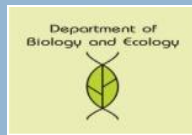


BIOLOGY, LIFE STRATEGY AND INVASIVENESS OF GENERA *AMARANTHUS* L. (CARYOPHYLLALES, AMARANTHACEAE) IN PANNONIAN PART OF SERBIA

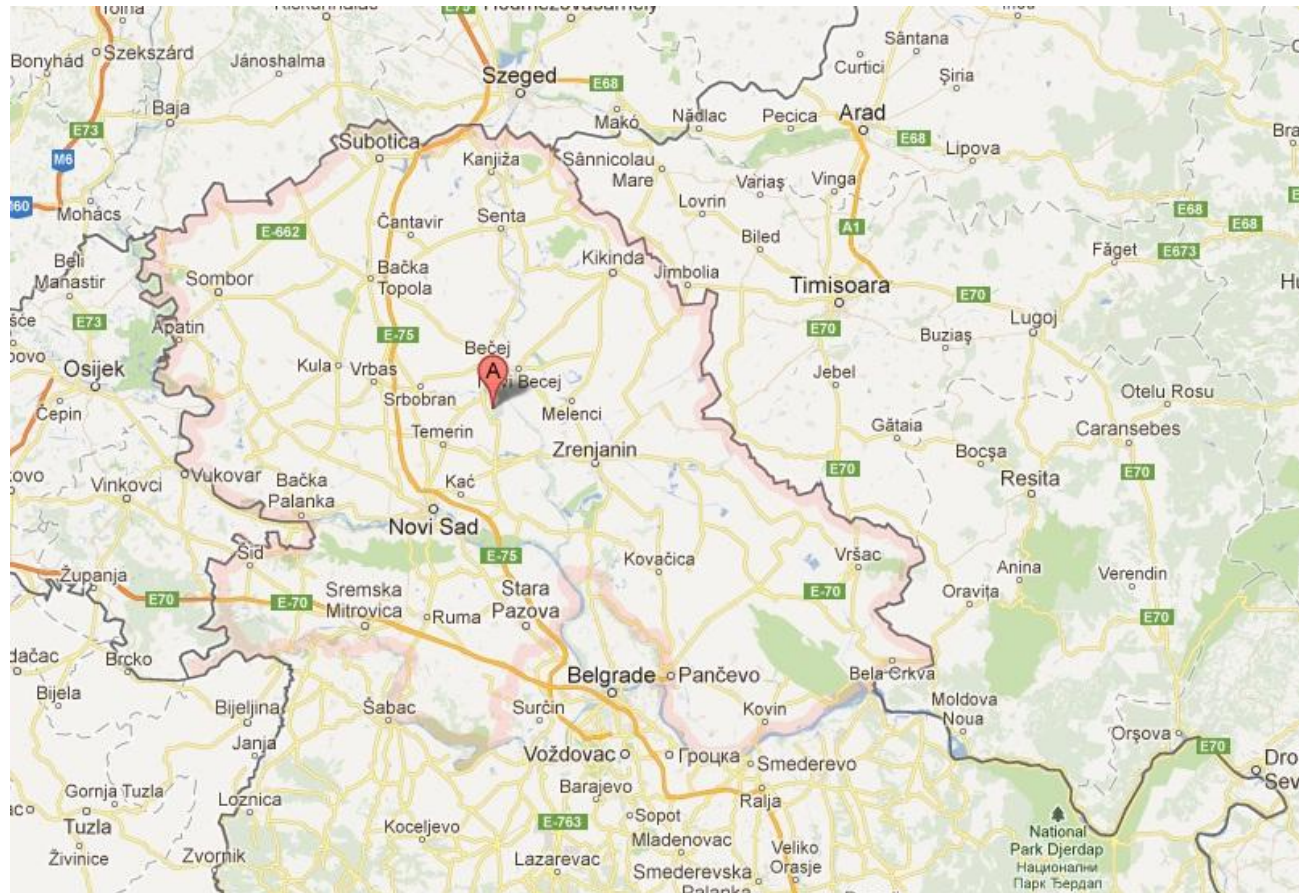
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Research area – Vojvodina



Research object – Genera *Amaranthus*

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□ Description

- Herbaceous plants
- Leaves simple, alternate
- Flowers small, uni/bipolar, in spikes



Introduction

- Genera *Amaranthus* in Europe
- Genera *Amaranthus* in Serbia
- Significance and negative impact
- State in Vojvodina
- High potential for spreading

