

## **EFFECT OF SOME ORGANIC AND INORGANIC NITROGEN FERTILIZERS ON ONION PLANTS GROWN ON A SANDY CALCAREOUS SOIL .**

M. R. Mahmoud.

Soil, water & Environment Research. Institute, Agricultural Research Center, Giza, Egypt.

---

**Abstract:** A field experiment was conducted in two successive seasons 2001/2002 and 2002/2003 in a sandy calcareous soil at west Samalout, EL-Minia Governorate, to study the effect of applying organic and inorganic nitrogen fertilizers as chicken manure (18.5% N and 30% water content ), ammonium sulfate ( 20.6% N) and their combination on growth parameters (plant height , bulb diameter , total fresh and dry weight of onion bulb after 100 days of transplanting ), bulb total yield of onion (*Allium cepa* L) and its N, P and K content . The two single sources of nitrogen fertilizer and their combination were application at five levels that are equal of nitrogen value .

1- Chicken manure was applied at levels of 0.0 , 5.0 , 10.0, 15.0 and 20.0m<sup>3</sup> / fed ., that equal of 0.0 , 2.0 , 4.0, 6.0 and 8.0 ton / fed., respectively .

2- Ammonium sulfate was applied at levels of 0.0, 37.0 , 74.0 , 111.0 and 148.0 kg N / fed .

3- Their combination at levels of nitrogen value :-

1 ton of chicken manure +18.5 kg N of ammonium sulfate / fed.

2 ton of chicken manure+ 37.0 kg N of ammonium sulfate / fed

3 ton of chicken manure+55.5 kg N of ammonium sulfate/fed.

4 ton of chicken manure+ 74 kg N of ammonium sulfate/ fed.

The results indicated that the application of organic , inorganic nitrogen fertilizer and their combination. at different levels significantly increased some growth parameters (plant height, and fresh and dry bulb weight) after 100 days of transplanting. The total yield and average weight of 10 bulbs also significantly increased with applying different levels of chicken manure and N fertilizer compared with control treatment.

The application of chicken manure, ammonium sulfate and their combination at different levels significantly increased N, P and K concentration and uptake by onion plants at harvest.

Moreover, the increases in the nutrient concentration and uptake by onion due to the application of these sources of nitrogen fertilizers followed the trend of ammonium sulfate + chicken manure > ammonium sulfate alone > chicken manure alone) .

Generally the results showed that the addition of 6 to 8 ton of chicken manure with 60 to 70 kg N / fed. as ammonium sulfate recommend to increase the yield of onion and the uptake of nitrogen, phosphorus and potassium by onion

plants and to improve of physical , chemical and microbiological properties of the treated soils to give reasonable crop productivity.

---

**Key words:** onion , sandy calcareous, organic manure, transplantation.

## **Introduction**

In Egypt, Onion is , planted in both old and new lands. It is usually planted in less fertile soils and desert areas. It is one of the most important Egyptian vegetable crops . Nitrogen fertilization is known to affect plant growth and yield .

Application of organic matter to soils improves soil properties and consequently, the growth of plants . Farmyard manure could be one of the most economical ways to increase organic matter and nitrogen content of the soil. Several investigators indicated that the application of farmyard manure increased plant growth, dry matter and bulb yield of onion ( Galbiotti and Castellance ,1990 and Fatma *et al.* 2002) .

The soil application of nitrogen markedly increased number of onion leaves ( Pande and Mundra, 1971; El-Neklawy *et al.* , 1985; and Dacquel, 1986) , bulbs yields (Hegde , 1988 and Badr *et al.* , 1996) and weight of the whole plants ( El-Habbasha and Behairy, 1976; and El –Gamili and Abd El-Hadi, 1996) . On the other hand,( Dawquel (1986); Al- Rajabi (1987) and Mohamed and Hemida (2004) showed that length and dry weight

percentage of onion bulb were not markedly affected by N levels .

