Effect of Bio,Organic and Nitrogenous Fertilization on The Productivity of Some Rice Cultivars (*Oryza sativa*, L.)

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ABSTRACT: Two field experiments were carried out at the Experimental Farm of the Faculty of Agriculture (Saba Basha), Alexandria University, at Abees region, Alexandria. Egypt during the two growing seasons 2013 and 2014 to study the effect of bio- organicand nitrogenous fertilization on the productivity of some rice cultivars (*Oryza sativa*, L.).The applied experimental design was splitsplit plot with three replicates. The main plots were conducted for the three rice cultivars (Sakha 106, Sakha 104 and Giza 178), while the four nitrogen fertilizer levels (Control, 40, 60 and 80 kg N/fed), as urea for 46.5% were arranged in the sub-plots and three bio-organic (uninoculation, compost and A-Mycarrhizal) which were arranged in the sub-sub plots. The main results could be summarized as follows (1) Sakha 104 cultivar significantly surpassed the other cultivars in all yield and its components I.e. panicle weight, number of filled grains/panicle, number of panicles/m^2, 1000- grain weight, straw, grain and biological yields/ha as well as harvest index. (2) Application at 60 kg N/fed, gave the highest all characters under study But applying 60kg N/fed gave significantly the highest Hulling, milling and head rice percentage. (3) Application with 60 kg N/fed with A-mycorrhizal inoculation was the best combination to obtain the highest values of panicle weight, number of panicles/m^2, 1000- grain weight, grain and biological yield/ha and harvest index as well as milling percentage.

The highest most traits except number of filled grains/panicle and straw yield were obtained from the combination of applying 60 kg N/fed and A-Mycorrhizal inoculation with sakha104 rice cultivar.

Key words:N- fertilizer, bio-organic, oryza sativa cultivars**,** organic, yield and its components.

INTRODUCTION

Rice(*Oryza sativa,* L.) is an important food in the diet of the world Population (FAO, 2004). Half of the worlds population eat rice daily and depend on it as their staple food. Rice occupies conspicuous position in the predominately agricultural economy of Egypt this attention is required to imrove its yield, quality characters and quality of elements nutrition (Chemma, 2004 and Yousef, 2007).

Nitrogen is one of three essential macronutrients for plants growth and yield. So, mineral nitrogen fertilizers are widely used in agriculture all over the world and also in Egypt. Nitrogen fertilizers is applied to meet the needs of the crop during the early growth stages and accumulate in the vegetative parts to be utilized for grain formation (Salem, 2006). Also, nitrogen fertilizers has a vital role in the contents of nitrogen% rice grains and nitrogen uptake by plants (Ebaid and Ghanem, 2000).

The present study was mainly directed to maximize the productivity of some rice cultivars through applying adequate organic fertilizer to reduce the environmental pollution in addition to improving soil chemical and physical properties which leads to improving grain yield and grain quality of rice under North Delta condition Egypt (El- Nory, 2008 and Badr, 2012). Compost is a perfect fertilizer made of natural substances like farm residue and animal manure, which have been through an ageing process. Making compost takes a little time and effect, but it's wonderful, it improv's the physical and chemical conditions of paddy soil (El- Ekhtyar, 2007).

Utilization of biological N2 fixation (BNF) can decrease the application of mineral N fertilizer and reducing environmental ranks (Choudhury and Kennedy, 2004). Also, Mycorrhizal fungi play an important role in whole plant nutrient balance by aiding in the uptake of limiling nutrients and maintaining the nutrient balance (Ning and Gumming, 2001) using biofertilization or microbial inoculates to replace of increase the efficiency of chemical fertilizer partially or totally in effective in reducing the cost of crop production and maintaining the natural fertility of soil (Radwan*et al*., 2008 and Tabl, 2014).

The information on role of nitrogen fertilizer levels and bio- organic fertilization as well as their combinations on production of rice are very scanty. Therefore, there is an urgent need to study the response of some rice cultivars to nitrogen levels and bio- organic fertilization on yield components and grain yield as well as grain quality under the conditions of Abees region, Alexandria Governorate.

MATERIALS AND METHODS

Two filed experiments were carried out at the Experimental farm of Faculty of Agric. (Saba Basha) Alexandria University, during the two successive summer seasons of 2013 and 2014. Field experiments were conducted to study the effect of nitrogen fertilizer levels and bio- organic fertilization on yield and its components and some grain quality characters of three rice cultivars (*Oryza sativa,* L.) namely Giza 178, Sakha 104 and Sakha 106.