- Aim of work – Ecological and taxonomic evaluation in order to define distribution pattern and adaptive strategy

Material and Methods

- Distribution data – literature and herbarium collections
- Nomenclature – Flora Europaea
- Life forms – Stevanović (1992)
- Origin – Soó (1970)
- Pollination and seed dispersion – Soó (1970)
- Adaptive strategy – Borhidi (1995)
- Ecological indicator values – Borhidi (1995)
- Statistica for Windows ver. 11.0

Recorded taxa

□ Ten species

- *A. albus* L., *A. blitoides* S. Watson, *A. blitum* L., *A. caudatus* L., *A. crispus* (Lesp.& Thév) N. Terracc., *A. deflexus* L., *A. graecizans* L., *A. hybridus* L., *A. retroflexus* L., *A. viridis* L.

□ Two subspecies

- *A. hybridus* L. subsp. *cruentus* (L.) Thell. and *A. hybridus* L. subsp. *hypochondriacus* (L.) Thell.

□ One hybrid

- *A x budensis* Prisztetz – insufficient data

□ More taxa than in the Flora Srbija – taxonomical and ecological revision of genera

Life forms

- All taxa – therophytes and erect forms
 - ▣ Only *A. blitoides* and *A. crispus* prostrate forms
- Exception – *A. deflexus* – hemicryptophyte

- Therophytes – short life cycle and rapid adaptation on new anthropogenic habitats (Viegi, 2001)
- Erect forms – successful competitors in relation to native species (Iamónico, 2010)

Adaptive strategies

- Two groups
 - ▣ Weeds and adventives
 - ▣ Introduced and ruderal competitors

Type of adaptive strategies SBT	%
I – introduced allian species	20
W - weeds	30
A - adventives	30
RC –ruderal competitors	20

Correspondent analysis - adaptive strategies in relation to life forms

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□ Weeds

- Crops, along roadsides and dumps

□ Adventive plants

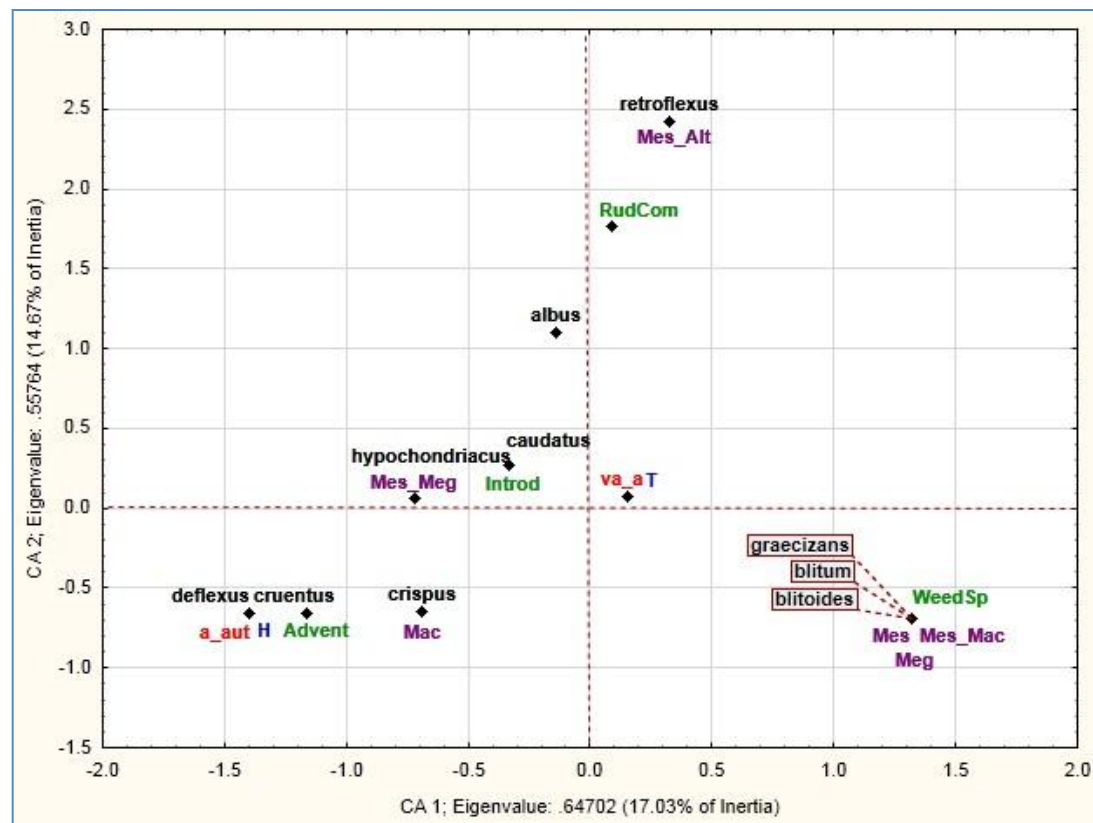
- Exception *A. crispus*
- Danger for native plants (Pyšek, 1998)

