Bull. Fac.Agric.,Cairo Univ., 62:438- 446, (2011)

RESPONSE OF THREE SUGAR BEET VARIETIES TO COMPOST, MINERAL NITROGEN FERTILIZER AND THEIR COMBINATION UNDER SANDY SOIL CONDITIONS I.GROWTH ATTRIBUTES

(Received:8.9.2011)

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ABSTRACT

Two field experiments were carried out at the Agricultural Experiments Desert Station, Faculty of Agriculture, Cairo University in Wadi El-Natroon, El-Beheira Governorate, during 2008/2009 and 2009/2010 seasons, to study the response of three sugar beet varieties, *i.e.* KWF1436, Swello and Faraha to compost (CM) and Mineral-N fertilizer and their combinations, at five treatments : 4 tons fed^{-1} of (CM), 4 tons fed^{-1} of (CM) +80 kg N fed^{-1} (100% N), 4 tons fed^{-1} of (CM) +60 kg N fed^{-1} (75 % N), 4 tons fed^{-1} of (CM) + 40 kg N fed^{-1} (50 %N) and 80 kg N fed^{-1}(100 % N) on growth attributes of sugar beet under drip irrigation system. The obtained results revealed that the tested sugar beet varieties significantly differed in all the traits under study except for, top dry weight in the 1st season and root diameter in the 2nd one. KWS1436 variety was superior to the other two varieties in chlorophyll a and b in both seasons. The highest leaf area index (LAI), root length and diameter, top and root fresh and dry weight, total dry weight were obtained by Faraha variety in both seasons. Application of 80 kg N fed^{-1} (100 % N) significantly increased the content of chlorophyll, a and b in beet leaves and gave the highest LAI and top dry weight in both seasons and the highest root length in the 1st season. Combination of CM + 80 kg N fed^{-1}, recorded the highest content of carotenoids in beet leaves, root fresh and dry weight and total plant dry weight in both seasons and root diameter in the 1st season. Various interaction orders among the two factors affected significantly all traits except for top fresh weight in the 1st season.

Key words: *compost, growth attributes, nitrogen fertilizer, sandy soil, sugar beet (Beta vulgaris, L.) varieties.*

1. INTRODUCTION

Sugar beet (*Beta vulgaris*, L.) is an important cash crop for Egyptian farmers and also contributes to the local economy. Sugar beet growth is largely influenced by the agronomic practices as crop stand and fertilization, especially in the newly reclaimed soils characterized by low content of organic matter and nutrients. Many investigations have been oriented to optimize using of nitrogen through a better understanding of crop requirements under varying conditions of soil and climate. This is because nitrogen has pronounced effect on growth and physiological processes of sugar beet (Salama and Badawi, 1996; Ghura *et al.*, 2000 and Attallah and El Etreiby 2002). Moustafa and El-Masry (2006) found that application of 120 kg N fed^{-1} significantly increased photosynthetic pigment content (chlorophyll a, b, and carotenoides) and leaf area / plant. Masri (2008) found that root fresh weight was increased with increasing N levels from 90 to 150 kg N fed^{-1} Also El-Sarag (2009) reported that increasing N rates from 60 to120 kg N fed^{-1} increased top fresh weight by 83.3% and root fresh weight by 0.772 and 0.752 kg/plant up to 0.853 and 0.869 kg/plant. Ferweez *et al.* (2011) indicated that adding N fertilizer at 100 or120 kg N fed^{-1} caused an increase in root length by 8.58 and 11.32% and root diameter by 7.78 and 11.84% compared to adding 80 kg N fed^{-1}.

Recently, some investigators tried to utilize the farmyard manure (FYM) to fertilize sugar beet to decrease the cost and minimize the pollution due to mineral fertilizers and drainage water. Furthermore, agricultural use of compost has increased due to the fact that composting represents a low-cost disposal method for organic wastes that improve the physical structure of soil. The rapid growth of organic farming has further

accelerated the use of compost. Compost has been shown to have a positive effect on agricultural soils and crop production, because compost provides a whole array of nutrients for the soil (Seok-In and Hee-Myong, 2009). Mohamed (2008) recorded that fertilizing sugar beet by 2 ton/fed. compost produced the highest values of root length, root fresh weight and root dry weight. Also El habbasha *et al.* (2008) found that saline water irrigation and organic manure significantly affected most of the growth traits. Higher values of root length, diameter, fresh and dry weight and leaf fresh and dry weight were produced by 25.0 m^3 / fed.

