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SPATIAL DISTRIBUTION OF THE OTTER POPULATION IN ROSCI 0065 PROTECTED AREA

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Abstract
In this paper were examined the distribution of the otter population on the right bank of the Danube River, between the settlements of Grindu (Cotu Pisicii) and Tulcea. The present work aims to present a case study, carried out between October 2019 and March 2022 in the floodplain (dyke - bank) of the Danube River (between the village of Grindu or Cotu Pisicii and the city of Tulcea) and the aquatic complex Somova - Parcheș. The investigated area presents two distinct types of habitat: the maritime Danube and the dike - bank flood zone and the Somova - Parcheș aquatic complex. Otter signs of presence (footprints, spraints anal jellies, prey) were recorded on 281 transects of 1200 m length using standard otter survey method. The study presents the distribution of signs of presence compared to the two types of habitats, but also aspects regarding the preference for the type of substrate used for defecation and the spatial distribution of the otter population.

Keywords: Danube River, Eurasian otter, spraint.

1. INTRODUCTION

The Eurasian otter, also called otter or river dog, is a carnivorous species that belongs to the Mustelidae family (Carnivora: *Mustelidae*), being the largest semi-aquatic wild mammal in Romania. The Eurasian otter lives in a wide variety of aquatic habitats, including mountain and lowland lakes, rivers, streams, swamps, swamp forests and coastal areas, regardless of their size, origin or latitude. (Conroy and Chanin, 2002). It is an opportunistic predator, its feeding behavior being dependent on prey availability and abundance (Erlinge, 1967; Erlinge and Jensen, 1981; Gormally and Fairley, 1982; Kruuk and Moorhouse, 1990; Breathnach and Fairley, 1993; Carss et al., 1998). As the population numbers of this species have undergone important changes over time, the status of these carnivores is of increasing concern to scientists and conservationists which makes the need for data on distribution, abundance and habitat use increasingly pressing. Determining the distribution and abundance of otter populations is of key importance for assessing population status, and for designing and implementing management protocols (Guter et al., 2008).

Estimating the size of a wild population is a very important ecological parameter but difficult to estimate. That is why much easier to estimate is the abundance or density, indicators that are used more. Estimating the size of the Eurasian otter populations is all the more difficult since the otters' activity is predominantly crepuscular and nocturnal. Since the 1980s, there have been many

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approaches to estimating their abundance as well as establishing relationships between the number of spraints and the number of otters. In 2001, Ruiz-Olmo et al., show that there are high correlations between the presence of spraints and the presence of otters, making a quantitative comparison between the presence of otters using radio telemetry and traditional surveys (ie footprints on the ground, spraints, visual censuses).
More recent studies using the genetic approach in assessing the size of otter populations show that there is a high correlation (r^2=72) between the number of genotyped individuals and spraints densities (Lanszki et al., 2008). Therefore, estimates of abundance and density by indirect methods (such as the use of presence signs) are widely used methods although they do not show great accuracy. The use of trace abundance is an indirect method still widely used to estimate the density of otter populations, the results of which are highly dependent on weather conditions. (Mercier and Fried, 2004; Ottino and Giller, 2004; Sulkava, 2007).
In this study we aimed to present aspects regarding the abundance of presence signs, the defecation preference for a certain type of substrate and the spatial distribution of the otter population.

2. MATERIALS AND METHODS

Study area

The study area was represented by the Danube River and its floodplain from Grindu village to Tulcea city and the Somova - Parcheș aquatic complex. The studied area is part of the ROSCI 0065 protected area Site of Community Importance. Also, ROSCI 0065 is an integral part of the Danube Delta Biosphere Reservation. The study took place between October 2019 and April 2022.

Figure 1. Area of study

The site of community importance Danube Delta ROSCI0065, with a total area of 453645.5 ha, (49.8% steppe bioregion and 50.2% pontic bioregion) was designated for the conservation of species/habitats of community interest. It is located between longitude 29.198361 and latitude: 45.052417. The studied area (Grindu village – Tulcea city) is considered the predeltaic area. It is entirely located in the steppe bioregion on the right bank of the Danube.
Due to its geographical position at 45^0 north latitude, near the Black Sea and the diversity of the landscape, with the predominance of the amphibious environment, the climate is temperate -

