

Contribution to the knowledge of distribution of certain macrophytes, invasive and threatened species in Serbia

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Abstract:

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This paper contains a short report about new and unpublished chorological data for the following species: *Hydrocharis morsus-ranae* L., *Bidens cernuus* L., *Najas marina* L., *Potamogeton lucens* L., *Schoenoplectus triqueter* (L.) Palla, *Cyperus rotundus* L., *Polypogon monspeliensis* (L.) Desf. and *Paspalum distichum* L.. Despite the fact that this paper provides insight into the distribution of analyzed species, it could be used as a base for invasive species' *Paspalum distichum* L. expanding patterns research, and as a base for reevaluation of the threatened status of *Schoenoplectus triqueter* (L.) Palla and *Cyperus rotundus* L. in Serbia.

Key words: macrophytes, invasive and threatened species, Serbia, distribution

Apstrakt:

Jenačković, D., Miljković, M., Mitrović, D., Randelović, V.: Prilog poznavanju rasprostranjenja pojedinih makrofitskih, invazivnih i ugroženih vrsta u Srbiji. *Biologica Nyssana*, 6 (2), December 2015: 59-65.

U ovom radu dat je pregled novih i nepublikovanih podataka o rasprostranjenju sledećih vrsta: *Hydrocharis morsus-ranae* L., *Bidens cernuus* L., *Najas marina* L., *Potamogeton lucens* L., *Schoenoplectus triqueter* (L.) Palla, *Cyperus rotundus* L., *Polypogon monspeliensis* (L.) Desf. i *Paspalum distichum* L.. Prikazani horološki podaci pružaju kompletniji uvid u rasprostranjenje analiziranih makrofita, predstavljaju osnovu za detaljnija proučavanja puteva introdukcije i širenja invazivne vrste *Paspalum distichum* L. i od velikog su značaja za procenu statusa ugroženosti vrsta *Schoenoplectus triqueter* (L.) Palla i *Cyperus rotundus* L. u Srbiji.

Key words: makrofite, invazivne i ugrožene vrste, Srbija, rasprostranjenje

Introduction

In the period of 2011-2014 years, floristic and phytocoenological researching of aquatic and swamp vegetation was performed in the region of the southern Serbia. On this occasion, new points of distribution for the following species: *Hydrocharis morsus-ranae* L., *Bidens cernuus* L., *Najas marina*

L., *Potamogeton lucens* L., *Schoenoplectus triqueter* (L.) Palla, *Cyperus rotundus* L., *Polypogon monspeliensis* (L.) Desf. and *Paspalum distichum* L. are recorded (**Fig. 1**). Unfortunately, in Serbia macrophytes are extensively studied in terms of distribution, ecology and coenotic affiliation on almost entire territory of Vojvodina province, while in the other parts of country they are sporadically

investigated. Significant contribution to the collection of the chorological data for the mentioned plants group on the southern area of the Sava and Danube rivers are given by Jovanović (1965), Topuzović et al. (2003), Ranđelović et al. (2007), Stanković et al. (2009), Ranđelović & Zlatković (2010).

Material and methods

The data about distribution of analyzed plant species in Serbia were collected by reviewing relevant literature sources. Further, herbarium specimens deposited in the Herbarium of the Institute of Botany and Botanical Garden "Jevremovac", University of Belgrade (BEOU) and the Herbarium of the Faculty of Sciences and Mathematics, Department of Biology and Ecology, University of Niš (HMN) were used as a source of distribution data. The new chorological data were obtained during floristic researching which was carried out at the territory of the SE Serbia. The distribution of studied species is presented on 10 x 10 km² UTM grid.

Determination of the collected plant materials was performed using dichotomous identification keys (Tutin et al. (eds.), 1964-1980; Josifović (ed.), 1970-1980). Nomenclature of the studied species is consistent with Euro+Med PlantBase (Euro+Med, 2006-). The threatened status for all researched species is considered in terms of IUCN (2000) criteria and categories.

