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Short note

Frogs at the Sea – Unusual Breeding Site of Pelophylax ridibundus (Pallas, 1771) (Amphibia: Anura) at the Black Sea Coast (Bulgaria)

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Abstract. Unusual breeding site of the Marsh frog (*Pelophylax ridibundus*) is reported from Ropotamo Reserve in the south Black Sea Coast. Few adult and subadult individuals, producing mating calls, as well as eggs and newly hatched larvae were observed in brackish standing water pools on a rocky shore.

Key words: Marsh frog, water salinity, breeding, Black Sea, Ropotamo Reserve, Bulgaria.

Anurans have limited ability to handle increased salinity of the water basins they inhabit, but sometimes aquatic frogs of the *Pelophylax* genus can be registered in brackish water bodies (Litvinchuk et al., 2015). Such observations are recorded from Bulgarian Black Sea coast for *P. esculentus* complex by Natchev et al. (2011) at Shablenska Tuzla Lagoon; Natchev et al. (2016) at the regions of Shabla and Ezeretz Lakes; the sand beach in the region of Durankulak Lake; The Bolata Bay and the sand beach in the region of Shablenska Tuzla Lagoon. Covaciu-Marcov et al. (2006) report occurrence of *P. ridibundus* in brackish waters in Romania. Litvinchuk et al. (2015) report several observations *P. esculentus* complex in brackish water basins from Kaliningrad Region in Russia.

Aquatic frogs of the *P. esculentus* complex are adapted to handle increased sodium concentrations and to withstand the osmotic gradient when inhabiting brackish sea waters (Kuzmin, 1999). According to the same author *P. ridibundus* is resistant to high water salinity from 0.9 to 8.3‰.

It is relatively rare occasion to observe breeding of aquatic frogs in brackish waters. On 25.06.2020 unusual breeding site of *Pelophylax ridibundus* was discovered. The frogs were found in three standing water basins on the rocks, just few meters away from the sea in Ropotamo Reserve (Bulgaria), at approximate coordinates N42°20.114 E027°47.052 (WGS 84 datum), 1-2 m a.s.l. (Fig. 1 & 3). Few subadult and adult individuals, producing mating calls, were observed in the pools (Fig. 2 & 4), as well as eggs and newly hatched larvae in one of them. Unfortunately, the salinity or the conductivity of the water could not be measured, but the presence of *Enteromorpha (Ulva) intestinalis* and *Cladophora sp.* algae and the marine isopod *Idotea baltica* was det-

Fig. 1. Small stagnant water basin with brackish water, few meters away from the sea, where eggs, larvae and adult individuals of *P. ridibundus* were recorded. Photo: I. Mollov.

Fig. 2. Subadult *P. ridibundus*, surrounded with *Entheromorpha (Ulva) intestinalis* algae. Photo: I. Mollov.

Fig. 3. Another standing water basin, 2 meters away from the first one, where adult specimens of *P. ridibundus* where observed. Photo: I. Mollov.

Fig. 4. Close-up of and adult *P. ridibundus* from one of the pools. Photo: I. Mollov.

ected in the pools. Based on that, we assume the waters were brackish. They are probably supplied with water by the sea waves crushing into the rocky shore (this could probably also explain the presence of *I. baltica*) and of course rain water.

Kuzmin (1999) reported a reproduction of *P. ridibundus* in marine water with low salinity, at 0.5 to 1 m from the shore for a population inhabiting the Apsheron Peninsula of the Caspian Sea. On the base of the results from the five year monitoring study Natchev et al. (2016) report that in four studied localities in the NE Black Sea coast line in Bulgaria, the green frogs from the *P. esculents* complex have developed adaptation to live and breed in mixoligohaline waters.

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