J. of Plant Production, Mansoura Univ., Vol. 14 (12): 627- 630, 2023

Journal of Plant Production

Journal homepage & Available online at: www.jpp.journals.ekb.eg

Impact of Bio and Mineral Nitrogen Fertilization on Yield and Growth of Three Bread Wheat Cultivars under Clayey Soil

Al-Farouk, M. O.[1] ; Hanan E. Ghanem[1] and Basma E. M. Elsmahy[2]*

Cross Mark

[1]Wheat Research Department. Field Crops Research. Institute, ARC, Giza, Egypt
[2]Seed Technology Research Department. Field Crops Research Institute. ARC, Giza, Egypt

ABSTRACT

This study was performed at El-Gemmeiza Agricultural Research Station, El- Gharbya Governorate, Egypt, during 2019/2020 and 2020/2021 seasons to study the impact of eight fertilizer treatments, *i.e.* B1 (Zero fertilizer), B2 (75 Kg N fed^{-1}), B3 (50 Kg N fed^{-1} + 5 Kg fed^{-1} Blue-green algae), B4 (50 Kg N fed^{-1} + 5 Kg fed^{-1}Azotobacter), B5 (25 Kg N fed^{-1} + 5 Kg fed^{-1} Blue-green algae + 5 Kg fed^{-1}Azotobacter), B6 (5 Kg fed^{-1} Blue-green algae + 5 Kg fed^{-1}Azotobacter), B7 (5 Kg fed^{-1} Blue-green algae) and B8 (5 Kg fed^{-1}Azotobacter) were evaluated on grain yield and wheat growth of three bread wheat cultivars (Misr 3, Sakha 95 and Sids 14) . Wheat cultivars significantly differed in all traits. Misr 3 wheat cultivar recorded the highest number of spikes/m^2, 1000 grains weight, biological yield, grain yield, harvest index and chlorophyll content in both seasons. B4 recorded a significant increase in the number of spikes/m^2, 1000 grains weight, grain yield, harvest index and chlorophyll a& b. Results exhibited that the interaction effect between fertilizer treatments and wheat cultivars had a significant effect on the number of spikes/m^2, grain yield, harvest index and chlorophyll content. The results indicated that Misr 3 gave the highest grain yield in both seasons under bio and mineral fertilizer treatments followed by Sakha 95 and Sids 14. Thus, the application of bio and mineral fertilizers significantly increases wheat grain yield and plant growth. Also, it enhanced all studied parameters.

***Keywords*:** Wheat,cultivars,mineral fertilizers, bio-fertilizer, blue green algae, azotobacter, and grain yield attributes

INTRODUCTION

Wheat (*Triticum aestivum* L.) is the Egypt's main food source. To close the production-consumption gap, the national goal is to increase wheat output by enhancing the land area units and cultivated area productivity (Taha *et al.*, 2017). Nitrogen is a necessary nutrient for proper wheat growth and acceptable yield. Nitrogen fertilizer losses are higher in arid environments, which hurt wheat growth in these areas. Nitrogen addition as Ammonia gas (82%) showed a favorable effect on improving wheat yield. Adding Ammonia gas had a significant effect on wheat yield and its components compared with control (Hassanein *et al*., 2018). Biofertilizers can help in solubilizing plant nutrients and plant growth, so they are considered essential for soil health management including productivity and sustainability. Bio- fertilizers are also eco-friendly, economical for farmers and protect the environment (Mohammadi and Sohrabi, 2012). (Yasin *et al.*, 2012) mentioned that using bio fertilizers is more economical and can enhance environmental restoration. (Namvar and Khandan,2013) suggested that combining bio and mineral fertilizers can raise grain quality without a negative effect. Bio-fertilizers are known as microbial inoculants and consist of artificially multiplied cultures of certain soil organisms. Inoculation of biofertilizers can reduce the use of chemical and mineral fertilizers and enrich the soil with less polluted environments. They can improve soil fertility and crop productivity by providing nutritive elements and growth promoting substances with less agricultural costs (Mahdi and Ismail, 2015, Al-Erwy *et al.*, 2016). In addition, biofertilizers can achieve soil nutrient balance at the end of season (Hadwan *et al*., 2019). (El-Khateeb and Metwaly, 2019) indicated that the combined treatment of bio-fertilizer and mineral nitrogen recorded increasing plant height, plant dry weight, leaf area,chlorophyll pigments concentration, spike length, dry weight, grains number spike^{-1},1000-grain weight and N-content in grains and straw yield of wheat plants. Azotobacter is a free living; nitrogen fixing diazotrophic bacterium that has an important role in the nitrogen cycle (Sahoo *et al.*, 2014).It produces vitamins such thiamine and riboflavin and can nourish the soil with nitrogen and growth substances as gibberellic acid, auxins and indole acetic acid. Cyanobacteria also raise crop yield by fertilizing the soil and creating an environmentally friendly agro-ecosystem (Fasusi *et al*., 2021).

