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EFFECT OF NITROGENOUS FERTILIZER RATES ON RICE YIELD, YIELD COMPONENTS AND INSECT INFESTATION OF SOME RICE CULTIVARS

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ABSTRACT

Rice is a very important cereal crop in Egypt and allover the world. In Egypt, it is an essential food crop because of shortage in wheat production, and nitrogen fertilizer is crucial to obtain a good yield. Two field experiments were conducted in 2011 and 2012 rice seasons at the Experimental Farm of Rice Research and Training Center, Sakha, kafr El-Sheikh, Egypt. The experiments aimed to evaluate yield and its components of four rice cultivars; Sakha 101, Giza 178, Egyptian Jasmine and rice Hybrid 1. These cultivars were tested under five nitrogen levels; 0, 23, 46, 69 and 92 kg N/ fed. in the form of urea (46.5 % N). Also, the insect infestations of rice stem borer, *Chilo agamemnon* Bles. and rice leaf miner, *Hydrellia prosternalis* Deeming. were evaluated. The main results proved the superiority of Egyptian Hybrid 1 rice cultivar, concerning filled grains and yield. The second rank was that of Sakha 101 cultivar as it gave the highest values of 1000-grain weight and harvest index. According to the current data, it is recommended to use 69 kg N/ fed. (not 92 kg) for fertilizing the tested cultivars, as no significant yield differences were found between the two nitrogen levels. On the other hand, it is important to avoid using overdoses of nitrogenous fertilizers because they encourage the infestation by rice stem borer and rice leaf miner.

Keywords: Rice -Nitrogenous fertilizer- Yield components- Rice cultivars- Rice Leaf Miner- Rice Stem Borer.

INTRODUCTION

Rice (*Oryza sativa* L.) is the most important crop after wheat. It is a staple food for nearly one half of the world's population; most of them live in the developing countries. Moreover, it is a very important cereal crop in Egypt for local consumption, particularly due to shortage in wheat supply. In addition rice is an export crop, and represents an important source for foreign currency. Rice productivity is affected by several abiotic and biotic factors. Low nitrogen fertilizer is one of abiotic factors, while the insect infestations are of biotic factors. There were significant differences among rice cultivars in respect to all chemical composition and these differences are mainly due to differences in the genetic constitution (El-Hissewy *et al*., 2002).

Nitrogen fertilization is crucial to obtain good yield, but the rates of fertilizations should be optimized. Splitting nitrogen fertilizer was proven to be an important agronomic practice that minimizes nitrogen losses and increases its efficiency (Abd El-Wahab *et al.*, 2005). The highest nitrogenous level (165 kg N/ ha) significantly increased number of panicle /hill, panicle length, number of filled grains/ panicle, panicle weight, grain and straw yields and harvest index (Ebaid and Ghanem, 2001). Increasing nitrogen up to 220 kg N/ ha significantly increased number of panicles /m2, grain and straw yields. Applying 165 kg N /ha was adequate for number of grains / panicle, grain yield, harvest index and 1000- grain weight.

Insect infestations are considered important biotic factors. Rice plants are liable to be attacked by several insect pests. In Egypt, the rice stem borer, *Chilo agamemnon* Bles. and the rice leaf miner *Hydrellia prosternalis* Deeming are the most important **(Sherif, 2002).** The current study aimed to investigate the effect of nitrogen fertilization rates on rice yield, yield components and insect infestations of some rice cultivars.

MATERIALS AND METHODS

Two field experiments were carried out at the Experimental Farm of Rice Research and Training Center (RRTC), Sakha, Kafr El-Sheikh, Egypt, during 2011 and 2012 rice growing seasons. The experiments aimed to evaluate yield, yield components and insect infestations of four rice cultivars ; Sakha 101, Giza 178, Egyptian Jasmine and rice Hybrid 1. These cultivars were tested under five nitrogen levels; 0, 23, 46, 69 and 92 kg N/fed. in the form of Urea (46.5 % N). Also, the insect infestations of rice stem borer *Chilo agamemnon* Bles. and rice leaf miner, *Hydrellia prosternalis,* Deeming. were evaluated. The split plot design, with three replicates, was adopted, as the main plots were devoted to the four rice cultivars, while the sub-plots were assigned to the five levels of nitrogen fertilization.