Many authors studied the difference between sugar beet varieties. Attallah (2004) evaluated ten sugar beet varieties, and recorded significant differences between them. The highest root weight was 2042.69 and 1821.68 g $plant^{-1}$ obtained from Kawimera and Pamela, respectively. Abou El Seoud *et al.* (2009) tested two sugar beet varieties (Lados and TWS 1436). They found that Lados gave highly significant values compared to TWS 1436 in root length and diameter, root fresh and dry weight, top fresh and dry weight and leaf area index. In contrast, Abd El-Wahab *et al.* (2005) found that the studied cultivars almost did not differ significantly from each other in root length, diameter and weight.

The objectives of this research were to find out the best variety to be grown under the stress conditions (sandy soil and salinity irrigation water of 2496-2650 ppm) and the best nitrogen level with organic fertilizer to obtain the highest growth traits of sugar beet.

2. MATERIALS AND METHODS

Two field experiments were carried out at the Agricultural Experiments Desert Station of the Faculty of Agriculture, Cairo University in Wadi El-Natroon, El-Beheira Governorate, during the two successive winter seasons of 2008/2009 and 2009/2010 to evaluate three sugar beet varieties (KWS1436, Swello and Faraha) to compost (CM) , three rates of mineral-N fertilizer and their combinations, at five treatments : 4 tons fed^{-1} of (CM), 4 tons fed^{-1} of (CM) + 80 kg N fed^{-1}(100% N), 4 tons fed^{-1} of (CM) + 60 kg N fed^{-1}(75 % N), 4 tons fed^{-1} of (CM)+ 40 kg N fed^{-1} (50 %N) and 80 kg N fed^{-1}(100 % N, recommended rate) on growth traits of sugar beet. Treatments were arranged in a split-plot in a randomized complete block design with three replications. The main plots were devoted to varieties, while sub plots were occupied by fertilizer treatments. Plot area was 21 m^2 (6 ridges, 7 cm long and 50 cm apart). Sugar beet was sown on 10 and 15 October in the two seasons, respectively.

All plots were fertilized with 30 kg P_2O_5 /fed. before planting in the form of single super-phosphate (15.5 % P_2O_5) as one dose. 50 kg K_2O fed^{-1} in the form of potassium sulphate (48% K_2O) was added through six equal doses. The first dose was added after thinning and the remaining doses were applied at 7-day intervals. Nitrogen fertilizer was applied at levels of 40, 60 and 80 kg N fed^{-1}, in the form of ammonium nitrate (33.5% N) in six equal doses; the first dose was added after thinning and the other doses were applied at 7-day intervals. Two ton/fed. of compost (CM) was broadcasted on the soil two weeks before sowing. All suitable agricultural practices were conducted in the proper time. The mechanical and chemical analyses of the soil, water and compost analysis were carried out by the Reclamation and Development Center for desert soils, Faculty of Agriculture, Cairo University (Tables 1, 2 and 3). The two field experiments were conducted under drip irrigation system.

2.1.Studied characters:

After 90 days seven plants were taken randomly from each plot to determine - Leaf area index (LAI) which was calculated according to Watson (1958) and photosynthetic pigments (chlorophyll a, b and carotenoides) according to Holden (1965) after 210 days from sowing . At harvest a random sample of ten guarded plants from each plot was taken to estimate the following characters:

1-Average root dimensions [length and diameter (cm)]
2-Average root and top fresh weight (kg/plant)
3- Average root and top dry weight and total dry weight (g/plant).

