Effect of the Amount of Irrigation and Nitrogen Fertilizer Splitting on Grain yield, Yield Components and Water Productivity of Corn under Subsurface Drip Irrigation

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Abstract

Use of subsurface drip irrigation (SDI) in row plants is increasing due to higher water and fertilizer efficiency. In order to investigate the effect of SDI levels and nitrogen fertilizer splitting on yield, yield components and water productivity of corn, a field study was conducted in 2018 as split plot experiment based on a completely randomized block design with three replications at the research farm of Urmia University. The main plots of this experiment including three irrigation levels: 100%, 75% and 50% of net irrigation requirement and subplots included three nitrogen fertilizer split applications as: weekly, every other week and three times during growing season as urea fertilizer. Based on the results, the effect of irrigation levels treatment and number of fertilizer splitting on yield, yield components and water productivity were significant at 1% level. However, the effect of fertilizer splitting on water productivity was not significant. Interaction effects of the two variable treatments on plant height and leaf area index were significant at 1% level but did not significantly affect grain yield, biomass and water productivity. The highest grain yield and corn biomass were obtained with 22.39 and 39.85 ton/ha for complete irrigation, respectively. Also, the grain yield and biomass in the three- split treatments were highest with 18.47 and 32.56 ton/ha, respectively. The highest water productivity was obtained by irrigation application of 75% of net water requirement. It seems that in regions with water scarcity, applying deficit irrigation equal to 75% of the corn irrigation requirement, can be a good solution for saving water and achieving high water productivity. Also, fertilizer injection with higher amounts and less frequency especially at the sensitive growth stages, can be a more effective solution than using lower amounts with more frequent fertilizer application.

Keywords: Deficit irrigation, Grain yield, Water saving

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