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EFFECT OF ORGANIC AND MINERAL FERTILIZERS ON PRODUCTIVITY AND QUALITY OF POTATO: 1- VEGETATIVE GROWTH.

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ABSTRACT

This study was conducted during the two successive winter seasons of 2003/2004 and 2004/2005 at Basandela village, Belqas, Dakahlia Governorate, Egypt. The objective of this experiment was to study the response of potato (*Solanum tuberosum* L. cv. Spunta) to organic manure sources (Chicken, farmyard manures and Compost), inorganic fertilizers and their interaction on the plant growth. The experimental design was split plot design with three replicates in both seasons of study. The three sources of organic manure occupied in the main plots, while the inorganic fertilizers treatments occupied the sub plots.

The results indicated that most of plant height, leaves area/plant, number of leaves/plant, fresh weight of leaves/plant (g), fresh and dry weights of stems/plant (g) and total chlorophyll content in leaves were significantly increased with chicken manure compared with compost or FYM in both seasons of study. Plant height, number of stems, leaves area/plant, number of leaves/plant, fresh weight of leaves/plant (g), fresh and dry weights of stems/plant (g) and total chlorophyll content in leaves were significantly increased with the application of 50% organic manure + 50 % inorganic manure in both seasons of study. The interaction between organic and NPK fertilization indicted that plant height, number of stems, leaves area/plant, fresh and dry weights of stems/plant were not affected by this interaction. On the other side, number of leaves/plant, fresh and dry weights of leaves and total chlorophyll content in leaves were increased with the application of 50% chicken manure and 50 % inorganic fertilizer in both seasons of study.

INTRODUCTION

Potato (*Solanum tuberosum* L.) is one of the most important vegetable crops cultivated in Egypt for local consumption and exportation.

To obtain the best yield from a potato crop, suitable cultural practices must be adopted, soil cultivation, good soil moisture conditions insect and disease control. Miss using of chemical fertilizer is one of the most serious problems in potato production.

The balance between N, P and K and increasing their levels had an important role for enhancing growth; N, P and K content in different parts and whole plants; yield and its components as well as N, P and K and starch content in potato tubers compared with untreated control. Also, NPK fertilizers affect all vegetative growth, chemical constituents and yield and its components (Awad, 1997).

Egyptian soils are low in organic matter about 2 % (Balba, 1976). Organic manures such as chicken, compost and farmyard manures contribute to plant growth through its effect on physical, chemical and

biological properties of the soil as well as through its effect as a source of essential nutrients (Abou – Baker and Samia, 1994 ; Meshref *et al.*, 1995 and El-Nagar, 1996).

Adding organic manure *i.e.* compost, farmyard and chicken manures increased total tuber yield and all vegetative growth and decreased nitrate (NO^-_3) content in tuber (Volodko, 1990 and Ashour and Sarhan, 1998). Mondal and Mazumdar (1986) reported that tubers yield of potato increased significantly with the application of organic manure.

Therefore, the objective of this study was to determine the effect of organic manure sources (Chicken, farmyard manures and Compost), inorganic fertilizers and their interaction on vegetative growth of potato.

MATERIALS AND METHODS

Two successive field experiments were carried out during both winter seasons of 2003/2004 and 2004/2005 at the private Farm in Basandela Village, Belqas, Dakahlia Governorate, to study the effect of NPK and manure sources application on the plant growth of potato (*Solanum tuberosum* L. cv. Spunta).

The treatments included three sources of manures *i.e.* chicken, farmyard and compost and five levels of NPK.

The soil in the experimental plots had a clay loam texture. The planting date was in October 10^{th} and 18^{th} during 2003/2004 and 2004/2005 seasons, respectively. Tuber seeds were placed at a uniform distance of 25 cm apart and 12-15 cm depth. The harvesting was done after 125 days from planting date in both seasons of this study.

