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Response of two garlic cultivars (*Allium sativum* L.) to some sources of organic and inorganic fertilizers.

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Abstract

Two field experiments were carried out during the two successive winter seasons of 2010/2011 and 2011/2012 under newly reclaimed sandy soil at Sadat City, Menoufia governorate, Egypt. The aim of these experiments is to study the response of two garlic cultivars namely Balady and clone Sids-40 to nitrogen fertilizer sources in the form of organic sources (botanical-waste compost, animal waste compost and animal – botanical-waste compost in addition to inorganic fertilizer (NPK) 100 % of the recommended does (120, 80, 70 kg fed -1 of NPK fertilizers respectively) + (20 m3) cattle manure as control treatment and the effect of that on the vegetative plant growth expressed as plant height, number of leaves per plant and fresh as well as dry weight of whole plant , chemical composition and yield of garlic plant. A split plot design with three replicates was used where the two garlic cultivars, Balady and Sids-40 were located in the man plots. While nitrogen fertilizer in the form of organic and inorganic was randomly applied in the sub plots .Obtained results indicated that the highest values of plant height and fresh and dry weight of whole plant as well as total produced yield/ fed., were obtained in case of cv. Balady while the highest number of leaves / plant was recorded in case of cv. Sids-40 plants Sids-40 cultivar gave the maximum bulb weight clove weight and total fresh yield in relative to the other tested garlic cv. In this respect, nitrogen at 120 kg /fed as a 100% of recommended dose in the form of inorganic and organic fertilizer (botanical waste compost) reflected the highest values in all studied growth and yield traits compared with other tested treatments in both seasons.

Finally it could be concluded that under such condition planting cv. Sids-40 and fertilizing with 100% of the recommended dose in the form of organic and inorganic was recommended for higher yield with good quality of garlic.

Keywords: *Allium sativum*, organic, inorganic fertilizers, vegetative plant growth, chemical composition and yield

Introduction

Garlic *(Allium sativum L.)* is considered as one of the most important and popular vegetable bulb crop grown in Egypt for both local and export markets. Egypt occupied the fourth country in the world for garlic production (301270 ton) in 2008 year according to the Egyptian statistics of Ministry of Agric. Increasing garlic production in Egypt has become of great important to meet the ever increased demand of local consumption and exportation. Nowadays, many new garlic cultivars and clones are greatly appeared in Egypt due to the rare and unknown information about the success of these cvs under different climatic conditions prevailing in Egypt, vegetable investigators must carry out extensive trials for evaluating these garlic cvs for ensuring the success of these cvs under different locations of Egypt. The great variation on the growth and production of different garlic cultivars according to the different locations in Egypt was a wide field for many researchers (Hassan, 2002, Tiwari et al, 2002, Pardo and Marin 2003; Patil et al., 2003, Costa et al, 2004, El-Sayed, 2004; Mohamed, 2004, Baghalian et al, 2005 Gowda *et al*, 2007; Moustafa et al, 2009 , Aly, 2010 and Dawood et al, 2011). Nitrogen is necessary and important element for increasing the yield and quality of vegetables such as garlic Increasing yield and nitrogen sources and thus more profitable for farmers to (Gulser, 2005) Increasing nitrogen fertilizer increased the growth trend of the number of leaves, leaf length and plant body. Reports have shown that garlic has a high nitrogen requirement, particularly in the early stages of growth. The highest yield was obtained in the treatment of 300 kg N/ha (Sardi and Timer, 2005).

Such increase could be achieved by growing garlic in the reclaimed areas with using organic manure for obtaining safe and healthy production than using inorganic fertilizers Reasons for the low yield of garlic are mainly due to depletion of macro and micro-nutrients from the soil, use of low yielding varieties with low or no inputs and poor management practices. Low use efficiencies of inorganic fertilizers coupled with their rising costs and the need for organically produced foods has directed the attention of farmers towards organic sources. Organic farming is one of the fastest growing sectors of agriculture worldwide. Its main objective is to create a balance between the interconnected systems of soil organisms, plants, animals and humans. Organic manures improve chemical, physical and

physiochemical properties of soil. Generally, excessive amounts of inorganic fertilizers are applied to vegetables in order to achieve a higher yield (Stewart et al., 2005) and maximum value of growth, (Dauda et al., 2008). (Shaheen et al., 2005 and Yassen and Khalid, 2009) who revealed that, the vegetative growth and yield of different crops were increased with addition of organic manure. However, the use of inorganic fertilizers alone may cause problems for human health and the environment (Arisha and Bardisi, 1999). Suthar (2009) on garlic, showed that the maximum range of some plant parameters i.e. root length, shoot length and number of leaves/plant was obtained by adding 15 t/ha vermicompost +50 % NPK.