Results and discussion

1. *Bidens cernuus* L. (Compositae)

General distribution: Europe, Siberia, Central Asia, Southeastern Asia, Japan, Central Africa, North America and Galapagos.

Distribution in Serbia: Published literature data points that this species is presented in the following areas: **Bačka region** (Babić, 1971; Lazić, 2006), **Banat region** (Obradović et al., 1977), **Šumadija region** (Topuzović et al., 2003), **SE Serbia** (Ranđelović & Stamenković, 1983; Ranđelović & Zlatković, 2010) and **S Serbia** (Jovanović, 2004) (**Fig. 2**).

New and unpublished distribution data: Smilovci lake (**FN57**), *Caricetum ripariae*, 715 m, 07.07.2013., coll./det. D. Jenačković.

Habitat description: This plant prefers wet, muddy habitats which are characterized by significant water level fluctuation during growing season.

IUCN threatened status in the World: Least Concern (LC).

IUCN threatened status in Serbia: not threatened.

2. *Najas marina* L. (Najadaceae)

General distribution: most of Europe, most of Asia (except West Asia), Indonesia, Australia, Mauritius, North Africa, South and Southeastern Africa, most of North America (except Alaska and Canada), Middle America, South America (Venezuela, Brazil and Argentina) and Hawaii. Accordingly, it could be said that *Najas marina* L. belongs to the group of cosmopolitan species. This species is native to Europe, Asia and Africa. In the last century it was recorded in America where it has the status of alien species.

Distribution in Serbia: The distribution pattern of *Najas marina* L. in Serbia could be met according to literature and herbarium data (**Fig. 2**). This species is recorded in **Banat region** (Slavnić, 1956; Butorac, 1995; Polić et al., 2004; Radulović, 2005; Knežević et al., 2008; Polić et al., 2008; Ljevnaić-Mašić, 2010), **Bačka region** (Slavnić, 1956; Čanak & Dokić 1969; Obradović et al., 1977; Vučković et al., 1998; Lazić et al., 2004; Lazić, 2006; Stojanović et al., 2007), **Srem region** (Obradović et al., 1977; Vukov et al., 2012), **Šumadija region** (Topuzović et al., 2003), **E Serbia** (Stanković et al., 2009), **W Serbia** and vicinity of **Belgrade** (Blaženčić, 1997).

New and unpublished distribution data: Debelica village (**FP03**), *Potamo-Najadetum*, 175 m, 20.07.2011., coll./det. D. Jenačković; Smilovci lake (**FN57**), *Potamo-Najadetum*, 712 m, 05.08.2012., coll./det. D. Jenačković.

Habitat description: *Najas marina* L. shows preferences to fresh water and brackish water.

IUCN threatened status in the World: Least Concern (LC).

IUCN threatened status in Serbia: not threatened.

3. *Potamogeton lucens* L. (Potamogetonaceae)

General distribution: most of Europe, most of Asia (except Central Asia), Australia, North Africa (Morocco), Tanzania, Madagascar, South America (Brazil and Argentina), Bahamas Islands and North America (except Alaska and Canada).

Distribution in Serbia: *Potamogeton lucens* L. is recorded in **Banat region** (Polić et al., 2004; Radulović, 2005; Knežević et al., 2008; Polić et al., 2008; Ljevnaić-Mašić, 2010), **Bačka region** (Slavnić, 1956; Stojanović et al., 1994; Radulović,

2000; Lazić et al., 2004; Panjković, 2005; Lazić, 2006; Stojanović et al., 2007), **Srem region** (Panjković, 2005; Vukov et al., 2012), **E Serbia** (Stanković et al., 2009), **SE Serbia** (Petković, 1983) and vicinity of **Belgrade** (Blaženčić, 1997). The first data about distribution of *Potamogeton lucens* L. in the vicinity of Niš is given by Sava Petrović (Petrović, S., 1879, BEOU) (**Fig. 2**).

