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INFLUENCE OF MINERAL AND NITROGEN FERTILIZATION ON MAIZE YIELD AND ITS COMPONENTS

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ABSTRACT

A field experiments were carried out at El-Wanysa village, Itsa district, El-Fayoum Governorate during two successive seasons of 2007 and 2008. The current work aimed to study the effect of both organic (compost) and inorganic nitrogen (ammonium sulphate) fertilizers and their combination on maize growth, yield and its components as well as grain contents of protein, oil and some nutrients

The obtained results could be summarized into:

- Concerning the nitrogen sources, it seems that the combined treatment of N-organic +N-mineral gave the greatest values for yield and its components, NPK concentration and it's uptake by maize plant. Also, the values of chlorophyll a, b, total chlorophyll content, ear length**,** ear diameter, ear weight, grain weight/ear, number of row/ear, number of grain/row, 100-grain weight and grain yield (ardab/fed.) were significantly increased by increasing nitrogen levels.
- Increasing nitrogen fertilizer rates up to 120 kg N/fed. significantly increased nitrogen concentration and its uptake as well as protein content.
- Phosphorus concentration and its uptake were significantly increased by applying 120 kg N/fed.
- Oil percentage, oil yield and grain total carbohydrate percentage increased significantly as N level was increased up to 120 kg N/fed.
- Concerning the interaction effect between nitrogen sources and it's levels, it could be noticed that the ammonium sulphate + compost mixture treatment at 120 kg N/fed. was the better treatment due to its positive effect on grain yield and its components.
- It may be concluded that the application of compost combined with inorganic nitrogen was more effective on yield and its components of maize plant as compared to the addition of mineral nitrogen or compost alone. This may be the positive effect of organic manure on the physico-chemical properties, besides it attains a pronounced content of essential nutrients, especially micronutrients.
- In general using organic manure improved yield and saved considerable amount of required mineral fertilizers which may decreased the chemical pollution of environment.

INTRODUCTION

Maize is one of the most important cereals, as it is widely used in bread making in rural areas of the country. The total production is insufficient to meet local consumption due to low productivity per unit area and relatively, the limited cultivated area. Therefore, efforts are focused towards increasing its productivity by growing high yielding varieties and searching cultivated area.

Nitrogen is the major nutrient-element and it's needed in a large amount to increase growth and yield of maize. Increasing maize growth

characteristic due to nitrogen application was reported by Abu-Grab *et al.*(1997) and Darwish (2003). They found that nitrogen fertilization had a significant positive effect on number of green leaves/plant, leaf area/plant, leaf area index, plant height, dry matter yield and chlorophyll a, b and total chlorophyll.

Also, increasing nitrogen fertilizer rates significantly increased yield and its attributes Atta-Allah (1998) and Salem (2000) reported that increasing nitrogen fertilizer levels led to an increase in N-uptake by corn plant in both grain and stover.

The addition of organic manure fertilizers as a soil amended could reduce the need for mineral nitrogen fertilizer, reduce the possibility of increasing concentration of ground water, also, improve the biological, chemical and physical properties of soil, reducing pH and EC values, increasing soil organic matter content and offer the nutrients for growing plant. The importance of mineral nitrogen fertilizer in combination with organic manure which have essential elements required for physiological mechanisms of plant growth and producing the best yield quality. The positive effects of mineral nitrogen and organic manure at different rates either alone or in combination with each other on growth, yield and chemical constituents in different plants were recorded by many researchers (Solman *et al*., 2002; Solieman et al., 2003 and Faten, 2004).

This study aimed to investigate the effect of organic manure in the form of compost and mineral nitrogen fertilizer in the form of ammonium sulphate as well as their combination on growth, yield and yield components of maize plants and some chemical properties of maize grains.

MATERIALS AND METHODS

A field experiments were carried out at El-Wanysa village, Itsa district, El-Fayoum Governorate during two successive seasons of 2007 and 2008. The work aimed to study the effect of both organic and inorganic nitrogen fertilizers and their combination on growth, yield and its components of maize plants(c.v. single hybrid 3020) as well as grain contents of protein, oil and some nutrients.