The aim of this study was to investigate the effect of some organic fertilizer, organic sources (Botanical-waste compost, animal waste compost and animal – botanical-waste compost in addition inorganic fertilizer (NPK) 100 % of the recommended does (120, 80, 70 kg fed m3-1 of NPK fertilizers respectively) + (20 m3) Cattle manure as control treatment on vegetative growth characters and bulb growth, yield and its components and chemical composition of cloves of two cvs garlic plants.

Materials and Methods

This study was carried out in private farm at Sadat city, Minofia Governorate during two successive winter seasons of 2010/2011 and 2011/2012. The experimental trails were conducted in sandy soil using drip irrigation. to investigate the response of garlic plants of two cultivars namely Balady and clone Sids-40 to the application of nitrogen fertilizer in the form of organic sources (Animal waste compost, Botanical waste compost and Animal – botanical-waste compost in addition to inorganic fertilizer (NPK) 100 % of the recommended does (120, 80, 70 kg fed. -1 of NPK fertilizers respectively) + (20 m3) cattle manure as a control treatment, according to the recommendations given by ministry of agriculture (1998). All organic manure rates were calculated as N unit/ fed, about 120 N unit /fed. Organic manure units were given to each row of plots before planting. Chemical analysis of organic fertilizers is given in Table (1).

The soil of experimental field was sandy loam in texture with Ec. 0.88 dS/m and PH 8.20 , N was 6.8 mg/kg soil , P 12.1 mg/kg soil and exchangeable K was 85.4 mg/kg soil .The chemical analysis of different sources of organic manures are give in Table 1.

Table 1. Average chemical analysis of different sources of organic manures during the two seasons of study.

Organic materials	sources of compost (Delta Bio Tec. Co.)	PH	Ec dS/m	O.M %	N %	P %	K %	C/N	Humidity %	Weight of m3 (kg)
Botanical waste compost	AL wadi compost	6.6	1.6	58	1.4	0.65	0.79	18: 1	24	730
Animal–botanical waste compost (70: 30)	EL waha compost	6.8	1.2	37	1.3	0.52	0.77	18: 1	25	850
botanical- animal waste compost(50: 50)	Delta mix compost	7.1	1.4	42	1.2	0.80	0.70	18.2 : 1	23	790
Cattle manure		7.3	1.2	25	1.2	0.72	0.98	19.8 : 1	19.8	750

Treatments:

1) Cultivars:

A- Balady B- Clone Sids-40

2) Organic manures:

1- Botanical waste compost(Full dose of NPK) +10 ton compost/fed = 18.570 ton compost/fed
2- Animal–botanical waste compost (70: 30) (Full dose of NPK) +10 ton compost/fed= 19.200 ton compost/fed
3- botanical- animal waste compost(50: 50) (Full dose of NPK) +10 ton compost/fed= 20.000 ton compost/fed
4- 100 % of mineral fertilizers (Full dose of NPK) + (20 m3) Cattle manure

A split plot design with three replicates was used in this experiment, where the tested cultivars were located at the main plots while the fertilizers treatments were distributed randomly in the sub plots. All treatments of organic manures were added at soil preparation, meanwhile, the amounts of NPK fertilizers, were added at three equal portions. The first portion was applied with organic fertilizer during the soil preparing, while the second portion was applied two months after planting and third one was applied two months later. Drip irrigation lines were spread over the ditches. Soil was irrigated continuously three days before planting. Cloves were planted on the first third of October 2010 and 2011 using homogeneous size cloves. The cloves were

planted at 10 cm apart on the two sides of each row. The plot area was 10.5 m2 (one row of 14 m length and 0.75m width).

A random sample of ten plants was taken from each experimental plot at 150 days after planting in both seasons and the following vegetative growth characters were measured (plant height, number of leaves, fresh and dry weight of whole plant as mentioned by Mann (1952)).

Total nitrogen, phosphorus and potassium content in tissue of produced cloves, were determined according to the methods which were described by Pregl (1945), Murphy and Riley (1962) and Brown and Lillel and (1946) for N,P and K respectively.