Soil samples of the experimental sites were taken at the depth of (0- 30cm) physical and chemical analyses are presented in Table (1) were don according to Chapman and Pratt (1978) while organic fertilizer analyses were Presented in Table (2).

The compost from solid waste as organic fertilizer was obtained from Abees Factory in the form of fine compost. Organic fertilizer was applied at a rate of 8 ton/fed and inculpated with the soil two weeks before sowing to a depth of 10- 15 cm. the Nursery seedbed was well ploughed and dry leveled-Phosphorus fertilizer in the form of single calcium super phosphate (15.5% P_2O_5) was added at the rate of 240 kg/ha (100 kg/fed) before tillage. Nitrogen in the form of urea (46%N) at the rates of (control 40 kg N, 60 kg N and 80 kg N/fed), was added in two portions.2/3 Basel in dry soil before the first irrigation and 1/3 at panicle initiation. Zinc sulphate (22% Zn) at the rate of 50 kg/ha (20 kg/fed) was added after pudding and before planting. The preceding crop was Egyptian clover (*Trifolium olexandrinum*, L.) for the two growing seasons. All cultivation practices were done according to the common practices in rice growing.

With A-mycorrhizal fungi with fungi (*Glomus maciarpuim*) strain an inoculants for rice from plant production Dept. (Saba Basha) Alex. Univ. at a rate of 250ml of infected roots and was mixed with seeds.

The experimental design was split- split plot with three replication. The main plots included three rice cultivars i.e. Giza 178, Sakha 106 and Sakha 104, while the nitrogen fertilizer levels (i.e. control, 40, 60 and 80 kg N/fed) was arranged in the subplots. Bio, organic fertilizers uninoculation, compost and A-Mycorrhizal were allocated to sub sub plots. The plot area was 10.5 m^2 (3.5m length and 3m width). Rice seeds at the rate of 100 kg/ha were soaked in fresh water for 24 hours then drained and inoculated. For 48 hours to hasten early germination. The pre- germinated seeds were uniformly broadcasted in the nursery on 4^{th} May in 2013 and 2014 seasons.

Table (1): The physical and chemical properties of the experimental soil 2013 and 2014 seasons

Soil properties	2013	2014
A- Particle size distribution (%):		
Sand	13.90	14.30
Silt	42.10	42.70
Clay	44.00	43.00
Soil texture	Sand clay soil	Sand clay soil
B- Chemical properties:		
pH (1:1)	7.80	7.90
EC (1:1) (ds/m)	3.40	3.45
1- Soluble cations(meq.1^{-1})		
K^+	0.85	0.90
Ca^{++}	4.20	4.30
Mg^{++}	3.25	3.20
Na^{++}	8.25	8.30
2- Soluble anions (meq.1^{-1})		
CO^-_3+ HCO^-_3	2.80	2.70
CL^-	11.90	11.80
SO^-_4	0.40	0.45
Calcium carbonate (%)	7.60	7.50
Organic matter (%)	0.90	1.00
Total nitrogen (%)	0.44	0.48
Avaliable Phosphorus (mg/kg)	10.8	11.3
Avaliable K (mg/kg)	123.60	118.70

Table (2): Chemical analysis of organic fertilizer (Compost)

Parameters	2013	2014
pH 1:2.5 (soil suspension)	7.75	7.73
EC ds/m (soil pastic)	3.4	3.4
N (total) %	1.6	1.7
Organic carbon (%)	22	21
Ash (%)	46	44
C/N ratio	18:1	17:1
P (mg/kg)	80.2	80
K (mg/kg)	115.5	114.6

Data recorded

1- Yield and its components:

- Panicle weight (g), number of filled grains/panicle, Number of panicles/m^2, 1000- grain weight (g), Grain yield (ton)/ha, straw yield ton/ha, biological yield (ton)/ha and harvest index.

2- Grain quality characters:

Milling characters

Hulling percentage, milling output and head rice percentage were estimated according to the methods reported by Adair (1952).

