

Oradea Zoo – a safe haven for urban *Bufo viridis* populations from Oradea (Romania)?

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Abstract: *Bufo viridis* is known to live in Oradea, in urban habitats. Since the modernization of the Oradea Zoo, a population has established here and is breeding in the water pools of various animal's enclosures. It remains to be seen if these permanent water pools are a safe-haven for the species' urban populations.

Key words: *Bufo viridis*, Oradea, zoo, urban population, urban habitat

Bufo viridis Laurenti, 1768 is a widely distributed species (see in: Stöck et al 2006), which extends from eastern France and Italy to central Asia, being also present in northern Africa and in several Mediterranean islands (see in: Bologna & Giacoma 2006). In Romania it is one of the most common species of amphibians (Cogalniceanu et al 2000) and it can also be encountered in urban settlements (e.g. Covaciu-Marcov et al 2000, 2006; Strugariu et al 2007; Kovacs & Sas 2009, 2010; Valkanova et al 2009). It is a quick colonizer of pioneer habitats (Indermaur et al. 2009) and thus can be met in a wide variety of habitats.

The Oradea Zoo was first established in 1960, but in 2010 it was shut down due to improper conditions for the animals (Address 17631). Since then, it was part of an expansion and modernization project, that saw its surface double to 7 ha (project "The improvement, expansion and modernizing of the Oradea Zoo"). Now all the animal enclosures are brand new and, since the zoo was granted license, it was re-opened to public on May 27th 2013. Currently, all the major animal enclosures have a water pool for the animal living there, which is regularly emptied and cleaned. The sizes of these pools vary from 5m² (in the jaguar enclosure) to 50m² (in the bear enclosure) and their depth generally exceeds 50cm.

At only one year after finishing the construction works at the Oradea Zoo, numerous *Bufo viridis* specimens were observed mating in these fore-mentioned water pools. The green toads were observed for the first time at the end of March 2014, with pairs in amplexus (Fig. 1).



Figure 1. *Bufo viridis* amplexus from one of the pools from Oradea Zoo.



Figure 2. *Bufo viridis* tadpoles from one of the pools from Oradea Zoo.

As spring progressed, we were able to see more and more pairs and individuals gathering around the water bodies and laying eggs. Such was the case of the pools from the lions, tiger, bears, brown capuchins, and grivet monkey's enclosures. Later in the year, numerous tadpoles were present in the water, while afterwards many younglings started migrating across the entire surface of the zoo (Fig. 2, 3, 4).



Figure 3. *Bufo viridis* juvenile



Figure 4. *Bufo viridis* juveniles on the banks of a water pool

The green toads were most likely present at Oradea Zoo even before its modernization, but no one has indicated their presence. In the vicinity of the Oradea Zoo, however, within the University of Oradea campus, the presence of this species was acknowledged some time ago (Covaciu-Marcov et al. 2005).

Regardless, now it is certain that they have found suitable habitat and they are here to stay. As the water pools are constantly refilled, their main “worry” of the habitat drying out during the summer months is forgotten and their spawn can freely grow and develop. Food is also probably plentiful, as many insects also use the water bodies to deposit their eggs and as hatching place for their larvae. Furthermore, the lack of natural predators here allows more younglings to develop and adults to roam free. At night, the walkways are lit by light poles – another aspect that works in the favor of the green toads as they are known to gather around light sources for feeding (Dimancea et al 2010).

Despite the apparent wellbeing of the *Bufo viridis* population, there are still various mortality causes, some probably typical only for Oradea zoo. If in other cases, the highest mortality rate for an urban green toad population is that from road killings followed by killing by humans (Valkanova et al 2009), here we noted several individuals killed when trying to cross the electric fence of certain enclosures (Fig. 5). Road kills were also noted, on the back road used by the staff and by the supply transporters. Road kills in general are a known declining factor for many amphibians from other areas of western Romania as well (see in: Bogdan et al 2013). A further study is necessary in order to say which is more harmful for the population.



Figure 5. *Bufo viridis* specimen killed by the electrical fence from an enclosure.

The above-mentioned aspect is important as *Bufo viridis* is an amphibian species protected by Romanian law under the OUG 57/2007, considered a species of community interest, which necessitates strict protection, especially since it was pointed out, the most human activities threaten the local amphibian fauna (Nicoara & Szekely 2004). So is the Oradea Zoo important for the green toad's conservation? Yes, as aside from shelter, it also offers a year-round reproduction habitat, a fact that sets this location apart from other urban habitats.

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- *** Sub-Project: The improvement, expansion and modernizing of the Oradea Zoo; as part of the project “Realizing and implementing investment projects in order to reach the necessary standards to authorize zoos” of the Environment Ministry and conducted locally by the Oradea Municipality (2008).
- *** Address 17631 registered on 10.12.2008 – in which the Oradea City Hall is notified by the Environment Protection Agency that the Oradea Zoo has lost its authorisation due to improper conditions for the animals.