In both seasons, the split design was used with 3 replicates. The main plots were conducted for the three N-forms, i.e., 1- N-mineral [$(NH_4)_2SO_4$]. 2- N-organic (compost) and 3- N-mineral + N-organic. Nitrogen in both two forms were applied at the rate of 60, 90 and 120 kg N/fed. (sub-plots). The plot area was 3x3.5 m^2 (i.e. 1/400 fed.)

Compost manure was mixed with the 20 cm of soil surface layer before planting. Maize plants were fertilized with the recommended doses of superphosphate fertilizer (15.5% P_2O_5) at the rate of 200kg/fed., potassium sulphate (48%K_2O) at the rate of 50kg /fed. before planting. Nitrogen fertilizer as ammonium sulphate was added in five equal doses. The first dose was added after thinning, the others were added every 10 days interval. Some physio-chemical analysis of the used soil according to Piper(1950) and Jackson (1973) are presented in Table (1), the analytical data of organic manure is given in Table (2). After 75 days from sowing, plant height (cm)

and dry weight of plant were measured. In addition, total nitrogen, total phosphate and total potassium were estimated in the digested plant material. Chlorophyll a, b and total chlorophyll were determined in the 3rd leaf of the plant according to method described by Wetlstein (1957).

At harvesting the following characters were recorded: ear length (cm), ear diameter (cm), number of row /ear, grain yield g/plant, weight of 100-grains (g), grain yield (ardab/fed.).

Total nitrogen, phosphorus, potassium and crude protein were estimated in grains of maize. Total nitrogen was determined by using microKjeldehl method (A.O.A.C.1980). Total phosphorus content was colorimetrically determined according to APHA(1989). Total potassium was determined according to Dewis and Freitas (1970), crude protein was calculated according to the following equation:

Crude protein%= total nitrogen x 6.25 (A.O.A.C.,1980). Oil content (%) was determined by Soxhelt apparatus using hexane as a solvent. Total soluble sugars (T.S.S.), total carbohydrate and starch of dry maize grains were estimated colorimetrically using phenol sulfuric acid method described by Dubois *et al*., (1956).

Data of growth characters and yield components were statistically analyzed by using split plot design according to the method described by Snedecor and Cochran (1982). The means were compared using L.S.D. values at 5%level.

Table (1): Some physical and chemical properties of the experimental soil

Soil properties	Value
Particle size distribution %	
Coarse sand	7.20
Fine sand	22.95
Silt	16.43
clay	53.42
Soil textural class	Clay
Soil $CaCO_3$ %	9.88
Soil organic matter %	1.82
Soil pH (1:2.5 soil water suspension)	7.45
EC_e (dSm^{-1}) in soil paste extract	2.65
Soluble ions in soil past extract (meq/l):	
$CO_3^=$	0.00
HCO_3^-	2.55
Cl^-	10.78
$SO_4^=$	13.27
Ca^{2+}	6.63
Mg^{++}	3.66
Na^+	16.02
K^+	0.29
Available nutrients in soil (mg/kg soil):	
Available N	42.00
Available P	5.00
Available K	450

Table (2): Some characteristics of the used compost.

Analysis	Value
Moisture %	18.2
EC (1:10)dSm^{-1}	4.65
N-NH$_4$ (mg/kg)	580
N-NO$_3$ (mg/kg)	250
Total N %	1.85
O.M. %	42.41
O.C.%	24.6
C/N	13.3:1
Total P %	1.6
Total K %	2.3
Fe (mg/kg)	960
Zn (mg/kg)	280
Mn (mg/kg)	320
Cu (mg/kg)	140

RESULTS AND DISCUSSION

1- Growth characters:

Nitrogen fertilizer levels had a significant effect on all the studied characters (Table 3). Raising nitrogen fertilizer level from 60 to 120 kg N/fed. led to increase the values of plant height, dry weight of shoot, the leaf pigments, i.e. chlorophyll a, b and its total as well as N, P and K concentrations after 75 days from planting.

