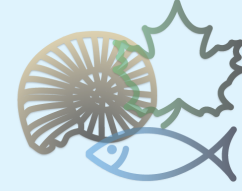




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A Record and Distribution of Exotic Species *Trachemys scripta* in the Streams Of Çanakkale (Turkey)

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Abstract

The introduction of many exotic animal species to environments which are not natural for them with the curiosity of human beings about animal species and the gradual acceleration of both transport among countries and intercontinental transport further threatens the natural communities. In order to investigate the distribution of exotic turtle species *Trachemys scripta* in Çanakkale, field studies were carried out between March and June 2014. Direct observation, detection of species by photographs and capturing by scoop nets and trap-nets were performed during the fieldwork. *Trachemys scripta* (the red-eared slider) was first recorded in Sarıçay stream, the Kepez, Kocabaş and the Kavak tributaries, in the Çanakkale province. It might be stated that this species arrived in the areas where it was detected through antropochore dispersal and may pose a threat to the natural species in the future.

Introduction

Owing to its geographical location and geomorphological characteristics that vary at short distances, Turkey involves many different types of habitats. Therefore, it houses a wide variety of vegetation and animal communities. Turkey also has rich herpetofauna within the western Palearctic region. Many studies on the inventorying of the amphibian and reptile faunas of important regions have been carried out in our country, which is a transitional region in terms of herpetofauna and has a rich diversity (Clark & Clark, 1973; Mertens, 1952; Baran, 1983; Uğurtaş, 1989; Sindaco *et al.* 2000; Ilgaz & Kumlutaş, 2005). Studies which have been made on this subject locally in the Çanakkale province are also available (Kaya *et al.* 2004; Hür *et al.* 2008; Tosunoğlu *et al.* 2009; Uysal *et al.* 2013; Tosunoğlu *et al.* 2017).

There are many factors which lead to the natural spread of species. However, upon globalization, the distribution of human beings on earth either intentionally or unintentionally brought about the expansion of the distributional ranges of some species. Even though especially those species which we call exotic species soon join natural communities and apparently do not pose any danger, they put pressure on native species and can lead to great irreversible destruction in the community structure and the ecosystem which might be as much as the extinction of some species. The alien (Exotic) species also found in the inland waters of Turkey have generally concentrated on inland water fish. In fresh waters, turtles are of ecological importance on the food web and the records of whether invasive species have entered these ecosystems are essential. It is known that *Trachemys scripta* (the red-eared slider) is among 100 “worst” invasive species of the world (Pendelbury, 2014). The hatchlings of this species are frequently sold at almost every pet shop in our country and people keep these hatchlings in their houses. There are rumors that those people who get bored with these animals after some time release these animals into natural environments. There are a limited number of scientific studies on the distribution of the invasive species of Turkey. Çiçek & Ayaz (2015), the south of Turkey (Mersin / Anamur) of invasive species in their study was identify the presence of the first breeding population in Turkey. This study aimed to reveal the existence of Çanakkale province in the inland waters of *Trachemys scripta* species found in northwestern Turkey and to discuss the potential effects on ecosystems.

Material and Method

Çanakkale Province is located on the territories of the Biga Peninsula, one of the western extensions of Anatolia in the north-west of Turkey, and of the Gelibolu Peninsula that is connected with the Eastern Thracian region of the Balkan Peninsula. There are many important streams and wetlands within the province of Çanakkale, including the Gulf of Saroz – reported to be a wetland of international importance. In the fieldwork carried out, specimens of *Trachemys scripta* were detected in Sarıçay stream (40.145226N, 26.418724E), passing through the central district of Çanakkale and pouring into the Çanakkale Strait; in the Kepez tributary (40.101712N, 26.377010E), passing through the municipal boundaries of Kepez and pouring into the Çanakkale Strait; in the Kocabaş tributary (40.239942N, 27.239655E), passing through the district center of Biga and pouring into the Marmara Sea; and in the Kavak tributary (40.623450N, 26.885930E), passing through the Kavak Delta – an important wetland – and pouring into the Gulf of Saroz (Fig. 1). Additionally the distributional range of *T. scripta* on earth is provided in Fig. 2.

