



2ND BBEST

Brazilian BioEnergy Science and
Technology Conference

20-24 October, 2014

Soil tillage system and the effect on sugarcane initial development of plants at Guaira-SP

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Keywords: no tillage, sugarcane, soil conservation

Researches involving soil tillage systems for crops are done for a long time with the purpose of increasing yield and environmental conservation and costs reduction. After 5 years (a common cycle for sugarcane in Brazil, one plant cane plus 4 ratoons) without till the soil, the compactation due to mechanization decreases the yield and tillage is needed to prepare the soil. In the other hand, no tillage is important to reduce GGE (greenhouse gasses emissions) from the soil. In order to enhance the knowledge about sugarcane soil tillage this study evaluated the effects of no-till, reduced and conventional tillage soil systems on initial development of plants at Guaira-SP. The experiment was carried in an Oxisol in a commercial area of sugarcane (variety IAC95-5000, in Guaira, SP). A field experiment was plotted in randomized blocks with four replications. The treatments consisted on (1) no till – soil without ploughing and disking, planting by a mechanized machine; (2) reduced till – subsoiling at 50cm depth + planting by a mechanized machine and 3) conventional tillage – ploughing, disk harrows, subsoiling at 50cm depth and planting by a mechanized machine. In all the treatments the planting machine applied fertilizers planted 18 buds per meter and covered the lines. The sugarcane was planted in April 2013 and plant growth was evaluated at 71, 140, 231, 279 and 334 days after planting using biometric methodology. It was evaluated number of tillers ($n \cdot m^{-1}$), height (m), stalk diameter (mm) and dry weight of biomass (green leaves, dry leaves and stalk in $kg \cdot ha^{-1}$). Statistical analysis of variance and Tukey tests to compare treatments's media were done. For biometric parameters and time a split plot scheme and regressions curves were determined. There was no significant interaction between tillage system and time of plant development and there were also no significant differences between treats for any variables studied. In the last period of evaluation, the average of tillers was 12.2 tillers m^{-1} , 2.2 m height and 32.2 mm of diameter, while dry weight of biomass were 3,3 $t \cdot ha^{-1}$ (green leaves), 7,9 $t \cdot ha^{-1}$ (dry leaves) and 13,9 $t \cdot ha^{-1}$ (stem) with final sugarcane biomass of 25,1 $t \cdot ha^{-1}$. The highest rate of biomass sugarcane accumulation was observed closed to 213 days after planting. It is possible to conclude that until 334 days of IAC 95-5000 cycle there is no differences for plant growth submitted to no tillage system, reduced tillage or conventional tillage of sugarcane for the conditions of Guaira-SP. It is important to point that it was expected to find decreases in yield due to no tillage system. It is a good opportunity to improve environmental conditions if it is possible to have the same yield in no tillage system. Although, a long time experiment will give more data and more consistent conclusions.

Financial Support: Embrapa - Brazil