Many investigators tried to use organic and inorganic nitrogen fertilization for growing onion (Sharma and Ajit , 1994 ; Fatma *et al.*, 2002) . Al-Rajabi,(1987); and Hegde,(1988) indicated that the application of nitrogen led to increasing nitrogen concentration and uptake by onion bulb, while P and K concentrations decreased with high levels of nitrogen application . Moreover, El-Sherif and El- Habbasha (1977) ; El-Neklawy *et al.* (1985), Patil and Patil (1995) ; Sharma and Ajit ,(1994); El-Gamil and Abd El-Hadi (1996) and Fatma *et al.* (2002) reported an increase in total uptake of N P K at different parts of onion plants as a result of increasing the organic or inorganic nitrogen fertilizer levels. El-Gizawy *et al.*,(1993) and Zahran and Abdoh (1998), found that the response of onion plants to nitrogen fertilizers as an inorganic source alone or combination with organic manure, significantly increased plant height , number of leaves , fresh and dry weights ( total yield ) and nitrogen , phosphorus and potassium uptake of onion plant after 100 days from sowing .

This study aims to investigate the effect of organic and inorganic

nitrogen fertilizers on the growth parameters , bulb yield and quality of onions .

**Materials and Methods**

A field experiment was carried out at west Samalout , EL- Minia Governorate during two successive seasons (2001/ 2002 and 2002/2003) in a newly reclaimed soil (a sandy calcareous soil) to study the effect of two sources of nitrogen fertilizers, i.e.(1) chicken manure (18.5 % N and 30% water content), ammonium sulfate ( 20.6% N) as single fertilizer and in combination on growth parameters, yield , nutrient concentration and uptake of onion plants ( *Allium cepa* L. CV. Gize 6) . Chicken manure was added at levels of 0.0., 5.0,

10.0, 15.0 and 20.0 m<sup>3</sup> / fed. that are equal to 0.0 , 2.0 , 4.0 , 6.0 and 8.0 ton / fed .It was broadcasted during soil preparation. Ammonium sulfate was applied at levels of 0.0 , 37.0 , 74.0 , 111.0 and 148.0 kg N/ fed . in three equal doses ( 30 , 60 and 90 days after transplanting ).

**The application of their combination at levels of nitrogen value :-**

- 1 ton of chicken manure + 18.5 kg N of ammonium sulfate .
- 2 ton of chicken manure + 37.0 kg N of ammonium sulfate .
- 3 ton of chicken manure + 55.5 kg N of ammonium sulfate .
- 4 ton of chicken manure + 74.0 kg N of ammonium sulfate .

**Table(1):** Some physical and chemical properties of the studied soil during the successive two seasons of 2001/2002 and 2002/2003 .

Property	2001/2002	2002/2003	Property	2001/2002	2002/2003
Particle size distribution,			Soluble ions ( meq/100g soil )		
Coarse sand (%)	61.49	62.89	Ca <sup>2+</sup>	18.7	18.20
Fine sand (%)	34.97	33.24	Mg <sup>2+</sup>	10.8	12.3
Silt (%)	3.18	3.70	Na <sup>+</sup>	11.9	10.3
Clay (%)	0.36	0.17	K <sup>+</sup>	1.4	1.1
Texture grade	sandy	sandy	Cl <sup>-</sup>	4.5	3.7
CaCO <sub>3</sub> %	28.51	30.85	CO <sub>3</sub> <sup>-2</sup> +HCO <sub>3</sub> <sup>-</sup>	28.8	28.8
Organic matter (%)	0.13	0.18	SO <sub>4</sub> <sup>-2</sup>	9.5	8.8
pH			Available N ppm	11.3	10.5
(1:2.5 soil to water suspension)	7.25	7.30	Available P ppm	2.5	1.8
EC (dS/m, 1:5 soil to water extetact )	4.28	4.18	Available K ppm	20.7	21.9

**Table(2):** some chemical properties of the chicken manure, that was used in the two seasons .

Properties	Value
Organic matter ( % )	58.25
Total organic carbon ( % )	33.79
Total nitrogen ( % )	1.85
C / N ratio	18.26:1
Mass of one m <sup>3</sup> ( Kg)	400
Water content ( % )	30
pH ( 1 : 2.5 )	7.10
EC ( dS / m , 1 :5 )	2.19
Available P ( ppm)	8.85
Available K ( ppm)	155.28

A randomized complete block design with four replications were used . The plot area was 1/400 fed. Onion plants were transplanted in rows of 20 cm apart and 7 cm between plants .