New and unpublished distribution data: Vrtište village (**EP60**), *Scirpo-Phragmitetum* subass. *typhetosum angustifoliae*, 181 m, 02.06.2013.,

coll./det. D. Jenačković; Smilovci lake (**FN57**), *Potamo-Najadetum*, 712 m, 05.08.2012., coll./det. D. Jenačković.

Habitat description: *Potamogeton lucens* L. inhabits relatively depth, clear, alkaline and nutrient poor waters.

IUCN threatened status in the World: Least Concern (LC).

IUCN threatened status in Serbia: not threatened.

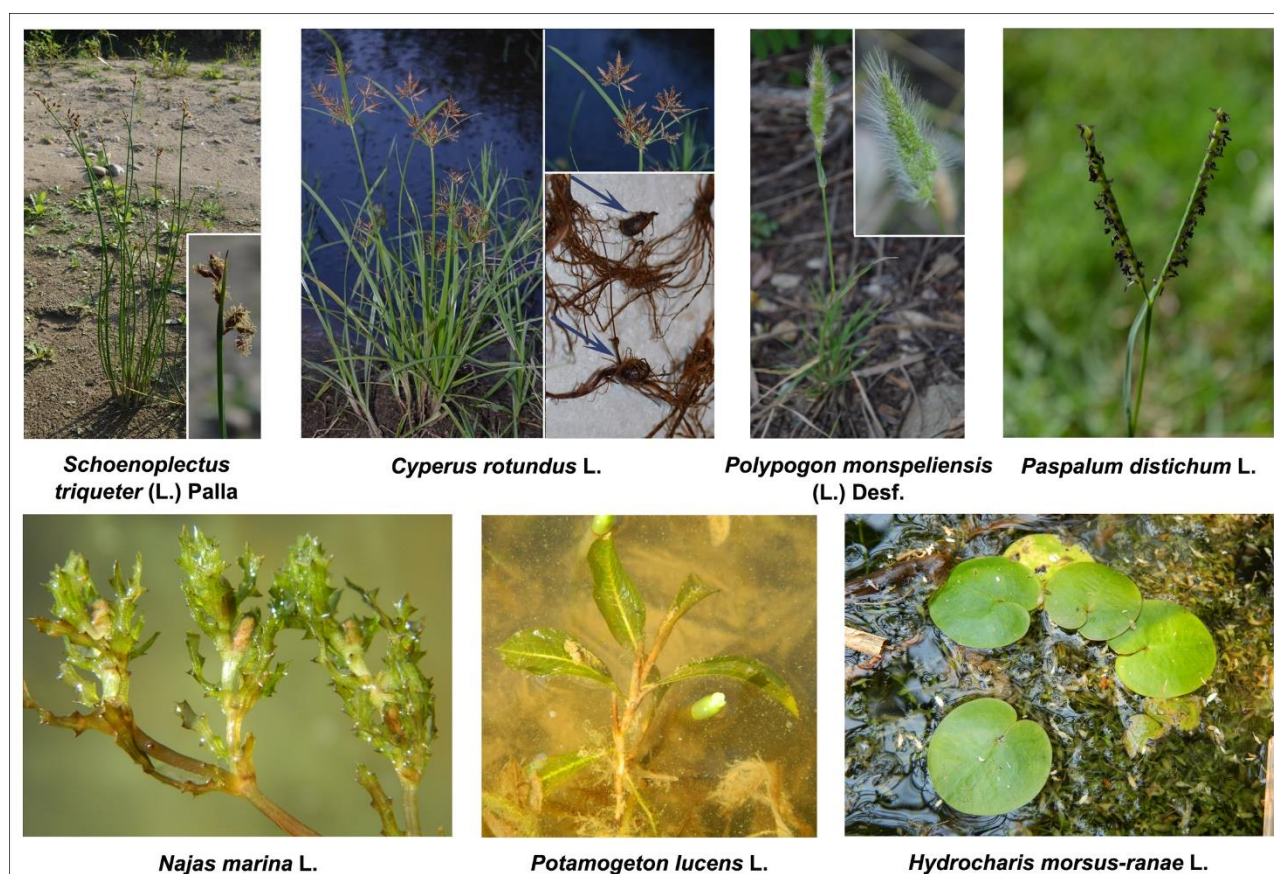


Fig. 1. The photographs of studied species

4. *Schoenoplectus triqueter* (L.) Palla (Cyperaceae)

