

Effect of Nitrogen Foliar Application in Different Growth Stage on Canopy Light Receiving on 3 Polygerm Sugar Beet Yield

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ABSTRACT

An experiment was conducted on three sugar beet cultivars(IC, PP22 and 7233) and different application method of Nitrogen in a RCBD base factorial in three replication in 2005. Results showed that there was significant difference between light receiving in bottom and head of canopy among cultivars. N affected this attribute also. In IC the highest light receiving to bottom and head of canopy and yield in foliar N application at 6-8 leaf stage were 627 PPF, 1198PPF respectively. In soil application and 14-16 leaf stage foliar application of N led to 248 PPF in bottom and 988 PPF in head of canopy, respectively.In IC the least root yield obtained in foliar application at 14-16 stage as 75/2 ton/ha. In PP22 light receiving to bottom and head of canopy was 472 PPF, 1134 PPF for soil and foliar application at 14-16 leaf stage and yield at that stage was 100 ton/ha. There was a %58 and %21 decreasing in light receiving to bottom and head in 6-8 leaf stage in compare with 14-16 leaf stage, foliar application at 14-16 leaf stage led to root yield increasing as %38 and %42 than soil and 6-8 leaf stage application, respectively.

In 7233 cultivar highest light received to bottom was 491 PPF in 14-16 leaf stage which was %17 higher than soil application. The highest light received to head of canopy was 1190 PPF in 6-8 leaf stage foliar application. There wasn't difference between root yield in different method N application in this cultivar. In spite of N fertilizer application led to increase leaf area and light absorption by plant canopy, there is limited information on the higher rates of N application between cultivars.

Keywords: *Beta vulgaris L.* light receiving canopy and root yield.

INTRODUCTION

Sugar beet is a plant ordered to Chenopodiaceous. This crop have very various and consist 4 main group that all of them have agricultural value. In all this groups' chromosome number is 18. Most European new varieties are triploid hybrids of diploid (Thornhill., 1999).

Yield of sugar beet consist of biomes yield, root yield and sugar yield and their economical component are storage root especially sugar (Evans and Fischer., 1999).

Nutrition elements consisted of two group's macro and micro elements plant yield of nutrition elements have similar value for plant growth and loss each one of them can decrease plant yield. Rate

of macro elements required Nutrition elements in tissues equal 1000 microgram in per gr dry matter or more(Oertli., 1979).

Nitrogen is important nutrition material for sugar beet. Nitrogen affected on sugar beet for primary growth and canopy establishment on sugar beet. Good nitrogen management in the season increased plant suitable growth and decreased number day's formation canopy and lasted the crop to use solar energy efficiency (Lamb *et al.*, 2001).

Nitrogen is one of essential nutrition for crop growth. Nitrogen deficient cause yellowing of low leaves downward leaf middle first and after that it becomes brown and at the end leaf tissue (Olson and sander., 1988).

Simpson *et al* (1981)reported that nitrogen deficient cause decreasing leaf area index, deformation of proteins and earlier leaves scenes especially with effect on RUBP carbocsilaz negatively effect on plant photosynthesis. Zhao et al (2005 reported that nitrogen deficiency significantly decrease leaf area extension.

In this experiment crop leaves that have nitrogen efficiency have low sucrose and a lot of sucrose and have lower concentration of nonstructural carbohydrate. Conducting this experiment to evaluation the effect of application methods on sugar beet cultivars.

MATERIAL and METHODS

For studying the effect of N fertilizers and application different methods on sugar beets cultivars an experiment was conducted in Islamic Azad University.Tabriz branch agricultural faculty station in 2005.with 3 replication, three cultivars(7233calibrate,IC and PP22) and Urea fertilizers application with methods arranged in a RCBD base factorials. Light receiving on different situation measured. Soil was loamy sand and pH was weak alkaline averaged (7/8-8/9).(Table 1).

Fertilizer application used in order to soil content and laboratories suggestion. Each experiment plot had 5 rows with 4m length planting distance between rows was 60 centimeter and the distance between two plants on rows was 18 centimeter and planting depth was 4 centimeter. Urea in a complex consisted of nitrogen that used in this experiment, this complex have 46 percentiles pure nitrogen. Soil application amount 300 kg in hectare (half of planting time and half after planting) and urea was used with 5 percent concentration in foliar application. Harvesting carried out for each plot separately in November. For elimination of border effect in each plot harvesting was done from middle rows in area equal to 5m². After harvesting and weighing root took random samples from each plot of root yield to determine of sugar percent.

Analysis includes ANOVA and means comparison carried out with MSTATC program and correction of correlation indexes and multiple regressions with status program SPSS and figure drawn with Excel.

Table 1: soil analysis in 0-30cm depth

Ntot (%)	P (ppm)	K (ppm)	B (ppm)	Silt%	Clay%	Sand%	OC%	TDN%	SpH	EC
0.097	14.84	281	0.91	20	15	65	0.88	4.1	7.8	1.72

RESULT

In IC cultivar maximum light receiving in surface equal 627PPF received with foliar application in 6-8 leafy stage that have significant difference with other application in this cultivar minimum light receiving equal 247/9 PPF with Nitrogen soil application received. Foliar application in 6-8 leafy stage caused 153/085 percent light receiving increased.

In PP22 cultivar hasn't significant difference between levels application. In this cultivar maximum light receiving equal 472/8 PPF with nitrogen soil application received but minimum rate equal 57/89 percent in 6-8 foliar application received. In 7233 cultivar maximum light receiving in surface canopy equal 491/1 PPF with foliar application in 14-16 leaf stage that showed increasing equal 16/79 percent than soil application. In 7233 cultivar minimum light receiving obtained (300/2 PPF) with foliar application at 6-8 leaf stage. Thus we can say that in this cultivar is effected foliar application at 14-16 leaf stage. Maximum light receiving in surface canopy between cultivars equal 403/9 PPF in 7233cultivar achievement.