Phosphorus fertilization as super phosphate ( 15.5% P<sub>2</sub>O<sub>5</sub> )at the level of 45 kg P<sub>2</sub>O<sub>5</sub> / fed. and potassium fertilization as potassium sulfate ( 48-52%K<sub>2</sub>O ) at the level 48 Kg K<sub>2</sub>O / fed. was applied to all plots. Super phosphate and potassium sulfate fertilizers were broadcaster during soil preparation .

Some physical and chemical properties of the experimental soil in two seasons (2001/2002 and 2002/2003) before transplanting

were determined according to Black ( 1965) and are shown in Table (1). The chemical composition of the chicken manure is also present in Table (2) .

After 100 days from transplanting, random samples of ten plants were taken from each treatment . Plant height , number of leaves, fresh and dry weight of both leaves bulbs and total dry weight were recorded for each sample . Plant material from each sample were dried at 70°C for 72 hours , digested and analyzed for N, P and K. The concentration and uptake (mg/ plant) of these nutrients were determined .

At maturity ( after 150 days from transplanting ), the total yield in each plot was taken , weighed and recorded ( ton / fed ). In addition , a random sample of 10 bulbs was chosen from each plot to determine the average weight of bulb, diameter and the percentage of dry matter content . Samples of ten bulbs were also taken from each treatment to determined dry weight and content and uptake of nitrogen , phosphorus and potassium . All samples were digested using  $H_2SO_4$  and  $H_2O_2$  method as described in Chapman and Pratt (1961) .

The proper statistical analysis of all data was carried out according to Gomez and Gomez (1984).The differences between treatments means were compared using the least significant difference (LSD) at 1 and 5% level of probability .

## **Results and Discussion**

### **1 : Growth parameters of onion :**

Data presented in Table (3) showed that the application of chicken manure, ammonium sulfate and their combination significantly increased plant height , fresh and dry weight of leaves after 100 days from transplanting compared with the control treatment . This result may be due to increasing root surface per unit of soil volume as a result of adding organic manure and ammonium sulfate fertilizers .In addition, organic manure contains humic substances, which improve physical and chemical properties of

the soil and releases nutrient such as N in the soil and hence increasing their availability to the growing plants . Asiegbu and UZO (1984) ; El- Gamili and Abd El- Hadi (1996) ; Zahran and Abdoh (1998) and Fatma et al (2002), showed that the growth parameters and total dry matter of onion plants were markedly affected by organic or inorganic nitrogen fertilizers added to soils . The results clearly showed that application of ammonium sulfate + chicken manure > ammonium sulfate alone > chicken manure alone , regarding their effects on growth parameters of onion .

### **2. Onion yield :**

The presented data in Table (4) showed that applying organic manure and ammonium sulfate fertilizer increased the marketable bulb yield and its quality . This increase may be due to the positive effect of organic manure and ammonium sulfate on the contained macronutrients, such as N , P and K as a result of its important role in the plant metabolism . Also, the results showed highly significant increases in the yield ( fresh and dry) of onion and average weight of ten bulbs in the two growing seasons . These finding are in accordance with those reported by EL-Neklawy *et al* (1985) ; Bader *et al* (1996) ; El-Sheekh and Hegazy (1998) and Fatma *et al.* (2002) .

**Table(3):** Some growth parameters of onion plants at 100 days from transplanting as affected by applying chicken manure and ammonium sulfate during the two growth seasons (2001/2002 & 2002/2003).

