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**PRELIMINARY DATA ON INVASIVE ALIEN PLANT SPECIES (IAPS)
ALONG THE FLOW OF THE DRENICA RIVER-KOSOVO**

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ABSTRACT

Rivers with their flora and vegetation represent biodiversity values, therefore they are protected according to international conventions. They present values of the natural heritage of the Republic of Kosovo. During the years 2022-2024, the vascular flora along the course of the Drenica River was researched. In particular, this paper presents invasive alien plant species (IAPS) along the course of the river. In terms of pedology, the researched area is dominated by alluvial soils. The climate of the area is continental with an average annual temperature of 9.6⁰C and an average annual rainfall of 692 mm. According to the methodology of Braun Blanquet 1964 (Rexhepi, F. 1994), the vegetation of the river banks is mostly covered with *willow (Salix)*, *poplar (Populus)* and *alder (Alnus)* species. Aquatic vegetation also develops in the river. Along the course of the river, invasive alien species from the genera *Impatiens*, *Echinocystis*, *Reynoutria*, etc. have been found. The vegetation of lowland meadows and agro-ecosystems lies close to the river course. In the vast area there are deciduous forests dominated by *oaks (Quercus)*. The river still has its physiognomy as an ecosystem, despite the anthropogenic factor acting continuously.

Key words: Flora, IAPS, *Echinocystis*, Ecosystems, Drenica River, Kosovo.

1. INTRODUCTION

Although the Republic of Kosovo is a small country, it stands out for its rich biodiversity. Geographical position, geological, pedological, hydrological factors, relief and climate, are some of the factors that have enabled Kosovo to have a rich biological and landscape diversity with a good variety of flora, vegetation and fauna. ([MESP-AMMK, 2010](#)).

The rivers of Kosovo originate in higher areas in the vertical profile, then their flow goes towards the lower areas in terms of altitude to continue their way to one of the three seas (Adriatic Sea, Black Sea and Aegean Sea).

The Drenica River, which is 50 km long, is a branch of the Sitnica River, which flows entirely within the territory of Kosovo ([Marković, J. 1990](#)).

The Drenica River originates in Karaçicë - a settlement in the Drenica region, which lies on the Drenica Mountain.

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, Shtrubullojë, 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-**Invasive Alien Plant Species (IAPS)** 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 Invasive Alien plant Species (IAPS) along the course of the Drenica River from its source to its discharge into the Sitnica River in Vragoli.

The research is important because:

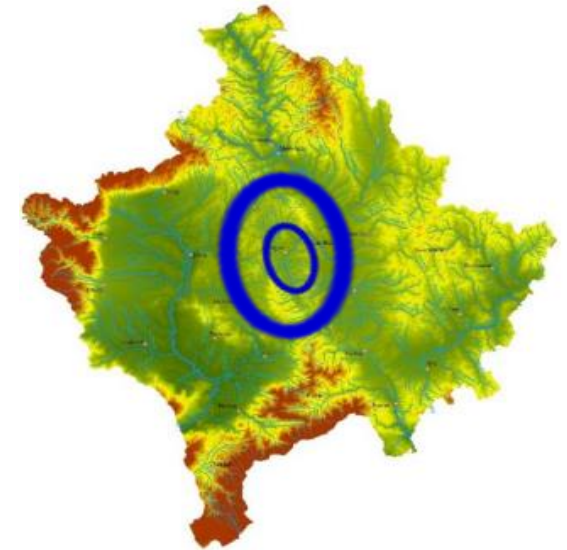
- The research is carried out for the first time in the course of the Drenica River
- The research is carried out in order to invent the vascular flora- Invasive Alien plant Species (IAPS)
- The anthropogenic impact is proven as well
- The obtained results are discussed and conclusions are drawn.

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 °C, while the average annual precipitation is 692 mm.



Drenica River, position on the map of Kosovo
(prepared by: Ferim Gashi 2016)

4. ANTHROPOGENIC IMPACT

The anthropogenic factor as factors in the negative context is also evident along the course of the Drenica river.

This impact is observed with the presence of mostly plastic waste, then there is also the discharge of waste water into the river flow, then the drainage of agricultural surfaces from rainfall (passage of pesticides into the river flow) thus in a chain way affecting the health of flora and fauna around.

We also consider negative the actions aimed at widening the flow of the river as protection against floods, causing damage to the water flow on one side and damage to biodiversity on the other.