The experiments were set out in split plot design with three replicates in both seasons. Each plot area was 21 m^2 (1/200 of feddan) which contained 5 rows, 6 m long and 0.7 m width. The treatments were:

1- 0 % chicken manure and 100 % inorganic fertilizers (NPK) [538 kg NH_4NO_3 + 200 kg K_2O + 484 kg P_2O_5/fed].
2- 25 % chicken manure and 75 % inorganic fertilizers (NPK) [1450 kg chicken manure + 403.5 kg NH_4NO_3 + 175 kg K_2O + 363 kg P_2O_5/fed].
3- 50 % chicken manure and 50 % inorganic fertilizers (NPK) [2900 kg chicken manure + 269 kg NH_4NO_3 + 100 kg K_2O + 242 kg P_2O_5/fed].
4- 75 % chicken manure and 25 % inorganic fertilizers (NPK) [4350 kg chicken manure + 134.5 kg NH_4NO_3 + 50 kg K_2O + 121 kg P_2O_5/fed].
5- 100 % chicken manure and 0 % inorganic fertilizers (NPK) [5800 kg chicken manure/fed].
6- 0 % farmyard manure and 100 % inorganic fertilizers (NPK) [538 kg NH_4NO_3 + 200 kg K_2O + 484 kg P_2O_5/fed].
7- 25 % farmyard manure and 75 % inorganic fertilizers (NPK) [1800 kg farmyard manure + 403.5 kg NH_4NO_3 + 175 kg K_2O + 363 kg P_2O_5/fed].
8- 50 % farmyard manure and 50 % inorganic fertilizers (NPK) [3600 kg farmyard manure + 269 kg NH_4NO_3 + 100 kg K_2O + 242 kg P_2O_5/fed].
9- 75 % farmyard manure and 25 % inorganic fertilizers (NPK) [5400 kg farmyard manure + 134.5 kg NH_4NO_3 + 50 kg K_2O + 121 kg P_2O_5/fed].

10- 100 % farmyard manure and 0 % inorganic fertilizers (NPK) [7200 kg farmyard manure/fed].
11- 0 % compost manure and 100 % inorganic fertilizers (NPK) [538 kg NH_4NO_3 + 200 kg K_2O + 484 kg P_2O_5/fed].
12- 25 % compost manure and 75 % inorganic fertilizers (NPK) [1600 kg compost manure + 403.5 kg NH_4NO_3 + 175 kg K_2O + 363 kg P_2O_5/fed].
13- 50 % compost manure and 50 % inorganic fertilizers (NPK) [3200 kg compost manure + 269 kg NH_4NO_3 + 100 kg K_2O + 242 kg P_2O_5/fed].
14- 75 % compost manure and 25 % inorganic fertilizers (NPK) [4800 kg compost manure + 134.5 kg NH_4NO_3 + 50 kg K_2O + 121 kg P_2O_5/fed].
15- 100 % compost manure and 0 % inorganic fertilizers (NPK) [6400 kg compost manure/fed].

Ammonium nitrate (33.5%) was used as a source of nitrogen fertilizer. Nitrogen fertilizer was applied in the three equal doses, the first dose was applied at 25 days after planting, the second and third doses were applied before second and third irrigation. Potassium sulfate (48% K_2O) was used as a source of potassium fertilizer. Potassium fertilizer was applied at 45 days after planting. Phosphorus was added once in the form of calcium superphosphate (15.5% P_2O_5) during soil preparation.

Rice straw and agricultural residuals were collected and cutting by using traditional threshing, then the agricultural residues were put in heap in layers. Also, 50 kg of calcium superphosphate and 50 kg ammonium nitrate were appended to agricultural residues layers as activator of bacteria and covered by black polyethylene. All week heap was well mixed with adding water. After two months, the compost was matured and after that added to an experimental units.

Chicken and farmyard manures as well as compost were distributed, spreaded and thoroughly mixed with the surface soil layer (0–20 cm) before planting.

Surface irrigation was used, the first irrigation was done after 25 days from planting, while the following ones were carried regularly and stopped at two weeks before harvesting. The cultural practices such as hilling weeds, pest and diseases control were done following the guidelines given by Ministry of Agriculture.

