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Effect of mineral and organic fertilizer rates on melon vegetative growth and its productivity

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Abstract

Two field experiments were carried out at the farm of Agriculture Researches Station, Fac. Agric, Cairo Univ., Giza during two successive summer seasons of 2011 and 2012 aiming to investigate the effect of organic and inorganic fertilizers and their interaction on melon vegetative growth and its yield. The obtained results cleared that applying 2 ton compost +60 kg N /fed enhanced plant length, number of leaves, plant fresh and dry weight, number of fruits, average fruit weight and yield per plant and per feddan in both seasons. The highest values of vegetative growth characters, average fruit weight, number of fruits and yield were recorded with 150 kg K_2O/fed compared to the other treatment of 100 kg K_2O/fed in both seasons. No significant differences were recorded on vegetative growth character (plant length and number of leaves) due to the application of foliar calcium treatment in both seasons. But there was a significant effect on plant fresh and dry weigh, average fruit weight, number of fruits and yield due to calcium treatment. The interactions between treatments in this study have been discussed.

Keywords: melon (*Cucumis melo*), mineral, organic and inorganic fertilizers, vegetative growth, yield.

Introduction

Melon (*Cucumis melo* .) is one of the most vegetable crops in Egypt for local consumption and exportations. Melon area was 643067 feddan that produced 11.3 ton per fed 2010 season. (Ministry of Agric, Egypt 2011). Commercial and subsistence farming has been and is still relying on the use of inorganic fertilizers for growing crops (Lampkin, 1990), this is because they are easy to use, quickly absorbed and utilized by crops. However, these fertilizers are believed to contribute substantially to human, animal food intoxication and environmental instability/degradation.

The chemical fertilizers used in conventional agriculture contain just a few minerals, which dissolve quickly in damp soil and give the plants large doses of minerals (Vernon, 1999). Although chemical fertilizers have been claimed as the most important contributor to the increase in world agricultural productivity over the past decades (Smil, 2001) The negative effects of chemical fertilizer on soil and environment limit its usage in sustainable agricultural systems (Peyvast *et al*., 2008). Weakening soil quality requires increasing inputs to maintain high yields. This, in turn, threatens future food security and raises production costs for often already poor farmers

Organic fertilizers can therefore be used to reduce the amount of toxic compounds (such as nitrates) produced by conventional fertilizers in vegetables.

Increased consumer awareness of food safety issues and environmental concerns has contributed to the development of organic farming over the last few years (Worthington, 1998 and 2001; Relf *et al*., 2002). Thus, it may be possible to lessen the escalating effects of diseases such as cancer and boost immunity of humans. Farming come will also improve when farmers use less money on fertilizers and pesticides for growing crops, (Vernon, 1999).

The use of organic manure has been the need of by production input for improving the sustainable productivity of soil. Addition of compost improves soil structure, texture and tilth (Hesse and Mishra, 1982).

Research comparing soils of organically and chemically managed farming systems has recognized the higher soil organic matter and total nitrogen (N) with the use of organic agriculture (Alvarez *et al*., 1988; Drinkwater *et al*., 1995; Reganold, 1988). Soil pH becomes higher, plant-available nutrient concentrations may be higher, and the total microbial population increases under organic management (Clark *et al.*, 1998; Dinesh *et al*., 2000; Reganold, 1988; Lee, 2010)

The combination of organic materials with reduced NPK fertilizer rates produced plants that were similar to unmixed NPK fertilizer. This indicated that the high dose of organic manures can be reduced by half and mixed with a reduced rate of NPK fertilizers as reported by Akande *et al.* (2003).

Plant length, number of leaves, fresh and dry weight were increased when organic and mineral fertilizer combined together (Farrag, 2009 on cantaloupe; olaniyi *et al*, 2009 and Eifediyi and Remison , 2010 on cucumber ;Olaniyi and Odedere, 2009 on fluted pumpkin.

Plant length , number of leaves ,fresh and dry weight were increased by increasing N mineral fertilizer(Shebl ,1995 Adam *et al*,2002 on cantaloupe.; Castellanos , 2011on melon and Abou El-yaized 2012 on cantaloupe ; Jilani *et al*, 2009 on

cucumber).

Thus, the aim of this study was to investigate the effect of the combination between organic and mineral fertilization on growth, yield and its component of melon.

Materials and methods

This investigation was carried at the farm of Agric. Res. Station, Fac. Agric. Cairo University, Egypt during the two successive summer seasons of 2011 and 2012 to study the effect of organic and mineral fertilization on growth, yield and its components. Table 1 and 2 show the physical and chemical properties of the experimental soil and compost chemical characteristics according to Piper (1950)

Table 1. Some physical and chemical properties of soil

Micronutrient (ppm)			Macro nutrient (ppm)			Soluble anions(meq/l)				Soluble Cations (meq/l)				$Caco_3$ %	E.C ds/ m	P H
Mn	Zn	Fe	N	P	K	So_4^-	Cl	Hco_3	Co_3	K^+	Na ++	Mg ++	Ca^+			
2.55	1.2	6.4	100	50	448	1.64	5.7	1.4	-	0.49	2.1	0.2	1	7.8	0.32	7.5

Table 2. chemical analysis of compost used at experimental period.

(Micronutrient) ppm			Macro nutrient %		
Zn	Mn	Fe	K	P	N
26	5.2	1938	1.36	0.14	1.26
O.C %	O.M %		C/N ratio		
13.2	22.8		10.5		

Plant material: seeds of orange flesh melon (Magenta.F_1 hybrid) were obtained through Nunhems Co. and sown in the nursery using foam seedling trays (84 cells) which were filled with a mixture of peat moss: vermiculite (1:1 V/V) on May7th and Mayst in 2011 and 2012, respectively. The seedlings were transplanted in the field on May 29 th 2011 and May 23 rd 2012 on the centre of the bed. The area of each plot was $12m^2$ (10 m long ×1.20 m width). Each plot contained 20 plants spacing of 50 cm between hills within the row as plant. All missing plants were replaced by seedling. Drip irrigation method and black plastic mulch were used.

The experiments included 24 treatments arranged in split-split plot design (using three replicates for each treatment) as follows:

Main plots treatment were filled with 6 different organic (compost) and inorganic (N) rates/ fed. as follows:

1. 5 ton compost +zero Nitrogen/fed
2. 4 ton compost + 20 kg Nitrogen/fed
3. 3 ton compost + 40 kg Nitrogen/fed
4. 2 ton compost + 60 kg Nitrogen/fed
5. 1 ton compost + 80 kg Nitrogen/fed
6. zero ton compost + 100 kg Nitrogen/fed

2- sub main plot treatments were filled with two rates of potassium (salphate potassium) as follows:

1. 100 kg K_2O / fed
2. 150 kg K_2O /fed

3- Sub-sub main plot treatments were included two rates of calcium (Edeta)foliar application as follows:

1-water spraying (expressed as zero calcium)

2- Calcium spraying with the rate of 400 g/100liter/fed

60 Kg/fed .phosphorus were added to all plots among experimental units

The compost and phosphor were applied during soil preparation. The quantity of mineral N and K fertilizer in each treatment was divided into two equal doses 21 and added at 45 days after sowing. The treatment of foliar calcium was applied three times (30, 40, 50 days after sowing)

Data recorded

1-vegetative growth parameters.

