

Registered high mortality of allochthon Red-eared Sliders (*Trachemys scripta elegans*) in an artificial pond in Sofia, Bulgaria

Registrirana visoka smrtnost alohtone crvenouhe kornjače (*Trachemys scripta elegans*) u umjetnom jezeru u Sofiji, Bugarska

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Abstract

I report of finding six adult Red-eared sliders dead in an artificial pond in a park in Sofia, Bulgaria and stipulate on potential causes. I compare this case to similar occurrences in Bulgaria and elsewhere. Briefly, I discuss the potential issues from the presence of this non-native turtle, especially in small, isolated ponds. My aim is to draw attention of researchers to this unexplained mortality, encourage them to report similar observations and work towards finding the exact cause.

Key words: Bulgaria, red-eared slider, high mortality

Sažetak

U ovom radu prikazujem nalaz šest uginulih odraslih jedinki crvenouhe kornjače u umjetnom jezeru u gradskom parku u Sofiji, Bugarska, te diskutiram o potencijalnim uzrocima. Ovo opažanje uspoređeno je i sa drugim sličnim zabilježenim smrtnostima u Bugarskoj i drugdje. Ukratko diskutiram i druge potencijalne probleme uzrokovane širenjem ove strane invazivne vrste, posebice u malim izoliranim jezerima i lokvama. Cilj ovog rada je da se privuče pozornost drugih istraživača prema ovakvim neobjašnjenim povećanim smrtnostima, da ih se ohrabri da takve slučajeve objavljuju, te da multidisciplinarnim istraživanjima pokuša objasniti o čemu se točno radi.

Ključne riječi: Bugarska, crvenouha kornjača, visoka stopa smrtnosti

Information for aggregations of the allochthon species Red-eared slider *Trachemys scripta elegans* in urban parks and park-like areas closely situated to cities have been previously reported (e.g. by Philippen (1982), Kordges (1990), and Thiesmeier & Kordges (1990, 1991) for Germany). By 2005, unpublished information on the presence of this non-native species were obtained from most parts of Bulgaria, but an official study on

the problem or scientific publications were lacking. Later, in two monographs the first published scientific reports on the species appeared, describing it as widely distributed in different water bodies throughout the whole country, with only a general map of the distribution was presented (besides a single location, the “Arboretum”) (Stojanov et al. 2011; Tzankov et al. 2014). The most up to date review for the country is presented by Tzankov et al.

(2015). In the beginning of May 2005, I visited one of the major public parks in Sofia, Bulgaria, the South Park. Within the park, a number of artificial waterbodies (ponds) are situated, inhabited by native amphibians and reptiles: Marsh frog *Pelophylax ridibundus*; Common toad *Bufo bufo*; Green toad *Bufo viridis*; Agile frog *Rana dalmatina*; Common tree frog *Hyla arborea*; Southern (Balkan) crested newt *Triturus ivanbureschi*; Smooth newt *Lissotriton vulgaris*; Grass snake *Natrix natrix*; Dice snake *N. tessellata* and European pond turtle *Emys orbicularis*. Prior to 2005, within some of the water bodies a large number of individuals of the non-native Red-eared slider *Trachemys scripta elegans* were registered (author's personal observations).

During a survey of the first large pond in the central part of the South Park (N42.668160°; E23.307211°; Fig. 1) on May 1st 2005, on the shore and in the water I found dead six large, adult Red-eared sliders (Fig. 2). The individuals had no visible external injuries, which speaks against the assumption of violent killing. I did not register dead *E. orbicularis*, a native species commonly observed there. I am not certain what killed them exactly because no additional tests were performed on the carcasses. The most probable explanation is the unusually cold weather during the previous winter months, when the majority of the water column of the

marsh was frozen, which probably led to shortage of oxygen in the water. The lack of a deeper layer of mud for the sliders to bury in and to avoid freezing also likely exacerbated the unfavorable conditions. My stipulation is supported by the fact that for the period November–March the mean air temperature between 2000–2007 varied from 1.3–4.8°C, with 2005 experiencing one of the lowest, e.g. 1.6°C. Thus, I suppose that the individuals I found dead were released shortly prior to the beginning of the unfavorable weather condition and had no time to adapt and find suitable locations for overwintering.



Figure 1. South park, Sofia – large, central pond, location of the dead Red-eared sliders (Photo: Axel Dehne).

Slika 1. Južni park, Sofija – veliko, centralno jezero, mjesto pronalaska mrtvih crvenouhkih kornjača (Slika: Axel Dehne).

