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CARBON AND NUTRIENT STOCKS IN CRONOSSEQUENCY OF CROPS UNDER NO-TILLAGE SYSTEM IN THE EASTERN AMAZON

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Different cropping systems and agricultural management can influence changes in organic carbon and nutrient stocks, interfering with soil quality. The objective of this study was to evaluate the influence of no-tillage (NT) system on carbon and nutrient stocks (P, K, Ca and Mg) on a Yellow Latosol (Oxisol) of the Eastern Amazon. The study was conducted in the municipality of Paragominas, southeast Pará, in an area under chronosequence of NT crops, using a completely randomized experimental design, with four replications, in subdivided plots. The plots were composed of management systems and depths (0-10, 10-20, 20-30 and 30-40 cm) were considered in the subplots. The management systems were: NT with nine (NT9), eleven (NT11), thirteen (NT13), fourteen (NT14) and fifteen (NT15) years of adoption, plus a reference treatment (native forest-NF). The stocks of organic carbon and nutrients (P, K, Ca and Mg) were adjusted to the same soil mass. Regardless of the depth, organic carbon stocks in NT9 (28.1 kg ha^{-1}) and NT11 (24.4 kg ha^{-1}) were highest than the other NT15 (18.5 kg ha^{-1}), NT14 (18.3 kg ha^{-1}), NT13 (20.5 kg ha^{-1}) and NF (19.7 kg ha^{-1}). These results may be due to management practices, such as subsoiling, carried out in areas under NT with longer adoption times, which may have caused oxidation of organic matter and as a consequence of carbon stocks. In the soil surface layers, the P stock increased in function of the time of adoption of the NT, observing that in the depth of 0-10 cm the quantities were equivalent to 18, 24, 26, 28 and 40 kg ha^{-1}, respectively, for the areas under NT9, NT11, NT13, NT14 and NT15. At depths of 10-20 cm, P stocks were equivalent to 12, 15, 18, 20 and 20 kg ha^{-1}, respectively, for the same management systems. In the 0-10 cm layer, NT15 (464 kg ha^{-1}), NT14 (484 kg ha^{-1}) and NT13 (453 kg ha^{-1}) presented highest K stocks than NT9 (360 kg ha^{-1}) and NT11 (238 kg ha^{-1}). However, in the other layers, we observed an inverse behavior, in which the NT9 and NT11 presented the highest stocks of K, in relation to the other systems. In the 0-10 cm layer, with the time of NT adoption, there was an increase in Ca and Mg stocks. However, in the subsurface layers the stocks were reduced over time of NT adoption, especially in NT13, NT14 and NT15.

Keywords: phosphorus stock, management systems, Oxisol.

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