Three plants were randomly taken from each plot for measuring the following vegetative growth parameters after 60 days from transplanting

- Plant length
- Number of leaves per plant
- Plant fresh weight
- Plant dry weight
- **Yield and its components**

Harvesting date began after 60 days from transplanting and yield and its component were recorded expressed as:

- Number of fruits/plant
- Average fruit weight
- Yield/plant and yield/fed

Result and discussion

Vegetative growth parameters

Effect of organic and mineral fertilization

1- **Plant length**: Data presented in Table 3 indicate that the effect of organic and mineral fertilization on plant length was significant in

both growing seasons. In this respect ,the application of 2 ton compost + 60 kg N gave the highest plant length in both seasons. In addition the same trend was recorded with using 3 ton compost + 40 kg N/fed in the first season.

2- **Number of leaves per plant** : Data presented in Table 3 indicate that melon plant that fertilized with 2 ton compost + 60 kg N gave the highest number of leaves in both seasons

3- **Plant fresh weight:** Data in the same Table indicate that melon plants that received 2 ton compost +60kg N were the heaviest in both seasons

4- **Plant dry weight**: Data in Table 3 indicate that the application of 2 ton compost + 60 kg N gave the highest plant dry weight in both seasons.

Generally the lowest values of plant length, number of leaves, plant fresh and dry weight were recorded with 1 ton compost + zero N in both seasons

Table 3. Effect of organic and mineral, potassium and calcium foliar application on vegetative growth parameters.

Treatments		Vegetative growth							
		Plant length(m)		Number of leaves/plant		Plant fresh weight (g)		Plant dry weight(g)	
		Season 2011	Season 2012	Season 2011	Season 2012	Season 2011	Season 2012	Season 2011	Season 2012
Compost and N rates	1	1.59 c	1.81 d	190.8 d	201.6 d	1402 d	1415 d	336.2 d	362.8 cd
	2	1.75 bc	1.96 c	214.8 c	222.8 c	1457 bc	1481 b	367.6 b	370.2 bc
	3	1.98 ab	2.21 b	229.3 b	240.7 b	1471 b	1496 b	372.4 b	379.0 b
	4	2.22 a	2.45 a	253.3 a	262.3 a	1543 a	1541 a	391.5 a	400.5 a
	5	1.86 b	2.13 b	230.8 b	241.3 b	1466 b	1474 b	368.4 b	368.2 c
	6	1.89 b	1.97 c	213.4 c	235.0 b	1432cd	1442 c	360.3 c	358.4 d
L.S.D(0.05)		**0.24**	**0.10**	**10.70**	**7.50**	**31.0**	**26.5**	**6.83**	**9.019**
Potassium Levels kg/fed	100	1.83 b	2.05 b	217.1 b	229.0 b	1440.0b	1460 b	362.0b	368.3 b
	150	1.93 a	2.13 a	227 a	238.9 a	1483.6a	1490 a	370.1a	378.00 a
L.S.D(0.05)		**0.09**	**0.06**	**5.9**	**2.9**	**13.08**	**12.63**	**4.32**	**9.408**
Calcium levels(400g/fed)	unsprayd	1.86 a	2.06 a	2.20 a	231.6 a	1448.2b	1460 b	363.4b	368.3 b
	sprayed	1.90 a	2.12 a	224.1 a	236.3 a	1475.4a	1490 a	368.7a	378.00 a
L.S.D(0.05)		**0.09**	**0.07**	**4.75**	**6.0**	**14.88**	**12.91**	**4.164**	**7.091**

Compost and N rates:
1= (5 ton compost + zero N) /fed 2= (4 ton compost + 20kg N)/fed 3= (3 ton compost + 40kg N) /fed
4= (2 ton compost + 60kg N)/fed 5= (1 ton compost + 80kg N) /fed 6= (zero ton compost + 100kg N)/fed

Vegetative growths parameters values were higher with the application of compost, Roe and Comforth (1997) Mohamed (2012) on cantaloupe and Bayoumi and Hafez(2006) , Jahromi *et al* .(2012)on cucumber. On the other hand Abd El-Aziz (2003) found that organic manure decreased cantaloupe plant height and number of leaves compared to inorganic solution in both seasons.

These results may be due to the favorable effect of organic manure on soil physical and chemical properties. The structural improvement can encourage the plant to have a good root development, which lead to a higher plant vegetative growth .similar results were obtained by EL-Shafie and EL-Gammaily (2002) on onion , Hafez and Mahmoud(2003) on squash plants .The same results were obtained by Abdallah *et al* .(2006) on cucumber plants Abo EL-Nour (2008)on cantaloupe found similar results.

Tindall (1968) stated that relatively high levels of nutrients are required for optimum growth and development at early stage. With compost, nutrient element content is low and the nutrients are not readily available for plant uptakes (Brady, 1990)

Organic manures activates many species of living organisms which release phytohormones and may stimulate the plant growth and absorption of nutrients (Arisha *et al*., 2003)

The combination of organic materials with reduced NPK fertilizer rates produced plants that were similar to unmixed NPK fertilizer. This indicated that the high dose of organic manures can be reduced by half and mixed with a reduced rate of NPK fertilizers as reported by Akande *et al*. (2003).

Generally improving vegetative growth parameters by treatment of compost plus chemical N fertilizer compared with using each alone can be attributed to that applying mineral N stimulated the rate of decomposition of compost and produced higher humus substances which improve the physical and chemical properties of the soil as well as increase both the exchangeable water soluble of nutrients and their uptake (Cooke, 1972). In this concern, Nafadi and Gohar (1975) reported that adsorption $NH4^+$ ion on the surface of compost and became available to plant uptake.

Effect of potassium level .

As for the effect of potassium levels on vegetative growth character, data in Table 3 show

that the highest plant lengths, number of leaves/plant, plant fresh and dry weight were recorded with 150 kg K_2O in both seasons

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Effect of calcium foliar application.

Data presented in Table 3 indicate that foliar of calcium treatment had no significant effect on plant length and number of leaves in both seasons , but the highest plant fresh and dry weight were recorded with foliar calcium treatment of 400 g/fed in both seasons.

