A Study on Rationalization of Mineral Fertilization Through Organic Manure and their Effects on Rice Crop

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ABSTRACT

Two field experiments were carried out at the Farm of the Faculty of Agricultural (Saba Basha) Alexandria University, during 2008 and 2009 seasons, to study rationalization of mineral fertilization through organic manure and their effects on rice crop.

Split plot design was used with three replicates the main plot assigned with three rice cultivars i.e. Sakha 104, Giza 182 and Giza 178. The sub plots were assigned with six fertilization treatments[control(without N added), 69kg N/fed., 51.75kg N/fed.+1.250tons FMY/fed., 51.75kg N/fed+1.250 tons compost/fed., 34.5kg N/fed+2.5 tons FMY/fed., 34.5kg N/fed+2.5 tons compost/fed.] The obtained results can be summarized as follows:

- Rice Cultivars significantly differed in all previously mentioned traits. Giza 182 surpassed Cultivars Sakha 104 and Giza 178 in all the studied traits in both seasons.
- Application of 100%N or 50%Compost plus 50%N gave the highest number of tillers, dry matter accumulation (g/m2), Leaf area index, number of grain per panicle, number of filled grains per panicle, number of panicle /m2, 1000-grain weight, straw and grain yield as well as grain quality(hulling%, milling%, broking%)compared to other treatments. Also, the results indicated that the use of farmyard manure combined with inorganic nitrogen had no significant effect on the studied traits.

According to the previous results it could be concluded that application of recommended nitrogen and compost plus inorganic fertilizer gave the best results compared with the other treatments. The use of compost combined with nitrogen was better than of farmyard manure, mainly due to the fast decomposition of compost. Recently, Compost play a major role in crop prediction since it minimizes that use of chemical fertilizer and decreased environmental pollution.

INTRODUCTION

Rice (*Oryza sativa.L.*) is one of the most important cereal crop in the world as well as in Egypt .It is the stable food in area of high population density and fast population growth. The green revolution has enabled rice production to meet the demand of the growing population and most of the increased demand will be in developing countries(Chemma 2004).

Nitrogen fertilizer is applied to meet the needs of the crop during the early growth stages and accumulate in the vegetative part to be utilized for

grain formation (Salem et al, 2005) . Also, nitrogen fertilizers has a vital role in the contents of nitrogen % in rice grains and nitrogen uptake by rice plants (Ebaid and Ghanem , 2000 and Mohamed 2001).Moreover they reported that the increasing of nitrogen up to 80kg/fed significantly increased each of plant height, panicle length, panicle number, filled grains, panicle weight and grain yield.

Compost is a perfect fertilizer made of natural substances like farm residue and animal manure, which have been through on ageing process. Making compost takes a little time and effort, but it is wonderful. It improves the physical and chemical conditions of paddy soil (El-Ekhtyar 2007), El-Rewoiny (2002), Usman *et al.*(2003),and Zayed *et al.*(2006),reported that the application of the organic fertilizer such as the farmyard manure and poultry manure will increase the organic matter content which serves several advantages like conservation and slow release of macro and micro nutrients.

MATERIALS AND METHODS

Two field experiments were conducted at the experimental Farm, Faculty of Agricultural (Saba Basha) Alexandria University, during 2008 and 2009 seasons, to study the effect of organic and inorganic nitrogen fertilizer, on growth, grain yield, yield composts and grain quality of some rice cultivars. The preceding crop was wheat in 2008 season and faba bean in 2009 season. The experimental design was split plot design with 3 replicates. Rice cultivars (Giza 182, Giza 178, Sakha 104) occupied the main plots. The sub-plot were assigned to six fertilizer treatment as the following:

1- control (without N applied).
2- 100% N (mineral).
3- 75% N (mineral)+25% N (FMY).
4- 75% N (mineral)+25% N (compost).
5- 50% N (mineral)+50% N (FMY).
6- 50% N (mineral)+50% N (compost).