Table (3): Effect of nitrogen fertilizers sources and levels on plant height, dry weight of shoot, chlorophyll content and concentration of maize leaves after 75 days of planting(Average of two seasons)

N-fertilizer Form	N level (kg/fed)	Plant height (cm)	Dry weight of shoot (g/plant)	Chlorophyll in fresh weight mg/g			Nutrients % dry weight		
				Chl.a	Chl.b	Total (a+b)	N	P	K
Ammonium sulphate (A.S)	**60**	223	170	3.294	0.930	4.224	2.60	0.214	1.58
	90	234	189	4.452	1.462	5.914	3.20	0.225	1.66
	120	242	199	5.031	1.566	6.597	3.60	0.238	1.74
Mean		233	186	4.26	1.32	5.578	3.13	0.226	1.66
Compost	**60**	219	164	2.640	0.563	3.203	2.19	0.188	1.46
	90	230	182	3.522	1.323	4.754	2.24	0.204	1.52
	120	238	193	4.820	1.452	6.272	2.35	0.210	1.63
Mean		229	179.67	3.661	1.08	4.743	2.26	0.201	1.54
A.S. + compost	**60**	228	179	4.124	1.192	5.316	2.82	0.228	1.76
	90	239	196	4.685	1.372	6.057	3.43	0.236	1.88
	120	245	208	5.312	1.386	6.698	3.71	0.245	1.96
Mean		237.33	194.33	4.707	1.32	6.024	3.32	0.236	1.87
L.S.D at 5%of fertilizer		4.17	2.72	0.80	0.032	0.10	0.20	0.005	0.036
Mean N level	**60**	223.33	171	3.353	0.895	4.248	2.54	0.210	1.66
	90	234.33	189	4.200	1.355	5.575	2.96	0.222	1.69
	120	241.67	200	5.054	1.468	6.522	3.22	0.231	1.78
L.S.D at 5% N level		3.38	3.89	0.51	0.029	0.121	0.229	0.005	0.030
L.S.D at 5%of interaction		5.13	4.98	1.23	0.047	0.189	0.398	0.008	n.s

The application of nitrogen at rates of 90 and 120 kg N/fed resulted in a significant increase of all the studied characters of maize plants as compared with 60 kg N/fed. These results are in agreement with those obtained by Gomma and El-Douby(2002), Othman *et al*., (2005) and Soliman (2007). The present results are confirmed the vital role of N-fertilizer on plant growth, as it is necessary for photosynthesis, cell division and meristematic activity in plant organs which reflected on maize grain yield.

Also, it seems that, the N-forms affected the plant height, dry weight of shoot, the leaf pigments and the mineral concentration. The beneficial effect of both mineral N (ammonium sulphate) and compost on all the studied characters of maize plants may be due to the vigorous vegetative growth which may be attributed to addition of mineral nitrogen or/and organic materials on increasing the availability of elements (macro and micronutrients) to be absorbed by plant roots. Nitrogen was highly effective on vegetative growth through its effects on vital process, i.e. chlorophylls, enzymes, photosynthesis and endogenous hormones synthesis, which consequently affect plant growth and yield (Hanafy Ahmed, 1997). Organic materials are expected to improve the physical conditions of soil and increase aggregation. In this concern, the possibility could be: (a) provide a substantial modification of physical soil properties such as bulk density, aeration, etc., which affect solubility, absorption and availability of nutrients(Tester, 1990 and Mazzarino *et al*., 1990), (b)-lowering the fixed nutrients through several mechanisms such as chelation and formation of organic complexes relatively available for plants and (c)-production of humates as a result of improving the microbial activity, which could possibly exchange for adsorbed anions such as phosphates.

Data in Table (3) show that the interaction effect between nitrogen sources and nitrogen level on all the studied characters was significant. Also, it could be concluded that the greatest values of all the studied characters were obtained using a mixture of N-mineral and organic manure treatment at 120kgN/fed.