Effect of the interaction between organic and mineral fertilization and potassium levels

The effect of the interaction between organic and mineral and potassium level on vegetative growth were significant in both growing seasons. Table 4 and 5 show that the highest values of plant length, number of leaves, plant fresh and dry weight were recorded with 2 ton compost + 60 kg N and fertilized with 150 kg /fed of potassium in both seasons while the lowest values of these vegetative growth characters were recorded with 5 ton compost + zero N and fertilized by 100 kg K_2O/fed in both seasons

Table 4. Effect of interaction between organic and mineral fertilizer and potassium level on plant length and number of leaves.

Compost and N rates	Plant length(m)				Number of leaves/plant			
	2011		2012		2011		2012	
	Potassium levels (kg/fed)							
	100	150	100	150	100	150	100	150
1	1.52 f	1.66 ef	1.73 f	1.89 ef	185.3 h	196.3 gh	193.7 j	209.5 i
2	1.73 def	1.78 de	1.97 de	1.94 e	210.5 efg	219.0 def	218.3 h	227.2 g
3	1.92bcd	2.04 bc	2.13 d	2.29 bc	221.7 de	237.0 bc	231.5 fg	249.8 c
4	2.13 ab	2.30 a	2.37 b	2.53 a	248.8 ab	257.7 a	258. 2 b	266.5 a
5	1.84 cde	1.89 cde	2.14 c	2.13 d	229.7 cd	232.0 cd	239 .0 de	243.7cd
6	1.87 cde	1.91bcd	1.94 e	2.00 de	206.8 fg	220.0 def	233.5 efg	236.5 ef
L.S.D(0.05)	0.22		0.16		14.53		7.12	

Compost and N rates:
1= (5 ton compost + zero N) /fed 2= (4 ton compost + 20kg N)/fed 3= (3 ton compost + 40kg N) /fed
4= (2 ton compost + 60kg N)/fed 5= (1 ton compost + 80kg N) /fed 6= (zero ton compost + 100kg N)/fed

Table 5. Effect of interaction between organic and mineral fertilizer and potassium level on plant fresh and dry weight.

Compost and N rates	Plant fresh weight(g)				Plant dry weight(g)			
	2011		2012		2011		2012	
	Potassium levels(kg/fed)							
	100	150	100	150	100	150	100	150
1	1361 h	1443 efg	1400 f	1430 ef	330.3 f	342.1 e	357 e	368.6cde
2	1422 g	1492 bc	1469 cd	1492 bc	365.8bcd	369.3bc	365.7de	374.7 cd
3	1457 def	1484bcd	1478 c	1513 b	370.3 bc	374.5 b	374cde	384.1 bc
4	1515 b	1572 a	1484 bc	1599 a	391.8 a	391.1 a	397.1ab	403.8 a
5	1458 def	1475cde	1482 c	1466 cd	364.5bcd	372.3bc	359.6de	376.8 cd
6	1428 fg	1436 fg	1444 de	1441 de	357.7 d	363.0cd	356.8 e	360.1 de
L.S.D(0.05)	32.05		30.94		10.20		17.37	

Compost and N rates:
1= (5 ton compost + zero N) /fed 2= (4 ton compost + 20kg N)/fed 3= (3 ton compost + 40kg N) /fed
4= (2 ton compost + 60kg N)/fed 5= (1 ton compost + 80kg N) /fed 6= (zero ton compost + 100kg N)/fed

Effect of the interaction between organic and mineral and calcium foliar application on vegetative growth parameters

Data in Table 6 show the effect of the interaction between organic and mineral fertilizer and calcium foliar application on vegetative growth characters. Significant differences in both seasons were recorded on these parameters(plant length , number of leaves/plant , plant fresh and dry weight) with 2 ton compost + 60 kg N with calcium treatments(0 and 400g/fed) in season of 2011and 2012. Also the treatment of 3 ton compost + 40 kg N and sprayed with calcium at 400 g /fed produced the highest plant length in the first season , but the lowest values of these characters were recorded with unsprayed plants with calcium and treated with 5 ton compost + zero N

Table 6 . Effect of interaction between organic and mineral and calcium foliar application on plant length and number of leaves .

Compost and N rates	Plant length(m)				Number of leaves/plant			
	2011		2012		2011		2012	
	Calcium levels(400g/fed)							
	unsprayed	sprayed	unsprayed	sprayed	unsprayed	sprayed	unsprayed	Sprayed
1	1.58 e	1.60 de	1.75 g	1.87 fg	189.8 f	191.8 f	200.5 f	202.7 f
2	1.72 cde	1.79 b-e	1.92 fg	1.99 def	214.7 de	214.c de	218.3 e	227.3 de
3	1.95 bc	2.01ab	2.19 c	2.23 bc	226.7 bc	232 b	235.2 cd	246.2 bc
4	2.20 a	2.24 a	2.39 ab	2.51 a	251.2 a	255.3 a	260.5 ab	264.2 a
5	1.83 bcd	1.90 bc	2.12 cde	2.15 cd	232.8 b	228.8 b	241.5 cd	241.2 cd
6	1.91 bc	1.87 bc	1.96 ef	1.99 def	205.5	221.3bcd	234 cd	234.3 cd
L.S.D(0.05)	**0.23**		**0.18**		**11.57**		**14.79**	

Compost and N rates:
1= (5 ton compost + zero N) /fed 2= (4 ton compost + 20kg N)/fed 3= (3 ton compost + 40kg N) /fed
4= (2 ton compost + 60kg N)/fed 5= (1 ton compost + 80kg N) /fed 6= (zero ton compost + 100kg N)/fed

Table 7. Effect of interaction between organic and mineral and calcium foliar application on plant fresh and dry weight.

Compost and N rates	Plant fresh weigh(g)				Plant dry weight(g)			
	2011		2012		2011		2012	
	Calcium levels(400g/fed)							
	unsprayed	sprayed	unsprayed	sprayed	unsprayed	sprayed	unsprayed	Sprayed
1	1373 f	1430 de	1406 g	1425 fg	330.3 f	342.1 e	357 e	368.6cde
2	1444 cde	1470 bc	1462 de	1499 bc	365.8bcd	369.3bc	365.7 de	374.7 cd
3	1452 cde	1489 b	1480 cd	1512 b	370.3 bc	374.5 b	374 cde	384.1 bc
4	1544 a	1543 a	1527 ab	1556 a	391.8 a	391.1 a	397.1 ab	403.8 a
5	1458 bcd	1475 bc	1438 ef	1510 bc	364.5bcd	372.3bc	359.6 de	376.8 cd
6	1419 e	1446cde	1447 ef	1438 f	357.7 d	363.0cd	356.8 e	360.1 de
L.S.D(0.05)	**36.46**		**31.62**		**10.20**		**17.37**	

