



The distribution and growth of roots for four sugarcane cultivars irrigated by a subsurface drip irrigation system

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The use of subsurface drip irrigation (SDI) in sugarcane cultivation is an interesting cultural practice to improve production and allow cultivation in marginal lands due to water deficit conditions or to reach high yield and to increase longevity of plants. The SDI allows improving the water use efficiency, due to the application of water and nutrients in the root zone plants. It is necessary knowledge of soil and plant parameters, such as root system to improve irrigation system use efficiency. However, despite of the agronomic importance, few studies of sugarcane roots have been performed. The use of root scanner is an alternative to the evaluation of the root system. The mentioned equipment enables the continuous study of the roots throughout the cycle and for many years, but data about the use of this method for sugarcane are scarce. The aim of this study was to determine the distribution and growth of roots for four sugarcane cultivars root system. The field experiment was carried out in Campinas SP Brazil, with IACSP95-5000, IACSP94-2094, IACSP94-2101 and SP79-1011 cultivars. The irrigation was performed by subsurface drip system and the soil moisture was monitored by capacitance probes. Three access tubes with 1.05 m-length were used for each cultivar. The images were caught with Root Scanner CI-600TM in two dates, 38 and 58 days after harvest (DAH) of cane-plant, in the second cycle (1st cane ratoon) in five depths and were analyzed by the software RootSnap!TM. The results show that, except for cultivar IACSP94-2094, more than 80% of root length was found in the first 0.40 m of soil profile. Until 38 DAH the root growth of cultivar IACSP94-2101 were approximately fourfold higher than other three ones in the 0 to 0.20 m layer, sevenfold higher to 0.20 to 0.40 m layer and threefold to 0.40 to 0.60 m soil profile layer. However, between 38 and 58 DAH the cultivar SP79-1011 presented higher growth taxes, being almost twofold higher than IACSP94-2101 at 0 to 0.20 m soil profile layer, although its growth rate for the other soil profile layers were between 38 and 57% of IACSP94-2101 rate. Compared to IACSP94-2101 and SP79-1011, the other two cultivars presented fivefold and sixfold lower growth rates in root length between 38 and 58 DAH in the first two layers, respectively. The higher root length in minirhizotron surface was with 0.64 cm cm⁻², found in the 20-40 cm layer of IACSP94-2101, while the overall average was 0.15 cm cm⁻². The percentage of root length in deeper layers increased between the first and second analyses.