Farmyard manure was incorporation into the soil before flooding at the different rates. Compost was carried out by spreading manually two weeks before transplanting in the permanent field.

Average of the composition of the organic materials are shown in Table(1)

Table(1): Some chemical properties of farmyard manure and compost

Analysis	Moisture%	O.M %	N %	P %	K %	pH	C/N
Compost	33.8	35.0	1.36	0.37	0.59	7.90	15:1
Farmyard manure	65.6	26.0	1.40	0.60	1.00	5.40	20:1

Soil analysis:

The mixed composite soil samples for the experimental sites revealed the followed pH : 7.6, EC:1.60 dsm2, organic matter % : 1.43 total nitrogen % : 0.09 and texture was clay loam. Mineral nitrogen on the form of urea (46 % N) were applied in two split doses. The first dose was 2/3 as basal application incorporated in dry soil before transplanting, while the second dose was applied at 30 days after transplanting. Farmyard manure and compost at the different rates were applied to the plots, the plot size was 10.5m2 (3.5x3)m and incorporated basely in the dry soil before rice transplanting.

Peregrinated seeds were uniformly broadcasted in the nursery on 15th May in both seasons, the experimental site was fertilized by phosphorus in the form calcium super phosphate (15.5 % P2O5) before sowing. Thirty days old seedling were pulled and transplanted to the permanent field then transplanted regularly in the sub plot at 20 cm distances between hills and rows (20 cm apart).

Studied characters :

A- Growth characters:

Ten hills from the third row were randomly taken from each plot at 75,82, 89 and 96 days after (DAT) to determine the following:

1- Number of tillers /m^2 .
2-Leaf are index.
3-Dry matter accumulation (gm/m^2).

B- Yield and yield attributes :

1- Number of panicles/m^2 .
2- Number of grains/panicle.
3 - 1000 grain weight.
4- Grain yield (t/fed).
5- Straw yield (t/fed).

C- Grain quality characters:

1-Hulling and Milling rice percentage.
2- Broken rice percentage.

Statistical analysis:

All data were collected and subjected to the standard statistical analysis following the procedure described by Steel and Torrie (1980) using Statistical Analysis System (SAS, version 6.11). Means were compared using LSD procedure.

RESULTS AND DISCUSSION

A- Growth characters:

1- Number of tillers / m^2

Data in Table(2) indicated that, there were significant differences in number of tillers / m^2 among rice cultivars. Giza 182 rice cultivar produced higher number of tillers / m^2 than other two cultivars. This results might be due to variation in tillering ability. Varietal difference in tillering ability were claimed by several investigators Gorgy (1995),Kalboch (1997), El-Kady and Abdel-Wahab (1999) and Abdel-Hameed (2002).

Data indicate also that application of either (100 % N) and (50 % N/fed + 50 % compost) produced the highest number of tillers /m2 at all sampling dates in both seasons. While the treatment (75 % N/fed + 25 % FMY)and untreated (control) produced the lowest number of tillers/m2 in both seasons (Table 2). So data indicate that application of compost was better than incorporation of Farmyard manure even where both combined with the same rate of inorganic nitrogen. This mainly due to the fact that compost is readily decomposed and organic materials provide rice plants with available nutrients particularly nitrogen, compost contains some available micronutrients for plants. These findings are in agreement with those reported by Nadita and Singh (1995), Takahashi et al. (2003), Gewaily (2006) and Badr (2008).

The interaction between fertilizer treatments and rice varieties had a significant effect on number of tillers/ m^2 at all sampling dates in both seasons. (Table 10).