2-Yield and its components:-

Data in Table (4) show that raising nitrogen levels up to 120kg N/fed. resulted in significantly increased ear length, ear diameter, ear weight, grain ear/ weight, No. of row/ear, No. of grain/row, 100 grain weight and grain yield. These results may be due to the favorable effect of nitrogen on metabolic processes and physiological activities of meristemic tissues, which are responsible for cell division and elongation in addition to the formation of sink characters and consequently increase ear weight and grain ear weight. These results are in harmony with those obtained by Salem (2000), El-Douby *et al*., (2001), Bader *et al*., (2003) and Gomaa(2008).

From data in the same Table, the increase in weight of 100-grain might be due to the increase in the assimilation rates of translocated materials to the grains rather than the increase in number of grains /ear (Salem, 1999). The increase in grain yield/fed may be due to the stimulating effect of nitrogen on the vigor of vegetative growth and accumulation of photosynthates and their assimilation which stimulate maize plants to produce high grain yield. These results are in accordance with those obtained

by Salem (2000), El-Douby *et al*., (2001), Peter *et al*., (2002) and El-Nagar (2003).

Also, the data presented in Table (4) indicate that the yield and its components were significantly affected with N sources, while No. of row/ear and No. of grain/row were not affected. Addition of compost during the preparation of soil resulted in a positive effect on the yield and its components. The highest rate of N-organic (120 kg N/fed.) gave the greatest increase for all the studied characters as compared to rate of 60kg N/fed. A combination between the organic and ammonium sulphate fertilizers gave the best results as compared to the treated plants with such treatments alone. The beneficial effect of both mineral-N(ammonium sulphate) and organic manure on yield and its components may be due to vigorous vegetative growth which may be attributed to addition of mineral nitrogen or/and the organic materials on increasing the availability of elements (macro and micronutrients) to be absorbed by plant roots. Nitrogen was highly effective on vegetative growth and yield through its effects on vital processes, i.e. chlorophylls, enzymes, photosynthesis and endogenous hormones synthesis which consequently affect plant growth and yield (Hanafy 1997). Organic materials are expected to improve the physical conditions of soil and increase aggregation. This conclusion agrees with those reported by Patil and Biradar(2001), who reported that application of inorganic fertilizer plus organic manure to plant produced the highest yield as compared to organic or inorganic fertilizer applied alone.

Table (4): Effect of nitrogen fertilizers sources and nitrogen levels on yield and its components of maize plants (Average of two seasons)

N-Fertilizer form	N level kg/fed	Ear length (cm)	Ear diameter (cm)	Ear weight (g)	Grain ear weight (g)	No. of row/ear	No. of grain/row	100 grain weight (g)	Grain yield (ard./fed)
Ammoniun sulphate (A.S)	60	21.50	4.88	228.67	197.67	13	42	35.30	24.73
	90	22.25	4.98	266.69	225.37	14	44	37.04	26.55
	120	22.91	5.09	304.25	252.58	14.67	46	38.22	28.62
Mean		22.22	4.98	266.54	225.21	13.89	44	36.85	26.63
Compost	60	21.33	4.30	216.67	184.13	12.67	41.33	33.48	23.41
	90	21.59	4.45	242.51	219	13.33	42.67	35.85	25.46
	120	22.33	4.61	267.02	236.1	14.00	44.00	36.82	27.95
Mean		21.75	4.45	242.07	213.08	13.33	42.67	35.38	25.61
A.S. + compost	60	22.36	5.14	240.67	203.65	13.33	44	35.77	25.08
	90	23.67	5.25	277.52	246.71	14.33	45	38.58	27.34
	120	23.83	5.41	315.65	278.65	14.67	47	39.29	30.65
Mean		23.29	5.27	277.95	243.00	14.11	45.33	37.88	27.69
L.S.D at 5%of fertilizer		0.52	0.25	8.38	14.92	n.s	n.s	0.81	0.82
Mean N level	60	21.73	4.77	228.67	195.15	13.00	42.44	34.85	24.41
	90	25.50	4.89	262.24	230.36	13.89	43.89	37.16	26.45
	120	23.02	5.04	295.64	255.78	14.45	45.67	38.11	29.07
L.S.D at 5% N level		0.81	0.15	5.06	10.98	0.89	1.45	1.71	1.79
L.S.D at 5%of interaction		1.32	0.31	11.33	18.94	n.s	n.s	2.00	2.01

The interaction effect of N fertilizer sources and levels on yield and its components of maize are presented in Table (4). It could be noticed that the greast values of maize yield and its components were obtained by using a mixture of ammonium sulphate and compost at rate of 120 kgN/fed. Thus it is recommended to add 120 kg of nitrogen as mixture from N-mineral ammonium sulphate at a rate of (60kg N/fed.) + Compost (60kg N/fed.) to maize crop.

