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Analysis of macroinvertebrate community and eutrophication assessment of Zelengora karstic lakes

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The mountainous area of Zelengora is positioned in southeast Bosnia and Herzegovina. It is characterized by dense forests (deciduous and coniferous), mountain pastures, barren rock peaks, gorges, canyons, and lakes. Dinaric mountains have karst morphology with underground drainage systems, caves and sinkholes. The amount of annual precipitation is high and continuous through the year. On Zelengora most of the water drains from the Drina River basin. The Lakes of this area have an average depth of 2-3m and are situated over 1400m above sea level, at the forest boundary. During the cold period of the year, they are covered with ice that can last for months.

The study of five Zelengora lakes (the Gornje bare, the Donje bare, the Crno jezero, the Bijelo jezero and the Orlovačko jezero) was carried out in August of 2016. Physico-chemical (temperature, pH, oxygen, conductivity, nitrates, nitrites, sulfates, orthophosphates, and total phosphor) and biological parameters (macroinvertebrates and phytoplankton) were gathered, at each lake. Water samples were taken for measuring chlorophyll concentrations, needed for the assessment of the trophic level by Carlson's and Felfoldy's indices.

Physico-chemical parameters were within expected range in all five lakes, with the exception of total phosphor which had higher values. As orthophosphates were relatively low, high values of total phosphor in the samples indicate that phosphor is mainly bound in organic matter. Regarding benthic fauna, 51 taxa of macroinvertebrates were recorded in total. Highest number of taxa (27) was recorded in the lake Bijelo jezero, and lowest (17) in the lake Orlovačko jezero. Groups with highest taxa richness were Oligochaeta, Gastropoda, Diptera and Odonata. Species *Erpobdella octoculata*, *Valvata piscinalis*, *Cloeon dipterum*, *Aeshna cyanea* and *Pyrrhosoma nymphula* were present in all lakes. Considering microhabitat preferences and feeding types, two groups were distinguished. One group consisting of Oligochaeta, Chironomidae and Mollusca that prefer pelal and inhabit deeper parts of the lakes with decomposing organic matter, and the other consisting of representatives from the Insecta group (predominantly Ephemeroptera, Trichoptera and Odonata) which prefer the littoral zone with macrophytes. Qualitative analysis of phytoplankton recorded 68 taxa from 7 phyla. According to both trophic indices, four lakes were oligotrophic to oligo-mesotrophic. The only exception was the Bijelo jezero which was mesotrophic.

These lakes are under no significant anthropogenic influence, and their organic load is a natural consequence of eutrophication. The succession was most evident at the Gornje bare and the Bijelo jezero. All sites have diverse habitats and therefore exceptionally diverse communities. Considering their biological richness, as well as their rare beauty and aesthetic value, these pristine sites meet the criteria to be protected.