Effect of irrigation systems on sugar cane production

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(Qtwo field experiments were conducted at EI_Mataana Station qena governorate) in two successive seasons of 1992 and 1993 toevaluate the relative effect of some irrigation systems (Drip and Furrowirrigation) and nitrogen fertilizer (150, 180 and 210 Kg N/fed.) on thequalitative and quantitative properties of three sugar cane varieties (G.T.54-9, F. 153 and G. 74-96). The obtained results could be summarized as follows:1- Irrigation systems and/or the used varieties had no significanteffect on the number of tillers /m, there was a tendency to theincreae in number of tillers as nitrogen dose increased up to210kglfed.However,the differences between nitrogen levels failed toreach the level of significance in their effect on this character at 120. days age. 2- Drip irrigation system surpassed the furrow irrigation in stalkheight by 5.3% and 50/0at harvest in the first and second season,respectively.There was a significant and gradual increase in stalk height byincreasing doses of nitrogen fertilizer up to 210 Kg N/fed in the firstseason. Meanwhile, nitrogen fertilizer had no significant influenceon stalk height in the second season at harvest.Variety G.T. 54-9 attained a significant superiority in respect to . plant height over the other two varieties followed by F.153 at harvest in the first and second season .Plant heighet was significantly affected by the interaction between variety andirrigation at 360 days age in both seasons and at harvesr in the firstone. 3- There was an insignifcant difference between the two irrigationsystems in stalk diameter. Drip irrigation slightly improved sugarcane thickness compared to the other one. Nitrogen fertilizer appeared a significant effect on stalk diameter except at 240 and 300 days after planting in the first and second seasons, respectively. Increasing nitrogen doses up to 21 kg/fed.increased the stalk diameter in both seasons . The highest values of stalk diameter were recorded for G.']'.54-9 variety (3.06 and 3.01) followed by F.l53 (2.79 and 2.79) then G.74- 96 (2.78 and 2.72) in both seasons.4- Irrigation systems had an insignificanteffect on elongation rate (ER) at the different periods of growth in both of the two growingseasons.Nitrogen fertilizer showed a significant and gradual increasein the ER as nitrogen levels increased up to 210 Kg/fed at 240 -300 days only in both seasons.The three studied varieties were. significantly only at 300 - 360 days in the first season and at 240-300daysin the second season differed in ER at the early stage ofgrowth.The highest ER value was attained by G.74-96. 5- There was insignifcant difference between the two irrigation systems on total soluble solids percentage (TSS%) in both seasons. TSS% responded negatively to the addition doses of nitrogen fertilizer. The variety G.74-96 recorded the highest values of TSS% (21.02% - 21.53%) followed by F.153 (20.27%..21.39%) . then G.T. 54-9 (19.79% - 20.66%) at 420 days in the first andsecond season, respectively. 6- There was an insignficant effect on nitrogen percentage in sugar cane leafblade due to irrigation systems. Nitrogen fertilizer gave a significant increase in nitrogen content of sugar cane leaf blade at120 days age in first season and at different stages of growth in thesecond season. There was insignifcant difference between the usedvarieties in nitrogen content of sugar cane leaf blade except atharvest in the second season.7- There was no significant differences for the irrigation systems as well as nitrogen fertilizer or the used varieties on their effect on nitrogen content in the stalks of sugar cane plants in both seasons.8- Drip irrigation system somewhat insignificantly raised sugar contentin tenus of brix percentage in both seasons, increasing nitrogendoses (150, 180 and 210 Kg/fed.) significantly decreased Brix%(22.160/0,21.59 and 19.89), respectivelly in the second season, thedifferences between the used varieties did not

reach the level ofsignificance in Brix%.in both seasons 9- Irrigation systems, nitrogen fertilizer and the used varieties had an insignificant effect on reducing sugar percentage in both seasons . except nitrogen fertilizer in the second season. Reducing sugarpersentage increased with increasing nitrogen levels up to 210 kg/fed. 10- Drip irrigation system improved sucrose percentage over furrow irrigation which amounted to 3.22 % and 5.11% in the first and second season, respectively. Nitrogen fertilizer had a reverse and significant effect on sucrose percentage in juice of sugar cane plants in both seasons; meanwhile the used varieties had nosignificant effect on sucrose percentage in both seasons.11- Irrigation systems had no significant influence on fiber percentagein sugar cane stalks, there was a signifcant effect on fiber percentage in stalks of sugar cane plants due to the different doses . of nitrogen fertilizer and the used varieties in both seasons, fiberpercentage increased by increasing nitrogen levels F.153 varietygave the highest values of fiber percentage (13.22% and 13.32%)in the first and the second season.respectively. Fiber percentage wassignificantly affected by the interaction between irrigation andnitrogen in the first season only.12- The differences between the irrigation systems and the usedvarieties on their effect on purity percentage did not reach the. level of significance. Moreover, increasing nitrogen doses decreasedpurity percentage in juice of sugar cane stalks, where the highestnitrogen doses gave the lowest values of purity percentage in bothseasons.13- Sugar cane recovery percentage was not influenced by varieties andirrigation systems in the first and second seasons. Nitrogen fertilizerapplication attained a statistical influence on sugar recoverypercentage, the lowest rate of nitrogen 150 Kg/fed produced thehighest sugar recovery percentage 12.59% in the first season and10.81%, in the second one.14- Irrigation systems and nitrogen fertilizer failed to attain a significantincrease in the number of millable cane in both seasons. Sugar caneties appeared a statisrical effect on this cahrater in the secondseason, F.153 exhibited a superiority over the two other varietiesconcerning number of millable cane in the first and second season.15- Drip irrigation system attained an increase of 13.38% and 9.16% incane yeild over the furrow irrigation system in the first and second season,respectively, without significant differences between them. Increasednitrogen doses up to 210 Kg/fed increased cane yield significantly in bothseasons, the higher addition doses of nitrogen (210 Kg/fed) the higher caneyield. (48.42 and 53.26 tons/fed). There was a statistical differencebetween the used varieties in their stalk yield, sugar cane variety G.T. 54-9registered the highest cane yield 48.72 and 53.06 tons/fed.in the seasons,respectively. 16- Drip irrigation slightly improved sugar yield, compared to furrowirrigation in both seasons. There was a gradual and significantincrease in sugar yield by increasing nitrogen doses up 210 kg/fed.The highest sugar yield was obtained by the application of 180-. 210kgN/fed. Variety G.T. 54-9 surpassed the other two varieties insugar yield which recorded 5.49 and 5.34 tons/fed. in the first andsecond season, respectively. 17- The interaction between irrigation systems, nitrogen fertilizer and different varieties did not significantly affected the studiedcharacters except stalk height which was significantly affected by irrigation x varieties interaction at 360 days age in the first and second seasons as well as at harvest in the first season.Fiber percentage was significantly affected by the interaction . between irrigation and nitrogen fertilizer in the first season only.Recomndation Under the shortage of the available water and based on thepromessing results of this study ,it could be noticed tbat using drip irrigation system ratianed more than 6 tbousands n?’ofwater cold used to reclaime new area. In summary ; it is necessary to carry out an intensive study on the effect of drip irrigation on the physical properties of soil.