Treatment	Plant height, (cm)	Number leaves, of plant	Bulb diameter (cm)	Fresh weight/plant.		Dry weight /plant		Total dray weight, (g/plant)	
				Leaves	Bulb	Leaves	Bulb		
First season									
Control	40.96	4.21	3.50	17.26	15.72	0.57	0.91	1.48	
A	a <sub>1</sub>	59.61	4.51	3.70	39.92	31.79	3.37	3.80	7.17
	a <sub>2</sub>	67.47	4.83	4.20	41.83	35.27	3.77	4.05	7.82
	a <sub>3</sub>	70.21	5.27	4.50	45.57	39.58	4.03	4.14	8.17
	a <sub>4</sub>	81.15	5.89	4.90	51.33	45.13	4.38	4.95	9.33
B	b <sub>1</sub>	68.50	4.73	4.10	37.16	35.50	3.40	3.81	7.21
	b <sub>2</sub>	71.29	4.81	4.50	40.39	38.54	3.95	4.28	8.23
	b <sub>3</sub>	78.90	5.90	4.90	44.26	40.56	4.63	4.37	9.00
	b <sub>4</sub>	85.11	6.10	5.30	56.33	50.15	5.62	5.16	10.78
½ AB	a <sub>1</sub> b <sub>1</sub>	72.90	4.89	3.90	42.54	39.98	4.30	4.23	8.81
	a <sub>2</sub> b <sub>2</sub>	81.22	5.10	4.50	46.72	44.54	4.93	4.95	9.88
	a <sub>3</sub> b <sub>3</sub>	89.27	5.91	4.80	50.43	47.72	5.76	5.53	11.29
	a <sub>4</sub> b <sub>4</sub>	98.76	6.43	5.50	63.14	51.43	6.81	5.62	12.43
L.SD	5%	1.850	N.S	N.S	1.145	2.015	0.762	0.762	1.26
	1%	2.520	N.S	N.S	1.558	2.749	1.039	1.039	1.720
Second season									
Control	40.17	4.10	3.30	16.41	14.56	0.56	0.89	1.45	
A	a <sub>1</sub>	58.21	4.55	3.50	32.24	30.78	3.12	3.75	6.87
	a <sub>2</sub>	63.45	4.71	3.60	37.08	33.57	3.25	3.91	7.16
	a <sub>3</sub>	69.15	5.10	4.00	40.16	37.41	3.89	4.16	8.05
	a <sub>4</sub>	71.28	5.38	4.02	51.53	41.65	4.59	4.20	8.79
B	b <sub>1</sub>	65.83	4.65	3.90	36.69	33.41	3.35	3.80	7.15
	b <sub>2</sub>	69.49	4.85	4.10	39.51	35.78	3.60	3.98	7.58
	b <sub>3</sub>	76.63	5.75	4.60	42.97	38.45	4.48	4.28	8.76
	b <sub>4</sub>	85.63	5.83	4.90	58.38	45.79	4.41	4.61	10.02
½ AB	a <sub>1</sub> b <sub>1</sub>	71.45	4.88	3.60	41.15	39.28	4.06	4.18	8.24
	a <sub>2</sub> b <sub>2</sub>	78.23	5.11	3.90	45.69	43.15	4.79	4.88	9.67
	a <sub>3</sub> b <sub>3</sub>	85.76	5.98	4.30	49.28	46.57	5.43	5.76	11.19
	a <sub>4</sub> b <sub>4</sub>	93.16	6.53	4.90	60.28	52.58	5.96	5.80	11.76
L.S.D	5%	1.826	N.S	N.S	0.852	2.639	0.660	0.762	0.930
	1%	2.491	N.S	N.S	1.611	3.599	0.900	1.039	1.270

A : Chicken manure – a<sub>1</sub>, a<sub>2</sub>, a<sub>3</sub> and a<sub>4</sub> represent 2.4, 6 and 8 ton / fed ., respectively .

B : Ammonium sulfate – b<sub>1</sub>, b<sub>2</sub>, b<sub>3</sub> and b<sub>4</sub> represent 37 , 74, 111 and 148 kg N/ fed ., respectively .

½AB : - a<sub>1</sub>b<sub>1</sub>, a<sub>2</sub> b<sub>1</sub>, a<sub>3</sub> b<sub>3</sub> and a<sub>4</sub> b<sub>4</sub> represent 1 ton + 18.5 kg N , 2 ton + 37 kg N, 3 ton + 55.5 kg N and 4 ton + 74 kg N / fed ., respectively .

**Table(4):** Yield , bulb diameter and average weight of 10 bulbs at harvest of onion plants as affected by applying chicken manure and ammonium sulfate during the two growth seasons (2001/2002 & 2002/2003).

