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Plant development and yield of four sugarcane varieties irrigated by a subsurface drip irrigation system in Campinas, Brazil

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The biofuel production is a growing concern on modern society due to the agricultural sustainability, in which both food and energy supply should be taken into account. The agroclimatic zoning indicates that sugarcane expansion in Brazil can only take place in marginal lands, where water deficit occurs and irrigation is necessary. 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 attain high yield and to increase longevity of plants. In this context it is necessary to investigate responses of different varieties to water supply. The aim of this work was to evaluate the plant development and yield of four sugarcane varieties irrigated by a subsurface drip irrigation system in Campinas, Brazil in the 1st cane ratoon cycle. The field experiment was carried out in Campinas SP Brazil, with IACSP95-5000, IACSP94-2094, IACSP94-2101 and SP79-1011 cultivars in the 1st cane ratoon cycle, from January (after the harvest of cane plant cycle) to October (harvest the 1st cane ratoon cycle). The plant spacing was 1.5 m between rows. Each cultivar was planted in an area of 0.4 hectares. The irrigation was done by a subsuperficial drip system with one drip line in each plant row installed at 0.25 m deep. During the 1st cane ratoon cycle the parameters were analysed on the 33rd, 123rd, 185th and 277th day. The analysed parameters were: plant yield (m), leaf area index (LAI) and yield (tons per hectare). According to the results from the second sampling (123rd day) the varieties IACSP95-5000 and IACSP94-2101 showed higher plant height when compared to the other varieties. However, from the third sampling (185th day) on the IACSP95-5000 variety grew considerably taller than the other varieties. The varieties SP79-1011and IACSP94-2101 presented lower values of LAI throughout the crop cycle when compared to other varieties. But on the third evaluation (185th day) DAP the LAI obtained in IACSP94-2101 variety reached a value close to that observed in IACSP94-2094. On the first two evaluations at 33rd and 123rd days the values achieved by varieties IACSP95-5000 and IACSP94-2094 were similar. On the last assessment the highest value of LAI was observed in IACSP95-5000 variety, reaching 6.47 LAI. From the second evaluation the highest value of yield were observed in IACSP95-5000 variety. On the last evaluation variety IACSP95-5000 yield reached over 140 tons per hectare. This productivity was 37%, 51% and 64% higher than the values obtained in the varieties SP79-1011, IACSP94-2101 and IACSP94-2094, respectively. This variety reached the greatest plant growth (height and LAI) and the highest yield in the first ratoon cane cycle under subsurface drip irrigation system. Based on the obtained results this variety has shown promise for cultivation under subsurface drip irrigation system.