Compost and N rates:
1= (5 ton compost + zero N) /fed 2= (4 ton compost + 20kg N)/fed 3= (3 ton compost + 40kg N) /fed
4= (2 ton compost + 60kg N)/fed 5= (1 ton compost + 80kg N) /fed 6= (zero ton compost + 100kg N)/fed

Effect of the interaction between potassium and calcium foliar application

With respect to the effect of the interaction between potassium and calcium foliar application, data in Table 8 and 9 indicate that there were no significant differences on plant length due to calcium treatments and potassium rates. The highest numbers of leaves were recorded with 150 kg K_2O with unsprayed and sprayed plants in both seasons. Moreover the highest values of fresh weight were recorded when plants fertilized with 150kg K_2O and sprayed with400 g calcium/fed in both season. Meanwhile the highest values of dry weight were recorded when plants received 150kg K_2O and sprayed with 400 g calcium/fed and untreated plants in the first season. But in the second season there were non significant differences between 100kg K_2O with 400g calcium/fed and 150 kg K_2O with sprayed and unsprayed with calcium. The lowest values of fresh and dry weight were recorded when plants received 100kg K_2O and non treated plants with calcium 400 g/fed in both seasons.

Table 8. Effect of the interaction between potassium and calcium foliar application plant length and number of leaves.

Potassium Level (kg/fed)	Plant length(m)				Number of leaves/plant			
	2011		2012		2011		2012	
	Calcium level (400g/fed)							
	unsprayed	sprayed	unsprayed	sprayed	unsprayed	sprayed	unsprayed	Sprayed
100	1.83 a	1.84 a	2.02 b	2.07 ab	212.9 b	221.9 b	226.4 c	231.7 bc
150	1.90 a	1.96 a	2.09 ab	2.17 a	225.4 a	228.8 a	236.9 ab	240.8 a
L.S.D(0.05)	**N.S.**		**N.S.**		**6.6**		**8.5**	

Table (9) Effect of the interaction between potassium and calcium foliar application on plant fresh and dry weight.

Potassium Level (kg/fed)	Plant fresh weight(g)				Plant dry weight(g)			
	2011		2012		2011		2012	
	Calcium level(400g/fed)							
	unsprayed	sprayed	unsprayed	sprayed	unsprayed	sprayed	unsprayed	sprayed
100	1425 c	1455 b	1442 c	1477 b	358.4 b	365.6	362.8 b	373.9 a
150	1471 b	1496 a	1478 b	1502 a	367.7	372.0 a	373.9 a	382.1 a
L.S.D(0.05)	**21.05**		**18.25**		**11.01**		**10.03**	

Effect of the interaction between organic and nitrogen, potassium and calcium

With respect to the effect of the interaction between organic and nitrogen, potassium and calcium foliar application, data in Table 10 and 11 indicate that the highest plant length , number of leaves , plant fresh and dry weight were recorded with 2 ton compost +60 kg N and fertilized by both potassium levels and sprayed with calcium in both seasons.

Effect of organic –mineral fertilization, potassium level, calcium foliar application on number of fruits and average fruit weight

Number of fruits and average fruit weight

It appears from data in Table 12 that fertilizing plants with 2ton compost +60 kg N and 3ton compost +40kg N gave the highest number of fruits and average fruit weight in the both seasons. and also 3 ton compost+ 60 kg N gave the highest average fruit weight in the first season

Table 10. Effect of interaction between nitrogen and organic, potassium and calcium on plant length and number of leaves.

Compost and N rates		Plant length(m)				Number of leaves/plant			
		2011		2012		2011		2012	
		Potassium level(kg/fed)							
	Calcium level(400g/fed)	100	150	100	150	100	150	100	150
1	**unsprayed**	1.51 f	1.52 f	1.68 i	1.79 hi	180.3l	190.3 kl	191.3 h	196.0 h
	Sprayed	1.65 ef	1.68 ef	1.83 hi	1.96fg h	199.3ijk	193.3jkl	209.7d gh	209.3 gh
2	**unsprayed**	1.68 ef	1.78 ef	1.95fgh	2.00fg h	209.0 hij	212ghi	212.0 gh	224.7 fg
	Sprayed	1.76 ef	1.79 def	1.90ghi	1.98fg h	219.0ef g	219.0d-h	224.3 fg	230.0 efg
3	**unsprayed**	1.93 b-e	1.92 b-e	2.11d-h	2.15c-g	218.fgh	225.3d-h	228.7 efg	234.3 ef
	Sprayed	1.97 b-e	2.11 a-d	2.28b-e	2.31b-e	235.3cd e	238.7bc d	241.7 c-f	258.0a-d
4	**unsprayed**	2.15 abc	2.11 a-d	2.36bc d	2.38bc	248.7ab c	249.0ab c	256.0a-d	260.3ab c
	Sprayed	2.25 ab	2.36 a	2.42 ab	2.65 a	253.7 ab	261.7 a	265.0a b	268.0a
5	**unsprayed**	1.80 def	1.89 cde	2.09efg	2.18b-f	228.0d-g	231.3def	237.3 def	240.7c-f
	Sprayed	1.86 cde	1.92 b-e	2.15c-g	2.11d-g	226.3d-g	237.7bc d	245.7b-e	241.7 c-f
6	**unsprayed**	1.89 cde	1.843c -f	1.93f-i	1.96fg h	193.3jkl	220.3e-h	233.0 ef	234.0 ef
	Sprayed	1.92 b-e	1.897c -e	1.99fgh	2.02fg h	217.7fg h	222.3d-h	235.0 ef	238.0 def
L.S.D(0.05)		**0.33**		**0.25**		**16.37**		**20.92**	

Compost and N rates:

1= (5 ton compost + zero N) /fed 2= (4 ton compost + 20kg N)/fed 3= (3 ton compost + 40kg N) /fed

4= (2 ton compost + 60kg N)/fed 5= (1 ton compost + 80kg N) /fed 6= (zero ton compost + 100kg N)

Table 11. Effect of interaction between nitrogen and organic ,potassium and calcium on plant fresh and dry weight

Compost and N rates		Plant fresh weight (g)				Plant dry weight(g)			
		2011		2012		2011		2012	
		Potassium level(kg/fed)							
	Calcium level(400g/fed)	100	150	100	150	100	150	100	150
1	unsprayed	1342	1379	1401 j	1399 j	322.5	330.8	355.6	358.5
	sprayed	1405	1481	1410 ij	1450ghi	338.2	353.5	358.4	378.7
2	unsprayed	1404	1440	1452ghi	1487d-g	357.8	367.2	363.3	371.5
	sprayed	1483	1500	1473 e-h	1512cde	373.9	371.4	368.0	378.0
3	unsprayed	1434	1481	1451ghi	1505 cde	365.6	374.6	365.0	380.0
	sprayed	1470	1497	1509cde	1518cd	375.0	374.3	383.0	388.2
4	unsprayed	1509	1520	1477d-h	1491d-g	384.7	387.6	384.2	386.7
	sprayed	1579	1565	1577ab	1621a	399.0	394.7	410.0	420.9
5	unsprayed	1450	1465	1415ij	1549bc	362.8	373.6	353.9	387.1
	sprayed	1465	1484	1461fgh	1470e-h	366.3	371.2	365.2	366.5
6	unsprayed	1414	1441	1454ghi	1434hij	357.0	359.9	355.0	359.5
	sprayed	1423	1450	1440hij	1441hij	358.4	366.1	358.5	360.6
L.S.D(0.05)		51.56		44.71		14.40		24.56	

