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PRELIMINARY DATA ON MACROPHYTE PLANT SPECIES ALONG THE FLOW OF THE DRENICA RIVER-KOSOVO

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ABSTRACT

Rivers are water ecosystems, part of Kosovo's natural heritage with biodiversity values. The research of the vascular flora along the course of the Drenica River was carried out during the period 2022-2024. In this paper, preliminary results are presented from the group of macrophyte plants, starting from the source of the Drenica River to its discharge into the Sitnica River. The pedology of the researched area is dominated by alluvial soils. The climate is continental. The average annual temperature is around 9.6 ^{0}C, while the average annual precipitation is 692 mm. The vegetation along the river's course consists mainly of forest-shrub fragments dominated by *willow* (*Salix*) species and less frequently *poplar* (*Populus*) and *alder* (*Alnus*). In particular, along the water course, the vegetation of flowing waters is observed, in the composition of which there are macrophyte plant species from the genera *Ceratophyllum*, *Nuphar*, *Lemna*, etc. The vegetation of the meadows of the surrounding area is dominated by the vegetation of the meadows of the lowlands. Also, in the area around the river course, we have vegetation coverage of deciduous forests dominated by *oak* species (*Quercus*) as well as the vegetation of agro-ecosystems. Despite the anthropogenic action, the river still preserves its physiognomy.

Key words: Flora, Macrophytes, *Nuphar lutea*, Ecosystems, Drenica River, Kosovo.

1. INTRODUCTION

The Republic of Kosovo, as part of the Western Balkans, is rich in terms of floristic diversity. This biodiversity has been made possible thanks to various factors such as geographical position, geology, pedology, hydrology, relief, climate and the historical past of this region.(MMPH-AMMK, 2010).

Kosovo has approximately 2800-3000 plant species. Of these, 237 plant species are assessed according to the degree of threat according to the IUCN, while they are also recorded in the Red Book of the Vascular Flora of the Republic of Kosovo.(Millaku, F. et al 2013).

Within the ecosystems of Kosovo, we also have water ecosystems where rivers are also a part. Kosovo's rivers flow into three seas (the Adriatic Sea, the Black Sea and the Aegean Sea). The waters of the Drenica River are discharged into the Sitnica River, which then continues its journey through the Ibër River to the Black Sea (Rexhepi, F. 1994).

The researched part of the river in the framework of this research, specifically from the locality Karaçicë to Vragoli, passes through the territory of the municipalities

Shtime,

Lipjan,

Drenas,

Obiliq and

Fushë Kosovë,

that is, it passes through the territory of settlements
Karaçicë, Pjetërshticë, Krojmir, Shalë, Resinoc, Baicë, Nekoc, Fushticë e Poshtme, Kishnarekë, Komoran, Llapushnik, Zabel i Ultë, Korroticë e Poshtme, Shtrubullovë, Drenas, Poklek, Dobrashec, Graboc i Epërm, Graboc i Poshtëm, Bardh i Madh, Bardh i Vogël and Vragoli (Osmani, J. 2003, 2005, Tahiri, R. 2024, Kastrati, R. 2024).

In this paper, the results of the vascular flora carried out in the research during the year 2022-2024 are presented.

2. PURPOSE AND SIGNIFICANCE OF THE RESEARCH

The aim of the work was to investigate the vascular flora from the group of macrophytes along the course of the Drenica River from its source to its discharge into the Sitnica River in Vragoli.

The research is important from the facts that:

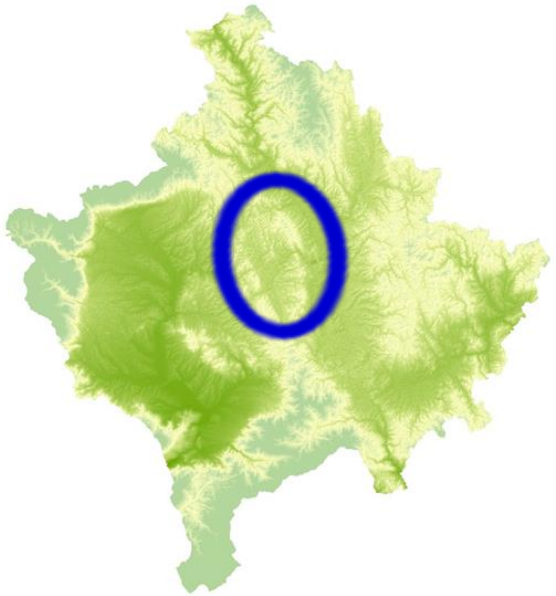
- Macrophyte vascular flora is inventoried in an area that has not been explored so far,
- Reliable results are achieved
- The action is analyzed - the anthropogenic impact,
- The realized results are discussed and conclusions are reached.