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continental, with Pontic influences. Temperature between 11 and 11.4^{0}C average annual temperature (-1^{0}C and 1.5^{0}C in January, 21^0 and 22^{0}C in July), precipitation between 400 - 450 mm/year.
The studied area consists of two types of ecosystems with distinct characteristics: the maritime Danube from Grindu village to Tulcea city (Grindu - Isaccea and between Pătlăgeanca and Tulcea) and the second type of ecosystem represented by the Somova - Parcheș aquatic complex.
The Danube between Grindu and Tulcea is an aquatic ecosystem of flowing water, with an approximate surface of 1500 ha (1300 ha Grindu - Isaccea and ~ 200 ha from Pătlăgeanca to Tulcea). The vegetation is represented by willow which occupy the lower parts and poplars or mixtures of poplars and willows on the higher parts. The natural vegetation is composed by broadleaf forest dominated mainly by *Salix alba, Salix fragilis, Populus alba, Populus canescens* and the most extensive euro - american poplar, also *Fraxinus angustifolia, Fraxinus pallisae,* mixed willow forests.
The Somova - Parcheş aquatic complex is a stagnant water ecosystem; total area of the complex is 9170 ha and its landscape mainly consisting of floodplain lakes: Rotundu, Gorgonel, Parcheș, Câșla. It is considered a mini-delta that conserves a great biodiversity of plant and animal species.
The vegetation is characteristic of stagnant and wetland ecosystems: submerged and floating vegetation: *Myriophylum, Trapa natans, Sagittaria sagittifolia, Salvinia natans, Spirogyra,* ș.a. The emerged vegetation consisting predominantly of *Phragmites communis Typha latifolia, Typha angustifolia, Carex dioica, Carex stricta, Scirpus radicans, Scirpus lacustris, Iris pseudocorus*, etc

Data collection and analysis
The study method used followed the guidelines of the standard method recommended by the IUCN/SSC Otter Specialist Group (Reuther et al., 2000). The surface of the studied area was divided into units of sample or sample markets (5 x 5 km). Each survey site was investigated for a maximum distance of 1200 m for signs of otters exclusively. Any signs of the presence of the species (faeces, spraints, anal jellies, footprints, prey) have been recorded in a field sheet.

Figure 2. Sample markets on the study area

The field sheet also recorded information on the number and degree of freshness of droppings and feces, the type of substrate on which the mark was found (vegetation type, sand, soil, stone) and the distance to the water surface. The coordinates were recorded for each identified presence trace.

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3. RESULTS AND DISCUSSIONS

During the two years of the study, 281 transects were made and monitored. Signs of otter presence were found in 88 of these (32% from the transects carried out in the studied area were positive.). The total length investigated was 115 km (51 km in the Danube flood zone and 64 km in the Somova – Parcheș aquatic complex). The abundance of presence signs identified in the study area shows us an intense activity of this species. During the entire period of the study, 737 signs of presence were recorded and 3 specimens of otter were observed (two dead adult specimen, found thrown on the waterside, we assume that it was found drowned in the fishermen's gillnets, and a live baby, also found in the fishermen's gillnets) .

The most common signs were spraints (found either singly or in latrines – 94.57 %) followed by footprints (2.85 %) and anal jellies (2.035 %) and 0.54 % trace of body (Figure 3).

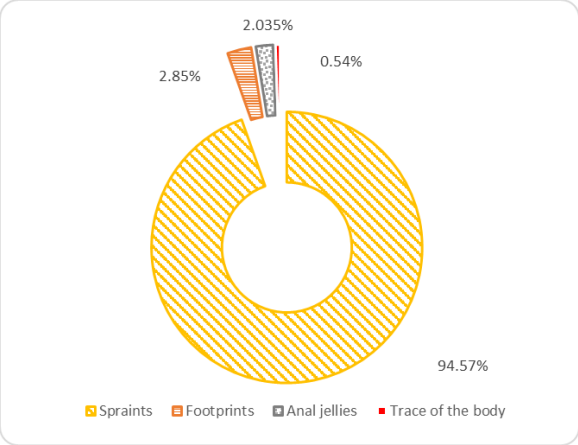

Figure 3. Abundance of presence signs

During the field work were collected also information about otter preference for choosing defecation sites, and registereded the type of the substrate on which was deposited the spraint The preferred substrate for defecation was wood substrate (stumps, tree roots) (72.17%), pieces of rock (9.47%) and the least on the soil (18.36%) (figure 4).

