Aquatic Invasions (2010) Volume 5, Issue 3: 297-302
doi: 10.3391/ai.2010.5.3.07

Open Access

Proceedings of the Symposium on non-native freshwater species introduction in the Iberian Peninsula 12-13 November 2009, Pamplona, Spain

Aquatic Invasions Records

Update of the pond slider *Trachemys scripta* (Schoepff, 1792) records in Navarre (Northern Spain), and presentation of the Aranzadi Turtle Trap for its population control

Aitor Valdeón*, Ariñe Crespo-Diaz, Aitziber Egaña-Callejo and Alberto Gosá

Observatory of Herpetology, Aranzadi Society of Sciences, Zorroagagaina, 11 20014 Donostia-San Sebastián, Spain

E-mail: emys@galapagosdenavarra.com (AV), acrespo@aranzadi-zientziak.org (ACD), aegana@aranzadi-zientziak.org (AEC), agosa@aranzadi-zientziak.org (AG)

**Corresponding author*

Received: 30 October 2009 / Accepted: 19 July 2010 / Published online: 23 August 2010

Abstract

The pond slider (*Trachemys scripta*), an American species considered one of the most harmful invasives in the world, has spread worldwide to many regions, including the Iberian Peninsula, where it is able to reproduce. Therefore, many eradication campaigns are being held in several places and various methods of elimination and trap models have been tried. We present the Aranzadi Turtle Trap (ATT), which has been tested with great effectiveness in a fluvial backwater stretch of the Arga River in Pamplona. Along with the ATT other traps were utilized, but they did not yield any results, while the ATT captured at least 70% of the detected *Trachemys*. Other new records of pond slider in Navarre are reported.

Key words: Emydidae, reptiles, basking, pet, trapping, conservation, invasive species

Introduction

Introduced species compete with, consume and In many parts of the world (Europe, Middle East, East and Southeast Asia, the Caribbean and South Africa) the American pond slider [*Trachemys scripta* (Schoepff, 1792)] has spread mainly through the pet trade (Ernst 1990; Barquero 2001; Telecky 2001; Cadi and Joly 2004; Ceballos and Fitzgerald 2004; Kraus 2009). The sliders, as they are omnivorous, can feed on plants and animals, being more carnivorous when they are juveniles (Parmenter and Avery 1990; Bouchard and Bjorndal 2006), and they can use various types of habitats, with calm water and abundant aquatic vegetation, like sluggish rivers, ponds, shallow streams, marshes, lakes, and reservoirs (Cagle 1950; Morreale et al. 1984; Gibbons 1990a). In Catalonia (North-eastern Spain) the pond slider can lay 12-17 eggs per clutch, with at least 2-3 clutches in a year (Franch I Quintana et al. 2006). Because of its adaptability (Gibbons 1990b; Arvy and Servan 1998) and longevity (up to 30 years in the wild) (Castanet 1994), the species has settled in a number of countries worldwide (Reed and Gibbons 2003; Kraus 2009) and in many places they can even reproduce (Chen and Lue 1998; Kraus 2009). These species' traits make it one of the most harmful invasive alien species in Spain (GEIB 2006) and around the World (Lowe et al. 2004). One of its breeding sites is the Iberian Peninsula. Reproduction is especially important in the East of Spain (Martinez Silvestre et al. 1997; De Roa and Roig 1997, Filella et al. 1999; Bertolero and Canicio 2000; Capalleras and Carretero 2000; Martínez Silvestre et al. 1997, 2001; Pleguezuelos 2002; Sancho et al. 2005) and the Natural Park of Doñana (Pérez-Santigosa et al. 2006).

In Navarre, the status of the species has not been studied in depth, and the only relevant publications are restricted to the Atlas and Red Book of Amphibians and Reptiles of Spain (Pleguezuelos et al. 2002) and to one sighting in Pamplona (Filella et al. 1999).

Several methodologies have been used to capture exotic turtles, from hand capture, to the

design of different kinds of traps (Iverson 1979; Plummer 1979; Dunham et al,. 1988; Bennett 1999; Zugadi et al. 2004), to the eradication of specimens by snipers (Pérez-Santigosa et al. 2006). In Pamplona - a very crowded city, where the river is very accessible through the "river parks" - trapping is complicated because of the need to locate the basking backwaters preferred by pond sliders (Gibbons 1990) and vandalism, which can lead to theft and destruction of the traps. For these reasons we needed a large, solid trap (to avoid poaching) and we designed modifications of an American trap, to build it. This model can be built and used freely to remove this invasive species from aquatic environments by scientists and conservation stakeholders.

The aim of this work is to update the distribution of *Trachemys scripta* in the Foral Community of Navarre (Northern Spain), as well as to introduce a model of a trap to the scientific community, which can give good results in places where other traps are not viable.

Methods

To compile records, some naturalists, biologists and forest conservation officers were consulted. Whenever it was possible they were asked for photographs. We made our own observations with ground-based telescopes and photographed the sliders. Using these methods we have sighted American sliders in various geographical locations in Navarre (Valdeón 2006; Valdeón and Gosá 2007).