2-1- Hilling percentage

About 150g cleaned rough rice samples at moisture content 12- 14% were estimated using experimental huller machine (Satake) at Rice Technology and Training Center, Alexandria.

$$\text{Huilling\%} = \frac{\text{Brown rice weight}}{\text{Rough rice weight}} \times 100$$

2-2- Milling percentage

Brown rice was consequently milled using milling machine model TMO5 at Rice Technology and Training Center, Alexandria, The milled rice sample was then collected and weighted taken and percentage of total milled rice was calculated by the following equation.

$$\text{Hilling\%} = \frac{\text{Milled rice weight}}{\text{Rough rice weight}} \times 100$$

2-3- Head rice percentage

Whole milled grains were separated from milled rice using rice – sizing device. Then, the percentage on head rice yield was obtained and calculated as follows:

$$\text{Head rice\%} = \frac{\text{Whole grain weight}}{\text{Rough rice weight}} \times 100$$

Statistical analysis:

All data collected were subjected to analysis of variance analysis according to Gomez and Gomez (1984) Treatment means were compared by Duncan's multiple range test (Duncan, 1955). All statistical analysis was performed using analysis of variance technique by means of IRRISTAT computer software package.

RESULTS AND DISCUSSION

1-Yield and its components:

Data in Tables (3 and 4) revealed that the differences among the studied rice cultivars in yield components i.e. panicle weight, number of filled grains/panicle, number of panicles/m^2, 1000- grain weight, grain yield (ton)/ha, straw yield (ton)/ha, biological yield (ton)/ha, harvest index (%) in both seasons were significant. Sakha 104 cultivar significantly surpassed the other cultivars in all yield and its components characters under study. These differences may be due to the genetic differences and the differences in 1000- grain weight might be attributed to the variation in translocation rate of photosunthelic from leaves to the storing organs i.e. the grains. The trends of the obtained results are in good accordance with that reported by many investigators such as Salem (2006), Radwan *et al.* (2008), Tabl (2008), Abou- Khalifa (2012).

Data in Tables (3 and 4), clear that increasing nitrogen fertilizer levels significantly increased grain, straw biological yield (ton/ha) and harvest index (%) in both seasons. This increase in grain yield could be attributed to the significant increase in panicle weight, number of filled grains/panicle, number of panicles/m^2 and 1000- grain weight in both seasons. Application of nitrogen fertilizer at level of 60 kg N/fed, gave the highest yield and its components compared to the other levels of application. The effect of nitrogen fertilizer may be attributed to the role of nitrogen in promoting the vegetative growth and moristemic activity during growth. Such finding is in agreement with those of Ebaid and Ghanem (2000), Abou- khalifa (2001), Badawi (2002) and Salem (2006).

With regard to the effect of bio- organic fertilization on rice yield and its components the results are shown in Tables (3 and 4). It could be concluded that inoculation of rice grains with A-mycorrhizal inoculation encourage the increase of panicle weight, number of filled grains/panicles, number of panicles/m^2, 1000- grain weight, grain straw and biological yield (ton)/ha and Harvest index (%) when compared with the uninoculation (control) in both seasons. This may be due to the effect of A- Mycorrhizal inoculation which plays an important role in the assimilation of rice cultivars that reflected on enhancing this characteristic. Alas, the could be attributed to the role of plant phytohormones like IAA, Gas and CKs which promote plant growth cell division, breaking the aperial dominances, hence encouraging the photosynthesis and assimilator accumulation (El- Khowas, 1990). Similar results were obtained by Radwan*et al.* (2008), Wijebandara *et al.* (2009) and Tabl (2014).

It is clear from Tables (3 and 4) that the highest panicle weight, number of panicles/m^2, 1000- grains weight, grain yield (ton)/ha, biological yield (ton/ha) and harvest index (%) were recorded under the treatment including the combination of Sakha 104 cultivar and applying 60 kg N/fed in 2013 and 2014 seasons.

As for the interaction between rice cultivar and bio- organic fertilization on panicle weight, number of panicles/m^2, 1000- grain weight, grain and biological yield (ton/ha) as well as harvest index there was significant effect in the two seasons, Table (3 and 4). Sakha 104 cultivar and A- Mycorrhizal inoculation recorded the highest values of three traits.

The interaction between nitrogen fertilizer levels and bio- organic fertilization was significant in the same traits in both seasons, Tables (3 and 4). The highest grain yield (ton)/ha was attend by applying 60 kg N/fed with A- mycorrhizal inoculation. The results in Tables (3 and 4) indicate that the same traits except number of filled grains/panicle was recorded by Sakha 104 cultivar and applying 60 kg N/fed with A- mycorrhizal inoculation in both seasons.

