TITLE: THE INFLUENCE OF SOIL WATER CONTENT ON SOIL BACTERIAL COMMUNITIES IN THE CERRADO BIOME

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ABSTRACT:

An intensive recent occupation process has transformed the Cerrado biome, a savanna in Central Brazil, into the most important region for cattle ranching and intensive plantation commodity crops. Because of this, understanding how land use affects microbial communities is fundamental for the sustainable management. The aim of this work was to determine the bacterial soil communities variations, according to changes in water availability during the wet and dry seasons in soils associated with three areas in Cerrado biome: a native cerrado area, a pasture in use and a pasture planted with tree species. Cerrado, the Brazilian savanna, is characterized by a ground layer of grasses, shrubs and trees. Pasture areas were planted with *Brachiaria brizantha.* For the pasture restoration, the plantations were mixed with native species, prioritized those of multiple uses: medicinal and food that add value to legal reserves and with important ecosystem functions. Bacterial community composition was determined by barcoded pyrosequencing of the 16S rRNA gene. Of the 17 phyla identified in these soils, nine phyla (Verrumicrobia, Proteobacteria, Planctomycetes, Firmicutes, Chloroflexi, Bacteriodetes, AD3, Actinobacteria, and Acidobacteria) were abundant; eight phyla (WPS-2, TM7, TM6, SPAM, Armatimonadetes, Chlamydiae, Elusimicrobia, Gemmatimonadetes) were considered low-abundance. The phyla Acidobacteria and Proteobacteria and the group "unclassified bacteria" were predominant under all areas. In the native cerrado area, the bacterial community profile showed a diverse pattern of distribution, without a dominant group. Acidobacteria were dominant in pasture in use and pasture planted with tree species, followed by Firmicutes, Planctomycetes and Proteobacteria. Our results showed that the bacterial community was significantly affected by different uses of the three areas. In wet season, with the increased of soil moisture content, the phyla Acidobacteria and Planctomycetes were predominant in the areas of cerrado and pasture in use. In the pasture area planted with tree species, in the dry season, Planctomycetes were dominant. Seasonality of the precipitation was an important factor to differentiate the bacterial communities between the sampled areas.

Keywords: Cerrado native area, pasture area, bacterial communities, seasons.

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