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Biological attributes in integrated crop-livestock-forestry (ICLF) systems in the Maranhão State Amazon, Brazil

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Soil microbial biomass Carbon (MBC) and Nitrogen (MBN) are indicative of the changes caused by different systems of land use and soil management. The evaluation of biological quality of soil is a strategy that aims to define appropriate systems for maintaining and improving the sustainability of agricultural enterprises. This research aimed to determine the levels of MBC and MBN of the soil microbial biomass in six agricultural management systems. Soil samples were collected within each system/management, at Muniz Farm, in the municipality of Pindaré-Mirim - MA, in a Haplic Plintosol, at 0-0.1 m depth, during the rainy season of 2017, in 4 replications, in all systems. The evaluated systems were (T1) corn intercropped with *brachiaria* grass and double rows of eucalyptus every 28 m implanted in 2016; (T2) corn intercropped with *massai* grass; (T3) corn intercropped with *massai* grass and double rows of *sabiá* tree (*Mimosa caesalpiniaefolia*) every 30 m implanted in 2017; (T4) corn intercropped with *massai* grass and babassu (native palm); (T5) corn intercropped with *massai* grass, babassu and double rows of *sabiá* tree every 30 m implanted in 2017; and (T6) *brachiaria* grass pasture (reference treatment). In each soil sample, the levels of MBC and MBN were determined. The analysis of variance of the data was performed by the F test. The averages were compared by the Tukey test. The MBC variable from T6 area (637 mg kg⁻¹ of soil) was higher in relation to T1 (343 mg kg⁻¹ soil), T2 (238 mg kg⁻¹ of soil), T4 (210 mg kg⁻¹ of soil) and T5 (203 mg kg⁻¹ soil). However, T6 did not differ from T3 (433 mg kg⁻¹ of soil). The highest concentration of MBN was observed in T6 (2.4 mg kg⁻¹ of soil). In general, the biological attributes of soil were significantly affected as a function of the soil management. The *brachiaria* grass pasture presented the highest activity when compared to other silviagricultural systems evaluated in 2017.

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