Several models of traps were installed to try to capture exotic pond sliders in two sections of the Arga River in Pamplona. In these areas water depth reaches about 2 meters, and several tree trunks protrude from the river surface. These trunks, which are sunny for several hours, provide an ideal place to thermoregulate. That makes them an ideal place to put basking traps.

One type of trap was a variant of the "Bolue Trap" (Zugadi and Buenetxea 2004), but we replaced the basking platform (round timber) with a natural cork plate that floated in the water next to a tree. The plate was tied with a fishing rope, on one side to an underwater net and on the other to the vegetation situated 2-3 meters from the bank, where the researcher could pull the rope to get the net if a turtle was basking over the cork. Two traps were laid in place.

Another type of trap was the Aranzadi Turtle Trap (ATT), which is a modification of the "Sun Deck Turtle Trap" (Heinsohns Country Store 2009). We replaced the metal grille ramp with cork plates on both sides of the trap. Cork plates have proven to be effective to census pond slider populations as turtles are attracted to this kind of substrate to bask (Pérez-Santigosa et al. 2006). Three traps were placed in the same areas and during the same dates as the modifications of the "Bolue Trap".

In this case, the slider climbs the cork plate to bask, when they throw themselves into the water (they can do it from either side of the cork), they can return into the natural environment or they may enter the trap. The ATT does not carry bait, and its small cork plate is tied with a fishing rope to both sides of the fishing trap, allowing it to stay in the centre of the ATT, and it is comfortable for the turtles so they do not try to escape (Figure 1). Furthermore, two fish-baited traps were also used. These traps were situated on vegetated banks.

The baited traps were visited on consecutive days, while basking traps were checked weekly during 5 months of spring and summer of 2008.

Results

In 2008, trapping was conducted in two sections of the Arga River in Pamplona where several specimens were observed and captured. Moreover, other specimens were located in different dates in the Sadar River (Pamplona), the Pulguer Pond and the Sasillo Dam (Tudela), the Ebro River (Azagra, Tudela and Castejón), the Ega River (Allo, Estella, Morentin and Murieta), Las Cañas Dam in Viana, Pitillas Lake in Pitillas, La Estanca in Corella, a pond in Fustiñana, Soto Sardilla (Arga River) in Funes, and the Aragón River in Gallipienzo (see Table 1 and Figure 2).

In Pamplona, after the first 4 sliders were located, several basking traps (both types of basking trap were situated in the same area), and fish baited traps were installed at the same time. The 4 sliders were trapped with the ATT, while the other traps offered no catch. After the removal of the specimens, we saw the arrival of other individuals previously not observed. After two weeks, however, one ATT situated in a wooded area close to the basking plates had no captures.

One trap was stolen during the sampling and one ATT was vandalised, apparently in an attempt to steal a turtle believed to have entered the trap.

Table 1. Collection of *Trachemys scripta* records (datum WGS84 in Latitude and Longitude and datum ED50 in UTM) in the natural environment of Navarre.

Locality	Geographic coordinates			Date	Notes
	Latitude, N	Longitude, W	UTM 10×10		
Castejón	42°10'45"	1°40'30"	30TXM07	1998	
Pamplona				1999	In Filella et al. 1999
			30TWN96	2002	In Pleguezuelos et al. 2002
Sasillo Dam (Tudela)	42º08'06"	1°40'04"	30TXM16	2004	
Urederra River (Artavia)	42º44'03"	2°04'53"	30TWN73	2005	1 large sized specimen
Las Cañas Dam (Viana)	42º29'02"	2°24'11"	30TWN40	2006	1 specimen
Soto Sardilla (Arga River, Funes)	42º18'42"	1°46'48"	30TXM08	2006	4 specimens basking over tree trunks
Ega River (Allo)	42º32'26"	1º58'36"	30TWN81	2006	1 specimen
Ega River (Estella)	42º40'25"	2º02'08"	30TWN72	2006	5 specimens
Ega River (Morentin)	42º35'30"	1º59'03"	30TWN81	2006	2 specimens
Ega River (Murieta)	42º39'10"	2º08'49"	30TWN72	2006	1 specimen
La Morea Pond (Beriain)	42º43'55"	1º38'13"	30TXN13	2006	Several specimens
Ebro River (Tudela)	42º03'56"	1º36'01"	30TXM15	2007	Several specimens basking over tree trunks
Pulguer Pond (Tudela)	42º03'12"	1º42'30"	30TXM05	2007	1 specimen basking over a rock
Aragón River (Gallipienzo)	42º31'13"	1º24'22"	30TXN30	2007	1 specimen
Ega River (Arínzano)	42º37'03"	1º59'20"	30TWN81	2007	1 specimen
Lor Lake (Ablitas)	41º59'09"	1º39'17"	30TXM14	2007	1 specimen
Ega River (Estella)	42º39'49"	2º00'56"	30TWN82	2008	1 specimen
Arga River (Pamplona)	42º49'36"	1º38'13"	30TXN14	2008	10 specimens in two sections
Arga River (Pamplona)	42º49'22"	1º39'18"	30TXN14	2009	4 specimens
Las Cañas Dam (Viana)	42º29'01"	2º24'10"	30TWN40	2009	3 specimens
Sadar River (Pamplona)	42º47'56"	1º39'11"	30TXN13	2010	1 specimen
Fustiñana	42º03'23"	1º28'53"	30TXM25	2010	2 specimens
Ebro River (Azagra)	42º17'03"	1º51'55"	30TWM98	2010	1 specimen
Pitillas Lake (Pitillas)	42º24'37"	1º35'34"	30TXM19	2010	1 specimen
La Estanca (Corella)	42º07'22"	1º46'12"	30TXM06	2010	1 specimen