3. GENERAL DATA FOR THE RESEARCHED TERRITORY

The Drenica River originates in Karaçicë ("Podi i Metës" locality, 985 m above sea level), and ends with its discharge into the Sitnica River in Vragoli (547 m above sea level). Several other watercourses are added to the river during its course, which continuously increase its volume.

According to Çavolli, R. 1997, in most of the rivers in Kosovo, along their course in the lowlands, mainly alluvial soils are evident.

The climate is continental. The average annual temperature is around 9.6 ^{0}C, while the average annual precipitation is 692 mm.



Drenica River, position on the map of Kosovo
(prepared by: Ferim Gashi 2015)

4. ANTHROPOGENIC IMPACT

The anthropogenic factor with its activities is also present in the research part. Based on field observations, continuous anthropogenic influence is observed.

The permanent anthropogenic influence is observed through numerous activities along the course of the river such as: constructions in the case of the expansion of settlements, the presence-disposal of waste, the expansion of the river bed in order to avoid floods, the discharge of polluted waters from settlements and from industry.

As a result of these impacts, in many locations the appearance of the river is not typical. These actions have a significant impact as a negative action on the environment in general but also on biodiversity in particular.

5. FLORA AND VEGETATION ALONG THE COURSE OF THE DRENICA RIVER, OVERVIEW

As mentioned in other studies, Kosovo has rich and interesting flora and vegetation.

Within the vascular flora of Kosovo, we have various interesting groups of plant species such as nutritious, medicinal, poisonous and ornamental ones.

Even the Drenica River is rich in plant species from the vascular flora.

This rich floristic diversity comes as a result of the conditions along the course of the river.

According to the methodology of Braun Blanquet 1964 (Rexhepi, F. 1994), the vegetation along the river's course consists mainly of forest-shrub fragments dominated by *willow* (*Salix*) species and less frequently *poplar* (*Populus*) and *alder* (*Alnus*).

In the parts where the river has a larger volume of water and where the water moves more slowly, we have the appearance of vegetation with *Phragmites* as well as vegetation dominated by *Lemna, Potamogeton* etc.

In the two lateral parts of the river course, the vegetation of lowland meadows, agroecosystems, ruderal and the vegetation of forests and deciduous shrubs is spread (Hundozi, B. 1980, Rexhepi, F. 1994, Krasniqi, F. 1972, Gruda, E. 2019, Tahiri, R. 2024, Kastrati, R. 2024).

MATERIAL AND METHODS

During the year 2022-2024, the research of the vascular flora was carried out along the course of the Drenica River. In particular, macrophytes plants have been researched.

During the work in the field, in order to document the results, floristic material was collected, in which case the herbarium of the material was also made with the relevant notes.

The determination of the floristic material up to the plant species was carried out according to the standard methods for the identification of plant species. For this purpose, materials from different authors such as Demiri, M. (1983), Jordanov, D. etj. (1963-1982), Josifovic, M. etj. (1970-1986), Micevski, K. (1993-2001), Misic, Lj. & Lakusic, R. (1990), Pajazitaj, Q. (2017), Paparisto, K. et al (1988, 1992), Schauer, Th., & Caspari, C. (1996), Polunin, O. (1997), Qosja, Xh. etj. (1996), Saric, M. etj. (1992), Stevanovic, V. etj. (2012), Tutin, T. G. etj. (1964-1980), Vangjeli, J. etj. (2000), Vangjeli, J. (2003, 2016, 2018, 2021), etc.

