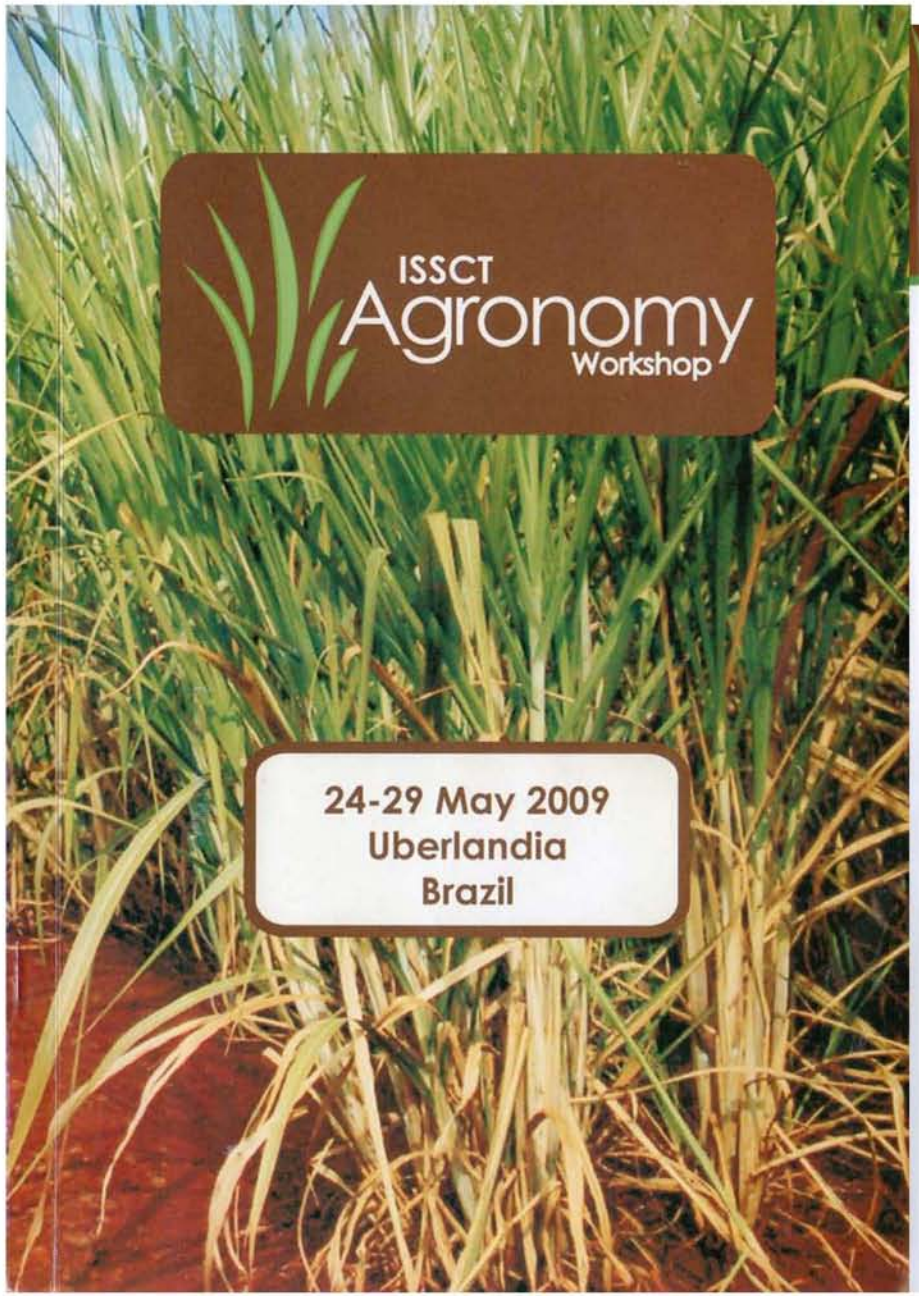

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SOIL CORE SAMPLING OR ROOT COUNTING ON TRENCH PROFILE FOR STUDYING ROOT SYSTEM DISTRIBUTION OF SUGARCANE

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The root system and particularly the root length density (RLD) is a key factor for sugarcane water and nutrient uptake, but it is difficult to measure. No standard method is currently available for assessing RLD in the soil. A new in situ methodology for studying sugarcane root length density 2D distribution was tested. It involve root intersection counting (RIC) on a soil profile with a 0.05x0.05 m mesh grid and modeling RLD from RIC. This model was published (Chopart et al.2008). The methodology was compared to a conventional soil core-sampled method (COR) at four dates of the cropping season, eight soil depths and three horizontal distances from the row. COR and RIC methods gave similar RLD results. A good relationship between COR and RIC was found (48 samples ranging from 103 to 104 m m-3, R^2= 0.756, slope = 0.999, root mean square error = 39%, mean bias = 2.3%). RLD profiles of COR and RIC (mean of four dates and 12 replications) were closed at each 0.1 m between 0 and 0.6 m without statistical difference. Total RLD between 0 and 0.6 m was 7300 and 7100m/m^2 for COR and RIC respectively. RIC method was tenfold less time-consuming than COR. RIC can be carried out in the field without exporting soil samples, the RLD spatial 2-D variability can be assessed in relation to the soil properties. The RIC method was thus found to be suitable for studying 2-D relationships between the soil, tillage and the sugarcane root distribution in the field.

Keywords: sugarcane, root mapping, root study methods, Saccharum spp, trench-profile method.