Compost and N rates:
1= (5 ton compost + zero N) /fed 2= (4 ton compost + 20kg N)/fed 3= (3 ton compost + 40kg N) /fed
4= (2 ton compost + 60kg N)/fed 5= (1 ton compost + 80kg N) /fed 6= (zero ton compost + 100kg N)/fed

Table 12 . Effect of organic and mineral, potassium and calcium on number of fruits and average fruit weight.

Treatments		Number of fruits/ plant		Average fruit weight /kg	
		Season 2011	Season 2012	Season 2011	Season 2012
Compost and N rates	1	3.22 d	3.27 d	1.790 e	1.681c
	2	3.30 d	3.48 c	1.918 cd	1.794 bc
	3	3.54 c	3.76 b	2.047 ab	1.981 b
	4	4.22 a	4.26 a	2.157 a	2.375 a
	5	3.68 b	3.43 cd	2.006 bc	2.013 b
	6	3.50 c	3.53 c	1.857 de	1.901 bc
L.S.D		0.13	0.18	0.115	0.220
Potassium Levels (kg/fed)	100	3.50 b	3.45 b	1.916 b	1.911b
	150	3.65 a	3.79 a	2.009 a	2.004 a
L.S.D		0.06	0.10	0.066	0.085
Calcium levels (400g/fed)	unsprayed	3.49 b	3.54 b	1.928 b	1.927 b
	sprayed	3.66 a	3.70 a	1.997 a	1.987a
L.S.D(0.05)		0.06	0.06	0.053	0.055

Compost and N rates:
1= (5 ton compost + zero N) /fed 2= (4 ton compost + 20kg N)/fed 3= (3 ton compost + 40kg N) /fed
4= (2 ton compost + 60kg N)/fed 5= (1 ton compost + 80kg N) /fed 6= (zero ton compost + 100kg N)/fed

Effect of potassium level

As shown in Table 12 the higher values for number of fruit and average fruit weight were recorded with 150kg K_2O than the other treatment in the both seasons

Effect of foliar calcium application

Data in Table 12 show that the foliar calcium application had significant effect on fruit number and average fruit weight in both seasons. The highest average fruit weights were recorded with foliar calcium application compared to unsprayed plants.

Effect of the interaction between organic and mineral and potassium level

Regarding the effect of the interaction between organic and mineral and potassium level, the highest values of number of fruits and average fruit were recorded with 2 ton compost + 60kg N with both levels of potassium, 3ton compost +40kg N with 100 and 150kg K_2O and 1 ton compost + 80 kg with 150 kg K_2O in the first season gave the highest average fruit weight in the first season. While in the second one the treatment 2 ton compost + 60 kg N with 150kg K_2O gave the highest number of fruits and average fruit weight.

Table 13. Effect of the interaction between organic and mineral and potassium level on number of fruits and average fruit weight.

Compost and N rates	Number of fruits /plant				Average fruit weight / kg			
	2011		2012		2011		2012	
	Potassium levels(kg/fed)							
	100	150	100	150	100	150	100	150
1	3.17 f	3.27 ef	3.24 f	3.29 f	1.715e	1.865 de	1.722fg	1.638 g
2	3.16 f	3.45 cd	3.42 ef	3.54 de	1.905bcd	1.930bcd	1.755efg	1.833d-g
3	3.48 cd	3.59 c	3.56 cd	3.95 b	2.036abc	2.058 ab	1.953b-e	2.008bcd
4	4.23 a	4.20 a	4.08 b	4.44 a	2.151 a	2.163 a	2.095b	2.655a
5	3.56 c	3.80 b	3.00 g	3.870 bc	1.868 de	2.148 a	2.060bc	1.965bcd
6	3.39 de	3.60 c	3.40 ef	3.67 cd	1.823 de	1.890 cd	1.878c-f	1. 925b-f
L.S.D(0.05)	0.15		0.24		0.164		0.210	

Compost and N rates:
1= (5 ton compost + zero N) /fed 2= (4 ton compost + 20kg N)/fed 3= (3 ton compost + 40kg N) /fed
4= (2 ton compost + 60kg N)/fed 5= (1 ton compost + 80kg N) /fed 6= (zero ton compost + 100kg N)/fed

Effect of the interaction between organic and mineral and calcium foliar application

With respect to the effect of the interaction between organic and mineral and calcium foliar application, data in Table 14 show that the treatment of 2 ton compost + 60 kg N with calcium treatment gave the highest values of number of fruits and average fruit weight in the first season and also 2 ton compost + 60 kg N with unsprayed plants, 3 ton compost + 40kg N with sprayed calcium gave the highest average fruit weight in the first season. also 3ton compost +80 kg N, 1 ton compost + 80 kg N with calcium foliar application gave the highest average fruit weight in the first seasons.

Table 14. Effect of the interaction between organic and mineral and calcium on fruit number and average fruit weight

Compost and N rates	Number of fruits /plant				Average fruit weight / kg			
	2011		2012		2011		2012	
	Calcium levels(400g/fed)							
	unsprayed	sprayed	unsprayed	sprayed	unsprayed	sprayed	unsprayed	Sprayed
1	3.19 f	3.25 ef	3.29 f	3.31 f	1.770 e	1.81 de	1.705 gh	1.656 h
2	3.20 f	3.41 de	3.24 f	3.7 bcd	1.907cd	1.928cd	1.789 fgh	1.799efg
3	3.51 d	3.56 d	3.75 bc	3.77 b	1.991bc	2.104ab	1.942 cd	2.020 bc
4	4.12 b	4.31 a	4.24 a	4.27 a	2.140 a	2.174 a	2.320 a	2.430a
5	3.46 d	3.900 c	3.30 f	3.57de	1.908 cd	2.103 ab	1.940 cd	2.086 b
6	3.47 d	3.52 d	3.47 de	3.60 cd	1.850 de	1.863cde	1.868 def	1.934cde
L.S.D(0.05)	0.16		0.16		0.130		0.135	

Compost and N rates:
1= (5 ton compost + zero N) /fed 2= (4 ton compost + 20kg N)/fed 3 (3 ton compost + 40kg N) /fed
4= (2 ton compost + 60kg N)/fed 5= (1 ton compost + 80kg N) /fed 6= (zero ton compost + 100kg N)/fed

Effect of the interaction between potassium and calcium foliar application

It is clear from data in Table 21 that the highest values of number of fruits and average fruit weight were recorded when plants fertilized by 150 kg K_2O and treated with calcium at 400 g/fed in both seasons. And also the plants that fertilized by 150 kg $K_2O$and unsprayed with calcium gave the highest average fruit weight in the second season.

