J. Plant Production, Mansoura Univ., Vol. 6 (9): 1517 - 1529, 2015

RESPONSE OF SOME WHEAT CULTIVARS TO SOME ORGANIC AND MINERAL NITROGEN FERTILIZER LEVELS

El-Hosary, A.A. ; G.Y.M. Hammam ; El.M.M. El-Gedwy and M.E.E. Sidi
Agronomy department, Faculty of Agriculture, Benha University

ABSTRACT

This study was conducted to examine the effect of five organic and mineral nitrogen fertilizer levels (F1 = 0, F2 = 17.5 kg organic nitrogen (ON) + 17.5 kg mineral nitrogen (MN), F3 = 35 kg MN, F4 = 35 kg ON + 35 kg MN and F5 = 70 kg MN / fed) on the growth characters, yield, its component and some chemical properties of three bread wheat cultivars (Sids 12, Gemmeiza 11 and Giza 168).The experimentwas carried out at two locations, the first location, at the Research and Experimental Centerof Faculty of Agriculture of Moshtohor,(Toukh Directorate, El-Kalubia Governorate) Benha University, Egypt, the second location, at the farm of Zarzora Agricultural Research Station, Etay El-Baroud Directorate, El-Behaira Governorate, Egypt, which planting in the same winter season 2014/2015.

The obvious results of this investigation can be summarized as follows:

Wheat cultivars were significantly differed in all traits studied in the two locations and the combinedaverage, except nitrogen use efficiency was not significant. Gemmeiza 11 cultivar significantly surpassed Sids 12 and Giza 168 cultivars in flag leaf area (cm^2), plant height (cm), spike length (cm), spike weight (g), kernels weight/spike (g), 1000-kernel weight (g), biological yield (kg/fed), grain yield (kg/fed) and grain protein yield (kg/fed) as well as grain nitrogen uptake (kg/fed). While,Sids 12 recorded the highest values of No. of kernels/spike, harvest index (%), hectoliter weight (kg/hl), grain nitrogen content (%) and protein content in grain (%) also, Sids 12 cultivar was earlier heading and physiological maturity dates compared with Giza 168 and Gemmeiza 11. Meanwhile, Giza 168 surpassed the other two cultivars in No. of tillers/m^2, No. of spike/m^2 and straw yield (kg/fed).

All characters under study showed significantly increased by increasing nitrogen fertilizer levels,except NUE significantly decreased with increasing N levels in Moshtohor location, Zarzora locationandthe combined analysis.Applied of 70 kg MN /fed recorded the highest values, also increasing nitrogen fertilizer levels delayed heading and physiological maturity dates.

Planting Gemmeiza 11 which fertilized by 70 kg MN/fedrecorded significantly the highest values of flag leaf area, biological, grain and protein yields/fed as well as grain nitrogen uptake/fed(in the two locations and the combined analysis), plant height and weight of kernels/spike (in Moshtohor location only and the combined analysis). Meanwhile, Sids 12 under the same nitrogen fertilizer surpassed the other treatments in No. of kernels/spike (in Moshtohor location only and the combined analysis) and harvest index (in the two locations and the combined average). Whereas, Giza 168 with the same level of nitrogen fertilizer gave the highest No. of tillers/m^2 (in Moshtohor location only and the combined analysis), No. of spike/m^2 and straw yield/fed (in the two locations and the combined analysis).

It could be summarized that sown wheat Gemmeiza 11 cultivar and application of 70 kg mineral nitrogen per fed or 35 kg organic N + 35 kg mineral nitrogen maximized grain yield per unit area.

INTRODUCTION

Bread wheat (*Triticumaestivum*, L.) is the most important cereal crops in Egypt as well as over the world and covers more of the earth's surface, used in human food and animal feed. It is a staple food for more than one third of the world population.