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

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

According to the results from the field research, based on the floristic and phytocenological analysis, along the course of the Drenica River, for the most part we found forest-shrub vegetation dominated by willow species (*Salix*) and less frequently poplar (*Populus*) and alder (*Alnus*).

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*).

According to the results of field research, based on floristic and phytocenological analyses, along the course of the Drenica River, we found mostly forest-shrub vegetation dominated by willow species (*Salix*).

Vegetation with Phragmites appears in a significant part of the river, as well as vegetation dominated by *Potamogeton*, *Lemna* and *Nuphar*.

The vegetation along the stream and the banks of the river belongs to lowland meadows, agroecosystems, ruderal and deciduous forests (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, Invasive Alien Plant Species (IAPS) 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 Invasive Alien Species?

Invasive alien species are *plants, animals, pathogens and other organisms that are non-native to an ecosystem, and which may cause economic or environmental harm or adversely affect human health. In particular, they impact adversely upon biodiversity, including decline or elimination of native species - through competition, predation, or transmission of pathogens - and the disruption of local ecosystems and ecosystem functions* (<https://www.cbd.int/idb/2009/about/what>).

7. RESEARCH RESULTS

7.1. REGISTER OF THE FLORA

SPERMATOPHYTA

ANGIOSPERMAE

DICOTYLEDONEAE

Fam. <i>Asteraceae</i>	=3 sp.		
<i>Conyza canadensis</i> L. Cronq.		T	Adv.-Amer.ver.
<i>Galinsoga parviflora</i> Cav.		T	Adv.-Amer.Jug.
<i>Helianthus tuberosus</i> L		G	Adv.-Amer.Ver.
Fam. <i>Balsaminaceae</i> A.Rich.	=2 sp.		
<i>Impatiens balfourii</i> Hook.f.		T	Adv.-Himalaje
<i>Impatiens glandulifera</i> Royle.		T	Adv.-Himalaje
Fam. <i>Cucubitaceae</i> Juss.	=1 sp.		
<i>Echinocystis lobata</i> (Michx.) Torr.		T	Adv.-Amer.Ver.



Fam. <i>Fabaceae</i> <i>Robinia pseudoacacia</i> L.	=1 sp.	P	Adv.Amer.Ver
Fam. <i>Polygonaceae</i> <i>Reynoutria japonica</i> Houtt.	=1 sp.	G	Aziat.Perend.
Fam. <i>Solanaceae</i> <i>Datura stramonium</i> L.	=1 sp.	T	Adv.-Evroaz.-Amer.



8. DISCUSSION

Like the other ecosystems of the Republic of Kosovo, the river ecosystems have rich floristic diversity.

Also, along the course of the Drenica River, a rich diversity of vascular flora can be observed, and this is represented by the presence of plant species of different biological and chorological forms.

During its course, the Drenica River is enriched with new water flows from the water flows of the side branches, in which case it appears with the typical physiognomy of the river.

Although the pressure from the anthropogenic factor exists continuously (somewhere more and somewhere less) in the course of the river, it still resists with its activity, reflecting its appearance and function as a natural ecosystem.

Preliminary list of Invasive Alien plant Species (IAPS) along the course of the Drenica River includes a total of 9 plant species from the vascular flora.

All these species belong to Angiosperms respectively Dicotyledons, while they belong to 6 families (*Asteraceae*, *Balsaminaceae*, *Cucurbitaceae*, *Fabaceae*, *Polygonaceae* and *Solanaceae*).

Invasive Alien Plant Species (IAPS), along the course of the Drenica River, are represented by the plant species *Conyza canadensis*, *Galinsoga parviflora*, *Helianthus tuberosus*, *Impatiens balfourii*, *Impatiens glandulifera*, *Echinocystis lobata*, *Robinia pseudoacacia*, *Reynoutria japonica* and *Datura stromonium*.

9. CONCLUSIONS

According to the results of the research of Alien Invasive Plant Species along the course of the Drenica River we can conclude:

We have confirmed the presence of 9 plant species from the group of Invasive Alien Plants (IAPS) which belong to 6 families of vascular plants.

Invasive Alien plant species present in the river course should be monitored as they may cause increased invasion.

Aquatic ecosystems, including the Drenica River, as well as other ecosystems and habitats, represent an important part of Kosovo's natural heritage. Therefore, the responsible institutions must take measures for the protection of river waters as well as flora and vegetation of the river banks, which is of great scientific importance in terms of biodiversity.



Thank You for your attention!