The seed bed was ploughed three times, with adding calcium super phosphate (15.50 % P_2O_5) at the rate of 100 kg/ fed. on the dry soil before ploughing. Nitrogen, in the form of urea (46.50% N), was used at a rate of 100 kg /fed. It was divided into two equal doses, the first dose was incorporated into the dry soil just before flooding. The second dose of N was added 15 days after sowing. Zinc sulphate (24 % Zn SO_4), at the rate of 24 kg/ fed., was added after puddling and before seeds broadcasting. The rice seeds were broadcasted at a rate of 10 kg /fed. for the Hybrid 1 cultivar, and at a rate of 40 kg /fed. for inbred varieties; Sakha 101, Giza 178, and Egyptian Jasmine on May 10th in each season. The broadcasted seeds were previously soaked in water for 48 hours, and incubated for additional 48 hours to accelerate seed germination.

The permanental field was ploughed three times, with adding calcium super phosphate (15.5 % P_2 O_5) at the rate of 100 kg /fed. before the third tillage. The nitrogen fertilizer was added in the form of urea (46.5 % N) in three splits according to the nitrogen levels applied; 1/3 as basal (incorporated into the soil before puddling), 1/3 twenty days after transplanting, and the last third was added forty days after transplanting. One month after seed sowing, the seedlings were pulled out, distributed in the permanent field, and transplanted at 20×20 cm spacing. The split plot design with three replicates was adopted, as the main plots were devoted to the four rice cultivars, while the sub-plots were assigned to the five levels of nitrogen fertilization. The other usual field practices of rice cultivation were conducted according to the recommendations of Ministry of Agriculture.

Studied Characters;

Plant samples were collected randomly from sub plots to estimate the following characters.

Number of panicles/m^2:

Total number of panicles (productive tillers) in five random hills were counted, and then converted to number of panicles/m^2.

Panicle weight (g):

Average of five weighed panicles was computed, after panicle air drying.

Number of filled and unfilled grains/panicle:

Average numbers of filled and unfilled grains in five panicles were computed.

1000-grain weight (g):

Samples of one thousand paddy rice grains were weighed in g.

Grain and Straw yields (t /fed):

Plants of an area of 4m^2 (100 hills) of each experimental plot were manually harvested according to the harvest time of each treatment. The plants were tied, labeled and moved to a floor for air drying for five days. The plants were mechanically threshed, and each of rice grain and straw were separately weighed in kg. On the basis of 14% moisture content, the weights of grain and straw were adjusted to tons per Fed.

Harvest index:

It was determined according to **Yoshida (1981**) by subdividing weight of grain yield (t/fed) (economic yield.) on the total dry weight (weight of grains and straw).

$$\text{Harvest index} = \frac{\text{Economical yield (grain yield)}}{\text{Biological yield (grain+ straw yields)}}$$

Insect infestation evaluation:-

Rice leaf miner, *Hydrellia prosternalis* Deem :-

Twenty-five days after transplanting, 100 rice leaves were picked from each plot, and the leaf miner infested leaves were counted.

Rice stem borer, *Chilo agamemnon* Bles. :-

Three weeks prior to harvest, white head percentages, were estimated. White heads are the empty rice panicles (unfilled grains) due to tunneling of borer larvae in the base of panicles, preventing the nutrients to go up. Each plot was represented by five hills, cut at the soil surface. Total number of tillers was recorded, and tillers having white heads were calculated, thus, the percentages of white heads were calculated.

Statistical analysis:-

Data were subjected to the standard statistical analysis by MSTATC. Means were compared using Duncan's Multiple Range Test (1955).

RESULTS AND DISCUSION

Results in Table 1 indicated that rice cultivars significantly varied in number of panicles/m^2 in both seasons. Hybrid 1 cultivar recorded the highest number of panicles/m^2 (615.13 and 572.0) followed by Giza 178 (613.2 and

540.7) in the first and second seasons, respectively. The lowest numbers of panicles/m^2 (455.9 and 453.0) were produced by Egyptian Jasmine cultivar in both seasons. Similar results were obtained by El-Kassaby *et al.* (2012).