In Egypt, wheat provides 37 % of the total calories for the people and 40 % of the protein in the Egyptian diet (Min. Agric. Statistic Year Book, 2000). The total production of wheat was 9.46 million tons in 2013 produced from an area of 3,377,876 faddans, (Monthly Economic Bulletin 2013), with an average yield of 18.67 ardabs/fad (one ardab= 150 kg), or 2.8 ton/fed. The total consumption of wheat nearly from16.26 million tons, thus the local production covers more than 56.7 % of the local consumption.

Consequently, increasing wheat production is a national target to fulfill the food security for the people. This target can be achieved through expanding wheat area in the delta and along the valley as well as in the new reclaimed lands and rainfed areas, or by means of raising the yield through growing high yielding varieties and applying the optimum cultural practices.

Several investigators showed that wheat cultivars differed in growth, yield, its components and some chemical properties (Benin *et al.,* 2012; Gomaa *et al.,* 2012; Hafez *et al.,* 2012; Harb*et al.,* 2012; Zaki*et al.,* 2012; Ashmawy *et al.,* 2013; Noureldin*et al.,* 2013; Sultana *et al.,* 2013; Khalid *et al.,* 2014; Mehasen, *et al*., 2014; Alves*et al.,* 2015; Jelic*et al.,* 2015; Mandic*et al.,* 2015 and Mehasen *et al*., 2015).

Nutrition is essential for plant life and yield therefore; mineral nitrogen fertilization is a common agronomic practice that leads to improve productivity. But with the steadily increasing prices of chemical fertilizers and the pollution problems of soil and water, the organic fertilizer is becoming more important.Organic fertilization which reduces pollution and sustains soil fertility through their effect on the physical, chemical and biological properties of soil, but its use alone is not sufficient to meet the requirement of nutrients.Most of the previous studies had showed different effects for nitrogen fertilizer levels on growth, yield and yield attributes of wheat.Benin *et al.,* 2012;Gomaa *et al.,* 2012;Hafez *et al.,*2012;Harb*et al.,*2012;Zaki*et al.,* 2012;Ashmawy *et al.,*2013;Noureldin*et al.,*2013;2013;Sultana *et al.,* 2013;Youssef*et al.,*2013;Abd El-Lattief2014;Gerdzhikova2014;Khalid *et al.,* 2014;Alves*et al.,* 2015;Jelic*et al.,*2015;Mandic*et al.,*2015and Mehasen *et al*., 2015concluded that increases in No. of days to 50% heading, flag leaf area, No. of days to physiological mature, No. of tillers/m^2, No. of spikes/m^2,plant height, spike length, spike weight, No. of kernels/spike, kernels weight/spike, 1000-kernel weight, hectoliter weight, biological, grain, straw and protein yields/fed, nitrogen and protein content in grain as well as grain nitrogen uptake/fed with increasing nitrogen fertilizer levels, while nitrogen use efficiency was decreased.

The aim of this investigation was designed to study the effect of organic and mineral nitrogen fertilizer levels on growth, yield, yield components and chemical composition in three wheat cultivars.

MATERIALS AND METHODS

Field experimentwas carried out at two locations, the first location allocatedat the Research and Experimental Centerof Faculty of Agriculture of Moshtohor i.e. Toukh Directorate, El-Kalubia Governorate Benha University, Egypt, the second one was conductedat the farm of Zarzora Agricultural Research Station, Etay El-Baroud Directorate, El-Behaira Governorate, Egypt, which planting in the same winter season 2014/2015,to study the effect of five organic and mineral nitrogen fertilizer levels{F1 = 0 (control), F2 = 17.5 kg organic nitrogen + 17.5 kg mineral nitrogen, F3 = 35 kg mineral nitrogen, F4 = 35 kg organic nitrogen + 35 kg mineral nitrogen and F5 = 70 kg mineral nitrogen/fed}on the growth characters, yield, its component and some chemical properties of three bread wheat cultivarsnamely, Sids 12, Gemmeiza 11 and Giza 168. Soil chemical and mechanical analyses in two locations are shown in Table, 1.

Table 1: Physical and chemical properties of the experimental soil units at the two locations during the winter season 2014/2015.