Effect of the interaction between organic and mineral, potassium level and calcium foliar application

The triple interaction between organic and mineral, potassium and calcium foliar application had a significant effect on the number of fruits in both seasons. Data in Table 16 show that the highest number of fruits were recorded when plants fertilized by 2 ton compost + 60 kg N with 100 and 150 kg K_2O and sprayed with 400 g calcium /fed in both seasons and also2 ton compost + 60 kg N with 100

and 150 kg K_2O and unsprayed plants in the first season .

While the highest average fruit weight was recorded with 1ton compost+80 kg N that fertilized by 150kg K_2O and sprayed with calcium in the first season. But in the second season the treatment with 2 ton compost+ 60 kg N and fertilized by 150kg K_2O and sprayed plants with calcium.

Table 15. Effect of the interaction between potassium and calcium foliar application on number of fruit and average fruit weight.

Potassium Level(kg/fed)	Number of fruits / plant				Average fruit weight / kg			
	2011		2012		2011		2012	
	Calcium level(400g/fed)							
	unsprayed	sprayed	unsprayed	sprayed	unsprayed	sprayed	unsprayed	sprayed
100	3.42 c	3.58 b	3.38 c	3.52 c	1.903 b	1.928 b	1.887 c	1.934bc
150	3.56 b	3.74 a	3.69 b	3.89 a	1.952 b	2.066 a	1.967 ab	2.041 a
L.S.D(0.05)	**0.09**		**0.09**		**0.075**		**0.078**	

Table 16. Effect of the interaction between organic and mineral, potassium and calcium foliar application on fruit number and average fruit weight

Compost and N rates		Number of fruits / plant				Average fruit weight / kg			
		2011		2012		2011		2012	
		Potassium level (kg/fed)							
	Calcium level	100	150	100	150	100	150	100	150
1	**Unsprayed**	3.14 lm	3.20klm	3.20 hi	3.29 gh	1.740 hi	1.690i	1.750h-k	1.695ijk
	sprayed	3.25 j-m	3.30 i-m	3.25 h	3.32 gh	1.800ghi	1.930efg	1.660jk	1.617 k
2	**Unsprayed**	3.08 m	3.25 j-m	3.27gh	3.57 ef	1.900 e-h	1.910e-h	1.750h-k	1.760h-k
	sprayed	3. 33 h-l	3.57 d-g	3.22 hi	3.87 cd	1.913 e-h	1.947e-g	1.827f-j	1.838f-j
3	**Unsprayed**	3.45 e-j	3.51 e-i i	3.63 ef	3.50 fg	2.000 c-f	2.073b-e	1.917 d-h	1.990d-g
	sprayed	3.5 efg	3.61 def	3.87cd	4.04 bc	1.981c-g	2.135bcd	1.967d-g	2.050cde
4	**Unsprayed**	4.14 ab	4.33 a	4.4 bc	4.15 b	2.140a-d	2.162abc	2.090cd	2.100cd
	sprayed	4.11 ab	4.30 a	4.48 a	4.40 a	2.140a-d	2.186ab	2.550b	2.760a
5	**Unsprayed**	3.32 h-l	3.80 cd	3.00 i	3.00 i	1.840f-i	1.887fgh	1.880e-i	2.240 c
	sprayed	3.60 d-g	4.00 f-k	3.60 ef	4.14 b	1.975d-g	2.320a	2.000def	1.931d-h
6	**Unsprayed**	3.40 f-k	3.38 g-k	3.20 hi	3.60 ef	1.800gh i	1.846f-i	1.937d-h	1.818f-j
	sprayed	3.55 e-h	3.66 de	3.75de	3.600 ef	1.900e-h	1.880fgh	1.800g-k	2.050cd e
L.S.D (0.05)		**0.23**		**0.23**		**0.184**		**0.192**	

Compost and N rates:

1= (5 ton compost + zero N) /fed 2= (4 ton compost + 20kg N)/fed 3= (3 ton compost + 40kg N) /fed
4= (2 ton compost + 60kg N)/fed 5= (1 ton compost + 80kg N) /fed 6= (zero ton compost + 100kg N)/fed

Yield Effect of organic and mineral fertilization

Data presented in Table 17 indicate that the highest values of yield /plant and yield/fed were produced with 2 ton compost + 60 kg N in both seasons ,while the lowest values of these parameters were recorded with zero ton compost + 100kg N in both seasons. Coelho *et al*. (2001) reported that applying N levels through drip irrigation at (0, 60,120 and 180 kg/ha) increased the yield of melon and the level of 120 kg/h was the most suitable for melon crop.

Fontes *et al*.(2004) studied the effect of five N rates (0, 75, 150, 300, and 450 kg ha^{-1}), as urea in greenhouse and in open field , on muskmelon .the experimental results showed that at both conditions, total and marketable melon fruit yields increased with increasing N rates.. Similar results were found by Meena *et al*. (2005) who found that the increasing levels of N up to 60% kg/ha significantly increased fruit and biomass yield of snap melon (*Cucumis melo var .momordica*).

The apparent deficiency of an adequate supply of plant-available N from organic fertilizer, resulting from a slow rate of mineralization, makes crop yields in fields treated with organic fertilizer lower than in those treated with chemical fertilizers (Blatt, 1991; Lee, 2010).

In this respect increase in the total yield resulting that organic manuring enhanced soil aggregation, soil areation and increasing water holding capacity and offers good environmental conditions for the root system (Abou El- Magd ,2005.)

Organic manures like compost discharge nutrients very slowly to the plants and these nutrients are not directly absorb by the plants. Therefore, plants are unable access required amount of nutrients in the critical yield-forming period. This may be the probable reason for the higher yield produced by the inorganic fertilizer applied. Thus, combination of organic and inorganic fertilizers could produce better yields than organic manure alone Seran *et al*. (2010).

The combination of organic materials with reduced NPK fertilizer rates produced plants that were similar to unmixed NPK fertilizer. This indicated that the high dose of organic manures can be reduced by half and mixed with a reduced rate of NPK fertilizers as reported by Akande *et al*. (2003).