Data obtained from each season of the study were statistically analyzed according to the procedures outlined by Gomez and Gomez (1984) using M-STAT-C computer program (Freed *et al.*, 1989). The differences among treatment means were compared by Least Significant Difference test (L.S.D) at 0.05 level of propability.

3. RESULTS AND DISCUSSION

3.1. Effect of Varieties

Data presented in Tables (4 and 5) showed that the tested sugar beet varieties responded significantly in all traits under study except for, top dry weight in the 1st season and root diameter in the 2nd one.

3.1.1. Photosynthetic pigments

Table (1): Physical and chemical properties of soil in 2008/2009 and 2009/2010 seasons.

Soil properties	Seasons	
	2008/2009	2009/2010
Physical properties		
Sand %	93.0	92.25
Silt %	4.56	5.19
Clay %	2.44	2.56
Texture	Sandy	Sandy
Chemical properties		
Soil (pH)	7.81	7.75
Ec (ds/m)	7.80	7.50
Organic Matter (%)	0.29	0.32
Total CaCo3 (%)	2.59	2.65
Total N (%)	0.60	0.65
Soluble anions concentration (meq/L) (meq/100g soil)		
Cl^-	77.75	77.0
HCO_3^-	0.51	0.55
SO_4^-	0.52	0.49
Soluble cations concentration (meq/L) (meq/100g soil)		
Na^+	52.0	50.0
K^+	1.00	1.20
Ca^+	17.00	7.50
Mg^+	17.00	18.00

Table (2): Chemical analysis of water sample in 2008/2009 and 2009/2010 years.

Year	pH	EC		Ions concentration meq/L						
	Unit	ds/m	Ppm	$HCO_3^- + CO_3^-$	Cl^-	$SO_4^=$	Ca^{++}	Mg^{++}	Na^+	Ka^+
2008/2009	7.49	3.9	2496	3.7	31.5	7.60	4.5	5.10	34.9	0.50
2009/2010	7.43	4.15	2656	3.2	30.0	7.10	5.0	4.0	30.0	0.42

Table (3): The mean values of chemical composition and DTPA-extractable micronutrients of the used compost

Ec Dsm^{-1}	pH	O.C %	T.N. %	P %	K %	C/N Ratio	Ash %	OM %	Fe	Zn	Mn	Cu
									Mg kg^{-1}			
1.90	7.2	19.1	1.40	0.30	0.98	13.64	80.2	32.65	45.9	14.3	36.0	22.4

Table (4): Mean performance of three sugar beet cultivars for LAI, top fresh weight and photosynthetic pigments in 2008/2009 and 2009/2010 seasons.

Variety	LAI	Top fresh weight (Kg/plant)	Photosynthetic pigments (mg/g f.w)		
			Chlorophyll a	Chlorophyll b	Carotenoids
2008/2009					
KWS1436	10.23	0.581	6.16	2.70	0.95
Swello	10.31	0.638	4.64	2.28	0.94
Faraha	14.11	0.738	5.11	2.51	1.36
$LSD_{0.05}$	0.10	2.7	0.31	0.28	0.06
2009/2010					
KWS1436	10.05	0.705	6.10	2.70	0.94
Swello	10.78	0.682	4.63	2.31	0.92
Faraha	13.61	0.725	5.10	2.49	1.34
$LSD_{0.05}$	0.54	0.6	0.29	0.27	0.06

Table (5): Mean performance of three sugar beet cultivars for root length and, diameter, root fresh weight, top and root dry weight and total dry weight in 2008/2009 and 2009/2010 seasons.

Variety	Root length (cm)	Root diameter (cm)	Root fresh weight (kg/plant)	Top dry weight (g/plant)	Root dry weight (g/plant)	Total dry weight (g/plant)
2008/2009						
KWS1436	23	11.80	1.173	71.50	240.1	311.60
Swello	23	11.80	1.080	72.10	234.2	306.30
Faraha	25	13.20	1.473	94.80	305.2	400.00
$LSD_{0.05}$	1.0	0.10	0.01	N.S.	1.3	1.30
2009/2010						
KWS1436	24	12.30	1.300	84.10	275.40	359.50
Swello	21	12.30	1.267	74.80	253.10	327.90
Faraha	25	12.50	1.384	85.70	282.80	368.50
$LSD_{0.05}$	1.0	N.S.	0.01	0.80	0.80	1.40

N.S.=not significant

Table (6): Effect of fertilizer treatments on LAI, top fresh weight and photosynthetic pigments in 2008/2009 and 2009/2010 seasons.

