

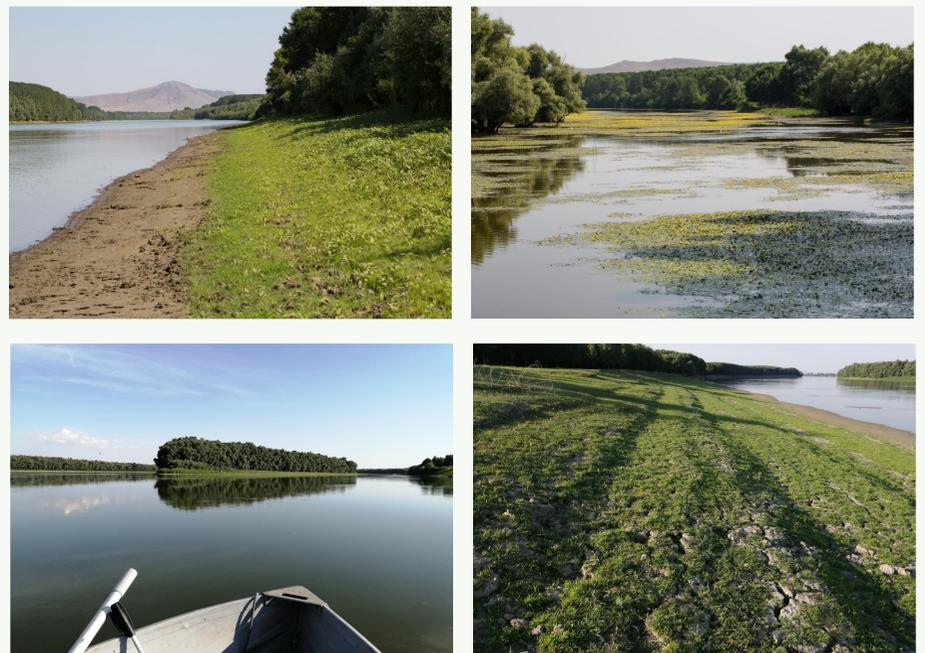
# Impact assessment of invasive alien plant species in aquatic and riparian habitats of conservative interest within Lower Danube basin (ROSCI0012 Braț Măcin, Romania)

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**INTRODUCTION.** Măcin Branch is a Danube pre-delta distributary and represents a Site of Community Importance located within the Lower Danube basin, in the steppic biogeographical region. The protected area comprises 6 habitat types of conservation interest EU Habitats Directive, totally dependent on the river's flooding regime and located in the main branch waters (3140 - **Hard oligo-mesotrophic waters with benthic vegetation of Chara spp.**), along the channel and islands banks (3130 - **Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and/or of the Isoeto-Nanojuncetea**, 3270- **Rivers with muddy banks with Chenopodium rubri pp and Bidention pp vegetation**), ponds and lakes (3150 - **Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation**, 3160 - **Natural dystrophic lakes and ponds**) and 92A0 - **Salix alba and Populus alba galleries** Considering that alien invasive plant species are one of the main threats of Danube wetlands biodiversity, the aim of this research is to assess their ecological impact along Măcin Branch sector. Knowledge of AIS distribution patterns in certain habitat types, along with their impact intensity will unequivocally contribute to a better understanding of AIS path of introduction and spreading in order to support the control efforts in the vulnerable Danube ecosystems.

**Methods.** Our study was carried out in 2019-2020 period and involved the floristic inventory of habitats of community interest within ROSCI0012 Măcin Branch, on which occasion we were able to record the invasive species present here. The entire surface of the site was covered by boat, establishing on the Giurgeni-Tulcea route (60 km) observation plots in the mentioned habitats, in order to assess the conservation status and impact of pressures and threats on protected habitats. Intensity of the impact was analyzed at two scales: local and regional, using the traffic light method, where green means low impact, orange - medium and red - high.



## Results.

AIS	Origin	Impact location	Affected habitat(s)	Impact intensity	
				local	regional
<i>Ambrosia artemisiifolia</i> L.	North America	Occupies small areas along the dam, roads and paths in the dam-shore area, the shores of ponds and channels with permanent water	3270	Green	Orange
<i>Amorpha fruticosa</i> L.	North America	<i>Amorpha fruticosa</i> shrubs have a great development along the dam, roads and paths in the dam-shore area (92A0 habitat) The very creation of the protection dam through the appearance of the uncovered areas allowed the easy installation of the species, its maintenance and spread in several types of habitats on the site. Nevertheless, in the riparian forests ( <i>Salix/Populus</i> ) more than 10% of the surface of the habitat type is damaged in terms of structure and functions, including characteristic species	92A0	Red	Orange
		It was also observed in the specific composition of phytocenoses attributed to habitat 3130 and 3270, on the banks of the Macin Branch, where in the vast majority of habitat inventories, the species is in its juvenile stage.	3130, 3270	Green	Green
<i>Amaranthus emarginatus</i> Moq. ex Uline & W.L. Bray	Tropical Americas	Riparian vegetation of Măcin Branch	3130, 3270	Green	Green
<i>Azolla filiculoides</i> Lam.	North America	Lakes and ponds with permanent waters	3150, 3160	Green	Green
<i>Bidens frondosa</i> L.	North America	Riparian vegetation of Măcin Branch	3130, 3270	Green	Green
<i>Chamaesyce maculata</i> (L.) Small	North America	Riparian vegetation of Măcin Branch	3130, 3270	Green	Green
<i>Cyperus odoratus</i> L.	Tropical Americas	Riparian vegetation of Măcin Branch	3130, 3270	Green	Green
<i>Eclipta prostrata</i> (L.) L.	Tropical Americas	Riparian vegetation of Măcin Branch.	3130, 3270	Green	Green
<i>Lindernia dubia</i> (L.) Penell	North America	<i>Lindernia dubia</i> has a constant presence in the annual terophyte communities on the banks of the Macin Branch. It bears fruit at the end of August-beginning of September, important possible routes of spread: hydrochory, endozoochory, off-road vehicles in the perimeter of habitats 3130 and 3270, fishing equipment, grazing activities.	3130, 3270	Green	Green
<i>Xanthium spinosum</i> L.	South America	Occupies small areas along the shores, especially near the localities where irrational pastoralism is practiced.	3130, 3270	Green	Green
<i>Xanthium italicum</i> Moretti	Mediterranean	The communities of <i>Xanthium italicum</i> occupy large areas, after the drying of temporary or permanent ponds in the dam-shore area where it becomes the dominant species forming communities with large coverage, difficult to cross. In the invaded areas, the intensity of the impact is high, but compared to the entire site, the viability of the habitat is not significantly affected.	3130	Green	Green
			3270, 3150, 3160	Red	Green



**Conclusion.** *Amorpha fruticosa*, *Lindernia dubia*, *Xanthium italicum*, *Xanthium strumarium*, *Xanthium spinosum* have been reported in the past as potentially invasive species in the steppe bioregion. However, our study contributes to the list of invasive plants with new species that have not been mentioned so far in this sector of the Danube. 11 AIS were identified in the 6 types of Natura 2000 habitats, their impact at local and regional scale was assessed in accordance with the affected habitats and intensity.

**Management measures.** Monitoring of the invasive species *A. fruticosa* and *X. italicum* and other potentially problematic species, as mentioned above; tracking the trend in distribution and abundance, and the impact on the environment, the economy and human health. Also, management and regulation of grazing inside the site, since the non-intensive grazing can affect both the structure of the habitat through selective consumption of certain species and can be vectors of invasive/non-native species.