3- Nutrients concentration and its uptake:

Data in Table (5) showed that N forms has a significant effect on NPK concentrations and their uptake (except K uptake) by maize grains. The data in Table (5) show that NPK concentration and the uptake of N and P, of maize grains was significantly increased by increasing mineral-N fertilizer, while K uptake was not significant. This increase reached to the greatest values at high rate of ammonium sulphate. Similar observations were recorded by Eisa *et al*., (2003) who found that the content of N,P and K in maize grain was increased by the addition of 120kgN/fed. Increasing N, P and K concentrations by N-fertilization might be due to the increase in plant capacity to absorb nutrients which, increased root surface per unit of soil volume as well as the high capacity of the plants supplied with nitrogen fertilizer in building metabolites, which in turn contribute much to increase the nutrient uptake. Similar results were obtained by Mishra, *et al.,* (1995) and El-Naggar *et al*.(2002).

Table (5): Nutrients concentrations and uptake in grains of maize plants as affected by nitrogen fertilizers sources and levels (Average of two seasons)

N-Fertilizer form	N level (kg/fed)	N		P		K	
		%	Uptake (kg/fed)	%	Uptake (kg/fed)	%	Uptake (kg/fed)
mmonium sulpha (A.S.)	60	1.55	53.66	0.228	7.89	0.309	10.70
	90	1.65	61.33	0.236	8.77	0.317	11.78
	120	1.80	72.12	0.248	9.94	0.354	14.18
Mean		1.67	62.37	0.237	8.87	0.327	12.22
Compost	60	1.50	49.16	0.226	7.41	0.295	9.67
	90	1.63	58.10	0.234	8.34	0.301	10.73
	120	1.75	68.48	0.245	9.59	0.336	13.15
Mean		1.63	58.58	0.235	8.45	0.311	11.18
A.S. + compost	60	1.65	57.93	0.235	8.25	0.324	11.38
	90	1.75	66.98	0.258	9.88	.0.352	13.47
	120	1.85	79.38	0.276	11.84	0.373	16.01
Mean		1.75	68.10	0.256	9.99	0.350	13.62
L.S.D at 5%of fertilizer		0.034	2.95	0.003	1.13	0.008	n.s
Mean N level	60	1.57	53.58	0.230	7.85	0.309	10.58
	90	1.68	62.14	0.243	9.00	0.323	11.99
	120	1.80	73.33	0.256	10.46	0.354	14.45
L.S.D at 5% N level		0.05	5.33	0.004	0.061	0.006	n.s
L.S.D at 5%of interaction		0.07	6.89	0.03	1.81	0.013	n.s

Data in Table (5) also revealed that compost addition exert a more beneficial effect on N, P and K percentage and uptake. The superiority of compost for increasing N, P and K contents in maize grain is probably

attributed to the production of organic and inorganic acids during the degradation of such organic materials as well as humates as a result of improving the microb activities will have a contribution in decreasing soil pH and makes chelating to the ions, leading to an increase in available forms of elements in the rhizosphere zone. The obtained results stood in a good agreement with those recorded by Singh *et al*., (1997), Mohammed (2002) and Bayoumi *et al.*(2003).

Results also indicated that application of compost combined with N-mineral fertilizer to soil had a markedly effect on the content of N, P and K, where the highest values were obtained at rate of 60 kg N/fed compost mixed with 60kg N/fed as N mineral.

These results illustrate that, adding organic manure in combination with chemical fertilizers improved the uptakes of N, P and K better than the addition of each individualy, that is may be not only due to that the organic manure improved the soil conditions, but also due to that addition of the chemical fertilizers with the organic manure may increase the exchangeable form of N, P and K in the organic manure. These results are in agreement with that observed by Aly (1999) who found a significant increase in N, P and K contents in maize as a result of combined effect of organic (compost) and N-mineral fertilizer applied to soil.