Table 17. Effect of organic and mineral, potassium and calcium on yield

Treatments		Yield Per/plant (kg)		Yield Per/fed (ton)	
		Season 2011	Season 2012	Season 2011	Season 2012
Compost and N rates	1	5.77 d	5.49 d	23.11 d	23.10 e
	2	6.35 c	6.25 cd	25.40 c	25.00 d
	3	7.24 b	7.46 b	29.00 b	30.22 b
	4	9.10 a	10.18 a	36.42 a	39.94 a
	5	7.42 b	6.89 bc	29.68 b	27.42 c
	6	6.50 c	6.71 bc	26.02 c	26.95 c
L.S.D		0.42	1.07	1.68	1.447
Potassium Levels (kg/fed)	100	6.75 b	6.61 b	26.33b	27.09b
	150	7.38 a	7.71 a	29.12a	30.45a
L.S.D		0.25	0.48	0.6465	1.227
Calcium levels(400g/fed)	unsprayed	6.77 b	6.89 b	27.09 b	27.75b
	sprayed	7.36 a	7.43 a	29.45 a	29.80a
L.S.D(0.05)		0.25	0.10	1.030	0.7768

Compost and N rates:
1= (5 ton compost + zero N) /fed 2= (4 ton compost + 20kg N)/fed 3= (3 ton compost + 40kg N) /fed
5= (1 ton compost + 80kg N) /fed 4= (2 ton compost + 60kg N)/fed 6= (zero ton compost + 100kg N)/fed

Effect of potassium levels on yield

It appears from data in Table 17 that plants received 150 kg K_2O gave the higher yield/plant and yield/feddan than the other treatment of 100 kg K_2O in both seasons.

Effect of calcium application on yield

Data in Table 17 show that plants treated with 400g calcium /fed produced the higher yield/plant and yield /fed than untreated plants.

Non significant differences were recorded on yield , number of fruits and average fruit weight due to increasing the rate of potassium . These results are in agreement with those reported by Lin *et al*. (2004) on muskmelon, Demiral and Köseoglu (2005). On galia melon. On the other hand Okur and Yacmur (2004) found that increasing the rate of potassium increased the fruit weight on water melon.

The effect of the interaction between organic and mineral and potassium level on yield

Regarding the effect of the interaction between organic and mineral fertilization and potassium levels, data in Table 18 show that the highest yield/plant and yield per/fed were recorded when plants received 2 ton compost + 60 kg N and fertilized by 150 kg K_2O in both seasons and also 2 ton compost + 60 kg N and fertilized by 100 kg K_2O in the first season. but the lowest values of yield/plant and yield/fed were recorded with zero ton compost + 100kg N and fertilized by 100 kg K_2O in both seasons .

Generally the significant increasing in the growth and yield as applied N rates increased confirmed the role of N in the promotion of vegetative growth and yield especially when applied at the recommended rate. (Olaniyi and Odedere, 2009).

This result is similar to the finding by Akanbi *et al.* (2005) and olaniyi (2006) who reported an increase in the performance fruit vegetable. The application of compost had significant effect on growth, yield and nutrient uptake possibly due to the ability of compost to support plant growth for an extended period of time, which makes essential nutrient available to crops over a long period. The N in compost is released slowly by microorganism through the process of mineralization. Hence compost need not be applied frequently and crops make use it more efficiently than mineral N fertilizer.

Makinde *et al*. (2007) reported that increasing melon growth and optimum yield with organo-mineral fertilizer rate at 4 t/ha or the application inorganic fertilizer at 41 kg N+ 20kg P. The combination of farm-yard manure and inorganic fertilizer significantly influenced cucumber yield compared to farm-yard manure and fertilizer alone especially at higher rates of application. The increasing in yield of cucumber could be attributed to the fact that nutrients were more readily available

when organic and inorganic fertilizers were combined

Table 18. Effect of interaction between organic and mineral and potassium level on yield

Compost and N rate	Yield Per/plant(kg)				Yield Per/fed(ton)			
	2011		2012		2011		2012	
	Potassium levels(kg/fed)							
	100	150	100	150	100	150	100	150
1	5044 f	6.11 e	5.58 f	5.39 f	21.76 f	24.46 e	22.35 f	21.59 f
2	6.03 ef	6.66 de	6.00 ef	6.50 def	24.14ef	26.66de	24.01 ef	26.02def
3	7.10 cd	7.39 c	6.97 cde	7.96 bc	28.42cd	29.57c	27.88cde	31.86bc
4	9.11 a	9.09 a	8.55 b	11.80 a	36.45a	36.38a	34.22b	47.19 a
5	6.64 de	8.19 b	6.19 ef	7.59bcd	26.59de	32.77b	24.79 ef	30.36bcd
6	6.18 f	6.82 cd	6.37 ef	7.06cde	24.75e	27.29cd	25.49 ef	28.24cde
L.S.D(0.05)	0.63		1.82		2.52		4.729	

Compost and N rates:
1= (5 ton compost + zero N) /fed 2= (4 ton compost + 20kg N)/fed 3= (3 ton compost + 40kg N) /fed
4= (2 ton compost + 60kg N)/fed 5= (1 ton compost + 80kg N) /fed 6= (zero ton compost + 100kg N)/fed

Effect of the interaction between organic and mineral and calcium foliar application on yield

Concerning to the effect of the interaction between organic and mineral and calcium foliar application, data in Table (19) show that the highest yield/plant and yield /fed were recorded when plants received 2 ton compost + 60 kg N and sprayed with 400 g calcium/fed in both seasons. While the lowest values of yield /plant and yield/fed were recorded when plants fertilizes by zero ton compost + 100kg N with sprayed and unsprayed with calcium in both seasons.

Table 19. Effect of the interaction between organic and mineral and calcium foliar application on yield

Compost and N rate	Yield Per/plant(kg)				Yield Per/fed(ton)			
	2011		2012		2011		2012	
	Calcium levels (400g/fed)							
	unsprayed	sprayed	unsprayed	sprayed	unsprayed	sprayed	unsprayed	Sprayed
1	5.65 h	5.89 gh	5.50 e	5.48 e	22.63 g	23.59fg	22.01 e	21.93 e
2	6.11 g	6.58 f	5.80 e	6.70 d	24.46 efg	26.34de	23.22 e	26.81 d
3	6.99 e	7.50 d	7.29 bc	7.64 b	27.97 cd	30.02 c	29.18 bc	30.56 b
4	8.82 b	9.38 a	9.90 a	10.45 a	35.30 ab	37.53 a	36.62 a	41.79 a
5	6.61 f	8.22 c	6.41 d	7.37 bc	26.46 de	32.90b	26.67 d	29.49bc
6	6.43 f	6.157 f	6.47 d	6.96	25.74 def	26.3 de	25.89 d	27.84cd
L.S.D(0.05)	0.25		0.58		2.52		2.35	

Compost and N rates:
1= (5 ton compost + zero N) /fed 2= (4 ton compost + 20kg N)/fed 3= (3 ton compost + 40kg N) /fed
4= (2 ton compost + 60kg N)/fed 5= (1 ton compost + 80kg N) /fed 6= (zero ton compost + 100kg N)/fed

Effect of the interaction between potassium and calcium foliar application on yield

It is clear from data presented in Table 20 that the highest values of fruit yield/plant and yield /fed were recorded when plants received 150 kg K2O and sprayed with 400 g calcium /fed.