2-Grain quality characters:

It is clear that hulling, milling and head rice percentages of the three tested cultivars varied significantly in both seasons, Table (5).

The highest hulling percentage (83.17%) in the first season. Milling percentage (73.06 and 73.22%) and head rice percentage (66.91 and 65.35%) in both seasons, respectively belonged to Sakha 104 cultivar. These differences may be due to the differences in the genetic structure and its interaction with environmental conditions. Similar differences among rice cultivars in grain quality were reported by El- Ekhtyar (2004).

Obtained results recorded in Table (5) revealed that hulling, milling and head rice percentages in grains were significantly affected by adding nitrogen fertilizer levels. The highest values of all grain quality characters were obtained by 60 kg N/fed compared with check (control). Increase in hulling milling and head rice percentages as a results of increasing of nitrogen levels to up 60 kg N/fed may be due to increasing nutrient availability. Similar results were obtained by Seedek (2001) and El- Hissewy*et al.* (2005).

Percentages data in Table (5) indicated that of hulling, milling and head rice significantly increased by inoculation of rice grain with A-mycorrhizal inoculation when compared with uninoculation (control) treatment during the two seasons. This may be due to A- mycorrhizal inoculation had favorable effect on grain quality characters via improved growth, escalating photosynthetic rate consequently improving both grain yield and grain quality as shown in Table (5).

Data documented in Table (5) show that the interaction between Sakha 104 cultivar and applying 60 kg N/fed produced the highest values of milling percentage in both seasons. In both seasons of study Sakha 104 cultivar and A-mycorrhizal inoculation was recorded the highest values of milling percentage.

Data in Table (5) reveal that the highest milling percentage were recorded by applying of 60 kg N/fed and the A-mycorrhizal inoculation in both seasons. Also, data in Table (5) reveal that highest values of milling percentage were recorded by Sakha 104 cultivar when it was fertilized with applying 60 kg N/fed and A- mycorrhizal inoculation in both seasons.

From the above mentioned results and under the condition of the present study it, could be concluded that the most economic fertilization treatment for maximum yield and its components of rice Sakha 104 cultivar as well as grain quality character sties in Alexandria are applying 60 kg N/fed with A-mycorrhizal inoculation which hence reduced the cost of production and pollution which could occur by excessive use of chemical fertilizer.

Table (3): Panicle weight (g), Number of filled grains/panicle, number of panicles/m^2 and 1000- grain weight (g) as influenced by cultivars, N-fertilizer levels and bio- organic fertilization and their interactions in 2013 and 2014 seasons

Treatments	Panicle weight (g)		No. of filled grains/panicle		No. of panicles/m^2		1000- grain weight (g)	
	2013	2014	2013	1014	2013	2014	2013	2014
A) Rice cultivars								
Giza 178	2.65c	2.82c	103.35b	104.47b	412.45c	418.93c	21.57c	24.81c
Sakha 106	2.80b	2.97b	103.81b	105.51b	415.33b	422.89b	22.08b	25.84b
Sakha 104	2.93a	3.09a	130.43a	134.47a	418.22a	429.36a	22.69a	26.19a
L.S.D. (0.05)	**0.012**	**0.026**	**4.56**	**4.50**	**0.23**	**2.26**	**0.10**	**0.06**
B) N- levels								
Control	2.47d	2.63d	100.90c	100.44c	403.81d	410.56d	20.03d	22.37d
40 kg N/fed	2.57c	2.78c	102.08bc	102.82c	409.71c	417.01c	21.21c	24.04c
60 kg N/fed	3.32a	3.34a	142.56a	146.74a	425.46a	436.62a	24.15a	28.76a
80 kg N/fed	2.81b	3.00b	104.49b	109.43b	422.61b	430.72b	23.06b	27.30b
L.S.D. (0.05)	**0.015**	**0.029**	**0.55**	**4.60**	**0.19**	**0.78**	**0.09**	**0.13**
C) Bio- organic								
Uninoculation	2.80b	3.11b	98.84b	102.75b	386.24c	410.70c	21.34c	23.27c
Compost (organic)	2.26c	2.39c	101.93b	105.21b	422.32b	420.52b	22.40b	25.40b
Mycorrhizal	3.33a	3.39a	136.82	136.41a	437.24a	439.95a	22.60a	28.11a
L.S.D. (0.05)	**0.009**	**0.033**	**5.60**	**6.20**	**0.30**	**3.08**	**0.15**	**0.16**
AxB								
AxC	**	**	**ns**	**ns**	**	**	**	**
BxC	**	**	**ns**	**ns**	**	**	**	**
AxBxC	**	**	**ns**	**ns**	**	**	**	**

*, **, N.S. indicates P< 0.05, P > 0.01 and not significant, respectively. Means at each factor designated by the same latter are not significantly different at 5% level using Duncan's multiple range test.