2- Leaf area index (LAI)

Data in Table (3) show that Giza 182 rice cultivar was superior to other rice cultivars in leaf area index at the two sampling dates in both seasons. There was an significant differences in leaf area index due to fertilizer treatments at 89 and 90 days after transplanting in both seasons. Plants received nitrogen fertilizer at (100 %N) alone or 25 % compost plus 75 % N/fed, exceeded those received other fertilizer treatments at the two sampling dates in both seasons. These results indicate that application of compost is so much better than the incorporation of Farmyard manure

mainly because compost is readily decomposed and have low C/N ratio than Farmyard manure. These results are in agreement with those reported by Sharma and Mittra (1991), Gorgy (1995), Salem (1997), Sharef et al. (1998), Abou El-Darag (2000), Mohamed (2001) and El-Feky (2006).

The interaction among rice cultivars and fertilizer sources had a significant effect on leaf area index at the two sampling dates in both seasons. Giza 182 with nitrogen applied at 100 % gave the highest leaf area index table (10).

3- Shoot dry weight (g /m^2)

Data in table (4) showed that Giza 182 rice cultivar produced the highest value of shoot dry weight (g/m^2) at all sampling dates in both seasons, while the lowest mean value of dry matter production were obtained by Giza 178 rice cultivar. These results might be due to the variation in tillering ability and LAI as a photosynthetic area.

Significant variation in dry matter production was found among fertilizers treatments at all sampling dates in both seasons (Table 4). Application of either 100 % N/fed or 25 % compost plus 75 % N/fed produced the highest dry matter weight in both seasons. Data indicated that application of compost is so much better than the incorporation of Farmyard manure even if it was combined with the high rates of inorganic nitrogen.

These findings are in agreement with there reported by Peng and Li (1991), Osman (1999), EL-Ekhtyer (2007) and Gorgy (2007).

The interaction between fertilizer treatments and rice cultivars had a significant effect on dry matter accumulation at all sampling dates in both seasons. The Giza 182 cultivars surpassed other cultivars in dry matter accumulation at any fertilizers treatments in both seasons table (10).

B- yield and its attributes :

1- Number of grains/panicle :

Data in Table (5) indicate that there were highly significant differences in no. of grains/panicle among the three rice cultivars. Giza182 rice cultivar had the superiority in the majority of the discussed traits and a continued to perform better regarding to number of grains/panicle. On the other hand, Giza 178 rice cultivars gave the lowest ones in the two seasons. The varietal differences in number of grains/panicle are mainly due to the genetic background. Similar findings are reported by Gorgy (1995) and Abou-Darag (2000).

Data in Table (5) show that, there was an apparent significant difference in number of grains/panicle due to fertilizers treatments in both seasons.

Table (2): Number of tillers/m^2 of rice cultivars as affected by mineral nitrogen and its combination with organic fertilizers in 2008 and 2009 seasons at different sampling dates.

Treatments	Tillers (no. m^{-2})					
	Day after sowing					
	89		98		At harvest	
	2008	2009	2008	2009	2008	2009
A- Rice Cultivars (V):						
Sakha 104	588.94	567.56	744.39	627.28	568.94	526.66
Giza 182	606.89	591.78	766.06	651.28	586.89	558.61
Giza 178	519.56	499.78	655.636	543.06	491.94	468.66
L.S.D $_{0.05}$	8.34	6.47	11.43	24.50	23.28	14.55
B-Fertilization (F):						
Control (without N)	382.11	369.56	481.66	405.56	349.56	346.11
100 % N (Mineral)	655.33	633.89	826.00	696.11	625.56	593.67
75 % N (M)+ 25 % N (FYM)	530.33	512.89	668.22	563.33	518.22	480.56
75 % N (M)+ 25 % N (Comp.)	574.22	555.56	723.78	610.00	565.56	520.56
50 % N (M)+ 50 % N (FYM)	640.44	619.22	815.78	680.00	602.33	579.78
50 % N (M)+ 50 % N (Comp.)	648.33	627.11	817.11	688.78	638.33	587.22
L.S.D $_{0.05}$	9.32	9.43	10.89	9.47	14.48	9.59
Interaction:						
V x F	**	**	**	**	**	**

Table (3): Leaf area index of rice cultivars as affected by mineral nitrogen and its combination with organic fertilizers in 2008 and 2009 seasons at different sampling dates