Treatment	Yield (ton/fed)		Average weight of 10 bulbs, (Kg)	Bulb diameter (Cm.)	Yield (ton/fed)		Average weight of 10 bulbs (kg)	Bulls diameter (cm)	
	Fresh	Dry			Fresh	Dry			
First season					Second season				
Control	3.39	0.29	0.642	3.50	3.15	0.28	0.602	3.40	
A	a <sub>1</sub>	8.59	0.78	1.162	3.70	8.85	0.81	0.997	3.50
	a <sub>2</sub>	9.95	0.90	1.337	4.30	9.67	0.96	1.192	3.80
	a <sub>3</sub>	11.82	1.23	1.514	4.60	11.37	1.21	1.318	4.10
	a <sub>4</sub>	14.76	1.52	1.821	5.00	14.22	1.58	1.682	4.40
B	b <sub>1</sub>	9.93	0.83	1.018	4.30	9.48	0.92	1.132	4.20
	b <sub>2</sub>	12.37	1.10	1.074	4.50	11.87	1.09	1.345	4.40
	b <sub>3</sub>	15.05	1.35	1.353	4.90	14.68	1.32	1.518	5.50
	b <sub>4</sub>	19.23	1.78	1.459	5.50	18.73	1.73	1.530	5.40
½ AB	a <sub>1</sub> b <sub>1</sub>	12.95	1.20	1.342	4.20	12.81	1.08	1.293	3.90
	a <sub>2</sub> b <sub>2</sub>	16.13	1.50	1.506	4.80	15.69	1.41	1.397	4.30
	a <sub>3</sub> b <sub>3</sub>	18.62	1.57	1.805	5.60	17.85	1.56	1.804	4.80
	a <sub>4</sub> b <sub>4</sub>	22.13	1.89	2.112	5.90	21.53	1.93	1.982	5.30
L.S.D	5%	1.008	0.148	0.179	N.S	0.668	0.179	0.048	N.S
	1%	1.374	0.201	0.683	N.S	0.900	0.238	0.066	N.S

A : Chicken manure – a<sub>1</sub>, a<sub>2</sub> – a<sub>3</sub> and a<sub>4</sub> represent 2.4, 4.6 and 8 ton / fed ., respectively

B : Ammonium sulfate – b<sub>1</sub> , b<sub>2</sub> , b<sub>3</sub> , and b<sub>4</sub> represent 37 , 74, 111 and 148 kg N/ fed ., respectively .

½AB : - a<sub>1</sub>b<sub>1</sub>, a<sub>2</sub> b<sub>2</sub>, a<sub>3</sub> b<sub>3</sub> and a<sub>4</sub> b<sub>4</sub> represent 1 ton + 18.5 kg N , 2 ton + 37 kg N, 3 ton + 55.5 kg N and 4 ton + 74 kg N / fed ., respectively .

### **3. Nitrogen, Phosphorus and Potassium contents of onion bulbs :**

The available forms of nutrients in the soil is an important factor for the absorption of these nutrients by plants, such as onion plants, and it is reflected on the nutrient content of the plants. Therefore, N, P and K contents were determined in the leaves and bulbs of onion during the growth period and at the harvest.

Data in Table(5) indicated that addition of the nitrogen source as organic and inorganic fertilizer and their combination gave significant increases in N, P and K concentration and uptake by bulbs after 100 days from transplanting compared with control treatment. These results may be attributed to the increases in the dry matter of onion as a result of an increase in the nutrient uptake. These results are in agreement with those obtained by Al-Rajabi (1987) and Fatma et al (2002).

At harvest, data recorded in Table (6) showed that the N,P and K concentration and uptake of onion leaves and bulbs were significantly increased with the application of chicken manure and ammonium sulfate and their combination levels. Generally, the increases in uptake of N, P and K may be attributed to the high contents of these nutrients in the chicken manure or when it was combined with ammonium sulfate fertilizer.