At 90 days after planting a representative sample of five plants were randomly taken from each plot to measure vegetative growth of plants as follows:

a- Plant height; measured from the ground level to the top of the main stem.
b- Number of stems/plant; the all visible branches of chosen plants were counted.
c- Number of leaves per plant.
d- Leaves area/plant; it was determined by using the fresh weight method. Leaves were randomly taken and cleaned from the dust and weighted. The fresh weight of twenty known disks were estimated and consequently the leaf area was calculated according the following formula according to Koller (1972):

$$\text{Leaves area} = \frac{\text{Fresh weight of leaves/plant X Area of the disks (cm}^2\text{)}}{\text{Fresh weight of 20 disks}}$$

e- Fresh weight and dry weight/leaves and stems of plant; the fresh of leaves and stems were dried till constant weight at 70° C.

f- Chlorophyll contents of leaves: were estimated by using method of Moran and Porath (1982).

All data of this study were statistically analyzed according to the technique of variance (ANOVA) for the split plot design as published by Gomez and Gomez (1984), using "MSTAT-C" Computer software package. The treatment means were compared using the Least Significant Differences method as described by Waller and Duncan (1969).

RESULTS AND DISCUSSION

Effect of organic manure sources:

a) Plant height:

Data in Table 1 show that plant height at 90 days after planting was significantly increased with chicken manure (43.27 cm) followed by compost (41.33 cm) and FYM (40.20 cm) in the first season, and (43.80 cm) with chicken manure followed by compost (41.53 cm) and FYM (39.93 cm) in the second season. This effect may be due to that applying of organic manure lead to increase in the soil cations exchange and capacity, thus allowing increases availability of certain nutrients such as Ca, Mg, and P (Brady, 1974). The same data were reported by Meshref *et al.* (1995) and El-Nagar (1996).

b) Number of stems/plant:

As shown in Table 1 the best number of stems was recorded with chicken manure as compared with farmyard manure or compost in both seasons, but the differences were not significant in both seasons of study. The same data were reported by Brady (1974) and Abdel-Ati (1998).

c) Leaves area/plant, number of leaves/plant, fresh weight of leaves/plant and dry weight of leaves/plant:

Data in Tables 1 and 2 revealed that leaves area/plant, number of leaves/plant, fresh weight of leaves/plant and dry weight of leaves/plant were significantly increased with the application of chicken manure compared with FYM or compost. The same data were reported by Brady (1974), Abou-Hussein (1995), Abdel-Ati (1998), Abdulla (1999) and Arisha and Bardisi (1999).

d) Fresh weight of stems/plant, dry weight of stems/plant and total chlorophyll content:

The results in Table 3 show that fresh weight of stems/plant, dry weight of stems/plant and total chlorophyll content were significantly increased in both seasons of study by application of chicken manure compared with FYM or compost. The same data were reported by Abdulla (1999) and Awad (2005).

In general, all vegetative growth characters were significantly increased with application of organic manure, *i.e.,* chicken manure, farmyard manure

and compost. This effect might be due to that its effect on physical, chemical and biological properties of soil as well as through its effects as a source of essential nutrients (Meshref *et al.*, 1995 ; El-Nagar, 1996 and Attalah *et al.*, 1997). The same data were recorded by Warman (1994), Abou-Hussein (1995) and Arisha and Bardisi (1999).

Effect of organic and levels of inorganic manures:

a) Plant height:

Data in Table 1 indicate that plant height was affected by these treatments significantly and the best treatment was recorded with the application of 50 % organic + 50 % inorganic manure in both seasons of study. Similar results were obtained by Awad (2005). Who found that application of 50 % chicken manure and 50 % NPK gave the highest values of plant height.

b) Number of stems/plant:

Data in Table 1 recorded that the number of stems was affected by this treatment in both seasons of this study. Similar trend was found by Awad (2005).

c) Leaves area/plant:

Data in Table 1 show that leaf area per plant at 90 days after planting was significantly increased with the application of 50 % organic + 50 % inorganic manure compared with other treatments in both seasons of study.

Table 1: Plant height (cm), number of stems and leaves area/plant (cm^2) at 90 days after planting as affected by organic manure sources and NPK fertilizers during fall seasons of 2003/2004 and 2004/2005.

