



Subsurface drip irrigation in different planting spacing of sugarcane

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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 deficits conditions. The SDI provides better water use efficiency, due to the water and nutrients application in root zone plants. However, it is important to investigate the long-term effect of irrigation in the yield and technological quality in different ecological condition cultivation. Thus, the aim of this work was to evaluate the effect of SDI in sugarcane cultivated in different planting spacings on technological quality, yield and theoretical recoverable sugar during four cycles of sugarcane cultivation. The experiment was carried out at Colorado Mill, Guaíra, São Paulo State in Brazil, in a clay soil. The experiment was installed in randomized blocks, with six replications. The treatments were three different planting spacings (S1 – 1.5 m between rows; S2 – 1.8 m between rows and S3 – planting in double line of 0.5 m x 1.3 m between planting rows) which were subdivided in irrigated and non-irrigated plots. In S1 and S2 treatments were installed one drip line in each plant row and in treatment S3 one drip line was installed between the rows with smaller spacing (0.5 m). The RB855536 genotype was used and the planting date occurred in May, 25th 2005. The analyzed parameters were: percentage of soluble solids (brix), percent apparent sucrose juice (Pol), total recoverable sugar (ATR), yield and theoretically recoverable sugar (RTR). Four years of yield (plant cane and first, second and third ratoon) were analyzed. Data were submitted to variance analysis and the averages compared by Duncan test at 5% probability. Two months before the first harvest a yield estimate was realized. According to the observed results the irrigated plants provided increase of about 20 % compared to non irrigated plants. However there was a great tipping of plants specially in irrigated plots. The increase of stem yield due to irrigation was observed in the ratoon sugarcane cycle and promoted significant effect in RTR in the last two ratoons sugarcane cycles. There were no negative effects in technological attributes by using irrigation. On the other hand in second ratoon the irrigation improved Brix, Pol and ATR in relation to non irrigated plants. The use of double planting spacing provided higher of stem yield when compared to simple spacings, with an average gain per cycle of 13.4 and 11.1 Mg ha⁻¹ in relation to treatments S1 and S2 respectively. The double rows planting improved RTR in plant-sugarcane and also in second ratoon sugarcane cycles in relation to other spacings. There was no interaction between irrigation and spacing on production of stems. The stem production presented positive interaction between irrigation and spacing only in the second cycle of sugarcane ratoon. In this case higher RTR yield occurred in irrigated plots in double spacing cultivation (S3). The irrigation promoted higher yield when compared to rainfed cultivation, with average values of 141.3 and 132.4 Mg ha⁻¹, respectively. The irrigated sugarcane plants provided higher RTR compared to non irrigated ones averaging 1.5 Mg ha⁻¹, representing an increase of approximately 6 Mg ha⁻¹ in four yields cycles. In general, results showed beneficial use of irrigation by SDI in sugarcane over the four years of production.