

Effect of Tape and Furrow Irrigation Systems in One and Two Planting Patterns on Yield and Water Use Efficiency of Corn

S. Samadvand^{1*}, M. Tajbakhsh¹, K. Anvari² and J. Ahmadaali³

(Received: Oct. 30-2012 ; Accepted : April 24-2013)

Abstract

An experiment was performed at the Miyandoab Agricultural Research Station to study yield and water use efficiency of furrow and tape irrigation systems in one-row and two-row planting patterns, and to investigate density of grain corn SC704. The experimental design was a completely randomized block arranged in Strip Split Plots with three replications in 2010. Irrigation treatments were applied in vertical plots, and planting arrays of different densities were applied in horizontal plots in the form of split plots. The vertical plots were comprised of four irrigation treatments, including three levels (80%, 100% and 120%) of water requirement by use of drip tape irrigation and 100% of water requirement in furrow irrigation, and the horizontal factor was a planting array in the form of single-row and two-row planting patterns and the sub factor was comprised of three levels: 75, 90 and 105 thousand plants per hectare. The results showed that furrow irrigation had the highest rate of grain yield, about 18.6 ton per hectare, and the treatments of tape irrigation of 120%, 100% and 80% had 18.4, 18.2 and 14.9 tons per hectare, respectively. Although the furrow irrigation treatment had higher yield than the rest, there was no significant difference between treatments except for the 80% of tape irrigation. Thus, by utilizing tape irrigation without a great decrease in the yield, water use efficiency improved. The comparison between treatments of tape irrigation of 80%, 100%, 120% and furrow irrigation led to grain yields of 2.3, 2.2, 1.9 and 1.4 kg/m³, respectively. Also, the highest water use efficiency and maximum yield were obtained from 90000 plants per hectare.

Keywords: Tape irrigation, Density, Yield, Water use efficiency.

1. Dept. of Agron. and Plant Breed., College of Agric., Urmia Univ., Urmia, Iran.

2. Miyandoab Agric. Res. Station, Miyandoab, West Azarbayjan, Iran.

3. West Azarbayjan Agric. and Natur. Resour. Res. Center, Urmia, Iran.

*: Corresponding Author, Email: sarasamadvand@yahoo.com