Panicles of Egyptian Jasmine (Table 1) were the heaviest ones; 4.24 and 4.79 g/ panicle, followed by those of Hybrid 1, and Sakha 101 cultivar, while the panicles of Giza 178 were the lightest ones; 3.27 and 3.86 g/ panicle in 2011 and 2012 rice seasons, respectively. The results indicated that most cultivars had a significant effect on panicle weight in both seasons. Highly significant differences were computed among the evaluated cultivars concerning this trait. There were significant differences among cultivars in respect to all chemical composition and these differences were mainly due to differences in the genetic constitution of these cultivars (El-Hissewy *et al.*, 2002).

Table (1): Yield components of some rice cultivars as affected by different levels of nitrogen fertilization during 2011 and 2012 seasons.

Treatment	No. of Panicles/m^2		Panicle weight (g)		No. of filled grains/panicle		No. of unfilled grains/panicle	
	2011	2012	2011	2012	2011	2012	2011	2012
Cultivar								
Sakha 101	533.4 ab	529.3 ab	4.13 a	3.95 b	135.90 b	142.83 b	18.90 b	13.93 b
Giza 178	613.2 a	540.7 a	3.27 b	3.86 b	139.10 b	157.40 a	17.94 b	10.13 c
E. Jasmine	455.9 b	453.0 b	4.24 a	4.79 a	128.40 c	139.60 b	32.07 a	17.46 a
Hybrid 1	615.13 a	572.0 a	4.17 a	3.94 b	158.10 a	159.13 a	7.97 c	8.77 c
F test	*	*	**	*	**	**	**	**
N. level (kg/fed)								
Zero	409.7 c	395.0 c	3.31 c	3.72 c	128.70 c	136.10 c	14.95 c	9.85 e
23	514.0 b	457.0 c	3.95 ab	3.84 bc	137.30 b	145.85 b	16.47 bc	11.15 d
46	541.4 b	535.0 b	3.92 ab	4.21 ab	144.22 ab	157.54 ab	18.92 b	12.50 c
69	636.9 a	587.5 ab	4.19 a	4.36 a	149.45 a	165.65 a	19.97 b	13.27 b
92	669.9 a	644.2 a	4.20 a	4.44 a	148.40 a	166.75 a	25.85 a	15.95 a
F test	**	**	**	**	**	**	**	**
Interaction – F test	NS	NS	NS	NS	NS	NS	NS	NS

***, ** and NS indicate P <0.05, P<0.01 and not significant, respectively**
In the same column, means followed by the same letter are not significantly different at 5% level of probability according to DMRT.

Number of filled and unfilled grains varied with highly significant differences among the four considered rice cultivars in both seasons.
Panicles of Hybrid 1 contained the greatest number of filled grains (158.10 and 159.13 grains/panicle) in the first and second seasons, respectively. In contrast, panicles of Egyptian Jasmine contained the lowest values of filled grains; 128.40 and 139.60 grains/ panicle in 2011 and 2012 rice seasons, respectively.

In the reverse trend, the lowest numbers of unfilled grains (7.97 and 8.77 grains/ panicle) were recorded in Hybrid 1 cultivar in the first and second seasons, respectively. The greatest values of unfilled grains (32.07 and 17.46 grains/ panicle) were recorded with Egyptian Jasmine in 2011 and 2012 seasons, respectively. Similar results were obtained by Abou Khalifa *et al.* (2007).

Data presented in Table (1) show that the variation in nitrogenous fertilization levels induced highly significant differences in number of panicles/m², and panicle weight in both seasons.

The highest number of panicles/m^2 (699.9 and 644.2) were recorded with the treatment of 92 kg N/fed, followed by those at 69 kg N/fed (636.9 and 587.5 panicles/m^2) in the first and second seasons, respectively. The lowest numbers of panicles were found in the non-fertilized plots (409.7 and 395.0 panicles/m^2).