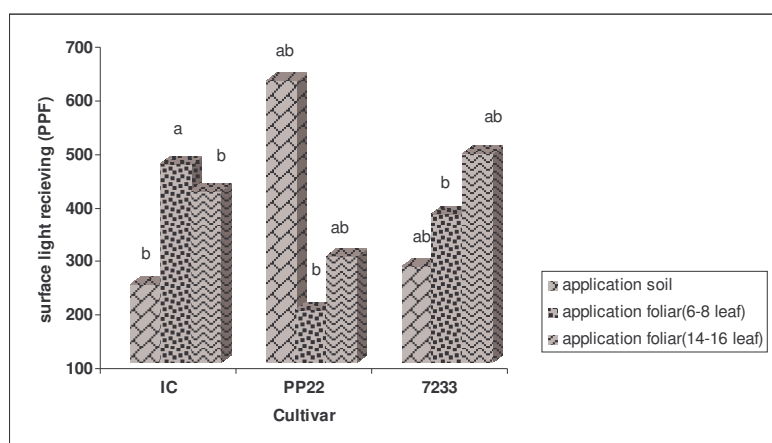


Figure 1. Effect of nitrogen application methods on light receiving in surface on soil sugar beet cultivars

In IC cultivar maximum light receiving in middle of canopy equal 1198 PPF received by foliar application at 14-16 leaf stage and in this cultivar minimum light receiving with nitrogen soil application equal 1172 PPF achievement.

In PP22 cultivar maximum light receiving in middle of canopy equal 1528 PPF received by soil application and this cultivar minimum light receiving by nitrogen foliar application at 14-16 leaf stage. That foliar application in 14-16 leaf stage caused decreasing 21/92 percent in receiving light compare to soil application.

In 7233 cultivar maximum light receiving in middle of canopy equal 1275 PPF received by soil application and in this cultivar minimum light receiving by nitrogen foliar application at 6-8 leaf stage.

Thus there are significant differences of receiving light between different cultivars in middle of canopy. Maximum and minimum receiving light respectively between cultivar in PP22 equal 1349 PPF and IC equal 1182 PPF achievement.

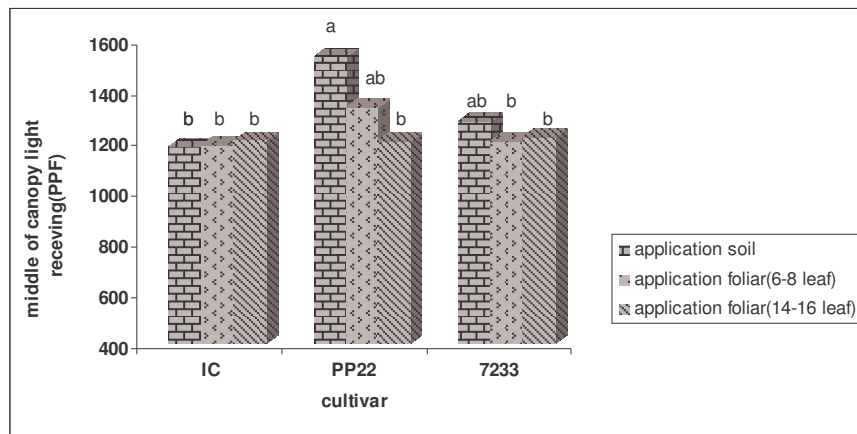


Figure 2. Effect of nitrogen application methods on light receiving in middle of canopy on sugar beet cultivars.

Comparing the mean light receiving on top of canopy in sugar beet cultivars by different treatment nitrogen showed significant difference between the effects of application methods.

Maximum and minimum receiving light respectively between cultivar in IC equal 1198 PPF and 988 PPF by nitrogen application at 6-8 and 14-16 leaf stage achievement.

Maximum light receiving in PP22 equal 1134PPF by nitrogen foliar application at 14-16 leaf stage. Minimum light receiving by nitrogen foliar application at 6-8 leaf stage achievement.

In 7233 cultivar maximum light receiving on top of canopy by foliar application at 6-8 leaf stage equal 1190 PPF showed and minimum by foliar application at 14-16 leaf stage received. There are no differences among root yield in different N application methods in this cultivar.

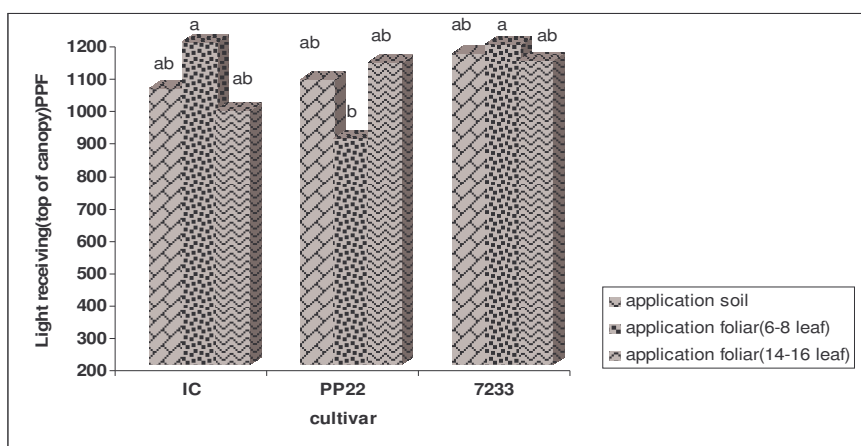


Figure 3. Effect of nitrogen application methods on light receiving on top of soil sugar beet cultivars

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