Improved wheat cultivars and quality is the key to agricultural progress. So, scientists are seeking to enhance the productivity of wheat under different conditions, but are paying less attention to its quality characteristics. This study aimed to evaluate the efficiency of bio and mineral nitrogen fertilizers in improving grain yield and wheat growth.

MATERIALS AND METHODS

A field experiment was carried out at El-Gemmeiza Agricultural Research Station, Agricultural Research Center, El-Gharbeia Governorate, Egypt, during 2019/20 and 2020/21 growing seasons to study the effect of bio and mineral nitrogen fertilizer on growth and wheat grain yield of three wheat cultivars in clayey soil. Three high-yielding bread wheat cultivars namely, Sids 14, Sakha 95 and Misr3 were used in this study. Table 1 shows the pedigree; selection history and origin of the three bread wheat cultivars.

*** Corresponding author.**
E-mail address: basma.elsamahy85@gmail.com
DOI: 10.21608/jpp.2024.257080.1297

Table 1. Name, pedigree and selection history of the three selected Egyptian wheat cultivars

Cultivar	Pedigree and selection history	Origin
Sids 14	Bow"s"/Vee"s"//Bow"s"/TSI/3/BaniSewef 1 SD293-1SD-2SD-4SD-Osd	Egypt
Sakha 95	PASTOR//SITE/MO/3/CHEN/AEGILOPS SQUARROSA (TAUS)//BCN/4/WBLL1 CMSA01Y00158S-040P0Y-040M-030ZTM-040SY-26M-0Y-0SY-0S	Egypt
Misr 3	Rohf 07*2/Kiriti CGSS 05 B00123T-099T-0PY-099M-099NJ-6WGY-0B-0BGY-0GZ	Egypt

The experiment conducted in a split plots arrangement in randomized complete block design with three replications, wherein the main- plots were assigned to wheat cultivars, while the sub-plots received random distributions of bio and mineral nitrogen fertilizer treatments. The plot area was 8.4 m^2 *i.e.* 2.4 m in width and 3.5 m in length. Soil samples were collected at the depth of (0-30 cm) in all plots. Samples were allowed to dry under shade, then ground and sieved to pass through a 2 mm sieve. A.O.A.C. (1995) was used to analyze soil samples for some chemical properties as shown in Table 2.

Table 2. Chemical and physical characteristics of the experimental soils in 2019/2020 and 2020/2021 seasons

Season	pH (1:2.50)	EC ds cm^{-1}	NPK available (mg kg^{-1}) N	P	K	OM	CEC Cmol kg^{-1}
2019/20	8.13	0.90	34.05	2.75	315.70	1.33	48.33
2020/21	8.09	1.09	38.85	2.05	335.35	1.22	49.05

Season	Particle size distribution (%) C. sand	F.sand	Silt	Clay	Soil texture
2019/20	8.90	15.33	27.86	47.91	Clayey
2020/21	10.03	14.01	25.31	50.65	Clayey

OM=organic matter, C. sand= coarse sand, F. sand= fine sand

Wheat cultivars were planted on the 16th and 25th of November in the 2019 and 2020 year, respectively, with seeding rate of 50 kg fed^{-1} for all cultivars. There were twenty-four treatments in the experiment, consisting of three different wheat cultivar (Misr 3, Sakha 95, and Sids 14) and eight bio and mineral nitrogen fertilizer treatments, i.e. B1 (Zero fertilizer), B2 (75 Kg N fed^{-1}), B3 (50 Kg N fed^{-1} + 5 Kg Blue green algae), B4 (50 Kg N fed^{-1} + 5 Kg fed^{-1}Azotobacter), B5 (25 Kg N Fed^{-1} + 5 Kg fed^{-1} Blue green algae + 5 Kg fed^{-1}Azotobacter), B6 (5 Kg fed^{-1} Blue green algae + 5 Kg fed^{-1}Azotobacter), B7 (5 Kg fed^{-1} Blue green algae) and B8 (5 Kg fed^{-1}Azotobacter). The biofertilizer was distributed to the experimental plots before first irrigating. During seedbed preparation, phosphate fertilizer was given at a rate of 100 kg calcium superphosphate fed^{-1} (15.5 kg P_2O_5), whereas N was given in the form of urea. The preceding crop was maize. Agronomic techniques for wheat were performed according to the recommendation till harvest. The sources of N and P in the experiment were urea and calcium superphosphate. Two dosages of nitrogen fertilizer were applied: one after 20 days after sowing and the other after 50 days. Wheat plants were harvested on the 12th of May 2020 and 25th of May 2021 and the grains were separated from straw and weighed.

The examined traits were number of spikes m^{-2} (SM), number of days to 50% heading (DH) and 50% maturity (DM), plant height (PH, cm), number of grains $spike^{-1}$ (GS), 1000-grain weight (GW, g), total biological yield (BY, ton fed^{-1}), straw yield (SY, ton fed^{-1}),harvest index (HI)and grain yield (GY, ardab/feddan, Ardab =150 kg). With the spectrophotometric approach, chlorophyll-a and b (µg ml^{-1}) were calculated using the following equation:

$$\text{chl a} = 12.64\, A_{664} - 2.99 A_{647}$$

$$\text{chl b} = -5.6\, A_{664} + 23.26\, A_{647}$$ **as described by Moran, (1982).**

The collected data were subjected to the appropriate statistical analysis of variance procedure. The Gomez and Gomez (1984) method of determining the difference between means was followed. The least significant differences (LSD) test was used to compare the treatment means at a 5% probability level.

