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Soil organic carbon (SOC) is of primary importance for maintaining soil functions, and agricultural management practices may significantly influence physical properties, SOC and crop yields. Importantly, in a scenario with straw removal for bioenergy production, the adoption of no-tillage during sugarcane crop renovation could be an opportunity to offset possible adverse effects on soil quality and crop yields. A field experiment was carried out in an Oxisol (sandy soil) located in Quatá-SP (22º14'S–50º42'W), southern Brazil, to assess the effects of no-till (NT) on selected physical properties, soil C stocks and sugarcane yields in relation to conventional tillage (CT) on a short-term basis (three crop cycles). Trials were established in a randomized block design with four replications and two management systems: CT and NT. Disturbed and undisturbed soil samples were collected for determination of SOC content, soil bulk density (BD), total porosity (TP) and soil resistance to root penetration (PR), and stalk yields were accounted through an instrumented truck equipped with a loading cell. The short-term effects of adopting NT during sugarcane crop renovation showed evidences of higher SOC content to a depth of up to 40 cm, with significant differences in the upper layer of soil (Tukey's test, $p<0.05$). Although not statistically significant in deep sub-soil layer (0-100 cm), a transition from CT to NT significantly increased soil C stocks at a rate of 0.5 Mg ha^{-1} yr^{-1} in the 0-40 cm layer ($p<0.05$). The data also showed significant differences in soil physical attributes for both treatments over three years ($p<0.05$), with reductions in TP and increases in BD and PR. Differences between treatments on physical attributes occurred only in the first crop cycle ($p<0.05$), in which NT presented higher PR compared to CT. Regarding the impact of tillage management on stalk yields, there was no difference between CT and NT in terms of biomass production. These results suggest that additional long-term studies should be encouraged to fully understand the potential of conservationist management practices coupled with controlled traffic as a key strategy for improving soil physical quality and increasing cane yields. Our findings support the conclusion that NT increased C stock, while the degradation of soil physical quality occurred for both treatments over the assessed period, especially because of intense machinery traffic during sugarcane crop management.

Keywords: *Saccharum* spp., soil quality, physical attributes, soil carbon, soil management, no-till
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(8015 - 2288) Soil structural properties under addition of crop residues and limestone

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Soil structure depends on physical, chemical, and biological factors. The interaction of these factors is a result of quantity and quality of residues and other inputs added to the soil, as well as their physicochemical conditions. Liming is an essential management practice in acid soils. When in excess, liming alters the electrolytic solution of the soil with impacts on its structure. In this sense, negative charges increase with pH, reducing the attraction between clay particles and resulting in increased clay dispersion and soil aggregate destabilization. In Brazil, Oxisols under no-till management system with biomass production lower than 12 ton/ha/year, the concentration of limestone in the uppermost soil layer aggravates these effects. The readily dispersed soil clay increases the concentration potential in the percolated water through soil profile, resulting in clay deposits into soil pores, and, consequently, changes pore size and continuity. These processes decrease soil permeability to water and air, and increase soil density in subsurface layer, soil penetration resistance, and soil susceptibility to erosion. The results of a study carried out in an Oxisol, located at subtropical region of Brazil confirm these statements. Liming at the soil surface or the incorporation of limestone in the topsoil layer of 0–5 cm depth increased soil pH to values higher than 7.0 and the electronegative potential of the surface of soil colloids, enhancing clay dispersion in topsoil layer. The migration of the clay through soil profile altered soil structure in subsurface layer, obstructing soil pores, reducing pore continuity, and increasing soil density and soil penetration resistance. In another study, in the same soil, associating liming on the soil surface or the incorporation of limestone in the layer 0-15 cm deep, soybean monocropping under no-till (production of crop residues lower than 4 ton/ha/year) or crop diversification with two or more harvests per year under no-till system (production of crop residues higher than 12 ton/ha/year), clay dispersion increased only with soybean monocropping. Conversely, in crop diversification with two or more crops per year, the high stability of soil aggregates avoided clay dispersion. Thus, liming, that is essential to acid soil management under no-till, should always be associated to production models that produce crop residues in amount, quality, and frequency, in order to maintain the stability of their aggregates.

Keywords: oxisol; clay dispersion; soil pH; production model; no-till
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(2300 - 2101) Structural changes of dystrophic yellow latosol in the function of the adoption of the direct plantation system

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Soil compaction is one of the main problems encountered in conventional agriculture because it affects the physical quality of the soil, hindering the root development of the plants. This effect is enhanced by the intense traffic of agricultural machinery. With the use of no-tillage, soil compaction and density are less intense due to the reduction of machine traffic, without the soil preparation steps required in the conventional method. In this way, the objective of this work was to evaluate the compaction and density history of a clayey eutrophic Yellow Latosol soil, during the implantation of the no-tillage system in the bean crop. This study was developed at IFES Campus Santa Teresa, state of Espírito Santo, in the period of August 2014 and July 2015, in a sample mesh of 3 x 10, measuring 20 x 20m each, totaling 12 data collection points all georeferenced through the demarcation of latitude and longitude with the aid of GPS. Initially, the planting of melga (sorghum spp.) was carried out in order to form the vegetative cover on the soil, after the sowing of the bean (phaseolus vulgaris L.) variety Ouro Vermelho, under the central pivot system. Three soil physical characterization analyzes were carried out, one prior to the planting of the melga, another after the development of the same, and the last one in the development stage of the bean crop. The parameters of density and resistance to penetration (at 12 points) at different depths (0.0 - 0.20 and 0.20 - 0.40 m) were evaluated. It