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PHYSICO-HYDRICAL ATTRIBUTES OF AN ALBAQUALF CULTIVATED UNDER CONVENTIONAL TILLAGE AND NO-TILLAGE SYSTEMS

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The Pampa biome portion located in the Rio Grande do Sul State, Brazil has about 5.4 million hectares of lowlands. The recently introduction of rainfed crops associated with surface drainage technologies has been diversifying the traditional rice-livestock production system. The objective of this study was to evaluate the effect of tillage systems on soil physico-hydrical attributes of an Albaqualf under conventional tillage and no-tillage system. The study was carried out during a soybean crop cycle in two experiments installed at the Lowland Experimental Station – Research Centre of Temperate Agriculture, Capão do Leão, Rio Grande do Sul State, Brazil. The no-tillage system (NTS) was installed in November 2006 while the conventional tillage (CT) was installed in November 2013, after a fallow period of three years. Soil samples with undisturbed structure were collected in the 0.00-0.10; 0.10-0.20 and 0.20-0.40 m soil layers to determine the macroporosity (MA), microporosity (MI), total porosity (TP), bulk density (BD) and soil water retention curve (SWRC) related attributes such as: water content at field capacity (θ_{FC}), permanent wilting point (θ_{PWP}), and available water (AW). Matric potential was monitored with soil sensors and water storage was calculated during the soybean crop cycle. The experimental treatments were submitted to analysis of variance and means were compared by Duncan test ($p<0.05$), using the software Statistical Analyses System Institute. Both tillage systems showed MA smaller than 0.10 m^3 m^{-3}, posing limiting conditions for gas exchange and water infiltration, however, on NTS it was observed higher values of MI in the 0.00-0.10 m soil layer and, in the 0.10-0.20 m soil layer, it was found higher MA, TP associated with lower BD, indicating improvements in soil structure when compared to CT, probably, due to the development of diversified root systems, reduction of machine traffic and continuous supply of organic matter to the soil surface. The θ_{PWP} was not affected by the soil tillage, but it was observed higher AW and θ_{FC} in the 0.00-0.10 m soil layer of the NTS. According to the shape of the SWRC, NTS promoted higher water retention capacity than CT in the 0.00-0.10 m soil layer, resulting in more available water during the whole crop cycle. Considering the cultivation of rainfed crops such as soybean in lowlands of the Pampa biome, apart from the management system, the low MA mean values seem to be the main soil physical limitation, however, the NTS was more effective to improve soil structure and use of water resources.

Key Words: No-tillage; *Glycine Max* (L.) Merr; soil porosity; available water capacity; soil water storage.