□ Introduced plants

- Exception *A. caudatus*

□ Ruderal competitor

- Saline soils

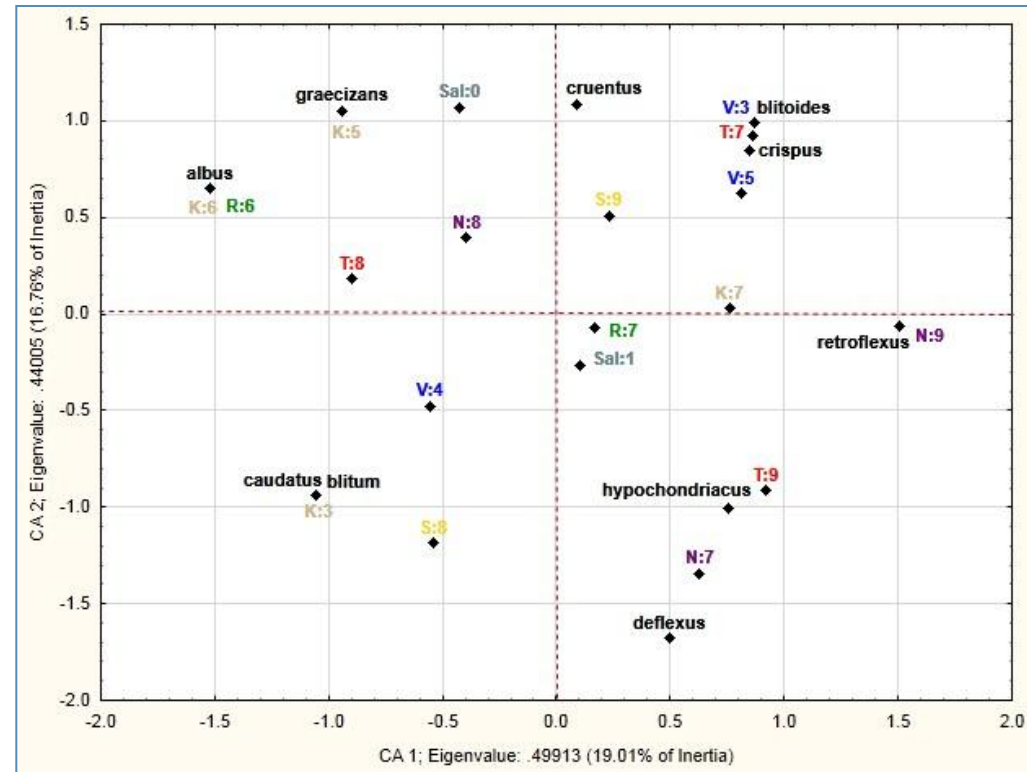


Correspondent analysis of ecological indicator values

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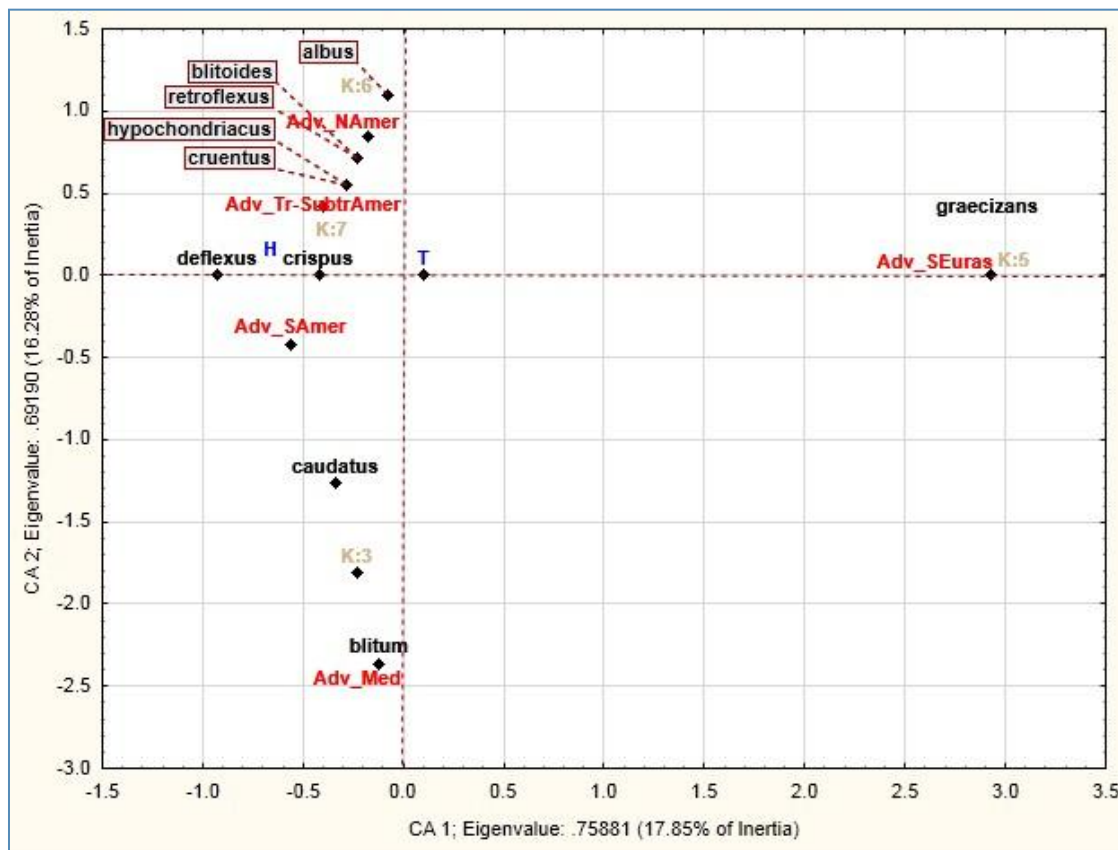
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- Continentality – primary factor in the selection and inhabitation
- All factors together – impact on expansion
- *A. retroflexus*
 - nitrogen
- *A. retroflexus*, *A. cruentus* i *A. crispus*
 - affinity to wet habitats
- *A. albus*
 - soil reaction



Correspondent analysis of origin, continentality and life forms

- Three groups
- Most of the taxa – Northamerican origin with high level of continentality



- Invasiveness level
 - ▣ Transition from artificial to natural habitats
 - Natural saline habitats in Vojvodina
 - ▣ Time of flowering
 - ▣ Type of pollination and seed dispersal

Invasiveness

- Six taxa – potentially more invasive

- Natural saline habitats
 - Opened
 - High level of sun light
 - Low number of native species
 - Extreme in salt content

Taxon	%
<i>A. caudatus</i>	40.0
<i>A. albus</i>	20.2
<i>A. crispus</i>	6.2
<i>A. retroflexus</i>	4.3
<i>A. hybridus</i>	4.0
<i>A. blitoides</i>	0.9

- Flowering time of major taxa
 - ▣ Final phase of flowering time in anthropogenic and saline ecosystems
