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Controlled traffic farming in no-tillage system in southern Brazil

Tiago De Gregori Teixeira[1]; Telmo Jorge Carneiro Amado[1]; Geovane Boschmann Reimche[1]; Emanuel Roggia[1]; Darlan Preuss[1]; Marcieli Piccin[1]; Arthur Kich Buhse[1]; Enza Rigon[1]; Gustavo Henrique dos Santos[1]

UFSM[1]

The increasing food demands are requiring the adoption of enhancing crop productivity techniques that are more economically profitable, and especially environmental friendly. Aiming the land usage efficiency and soil and water conservation, the no-till system is well adapted with tropical soils, climate and crops and is adopted in the most part of annual crop producers in Brazil. One of the common problem that areas managed under no-till face are the surface and subsurface soil compaction, harming annual crop root development. Soil compaction reduces micropores so affecting water infiltration capacity thereby stimulating the surface runoff water and consequently favoring the occurrence of rill and interrill erosion favored by steep relief. The increase in density in soil under no-till can be caused by a number of factors, such as cattle, or disorderly displacement of implements and soil managed under excessive soil moisture. Also, the increase of weight of new agricultural equipment by keeping similar area of soil contact, can contributed to compaction. The aim of this work is to study the controlled traffic technique to reduce random compaction in an area managed under no-tillage. For this purpose, traffic lines were established taking into account relief surveys and area format, adjusting the gauges and work widths of the equipment in order to reduce unnecessary strides. The implements have been adapted to work with a width of 3.05m, since the working widths of the seeder and harvester are 9.00meters (m), while the sprayer works in the width of 27.00m. The experimental area is located in the municipality of Carazinho - RS, southern Brazil, presenting a soil classified as a dystrophic Red Oxisol and the Cfa type climate. The first results indicate that areas managed by traffic control when compared to tradition traffic present higher soil density (0.72%), macroporosity (26.41%) and total porosity (1.01%), while lower microporosity (-4.44%) Results show that soybean cultivated during 2016/17 summer season yield 10.9% higher grain yield and the cover crop (oat) during the 2017 winter season, cultivated after summer crop, presented 33.63% higher dry mass, under traffic control treatments compared to traditional ones.

Keywords: sustainable farming, traffic intensity, soil compaction management, porosity, soybean

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