The heaviest panicles (4.20 and 4.44 g/panicle) were found in rice plots fertilized with 92 kg N/fed, followed by those in plots fertilized with 69 kg N/fed (4.19 and 4.36 g/panicle) in 2011 and 2012 seasons, respectively. The lightest panicles (3.31 and 3.72 g/panicle) were recorded in the non-fertilized plots. The increase in panicle weight may be attributed to the increase in number of grains/panicle which increased with increasing rates of nitrogen fertilization. Ebaid and Ghanem (2001) reported that the nitrogenous level at 165 kg/ha surpassed 55 and 110 kg N/ha in number of panicles/m^2 and panicle weight.

Both number of filled and unfilled grains/panicle varied with highly significant differences due to different levels of nitrogen fertilization (Table 1). The highest number of filled grains were obtained with 69 and 92 kg N/fed, without significant differences between the two nitrogenous levels. On the other hand, the lowest numbers of filled grains were detected in non-fertilized plots (128.70 and 136.10) in the first and second seasons, respectively.

The number of unfilled grains was highest at 92 kg N/fed (25.85 and 15.95 grains/panicle) in the first and second seasons, respectively, followed by those at 69 kg N/fed; (19.97 and 13.27 grains/panicle). Similar findings were reported by Chakraborty (2011).

The results in Table 2 indicated that the heaviest 1000-grain weight was obtained with Egyptian Jasmine (27.22 and 26.30 g) and Sakha 101 (27.03 and 28.01g) in the first and second seasons, respectively. Giza 178 cultivar had the least 1000-grain weight with values of 23.35 and 22.42 g in the 2011 and 2012 seasons, respectively. Statistical analysis showed that the differences among rice cultivars concerning 1000- grain weight were highly significant. The current results are in accordance with those reported El-Kady and Abd El-Wahab (1999).

Rice cultivars displayed highly significant and significant differences in their grain yield Table 2 in both seasons. Hybrid 1 and Sakha 101 produced the highest grain yield, followed by Giza 178 cultivar, and then Egyptian Jasmine that produced the lowest grain yield (3.71 and 3.78 t/fed. in the first and second seasons, respectively). These results are in accordance with those reported Abou Khalifa *et al.* (2007) and El-Kassaby *et al.* (2012).

The highest straw yield was obtained with Egyptian Jasmine, followed by that of Hybrid 1, while straw yields of Sakha 101 and Giza 178 were lower. Highly significant differences in straw yield were found among rice cultivars in 2011 season, but the differences were significant in 2012 season (Table 2).

Table 2: 1000-grain weight, Grain and straw yield, and harvest index of some rice cultivars as affected by different levels of nitrogenous fertilization in both seasons.

Treatment	1000-grain weight (g)		Grain yield (t/fed)		Straw yield (t/fed)		Harvest index	
	2011	2012	2011	2012	2011	2012	2011	2012
Cultivar								
Sakha 101	27.03 a	28.01 a	4.05 ab	4.43 ab	4.80 b	5.58 ab	45.85 a	43.95
Giza 178	23.35 b	22.42 d	3.98 bc	3.98 bc	4.96 b	5.39 b	42.52 b	41.75
E. Jasmine	27.22 a	26.30 b	3.71 c	3.78 c	5.87 a	6.12 a	37.18 c	40.17
Hybrid 1	25.37 ab	24.65 c	4.38 a	4.53 a	5.27 b	6.04 a	45.32 a	43.03
F test	**	**	**	*	**	*	**	NS
N. level (kg/fed)								
Zero	23.20 c	23.62 c	3.21 d	3.13 c	4.42 d	4.60 d	39.10 d	40.50 bc
23	24.50 bc	24.33 b	3.63 c	3.92 b	4.67 cd	5.23 cd	42.78 bc	42.99 a-c
46	25.16 ab	25.43 ab	4.04 b	4.54 a	5.00 c	5.73 bc	44.78 ab	44.20 ab
69	26.26 a	26.54 a	4.81 a	4.73 a	5.68 b	6.04 b	45.93 a	44.50 a
92	25.14 ab	25.75 ab	4.59 a	4.71 a	6.39 a	7.29 a	41.98 c	39.33 c
F test	**	**	**	**	**	**	*	*
Interaction – F test	NS	NS	NS	NS	NS	NS	NS	NS

***, ** and NS indicate P <0.05, P<0.01 and not significant, respectively**
In the same column, means followed by the same letter are not significantly different at 5% level of probability according to DMRT.