Treatments	Plant height (cm)		Number of stems/plant		Leaves area/plant (cm^2)	
	2003/2004	2004/2005	2003/2004	2004/2005	2003/2004	2004/2005
A- Organic manure sources						
Chicken	43.27	43.80	2.79	2.82	1798.20	1799.60
FYM	40.20	39.93	2.78	2.75	1475.80	1484.30
Compost	41.33	41.53	2.77	2.73	1781.40	1786.30
LSD at 5 %	0.59	0.65	NS	NS	0.43	0.67
B- Organic + inorganic						
0 % + 100 %	41.33	41.00	2.75	2.71	1736.72	1737.66
25 % + 75 %	41.89	42.78	2.83	2.77	1737.98	1741.22
50 % + 50 %	43.78	45.44	2.99	2.92	1738.60	1740.25
75 % + 25 %	41.11	40.33	2.78	2.73	1737.45	1738.41
100 % + 0 %	39.89	39.22	2.71	2.70	1736.67	1738.58
LSD at 5 %	1.10	1.44	0.15	0.18	0.33	2.57

d) Number of leaves/plant:

As shown in Table 2 data reveal that number of leaves per plant was significantly increased with the application of 50% organic + 50% inorganic manure compared with other treatments in both seasons of study.

e) Fresh weight of leaves/plant:

Data in Table 2 show that fresh weight of leaves per plant was significantly increased with 50% organic + 50% inorganic manure in both seasons of study. These data are in line with those recorded by Awad (2005).

f) Dry weight of leaves/plant:

As shown in Table 2 data clear that no significant effect on dry weight of leaves per plant as a result of the application of organic + inorganic manure in both seasons of this study.

Table 2: Number of leaves/plant, fresh and dry weight of leaves/plant (g) as affected by organic manure sources and NPK fertilizers during fall seasons of 2003/2004 and 2004/2005.

Treatments	Number of leaves/plant		Fresh weight of leaves/plant (g)		Dry weight of leaves/plant (g)	
	2003/2004	2004/2005	2003/2004	2004/2005	2003/2004	2004/2005
A- Organic manure sources						
Chicken	37.93	40.66	122.32	123.56	12.44	12.52
FYM	36.72	37.74	120.06	120.90	12.38	12.44
Compost	37.82	38.67	121.51	122.54	12.34	12.42
LSD at 5 %	0.43	0.67	0.16	0.58	NS	NS
B- Organic + inorganic						
0 % + 100 %	36.72	37.66	120.78	121.51	12.30	12.45
25 % + 75 %	37.98	41.22	121.60	122.81	12.42	12.47
50 % + 50 %	38.66	40.25	122.27	123.17	12.52	12.57
75 % + 25 %	37.45	38.41	121.44	122.29	12.40	12.48
100 % + 0 %	36.67	38.58	120.41	122.03	12.31	12.33
LSD at 5 %	0.33	0.55	0.35	1.31	NS	NS

g) Fresh weight of stems/plant, dry weight of stems/plant and total chlorophyll content:

The results in Table 3 show that fresh weight of stems/plant, dry weight of stems/plant and total chlorophyll content were significantly increased with 50% organic + 50% inorganic manure in the first season only, but in the second season fresh weight of stems was not affected by this treatments.

In general, all vegetative growth characters were significantly affected with the application of organic and inorganic manure in both seasons of study. The best data were recorded with application of 50 % organic + 50 % inorganic manures as compared with other treatments. This effect might be attributed to to the improvement of physical conditions of the soil and supplying with nutrients, thus benefiting plant growth (Abou-Hussein, 1995 ; Rechcig, 1995 and Abdel-Ati, 1998). Awad (2005) reported that application of 50 % chicken manure and 50 % NPK gave the highest values of plant height, number of main stems/plant, chlorophyll content, foliage fresh weight and dry weight as compared with other treatments.

Table 3: Fresh and dry weight of stems/plant (g) and total chlorophyll (mg/100 cm^3) at 90 days after planting as affected by organic manure sources and NPK fertilizers during fall seasons of 2003/2004 and 2004/2005.