- Exception – *A. hybridus* subsp. *cruentus* (a-aut)
 - ▣ Later flowering may be a key character in the process which starts with neutralization and ends with invasion (Iamónico, 2010)
 - ▣ Expectations

Invasiveness

- Pollination
- Seed dispersal
 - ▣ Dispersal by wind is an advantage in open areas (Rejmanek, 1999)
 - ▣ All taxa potentially invasive except *A. retroflexus*

Taxon	Seed dispersal type	Pollination type
<i>A. albus</i>	anemochory, antropochory	anemophily
<i>A. blitoides</i>	anemochory, antropochory, epizoochory	anemophily, entomophily
<i>A. caudatus</i>	anemochory, antropochory	anemophily, entomophily
<i>A. crispus</i>	anemochory, epizoochory	anemophily, entomophily
<i>A. deflexus</i>	anemochory, epizoochory	anemophily, entomophily
<i>A. hybridus</i>	anemochory, epizoochory	anemophily, entomophily
<i>A. retroflexus</i>	epizoochory, endozoochory	anemophily, entomophily

Conclusion

- Most taxa – erect, annual, anemophilous plants with high competitiveness and adaptability degree
- Prefer sunny, hot, less humid habitats with high nitrogen content
 - ▣ ruderal and arable land on which they are primarily occurring
- Records on natural saline soils
 - ▣ maybe the next stage of invasion process in this area

Acknowledgement

- Government of the Republic of Serbia
 - ▣ Ministry of Education, Science and Technological Development
 - Project no. 173030