Treatments	Leaf area index			
	Day after sowing			
	89		96	
	2008	2009	2008	2009
A- Rice Cultivars (V):				
Sakha 104	6.75	6.95	7.23	7.18
Giza 182	7.59	7.75	7.94	7.98
Giza 178	5.71	5.88	6.05	5.90
L.S.D $_{0.05}$	0.432	0.503	0.656	0.605
B-Fertilization (F):				
Control (without N added)	3.90	4.09	4.49	4.10
100 % N (Mineral)	7.70	7.90	8.01	8.15
75 % N (M)+ 25 % N (FYM)	6.84	6.85	7.18	6.98
75 % N (M)+ 25 % N (Comp.)	7.50	7.71	7.95	7.89
50 % N (M)+ 50 % N (FYM)	6.89	7.11	7.20	7.28
50 % N (M)+ 50 % N (Comp.)	7.27	7.50	7.61	7.74
L.S.D $_{0.05}$	0.565	0.269	0.559	0.539
Interaction:				
V x F	**	**	*	*

Table (4) :Shoot dry weight (g/m^{-2}) as affected by rice cultivars and fertilization at four growth stages in 2008 and 2009 seasons.

Treatments	Day after sowing (g/m^{-2})							
	75		82		89		96	
	2008	2009	2008	2009	2008	2009	2008	2009
A- Rice Cultivars (V):								
Sakha 104	444.40	511.84	932.04	1026.47	1206.23	1335.39	1358.41	1452.84
Giza 182	661.40	696.45	1141.60	1225.54	1361.12	1486.95	1491.86	1559.13
Giza 178	360.77	431.56	740.56	833.25	992.39	1114.38	1148.10	1240.80
L.S.D $_{0.05}$	13.57	9.49	26.76	24.35	28.82	26.21	51.25	46.22
B-Fertilization (F):								
Control (without N)	270.08	300.19	526.02	571.14	722.76	788.61	841.80	886.91
100 % N (Mineral)	602.69	673.69	1140.29	1244	1446.41	1591.97	1625.84	1729.55
75 % N (M)+ 25 % N (FYM)	551.94	534.11	943.89	962.47	1168.32	1207.53	1305.34	1312.81
75 % N (M)+ 25 % N (Comp.)	563.28	629.79	1125.25	1223.91	1406.18	1545.47	1567.95	1666.61
50 % N (M)+ 50 % N (FYM)	469.25	524.51	888.32	991.88	1160.80	1275.67	1312.44	1393.77
50 % N (M)+ 50 % N (Comp.)	475.92	617.47	1004.65	1177.16	1215.02	1424.99	1343.37	1515.88
L.S.D $_{0.05}$	24.38	27.10	48.43	49.66	50.34	58.12	54.48	61.13
Interaction: V x F	**	**	**	**	**	**	*	**

Mineral nitrogen (100% N/ alone or combined with organic fertilizer significantly increased no. of grains/ panicle.
Compared with control treatments in both seasons . plant at 100 % N /fed and 50% N/ fed + 50 % compost produced the highest no. of grains \ panicle and no. of filled grains / panicle in both seasons .

The interaction between rice cultivars and fertilizer treatment had a significant effect on number of grains in both seasons.

2 - Number of panicles / m^2

Data in Table (5) indicate that there were highly significant differences in number of panicle/ m^2. among three rice cultivars . Giza 182 rice cultivar significantly surpassed Sakha 104 and Giza 178 in this respect .

Data in Table (5) show that , there was an apparent significant differences in number of panicles / m^2 . due to fertilizer treatments in both seasons . mineral nitrogen (100% N) or combined (50% N/fed + 50 % compost) significantly increased number of panicle / m^2 compared with

control treatment in both seasons. The increase in number of panicles / m^2 by adding mineral nitrogen reflects the important role of nitrogen as an essential constituent of all proteins and its concern in the production of new living stuff and thus in growth and reproduction data which indicate that the application of compost is better than the incorporation of farmyard manure combined with high rate of mineral nitrogen. These finding are in agreement with those reported by Ibrahim (2002) and El-Sherief *et al.* (2007) .