### **References**

- Al- Rajabi , M. F . ( 1987 ) : Production function determination of onion as affected by water amounts , evapotranspiration and nitrogen fertilization rates in the Central Jordan Valley . Ammon ( Jordan ) . Agr . 1987 , 84 P.
- Asiegbu , J.E . and J.O. uzo , ( 1984 ) : Yield and yield components ... responses of vegetable crops of farmyard manure rates in presence of nitrogen fertilizer . Journal of Agriculture of University of Puerto Rico , 68 (3) : 243 -252 .
- Badr , S. K. , Aly , A. M . and Greish , M. H. M. (1996) : Optimizing agricultural practices for intercropping onion with cotton Proc. 7 th conf . Agronomy . 9-10 Sept. 1996 , 623-634 ,
- Black, C.A. (1965) : Methods of soil analysis . Am. Soc. Agron . Madison, Wisconsin, U.S.A .
- Chapman , D.H. and Pratt . D.F. ( 1961 ) : Methods of Analysis for soils , Plants and Waters . Univ . of California Riverside of Agric . Sci . USA.
- Dacqual , B.S. ( 1986 ) : Effect of nitrogen levels on the moisture content and yield of onion .Scientific Jour .(Philippines) .V.6 (1) P.18.







- El-Gizawy , A. M. ; El- Oksh , L.L.; Abdallah , M. M.F.; Mohamed , A.R.A.G and Abdallaha , A.A.G. (1993) : Effect of soil moisture and nitrogen levels on growth and yield of onion grown in sandy soil . Bulletin of Fac . Agric . Cairo univ ., 44 (1) , 157-168 .
- EL- Gamili , A.E., and Abd El-Hadi , A.H. ( 1996) : Effect of nitrogen , phesphorus and potassium fertilizers and their interaction on the growth and yield of onion ( *Allium cepal* ) plant . Minufiya . J. Agric . Res ., vol . 21 ( 1996) No.5 : 1309 – 1321 .
- El-Habbasha , K. M. and Bchairy, A.G . (1976) : Response of onion (*Allium cepa* L.) plants to nitrogenous and phosphatic fertilizers . Egypt . J. Agron . 2 , 247 – 256 .
- El-Neklawy , A.S ., Ibrahim , S.A. and Selim , A. M. ( 1985) : Response of onion plants ( *Allium cepa* L.) grown in newly reclaimed soil . to foliar application under different nitrogen levels . Annals of agric . Sc ., Moshtohor , vol . 23 (3) PP . 1375 –1386 .
- El-Sharife , A.F. and El. Habbasha , K. M. (1977) : Micronutrient uptake by onion plants ( *Allium cepa* L.) as affected by Cu application and nitrogen fertilization . Egypt . J. Agron . 189-196
- El- Sheekh , H. M. and A. M. Hegazy ( 1988) : Effect of organic and mineral fertilizers on growth , yield , quality and storability of onion . J. Agric . Sci . Mansoura Univ., 23 (8) : 3641-3650 .
- Fatma . S., El .Shafie and Eida E.El-Gamaily ( 2002 ) Effect of organic manure , sulphur and microelements on growth , bulb yield , storability and chemical composition of onion plants Minufiya . J. Agric . Res . vol . 27 No .2 : 407 –424 .
- Galbiotti , J. A. and P.D. Castellance . (1990) : Effect of irrigation and mineral and organic fertilization on the onion cultivars . Horticultura – Brasileira , 8 (1) : 24-30 .
- Gomez , K.A . and A.A . Gomez (1984) : statistical Procedures of Agricultural Research . Seconded . weilly interscience puble ., PP.357 –423 .
- Hegde , D. M. (1988) : Effect of irrigation and nitrogen fertilization on yield quality , nutrient and water use of onion ( *Allium cepa* L.) singapore Jornal of primary Industries (1988) (16) (2) III-123 .
- Mohammed , G. A. and Hemida , A.A . (2004) : Response of Giza –6 mohassan ouion to some irrigation and nitrogen fertilization treatments . Minia J.

- Agric . Res . & Develop . vol ( 24) No . 2 pp 177 – 190 –2004 .
- Pande , R.C . and Mundra , R. S . ( 1971) : Note on response of onion ( *Allium cepa* L . ) to varying levels of N. P and K . Indian , J. Agric . Sci . 14 : 107 – 108 .
- Patil,j.j. and Patil, A.T. (1995): the effect of nitrogen and phosphorous levels on growth and yield of onion (*Allium cepa* L.) cultivar pusa red. Gujarat Agric. Univ. Res. J. 25, (2) 1-5 .
- Sharma , P. K . ; and Ajit Rania ( 1994 ) : Effect of phosphorus on the bulb yield and phosphorus use efficiency an influenced by FYM in onion crop in acid soil from westren Himalayas . J. Indian Society of soil sci : 42 (1) : 68-72 .
- Zahran , F. A. and Abdoh , A.E. (1998) : Nitrogen fertilization of onion in sandy souls . Egypt . J. Agric . Res . , 76 (3) 1998 .

