



Soil moisture and soil loss study under different cover densities in Ultisols in Pernambuco State semi-arid (Brazil)

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Throughout Brazil occurs a large loss of soil and water runoff due to soil erosion especially in rural areas. The soil moisture monitoring has been a practice increasingly important in agriculture, especially in regions where water scarcity is high and rainfed cropping is adopted. The soil cover is one of the factors that minimize these effects of degradation arising from agricultural land use. To monitor the water content in the soil profile, point measurements were performed using an FDR equipment, which is a capacitance probe, Diviner 2000[®] model, the Sentek Pty Ltd, Australia. The objective of this study was to investigate the dynamics of soil water content under different types of ground cover, using a probe and the Diviner soil loss in the semi-arid Pernambuco. The study was carried out in the Municipality of Pesqueira-PE, located in the State of Pernambuco, in the Alto Ipanema Representative Basin, with average annual rainfall of 730 mm and average annual potential evapotranspiration of 1683 mm. The soil of the study areas is classified as Eutrophic Yellow Ultisol abruptly (Area A) and typical Eutrophic Yellow Ultisol (Area B). For this, study three experimental plots were installed in two different areas, totalling six plots, bounded by brick, with 4.5 m wide and 11 m long in the direction of the slope, under three soil cover conditions. The treatments involved in this study are: bare soil (SD); with cactus (P) and natural cover (CN). The water content in soil was evaluated at 0.10, 0.20 and 0.30 m at the soil profile and sediment sampling were carried out fortnightly between April and July 2011 (rainy season). In this work we used cumulative precipitation for seven and fourteen days before the readings with the Diviner probe. The highest rainfall is concentrated during the months of May and July of 2011, and May is the month with the highest cumulative rainfall. April received the lowest rainfall, considered the driest. The water content in the soil indicates that in all treatments there was a greater storage of water with increased rainfall and reduced runoff. In area A treatment with CN had a larger increase in moisture at all depths. These results prove that the presence of vegetation is important for the semi-arid region, especially during drought periods. In the area B, at a depth of 0.10 m, the cactus had the highest increase of moisture, while at depths of 0.20 and 0.30 m above the ground there was a lower water storage. This result is related to the fact that in areas with high vegetation density results in a higher water consumption due to the demand of the plants, resulting in less moisture compared to the bare soil plot. The erosion results obtained show that the highest soil losses occurred in the condition without cover and it can be verified that it was influenced by the presence or absence of cover used and demonstrated to be effective (CN and P) to control erosion, providing a greater protective effect in the soil to reduce the area exposed to the raindrops impact.