What are Macrophytes plants?

Macrophytes are common defined as those "*growing in water or on a substrate that is at least periodically deficient in oxygen as a result of excessive water content*".

Macrophytes plants maybe floating, floating-leaved, submerged, or emergent and may complete their life cycle in still or flowing water, or on inundated or non inundated hydro soils (Cronk & Fennessy, 2001).

7. RESEARCH RESULTS

7.1. REGISTER OF THE FLORA

SPERMATOPHYTA
ANGIOSPERMAE

DICOTYLEDONEAE

Fam. *Ceratophyllaceae* Gray	=1 sp.		
Ceratophyllum demersum L.		Hyd.(A)	Subkozm.
Fam. *Nymphaeaceae* Salisb.	=1 sp.		
Nuphar lutea (L.) Sm.		Hyd.(A)	Evroaz.

MONOCOTYLEDONEAE

Fam. *Alismataceae*	=2 sp.		
Alisma plantago-aquatica L.		Hyd.(A)	Subkozm.
Alisma lanceolatum With.		Hyd.(A)	Subkozm.

Fam. *Araceae* =1 sp.

Lemna minor L. Hyd.(A) Subkozm.

Fam. *Cyperaceae* =1 sp.

Schoenoplectus lacustris Palla H Subkozm.

Fam. *Potamogetonaceae* Bercht. & J. Presl =2 sp.

Potamogeton crispus L. Hyd. (A) Subkozm.

Potamogeton natans L. Hyd. (A) Subkozm.

Fam. *Typhaceae* =1 sp.

Typha latifolia L. G Kozm.

Ceratophyllum demersum L.
(Dobrashec, 14.09.2023)

Nuphar lutea (L.) Sm.
(Vragoli, 14.09.2023)

Alisma plantago - aquatica L.
(Graboc i Epërm, 14.09.2023)

Lemna minor L. (Dobrashec
14.09.2023)

Schoenoplectus lacustris Palla [*Scirpus lacustris* L.]
(Dobrashec, 30.05.2023)

Potamogeton natans L.
(Vragoli, 14.09.2023)

Typha angustifolia L.
(Drenas, 30.05.2023)

8. DISCUSSION

Even watercourses-rivers as ecosystems or important habitats, compared to other ecosystems in Kosovo, have rich floristic diversity.

Along the course of the Drenica River, there is a rich plant diversity from the vascular flora and this is shown through the presence of plant species of different biological and chorological forms.

During its course, the river is filled with new water flows from other side streams, reflecting a typical physiognomy of the river. This is enriched even more by the presence of biodiversity, where the central part of the physiognomy-landscape is phytodiversity (flora and vegetation).

Although anthropogenic actions are continuously evident along the course of the Drenica River, in particular the presence of aquatic plant species gives value to the river as an ecosystem or habitat.

As in the rest of the Drenica River, but also in other rivers in Kosovo (Bytyçi, P. et al. 2022, Tahiri, R. 2024, Kastrati, R. 2024), macrophytes as an important group for water-river ecosystems were present with the species *Ceratophyllum demersum, Nuphar lutea, Alisma plantago-aquatica, Alisma lanceolatum, Lemna minor, Schoenoplectus lacustris, Potemogeton crispus, Potamogeton natans, Typha latifolia*.

9. CONCLUSIONS

Based on the results achieved during the research of the vascular flora along the course of the Drenica River, we can conclude:

We found the presence of 9 plant species from the group of macrophyte plants (*Ceratophyllum demersum*, *Nuphar lutea*, *Alisma plantago-aquatica*, *Alisma lanceolatum*, *Lemna minor*, *Schoenoplectus lacustris*, *Potemogeton crispus*, *Potamogeton natans*, *Typha latifolia*).

The Drenica River, together with ecosystems and other habitats, represents an important part of Kosovo's natural heritage.

As the majority of Kosovo's rivers, even the Drenica River, was quite polluted, we therefore appeal to the responsible institutions to take measures to protect river water as well as flora and vegetation of the bank of the river, which is of great scientific importance in terms of biodiversity.


Thank You for your attention!