Table (4): Grain yield (t)/ha, straw yield (t)/ha, biological yield (t)/ha and harvest index as influenced by rice cultivars, N- levels bio-organic fertilization and their interactions

Treatments	Grain yield (ton/ha)		Straw yield (ton/ha)		Biological yield (ton/ha)		Harvest index (%)	
	2013	**2014**	**2013**	**1014**	**2013**	**2014**	**2013**	**2014**
A) Rice cultivars								
Giza 178	9.67c	10.09c	12.14b	12.23	21.98c	22.27c	45.00b	45.61
Sakha 106	10.05b	10.39b	12.48a	15.39	22.29b	22.99b	45.22b	45.50
Sakha 104	10.35a	10.74a	12.07b	13.03	22.85a	23.62a	45.56a	45.42
L.S.D. (0.05)	**0.03**	**0.05**	**0.09**	**ns**	**0.05**	**0.06**	**0.20**	**ns**
B) N- levels								
Control	9.07d	9.39d	11.40d	11.51b	20.36b	20.82b	44.70c	45.37b
40 kg N/fed	9.41c	9.86c	12.08c	11.99ab	21.14c	21.74c	44.82c	45.26b
60 kg N/fed	11.26a	11.70a	13.06a	17.62a	24.57a	25.63a	46.11a	46.11a
80 kg N/fed	10.35b	10.68b	12.32b	13.07ab	22.90b	23.69b	45.41b	45.30b
L.S.D. (0.05)	**0.05**	**0.07**	**0.09**	**5.46**	**0.09**	**0.10**	**0.37**	**0.52**
C) Bio- organic								
Uninoculation	9.24c	9.78c	12.07b	12.54	20.67c	21.30c	39.75c	40.27c
Compost (organic)	10.04b	10.62b	12.14b	14.61	22.24b	23.32b	47.33b	46.47b
Mycorrhizal	10.74a	10.82a	12.48a	13.49	23.22a	24.29a	48.69a	49.78a
L.S.D. (0.05)	**0.05**	**0.11**	**0.07**	**ns**	**0.12**	**0.09**	**0.53**	**0.82**
AxB								
AxC	**	**	**ns**	**ns**	**	**	**	**
BxC	**	**	**ns**	**ns**	**	**	**	**
AxBxC	**	**	**ns**	**ns**	**	**	**	**

*, **, N.S. indicates P < 0.05, P > 0.01 and not significant, respectively. Means at each factor designated by the same latter are not significantly different at 5% level using Duncan's multiple range test.

Table (5): Hilling, milling and head rice percentages as influenced by rice cultivars nitrogen levels, bio-organic fertilization and interactions in 2013 and 2014 seasons

Treatments	Hulling %		Milling %		Head rice %	
	2013	2014	2013	1014	2013	2014
A) Rice cultivars						
Giza 178	78.33c	77.53	72.14c	72.33c	65.96c	64.35b
Sakha 106	81.26b	78.50	72.55b	72.75b	66.45b	64.52b
Sakha 104	83.17a	78.93	73.06a	73.22a	66.91a	65.35a
L.S.D. (0.05)	**0.55**	**ns**	**0.05**	**0.08**	**0.42**	**0.19**
B) N- levels						
Control	77.01b	76.66	70.75d	70.92d	64.48d	63.59d
40 kg N/fed	80.57b	77.40	71.84c	72.82c	65.68c	64.12c
60 kg N/fed	83.68a	80.54	74.14a	74.53a	68.09a	65.92a
80 kg N/fed	79.75b	98.2	73.61	73.80b	67.01b	65.01b
L.S.D. (0.05)	**0.71**	**ns**	**0.08**	**0.11**	**0.52**	**0.26**
C) Bio- organic						
Uninoculation	76.69c	72.30	71.42c	72.03c	66.59b	64.79b
Compost (organic)	81.68b	82.49	72.45b	72.72b	64.76c	63.70c
Mycorrhizal	84.39a	75.73	73.88a	73.55a	67.97a	65.48a
L.S.D. (0.05)	**0.60**	**ns**	**0.09**	**0.17**	**0.32**	**0.28**
AxB						
AxC	**	**	**ns**	**ns**	**	**
BxC	**	**	**ns**	**ns**	**	**
AxBxC	**	**	**ns**	**ns**	**	**

*, **, N.S. indicates P < 0.05, P > 0.01 and not significant, respectively. Means at each factor designated by the same latter are not significantly different at 5% level using Duncan's multiple range test.