The greatest harvest index was that of Sakha 101 and Hybrid 1, while the least one was that of Egyptian Jasmine. The differences in the harvest index were highly significant in the first season, but insignificant in the second one.

The highest values of 1000-grain weight (Table 2) were recorded in rice plots fertilized with 69 kg N/fed (26.26 and 26.54 in the first and second seasons, respectively). The lowest values were recorded in non-fertilized rice plants. Highly significant differences were recorded in 1000-grain weight, due to different levels of nitrogenous fertilization. The increase in 1000- grain weight with increasing nitrogen level may be due to the accumulation of more assimilates and vigor growth of rice plants. Similar results were obtained by Gorgy *et al.* (2011).

Data in (Table 2) show that the higher grain yields were obtained, in both seasons, at 69 kg N/fed, with values of 4.81 and 4.73 t/fed, respectively, followed by rice grain yield at 92 kg N/fed. with no significant differences between both N levels. The least grain yield was obtained in the non-fertilized plots ; 3.21 and 3.13 preceded by those fertilized with 23 kg N/fed ; 3.63 and 3.92 t/fed, in the first and second seasons, respectively.

The straw yield was highest at 92 kg N/fed, followed by that at 69 kg N/fed, in both seasons.

The harvest index was superior at 69 kg N/fed; 45.93 and 44.5, followed by that at 46 kg N/fed; 44.78 and 44.20, but lowest in the non-fertilized (control) plots; 39.10 and 40.50, in 2011 and 2012 seasons, respectively. From the abovementioned results, it could be concluded that there is no need for raising nitrogen fertilization over 69 kg/fed.

The highest grain and straw yields of Hybrid 1 could be attributed mainly to its higher tillering ability, large leaf area and higher dry matter production. Similar results were found by Talathi *et al.* (2009).

Insect Infestation:-

Rice leaf miner *Hydrellia prosternalis* Deem. :-

Percentage of infested leaves:-

Data presented in Table 3 show percentages of rice leaves infested with the rice leaf miner, *Hydrellia prosternalis* as affected by rice cultivars and nitrogenous fertilization levels. In 2011 season, the differences in infestation of rice cultivars were highly significant. Giza 178 recorded the highest infestation (32.60 %), followed by Egyptian Jasmine (27.93 %), while Sakha 101 was the least infested one (15.40%). Similar results were obtained in 2012 rice season, but the differences were not significant. However, Egyptian Jasmine was the highest infested (77.33%), and Giza 178 occupied the second rank (73.47%). The least infested cultivar was Sakha 101 with 68.00% infested leaves. miner in both seasons. In contrast, Karuppuchamy and Uthamasamy (1984) reported that nitrogen fertilizer had no effect on the leaf miner damage.

Table 3: Percentage of rice leaves infested with rice leaf miner of some rice cultivars under different nitrogen levels in both seasons

Treatment	2011	2012
Cultivar		
Sakha 101	15.40 b	68.00
Giza 178	32.60 a	73.47
Egyptian Jasmine	27.93 a	77.33
Hybrid 1	26.27 a	68.73
F test	**	NS
Nitrogen level (kg/fed)		
Control (zero)	19.33 b	60.25 c
23 (kg N/fed)	26.75 a	70.00 bc
46 (kg N/fed)	25.00 ab	74.00 ab
69 (kg N/fed)	25.92 ab	72.42 ab
92 (kg N/fed)	30.75 a	82.75 a
F test	**	**
Interaction - F test	NS	NS

***, ** and NS indicate P <0.05, P <0.01 and not significant, respectively.**

In the same column, means followed by the same letter are not significantly different at 5% level of probability according to DMRT.

Sakha 101 and Giza 178 rice cultivars were classified as moderately resistant to the rice leaf miner Rice Research and Training Center (2008).