The fieldwork was carried out in different periods between March-June 2014 considering the daily weather conditions. Direct observation, detection of species by photographs and capturing by scoop nets and trap-nets were performed during the fieldwork. *Trachemys scripta* specimens were identified by using Cites, 1999 – a guide to identify turtles and tortoises – and the other specimens were identified directly and by using their photographs by the sources of Baran *et al.* (2012) and Basoglu & Baran, (1977; 1980).

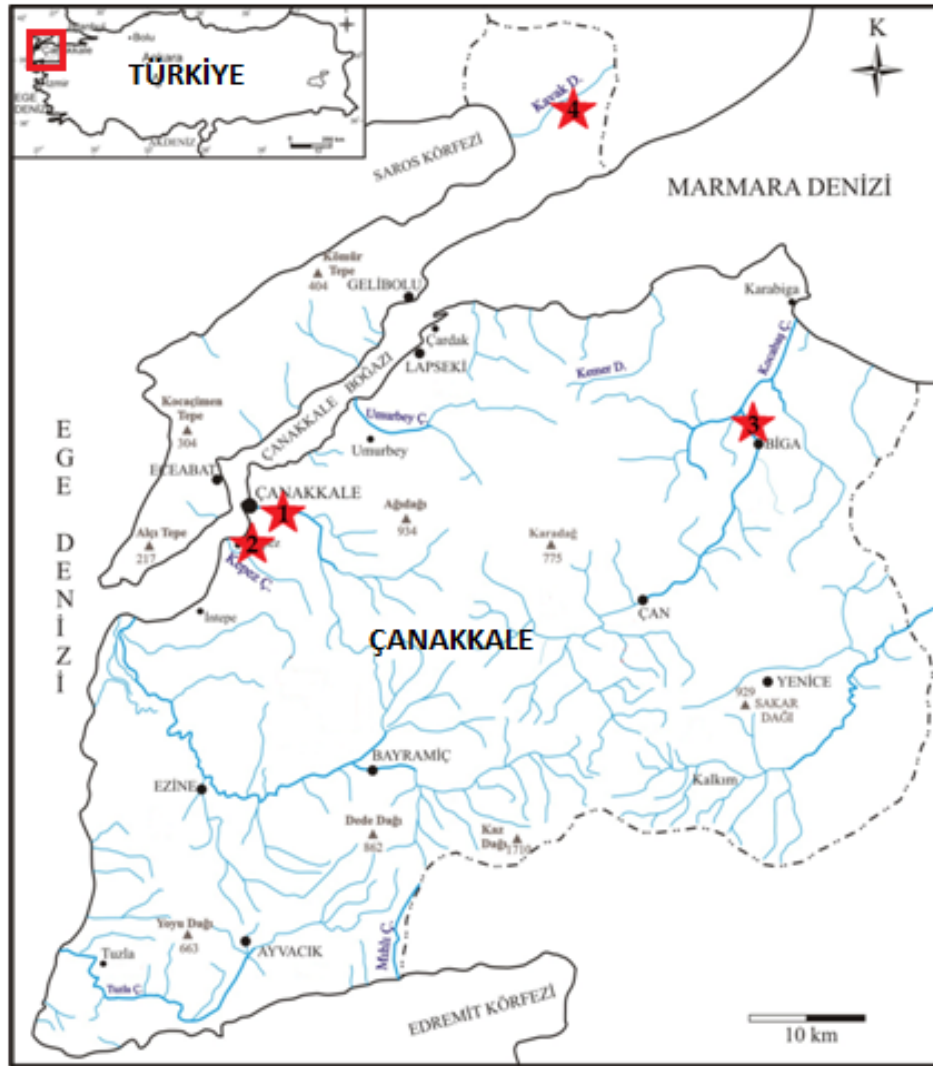


Figure 1. The localities where *Trachemys scripta* specimens were detected in Çanakkale. 1-Sarıçay stream, 2-The Kepez tributary, 3-The Kocabaş tributary, and 4- The Kavak tributary.