Fertilizer	LAI	Top fresh weight (kg/plant)	Photosynthetic pigments (mg/g f.w)		
			Chlorophyll a	Chlorophyll b	Carotenoides
2008/2009					
Compost CM)	11.71	0.572	5.24	2.40	0.98
CM+80 kg N	12.04	0.714	4.90	2.26	1.37
CM+60 kg N	10.55	0.653	4.89	2.33	1.05
CM+40 kg N	10.64	0.625	5.49	2.66	1.36
80 kg N	12.81	0.700	6.00	2.82	0.66
$LSD_{0.05}$	0.07	N.S.	0.25	0.13	0.05
2009/2010					
Compost CM)	9.29	0.471	5.22	2.42	0.97
CM+80 kg N	11.55	0.795	4.89	2.28	1.35
CM+60 kg N	10.47	0.756	4.88	2.35	1.04
CM+40 kg N	12.54	0.755	5.41	2.66	1.33
80 kg N	13.56	0.742	5.99	2.79	0.64
$LSD_{0.05}$	0.19	0.2	0.23	0.11	0.04

Table (7): Effect of fertilizer treatments on root length and diameter, root fresh weight, top and root dry weight and total dry weight in 2008/2009 and 2009/2010 seasons.

Fertilizer	Root length (cm)	Root diameter (cm)	Root fresh weight (kg/plant)	Top dry weight (g/plant)	Root dry weight (g/plant)	Total dry weight (g/plant)
2008/2009						
Compost CM)	22	11.5	1.11	69.5	239.9	309.4
CM+80 kg N	24	13.2	1.80	84.8	306.9	391.6
CM+60 kg N	23	12.5	1.11	81.5	269.4	350.9
CM+40 kg N	22	11.5	1.02	74.3	242.0	328.3
80 kg N	26	12.5	1.17	87.4	240.8	316.1
$LSD_{0.05}$	0.1	0.1	0.01	0.1	0.1	0.1
2009/2010						
Compost CM)	21	9.1	0.88	54.7	198.7	253.4
CM+80 kg N	25	13.4	1.49	81.2	346.9	428.0
CM+60 kg N	24	12.0	1.46	86.3	271.1	359.4
CM+40 kg N	25	13.1	1.32	91.4	269.6	361.0
80 kg N	23	14.2	1.44	94.1	265.9	357.9
$LSD_{0.05}$	0.7	0.4	0.01	0.1	0.1	0.1

Table (8): Effect of interaction between sugar beet varieties and fertilizer treatmants on chlorophyll a, chlorophyll b and carotenoides (mg/g f.w.) in 2008/2009 and 2009/2010 seasons.

Variety	Fertilizer treatment	Chlorophyll a (mg/g f.w.)		Chlorophyll b (mg/g f.w.)		Carotenoides (mg/g f.w.)	
		2009	2010	2009	2010	2009	2010
KWS-1436	Compost (CM)	5.78	5.81	2.47	2.54	0.81	0.78
	CM+80 kg N	5.33	5.34	2.18	2.17	1.01	1.01
	CM+60 kg N	6.82	6.77	3.01	3.02	0.75	0.77
	CM+40 kg N	7.63	7.56	3.19	3.16	1.30	1.30
	80 kg N	5.24	5.03	2.66	2.62	0.89	0.87
Swello	Compost (CM)	4.85	4.79	2.24	2.23	1.42	1.43
	CM+80 kg N	4.22	4.19	2.06	2.11	1.45	1.44
	CM+60 kg N	3.48	3.53	1.84	1.88	0.87	0.84
	CM+40 kg N	4.56	4.58	2.27	2.31	0.70	0.66
	80 kg N	6.09	6.08	2.97	3.01	0.27	0.24
Faraha	Compost (CM)	5.09	5.06	2.50	2.50	0.71	0.72
	CM+80 kg N	5.15	5.14	2.55	2.58	1.63	1.60
	CM+60 kg N	4.37	4.34	2.13	2.15	1.54	1.52
	CM+40 kg N	5.82	5.83	2.53	2.52	2.08	2.04
	80 kg N	5.14	5.13	2.83	2.73	0.83	0.82
$LSD_{0.05}$		0.43	0.39	0.23	0.19	0.09	0.08

