

Behavior of the organic matter as indicators of the soil quality under soil management systems, Northeastern Brazil, in experiment long-term

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ABSTRACT

The corn (*Zea mays* L.) is the main cereal produced in Brazil and is cultivated in about 14 million hectares. To obtain sustainable yields of this cereal must establish appropriate management systems to keep the soil organic matter and associating crops in succession, with conditions adapted to soil and climatic characteristics of the region. The corn (*Zea mays* L.) is the main cereal produced in Brazil and is cultivated in about 14 million hectares. To obtain sustainable yields of this cereal must establish appropriate management systems that maintain soil organic matter and associating crops in succession, with conditions adapted to edaphoclimatic characteristics of the region. The edaphological conditions of the tablelands in the Northeastern Region of Brazil during ten year of evaluation in long-term plots was studied. The experimental split-plot design was used, with three randomized replications, performing 12 treatments that associate three soil management systems (CC - conventional tillage, cm - minimum tillage, PD – No- tillage) and four green manure species rotations: peanut (*Arachis hypogea* L.), beans (*Phaseolus vulgaris* L.), coverage:pea (*Cajanus cajan* L.) and sunn hemp (*Crotalaria juncea* L.), rotated with sweet corn (*Zea mays* L.). The aim of this study was to analyze the effect of different cropping systems and plants in succession to corn (*Zea mays* L.) on carbon storage and soil N in long-term experiment conducted in a Argissol in the Coastal Plains the state of Sergipe, Brazil. As main results, after ten years of conducting the experiment it was concluded the no-tillage system presented the highest average compared to other cropping systems, this fact was probably due to low tillage, which provided a greater increase in plant residues of cover crops. The highest contents of total N in soil under no-tillage are the result of lower decomposition rate of MO in this system. Besides this fact, the superficial location of crop residues reduces soil-residue contact, slowing decomposition. Other effects, such as non-mechanical fractionation of the waste, lower temperature, higher humidity, lower soil aeration and preservation of surface aggregates, contributing to lower rates of organic N mineralization. The total organic carbon, no-till had higher results compared to other cropping systems. The deployment time of no-tillage crop succession and promote changes in carbon stocks in soil depths evaluated. Minimum tillage systems and no tillage contributed significantly to the increased levels of total nitrogen, possibly due to the large plant cover present in these systems. The higher values for carbon storage in soil were found at a depth of 10-20 cm. The system of continuous cultivation had the lowest inventory values of N, with the use of plant succession.

Keywords: No-tillage, Nitrogen, Corn, Tillage systems