Properties		**location**	
		Moshtohor	**Zarzora**
Physical properties			
Bulk density (g / cm3)	0–10	1.004	1.252
	10–20	1.202	1.425
	20–30	1.255	1.495
Soil porosity %	0–10	57.63	48.7
	10–20	49.49	47.66
	20–30	47.26	45.80
Chemical analysis			
E.C.		2.28	1.98
pH (1 :2.5)		8.12	8.00
CaCo3 %		3.21	3.51
O.M %		2.28	2.16
N % (total)		0.19	0.14
N (ppm) (available)		61.93	30.08
P % (total)		0.120	0.105
P (ppm) (available)		23.80	10.5
K % (total)		0.62	0.56
K (ppm) (available)		919.06	207.78
Soluble cations and anions (ppm)			
Ca++		180.00	190.4
Mg++		46.44	47.10
K+		48.49	48.49
Na+		199.79	190.79
Cl -		233.00	233.08
Co3--		0.00	0.00
H Co3-		337.33	356.85
So4--		514.08	522.32
Particle size distribution (mechanical analysis)			
Course sand %		6.93	7.26
Find sand %		27.28	26.91
Silt %		13.23	13.85
Clay %		52.58	51.98
Texture grade		Clay	Clay

Seeds of the three wheat cultivars were secured every two locations from Wheat Research Section, Agricultural Research Center (ARC),Giza, Egypt.Organic nitrogen (compost) from compost Projects at the farm of Faculty of Agriculture at Moshtohor was applied before the planting. Chemical analysis of the organic nitrogen (compost) is presented in Table (2).

Table (2): Chemical analysis of the organic nitrogen (compost).

Properties	**values**
Density (kg/m^3)	520
Moisture %	28.5
pH (1 : 5)	7.44
E.C. (1 : 5)	4.56
Total N %	1.53
Total P %	0.69
Total K %	1.42
O.M. %	50
Organic carbon%	23.8
C : N ratio	15.56 : 1
NaCl %	1.04

Mineral nitrogen fertilizer was applied in the form of Ammonium nitrate (33.5% N),as well as divided into two equal parts and applied before the first and second irrigations in each location.

Maize was the previous crop in both locations. The experimental design was randomized complete block design (Gomez and Gomez, 1984) in four replications. The plot size was 10.5 m^2 of 3.0 X 3.5 m including 15 rows 20 cm apart and 3.5 meter length. Seeding rate for the three wheat cultivars was 60 kg seeds/fed. Experiments were planted on November 26th and 25th of in the first location (Moshtohor) and the second location (Zarzora), respectively. Wheat plants were harvested after 160 and 156 days from sowing date in Moshtohor and Zarzora, respectively.The other recommended agronomic practices of growing wheat were applied in the manner prevailing in the two locations.

Studied parameters:

The following growth characters,yield and yield attributes were recorded:

No. of days to 50% heading and No. of days to physiological mature were determined from the basis of whole plots. Flag leaf area at 100 days after sowing (cm^2) according to (Chanda and Singh, 2002) from average of ten flag leaf. At harvest, plants in one square meter from each plot were harvested to determine No. of tillers/m^2, No. of spikes/$m^2$and 1000-kernel weight. Then, ten fertile tillers from the previous one square meter were chosen randomly toestimate the plant height (cm), spike length (cm), spike weight (g), No. of kernels/spike and kernels weight / spike. While,biological,grain andstraw yields (kg/fed), hectoliter weight (weight of volume one liter from grains then X100), harvest index %{(grain yield kg/biological yield kg) X 100} and nitrogen use efficiency (NUE) were determined from an area of 4 m^2on each plots.NUE (kg grain/kg N applied) was calculated according toCraswell and Godwin (1984) as follows:

$$\textbf{NUE =.}\ \frac{\textit{Grains}\ \text{yield fertilized plot - grains yield control}}{\textit{nitrogen}\ \text{applied}}$$

Chemical analysis

Wheat grain samples were taken after harvest at random from grains of ten spikes to determinegrainnitrogen content (%) according to the modified micro Kjeldahl method as described by A. O. A. C., 1980, crude protein content (%) in graincalculated by multiplying (grain nitrogen content X 5.7), protein yield/fedwas calculated by multiplying (crude protein % in grain by grain yield kg/fed) and grain nitrogen uptake (kg/fed) was calculated by multiplying (grain nitrogen content by grain yield kg/fed).