## تأثير بعض الاسمدة النيتروجية العضوية والغير عضوية على نباتات البصل النامية فى تربة رملية - جيرية

محمد ربيع محمود

معهد بحوث الأراضى والمياه والبيئة - مركز البحوث الزراعية - جيزة - مصر

تم تنفيذ تجربة حقلية بمنطقة غرب سمالوط - محافظة المنيا - مصر - وفى الأراضى الرملية الجيرية على مدار موسمين متتاليين ( 2001 / 2002 ، 2002 / 2003 ) وذلك لدراسة تأثير بعض المصادر المختلفة للاسمدة النيتروجية فى صورة سماد عضوى زرق الطيور ( 18.5% نيتروجين - 30% رطوبة -  $1\text{m}^3 = 400\text{كجم}$  ) وسماد سلفات النشادر ( 20.6% نيتروجين ) على مؤشرات النمو ( ارتفاع النبات ، قطر البصلة ، الوزن الطازج والجاف لعدد عشرة نباتات بعد 100 يوم من الشتل ) والوزن الكلى للمحصول لنباتات البصل واحتوائها على عناصر النيتروجين والفوسفور والبوتاسيوم . وأضيفت هذه الاسمدة فى خمس مستويات متكافئة فى كمية النيتروجين وكانت على هذا النحو :-

1- سماد زرق الطيور منفرد ( صفر - 2، 4، 6، 8 طن ) فدان بما يعادل صفر- 5 - 10 - 15 - 20م3 / فدان .

2- سماد سلفات النشادر ومنفرد بمستويات صفر - 37- 74- 111- 148كم نيتروجين / فدان

3- أضيفت الاسمدة فى هذه المعاملة ، وبنصف كمية النيتروجين من زرق الطيور والنصف الآخر سماد سلفات النشادر .

1طن زرق طيور + 18.5 كجم من سلفات النشادر / فدان

2طن زرق طيور + ، - 37 كجم سلفات النشادر / فدان

3طن زرق طيور + 55.5 كجم سلفات النشادر / فدان

4طن زرق طيور + ،- 74 كجم سلفات النشادر / فدان

وقد أوضحت النتائج المتحصل عليها من الدراسة بعد 100 يوم من الشتل أن هناك زيادة واضحة فى جميع صفات النمو تحت الدراسة مثل ارتفاع النبات عدد الأوراق الوزن الجاف ومعدلات امتصاص النباتات لعناصر النيتروجين والفوسفور والبوتاسيوم نتيجة للمعاملات بالمقارنة بمعاملة الكنترول ( أرض غير معاملة وغير مسمدة ) وذلك بعد 100 يوم من الشتل .

كذلك أكدت النتائج المأخوذة بعد النضج وعند الحصاد النتائج السابقة المأخوذة بعد 100 يوم من الشتل حيث ازداد المحصول مع ارتفاع فى تركيز وامتصاص عناصر النيتروجين والفوسفور والبوتاسيوم وذلك فى جميع معاملات التسميد وكان هناك فروق واضحة بين المعاملات فى كلا مصدري النيتروجين ، وكان ترتيب مصدري النيتروجين تبعاً للزيادات المتحصل عليها على هذا النحو : زرق الطيور + سلفات النشادر < سلفات النشادر منفردة < زرق الطيور منفرداً

ومن النتائج السابقة يتضح أنه يمكن إضافة من 6-8 طن زرق طيور/ لكل فدان كمصدر للتسميد العضوي مع إضافة 60-70 كجم نيتروجين/ لكل فدان فى صورة سلفات نشادر كمصدر غير عضوي لزيادة محصول البصل وزيادة تركيز وامتصاص عناصر النيتروجين والفوسفور والبوتاسيوم كما أنها تعمل على زيادة تحسين صفات التربة الطبيعية والكيميائية والبيولوجية مما ينعكس ذلك على زيادة الإنتاج المحصولي .