REFERENCES:

Abou- Khalifa, A. A. B. (2001). Response of some rice varieties to nitrogen fertilizer application under different irrigation intervals. Ph. D. Thesis. Fac. of Agric. Moshtohor, Zagzig Univ., Egypt.

Abou- Khalifa, A. A. B. (2012). Study some physiologic characters, yield and yield components for five new rice varieties under different sowing dates, Pelegia. Res. Livrary. Adv. In Applied Sci. Res., 3 (1): 440- 445.

Adair, C. R. (1952). The Mc Gill miller method 20 for determining the milled quality of small samples of rice.J. of Appl. Sci. Res., 55 (2) 21- 20.

Badr, A. M. M. (2012). Impact of organic and inorganic fertilization on yield, quality of rice and soil fertility. Ph.D. Thesis, Fac. of Agric. Kafr El- Sheikh Univ.

Badawi, S. A. T (2002). Physiological studies on rice crop. M. Sc. Thesis, Fac. of Agric. Kafr El- Sheikh, Tanta. Univ., Egypt.

Chapman, H. D. and P. F. Pratt. (1978). Methods of analysis for soils and plants and water. Division Agric. Sci. Univ. California pp. 162- 172.

Choudhury, A. T. M. and I. R. Kennedy. (2004). Prospects and potentials for systems of biological nitrogen fixation in sustainable rice production. Biofertil Soils. 39: 219-227.

Chemma, M. A.A. (2004). Effect of nitrogen fertilizers on Basmati rice productivity Pak. J. of Botany, 19 (5): 312- 318.

Duncan, C. B. (1955). Multiple ranges and multiple F- Test Biometrics. 11. 1-24.

Ebaid, R. A. and S. A. Ghanem. (2000). Productivity of Giza 177 rice variety growth after different winter crops and fertilized with different nitrogen levels Egypt. J. Agric. Res., 78 (2): 717- 731.

El- Ekhtyar, A. M. M. (2004). Behavior of some rice cultivars as affected by drought treatments and direct seedling method (drilling), Ph. D. Thesis. Argon.Dep. Fac. of Agric. Mansoura Univ., Egypt.

El- Ekhtyar, N. M. I. (2007). Response of rice yield to application of nitrogen from different sources and forms. M. Sc. Thesis, Fac. of Agric. Kafr El-Sheikh. Univ., Egypt.

El- Hissewy, A. A., M. A. Gomaa, F. I. Radwan and M. M. El- Sigini. (2005). Grain quality characteristics of rice it's affected by different irrigation water sources and nitrogen levels. Egypt. J. Agric. Vol. 83 (5A): 131- 141.

El- Khawas, M. A. (1990). Effect of Azotobacter chroococum and Azosprilliumbrasilience inoculation under graded levels of nitrogen growth and yield of wheat plant and soil, 69: 61-67.

El- Nory, M. I. I. (2008). Effect of organic and nitrogen fertilizer on the performance of some rice cultivars under North Delta Conditions.M. Sc. Thesis Fac. of Agroc.Kafr El- Sheikha Univ.

Gomez, K.A. and A.A. Gomez (1984). StatistialProducess for agricultural Research 2nd Ed. John wiley& Sons Inc. New York.

Gorgy, R. N. (1995). Performance of hybrid rice and inbred ric cultivar different planting and number of seedling perhill. J. Agric. Sci. Mansoura Univ., 32 (1): 117- 131.

FAO (2004).FOA STAT, FAO Statistical Databases.

Ning, N. and J. R. Cumming. (2001). Arbuscularmycorrhizal fungi enhance aluminium resistance of broomsedge (Andropogonvirginicus L.) J. Exp. Bi (2003) 54 (388) 1447- 1459 first published online March 31.