Table (9): Effect of interaction between sugar beet varieties and fertilizer treatmants on LAI and top fresh weight in 2008/2009 and 2009/2010 seasons.

Variety	Fertilizer treatment	LAI		Top fresh weight (g/plant)	
		2009	2010	2009	2010
KWS-1436	Compost (CM)	8.35	6.66	623.7	475.2
	CM+80 kg N	18.25	15.87	783.7	966.3
	CM+60 kg N	13.7	12.21	642.7	912.2
	CM+40 kg N	5.28	8.32	448.7	700.2
	80 kg N	5.54	7.20	407.7	469.4
Swello	Compost (CM)	9.22	6.59	480.0	400.1
	CM+80 kg N	8.81	11.29	657.0	739.0
	CM+60 kg N	6.17	4.89	522.0	490.0
	CM+40 kg N	15.79	17.52	768.0	850.1
	80 kg N	11.57	13.60	764.0	933.0
Faraha	Compost (CM)	17.56	14.61	612.0	537.2
	CM+80 kg N	9.05	7.49	700.0	678.1
	CM+60 kg N	11.77	14.30	793.0	866.2
	CM+40 kg N	10.85	11.79	657.0	718.3
	80 kg N	21.31	19.87	623.7	823.2
$LSD_{0.05}$		0.12	0.34	N.S.	0.3

N.S.= not significant

Table (10): Effect of interaction between sugar beet varieties and fertilizer treatmants on root fresh weight and root length and diameter in 2008/2009 and 2009/2010 seasons.

Variety	Fertilizer treatment	Root fresh weight (kg)		Root length (cm)		Root diameter (cm)	
		2009	2010	2009	2010	2009	2010
KWS-1436	Compost (CM)	1.000	0.705	22	20	10.2	9.0
	CM+80 kg N	2.282	2.031	29	30	15.2	16.0
	CM+60 kg N	1.076	1.808	20	24	13.2	13.2
	CM+40 kg N	0.704	1.033	19	23	9.2	11.2
	80 kg N	0.805	0.922	21	23	11.2	12.1
Swello	Compost (CM)	1.078	0.831	21	18	11.2	8.2
	CM+80 kg N	1.128	1.426	20	23	11.2	13.2
	CM+60 kg N	0.645	0.613	21	18	10.2	8.8
	CM+40 kg N	1.304	1.454	21	23	13.2	14.1
	80 kg N	1.247	2.011	28	24	13.2	17.3
Faraha	Compost (CM)	1.244	1.091	22	24	13.2	10.1
	CM+80 kg N	2.003	1.013	23	21	13.2	11.0
	CM+60 kg N	1.602	1.967	27	29	14.2	14.0
	CM+40 kg N	1.051	1.473	24	28	12.2	14.0
	80 kg N	1.463	1.374	27	24	13.2	13.2
$LSD_{0.05}$		0.017	0.016	1.0	1.0	0.1	0.6

Table (11): Effect of interaction between sugar beet varieties and fertilizer treatmants on top and root dry weight and total dry weight in 2008/2009 and 2009/2010 seasons.

