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
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The Effect of Water Deficit on Yield and Yield Components of Sugar Beet

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**Abstract:** This study was conducted to determine the effect of different water levels on the sugar rate, sugar yield and root yield of sugar beet (*Beta vulgaris* L.) under Kahramanmaraş climatic conditions in the production season 1999-2000. A line source sprinkler irrigation system was used with 6 irrigation levels;  $I_1$ ,  $I_2$ ,  $I_3$ ,  $I_4$ ,  $I_5$  and  $I_6$ . The sugar beet row adjacent to the lateral was denoted the most water applied level ( $I_1$ ), and the most remote row from the lateral was denoted the least water applied level ( $I_6$ ). The plant rows between levels  $I_1$  and  $I_6$  were taken as the deficit irrigation levels in variably decreasing amounts. In the first (1999) and second (2000) years of the experiment, the total amount of irrigation water applied in a season was 1232 mm in 1999 and 1331 mm in 2000, while the amounts of water consumed ( $E_t$ ) were 1446 mm and 1491 mm lively respect. For level  $I_1$ , sugar rates were 17.2% and 15.1%, sugar yields were 9870 kg ha<sup>-1</sup> and 9420 kg ha<sup>-1</sup>, and root yields were 57 360 kg ha<sup>-1</sup> and 62 350 kg ha<sup>-1</sup> in 1999 and 2000, respectively. Reductions in applied irrigation water increased sugar rates and reduced  $E_t$  and root yield. For level  $I_6$ , the amount of irrigation water applied in a season was 298 mm and 429 mm,  $E_t$  levels were 495 mm and 587 mm, sugar rates were 18.9% and 18.3%, sugar yields were 1820 kg ha<sup>-1</sup> and 2050 kg ha<sup>-1</sup>, and root yields were 9630 kg ha<sup>-1</sup> and 11 210 kg ha<sup>-1</sup> in 1999 and 2000, respectively. Irrigation water use efficiency (IWUE) and water use efficiency (WUE) levels for  $I_1$  were 46.6 kg ha<sup>-1</sup> mm<sup>-1</sup> and 39.7 kg ha<sup>-1</sup> mm<sup>-1</sup> in 1999 and 46.8 kg ha<sup>-1</sup> mm<sup>-1</sup> and 418 kg ha<sup>-1</sup> mm<sup>-1</sup> in the 2000, respectively. Both IWUE and WUE values varied with the amount of applied irrigation water. The root yield increased as the applied irrigation water increased, and a linear relationship was found between these 2 parameters.

**Key Words:** Sugar beet, deficit irrigation, water consumption, line source sprinkler system

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