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COMPARATIVE STUDIES ON HERPETOFAUNA BIODIVERSITY OF WETLANDS AROUND BUCHAREST

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Key words: *herpetological fauna, wetlands, Snagov*

INTRODUCTION

Aquatic and amphibious habitats in Snagov lake area have been studied relatively little, both in terms of fauna, flora and ecology. In this paper we present the current situation of the herpetological fauna in the area of interests compared with the reference data. We are signaling even some species that have not been cited until now.

MATERIALS AND METHODS

For inventory of herpetology fauna species we used the following methods: transects method, fixed point observation method, photography, filming ethological and ecological sequences. Taxonomic and biometric data were noted in standard field sheets.

Transects method consists in establishing a test surface and then using the previously set reference points, crossing area along the lines of equal length, record or capture species observed in the case in which there can be determined visually. In most cases this method is supplemented with specific habitats more searching to get the best detection rates and a truer picture on all the existing fauna. In this case, while driving along the transects is given more time to investigate the most promising habitats over those considered less favorable.

Auditive transects represent a variation of the transect method, that requires a very good knowledge of the specific sounds of amphibians. In this case the polygon is traversed and amphibian species heard are noted during the movement. The advantage of the method is that it can be used at night.

Stations inventory: For mapping fauna of amphibians and reptiles have been used 16 stations.

Covered habitats: Inventory stations were set to cover the entire range of existing habitats in the Lake Snagov, to get a more realistic image of the fauna here. However, habitats that are generally known to harbor a higher variety of species have benefited from several stations and a greater number of visits.

Given the short distance between forest and lake, in some places the forest edge extending to the lake, most stations were fixed in the bank (riparian habitats, aquatic habitats) and open forest habitats, because here are the various environmental conditions (fringe forest, ponds with aquatic vegetation, increased humidity, thick cover vegetation).

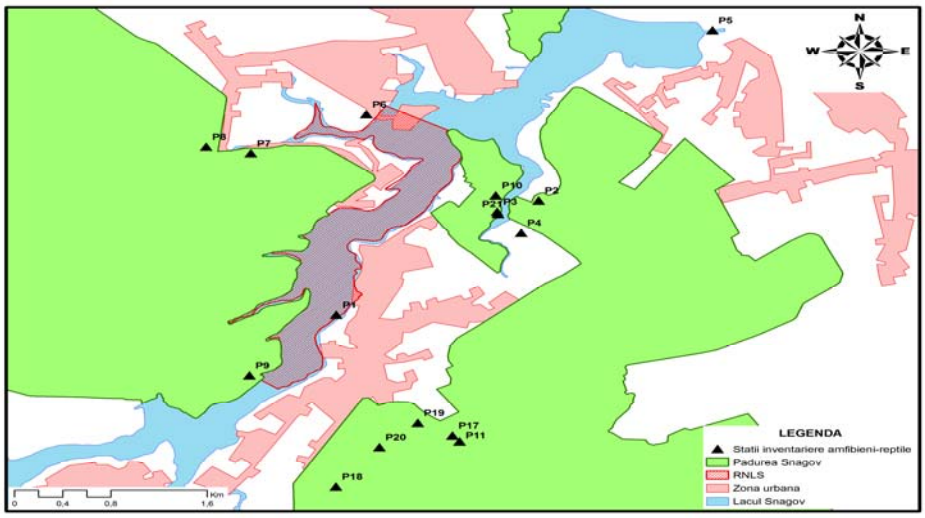

Figure 1. Spatial distribution of inventory stations for amphibians and reptiles in the Snagov Lake area