Variety	Fertilizer treatment	Top dry weight (g/plant)		Root dry weight (g/plant)		Total dry weight (g/plant)	
		2009	2010	2009	2010	2009	2010
KWS-1436	Compost (CM)	63.9	62.4	200.5	197.9	264.3	260.3
	CM+80 kg N	94.0	104.3	322.4	457.0	416.3	561.3
	CM+60 kg N	85.7	100.4	316.6	329.9	402.3	430.3
	CM+40 kg N	62.7	84.0	176.1	201.5	238.8	285.5
	80 kg N	51.4	69.6	185.0	190.8	236.4	260.3
Swello	Compost (CM)	63.4	40.2	239.7	196.1	303.1	236.3
	CM+80 kg N	67.7	80.6	243.8	308.0	311.4	388.6
	CM+60 kg N	60.1	55.7	145.6	137.3	205.7	193.0
	CM+40 kg N	86.8	98.3	292.2	302.4	379.0	400.7
	80 kg N	82.6	99.1	249.5	321.8	332.1	420.9
Faraha	Compost (CM)	81.1	61.6	279.6	202.2	360.7	263.7
	CM+80 kg N	92.7	58.6	354.4	275.6	447.1	334.2
	CM+60 kg N	98.8	102.7	346.0	346.2	444.8	448.9
	CM+40 kg N	73.4	92.0	257.8	304.9	331.2	396.9
	80 kg N	128.1	113.6	287.8	285.1	415.9	398.7
$LSD_{0.05}$		0.1	0.2	0.1	0.1	0.2	0.1

KWS1436 variety was superior compared to the other two varieties for chlorophyll, a and b in the two seasons. While, Faraha variety surpassed the KWS1436 and Swello varieties in carotenoids in both seasons (Table 4).

Growth characters

Data in Tables (4 and 5) cleared that the highest leaf area index (LAI), root length and diameter, top and root fresh and dry weight and total dry weight were obtained by Faraha variety in both seasons. Differences among sugar beet varieties for LAI, top and root fresh and dry weight and total dry weight were also detected by Mohamed (2008). Ouda (2009) showed that root length and diameter of the variety Lados were significantly higher than Athose poly. Also, Al-Labbody (2003) found differences among sugar beet varieties in root length and diameter. It is important to report that the differences between KWS1436 and Swello varieties were insignificant in LAI and root length and diameter in the 1st season.

3.2. Effect of fertilizer treatments

3.2.1. Photosynthetic pigments

Data presented in Table (6) indicated that application of 80 kg N fed^{-1} (100 % N) was more effective and significantly increased the contents of chlorophyll, a and b in beet leaves in comparison to the other treatments in both seasons. Also, it was noticed that, all combined treatments significantly increased carotenoid content as compared with using compost or Mineral-N fertilizer alone in the two seasons in favor of the combination of CM + 80 kg N fed^{-1} which produced the highest content of carotenoids in the two seasons. These results may be due to the role of nitrogen in increasing the vegetative growth of sugar beet plants. These results are in agreement with Moustafa and El-Masry (2006) who reported that N fertilizer increased significantly photosynthetic pigments (chlorophyll, a, b and carotenoids).

3.2.2. Growth characters

Results in Tables (6 and 7) cleared that, all traits under study were significantly affected by N treatment in both seasons except top fresh weight in the 1st season. Application of 80 kg N fed^{-1} recorded the maximum LAI and top dry weight in both seasons and the highest root length in the 1st season.

Application of CM + 80 kg N fed^{-1} give the highest root fresh and dry weight and total dry weight in both seasons and significantly increased root fresh weight by 53.85 % and 3.47 %, root dry weight 27.45% and 30.46% and total dry weight by 23.88 % and 19.59% over adding 80 kg N fed^{-1} in the 1st and 2nd seasons, respectively.

This result may be due to applying organic manure (compost) to sandy soil which plays an important role for improving soil media throughout modifying the pore size distribution and consequently the majority of soil physical properties which is reflected in higher crop production (Badwy, 2008). Application of compost with N increased root length in the 2nd season and root dry weight and total dry weight in both seasons as compared with using compost or Mineral-N alone. In combined treatments increasing N levels from 40 kg N fed^{-1} (50 %N) to 80 kg N fed^{-1} (100% N) significantly increased the values of root length, fresh and dry weight and total dry weight in both seasons.