The interaction between rice cultivar and fertilizers treatments had significant effect on number of panicles / m^2 in both seasons . Sakha and Giza 182 with application 100 % N produced the highest no. of panicles / m^2 in 2008 and 2009 seasons , respectively,(Table 8).

3 - 1000 – grain weight (g):

The results presented in Table (6) show that there was high significant difference in 1000 - grain - weight among the three rice cultivars . Sakha 104 rice cultivar was superior to Giza 182 and Giza 178 rice cultivars in the two seasons . it could be concluded that, each rice cultivar has its different grain size , which may be described to different genetically make up. Similar findings were reported by Abou El- Darag (2002) .
The highest value of 1000-grain weight was found when fertilizer applied with 100% N or 50% compost in the both seasons. Data showed also that there was no significant difference in 1000-grains weight in plant received 100 % N or received 50 % compost plus 50 % N for the three varieties

under study. This results was in according with the obtained by Ibrahim (2002).

The interaction between rice cultivars and treatment fertilizer had a significant difference in 1000-grains weight in both seasons. Sakha 104 produced the highest weight of 1000-grain weight under 100 % N and 50 % N + 50 % compost in both seasons, (Table 8).

4- Grain yield (t/fed):

Grain yield of the three rice cultivars as affected by fertilization treatments in 2008 and 2009 seasons are presented in Table (6). The data reveal that highly varietal difference were observed among the tested cultivars in grain yield in the two seasons. Giza 182 gave the highest yield with significant differences than other varieties. The superiority of Giza 182 in this respect was mainly due to its high ability to produced dry matter, LAI, number of panicle/m^2, number of grains/panicle. The varietal differences in the grain yield of rice plants were found by Badawi (2002) and El-Feky (2006).

There was significant difference in grain yield/fed among fertilizer treatments in the two seasons (Table 6). Plant which received urea at the 100% N or compost 50% plus 50% N being insignificant, and outyielded substantially control plants and those which received farmyard manure or compost separately of their combination with low rate of N fertilizer. Data show that application of compost is better in grain yield than the incorporation of farmyard manure even when both combined with the some rates of inorganic nitrogen in both seasons.

Moreover, growth in terms of leaf area index, dry matter accumulation, and tillers number/m^2 were favor of nitrogen and compost and these were reflected on increasing different yield attributes. Similar results were obtained by Badawi (2002), El-Sheref *et al.* (2004) and El-Feky (2006).

The interaction between rice cultivars and fertilizers treatments had significant effect on grain yield in both seasons. Giza 182 rice cultivar significantly surpassed Sakha 104 and Giza 178 when fertilized with 50% N + 50% FMY in the two seasons,(Table 8).

5- straw yield (t/ fed)

.Data in Table (6) indicated that the three cultivars differed significantly in the straw yield in the two seasons Giza 182 gave the highest straw yield in both seasons while Giza 178 recorded with the lowest one , where Giza 182 gave the highest number of tillers / m^2 . similar findings were also reported by Abdel – Hamed (2002) .

Regarding the effect of fertilizers treatments on the straw yield in the two seasons. the results reveal that the second treatment (100 % N) gave the highest straw yield compared with the control treatment . there was no significant difference in straw yield between plants received 100 % N and 50 % N + 50 % compost in the first season . these results are harmony with those obtained by Mohamed (2001) and Ibrahim (2002) .

The interaction between rice cultivars and fertilizers treatment had significant effect on straw yield in both seasons. Giza 182 produced the highest straw yield under the application 50 % N + 50 % compost, (Table 8).