Radwan, F. I., I. Abou El- Deoud and El ham A. Badr. (2008). Response of two rice cultivars to blue green algee, A- Mycorrhizal inoculation and mineral nitrogen fertilizer Middle Easton and Russian J. of plant Sci. and Biotechnology 17 March, 2008.

Salem, A. K. M. (2006).effect of nitrogen levels plant spacing and time of farmyard manure application on the productivity of Rice, J. of Alppl. Sci. Res., 2 (11): 980- 987.

Sedeek, S. F. M. (2001). Studies of morphological and agronomical characteristics of some early varieties and lines of rice M. Sc. Thesis, Fac. of Agric. Kafr El- Sheikh, Tanta Univ., Egypt.

Tabl, D. M. M. (2008). Effect of nitrogenous and Potash fertilization on productivity and grain quality of some rice cultivars.M. Sc. Thesis, Fac. of Agric (Saba Basha) Alex. Univ., Egypt.

Tabl, D. M. M. (2014). Response of some rice cultivars to plant spacing and nitrogenous bio- fertilization. Ph. D. Thesis, Fac. of Agric. (Saba Basha) Alex. Univ., Egypt.

Wijebandara, D. M. D. I. Ranie, G. S. Dasog; P. L. Patil and M. Hebbar. (2009). Response of rice to nutrients and bio- fertilizers under conventional and system of rice intensification methods of cultivation in Tungabhadra command of Karnataka Dept of soil Sci. and Agric. Chem. Univ. India. J. Agric. Sci., 22 (4) 741- 750.

Yousef, A. A. M. (2007). Breeding studies on Rice. M. Sc. Thesis, Fac. of Agric. Kafr El- Sheikh. Univ., Egypt.

الملخص العربي

تأثير التسميد النتروجيني والعضوي والحيوي على إنتاجية بعض أصناف الأرز

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*قسم الإنتاج النباتي . كلية الزراعة سابا باشا . جامعة الإسكندرية . مصر

**مركز تدريب وبحوث الأرز– معهد بحوث المحاصيل الحقلية – مركز البحوث الزراعية – مصر

أجريت تجربتان حقليتان بمزرعة كلية الزراعة (سابا باشا) جامعة الإسكندرية في منطقة أبيس – إسكندرية – مصر خلال موسمي الزراعة٢٠١٣،٢٠١٤م لدراسة تأثير التسميد النتروجيني والعضوي والحيوي على إنتاجية بعض أصناف الأرز. وقد صممت التجربة باستخدام تصميم القطع المنشقة مرتين في ثلاث مكررات. وكانت القطع الرئيسية تحتوي على ثلاث أصناف (سخا ١٠٦، سخا ١٠٤، وجيزة ١٧٨) بينما معدلات التسميد النتروجينى

(كنترول ٤٠، ٦٠، ٨٠كجم نتروجين/فدان كانت موزعة في القطع الشقية الأولى أما ثلاث معاملات التسميد العضوي – الحيوي (بدون تلقيح –كمبوست، ميكوريزا) كانت موزعة في القطع الشقية الثانية.

ويمكن تلخيص أهم النتائج فيما يلي: سجل صنف سخا ١٠٤ أعلى تفوق معنوي على الأصناف الأخرى في جميع صفات المحصول ومكوناته وهي (وزن السنبيلة ، عدد الحبوب/سنبيلة، عدد السنابل/م٢، وزن الألف حبة، محصول القش والحبوب والمحصول البيولوجي/هكتار وأيضاً دليل الحصاد وجودة الحبوب.

– أعطى إضافة ٦٠ كجم نتروجين/فدان أعلى قيم لجميع الصفات تحت الدراسة وأيضاً إضافة ٦٠ كجم نتروجين/فدان تفوق معنوياً في صفات التبيض والتقشير.

– أعطى التداخل بين إضافة ٦٠ كجم نتروجين/فدان والتلقيح بالميكوريزا أفضل وأعلى قيم أعلى من وزن السنبلة، عدد السنابل/م٢، وزن الألف حبة – محصول الحبوب والبيولوجي ودليل الحصاد وأيضاً النسبة المئوية للتبيض.

– أعطى التداخل بين إضافة ٦٠ كجم نتروجين/فدان والتلقيح بالميكوريزا مع الصنف الأرز سخا ١٠٤ أعلى قيم لمعظم الصفات ماعدا عدد الحبوب/سنبيلة ومحصول القش.