Garlic plants were harvested on 15th of April in 2011 and on the 19th of April in 2012. Garlic plants were cured for fifteen days and weight of cured plants/plot was detected then the total yields as ton/ fed., was accounted, also the average cloves weight and cloves number/ bulb were determined.

All data values were subjected to the statistical analysis of variance according to Gomez and Gomez (1984).

Results and Discussion

1- Vegetative growth:

a) Effect of cultivars

Data on vegetative growth parameters, i.e. plant height, number of leaves, fresh and dry weight per plant for the studied cultivars under different nitrogen sources were presented in Table 2. Such data reveal that there were significant differences in most studied plant growth characteristics among cv. Balady and Sids-40 In this respect, cv. Balady recorded the highest values in plant height. But cv. Clone Sids-40 significantly produced more leaves than cv. Balady.

Obtained results may be attributed to the genetically variance that showed vegetative growth differences among the studied cultivars. Similar results were reported by El-Zohery(2004), Mohamed(2004), Moustafa et al. (2009) and Aly (2010) on Balady and clone Sids-40 garlic cultivars.

b) Effect of organic and inorganic sources:

The results reported in Table 2 show that application of inorganic fertilizer (NPK) 100 % of the recommended does to garlic plants increased their vegetative growth characters expressed as plant height, number of leaves and fresh and dry weight / plant compared with the tested organic fertilizers (NPK).It is worthy to mention that, the highest records of plant height, number of leaves and fresh and dry weight per plant were obtained by using inorganic fertilizer (NPK) at 100 % of the recommended dose during both seasons of study. On the other hand, the lowest records were resulted by using animal –botanical-waste compost fertilizer alone in fertilizing garlic plants in the both growth seasons. These results are in harmony with those reported by Baghalian et al. (2005), Gowda et al. (2007), Moustafa et al. (2009), Aly (2010) and Dawood et al. (2011).

Effect of the interaction

The interaction within tested cultivars and organic and inorganic nitrogen sources affected the garlic plant growth characters as shown in Table 2 for seasons of 2010/2011 and 2011/2012. Obtained data reveal that, the differences within different interaction treatments were significantly for all parameters of plant growth. Adding inorganic fertilizer or animal –botanical-waste compost (NPK) 100 % of the recommended does increased most of plant vegetative growth parameters but with different trend for the garlic cultivars and traits (Table 2). In general, Balady cv. gave taller plants than Sids-40 one for the inorganic fertilizer (NPK) 100 % of the recommended does applications. Sids-40 cv. gave heavier fresh and dry weight comparing with Balady one for the inorganic fertilizer (NPK) 100 % of the recommended does applications. Plant height trait was recorded the highest value with Balady cv. plants that treated with the inorganic fertilizer (NPK) 100 % of the recommended does applications comparing with animal waste compost and Sids-40 cv in the both growth seasons. While, Sids-40 revealed higher mean values for the fresh weight and dry weight, especially when treated with inorganic fertilizer (NPK) 100 % of the recommended does, animal –botanical-waste compost and botanical waste compost applications. Respectively. However, number of leaves trait was recorded the highest value with Sids-40 cv plants that treated with the inorganic fertilizer (NPK) 100 % of the recommended does, animal –botanical-waste compost and botanical waste compost respectively applications comparing with animal waste compost and Sids-40 cv in the both growth seasons. This in turn increases the vegetative growth of garlic plants. Similar results were obtained by ((Dauda et al. 2008, Shaheen et al. 2005 and Yassen and Khalid, 2009).

2- Total garlic bulb yield and its components.

a) Effect of cultivars:

Data in Table 3 reveal that there were varietals differences in yield and its components. In this concern. Balady cv. showed the highest number of cloves per bulb, whereas, sids-40 cv. being the lowest in these characters. However, sids-40 cv. recorded higher average clove weight, average Bulb Weight and total yield than cv. Balady during both seasons of study. Similar results were reported by Baghalian et al. (2005), Gowda et al. (2007) and Dawood et al. (2011). On the other hand, El-Sayed(2004), found that cv. (clone Sids-40) had

average clove weight and total bulb yield than cv. Balady.

b) Effect of organic and inorganic sources of nitrogen :

The results reported in Table 3 indicate that number of cloves per bulb, average clove weight and fresh yield of garlic plants were significantly affected by all the studied treatments, i.e. organic and inorganic nitrogen. On the other hand. The lowest number of cloves per bulb, average clove weight and total yield of garlic plants were resulted from the plants fertilized by animal waste compost of the recommended dose of nitrogen only during both season.

