

Soil water retention of Savannah Oxisol in recovery

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In planning the recovery of a degraded area, civil works and removal of soil layer, the major challenge to be achieved is the establishment of A horizon, so from there, the process is catalyzed by the biosphere, other horizons may arise as the natural conditioning. Water retention is primarily dependent on the particle size distribution of the soil structure, mineralogy and organic matter, a second consideration, the use and soil management will affect soil retention and water content. The Savannah Oxisol is under human intervention techniques for recovery to seven years, having been used a Savannah tree species, green manure, sewage sludge and pasture. The experiment was conducted at the Teaching and Research Farm of the Faculty of Engineering, Campus of Ilha Solteira, University of São Paulo State (UNESP), in Selvíria, Mato Grosso do Sul, Brazil. The geographical coordinates of 51° 22' west of Greenwich and 20° 22' South, at 327m altitude. The study was conducted in degraded area, where a soil layer of 8.60 m thick for use in earthwork and foundation Hydropower Plant Ilha Solteira, São Paulo, was withdrawn. The experiment was conducted in February 2004 and this research was in January 2011. The research design was randomized blocks with six treatments, five replication and the treatments were: 1- Control - bare soil (without management); 2- species tree- *Astronium fraxinifolium*; 3- *A. fraxinifolium*+*Canavalia ensiformis*; 4- *A. fraxinifolium* fodder *Raphanus sativus* by 2005 was replaced in 2006 by *Crotalaria juncea*; 5- *A. fraxinifolium*+*Brachiaria decumbens*+sewage sludge (60 t ha⁻¹, dry basis). We studied the condition of Savannah native vegetation. In two soil layers, from 0.00 to 0.05 and 0.05-0.10 m were studied: soil water retention and texture. Analyses of water retention were carried out under lower pressure, 0.006 MPa employing the voltage table. To the strains of 0.05; 0.10; 0.20; 0.50 and 1.50 MPa, we used the Richards camera. Also used to obtain the water retention in the soil the apparatus WP4-T Analyzer (Potential water with temperature controller), manufactured by Decagon Devices, and this unit is used for higher voltages, 5; 7; 10; 15 and 20 MPa. The choice of this method of analysis is due to the fact that reading the water potential for soil sample is obtained quickly allowing the determination of water retention curves in the soil within a few days. The treatment *A. fraxinifolium*+*Brachiaria decumbens*+ sewage sludge management is the best for the degraded soil recovery under study. The water retention in the soil was a good indicator of recovery.