

TITLE: SEASONAL DIVERSITY OF BACTERIA AND ARCHAEA COMMUNITIES IN NATURAL SHALLOW LAKES SEDIMENT OF CERRADO

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ABSTRACT

Lentic ecosystems are important landscape components in the Brazilian Cerrado, nevertheless still less studied. In particular, the microorganisms richness in the sediments is one of the crucial aspects for understanding the functioning of these ecosystems. The objective of this work was to characterize seasonally the Bacteria and Archaea diversity in the sediment of two shallow, acid and oligotrophic lakes of Cerrado (Lagoa Bonita in Estação Ecológica de Águas Emendadas – Planaltina, Federal District, Brazil and Lagoa Cabocla in Campo de Instrução de Formosa – Formosa, Goiás, Brazil), which differ in area and depth of water column. Four sampling were conducted between May 2014 and March 2015, comprising the transition between rainy-dry seasons, dry season, transition dry-rainy and rainy season. Three replicates of the superficial layer (0-5 cm) of the sediment in both lake and seasons were collected. The diversity of bacteria and archaea communities in the sediment was accessed after total DNA extraction and subsequent submission of the product to techniques of polymerase chain reaction (PCR) and pyrosequencing of the 16S rRNA gene by 454 GS-FLX Titanium platform. The sequences obtained were analyzed using the QIIME (Quantitative Insights into Microbial Ecology) software. Were identified 45 bacterial phyla and additional bacterial group not classified in the lower domain level of the taxonomy hierarchy. Distributed in these phyla, 943 bacterial genus were recovered. Concerning archaeal communities, three phyla were identified, one group given as “uncultured archaeon” and one group more indicated as “unclassified”. Into theses groups, 78 genus were recovered. The calculations of the alpha-diversity index showed high richness and diversity of the bacterial and archaeal communities in all lakes and seasons. By Factorial Anova test, there are not differences in the bacterial diversity between the two lakes. However, the Lagoa Bonita showed greater richness and diversity of the Archaea domain than Lagoa Cabocla, which may be associated with greater depth of Lagoa Bonita. Regarding seasonality, the greater diversity of Bacteria domain and richness of Archaea communities were observed during the dry season. The results represent a baseline for the characterization of the microbial diversity in aquatic ecosystems with low anthropogenic impacts and may guide future studies of environmental impacts and conservation these ecosystems in Cerrado.

Keywords: Central Brazil, lentic ecosystems, metagenomics, microbial diversity, tropical lakes.

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