C- grain quality :

1- Hulling and milling rice percentage :

Table (7) show that , hulling and milling percentage were significantly affected by any of the applied treatments in the two seasons . Sakha 104 produced the highest hulling and milling % compared other varieties . the highest values of hulling and milling % were obtained by the application of 50 % compost plus 50 % N and 100 % N in the both seasons .

The interaction between rice cultivars and fertilizers treatments were significant in both seasons. Sakha 104 cultivar gave the highest of hulling and milling % with the treatment 50 % N + 50 % compost in the two seasons (Table 9).

2- Broken rice percentage:

broken percentage as affected by different fertilizer treatments in both seasons of study are presented in Table (7). Varietal differences were observed among tested cultivars in broken percentage. Sakha 104 and Giza 182 produced the highest broken percentage in the first and second season respectively.

Data in table (7) indicated that broken % was significantly decreased by fertilizers treatments in both seasons. The broken % was highest by unfertilized (control) in both seasons.

The interaction between rice cultivars and fertilizers treatments had significant in both seasons. Giza 182 cultivar gave the highest broken % with the control treatment in the two seasons (Table 9).

Table (5): Number of grains panicle^{-1}, number of panicle (m^{-2}) of rice cultivars as affected by mineral nitrogen and its combination with organic fertilizers in 2008 and 2009 seasons.

Treatments	No. of grains panicle^{-1}		No. of panicle (m^{-2})	
	2008	2009	2008	2009
A- Rice Cultivars (V):				
Sakha 104	146.72	138.89	545.44	517.28
Giza 182	158.16	159.16	583.89	551.22
Giza 178	137.05	126.89	449.67	457.56
L.S.D $_{0.05}$	19.80	18.05	33.66	17.38
B-Fertilization (F):				
Control (without N)	118.33	112.00	351.89	337.66
100 % N (Mineral)	160.33	154.33	636.22	583.11
75 % N (M)+ 25 % N (FYM)	146.00	138.00	484.78	470.78
75 % N (M)+ 25 % N (Comp.)	150.66	148.89	512.44	513.44
50 % N (M)+ 50 % N (FYM)	151.33	143.56	536.89	569.33
50 % N (M)+ 50 % N (Comp.)	157.22	153.00	635.78	577.78
L.S.D $_{0.05}$	12.99	11.15	16.96	9.11
Interaction:				
V x F	**	**	**	**

Table (6): 1000-grain weight(g), grain yield (t/fed) and straw yield (t/fed), of rice cultivars as affected by mineral nitrogen and its combination with organic fertilizers in 2008 and 2009 seasons.

Treatment	1000-grain weight (g)		Grain yield (t/fed)		Straw yield (t/fed)	
	2008	2009	2008	2009	2008	2009
A- Rice cultivars (V)						
Sakha 104	25.64	23.73	4.16	4.30	5.01	4.78
Giza 182	24.01	22.23	4.51	4.29	5.36	5.13
Giza 178	19.71	18.24	4.14	3.83	4.85	4.53
L.S.D. $_{0.05\%}$	0.219	0.200	0.36	0.44	0.30	0.25
B- N fertilization (F)						
Control (without N)	21.45	19.85	2.15	2.24	3.34	3.22
100% N	23.82	22.29	4.84	4.59	5.63	5.48
75% N + 25% FYM	22.67	20.98	4.47	4.22	5.27	5.31
75% N + 25% Compost	23.23	21.50	4.48	4.23	5.47	4.64
50% N + 50% FYM	23.47	21.72	4.69	4.43	5.35	5.41
50% N + 50% Compost	24.09	22.04	4.99	4.59	5.38	4.80
L.S.D. $_{0.05\%}$	0.804	0.745	0.28	0.27	0.25	0.31
Interaction V x F	**	**	**	**	**	**

Table (7): Grain quality characters (Hulling percentage, Milling and Broken rice percentages) at harvest of rice cultivars as affected by mineral nitrogen and its combination with organic fertilizers in 2008 and 2009 seasons.