Rice stem borer, *Chilo agamemnon* Bles. :-

White heads:-

Data in (Table 4) show the rice stem borer infestation, expressed as white heads, as affected by rice cultivars, as well as by nitrogenous levels.

In 2011 season, the infestation of cultivars by the borer varied with highly significant differences, with Egyptian Jasmine being the higher infested cultivar (3.00 % white head), followed by Giza 178 (2.59 %). In 2012 season, the cultivars varied in white head symptoms with significant differences. Giza 178 and Egyptian Jasmine were more infested (5.12 and 4.76 %, respectively) than Hybrid 1 (3.65 %), while Sakha 101 was the least infested cultivar (1.35% white heads). Nitrogenous fertilization levels resulted in highly significant differences in white head values in both seasons. The highest infestations; 3.71 and 6.28 % were recorded with 92 kg N/fed in 2011 and 2012 seasons, respectively. The second rank was that at 69 kg N/fed (2.03 and 4.64 % in the first and second seasons, respectively). The least infestations were detected in the non-fertilized plots (0.79 and 1.66%), or in plots fertilized with 23 kg N/fed (1.07 & 2.67% white heads).

Table 4: White head percentage, caused by rice stem borer, of some rice cultivars, as affected by nitrogenous fertilizer during 2011 and 2012 seasons.

Treatment	2011	2012
Cultivar		
Sakha 101	0.47 b	1.35 b
Giza 178	2.59 a	5.12 a
Egyptian Jasmine	3.00 a	4.76 ab
Hybrid 1	1.25 b	3.65 ab
F test	**	*
Nitrogen level (kg/fed)		
Control (zero)	0.79 b	1.66 b
23 (kg N/fed)	1.07 b	2.67 b
46 (kg N/fed)	1.88 ab	3.34 ab
69 (kg N/fed)	2.03 ab	4.64 ab
92 (kg N/fed)	3.71 a	6.28 a
F test	**	**
Interaction - F test	NS	NS

***, ** and NS indicate P <0.05, P <0.01 and not significant, respectively.**
In the same column, means followed by the same letter are not significantly different at 5% level of probability according to DMRT.

It was found that the indica rice types, Egyptian Jasmine and Hybrid 1 had higher borer infestation than the japonica rice types, Sakha 101. Sherif (1996) indicated that the borer infestation to rice cultivars was higher with indica or indica × japonica rices than with pure japonica rices. The response of rice plants to infestation by the rice stem borer was similar to the results obtained by Badr and EL-Habashy (2007) who obtained the higher insect infestation at the high nitrogen levels; 80 and 60 kg N/fed.

Lu, *et al* (2007) explained the effect of higher nitrogenous doses in raising rice stem borer infestation, by the increase in the succulence of stems and leaves. This can lead to a greater stem borer attack, higher larval weight, meanwhile shorter development duration of the rice stem borer. Thus, the rice stem borer feeding upon plants highly fertilized with nitrogen can build up greater populations, which reflects more damage to rice plants. Accordingly, wise application of mineral nitrogen doses (as recommend) should be strictly followed to avoid rice stem borer outbreak.

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تأثير معدلات السماد النيتروجينى علي المحصول ومكوناته والإصابات الحشرية لبعض أصناف الأرز

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أجريت تجربتان حقليتان في المزرعة البحثية لمركز البحوث والتدريب في الأرز سخا – كفر الشيخ لدراسة تأثير معدلات السماد النيتروجينى علي المحصول ومكوناته والإصابات الحشرية لأربعة أصناف من الأرز هي : سخا ١٠١ ، جيزة ١٧٨ ، ياسمين المصري ، هجين مصري١ خلال موسمي الدراسة ٢٠١١ و ٢٠١٢. استخدم تصميم القطع المنشقة مرة واحدة في ثلاث مكررات وخصصت القطع الرئيسية للأصناف الأربعة. واحتلت القطع الشقية خمس مستويات من السماد النيتروجيني هي (بدون تسميد ، ٢٣ ، ٤٦ ، ٦٩ ، ٩٢ كجم / فدان).