Statistical analysis:

Analysis of variance was done for the data of each location separately and the combined analysis of variance for the two locations was conducted testing the error homogeneity according to Gomez and Gomez (1984) treatment means were compared using least significant difference test at 5 % level of significance using the MSTAT-C Statistical Software package (Michigan State University, 1983).

RESULTS AND DISCUSSION

Effect of wheat cultivars:

Results presented in Tables3, 4 and 5 revealed that the differences between the studied three cultivarsi.e. Sids 12, Gemmeiza 11 and Giza 168 in growth, yield, its components and chemical properties in the both locations and the combinedaverage were significant except, nitrogen use efficiency was not significant. These results revealed that Gemmeiza 11 cultivar recorded the greatest flag leaf area (48.38, 45.28 and 46.83 cm^2), plant height (101.0, 99.5 and 100.2 cm), spike length (14.21, 14.04 and 14.12 cm), spike weight (5.86, 5.53 and 5.69 g), kernels weight/spike (3.38, 3.12 and 3.25 g), 1000-kernel weight (50.73, 47.55 and 49.14 g), biological yield (7009.2, 6760.7 and 6884.9 kg /fed), grain yield (2792.9, 2705.8 and 2749.3kg /fed) and grain protein yield (380.5, 363.2 and 371.8kg /fed) as well as grain nitrogen uptake (66.75, 63.71 and 65.23kg/fed) in the first location, the second location and the combined average, respectively.The three tested cultivars could be arranged in a descending order with regard to the previous traits as follows, Gemmeiza 11, Sids 12 and Giza 168, except biological yield (kg/fed) was Gemmeiza 11, Giza 168 and Sids 12. However, results may reveal the superiority of Sids 12 cultivar inNo. of kernels/spike (73.05, 72.05 and 72.55 kernels), harvest index (40.18, 40.80 and 40.49 %), hectoliter weight (76.71, 75.19 and 75.95 kg/hl), grain nitrogen content (2.53, 2.48 and 2.50 %) and protein content in grain (14.41, 14.13 and 14.27 %), as well as, Sids 12 cultivar was earlier heading date (101.2, 100.6 and 100.9 days) and physiological maturity date (151.2, 150.1 and 150.7 days)in the first location, the second location and the combined analysis, respectively. moreover, Giza

168 cultivar gave the highest values of No. of tillers/m^2 (642.3, 634.6 and 638.5 tillers), No. of spikes/m^2(403.2, 395.3 and 399.2 spikes) and straw yield (4474.9, 4235.0 and 4354.9kg/fed)in the first location, the second location and the combined analysis, respectively.These differences may be due to the genetic differences between the three cultivars. Also, the differences in 1000-kernel weight might be attributed to the variation in translocation rate of photosynthetic from leaves to the storing organs i.e. the grain. The superiority of Gemmeiza 11 cultivar in grain yield over other wheat cultivars might be due to the increase in growth and yieldcomponents, namely, flag leaf area, spike length, spike weight, kernels weight / spike, 1000-kernel weight.

These results are in harmony with those reported by Benin *et al.,* 2012; Gomaa *et al.,* 2012; Hafez *et al.,* 2012; Harb*et al.,* 2012; Zaki*et al.,* 2012; Ashmawy *et al.,* 2013; Noureldin*et al.,* 2013; Sultana *et al.,* 2013; Khalid *et al.,* 2014; Khalil 2014; Mehasen, *et al*., 2014; Alves*et al.,* 2015; Jelic*et al.,* 2015; Mandic*et al.,* 2015 and Mehasen *et al*., 2015.