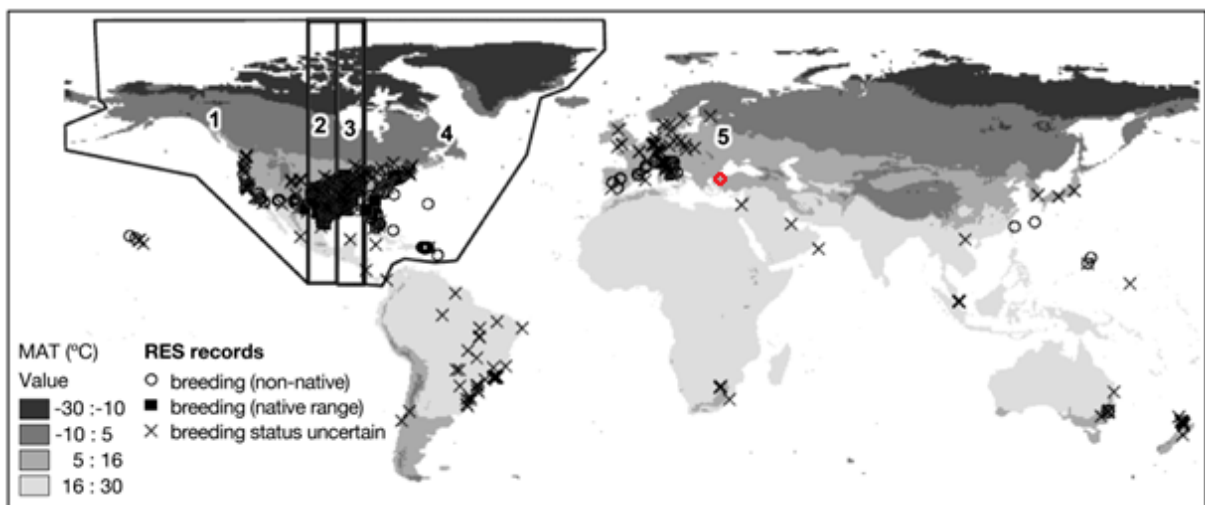


Figure 2. The distribution of *Trachemys scripta* worldwide. (MAT: Mean Annual Temperature (Kikillus, 2010, ○ The new record of locality detected in this study for *T. scripta*).

Results and Discussion

As a result of field studies carried out in Çanakkale province located in the northwestern part of Turkey, *Trachemys scripta* samples were detected for the first time in this study. A comparison of the densities according to the number of the freshwater turtles naturally distributed in the same environment at the localities where they found and the number of individuals observed is presented in Table 1.

Table 1. The densities of exotic species *Trachemys scripta* and the natural freshwater turtle species inhabiting the some localities. (0 = Unavailable, 1 = A single Individual was observed, 2 = Few, 3 = Moderate, 4 = Dense, and 5 = Dominant; **LC:** Least Concern; **NT:** Near Threatened (IUCN 2013))

IUCN	Species	Sarıçay stream	Kepez tributary	Kocabaş tributary	Kavak tributary
LC	<i>Trachemys scripta</i>	4	2	1	1
NT	<i>Emys orbicularis</i>	0	0	4	5
LC	<i>Mauremys rivulata</i>	3	4	5	4

The specimens of *T. scripta* detected as an alien (exotic) species in the study area were determined in the shallow edges of the streams covered with macrophytes. The largest number of individuals was recorded in Sarıçay stream (Which passes through the center of Çanakkale), during the day by counting 16 individuals. Three individuals were observed in the Kepez tributary, whereas an individual was observed in the Biga and Kavak tributaries. All biotopes where they were detected are located around the urban areas (Fig. 3).



Figure 3. The biotope where the specimens of *Trachemys scripta* were detected in Sarıçay stream, located at the city center of Çanakkale.

Species *T. scripta elegans*, native to South America, is the turtle subspecies which is most sold as domestic all around the world (Luiselli *et al.* 1997). It was recorded that some 52 million *T. scripta* individuals were exported from the United States of America between 1989 and 1997 and that the majority of them were released into nature after they had grown up (Cadi & Joly, 2003). Generally, the turtles purchased worldwide when they are hatchlings are usually released into those streams and pools, which are not natural for them when they grow up (Luiselli *et al.*, 1997; Cadi & Joly, 2003). According to the interviews with the pet sellers in Çanakkale, it is estimated that about 200 individuals are sold annually. The individuals of this species, supposed to have been released into fresh waters as their owners could not kept them, were observed in the same biotopes *Mauremys rivulata* and *Emys orbicularis* species – the freshwater turtles naturally distributed in Çanakkale. Exotic species breeding records and interact with native species in their natural environment in Turkey has been the subject of very few scientific studies. Çiçek and Ayaz (2015), the south of Turkey (Mersin / Anamur) of invasive species in their study was identifying the presence of the first breeding population in Turkey.