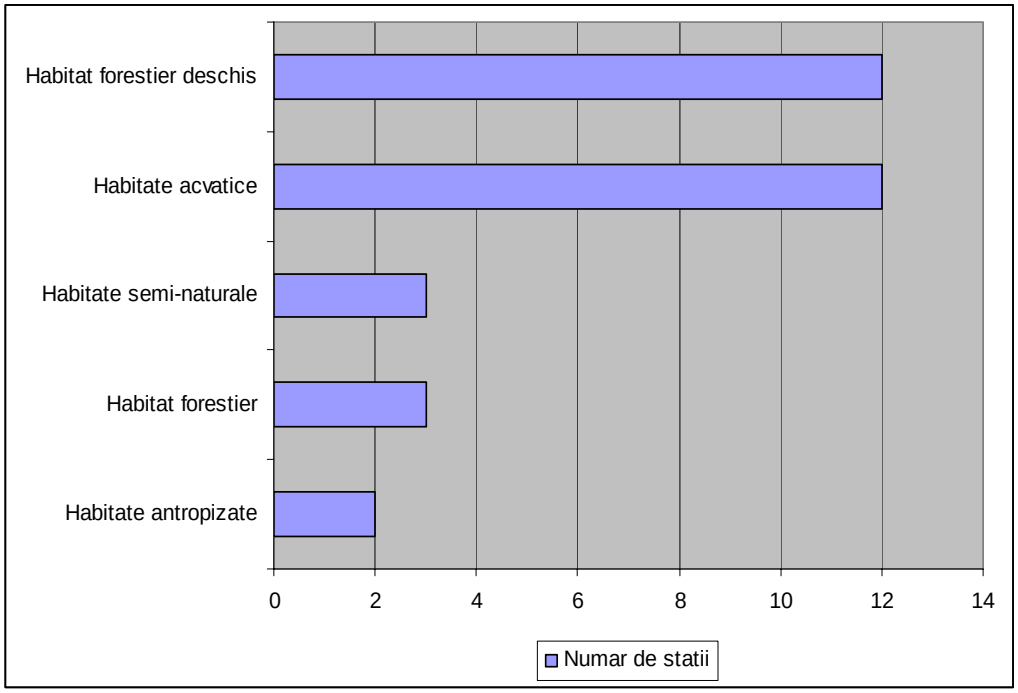

Figure 2. Habitat types and the number of fixed stations in each habitat type

RESULTS AND DISCUSSIONS

During field trips to study the herpetofauna made during 2011 were identified 17 species of amphibians and reptiles, respectively: *Bombina Bombina, Bufo bufo, Lissotriton vulgaris, Triturus cristatus, Hyla arborea, Pelophylax kl. esculentus, Pelophylax ridibundus, dalmatina Rana, Rana temporaria, P. fuscus, Emys orbicularis, Lacerta agilis, Lacerta viridis, Anguis fragilis, Natrix natrix, Natrix tessellata and Zamenis longissimus*. Part of fauna species listed in the reference data were not identified in ANPL Snagov, but were observed some new species previously unknown. It was not reconfirmed the presence of three species in the area but were reported 11 species new to the area of interest, species that were not known before living in the perimeter of Lake Snagov.

The most common species is the Lake Snagov area is the marsh frog (Pelophylax ridibundus), 46% of individuals. Also common species such as Bombina bombina, Lacerta viridis and Rana dalmatina in the area are well represented.

Most diverse herpetofauna stations were P9, P11, P18 and P19, respectively skirts and meadows and clearings in the forest, but where there is a water source nearby. Autumn observations shows that these temporary pools in the forest are used as a part of hibernacule amphibians being found high concentrations of the species *Rana temporaria, Rana dalmatina* and *Pelophylax ridibundus* in these areas with decreasing temperatures.

To observe the degree of similarity in the habitats occupied by amphibians and reptiles species in the Snagov natural protected area was used a multivariate statistical analysis - HCA (Hierarchical agglomerative clustering), with Jaccard ecological index.

The results show that, Lacerta agilis, although sister taxon with Lacerta viridis, occupies only grassland habitats (Figure 5), while European green lizard with a higher waist has a higher success, for which occupies almost all available habitats. European pond turtle (Emys orbicularis), marsh frog (Pelophylax ridibundus) and dice snake (Natrix tessellata) are the only species that occupy fully herpetology fauna slick both the shore and offshore. Habitat preferences are resembling to the house snake (Natrix natrix), but it is present only in the shore, where it feeds on amphibians.

Forest frogs (Rana temporaria, Rana dalmatina) attending both massive forest and forest fringe in the Snagov area, unlike slow-worm (Anguis fragilis) and the Aesculapian snake (Zamenis longissimus) which, although present in the forest, preferred glades, clearings or skirt with ample sunshine.

Table 1. Species of amphibians and reptiles found in the Snagov natural protected area and stations where they were reported

Scientific name	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P17	P18	P19	P20	P21
Anguis fragilis	-	-	-	-	-	-	-	x	-	-	-	-	-	-	-	-
Anguis fragilis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bombina bombina	-	-	-	-	-	-	-	-	x	-	-	x	x	-	-	-
Bufo bufo	-	-	-	-	-	-	-	-	-	-	-	-	x	-	-	-
Emys orbicularis	-	-	-	-	-	-	x	-	-	-	-	-	-	-	-	-
Hyla arborea	-	-	-	-	-	-	-	x	-	-	x	-	-	x	-	x
Lacerta agilis	-	-	-	-	-	-	-	x	-	-	-	-	-	-	-	-
Lacerta viridis	-	-	x	x	-	-	x	x	x	-	x	-	-	-	x	-
Lissotriton vulgaris	-	-	-	-	-	-	-	-	-	-	-	x	x	x	-	-
Natrix natrix	-	-	-	-	-	-	-	-	x	-	x	-	-	x	-	-
Natrix tessellata	-	-	x	-	x	-	-	-	x	x	-	-	-	-	-	-
Pelobates fuscus	-	-	-	-	-	-	-	-	-	-	-	-	x	-	-	-
Pelophylax kl. esculentus	x	-	x	-	x	-	-	-	-	-	-	-	-	-	-	-
Pelophylax ridibundus	x	-	x	-	x	x	x	x	x	x	x	x	x	x	-	-
Rana dalmatina	-	x	-	x	-	-	-	-	x	-	x	x	x	x	-	-
Rana temporaria	-	-	-	-	-	-	-	-	-	-	x	-	-	-	-	-
Triturus cristatus	-	-	-	-	-	-	-	-	-	-	-	x	x	-	-	-
Zamenis longissimus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 2. Comparison between reference data about Snagov natural protected area species and observed field situation

