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Abstract

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RESPONSE OF TAXONOMIC AND FUNCTIONAL BENTHIC MACROFAUNA RICHNESS TO LAND USE AND LAND COVER AT BRAZILIAN RESERVOIRS DURING EXTREME DROUGHT

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Introduction: Reservoirs are artificial aquatic ecosystems created by damming rivers, and are influenced by different sorts of impacts. Anthropic land use and occupation are one of the main causes of the loss of environmental quality and biological diversity in aquatic ecosystems. The objective of this work was to evaluate the effects of land use and occupation on the taxonomic and functional richness of benthic macroinvertebrates in reservoirs in the Brazilian semiarid region during a period of extreme drought. **Material and methods**: The study was conducted in six reservoirs located in the semiarid region from Brazilian Northeast (Paraíba and Rio Grande do Norte states): Sabugí, Passagem das Traíras, Cruzeta, Cordeiro, Sumé and Poções. The collections of benthic macrofauna, physical and chemical variables of water and the mapping of land use and occupation were performed for the years 2014 and 2019, in June and September. The sampling period was characterized as the most severe drought in the last 50 years in this study area. The land use and occupation were verified through the semi-supervised classification method of images captured by the Landsat 8 satellite, within 100 meters of the reservoir margin. The diversity of benthic macrofauna was analyzed through the taxonomic richness and functional richness, according to five functional characteristics: feeding trophic groups, breathing mode, voltinism, body size and body protection. To check for significant differences in physical and chemical water variables and taxonomic and functional richness among land use and land cover categories we performed PERMANOVA test. **Results and Discussion**: Seven land use and land cover categories were found in the reservoirs studied in the years 2014 and 2019, these are: water, agriculture, pasture, exposed soil, human occupation, open vegetation (native and exotic species of small/medium size with continuous spacing) and tree/shrub vegetation (native and exotic species of medium/large size with associated herbaceous stratum and predominance of semi-continuous dorsel). In all reservoirs the prevalent-use was pasture. Physical and chemical variables of water varied significantly among land use and land cover types, they were soluble reactive phosphate ($p=0.02$), total phosphorus ($p=0.002$) and water volume ($p=0.01$). The highest concentrations of total phosphorus were associated with predominant human occupation and soluble reactive phosphate with agriculture. The highest percentage of water volume was associated with a predominant use of tree/shrub vegetation. In reservoirs of semiarid regions with low connectivity due to intermittent rivers and extreme drought periods, adjacent anthropic activities such as agriculture, pasture and human occupation are the main external sources of nutrients. The taxonomic and functional richness of benthic macrofauna was higher in areas of open vegetation, however, it did not vary significantly between land use and land cover categories. **Conclusions**: Our results show that the effects of anthropic use and occupation in reservoirs associated with water scarcity lead to the homogenization of the macrobenthic community, which can generate negative consequences in processes sustained by the community.

Keywords: Benthic macroinvertebrates. Anthropic impact. Diversity. Brazilian semiarid.

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DECLARATION OF INTEREST

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this manuscript.

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