In Turkey, settlement areas are generally located either around water resources or at their closest points. Natural streams, lakes and wetlands are regions which are extremely important for biological diversity. Herpetofaunal diversity is quite rich in the wetlands intertwined with the settlement areas, along with biological diversity. 6 amphibian and 16 reptile species were detected during the fieldwork carried out in and around Sarıçay stream, show that this area has a rich herpetofauna. This invasive species was particularly recorded in the places close to the settlement units in the section of the stream ecosystem, which passes through the city. Spinks *et al.* (2003) similarly recorded this species in an urban pond. Therefore, it is suggested to regularly monitor the streams and ponds particularly in urban areas and to collect scientific data about the population states of the invasive species as well as their attributes of age, sex, breeding, and nourishment, if available.

Although no research has been made on the alien species in Turkey – were likely to compete, it was stated in a study on this subject which was carried out in Europe that this species was relatively aggressive and entered into competition particularly with the native *Emys orbicularis* for nourishment and resting places (Natchev *et al.* 2014). Likewise, the competitive behavior of this species with *Actinemys marmorata*, a natural pond turtle in an urban pond in California, for sunbathing areas was observed (Spinks *et al.* 2003). Lindeman (1999) stated that large turtle species were more dominant than the smaller ones in the competitions between *T. scripta* and other Emydid turtles for sunbathing regions. In an investigation carried out in 52 regions of Pennsylvania, they stated that specimens of *T. scripta* were found instead of *P. rubriventris* in 50% of the regions where *Pseudemys rubriventris* – a native species – had been distributed earlier. These two species did not coexist and that the reason why the specimens of *T. scripta* were not dominant in the areas where they did not predominate was that they had not had adequate density yet (Stone, 2010). They stated that the individuals of *T. scripta* might compete with *Mauremys caspica* in France (Lever, 2003) and Israel (Bouskila, 1986) and with *Pelomedusa subrufa* in South Africa (Newberry, 1984) for food, sunbathing areas, and nesting areas.

In order to display an invasive character for alien species and affect natural communities, they must first form a naturally breeding population in the environment that they have recently entered, i.e. show settlement success (Lockwood *et al.* 2007). Risk assessment models were investigated for the settlement of exotic vertebrates in Australia and New Zealand and it was stated that the score of settlement success scored between 0 and 160 was 99 for *T. scripta*

(Bomford, 2008). There are records about the fact that this species has also exhibited settlement success in the countries located on the Mediterranean Belt such as Italy, Spain, and Southern France in Europe (Cadi & Joly, 2004). No information has been collected yet on whether the specimens of *T. scripta* detected in the study area in Sarıçay Stream achieved breeding success. However, if they have established a naturally breeding population here, they might enter into competition with *M. rivulata*, a natural species inhabiting the same region, and with *Emys orbicularis* that inhabits a similar biotope in other habitats, if available. Depending on the above-mentioned literature information, it is supposed that *T. scripta* will establish dominance over native species by being more aggressive concerning competition. Thus, it is suggested to urgently perform population monitoring studies for the species in the natural habitats where this species is found.

As specimens of *T. scripta* have not been followed in our country so far, no adequate data are available about how many specimens of this species have been introduced into our country to date or whether the specimens have been released into nature. As in the other countries, many of the specimens sold are probably released into nature and consequently, some of them die in inconvenient environments or become extinct by failing to achieve breeding success, and it is clear that they can acquire an invasive character if they can succeed in surviving and establish a naturally breeding population. Therefore, regarding *T. scripta*, it is necessary to follow their entries into and departures from our country, to make those animal owners who purchase and keep the exotic species sold in our country conscious, and to follow them. It might be recommended to make training studies on definitely not releasing these species into natural environments. The distribution of the species in Turkey and especially its presence in the streams close to the settlement areas should be investigated, and the necessary measures should be taken.

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