No.	Species	Fuhn 1960	Fuhn & Vancea 1961	Current assessment
1	*Bombina bombina*	-	-	X
2	*Bufo bufo*	X	-	X
3	*Lissotriton vulgaris*	-	-	X
4	*Triturus cristatus*	-	-	X
5	*Hyla arborea*	X	-	X
6	*Pelophylax ridibundus*	X	-	X
7	*Pelophylax* kl. *esculentus*	-	-	X
8	*Rana dalmatina*	X	-	X
9	*Rana temporaria*	-	-	X
10	*Pelobates fuscus*	-	-	X
11	*Emys orbicularis*	-	-	X
12	*Ablepharus kitaibelli*	-	X	-
13	*Lacerta agilis*	-	-	X
14	*Lacerta viridis*	-	X	X
15	*Darevskia praticola*	-	X	-
16	*Anguis fragilis*	-	X	X
17	*Natrix natrix*	-	-	X
18	*Natrix tessellata*	-	-	X
19	*Coronella austriaca*	-	X	-
20	*Zamenis longissimus*	-	-	X

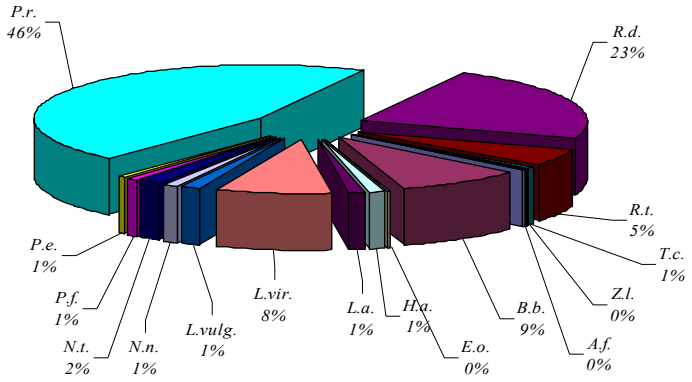

Figure 3. Number of individuals of each species observed and the percentage contribution to the composition of herpetofauna of the area (*P.r. – Pelophylax ridibundus, P.e. – Pelophylax* kl. *esculentus, P.f. – Pelobates fuscus, N.t. – Natrix tessellata, N.n. – Natrix natrix, L.vulg. – Lissotriton vulgaris, L.vir. – Lacerta viridis, L.a. – Lacerta agilis, H.a. – Hyla arborea, E.o. – Emys orbicularis, B.b. – Bombina bombina, A.f. – Anguis fragilis, Z.l. – Zamenis longissimus, T.c. – Triturus cristatus, R.t. – Rana temporaria, R.d. – Rana dalmatina*)