Treatments	Fresh weight of stems/plant (g)		Dry weight of stems/plant (g)		Total chlorophyll (mg/100 cm^3)	
	2003/2004	2004/2005	2003/2004	2004/2005	2003/2004	2004/2005
A- Organic manure sources						
Chicken	42.06	43.00	3.88	3.95	5.99	6.01
FYM	40.52	41.23	3.38	3.48	5.62	5.62
Compost	41.72	42.68	3.74	3.82	5.82	5.84
LSD at 5 %	0.34	0.23	0.17	0.07	0.05	0.08
B- Organic + inorganic						
0 % + 100 %	41.10	42.04	3.65	3.70	5.76	5.78
25 % + 75 %	41.40	42.34	3.70	3.78	5.84	5.86
50 % + 50 %	42.72	43.45	3.84	3.92	5.88	5.91
75 % + 25 %	41.07	42.04	3.64	3.72	5.82	5.84
100 % + 0 %	40.86	41.63	3.50	3.63	5.75	5.374
LSD at 5 %	0.28	NS	0.17	0.11	0.08	0.10

Effect of the interaction between organic manure sources and NPK fertilization on vegetative growth:

a) Plant height:

Data in Table 4 indicate that plant height was not significantly affected by the interaction between organic manure sources and NPK fertilizers in both seasons of study.

Table 4: Plant height (cm), number of stems and leaves area/plant (cm^2) as affected by the interaction between organic manure sources and NPK fertilizers during fall seasons of 2003/2004 and 2004/2005.

Treatments		Plant height (cm)		Number of stems		Leaves area/plant (cm^2)	
		2003/2004	2004/2005	2003/2004	2004/2005	2003/2004	2004/2005
Chicken	0 % + 100 %	43.00	43.66	2.70	2.70	1794.0	1795.0
	25 % + 75 %	44.66	46.00	2.80	2.80	1797.6	1801.3
	50 % + 50 %	45.66	47.00	3.10	3.10	1802.6	1807.0
	75 % + 25 %	42.00	42.00	2.76	2.80	1794.0	1798.0
	100 % + 0 %	41.00	40.33	2.60	2.70	1790.6	1792.0
FYM	0 % + 100 %	40.00	38.33	2.76	2.70	1780.0	1781.0
	25 % + 75 %	40.00	40.00	2.80	2.80	1781.6	1786.6
	50 % + 50 %	42.00	44.00	2.90	2.80	1785.3	1793.6
	75 % + 25 %	40.00	39.00	2.70	2.70	1781.0	1784.6
	100 % + 0 %	39.00	38.33	2.73	2.73	1779.0	1779.6
Compost	0 % + 100 %	41.00	41.00	2.80	2.73	1788.3	1791.6
	25 % + 75 %	41.66	42.33	2.90	2.70	1789.6	1797.6
	50 % + 50 %	43.66	45.33	2.96	2.86	1792.0	1801.0
	75 % + 25 %	40.66	40.00	2.90	2.70	1789.3	1796.3
	100 % + 0 %	39.66	39.00	2.80	2.60	1786.6	1790.0
LSD at 5 %		NS	NS	NS	NS	NS	NS

b) Number of stems:

Data in Table 4 recorded that the number of stems was not affected by the interaction between organic manure sources and NPK fertilizers in both seasons of this study.

c) Leaves area/plant:

Data in Table 4 recorded that leaf area per plant at 90 days after planting was not significantly affected due to the interaction between organic manure sources and NPK fertilizers in both seasons of study.

d) Number of leaves/plant:

As shown in Table 5 data reveal that number of leaves per plant was significantly increased with the interaction between organic manure sources and NPK fertilizers in both seasons of study and highest number of leaves was found when plants treated with 50 % organic + 50 % inorganic manure.

e) Fresh weight of leaves/plant and dry weight of leaves/plant:

Data in Table 5 show that fresh and dry weight of leaves per plant were significantly increased with the interaction between 50% chicken manure + 50% inorganic fertilizers in both seasons of study.

Table 5: Number of leaves/plant, fresh and dry weight of leaves/plant (g) as affected by the interaction between organic manure sources and NPK fertilizers during fall seasons of 2003/2004 and 2004/2005.