In this respect, the highest number of cloves per bulb, average clove weight and fresh bulb yield were resulted by fertilizing the plants with inorganic fertilizer (NPK) 100 % of the recommended does in the two seasons. These results might be due to the role of organic manure for continues supply of nutrients which improve some physical properties of soil and increase water retention than that for chemical fertilizers Salama (2002).

Also, Rizk (2002) and Salama (2002), cleared that organic manure at high rate gave the highest contents of nutritional elements and consequently increased uptake of those elements in plant tissues which improve yield and its quality

c) Effect of interaction:

The interaction treatments between using cultivars and organic and inorganic nitrogen sources as affect on the number of cloves per bulb average clove and fresh bulb yield are shown in Table 3.

The recorded data declared that Balady cv. gave highest number of cloves per bulb than Sids-40 one for the inorganic fertilizer (NPK) 100 % of the recommended does applications. Sids-40 cv. gave heavier average clove weight, average bulb weight and fresh yield comparing with Balady one for the inorganic fertilizer (NPK) 100 % of the recommended does applications in the both growth seasons. These results are in conformity with those obtained by Baghalian et al. (2005), Gowda et al. (2007), Moustafa et al. (2009), Aly (2010) and Dawood et al. (2011).

3- Chemical constituents of garlic bulb:

a) Effect of cultivar

Data recorded in Table 4 show clearly that there were significant differences among the tested cultivars in the percentage of total nitrogen, phosphorus and potassium for the produced cloves during both seasons of growth. In this regard, the highest values for the percentage of all assayed macro-elements (N, P and k) were noticed in case of cv. (clone Sids-40) gloves compared with cv. Balady. Obtained results may be due to the difference in genotype potential which affect the absorption and accumulation of N,P and K in cloves of garlic plant similar results were reported by Naruka and Dhaka (2001), Hassan (2002), Tiwari et al. (2002), Pardo and Marin (2003), Patil et al. (2003), El-Sayed (2004), Costa et al. (2004), Mohamed(2004), Baghalian et al. (2005), Gowda et al.(2007), Moustafa et al. (2009) , Aly(2010) and Dawood et al. (2011).

b) Effect of inorganic and organic fertilization.

Results recorded in Table 4 reveal that total nitrogen, phosphorus and potassium percentages in garlic cloves were significantly affected as a result of fertilizers application either in the form of inorganic fertilizer or botanical waste compost (NPK) 100 % of the recommended nitrogen fertilizer during both seasons of study. In this respect, garlic plants fertilized with inorganic fertilizer or botanical waste compost (NPK) 100 % of the recommended nitrogen fertilizer reflected the highest values of nitrogen, phosphorus and potassium percentage during both seasons of growth. Obtained results as in agreement with those reported by Suthar (2009), Yassen and Khalid (2009), Aly (2010) and Dawood et al. (2011).

c) Effect of the interaction :

As for the affect of the interaction between the used cultivars and fertilization treatments, the same date in Table 4 show that the highest percentage of nitrogen, phosphorus and potassium was recorded in case of cv. (clone Sids-40) garlic as a result of fertilization with of inorganic fertilizer or botanical waste compost (NPK) 100 % of the recommended nitrogen fertilizer during both seasons of study. These results are in conformity with those obtained by Baghalian et al. (2005), Shaheen et al. (2005), Gowda et al. (2007), Moustafa et al. (2009) , Yassen and Khalid (2009), Aly (2010) and Dawoodetal.(2011).

Table 2. Effect of nitrogen fertilizer in the form of organic and inorganic applications on the vegetative growth of two garlic (Allium sativum L.) cultivars in seasons of 2009/2010.