3.3. Interaction effects

Varieties and fertilizer treatment interactions affect significantly all the studied characters in both seasons except top fresh weight in the 1st season (Tables 8, 9, 10 and 11).

3.3.1. Photosynthetic pigments

Using CM +40 kg N with KWS1436 variety gave the highest values of chlorophyll, a and b (7.63, 7.56 and 3.19, 3.16 mg/g f.w.). While the highest values of carotenoids (2.08 and2.04 mg/g f.w.) were obtained by applying CM + 40 Kg N to Faraha variety, respectively in the 1st and 2nd seasons (Table 8).

3.3.2. Growth characters

The Results in Tables (9 and 11) showed that, applying N fertilizer at the rate of 80 kg N fed^{-1} to the variety Faraha gave the highest LAI (21.31 and 19.87) and top dry weight (128.10 and 113.60 g/plant) in the 1st and 2nd season , respectively . While, KWS1436 variety which received CM + 80 kg N fed^{-1} recorded the highest, root fresh weight (2.28 and 2.03 kg) and root length (29 and 30 cm) in the 1st and 2nd seasons, respectively (Table 10) and root dry weight and total dry weight amounted to (457.00 and 561.30 g/plant), respectively in the 2nd season (Tables 11).

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إستجابة ثلاثة أصناف من بنجر السكر للتسميد بالكمبوست والأزوت المعدني و التوافق بينها تحت ظروف الأراضي الرملية
١- صفات النمو

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ملخص

أجريت تجربتان حقليتان بمحطة التجارب الزراعية الصحراوية لكلية الزراعة جامعة القاهرة بوادي النطرون، بمحافظة البحيرة ، خلال موسمي ٢٠٠٨/٢٠٠٩ ، ٢٠٠٩/٢٠١٠ لدراسة استجابة ٣ أصناف من بنجر السكر (KWS1436, Swello and Faraha) للتسميد بالكمبوست والنيتروجين في خمس معاملات : ٤ طن كمبوست/ف، ٤ طن كمبوست +٨٠ كجم ن/ف (١٠٠ % ن)، ٤ طن كمبوست + ٦٠ كجم ن/ف (٧٥ %ن)، ٤ طن كمبوست + ٤٠ كجم ن/ف (٥٠ % ن) و ٨٠ كجم ن/فدان (١٠٠% ن) وتأثير ذلك على صفات النمو في بنجر السكر تحت نظام الري بالتنقيط. ويمكن تلخيص أهم النتائج فيما يلي: أظهرت النتائج وجود إختلافات معنوية بين الأصناف في جميع الصفات المدروسة، ماعدا الوزن الجاف للمجموع الخضري في الموسم الاول وقطر الجذر في الموسم الثاني. تفوق الصنف KWS1436 على الصنفين الأخرين في محتوي الاوراق من كلوروفيل a ، b خلال موسمي الزراعة. سجل أعلي دليل لمساحة الاوراق وطول الجذر و قطر الجذر و الوزن الطازج و الجاف للمجموع الخضري و الجذري والوزن الجاف الكلي للنبات للصنف Faraha خلال موسمي الزراعة. وأظهرت النتائج أن إضافة ٨٠ كجم ن/ف (١٠٠ % ن) ادي الي حدوث زيادة معنوية في محتوي اوراق البنجر من كلوروفيل a ، b و دليل مساحة الاوراق و عدد اوراق النبات و الوزن الجاف للمجموع الخضري خلال موسمي الزراعة ، و أعلي طول للجذر في الموسم الاول وأعطت المعاملة ٨٠ كجم ن/فدان (١٠٠ % ن) مع الكمبوست اعلي قيمة في محتوي الاوراق من الكاروتينات و الوزن الطازج والجاف للجذر و الوزن الجاف الكلي للنبات خلال موسمي الزراعة ، و قطر الجذر في الموسم الاول. وأوضحت النتائج ان التفاعل بين الاصناف و التسميد كان معنويا لجميع الصفات تحت الدراسة خلال موسمي الزراعة ماعدا الوزن الطازج للمجموع الخضري في الموسم الاول.

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