General distribution: Central and West Europe, most of Asia (except North Asia), Africa (Sudan and South Africa), North America (The United States). *Schoenoplectus triqueter* (L.) Palla is considered an autochthonous species to Europe and Asia while in the other parts of areal it is introduced.

Distribution in Serbia: There is a little data about distribution of *Schoenoplectus triqueter* (L.) Palla in Serbia. It has been recorded in **Bačka region** (Babić, 1971; Panjković et al., 2010) and **Srem region** (Slavnić, 1956; Stanković, 2011) (**Fig. 2**). Only one herbarium data about distribution of this species

exists for region positioned outside the boundaries of the Vojvodina province. It refers to West Serbia (Zlatibor mountain).

New and unpublished distribution data: **SE Serbia:** Pukovac village (**EN67**), 190 m, 11.09.2014., coll./det. M. Miljković.

Habitat description: This plant grows on wet and muddy habitats which occur at the banks of rivers, marches and the other types of aquatic habitats.

IUCN threatened status in the World: Least Concern (LC).

IUCN threatened status in Serbia: Critically Endangered - Vulnerable (data deficient) ((CR - VU (DD)).

5. *Cyperus rotundus* L. (Cyperaceae)

General distribution: Europe (except North, Central and East Europe), Asia Minor, South, Central and Southeastern Asia, Indonesia, Australia, Africa, North America (except Alaska and Canada), South America and islands in Atlantic, Indian and Pacific Ocean.

Distribution in Serbia: The only literature data about distribution of *Cyperus rotundus* L. in Serbia are published in "The Red Data Book of Flora of Serbia 1" (Stevanović (ed.), 1999). According to this literature source, *Cyperus rotundus* L. is recorded on the following locations: the Velika Morava river near Čuprija (EP26), Miljkovo (EP19) and the Južna Morava river near Vrtište (EP60). In HMN is stored exemplar of the mentioned species from the village Klisura (EN68) while BEOU contains specimens from the sands around the village Vrtište (EP60) (Fig. 2).

New and unpublished distribution data: SE Serbia: Pukovac village (EN67), 190 m, 20.08.2013., coll./det. D. Jenačković & D. Mitrović.

Habitat description: *Cyperus rotundus* L. grows at sandy habitats which are positioned on the bank of aquatic bodies.

IUCN threatened status in the World: Least Concern (LC).

IUCN threatened status in Serbia: Endangered – Vulnerable (EN B2c - VU A1c; B1; E).

6. *Polypogon monspeliensis* (L.) Desf. (Gramineae)

General distribution: Europe (except Central, North and East Europe), Asia Minor, South, Central and East Asia, Australia, New Zealand, Africa, North America, Middle America, west part of South America, islands in Atlantic and Pacific Ocean. Thus, *Polypogon monspeliensis* (L.) Desf. could be defined as cosmopolitan species which is native to the area of Europe, Asia and Africa while to the other continent it is introduced.

Distribution in Serbia: Distribution of *Polypogon monspeliensis* (L.) Desf. in Serbia is not known (Fig. 2).

New and unpublished distribution data: SE Serbia: Pukovac village (EN67), 190 m, 20.08.2013., coll./det. D. Jenačković & D. Mitrović.

Habitat description: *Polypogon monspeliensis* (L.) Desf. shows preference to the humid habitats which are placed around swamps, backwaters and

depressions. The specificity of this plant is ability to tolerate the higher level of salinity, so that it often occurs in salt marshes.

IUCN threatened status in the World: Least Concern (LC).