Treatments	Seasons 1				Seasons 2			
	Plant height (cm)	No. of leaves/plant	Leaves fresh weight (g)	leaves dry weight (g)	Plant height (cm)	No. of leaves/plant	Leaves fresh weight (g)	leaves dry weight (g)
Cultivars								
Balady (B)	38.9	6.5	18.3	3.6	43.8	6.8	19.5	3.9
Clone Sids-40 (S)	25.4	15.1	26.1	4.4	28.8	9.0	27.9	5.2
L.S.D. At 5%	4.3	0.4	0.7	0.2	1.5	0.6	0.3	0.4
Nitrogen Sources								
Animal–botanical waste compost (70: 30)	28.5	6.4	21.0	3.3	31.3	6.9	21.7	3.6
Botanical- animal waste compost(50: 50)	31.5	7.0	21.7	3.6	34.8	7.6	22.8	4.2
Botanical waste compost	32.8	7.5	22.6	4.2	37.8	8.2	24.4	4.9
Mineral fertilizer (Control)	35.8	7.3	23.5	4.8	41.3	8.9	25.9	5.5
L.S.D. At 5%	2.5	0.2	0.4	0.2	2.7	0.2	0.5	0.3
Interactions								
Balady (B) + animal–botanical waste compost (70: 30)	35.0	5.6	16.8	2.9	38.0	5.8	17.3	3.2
Balady (B) + botanical- animal waste compost(50: 50)	38.6	6.2	17.7	3.3	42.3	6.5	18.6	3.6
Balady (B) + botanical waste compost	40..0	6.8	18.8	3.8	46.0	7.2	20.1	4.1
Balady (B) +mineral fertilizer	42.0	7.4	19.9	4.4	49.0	7.7	22.0	4.6
Clone Sids-40 (S) + Animal–botanical waste compost (70: 30)	22.0	7.2	25.2	3.7	24.6	8.1	26.2	4.0
Clone Sids-40 (S) + botanical-animal waste compost(50: 50)	24.3	7.8	25.7	4.0	27.3	8.7	27.1	4.8
Clone Sids-40 (S) + botanical waste compost	25.6	8.2	26.4	4.7	29.6	9.1	28.6	5.7
Clone Sids-40 (S) +mineral fertilizer	29.6	7.3	27.2	5.1	33.6	10.2	29.8	6.4
L.S.D. At 5%	1.3	0.1	0.2	0.2	1.3	0.1	0.2	0.1

Table 3. Effect of nitrogen fertilizer in the form of organic and inorganic applications on the yield and its components of two garlic (Allium sativum L.) cultivars in seasons of 2009/2010.

Treatments	Seasons 1				Seasons 2			
	Average bulb weight (g)	No. cloves / bulb	Average clove weight (g)	Total yield (t/fed)	Average bulb weight (g)	No. cloves / bulb	Average clove weight (g)	Total yield (t/fed)
Cultivars								
Balady (B)	42.7	22.8	3.0	5.6	49.1	23.4	3.5	6.9
Clone Sids-40 (S)	72.7	9.4	4.3	7.8	77.8	9.8	4.8	9.3
L.S.D. At 5%	5.3	0.7	0.5	0.6	4.3	2.2	0.4	0.6
Nitrogen Sources								
Animal–botanical waste compost (70: 30)	51.3	14.6	3.0	6.2	54.8	15.1	3.5	7.4
Botanical- animal waste compost(50: 50)	55.1	15.8	3.2	6.5	60.0	16.1	3.9	7.7
Botanical waste compost	59.0	16.5	3.9	7.0	66.3	17.0	4.5	8.3
Mineral fertilizer (Control)	65.3	17.6	4.5	7.5	72.8	18.0	4.7	8.9
L.S.D. At 5%	3.2	0.4	0.3	0.2	2.2	0.2	0.4	0.6
Interactions								
Balady (B) + animal–botanical waste compost (70: 30)	37.6	20.9	2.3	5.1	41.0	21.7	2.7	5.2
Balady (B) + botanical- animal waste compost(50: 50)	39.3	22.6	2.6	5.4	45.6	23.1	3.0	6.4
Balady (B) + botanical waste compost	43.6	23.3	3.2	5.9	52.0	23.9	3.8	7.1
Balady (B) +mineral fertilizer	50.3	24.6	3.9	6.3	58.0	24.9	4.5	7.7
Clone Sids-40 (S) + Animal–botanical waste compost (70: 30)	65.0	8.3	3.7	7.2	68.6	8.5	4.3	8.5
Clone Sids-40 (S) + botanical-animal waste compost(50: 50)	71.0	9.1	3.9	7.5	74.3	9.2	4.8	8.0
Clone Sids-40 (S) + botanical waste compost	74.3	9.8	4.5	9.2	80.6	10.2	5.2	9.6
Clone Sids-40 (S) +mineral fertilizer	80.3	10.6	5.1	8.6	87.6	11.2	4.9	10.1
L.S.D. At 5%	1.6	0.2	0.2	0.1	0.9	0.1	0.2	0.2

Table 4. Effect of nitrogen fertilizer in the form of organic and inorganic applications on chemical constituents of two garlic (Allium sativum L.) cultivars in seasons of 2009/2010.

