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Organic Matter and Soil Aggregation under Crop-Pasture Rotation in Tropical Environment.

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The West-Central region is very important for the agricultural production in Brazil. In this environment, the No-Tillage (NT), associated to the annual crop and pastures rotation, is recognized as the soil management system more adapted to reconcile productivity with sustainability. To study the effects of soil management systems, on the aggregation and the dynamics of the Soil Organic Matter (SOM), three long-term experiments, located in state of Mato Grosso do Sul, Brazil, were evaluated with relation to the concentration and the stocks of Total Organic Carbon (TOC) and of C in its fractions, as Particulate soil Organic Matter (POM) and associated to the Minerals Of the soil (MOM). It was also determined the aggregation of the soil through dry and wet sieving method, the Mean Weight Diameter (MWD) and the Index of Aggregates stability (IAE). The management systems studied was constituted of annual crops, under NT and Conventional Tillage (CT), continuous pasture (Brachiaria sp.), crop-pasture rotation with soybean under NT, and Natural Vegetation (NV) area. The systems with continuous pastures or in rotation with annual crops, presented the largest stocks of TOC and larger aggregation of the soil. Important effect of the pastures was verified in the formation of macro-aggregates, whose stability was positively related with the concentration of TOC in the soil. The relationships among the accumulation of C in the soil and the protection provided by the occlusion of POM and the decomposition difficulty of MOM inside the aggregate also are discussed. The medium rates of accumulation of C in the soil (0 to 20 cm) in comparison to the annual crops system, for crop-pasture systems rotation were 0.42 Mg ha⁻¹ year⁻¹ and continuous pasture of 0.84 Mg ha⁻¹ year⁻¹. The concentration of C in the fractions of the SOM, MWD and stocks of TOC, made possible calculation quality indicators of soil management systems (C Management Index, Stratification Ratio and Order Level), which evidenced the importance of the crop-pasture rotation under NT on this environment.

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