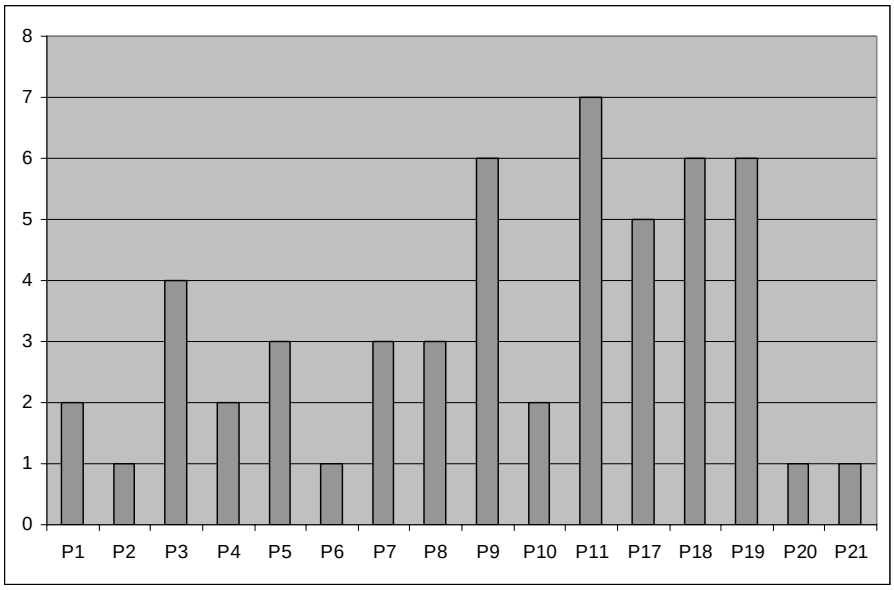

Figure 1. Species diversity of amphibians and reptiles in fixed sample stations

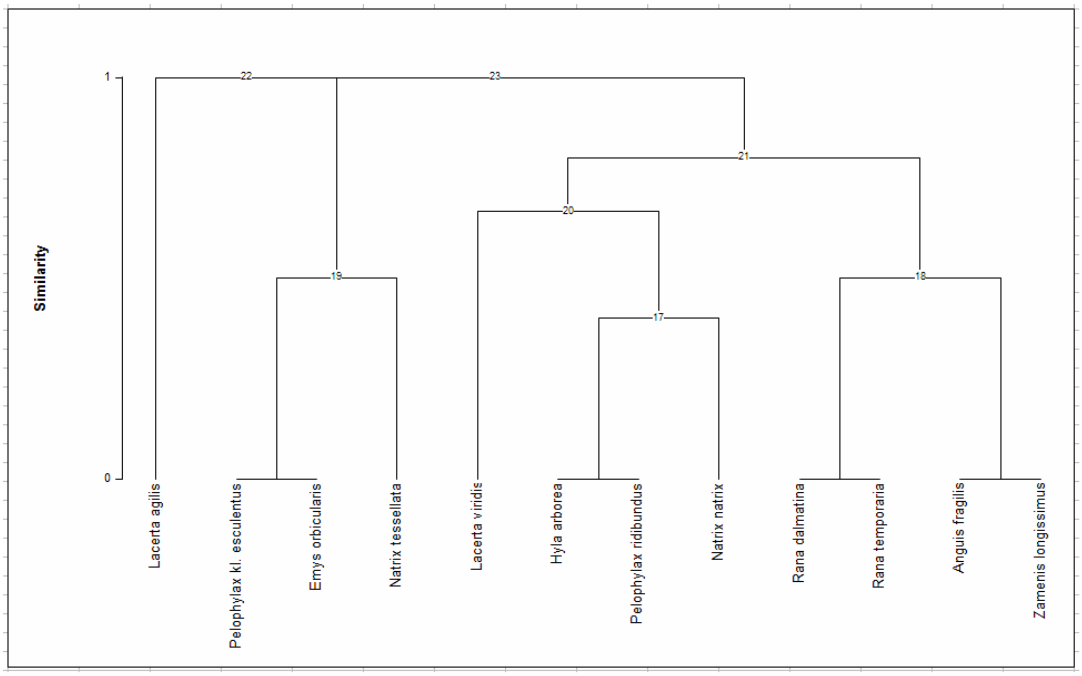

Figure 5. Similarity of habitat preferences reflected by AHC and Jaccard index

CONCLUSIONS

The majority of aquatic habitats, those of eco-tone and the surrounding forest, especially in the older stands, herpetology fauna is rich and well represented as number of individuals in all categories (larvae - tadpoles, juveniles, adults), while in young stands are found only the adult stages and in small numbers. As a general conclusion we observed a decrease in amphibians and reptiles populations in the Snagov lake area, although the number of recorded species increased.

As a result of lifestyle and adaptations for life on land and in water (breathing skin development through metamorphosis , passive diffusion of substances in the skin, oviposition in the aquatic environment), many species of amphibians are very sensitive to alterations habitat or environmental pollution. Also, since both amphibians and reptiles are forced to travel on the ground, no other way to look for other areas of feeding, breeding or hibernation , the existence or absence of natural vegetation curtains can be the difference between presence and absence of the respective species the

area. While lake frogs are common species and support better human presence species like *Bombina bombina* , *P. fuscus* or *Triturus cristatus* requires natural habitat with minimal anthropogenic intervention and with minimal pollution . Likewise, lake turtles are also dependent on keeping unaltered the side arms of the lake, and riparian habitats in which they lay eggs or moves to reach places of hibernation.

ABSTRACT

The study was carried out in 16 stations which were set to cover the entire range of existing habitats in the Lake Snagov, in 2011. The aim of the study was to assess the state of herpetofauna in this area relative to the reference data. During the field trips 17 species of amphibians and reptiles were identified. Part of fauna species listed in the reference data were not identified in ANPL Snagov, but there were observed some new species previously unknown. It was not reconfirmed the presence of three species in the area. Other 11 new species that were not known before living in the perimeter of Lake Snagov were reported.

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