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Limnological characteristics and trophic state of a newly created site: the Pareja Limno-reservoir

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The creation of dams in the riverine zone of large reservoirs is an innovative action whose primary goal is to generate water bodies that ensure a stable level of water there. We have termed these bodies of water "limno-reservoirs" because their water level becomes constant and independent of the fluctuations occurring in the main reservoir. In addition, limno-reservoirs represent environmental initiatives with corrective and/or compensatory effects. Pareja Limno-reservoir, located near the left side of Entrepeñas Reservoir (Guadalajara province, central Spain), is one of the first initiatives of this type in Spain. We are investigating the hydrology, limnology, microbiology, siltation risk and other aspects of this site. This research has a special interest since the building of limno-reservoirs is rising in Spain. To acquire knowledge about their behavior may be helpful for further constructions. In fact, every new reservoir building project usually includes a limno-reservoir. Moreover, there are many initiatives related with the construction of this kind of hydraulic infrastructures in the reservoirs under exploitation.

This work focuses on the limnological study of the Pareja Limno-reservoir. To conduct this research, twelve seasonal sample collections at two sampling points (the dam and inflow zones) have been made in Pareja Limno-reservoir, from spring 2008 to winter 2011. The primary goal of this study is to describe the limnological characteristics of the limno-reservoir. Special interest is placed in the study of the trophic state through different indicators (nutrients, transparency, phytoplankton and zooplankton populations), as the European Water Framework Directive objective is to achieve a "good ecological status" in every aquatic ecosystem by 2015.

The results of the study show that the Pareja Limno-reservoir follows a warm monomictic water stratification pattern. Water was slightly alkaline and conductivity values were mostly over 1000 μS cm^{-1} due to the high $SO_4^{=}$ concentrations. The highest N and P levels were found in the winter, whereas the highest chlorophyll $a$and phytoplankton biomass values were found in the summer and autumn. The total zooplankton species richness was high, especially in the inflow zone. Globally, the results obtained suggest that the Pareja Limno-reservoir is oligo-mesotrophic, so it may be under the WFD requirements, although some differences were found using a variety of trophic state criteria.