Table 2. Main biometric measures of the captured sliders. The weight is expressed in grams and straight carapace length (CL) in millimeters.

ID	Date of the capture	Subespecies	Sex	Weight	CL
1	06/24/2008	*T.s.elegans*	M	271	122.01
2	06/24/2008	*T.s.scripta*	F	192	105.53
3	06/30/2008	*T.s.elegans*	F	1653	228.52
4	06/30/2008	*T.s.elegans*	F	1439	216.43
5	07/05/2008	*T.s.elegans*	F	1706	230.97
6	08/05/2008	*T.s.elegans*	F	1838	249.23
7	08/20/2008	*T.s.elegans* × *T.s.scripta*	M	372	134.85

Figure 1. Aranzadi Turtle Trap. Left: trap before being placed on the river. Right: a turtle *Trachemys scripta elegans* captured in the trap (Photograph: Aitor Valdeón).

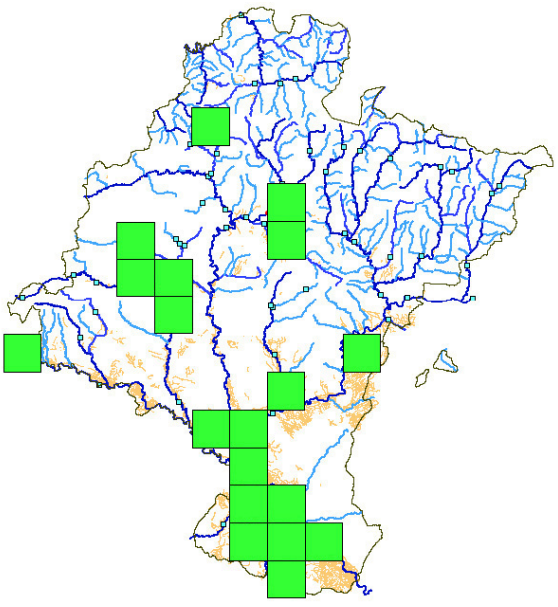

Figure 2. Map of *Trachemys scripta* records in the natural environment of Navarre. 10×10 Km UTM grids (datum ED50).

A total of 10 *Trachemys scripta*, belonging to the subspecies *Trachemys scripta elegans* (Wied-Neuwied, 1839), *Trachemys scripta scripta* (Schoepff, 1792) and one hybrid of these two subspecies were detected. The ATT captured 7 turtles (Table 2), representing 70% of the total capture with both sexes living in the same area.

Discussion

The species occurs either in areas of touristic interest or sport fishing (Pulguer pond, reservoir of Reeds, Soto Sardilla, Morea pond, pond in Fustiñana, Pitillas Lake) or with significant human population centers (Pamplona, Tudela, Estella, Logroño). The only exception is the specimen located in the Aragón River, near the village of Gallipienzo, with a population of just over one hundred people.

In Pamplona there were males and females of this invasive species living in the same area, like in other sites of Castilla y León (Alarcos et al. 2010). This will be a problem if the pond sliders manage to reproduce.

The ATT trap was very effective for the capture of *Trachemys scripta* in basking areas previously chosen by the sliders, even in river stretches. By contrast, the fish baited trap and the basking trap with manual handling showed ineffective results in this area; this is believed to be because in the former case sliders avoid entering these traps and in the latter case the trigger mechanism gives the turtle time to

escape. Another advantage of the ATT with respect to conventional traps is that its weight and volume makes it difficult to manage, reducing the risk of theft when used in dense human urban cores.

Natural cork proved to be a very attractive basking substrate for turtles, as already described by the Biological Station of Doñana and Doñana National Park researchers (Pérez-Santigosa et al. 2006).

Acknowledgements

We like to thank the Pamplona City Council, who funded the removal of the non-native pond sliders and especially to José Fermin Costero who enthusiastically collaborated in this work and all who contributed to this research (Lorea Gardeazabal, Txema Vadillo, Eneko Arrondo, José Ardaiz, Antonio Vilches, Javier Erdociain, the Sociedad de Cazadores y Pescadores de Estella, fishers from Tudela and forest rangers from Estella and Tudela). Also thanks to the Habitat Section of the Government of Navarre which processed the permits for the turtles' management; Andrea Pino and María Díez-León who translated this document; Rafael Miranda who organized the symposium on invasive freshwater species of the Iberian Peninsula and has arranged this special issue of *Aquatic Invasions*.

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