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Effect of Partial Root Zone Drying and Deficit Irrigation Techniques for Saving Water and Improving Productivity of Potato

Abdelraouf, R. E.

Water Relations & Field Irrigation Department, National Research Centre , Dokki, Giza, Egypt.
E-mail: abdelrouf2000@yahoo.com

Abstract : Water shortage is the most important factor constraining agricultural production all over the world. New irrigation strategies must be established to use the limited water resource more efficiently. Partial root drying (PRD) is a new irrigation and plants growing technique which improves water use efficiency without significant yield reduction. Two field experiments were carried out during growing seasons 2014 and 2015, it executed in private farm in Baiyala City, Kafer El-Sheikh Governorate , Egypt to study the effect of partial rootzone drying (PRD) and deficit irrigation (DI) techniques for saving water and improving productivity of potato crop. The study factor was PRD technique compared with furrow irrigation "FI" under DI (100% ETc, 75% ETc and 50%ETc). The following parameters were studied to evaluate the effect of PRD technique: 1) Growth of potato, 2) Yield of potato, 3) water productivity of potato "WP_{potato}" and 4) Quality traits like carbohydrates and protein content. Results of statistical analysis for effect of PRD technique on yield, quality traits and WP_{potato} indicated that, there were no significant differences between FI+100%ETc and PRD where, FI+100%Etc>PRD> FI+75%ETc >FI+50%ETc This irrigation technique "PRD" is promising for application in arid regions for saving water up to 50% from crop water requirements.
Keywords: partial root zone drying; deficit irrigation; water productivity; potato; furrow irrigation; water scarcity.

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