

# **Structural and functional parameters of the hydrozoocenosis from the Lower Danube wetlands**

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(Summary of PhD-Thesis)

This work aims to assess the species richness and the heterogeneity of the hydrozoocenoses in the water bodies from the Lower Danube floodplains, as well as to identify and evaluate driving factors responsible for their structural and functional features under modified and regulated hydrological regime. Assessment of the Lower Danube flood capacity was made, using calculation of the annual flood duration. The investigated water bodies were classified according to their hydromorphological, hydrodynamic and ecological characteristics. Species richness and heterogeneity of the zooplankton, macrozoobenthos and ichthyofauna communities was updated as well as their distribution along the environmental factors, hydrological connectivity, hydromorphology, hydrodynamic and trophic state.

Decrease in the flood capacity of the Lower Danube was registered after 1984, considering impact of the river embankment, gravel abstraction and the accumulation of large amount of sediments in the “Iron Gates” dams. Investigated floodplains experience reduction in the flood period in the range of several days to more than 2 months. Daily data shows that since 2011 the winter-spring floods remain as a steady event, opposite to the spring-summer floods which seem to be unsustainable, registering decreased capacity. Extremely fast decreases in the Danube water levels were registered in July, enhancing the dry period. Also, daily dynamics of the water levels caused by hydropeaking reflect the ripal and the floodplain zones nearly 200 km downstream.

The duration of the flood pulse was revealed as a major factor determining the trophic state in the floodplains water bodies. Higher trophic state were registered in the water bodies which experience the shortest annual flood. Water bodies with continuous hydrological connectivity as well as those in complete surface isolation demonstrated more stable conditions.

Over 143 zooplankton, 67 macrozoobenthos and 17 fish species were registered. Zooplankton and macrozoobenthos community structure showed significant relation along the trophic state gradient. Zooplankton abundance showed positive correlation with trophic status, while mean size of Crustacea, especially Cladocera showed negative correlation. The share of *Thermocyclops crassus* and the predatory rotifers genus *Asplanchna* and genus *Synchaeta* increased positively with the trophic status.

Highest abundance in the macrozoobenthos community was registered in the mesotrophic conditions, while in hypertrophic state the total abundance significantly decreases. As a dominant group for the mesotrophic state occurred family Chironomidae, while in the hypertrophic state class Oligochaeta dominated numerically. The distribution of the macroinvertebrates in the different hydrodynamic types showed highest species richness in the dynamic zones – plesiopotamon and the temporary water bodies. Ordination methods revealed the type of the bottom substrate, water level fluctuations, average volume of the water body, the flow pulse and the abundance of coastal vegetation as main environmental factors, determining the structure of the macrozoobenthos,

Hydrological distance to the river, trophic state and the size of the water body seems to correspond to the fish size and biomass, as well as to number of structural indices of the ichthyocenoses. Along the surface connectivity to the river the species distribution occurred as follows: *Carassius gibelio* was the most common species in the temporary pools, *Tinca tinca*, *Scardinius erythrophthalmus* and *Lepomis gibbosus* - mainly in the isolated water bodies, *Alburnus alburnus* and *Blicca bjoerkna* - in the main channel and the side arms of the Lower Danube, while the predators (*Esox lucius* and *Aspius aspius*) mainly occurred in the transitional zones.