Effect of mineral and organic fertilizers:

Results presented in Tables (3, 4 and 5) indicated that, growth, yield, its attributes and chemical properties of wheat i.e. flag leaf area (cm^2), heading and physiological maturity dates, plant height (cm), No. of tillers/m^2, No. of spikes/ ^{2}, spike length (cm), spike weight (g), No. of kernels/spike, kernels weight/spike (g), 1000-kernel weight (g), biological yield (kg/fed), grain yield (kg/fed), straw yield (kg/fed), harvest index (%), nitrogen use efficiency (NUE),hectoliter weight (kg/hl), grain nitrogen content, protein content in grain, protein yield (kg /fed) as well as grain nitrogen uptake (kg/fed) in the two locations and the combined average were affected significantly by adding organic and mineral nitrogen fertilizers.

Resultsshowed that all studied traits except NUEwere significantly increased withincreasing N fertilizer levels, as well as increasing nitrogen fertilizer levels delayed heading and physiological maturity dates.

The highermineral nitrogen level (70 kg MN/fed) was more effectivein increasing values of all studied traits. Also, produced the maximum grainyield and proved significantly superior tolower levels. But, there is no significant difference among application of 17.5 kg ON + 17.5 kg MN/fed and 35 kg MN/fed as well as between 35 kg ON + 35 kg MN/fed and 70 kg MN/fed in most characters under study.

Application of 17.5 kg ON + 17.5 kg MN, 35 kg MN, 35 kg ON + 35 kg MN and 70 kg MN/fed increased the grain yield over the 0 kg N/fed (control) by18.46, 28.03, 36.05 and 42.23 % in Moshtohor location and by 25.96, 38.04, 47.99 and 56.20 % in Zarzora location as well as, 22.02,32.78, 41.72 and 48.86 % in the combined analysis, respectively.

In general, application of 70 kg MN/fed gave the highest yield and its components compared to the other levels of application. This superiority may be due to the fast effect of nitrogen in chemical forms at the early stages of plant growth followed by the stimulate effect of organic fertilizer through flowering and grain production.

3-

4-

5-

Increases in flag leaf area, No. of days to heading and maturity, plant height, No. of tillers/m^2, No. of spikes/m^{2}and spike length with increasing nitrogen fertilizer may be attributed to the role of nitrogen in promoting the cell division, vegetative growth and meristimatic activity during growth. Similar findings have been reported byBenin *et al.,* 2012; Hafez *et al.,* 2012; Zaki*et al.,* 2012; Sultana *et al.,* 2013; Abd El-Lattief, 2014; Khalid *et al.,* 2014;Jelic*et al.,* 2015 and Mehasen *et al*., 2015.

This increase in grain yield could be attributed to the significant increase in No. of spikes m^2, spike length, spike weight, No. of kernels/spike, weight of kernels/spike, hectoliter weight and 1000 grain weight due to increasing nitrogen fertilizer. These finding are in agreement with those obtained byGomaa *et al.,* 2012; Harb*et al.,* 2012; Ashmawy *et al.,* 2013; Noureldin*et al.,* 2013; Youssef*et al.,* 2013; Gerdzhikova 2014;Alves*et al.,* 2015 andMandic*et al.,* 2015.

Interaction effects:

Significant effect of interaction between wheat genotypes and nitrogen fertilizer treatments (organic and mineral) obtained for some growth, yield and yield components of wheat namely, flag leaf area, No. of spike/m^2, harvest index %, biological yield, grain yield, straw yield, grain protein yield and grain nitrogen uptake in the two locations and the combined analysis (Tables, 3, 4 and 5). Gemmeiza 11 with 70 kg MN /fed recorded significantly the highest values of flag leaf area (61.65, 55.90 and 58.78 cm^2), biological yield (7726.8, 7622.0 and 7674.4 kg/fed), grain yield (3138.0, 3108.3 and 3123.1 kg/fed) and grain protein yield (469.1, 455.0 and 462.1 kg/fed) as well as grain nitrogen uptake (82.30, 79.83 and 81.06 kg/fed) in the first location, the second location and the combined analysis, respectively, also, recordedthe tallest plant height (107.8 and 107.4 cm) and the heaviest weight of kernels/spike (3.87 and 3.72 g) in the first location and the combined analysis, respectively.Meanwhile, Sids 12 under the same nitrogen fertilizer surpassed the other treatments in No. of kernels / spike (80.83 and 80.20 kernels) in the first location and the combined analysis, respectively and harvest index (42.03, 42.60 and 42.31 % in the first location, the second locations and the combined analysis, respectively. Whereas, Giza 168 under the same nitrogen treatmentgave the highest No. of tillers/m^2 (674.3 and 672.0 tillers) in the first location and the combined analysis, respectively, No. of spike/m^2(423.5, 414.5 and 419.0 spike) and straw yield (4804.0, 4744.5 and 4774.3 kg/fed)in the first location, the second location and the combined analysis, respectively.Similar results were also reported byBenin *et al.,* 2012; Gomaa *et al.,* 2012; Hafez *et al.,* 2012; Harb*et al.,* 2012; Zaki*et al.,* 2012; Ashmawy *et al.,* 2013; Noureldin*et al.,* 2013; Sultana *et al.,* 2013; Khalid *et al.,* 2014; Alves*et al.,* 2015; Jelic*et al.,* 2015; Mandic*et al.,* 2015 and Mehasen *et al*., 2015.

CONCLUSION

From the obtained results of this study it could be concluded that planting wheat Gemmeiza 11 cultivar with fertilizing by 70 kg mineral nitrogen/fed or 35 kg organic nitrogen + 35 kg mineral nitrogen/fed in order to maximizing its productivity under environmental of the experiments.

REFERENCES

A.O.A.C. (1990).Official methods of analysis association of official analysis chemists, 13th Ed., Washington, D. C., U. S. A.

Abd El-Lattief, E. A.(2014).Effect of integrated use of farm yard manure (FYM) and chemical fertilizers (NPK) on productivity of bread wheat under arid conditions. Int. J. Adv. Res., Eng. & Appl. Sci., 3 (12):22-27

Alves, M. J. F., W. W. R. Teixeira, E. Daros, L. C. Cassol, J. A. L. Pascoalino and M. F. Moraes(2015). Productive performance of wheat based on nitrogen fertilization in coverage. American J. Plant Sci., 6: 1587-1593.

Ashmawy, F., M. S. EL-Habal, H. S. Saudy and I. K. Abbas(2013).The relative contribution of yield components to grain yield of some wheat cultivars grown under different nitrogen fertilizer levels. Egypt. J. Agric. Res., 88 (1): 225-239.

Benin, G., E. Bornhofen, E. Beche, E. S. Pagliosa, C. L. Silva and C. Pinnow(2012). Agronomic performance of wheat cultivars in response to nitrogen fertilization levels.ActaScientiarum. Agronomy, 34(3): 275-283.

Chanda, S. V. and Y. D. Singh(2002).Estimation of leaf area in wheat using linear measurements.Plant Breed. Seed Sci., 46 (2): 75-79.

Craswell, E.T. and D.C. Godwin (1984).The efficiency of nitrogen fertilizers applied to cereal in different climates in Tinker, P.B. and A. Lauchli (Ed.). Advances in Plant Nutrition, Vol. 1- Praeger.

Gerdzhikova, M.(2014). Influence of N fertilization and predecessors on Triticale yield structure characteristics. Turkish J. Agric. Nat. Sci., 2: 1922-1932.

Gomaa, M. A., N. M. Zaki, F. I. Radwan, M. S. Hassanein, A. M. Gomaa and A. M. Wali(2012).The combined effect of mineral, organic and bio-fertilizers on growth of some wheat cultivars. J. Appl. Sci. Res., 7(11): 1591-1608.

Gomez, K.A. and A.A. Gomez(1984).Statistical procedures for agricultural research. 2nd, (ed.). John Wiley and Sons, NY, U.S.A.

