur has a Mediterranean climate which has long, hot and dry summers with cool, rainy winters. Average monthly temperature is 19.1°C and average precipitation was 48.8kg/m<sup>2</sup> between 1954 and 2015 (Turkish state meteorological service 2015, Figure 2). In the breeding and incubation period (May - September) of the Anamur population, average monthly air temperature ranges between 21.3 – 28.3°C (Turkish state meteorological service 2015). The sliders usually lay eggs from April to July in their native distribution, and development of eggs depends on moisture and temperature (Tucker & Packard 1998; Ernst et al. 1994). The eggs that are incubated at

temperatures of 22 - 27°C become males, whereas females develop at warmer temperatures (Ernst et al. 1994). Besides, when we look at the native distribution of the sliders (Ficetola et al. 2012), it seems that almost all of Turkey is in same latitude of their natural range.

A naturalized population of 20-30 individuals is present in the Izmir Wild Life Park in Western Anatolia. According to the interviews we conducted with the employees of the park and our own observations, it is presumed that the species does not reproduce there. On the other hand, the Mediterranean coast of Turkey has the potential to provide the requirements of the species. The

established breeding population we have identified is an indicator of such potential.

It has been reported that the red-eared sliders are competing with European terrapins - European pond turtles (*Emys orbicularis*) and Spanish terrapins (*Mauremys leprosa*) for food, basking and nesting sites (Cadi & Joly 2003, 2004; Ficetola et al. 2012). We also observed the competition of the sliders with the native terrapins of *E. orbicularis* and *M. rivutala* at Mamure castle. Especially *E. orbicularis* is repressed for food and basking place by the other two turtle species. The sliders are generally omnivores (Ernst et al. 1994) and high density populations could even impact on aquatic vegetation, macroinvertebrates and amphibian communities (Teillac-deschamps & Prevot-julliard 2006). The species is also considered a potential vector of Salmonella (Nagano et al. 2006) and the epidemiological risk has led to a national ban of sales of sliders since 1975 in the US (Ernst et al. 1994; Scalera 2006). Besides, the red-eared sliders could cause the risk of transmission of pathogens to native terrapins (Hidalgo-vila et al. 2009).

Rödder et al. (2009) modeled a potential distribution of *Trachemys scripta* according to some essential physiological and reproductive characteristics, and observed there are vast suitable areas that could provide the requirements of the species in North, Central and South America, Europe, West and Central Africa, the East African coast, eastern Asia, and the eastern and western parts of Australia, and Turkey. Our observation also supported the model (Rödder et al. 2009) and demonstrated that southern Anatolia is quite suitable for the reproduction of the species. In Turkey, red-eared sliders are sold at pet shops for 2-3 euros and there is no monitoring. Therefore, it

seems inevitable that the invasive turtle will generate pressure on many native species, notably on European pond turtles, in the immediate future. The Convention on Biological Diversity (CBD 2015) recommended a three-stage hierarchical approach to invasive non-native species: prevention, detection/surveillance and rapid response, control and eradication. Primary precautions to be taken on non-native species are: the prohibition on the import of the sliders by Turkish authorities, raising awareness in pet reptile enthusiasts and, in addition, potential national sustainable management plans for controlling non-native species, designed by decision-makers in the near future.

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