Table 20. Effect of the interaction potassium and calcium foliar application on yield

Potassium Level(kg/fed)	Yield Per/plant(kg)				Yield Per/fed(ton)			
	2011		2012		2011		2012	
	Calcium level(400g/fed)							
	Unsprayed	Sprayed	unsprayed	sprayed	unsprayed	sprayed	unsprayed	sprayed
100	6.55 c	6.95 b	6.41 d	6.81 c	26.23 c	27.80 b	25.67 d	27.25 c
150(0.05)	6.98 b	7.77 a	7.38 b	8.057 a	27.95 b	31.09 a	29.52 b	32.23 a
	0.36		0.33		1.45		1.35	

Effect of the interaction between organic and mineral, potassium level and calcium foliar application on yield

Regarding to the effect of the interaction between organic and mineral, potassium level and calcium foliar application , data in Table 21 show that the highest values of yield/plant and yield/fed .were recorded with 2 ton compost + 60 kg N and fertilized with 100 and 150 kg K_2O and sprayed with 400 g calcium /fed). On the other hand, the treatment with zero ton compost +100kg N with 100kg K_2O and unsprayed with calcium gave the lowest values of yield/plant and yield/fed in the first season .while the lowest values of yield/plant and yield/fed were recorded with 5ton compost + zero N with100 and 150 K_2O and unsprayed with calcium .

Table 21. Effect of the interaction between organic and mineral ,potassium and calcium foliar application yield/plant and yield/fed

Compost and N rate		Yield Per/plant (kg)				Yield Per/fed(ton)			
		2011		2012		2011		2012	
		Potassium level (kg/fed)							
	Calcium level(g/fed)	100	150	100	150	100	150	100	150
1	Unsprayed	5.46 j	5.41 j	5.59 ij	5.58 ij	21.85 j	21.67 j	22.38ij	22.32 ij
	Sprayed	5.85 ij	6.37 d-i	5.41 j	5.38 j	23.41ij	25.51 d-i	21.64 i	21.51j
2	Unsprayed	5.86 hij	6.20 f-j	5.72 hij	6.28 ghi	23.46 h-j	24.82 f-j	22.90hij	25.13hij
	Sprayed	6.36 d-i	6.96 b-g	5.88 hij	7.12 ef	25.46 d-i	27.85b-g	23.54hij	28.49ef
3	Unsprayed	6.92 b-g	7.28 bc	6.96 efg	6.97 efg	27.70 b-g	29.15 bc	27.88efg	27.89efg
	Sprayed	7.06 b-f	7.72 b	7.6 cde	8.31 bc	28.24b-f	30.90b	30.48cde	33.24bc
4	Unsprayed	8.85 a	9.37 a	8.37 bc	8.73 b	35.42 a	37.49 a	33.50bc	34.94b
	Sprayed	8.79 a	9.39 a	11.44 a	12.16 a	35.18 a	37.57 a	45.74a	48.64a
5	unsprayed	6.12 g-i	7.17 bcd	5.64 ij	6.75 fg	24.49 g-i	28.70bcd	48.64ij	27.02fg
	sprayed	7.10 b-e	9.27 a	7.19 def	7.98 bcd	28.43b-e	37.11a	28.77def	31.96bcd
6	unsprayed	6.12 g-j	6.25 e-j	6.20 g-j	6.54 fgh	24.49 g-i	25.01e-j	24.80g-j	26.19fgh
	sprayed	6.74 c-h	6.89 b-g	6.74 fg	7.37 def	26.99ch	27.59b-g	26.98fg	29.50def
L.S.D		0.89		0.83		3.56		3.33	

Compost and N rates:
1= (5 ton compost + zero N) /fed 2= (4 ton compost + 20kg N)/fed 3= (3 ton compost + 40kg N) /fed
4= (2 ton compost + 60kg N)/fed 5= (1 ton compost + 80kg N) /fed 6= (zero ton compost + 100kg N)/ Fed

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تاثير معدلات التسميد المعدنى والعضوى على نمو الخضرى ومحصول القاوون

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نفذت تجربتان بمزرعة – محطة التجارب الزراعية كلية الزراعة جامعة القاهرة – جيزة خلال الموسم الصيفى لعامى 2011- 2012 لدراسة تاثير التسميد العدنى والعضوى و التفاعل بينهما على النمو الخضرى والمحصول القاوون (صنف ماجينا) ومن خلال النتائج اظهرت ان المعاملة بـ2 طن كمبوست + 60 كجم نيتروجين أعطت أعلى النتائج لكل من طول النبات ، عدد الاوراق ، الوزن الطازج والجاف ، عدد الثمار ، متوسط وزن الثمار وامحصول الكلى للنبات والفدان. وعند معاملة النباتات بـ 150 كجم بوتاسيوم /الفدان أعطت أعلى قيم لكل من النمو الخضرى والمحصول بالمقارنة بـ 100 كجم بوتاسيوم /الفدان فى كلا الموسمين . لم يوجد اى فروق معنوية عند استخدام الكالسيوم رشا على النمو الخضرى ولكن ظهرت فروق معنوية للوزن الطازج والجاف وعدد الثمار والمحصول عند معاملة الكالسيوم رشا. وعند التفاعل بين التسميد العضوى والمعدنى والبوتاسيوم والكالسيوم يكون أفضل طول للنبات وعدد الاوراق والوزن الطازج والجاف وعدد الثمار والمحصول عند التسميد بـ2 طن كمبوست + 60 كجم نيتروجين مع التسميد بـ 150 و 100 كجم بوتاسيوم /الفدان وأستخدام الكالسيوم رشا فى كلا الموسمين ولكن عند المعاملة بـ2 طن كمبوست + 60 كجم نيتروجين مع التسميد ب 150 كجم بوتاسيوم /الفدان وأستخدام الكالسيوم رشا يعطى أعلى وزن للثمار فى الموسم الثانى و لكن فى الموسم الاول اعلى وزن للثمار عند التسميد بـ 1طن كمبوست+80 كجم نيتروجين مع التسميد ب 150 كجم بوتاسيوم /الفدان وأستخدام الكالسيوم رشا.

الكلمات المفتاحية: القاوون ،التسميد العضوى والمعدنى، نمو الخضرى، المحصول.