Regarding the effect of interactions between nitrogen sources and nitrogen levels on NPK concentrations and their uptake (except K uptake) were significant. Also, it can be concluded that the greatest NPK concentration and their uptake were obtained by using a mixture of N-inorganic and N-organic fertilizers treatment from (ammonium sulphate +compost) at rate of 120kg N/fed.

4- Grain chemical contents

Data in Table (6) show that treated plants by the different rates of ammonium sulphate led to significant increases in protein percentage, protein yield, oil percentage, oil yield, total soluble sugar, starch and total carbohydrates percentage.

This is due mainly to the effect of nitrogen on the vigor of vegetative growth and accumulation of photosynthates and their assimilation which stimulate maize plants to produce high grain yield. Also, the application of nitrogen fertilizer encourages plant to absorb large N amounts and consequently more assimilation rates in forms of amino acids, protein, enzymes and other nitrogen substances which will be formed. More cell division, forming new tissues and organs, more assimilation rate and carbohydrate metabolism, as well as more dry matter formation which are characterized with more nitrogen constituents were expected. These results are in harmony with those obtained by Salem (2000), El-Douby *et al*. (2001), Peter *et al*.(2002) and El-Nagar(2003).

Concerning the effect of compost application, the data show that the combined treatment of organic and N-mineral fertilizers gave the highest increases in protein percentage, protein yield, oil percentage, oil yield, total soluble sugars, starch and total carbohydrates percentages. The favourable effect of organic manure on enhancement of chemical constituents of maize grains might be attributed to its beneficial effect on vegetative growth, yield

and increasing the uptake of nutrient by roots of plant especially phosphorus (p element is the main constituent of phospholipids, phosphoroteins, nucleic acid and coenzymes. However, the most important compound in which phosphate groups linked by pyrophosphate bonds is adenosine triphosphate (ATP). The energy absorbed during photosynthesis or released during respiration is utilized in the synthesis of the pyrophosphate bonds in adenosine triphosphate(ATP). In that form, the energy can be conveyed to various undergoing processes such as activation uptake and the synthesis of various organic compounds such as oil. Similar results were recorded by Mohamed and Matter(2001).

Table (6): Effect of nitrogen fertilizers sources and levels on maize grain quality (Average of two seasons)

N-Fertilizer form	N level (kg/fed)	Protein %	Protein yield (kg/fed)	Oil %	Oil yield (kg/fed)	TSS %	Starch %	Total carbohydrate %
Ammoniun sulphate	60	9.69	335.49	6.28	217.43	1.75	61.80	63.55
	90	10.31	383.22	7.50	278.78	1.98	65.81	67.79
	120	11.25	450.77	7.64	306.12	2.20	68.41	70.61
Mean		10.42	389.83	7.14	267.44	1.98	65.34	67.32
Compost	60	9.38	307.42	6.20	203.20	1.70	59.14	60.84
	90	10.19	363.21	7.03	250.58	1.97	63.61	65.58
	120	10.94	428.08	7.50	293.48	1.98	67.81	69.79
Mean		10.17	366.24	6.91	249.09	1.88	63.52	65.40
A.S. + compost	60	10.31	362.00	6.63	232.79	1.85	63.73	65.58
	90	10.94	418.74	7.81	298.94	2.00	66.76	68.76
	120	11.56	496.04	8.21	352.29	2.31	69.10	71.41
Mean		10.94	425.59	7.55	294.67	2.05	66.53	68.58
L.S.D at 5%of fertilizer		0.16	16.03	0.133	6.13	0.07	1.05	0.62
Mean N level	60	9.79	334.97	6.37	217.81	1.77	61.56	63.32
	90	10.48	388.39	7.45	276.10	1.98	65.39	67.38
	120	11.25	458.30	7.78	317.30	2.16	68.44	70.60
L.S.D at 5% N level		0.17	21.14	0.01	9.78	0.07	0.81	0.32
L.S.D at 5%of interaction		0.199	31.13	0.199	12.76	0.14	1.53	0.80

A combination between ammonium sulphate and compost gave the best results as compared with those treatments alone. The highest increases were obtained by using a mixture of ammonium sulphate and compost at 120 kg N/fed.(60 kg N/fed. for each of N-mineral and N-organic)

The interaction effect of N source and levels on maize grain quality are presented in Table (6). It can be noticed that the maximum grain chemical constituent in grain were obtained using a mixture of ammonium sulphate and compost at 120 kg N/fed.

