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Effect of different irrigation level on yield potato

Elnaz Farajzadeh Memari Tabrizi^{*1} Mehrdad Yarnia², Noshin Farajzadeh¹ and Vahid Ahmadzadeh¹

¹Young Researchers club, Tabriz Branch, Islamic Azad University, Tabriz, Iran

²Department of Agronomy, Faculty of Agriculture, Tabriz Branch, Islamic Azad University Tabriz, Iran

ABSTRACT

Potato tuber products that has an important role in feeding the world with annual production of 31 million tons of food products is important and different types of soil and climatic conditions is growing culture. Potato after wheat, rice and corn for the fourth position and the number of producing countries is in the second after the corn. A factorial experiment based on randomized complete block design with three replications was conducted during growing season of 2009 at Islamic Azad University, Tabriz branch, Agricultural Research Station. Treatments including: irrigation of 70 (control), 110, 150 mm evaporation from basin class A and different varieties of potato, including (Agria, Satyna, Savalan, Kaizr and Markis) respectively. The results showed that water stress decreased yield and lowest yield was in cultivar Markis with 150 mm of irrigation water evaporation basin level and most resistant cultivars in the rate of tuber production with 10.68 numbers has been obtained Satyna. Equivalent of 96.12 percent increase than sensitive cultivars. Therefore aim of this study reaction of different cultivars of potato on different traits

Key words: potato cultivars, different irrigation level and yield.

INTRODUCTION

Potato after wheat, rice and corn accounted for the fourth position and the number of producing countries is in the second after the corn. Potato biodiversity is enormous. Nearly 5000 varieties of potatoes have been detected. However, about 10 other species of Solanum cultivated placed [1]. Water deficiency is one of the most important factors limiting plant growth and dry matter which is the reduction of product quality and lack water soil or air, often during the plant life cycle even outside of the semi-arid and dry areas occurs.

Water, an important factor in the distribution of plant species are ground level and has a set of unique characteristics of the biological importance of many shows, including raising water specific heat of water evaporation and heat balance heat plant is very important also that one of the most important factors in species and population dynamics in the soil keeps[2]. Research has shown that potato plants are very sensitive to drought stress. Root systems in this plant because less than 30 cm soil layer increased accumulation [3]. Camacho *et al*[4] showed that Ajahuri cv had higher water loss in stress condition because of higher leaf development Attaher *et al*[5] reported in experimental for two years and the field evaluation of experimental methods for surface and sub-surface drip irrigation on potato product water requirements at three levels (75%, 100% and 125% of ETc).

The purpose of this study the effect of different amounts of irrigation water in the yield of different cultivars of potato.

MATERIALS AND METHODS

A factorial experiment based on randomized complete block design with three replications was conducted during growing season of 2009 at Islamic Azad University, Tabriz branch, Agricultural Research Station. Treatments consisted of 3 cultivar of potato (Agria, Kayzer, and Savalan) as the first factor and three forms of water application (70,110 and 150 mm water evaporation) as the second factor. Each plot consisted of 4 rows, spaced 75 cm apart. Tuber potato was sown into moist soil to a depth of 4 cm and 25cm apart on the rows. To determine available soil nutrients, samples were taken from 0-30 cm depth analyzed and results are presented in table 1. Based on the results of soil analysis, 300 kg.ha⁻¹ urea, 100 kg.ha⁻¹ triple super phosphate and 150 kg.ha⁻¹potassium sulfate were applied to soil as the starter fertilizer prior to planting. When the plants were at 2-4 and 6-8 leaf stages, thinning, weeding and nitrogen top dressing were performed.

Plots were then furrow irrigated regularly every week in the mornings. During growing period every two weeks leaf area and measured. By mid Nov. an area of 2.5 m² from 3rd line of plot area was separately harvested and yield was evaluated. MSTATC, EXCEL and were used to analyze data and draw graphs, respectively.

RESULTS

-Percent of tuber 30-60mm

Maximum tuber number 30-60 mm was 46.59 numbers in Savalan and minimum achieved by Agria cultivar equal 35.07 that 24.73% reduced (figure 1). Other researchers reported that there are significant differences between different cultivars.

Tuber weight per plant

By figure (2) can be stated that such a significant difference among the different levels of irrigation. Maximum weight of tubers per plant has been Agria cultivar equivalent to 707.7 gr with irrigated water from the surface after 70 mm evaporation from pan evaporation. Minimum weight of tubers per plant equivalent to 429/6 gr with 150 mm of irrigation water evaporates from the surface of the evaporation pan. Irrigation after 150 mm water that has been reduced to

39/29 percent. Deblonde and Ledent [6] reported that Different growth strategies by plants to adapt to different levels of drought without a significant to be used decrease in yield. The highest Tuber weight Savalan, has been equivalent 622/8 g by irrigation after 70 mm evaporation from pan evaporation. Lowest Tuber weight was equal 471/7 gr with the irrigation after 150 mm evaporation from pan evaporation surface.

