Joint ESENIAS and DIAS Scientific Conference 2022 and 11th ESENIAS Workshop

Invasive alien species under conditions of global crisis

13 – 15 November 2022

Book of Abstracts

Demre, Antalya, Türkiye

2022

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Hristina Kalcheva, F. Güler Ekmekçi, Paraskevi K. Karachle, Ahmet Uludağ, Rumen Tomov, Teodora Trichkova, Mahir Kanyılmaz, Mustafa Altuğ Atalay

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Effects of selective removal of the black bullhead (*Ameiurus melas*) on other non-native fish populations in the Ponjavica Nature Park (Serbia)

Milica Jaćimović[1], Marija Smederevac-Lalić[1], Dušan Nikolić[1], Gorčin Cvijanović[1], Slađana Spasić[2,3], Željka Višnjić-Jeftić[1], Stefan Skorić[1], Jasmina Krpo-Ćetković[4]

[1] Department of Biology and Inland Waters Protection, Institute for Multidisciplinary Research, University of Belgrade, Kneza Višeslava 1, 11030 Belgrade, Serbia; E-mail: mpucar@imsi.rs
[2] Department of Life Sciences, Institute for Multidisciplinary Research, University of Belgrade, Kneza Višeslava 1, 11030 Belgrade, Serbia
[3] Faculty of Informatics and Computing, Singidunum University, Danijelova 32, 11000 Belgrade, Serbia
[4] Faculty of Biology, University of Belgrade, Studentski trg 16, 11000 Belgrade, Serbia

North American black bullhead (*Ameiurus melas*) is an ictalurid species that has become widespread outside of its native range, causing undesirable ecological impacts. Numerous studies have suggested that its physical removal could be a way to reduce any potential detrimental effects of this species. This study measured the effects on population dynamics of both native and non-native fish species following the removal of 20,145 black bullheads from the Ponjavica Nature Park. The most significant changes between the zero-point state and the post-removal state have been recorded among the populations of non-native fish species: the abundances of topmouth gudgeon (*Pseudorasbora parva*), pumpkinseed (*Lepomis gibbosus*), and Prussian carp (*Carassius gibelio*) increased 25.5, 4.9, and 4.2 times, respectively. Previous research has shown that smaller black bullhead individuals enter into competitive relationships with the topmouth gudgeon, while larger individuals use the topmouth gudgeon as prey. By removing black bullhead individuals from the ecosystem, a part of the ecological niche used by both species was freed. Also, the predatory pressure on topmouth gudgeon decreased by removing larger black bullhead individuals. All these factors led to an increase in the abundance of topmouth gudgeon. Black bullhead and pumpkinseed have overlapping diets and are therefore considered competitors for food. Moreover, research on the black bullhead's feeding ecology showed that this species feeds on the pumpkinseed. When a greater number of black bullhead individuals were removed from the ecosystem, it led to an increase in the abundance of pumpkinseed. The abundance of Prussian carp also increased after the removal of the black bullhead. The Prussian carp and the black bullhead are quite similar in terms of diet habits, habitat preferences, and reproductive characteristics. Since these two species are in direct competition, the decline in the black bullhead population contributed to an increase in the Prussian carp population. These results point to the fact that management programs must include multiple species and methods, and one of them is the removal of all undesirable, invasive non-native species. Further research should also focus on possible diet shifts in allochthonous fishes after removing the black bullhead.

Key words: Fish management, fish population dynamics, mass removal, community diversity.

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