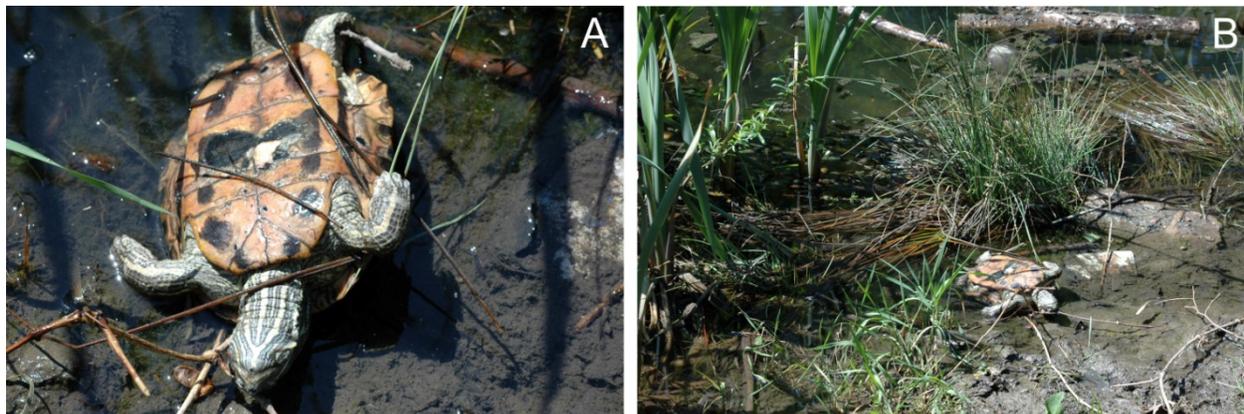


Figure 2. a) Dead adult Red-eared slider, *Trachemys scripta elegans* (Photo: Axel Dehne), b) Same dead individual – the solid bottom with limited amount of mud in the coastal, dry part of the pond (Photo: Axel Dehne).

Slika 2. a) Uginula odrasla jedinka crvenouhe kornjače, *Trachemys scripta elegans*, (Slika: Axel Dehne), b) Ista uginula jedinka – kompaktno dno sa ograničenom količinom mulja u priobalnom, suhom djelu jezera (Slika: Axel Dehne).



Figure 3. Live turtles, photographed on the same date at the same pond, that have presumably overwintered successfully (Photo: Axel Dehne).

Slika 3. Žive kornjače, fotografirane na isti datum u istom jezeru, koje su uspješno preživjele hibernaciju (Slika: Axel Dehne).

Despite the presence of the dead individuals, I also recorded live specimens (Fig. 3), which strongly suggests that the species is able to survive such extreme situations, especially when the numbers

in a location are high enough. A confirmation, that Red-eared slider can endure very low temperatures during hibernation can be found by its continuous presence at an altitude of over 1,200 meters above sea level in the "Arboretum" at the nearby Vitosha Mountain (N42.627835°; E22.229138°), where its successful overwintering has been confirmed (Stojanov et al. 2011; Tzankov et al. 2014). Similar information about high mortality during especially severe winters was provided by Bringsøe (2001): in 1964 in a shallow, forest pond in Jonstrup Vang, Ballerup (near Copenhagen) 16 Red-eared slider were released; dead individuals were then found on the surface during the first winter, but because individuals were observed in subsequent years, it is believed some survived. Bringsøe (2001) also states that sliders usually survive with minimal losses in waterbodies more than 2 m deep; similarly to my observations, he stipulates that the lack of oxygen is what likely causes such die-offs.

No specific data exist on the actual number of released Red-eared sliders in the area of South Park,

but visual observations and expert evaluation suggest tens to hundreds of animals. This assumption is indirectly supported by the fact that the park facility and the discussed pond are located within the capital city of Sofia and human attendance for recreation there is very high. The proximity, the size of the water areas and the easy access suggest that this location will be preferred as an opportunity for the release of unwanted turtles compared to other alternatives outside the city (likely associated with elevated transport costs and invested time). Another understandable mistake of "nature lovers" is their association of habitats within a city park with wild nature, which is the natural environment of the home grown, exotic species.

I observed a similar die-off in the spring of 2012 in a much larger body of water – the Choklyovo swamp (N42.398094°, E22.825982°), with a mass extinction of fish after extremely cold winters and deep freezing of the water column in the basin (Fig. 4). Such incidents with fish have been previously reported, including in relation to Red-eared sliders (Bringsøe 2001).

The waterbody is inhabited by *E. orbicularis* as well; I found no dead turtles. The better conditions for overwintering for turtles (e.g. larger area and depth of the lake, as well as deeper layers of silt) are probable conditions that had allowed the European pond turtles observed there to overcome (supposedly without losses) the adverse climatic conditions of the particular year.



Figure 4. Pike (*Esox lucius*), suffocated at the shore of Choklyovo swamp, 2012. (Photo: Andrey Stoyanov).

Slika 4. Štuka (*Esox lucius*), uginula od gušenja u močvari Choklyovo 2012. godine (Slika: Andrey Stoyanov)

Usually the main negative impact of the invasive *T. s. elegans* that is discussed is mostly related to its role as a direct competitor for resources to the indigenous species of aquatic turtles (habitat, feeding grounds, etc.). However, observations in Germany demonstrate that the Red-eared slider feeds on species such as the Marsh frog (*P. ridibundus*) and various species of newt (Klewen 1988, Klewen & Müller 1988). A justified assumption is that possible victims can be the juveniles of the two native species of water snakes, based on findings of predation of juvenile animal of the genus *Nerodia* in North America (Goodman & Stewart 1998). These concerns should significantly expand the potentially harmful influence of this non-native predator on the local herpetofauna and biodiversity. This should be considered especially for small, isolated waterbodies, as is the present case. In addition, serious

consideration deserve individual messages for possible cases of successful breeding in more northern latitudes than Bulgaria (Gemel et al. 2005; Pieh & Laufer 2006), which suggest that future issues with this species will exacerbate. Due to difficulties with the artificial removal from the wild of the Red-eared slider, natural limiting factors such as extremely cold weather might be an important, auxiliary means for limiting their distribution in non-native habitats.

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