IUCN threatened status in Serbia: not threatened.

7. *Paspalum distichum* L. (Gramineae)

General distribution: Europe (except North, Central and East Europe), Asia Minor, South Asia, East Asia, Australia, Africa (except Central and East Africa), North America (except Alaska and Canada), Middle America, South America, islands in Atlantic and Pacific Ocean. This plant has a status of alien species for the European area.

Distribution in Serbia: *Paspalum distichum* L. is an invasive, emergent plant. According to the published data (Stevanović et al., 2004; Polić, 2006), this species massively occurred near the Danube river between Belgrade and Đerdap dam (Fig. 2). In the southern part of Serbia, it is recorded in the vicinity of Niš (Randelović et al., 2007). The other data about distribution are unpublished and they confirm spreading of *Paspalum distichum* L. in the vicinity of Belgrade and Banat region. Ability to displace the autochthonous vegetation makes it a threat to native biological diversity.

New and unpublished distribution data: SE Serbia: Klisura village (EN68), 11.10.2014., coll./det. M. Miljković.

Habitat description: *Paspalum distichum* L. grows on humid habitats which are often flooded at the beginning of growing season.

IUCN threatened status in the World: Least Concern (LC).

IUCN threatened status in Serbia: not threatened.

8. *Hydrocharis morsus-ranae* L. (Hydrocharitaceae)

General distribution: most of Europe, Siberia, Caucasus, Asia Minor, Middle Asia, North Africa (Morocco and Algeria) and Madagascar, North America. *Hydrocharis morsus-ranae* L. is native species to Europe, Asia and Africa while it has been introduced to the territory of North America (Catling et al., 2003).

Distribution in Serbia: *Hydrocharis morsus-ranae* L. is common species in aquatic and semi-aquatic vegetation of Vojvodina province. According to the literature data, this plant is distributed in the Banat