Treatments	Hulling (%)		Milling (%)		Broken (%)	
	2008	2009	2008	2009	2008	2009
A- Rice Cultivars (V):						
Sakha 104	80.66	81.35	71.44	70.76	4.50	3.71
Giza 182	79.51	80.15	69.44	68.83	5.05	4.14
Giza 178	78.60	79.26	70.30	69.61	2.89	2.37
L.S.D $_{0.05}$	0.201	0.287	0.179	0.267	1.33	0.109
B-Fertilization (F):						
Control (without N)	78.49	79.19	69.33	68.65	6.86	5.64
100 % N (Mineral)	80.14	80.96	70.88	70.21	4.07	3.16
75 % N (M)+ 25 % N (FYM)	79.22	79.85	70.05	69.36	2.79	2.43
75 % N (M)+ 25 % N (Comp.)	79.76	80.46	70.69	70.03	3.11	2.56
50 % N (M)+ 50 % N (FYM)	79.69	80.13	70.47	69.89	4.72	3.89
50 % N (M)+ 50 % N (Comp.)	80.22	80.95	70.95	70.26	3.33	2.74
L.S.D $_{0.05}$	0.200	0.269	0.198	0.231	0.300	0.290
Interaction:						
V x F	**	**	**	**	**	**

Table (8): Number of panicles (m^{-2}), 1000-grain weight (g), of rice cultivars as affected by the interaction between mineral nitrogen and its combination with organic fertilizers in 2008 and 2009 seasons.

Fertilization	Number of panicles (m^{-2})							
	2008 seasons			Mean	2009 seasons			Mean
	Sakha 104	Giza 182	Giza 178		Sakha 104	Giza 182	Giza 178	
Control (without N.)	415.00	359.00	281.67	351.89	333.33	362.67	317.00	337.66
100 % N (Mineral)	712.67	664.00	532.00	636.22	599.67	626.67	523.00	583.11
75 % N+ 25 % FMY	524.67	549.33	380.33	484.78	481.67	519.33	411.33	470.78
75 % N+ 25 % compost	483.67	620.33	433.33	512.44	502.00	573.67	464.67	513.44
50 % N+ 50 % FMY	507.67	624.33	478.67	536.86	588.33	604.67	516.00	569.33
50 % N+ 50% Compost	629.00	686.33	592.00	635.78	598.67	620.33	514.33	577.78
Mean	545.44	583.89	449.67	526.33	517.28	551.22	457.56	508.69
L.S.D $_{0.05}$	42.55				22.32			
	1000-grain weight (g)							
Control (without N.)	23.20	22.27	18.88	21.45	21.47	20.61	17.48	19.85
100 % N (Mineral)	27.23	24.10	20.13	23.82	25.49	23.14	18.27	22.29
75 % N+ 25 % FMY	24.80	23.53	19.69	22.67	22.95	21.78	18.22	20.98
75 % N+ 25 % compost	24.59	24.83	20.27	23.23	22.76	22.98	18.76	21.50
50 % N+ 50 % FMY	26.48	24.37	19.57	23.47	24.51	22.55	18.11	21.72
50 % N+ 50% Compost	27.54	25.00	19.74	24.09	25.21	22.30	18.64	22.04
Mean	25.84	24.01	19.71	23.12	23.73	22.23	18.24	21.39
L.S.D $_{0.05}$	1.29				1.19			

Table (9): Grain yield (t/fed), Straw yield (t/fed) of rice cultivars as affected by the Interaction between mineral nitrogen and its combination with organic fertilizers in 2008 and 2009 seasons.

