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The Effects of Deficit Irrigations on Corn Yield and Water Use Efficiency

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Abstract: This study was carried out to determine the effects of deficit irrigations on grain yield and water use efficiency (WUE ET) of corn under Çukurova conditions. Irrigation management treatments were created as 100%, 80 %, 60 %, 40 %, 20 % and 0 % replenishment of water depleted in the 120 cm soil profile from the 100 % replenishment treatment in every ten days. In the experiment, corn was irrigated 6 and 7 times in 1993 and 1994, respectively, and a total of 752 mm to 823 mm or irrigation water were applied to $I_1$00 irrigation treatment, in which water use was determined as 999 mm and 1052 mm in 1993 and 1994, respectively. Grain yield obtained from the $I_1$00 treatment, 1001.5 kg/da in the first year and 1003.5 kg/da in the second year of the experiment. Yield obtained from the $I_8$0 treatment, which received 20% less water as compared with $I_1$00 , was not significantly different from the full irrigation treatment. Beyond the I 80 level, deficit water application resulted in significant yield reduction by affecting both seed mass and kernels per ear. Significant second power and linear relationships were found between grain yield (Y) vs seasonal irrigation (I), and grain yield vs water use (ET), respectively. In the first and second year of the experiment, the yield response factor (ky) was determined as 1.08 and 1.61, respectively. Irrigation water use efficiency (IWUE) and water use efficiency (WUE ET) were found to be between 1.0-2.43 kg/da- mm and 0.22-1.25 kg/da-mm, respectively for the treatments studied.

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