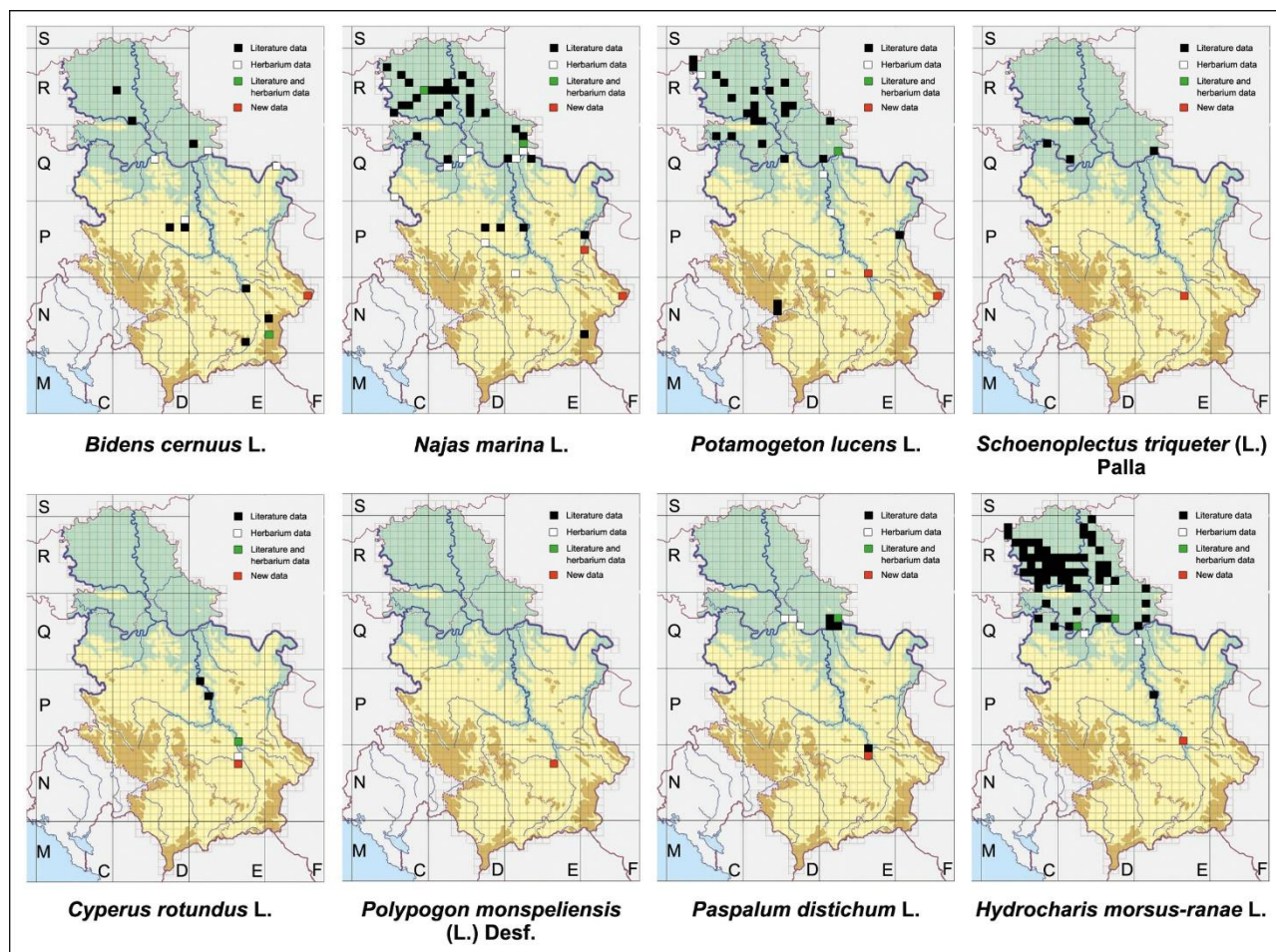


Fig.2. The UTM grid maps of distribution of the researched species

region (Slavnić, 1956; Butorac, 1995; Stojanović & Lazić, 1998; Polić et al., 2004; Radulović, 2005; Knežević et al., 2008; Ljevnaić-Mašić, 2010), **Bačka region** (Slavnić, 1956; Stojanović et al., 1994; Stojanović & Lazić, 1998; Vučković et al., 1998; Radulović, 2000; Borišev, 2002; Lazić, 2003; Lazić et al., 2004; Nikolić, 2004; Panjković, 2005; Lazić, 2006; Stojanović et al., 2007), **Srem region** (Slavnić, 1956; Obradović et al., 1977; Igić et al., 2004; Stanković, 2011; Vukov et al., 2012) and the vicinity of **Belgrade** (Jovanović, 2011). In BEOU a few exemplars of the mentioned species are stored and they refer to localities (**Mala Krsna** and **Obrenovac**) which are placed in the south of the Sava and Danube rivers (Fig. 2). The first literature data about presence of this species in **central Serbia** is given by Pančić (1874).

New and unpublished distribution data: Vrtište village (**EP60**), *Scirpo-Phragmitetum* subass. *phragmitetosum*, 185 m, 15.07.2012., coll./det. D. Jenačković.

Habitat description: *Hydrocharis morsus-ranae* L. grows in shallow, mesotrophic, calcareous waters

which are protected from direct wave and wind action.

IUCN threatened status in the World: Least Concern (LC).

IUCN threatened status in Serbia: not threatened.

Conclusion

The presented results are important to prepare the new edition of Flora Serbia and Red Book of Flora Serbia. Particularly significant are data about distribution of species *Polypogon monspeliensis* (L.) Desf. which has been not recorded in Serbia until to now. Further, presence of species *Paspalum distichum* L. on the banks of the Južna Morava river is significant for tracking the expanding pattern of this invasive species in our country. Information about distribution of threatened species: *Schoenoplectus triqueter* (L.) Palla and *Cyperus rotundus* L. are also very important. Their significance is reflected in reevaluation of the threatened status and implementation of conservation process.

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