Treatments	Seasons 1			Seasons 2		
	Nitrogen %	Phosphorus %	Potassium %	Nitrogen %	Phosphorus %	Potassium %
Cultivars						
Balady (B)	1.692	0.407	1.952	1.905	0.466	2.153
Clone Sids-40 (S)	2.372	0.456	2.589	2.713	0.537	3.088
L.S.D. At 5%	0.401	0.034	0.164	0.733	0.041	0.171
Nitrogen Sources						
Animal–botanical waste compost (70: 30)	1.538	0.341	1.997	1.718	0.380	2.285
Botanical- animal waste compost(50: 50)	1.695	0.400	2.172	1.992	0.466	2.435
Botanical waste compost	2.197	0.461	2.358	2.470	0.543	2.728
Mineral fertilizer (Control)	2.700	0.525	2.555	3.057	0.618	3.033
L.S.D. At 5%	0.174	0.058	0.082	0.246	0.063	0.087
Interactions						
Balady (B) + animal–botanical waste compost (70: 30)	1.323	0.320	1.747	1.450	0.350	1.803
Balady (B) + botanical- animal waste compost(50: 50)	1.387	0.380	1.843	1.650	0.436	1.933
Balady (B) + botanical waste compost	1.793	0.443	2.000	1.940	0.506	2.300
Balady (B) +mineral fertilizer	2.267	0.486	2.217	2.580	0.573	2.577
Clone Sids-40 (S) + Animal–botanical waste compost (70: 30)	1.753	0.363	2.247	1.987	0.410	2.767
Clone Sids-40 (S) + botanical-animal waste compost(50: 50)	2.003	0.420	2.500	2.333	0.496	2.937
Clone Sids-40 (S) + botanical waste compost	2.600	0.480	2.717	3.000	0.580	3.157
Clone Sids-40 (S) +mineral fertilizer	3.133	0.563	2.893	3.533	0.663	3.490
L.S.D. At 5%	0.168	0.056	0.059	0.238	0.058	0.066

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استجابة صنفين من نباتات الثوم لبعض مصادر التسميد العضوى والمعدنى

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تم إجراء تجربتان حقليتان فى تحت ظروف الأراضي الرملية المستصلحة حديثا في مدينة السادات، محافظة المنوفية فى الموسمين الشتويين لعامي 2010-2011، 2011-2012 وذلك لدراسة استجابة نباتات الثوم صنفى سيدس 40 والبلدى لثلاث مصادر من التسميد العضوى النيتروجينى (سماد كمبوست نباتى – كمبوست نباتى حيوانى 50 : 50 – كمبوست حيوانى نباتى 70 : 30) مع استخدام التسميد المعدنى للمقارنة 100% من المعدل الموصى به (120 كجم ن للفدان) من حيث الطول – عدد الأوراق الوزن الطازج والجاف وكمية المحصول الناتج وكان التصميم الإحصائى المستخدم هو تصميم القطع المنشقة مرة واحدة وعدد المكررات ثلاثة حيث كانت الأصناف البلدى والصينى فى القطع الرئيسية ومعاملات التسميد العضوى و المعدنى بينهما موزعة توزيعا عشوائيا فى القطع الفرعية.

وقد أوضحت النتائج المتحصل عليها ما يلى :

- أظهر الصنف البلدى تفوقا واضحاً فى طول و وزن النبات الطازج والجاف وكذلك عدد الفصوص فى البصلة الناتجة بالمقارنة بالصنف سيدس 40 بينما تفوق الصنف سيدس 40 فى عدد الأوراق بالنسبة للنبات ومتوسط وزن الفصوص وكمية المحصول .
- أدى إضافة التسميد المعدنى 100% من المعدل الموصى به 120 كجم نيتروجين للفدان وكذلك التسميد العضوى بكمبوست نباتى بمعدل100% من المعدل الموصى إلى الحصول على أعلى القيم فى جميع قياسات النمو الخضريه وكذلك كمية المحصول الناتج والمحتوى الكيماوى للعناصر المقدرة مقارنة بباقى المعاملات التى استخدمت فى كلا الموسمين .

وبالتالى يمكن التوصية بإتباع المعاملة التى استخدم فيها الصنف سيدس 40 والتسميد بمعدل 100% من المعدل الموصى به من التسميد المعدنى او التسميد العضوى باستخدام كمبوست نباتى للحصول على أفضل صورة لنمو النباتات والحصول على أعلى كمية محصول وصفات جودة .