SURVEY THE INFLUENCE OF SOWING DATES AND ROW DISTANCE ON SUGAR CONTENT, ROOT YIELD AND SOLAR RADIATION ABSORPTION OF SUGAR BEET IN DIFFERENT PLANT POPULATIONS

Ali Soleymani[1*], Mohamad Hesam Shahrajabian[1]

[1]Department of Agronomy and Plant Breeding, Khorasgan (Esfahan) Branch, Islamic Azad University, Esfahan, Iran.
*e-mail: a_Soleymani@Khuisf.ac.ir

INTRODUCTION: In particular in sugar beet, which is an industrial crop, yield prediction is very important for optimizing the sugar factories' processing campaigns (Sohrabi and Heidari 2008). Puscas et al. (2008) reported that plant density represents one of the factors that condition the sugar beet production level. Awal et al. (2006) reported that the intensity of solar radiation will remain relatively constant and represents a resource that could be used more efficiently for crop production. Having information on planting dates, plant density and row distance between rows is necessary to design a profitable management system.

MATRIALS AND METHODS:
Two experiments were conducted in 2008 and 2009 in Mashhad Agricultural Research Station ($59^o20^/$ E and $36^o13^/$ N), Khorasan province, Iran, to evaluate the effects of planting dates and row distance on sugar content and root yield of sugar beet (Ic1 var.) in different plant densities. The research field features a steppe climate (Köppen BSk) with 250 mm of precipitation per year; the research field altitude is 958 m. A Split-split plot layout within a randomized complete block design with four replications was used in each year. Main plots were planting dates (May 5th, June 10th), subplots were row distances (50 and 60 cm) and Split-subplots were plant densities (8, 10 and 12 plants per m^2). The soil preparation consisted of mouldboard ploughing (20-25 cm) followed by discing and smoothing with a land leveler. Each experimental plot had 10 rows with length of 12 m. The field was fertilized with 120 kg/ha P from triple superphosphate was used. 90 kg N per ha also was used from urea before the plantation. The first irrigation was done immediately after seed plantation. In this experiment root yield (t/ha), sugar content (SC) (%), potassium (meq/100 gr), sodium (meq/100 gr) and Amino-N content of root (meq/100 gr) was measured after harvesting. The portable Lux Meter LX-101 was used in this experiment. For determination of solar radiation absorption (A), equation number 2 was used, before it, light transmission was evaluated (Equation number 1). All statistics was performed with MSTAT-C program (version 2.10).

$$T = 1/10 \times 100 \qquad (1)$$
$$A = 100 - T \qquad (2)$$

RESULTS AND DISCUSSION: In both 2008 and 2009, the highest values of root yield were related to plantation on 5th May. There were not significant differences in sugar content between two planting dates in 2008 and 2009. However, the value of potassium, sodium and amino-N content of root were lower on 5th May than those of 10th June, in 2008 and 2009. The maximum root yield and sugar content were obtained for 50 cm distance between rows. Moreover, the highest sugar content and appropriate root yield were achieved in 10 plants per m^2 in both 2008 and 2009. Planting date on 5th May and 50 cm distance between rows obtained the higher value for time of maximum light interception and time of final harvesting in both 2008 and 2009. Although, 12 plants per m^2 obtained the highest maximum solar radiation absorption in time of maximum light interception and the highest solar radiation absorption in time of final harvesting in both 2008 and 2009, but its differences with 10 plants per m^2 were not significant. The sustainability of cropping systems can be achieved through the choice of new agronomic methods, which are better able than others to exploit natural resources, like solar radiation. Plantation on 5th May and 50 cm distance between rows obtained the highest value for maximum LAI and total dry matter in not only 2008, but also 2009. Appropriate LAI and total dry matter in these two years also were

related to 10 plants per m^2. It is necessary to perform more experiments in different years and locations with various treatments to obtained the exact yield and yield components of sugar beet. Plantation on the basis of 50 cm distance between rows and 10 plants per m^2 gave the best yield and yield components, which is suggested for fields under the condition similar to the present study.

Keywords: Planting date, row distance, sugarbeet.

REFERENCES

Awal M A, Koshi H and Ikeda T. 2006. Radiation interception and use by maize/peanut intercrop canopy. Agriculture and Forest Meteorology 139: 74-83.

Puscas A, Luca E, Barsan S, Ceuca V and Simu Al. 2008. Experimental results obtained in sugar beet crop technology and water consumption specific to Transylvania 's field conditions. Bulletin UASSVM, Horticulture 65(2): 528-532.

Sohrabi Y and Heidari G. 2008. Influence of withholding irrigation and harvest times on yield and quality of sugar beet (*Beta vulgaris*). International Journal of Agriculture and Biology 10(4): 427-431.