Generally, it could be concluded that, adding the organic manure (compost) at rate of 60kg N/fed in combination with mineral N-fertilizer (ammonium sulphate) at rate 60kg N/fed induced an increase in the studied plant growth characters as well as macronutrients. This, in turn could be

related to the improvement effects of organic manure on the physical, biological and chemical properties of the soil which might be promoted the release of some nutrients and /or some growth substance in rooting zone in readily available form which consequently may be increase their uptake by plants. Thus, it can be suggested that, the use of organic manure in combination with mineral-N fertilizer will give a good growth and high yield of maize plants and decrease the extensive use of mineral-N fertilizer.

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تأثير التسميد النتروجينى العضوى والمعدنى على محصول الاذرة ومكوناته

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اجريت تجربة حقلية بناحية قرية الونايسة مركز اطسا محافظة الفيوم خلال الموسم الزراعى لعام ٢٠٠٧، ٢٠٠٨ لدراسة تأثير اضافة كلا من سماد كبريتات الامونيوم والسماد العضوى (الكمبوست) وخليط منهما على النمو ، المحصول ومكوناتة لصنف الذرة (هجين فردى ٣٠٢٠)

وقد أظهرت النتائج أنة بالنسبة لتأثير مصادر النتروجين وجد أن خليط من سماد كبريتات الامونيوم والكمبوست أعطى أعلى محصول للحبوب ومكوناتة وكذا أعلى قيم لكل من تركيز وامتصاص عناصرNPK.

- اوضحت النتائج أن محتوى الاوراق من الكلوروفيل وكذا القياسات النباتية ممثلة فى طول الكوز-قطر الكوز-وزن الكوز-عدد الصفوف-عدد حبوب الصف- وزن ١٠٠حبة – محصول الحبوب للفدان ازدات زيادة معنوية بزيادة معدل التسميد النيتروجينى وكذلك ادت زيادة معدل التسميد النيتروجينى حتى ١٢٠كجم نيتروجين للفدان الى زيادة فى محتوى الحبوب من النيتروجين والفوسفور والبوتاسيوم وكذلك البروتين
- ادى زيادة مستوى التسميد حتى ١٢٠ كجم نيتروجين للفدان الى زيادة فى النسبة المئوية للزيت ومحصول الزيت وزيادة النسبة المئوية للكربوهيدرات الكلية فى الحبوب
- اما بالنسبة لتأثير التفاعل بين مصادر ومعدل التسميد النيتروجينى وجد أن أحسن المعاملات كانت عند استخدام خليط من سماد كبريتات الامونيوم والكمبوست وعند معدل ١٢٠ كجم نيتروجين للفدان(٦٠ كجم N معدنى /فدان + ٦٠ كجم N عضوى/فدان) حيث أعطت أكبر قيم لكل من محصول الحبوب ومكونات المحصول
- كما تشير النتائج الى أن اضافة السماد النيتروجينى العضوى مع المعدنى كان له اكبر الاثر فى الزيادة المعنوية لمحصول الذرة ومكوناتة بالمقارنة بالاضافة الفردية لكل منهما هذا يعنى أن الاضافة المزدوجة للسمادين العضوى والمعدنى ادت الى زيادة التاثير المعنوى على الصفات النباتية المختلفة المقدرة عنه فى حالة الاضافة الفردية لكل منهما
- وبناء على النتائج المتحصل عليها يمكن القول أن اضافة التسميد العضوى له أثر جيد فى تحسين المحصول وكذلك ايضا فى تقليل الاعتماد على السماد المعدنى لتقليل التلوث للبيئة.