Treatments		Number of leaves/plant		Fresh weight of leaves/plant (g)		Dry weight of leaves/plant (g)	
		2003/ 2004	2004/ 2005	2003/ 2004	2004/ 2005	2003/ 2004	2004/ 2005
Chicken	0 % + 100 %	36.80	37.60	121.9	122.3	12.43	12.60
	25 % + 75 %	38.60	38.80	122.6	123.6	12.50	12.50
	50 % + 50 %	39.40	39.90	123.6	124.4	12.60	12.70
	75 % + 25 %	37.90	38.00	122.4	123.4	12.40	12.50
	100 % + 0 %	36.80	37.10	120.9	121.8	12.20	12.30
FYM	0 % + 100 %	36.30	37.40	119.8	120.6	12.30	12.40
	25 % + 75 %	36.70	37.70	119.9	121.4	12.30	12.40
	50 % + 50 %	37.70	38.70	120.6	121.5	12.40	12.40
	75 % + 25 %	36.60	37.60	120.0	120.6	12.40	12.50
	100 % + 0 %	36.10	37.20	119.9	120.6	12.40	12.40
Compost	0 % + 100 %	36.00	37.70	120.6	121.5	12.20	12.30
	25 % + 75 %	38.50	39.50	122.2	123.5	12.50	12.60
	50 % + 50 %	38.60	39.60	122.5	123.5	12.50	12.60
	75 % + 25 %	37.80	38.60	121.8	122.8	12.16	12.46
	100 % + 0 %	37.00	37.70	120.3	121.5	12.10	12.26
LSD at 5 %		0.40	3.69	0.5	0.1	0.20	0.20

f) Fresh weight of stems/plant:

The results in Table 6 show that fresh weight of stems per plant was not affected by the interaction between organic manure sources and NPK fertilizers in both seasons of this study.

g) Dry weight of stems/plant:

Data shown in Table 6 indicate that the interaction between organic manure sources and NPK fertilizers was not affected on dry weight of stems per plant in both seasons of this study.

i) Total chlorophyll content:

The results in Table 6 show that total chlorophyll content in leaves was significantly increased with the interaction between organic manure sources and NPK fertilizers in both seasons of this study.

In general, all vegetative growth characters were significantly affected by the interaction between organic manure sources and NPK fertilization in both seasons of study. The best data were recorded with application of 50 % chicken manure organic + 50 % NPK as compared with farmyard manure or compost in both seasons. The response of potato plants to organic fertilizers different from on kind of manure to the other according to chemical composition of the different manures and/or due to rapid releasing of essential nutrients from mineral fertilizers to plant. There results are in agreement with those reported by Das and Banerjee (1994), Rizk (2001) and Awad (2005).

Table 6: Fresh and dry weight of stems/plant (g) and total chlorophyll (mg/100 cm^3) at 90 days after planting as affected by the interaction between organic manure sources and NPK fertilizers during fall seasons of 2003/2004 and 2004/2005.

Treatments		Fresh weight of stems/plant (g)		Dry weight of stems/plant (g)		Total chlorophyll (mg/100 cm^3)	
		2003/2004	2004/2005	2003/2004	2004/2005	2003/2004	2004/2005
Chicken	0 % + 100 %	41.80	42.70	3.80	3.80	5.94	5.96
	25 % + 75 %	42.00	42.90	3.90	4.00	6.00	6.03
	50 % + 50 %	43.20	44.10	4.10	4.20	6.03	6.11
	75 % + 25 %	41.70	42.60	3.80	3.70	6.01	6.03
	100 % + 0 %	41.50	42.50	3.60	3.81	5.93	5.95
FYM	0 % + 100 %	40.10	41.10	3.30	3.40	5.56	5.58
	25 % + 75 %	40.30	41.30	3.40	3.50	5.68	5.69
	50 % + 50 %	42.00	42.40	3.50	3.60	5.69	5.70
	75 % + 25 %	40.10	41.10	3.40	3.50	5.62	5.66
	100 % + 0 %	39.80	40.20	3.30	3.40	5.62	5.51
Compost	0 % + 100 %	41.30	42.20	3.70	3.80	5.78	5.80
	25 % + 75 %	41.80	42.80	3.70	3.80	5.86	5.87
	50 % + 50 %	42.90	43.80	3.90	4.00	5.94	5.95
	75 % + 25 %	41.30	42.30	3.70	3.80	5.83	5.85
	100 % + 0 %	41.20	42.10	3.50	3.60	5.69	5.74
LSD at 5 %		NS	NS	NS	NS	0.01	0.01