Hafez, E. M., H. Aboukhadrah, S.Gh. R. Sorour and A. R. Yousef(2012).Comparison of agronomical and physiological nitrogen use efficiency in three cultivars of wheat as affected by differentlevels of n-sources.Proc. 13th international Conf. Agron., Fac. of Agic., Benha Univ., Egypt, 9-10 September, 130-145.

Harb, O. M. S., G. H. Abd EI-Hay, M. A. Hager, M. K. Hassanien and M. M. Abou EI-Enin(2012). Effect of water irrigation quantity and compost rates on some wheat varieties under sandy soil conditions of West Delta region conditions. J. Plant Production, Mansoura Univ., 3 (5): 847- 855.

Jelic, M., J. Milivojevic, O. Nikolic, V. Djekic, S. Stamenkovic(2015).Effect of long-term fertilization and soil amendments on yield, grain quality and nutrition optimization in winter wheat on an acidic Pseudogley. Romanian Agri. Res., 32:1-10.

Khalid, M. S., M. F. Saleem, S. Ali, M. W. Pervez, M. Rehman, S. Hussain, K. Rehman(2014).Optimization of nitrogen fertilizer level for newly evolved wheat (*Triticum aestivum*, L.) cultivars. App. Sci. Report. 7 (2): 83-87.

Mandic, V., V. Krnjaja, Z.Tomic, Z. Bijelic, A. Simic, D. R. Muslic and M. Gogic(2015). Nitrogen fertilizer influence on wheat yield and use efficiency under different environmental conditions. Chilean J. Agric. Res., 75(1): 92 -97.

Mehasen S. A. S., S. A. Badawy and S. Sh. Abdullah (2015).Influence of bio and mineral nitrogen fertilizers on productivity of some bread wheat varieties. J. Food, Agric. &Env., 13 (2): 162-167.

Mehasen, S. A. S., N. Kh. El-Gizawy, A. M. Sharoba, S. A. Soliman and T. R. M. Khalil(2014). Yield and chemical composition of broad wheat cultivars as affected by some skipping irrigation.Minufiya J. Agric. Res., 39 (3I): 1009-1018.

Michigan State University(1983). MSTAT-C: Micro- computer Statistical Program, Version 2. Michigan State University, East Lansing.

Noureldin, N. A., H. S. Saudy, F. Ashmawy, H. M. Saed(2013). Grain yield response index of bread wheat cultivars as influenced by nitrogen levels. Annals Agric. Sci., Ain Shams Univ., Cairo 58 (2): 147–152.

Sultana, S. R., A. Ahmad, A. Wajid and J. Akhtar(2013). Estimating growth and yield related traits of wheat genotypes under variable nitrogen application in semi-arid conditions. Pak. J. life Soc. Sci., 11(2): 118-125.

Youssef, M. A., M. M. EL-Sayed and I. I. Sadek(2013).Impact of organic manure, bio-fertilizer and irrigation intervals on wheat growth and grain yield. American-Eurasian J. Agric. & Environ. Sci., 13 (11): 1488-1496.

Zaki, N. M., M. A. Gomaa, F. I. Radwan, M. S. Hassanein and A. M. Wali(2012).Effect of mineral, organic and bio-fertilizers on yield, yield components and chemical composition of some wheat cultivars. J. Appl. Sci. Res., 8(1): 174-191.

إستجابة بعض أصناف القمح لبعض مستويات السماد النيتروجيني العضوي والمعدني

علي عبد المقصود الحصري , جابر يحيى محمد همام , السعيد محمد محمود الجدوي و محمد الحافظ الحافظ سيدي
قسم المحاصيل - كلية الزراعة بمشتهر - جامعة بنها - مصر