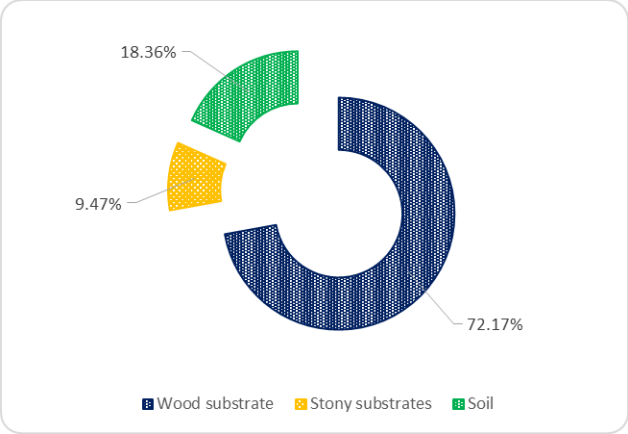

Figure 4. Distribution of spraints by substrate types

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66.57% of signs of otter presence were found on the banks of the Danube and in its flood zone and 33.43% in the Somova - Parcheș the lacustrine complex. Figure 5 shows the spatial distribution of signs of presence in the studied area.

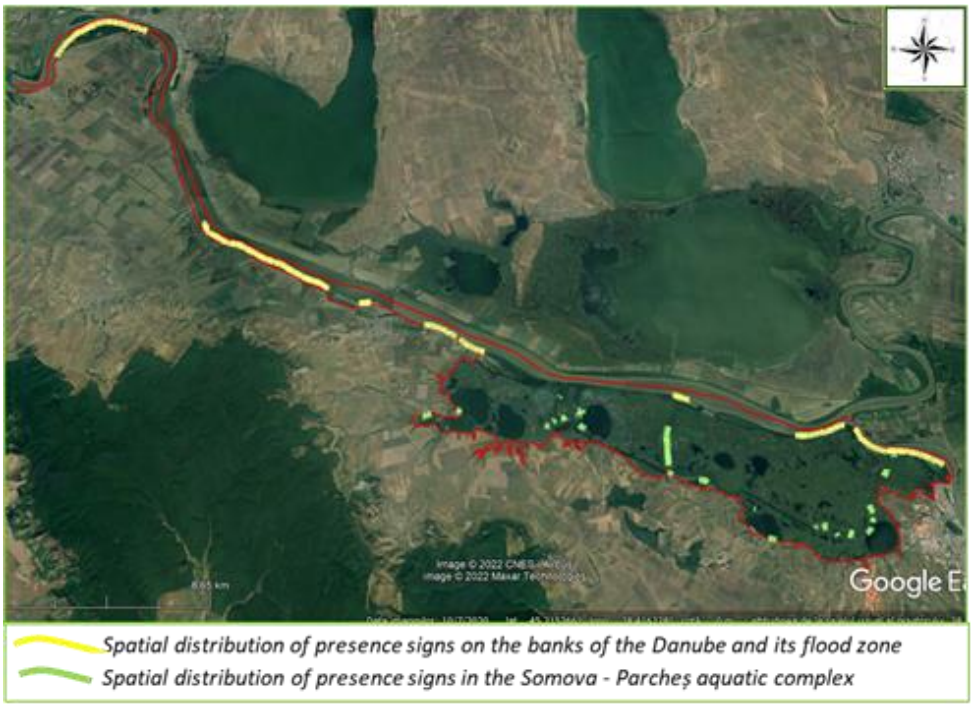

Figure 5. Spatial distribution of presence signs

4. CONCLUSIONS

This study was limited to the exposition of three aspects regarding the otter population from the Danube River and its floodplain: abundance of signs of presence, the preference of defecation for the type of substrate and spatial distribution. Because the activity of otters is predominantly twilight and nocturnal, most of the studies that have been carried out on otter in Europe were based on presence signs, which are considered indicators of the otter presence (Kruuk, 2006; Jefferies et al., 1986; Chanin, 2003).

In this study the abundance of signs of presence indicates an intense activity of this species in the researched area and may be an indicator of the size of the otter population. The most common signs were spraints or excrements (found either singly or in latrines) ~ 95%, followed by footprints and anal jellies. Habitat use in terms of defecation is known from the literature to be influenced by environmental factors such as fish stocking densities, water levels, and coastal vegetation (Kemenes and Demeter, 1995; Mason and Macdonald, 1986). More than 70% of the presence signs identified were on woody substrate and the fewest signs were identified on stony substrate.

The area with the most abundant signs of presence is represented by the banks of the Danube and its floodplain near the city of Tulcea, where there is an area of more compact vegetation and mixed willow and poplar forests.

For otter populations, wooded or covered areas with mixed vegetation represent optimal places for playing, hiding, marking territorial boundaries.

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In the Somova - Parcheș aquatic complex, the areas with large agglomerations of signs were associated with the presence of fishing gear, thus highlighting the developed opportunism of this species in terms of food procurement.
The studied area can be considered a good conservation area for this species because its natural characteristics provide optimal habitats for feeding, hiding places (burrows), breeding and growing of cubs/juveniles.

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