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تأثير التسميد العضوى والمعدنى على النمو والجودة فى البطاطس:
١- النمو الخضرى

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أجريت تجربتان حقليتان بقرية بسنديلة – بلقاس – دقهلية خلال الموسمين الشتويين ٢٠٠٣/٢٠٠٤ و٢٠٠٤/٢٠٠٥ لدراسة تأثير إستخدام أنواع مختلفة من الأسمدة العضوية (سماد دواجن ، سماد مواشى ، سماد كمبوست) كل على حدة أو مخلوطاً مع السماد المعدنى بالمعدل الموصى به وهو ١٨٠ ، ٧٥ ، ٩٦ كجم/فدان على صورة نترات النشادر ٣٣.٥ % وسوبر فوسفات الكالسيوم ١٥.٥ % وسلفات البوتاسيوم ٤٨ % على النمو الخضرى فى البطاطس صنف أسبونتا.

أوضحت النتائج أن طول النبات ، المساحة الورقية ، عدد الأوراق/نبات ، الوزن الطازج للأوراق ، تركيز الكلوروفيل (أ) والكلوروفيل الكلى قد تأثرت معنوياً حسب نوعية السماد العضوى المستخدم. كانت أفضل النتائج مع سماد الدواجن ثم تبعه سماد الكمبوست الذى كان افضل من سماد المواشى وذلك فى كلا موسمى الدراسة. فى حين أن عدد الأفرع الرئيسية للنبات والوزن الجاف للأوراق ونسبة كلوروفيل (ب) لم تتأثر معنوياً بنوعية السماد العضوى المستخدم خلال موسمى الدراسة.

كما أوضحت النتائج أن إستخدام المعدل ٥٠ % من السماد المعدنى + ٥٠ % من السماد العضوى أعطت أفضل النتائج وذلك لصفات طول النبات ، المساحة الورقية ، عدد الأوراق/نبات ، الوزن الطازج للأوراق ،الوزن الجاف للسيقان ، الوزن الطازج للنبات ، تركيز الكلوروفيل (أ) والكلوروفيل الكلى وذلك خلال موسمى الدراسة. فى حين أن الوزن الجاف للأوراق ونسبة كلوروفيل (ب) لم تتأثر معنوياً بنوعية السماد العضوى المستخدم خلال موسمى الدراسة وأيضاً الوزن الطازج للسيقان خلال الموسم الثانى فقط لم تتأثر معنوياً بنوعية السماد العضوى المستخدم.

تشير النتائج أن طول النبات ، عدد السيقان الرئيسية/نبات ، المساحة الورقية ، الوزن الطازج والجاف للسيقان وأيضاً تركيز الكلوروفيل (ب) لم تتأثر بالتفاعل بين السماد العضوى والسماد المعدنى وذلك خلال موسمى الدراسة. فى حين أن عدد الأوراق/نبات ، الوزن الطازج والجاف للأوراق ، الوزن الطازج للنبات كله ، نسبة كلوروفيل (أ) والكلوروفيل الكلى تأثرت تأثيراً معنوياً بالتفاعل بين السماد العضوى والسماد المعدنى وكانت أفضل النتائج مع معاملة ٥٠ % سماد معدنى + ٥٠ % سماد دواجن وذلك خلال موسمى الدراسة.

من ذلك يوصى بإستخدام ٥٠ % سماد عضوى + ٥٠ % سماد معدنى للحصول على أفضل صفات للنمو الخضرى للبطاطس مع تقليل التلوث الناتج عن الإسراف فى إستخدام الأسمدة المعدنية وأيضاً تقليل التكاليف بواسطة سماد الكمبوست لرخص ثمنه وسهولة تصنيعه بواسطة المزارع.

قام بتحكيم البحث

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