Fertilization	Grain yield (t/fed)							
	2008 seasons			Mean	2009 seasons			Mean
	Sakha 104	Giza 182	Giza 178		Sakha 104	Giza 182	Giza 178	
Control (without N)	2.05	2.12	2.28	2.15	2.21	2.18	2.34	2.24
100 % N (Mineral	5.11	4.55	4.88	4.84	4.93	4.27	4.59	4.59
75 % N+ 25 % FMY	4.25	4.96	4.22	4.47	4.06	4.68	3.95	4.22
75 % N+ 25 % compost	4.39	4.95	4.11	4.48	4.20	4.67	3.84	4.23
50 % N+ 50 % FMY	4.06	5.65	4.37	4.69	3.86	5.35	4.09	4.43
50 % N+ 50% Compost	5.12	4.85	5.00	4.99	4.94	4.57	4.28	5.59
Mean	4.16	4.51	4.14	4.27	4.03	4.29	3.85	4.05
L.S.D $_{0.05}$	0.576				0.616			
	Straw yield (t/fed)							
Control (without N)	3.61	3.25	3.15	3.34	3.27	3.25	3.15	3.22
100 % N (Mineral	5.64	5.66	5.60	5.63	5.69	5.60	5.17	5.48
75 % N+ 25 % FMY	4.92	5.87	5.02	5.27	5.03	5.85	5.06	5.31
75 % N+ 25 % compost	5.45	5.37	5.59	5.47	4.45	4.89	4.59	4.64
50 % N+ 50 % FMY	5.18	6.29	4.61	5.35	5.17	6.35	4.74	5.41
50 % N+ 50% Compost	5.28	5.73	5.14	5.38	5.08	4.84	4.48	4.80
Mean	5.01	5.36	4.85	5.07	4.78	5.13	4.53	4.81
L.S.D $_{0.05}$	0.502				0.558			

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الملخص العربى

دراسة ترشيد استخدام الأسمدة المعدنية باستخدام الأسمدة العضوية وتأثيرها علي محصول الأرز

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أجريت تجربتان حقليتان بالمزرعة البحثية بكلية زراعة سابا باشا– جامعة الإسكندرية خلال موسم 2008،2009م بهدف دراسة ترشيد استخدام الأسمدة المعدنية باستخدام الأسمدة العضوية وتأثيرها علي محصول الأرز. استخدم تصميم القطع المنشقة في ثلاث مكررات حيث اشتملت القطع الرئيسية علي ثلاثة أصناف سخا104، جيزة182، جيزة178 كما اشتملت القطع الشقية على ست معاملات للتسميد المعدني والعضوي (مقارنة، 100 % نيتروجين معدني، 75% نيتروجين معدني + 25% كمبوست،75 % نيتروجين معدني+25 % سماد المزرعة ، 50% نيتروجين معدني+ 50 % سماد مزرعة و 50% نيتروجين معدني + 50 % كمبوست)

<u>وتلخص النتائج في الأتي:</u>

- تفوق الصنف جيزة182 تفوق علي الصنفين سخا104 و الصنف جيزة 178 في كل الصفات المدروسة في كلا الموسمين.
- أدت إضافة النيتروجين الموصي به (100% ن)، 50% كمبوست مع 50% نيتروجين معدني إلي زيادة معنوية في عدد الفروع ، المادة الجافة، دليل مساحة الورقة، عدد الحبوب بالسنبلة، عدد السنابل/م2، وزن 1000 حبة ، محصول الحبوب والقش والصفات التكنولوجية للحبوب (نسبة التقشير

والتبييض بالحبوب). كما أوضحت النتائج أن استخدام سماد المزرعة مصحوبا بالنيتروجين المعـدني لـم يكن له تأثير معنوي علي الصفات المدروسة.

وتبين النتائج المتحصل عليها إن خلط الأسمدة المعدنية بالكمبوست يؤدي إلي الحصول علي أفضل النتائج للصفات المدروسة بالمقارنة بالمعاملات الاخرى . كما أوضحت النتائج أن استخدام الكمبوست كـان أفضل من استخدام سماد المزرعة نظرا لسهولة تحلل الكمبوست وانفراد ما به من عناصر، وان إضافة الكمبوست يلعب دورا هاما في إنتاج المحصول وتقليل استخدام الأسمدة الكيماوية والتي تحد من تلـوث البيئة.