يهدف هذا البحث دراسة تأثيرخمسة مستويات من السماد النيتروجيني العضوي (سماد الكمبوست ١.٥٣ نيتروجين) والمعدني(صفر، ١٧.٥ كجم نيتروجين عضوي+ ١٧.٥ كجم نيتروجين معدني، ٣٥ كجم نيتروجين معدني، ٣٥ كجم نيتروجين عضوي + ٣٥ كجم نيتروجين معدني، ٧٠ كجم نيتروجين معدني/فدان) على صفات النمو والمحصول ومكوناته وبعض الصفات الكيميائية لثلاثة أصناف من القمح (سدس ١٢ ، جميزة ١١ و جيزة ١٦٨). ولتحقيق هذا الغرض أقيمت تجربتان حقيتان في موقعين الأول بمزرعة مركز البحوث والتجارب الزراعية بكلية الزراعة بمشتهر- جامعة بنها - محافظة القليوبية - مصر والموقع الثاني بمزرعة محطة زارزورة للبحوث والتجارب الزراعية - أيتاي البارود - محافظة البحيرة - مصر في نفس الموسم الشتوي ٢٠١٤/٢٠١٥.

وتتلخص أهم النتائج على النحو التالى:-

أوضحت النتائج أن الإختلافات بين الاصناف كانت معنوية في جميع الصفات المدروسة في الموقعين تحت الدراسة والتحليل المشترك. أعطى الصنف جميزة ١١ أعلى قيم في متوسط صفات مساحة ورقة العلم، إرتفاع النبات، طول السنبلة، وزن السنبلة، وزن حبوب السنبلة، وزن ١٠٠٠ حبة، المحصول البيولوجي/فدان، محصول الحبوب/ فدان، محصول البروتين/فدان والنيتروجين الممتص/فدان. بينما سجل الصنف سدس ١٢ أعلى قيم في متوسطات صفات عدد حبوب السنبلة، دليل الحصاد ووزن الهكتوليتر. بينما تفوق الصنف جيزة ١٦٨ في متوسط صفات عدد الأشطاء/م٢، عدد السنابل/ م٢ ومحصول القش/فدان.

لقد زادت كل الصفات المدروسة معنويا بزيادة مستويات السماد النيتروجيني ماعدا كفاءة استخدام النيتروجين تناقصت في الموقعين تحت الدراسة والتحليل المشترك.سجل معدل السماد النيتروجيني ٧٠ كجم نيتروجين معدني/فدان أعطى أفضل المستويات للحصول على أعلى قيم. أيضا زيادة مستويات السماد النيتروجيني أدى معنويا الى تأخيرعدد الأيام لطرد ٥٠ % من السنابل والنضج الفسيولوجي.

أظهرت النتائج أن زراعة الصنف جميزة ١١ مع التسميد النيتروجيني بمقدار ٧٠ كجم نيتروجين معدني/فدان سجل أعلى القيم في صفات مساحة ورقة العلم، المحصول البيولوجي/فدان، محصول الحبوب/فدان، محصول البروتين/فدان والنيتروجين الممتص/فدان (في الموقعين تحت الدراسة والتحليل المشترك)، إرتفاع النبات ووزن حبوب السنبلة (في موقع مشتهر والتحليل المشترك). بينما زراعة الصنف سدس ١٢ تحت نفس معدل السماد النيتروجيني حقق أعلى قيم في صفات عدد حبوب السنبلة (في موقع مشتهر والتحليل المشترك) ودليل الحصاد (في الموقعين تحت الدراسة والتحليل المشترك). بينما الصنف جيزة ١٦٨ مع نفس معدل السماد النيتروجيني سجل أفضل القيم في عدد الأشطاء/م٢ (في موقع مشتهر والتحليل المشترك)، عدد السنابل/ م٢ ومحصول القش/فدان (في الموقعين تحت الدراسة والتحليل المشترك).

توصي النتائج بزراعة الصنف جميزة ١١ والتسميد بالسماد المعدني بمعدل ٧٠ كجم نيتروجين للفدان أو التسميد بمعدل ٣٥ كجم نيتروجين عضوي + ٣٥ كجم نيتروجين معدني للفدان حيث عظمت إنتاجية محصول الحبوب بوحدة المساحة.