يمكن تلخيص أهم النتائج المتحصل عليها فيما يلي :

أظهرت النتائج وجود فروق معنوية بين الأصناف تحت الدراسة في معظم صفات المحصول ومكوناته في الموسمين؛ حيث أعطى الصنف هجين مصري ١ أعلي القيم لعدد الداليات /م٢، ومتوسط وزن الدالية ، عدد الحبوب الممتلئة في الدالية ، عدد الحبوب الفارغة في الدالية ووزن الألف حبة/جم ، محصول الحبوب طن/فدان ، دليل الحصاد و لم توجد فروق معنوية بين الصنفين هجين مصري ١ وسخا ١٠١ في معظم الصفات المحصولية تحت الدراسة.

أظهرت النتائج وجود تأثير معنوي لمستويات السماد النيتروجينى علي الصفات المحصولية تحت الدراسة. أدي استخدام ٩٢ كجم نيتروجين/ فدان إلي الحصول علي أعلي القيم في كل من؛ عدد الداليات/م٢ ، متوسط وزن الدالية (جم) ، عدد الحبوب الممتلئة بالدالية، ووزن الألف حبة ، ومحصول الحبوب والقش طن/فدان ، ودليل الحصاد في كلا الموسمين علي التوالي ولم توجد فروق معنوية بين معاملات التسميد ٦٩ ، ٩٢ كجم نيتروجين/فدان. بينما جاءت أدني القيم في حالة عدم إضافة أي سماد نيتروجيني. ولم يكن للتفاعل بين الأصناف تحت الدراسة ومستويات التسميد النيتروجيني أثر معنوي علي الصفات المحصولية تحت الدراسة في كلا الموسمين.

الإصابات الحشرية:

أ- صانعة أنفاق أوراق الأرز.

أظهرت النتائج في الموسم الأول والثاني وجود اختلافات معنوية في نسبة الإصابة بصانعة أنفاق أوراق الأرز بين الأصناف تحت الدراسة، حيث كانت أعلي نسبة إصابة في الصنفين جيزة ١٧٨ ، ياسمين المصري وان كانت نسب الإصابة أعلي بشكل ملحوظ في الموسم الثاني. وجاءت أقل نسبة إصابة في الصنف سخا ١٠١ في كلا موسمي الدراسة. بينت النتائج وجود زيادة معنوية في نسبة الإصابة بصانعة أنفاق أوراق الأرز بزيادة معدلات السماد النيتروجيني في كلا الموسمين، أدت إضافة النيتروجين بمعدل ٩٢ كجم/فدان إلي الحصول علي أعلي نسبة إصابة في كلا الموسمين.

ب- ثاقبة ساق الأرز.

أظهرت النتائج وجود اختلافات معنوية في النسبة المئوية للداليات البيضاء الناتجة عن الإصابة بثاقبة ساق الأرز بين الأصناف تحت الدراسة حيث كانت أعلي نسبة في الصنف ياسمين المصري تلاه جيزة ١٧٨، بينما كانت أقل نسبة للداليات البيضاء في الصنف سخا ١٠١ خلال موسمي الدراسة. أشارت النتائج إلى تأثير زيادة مستويات النيتروجين على الإصابة بثاقبة ساق الأرز إلي الزيادة المعنوية في نسبة الداليات البيضاء في كلا الموسمين، حيث كانت أعلي نسبة للداليات البيضاء عند إضافة النيتروجين بمعدل ٩٢ كجم /فدان في كلا الموسمين.

التوصية:

أوضحت نتائج التجربة تفوق صنف الأرز هجين مصري ١ من حيث امتلاء الحبوب وكمية المحصول تلاه الصنف سخا ١٠١ من حيث وزن الألف حبة ودليل الحصاد. لم توجد فروق معنوية بين معدلي التسميد الآزوتي ٦٩ ، ٩٢ كجم/ فدان بين الأصناف تحت الدراسة. تؤدي المغالاة في التسميد الآزوتي إلي رفع نسبه الإصابة بكل من صانعة أنفاق أوراق الأرز وثاقبة ساق الأرز خاصة في الأصناف ذات الطرز الهندية والأصناف ذات الطرز الهندية اليابانية.

قام بتحكيم البحث

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