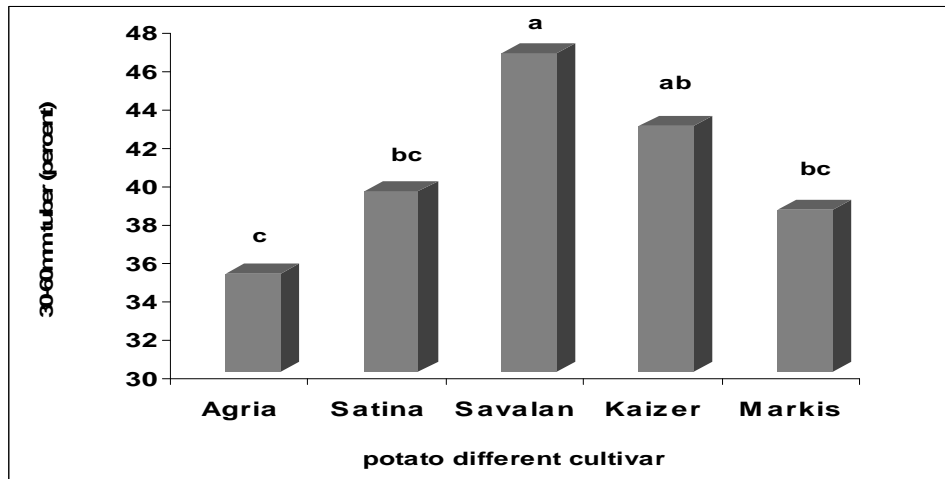


Figure 1) effect of irrigation different level on % of tuber 30-60mm

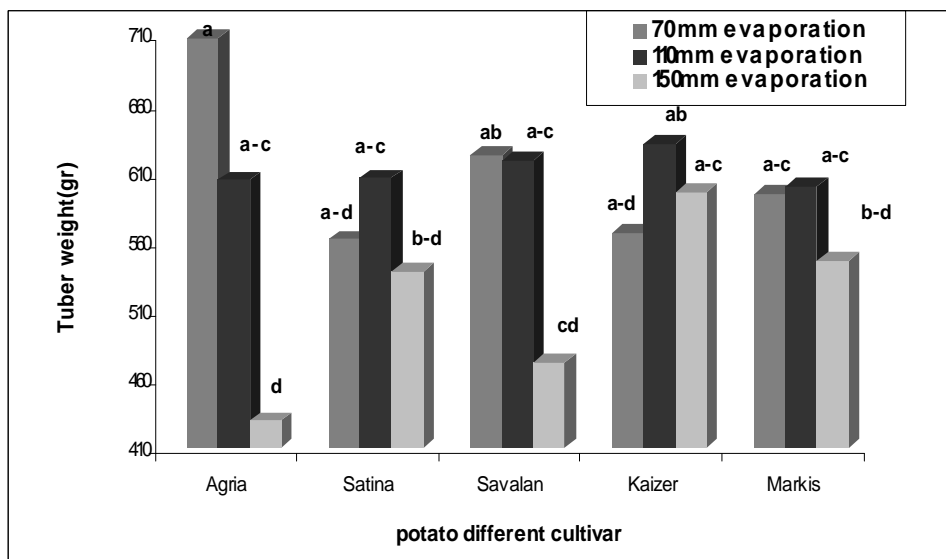


Figure 2) effect of irrigation different level on tuber weight in potato cultivar

Yield

According figure(3) a maximum yield was Agria cultivar 359.8 kg/ha with irrigation after 70 mm of water evaporates from the surface of the pan and minimum yield this cultivar has been 193/9 kg/ha with irrigation after 150 mm evaporation from pan evaporation. By results can be stated that the irrigation of 150 mm of water evaporated from the evaporation pan 46/27 percent decrease yield.

Hassanpanah [7] reported that water stress is one of factor that potato tuber yield can be reduced. Reduction crop yield in physiological traits such as photosynthesis, leaf expansion, leaf senescence, photosynthesis and allocation, and the bulk of the gland is the impact of drought. The minimum number of tubers per hectare was 291.4 kg/ha in Markis cultivar by irrigation after 150 mm evaporated from the surface of the pan.

Miene and De Ronde [8] also stated that the potato is highly susceptible to drought, but the damage to the land, there are significant differences among cultivars. The water treatment reduced the 30/36 percent ratio of yield to the level of control.

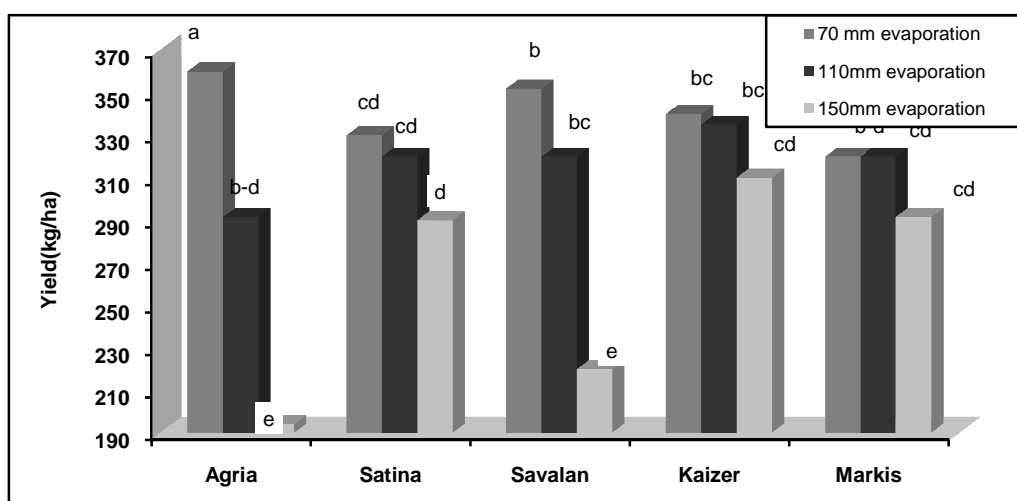


Figure 3) effect of irrigation different level on potato yield

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