RESULTS AND DISCUSSIONS

Effect of wheat cultivars:

According to the results in Tables 3and 4, the three bread wheat cultivars were significantly different in all studied traits during the two growing seasons. The cultivar Sakha 95 had the longest heading date (102 and 101 days) and maturity date (149 and 148 days) in the first and second seasons, respectively, whereas Sids 14 had the shortest heading date (96 and 94 days) and maturity date (144 and 142 days). According to Table 3, the Sakha 95 cultivar recorded the highest plant height of (110.2 and 108.90 cm), while the Misr 3 cultivar recorded the lowest plant height of (100.9 and 99.6 cm) in the first and second seasons, respectively.

Table 3. Effect of wheat cultivars, bio and mineral nitrogen fertilizer and their interaction on days to heading, days to maturity, plant height, number of spikes/m² and number of grains/spike in 2019/2020 and 2020/2021 seasons

Cultivars (V)	Days to heading 2019/2020	Days to heading 2020/2021	Days to maturity 2019/2020	Days to maturity 2020/2021	Plant height (cm) 2019/2020	Plant height (cm) 2020/2021	Number of spikes/m² 2019/2020	Number of spikes/m² 2020/2021	Number of grains/ spike 2019/2020	Number of grains/ spike 2020/ 2021
Misr 3	99	97	147	145	100.9	99.6	417	419	48	50
Sakha 95	102	101	149	148	110.2	108.9	398	399	53	54
Sids 14	96	94	144	142	106.2	104.5	376	377	44	46
LSD $_{0.05}$	0.9	1.0	1.0	1.0	1.89	1.74	4.7	4.0	2.4	2.5
Bio-mineralfertilizer(B)										
B1	97	95	139	138	99.5	98.1	311	312	37	38
B2	100	99	156	154	110.4	109.1	467	469	59	61
B3	100	98	148	146	107.3	106.6	430	431	54	55
B4	101	100	148	146	107.2	106	471	474	56	58
B5	100	98	148	147	106.4	104.3	421	422	54	56
B6	97	96	144	142	105.0	104.1	406	407	52	53
B7	97	95	145	143	105.9	103.7	350	351	38	40
B8	98	96	144	142	104.4	102.6	321	321	39	40
LSD $_{0.05}$	1.8	1.6	1.4	1.2	3.25	2.79	8.0	7.1	2.6	2.7
Interactions										
LSD $_{0.05}$ (V X B)	NS	NS	NS	NS	NS	NS	13.1	11.3	NS	NS

Table 4. Effect of wheat cultivars, bio and mineral nitrogen fertilizer and their interaction on 1000-grain weight, biological yield, straw yield, grain yield and harvest index in 2019/2020 and 2020/2021 seasons.

Cultivars	1000-grain weight (g)		Biological yield (ton/ fed)		Straw yield (ton/fed)		Grain yield,(ardab/fed)		Harvest index (%)	
(V)	2019/2020	2020/2021	2019/2020	2020/2021	2019/2020	2020/2021	2019/2020	2020/2021	2019/2020	2020/2021
Misr3	50.4	52.18	10.66	11.51	7.51	7.88	21	24.25	29.39	31.93
Sakha95	44.56	46.09	9.84	10.5	7.08	7.39	18.42	20.79	27.76	29.45
Sids 14	41.72	43.2	8.93	9.59	6.61	7.03	15.45	17.02	25.70	25.99
LSD 0.05	1.47	1.46	0.29	0.3	0.33	0.33	0.9	1.07	1.63	1.74
Bio-mineral fertilizer(B)										
B1	35.69	36.31	7.41	7.71	5.64	5.45	11.80	15.05	23.87	28.87
B2	52.18	53.92	12.78	13.88	9.26	9.99	23.51	26.26	27.54	28.19
B3	49.27	51.56	11.74	12.5	8.32	8.56	22.82	25.98	29.13	31.46
B4	53.84	56.83	10.6	12.03	6.91	7.95	24.65	27.22	35.02	33.98
B5	49.53	51.26	10.06	10.68	7.18	7.39	19.22	21.94	28.57	30.72
B6	46.74	48.37	9.59	10.25	7.14	7.53	16.33	18.16	25.46	26.37
B7	38.05	38.74	8.28	8.78	6.09	6.30	15.37	16.55	27.76	28.02
B8	39.14	40.27	8.02	8.43	6.01	6.28	12.62	14.36	23.56	25.40
LSD 0.05	3.5	3.49	0.55	0.53	0.66	0.68	1.62	2.06	3.61	3.92
Interaction										
LSD 0.05 (V X B)	NS	NS	NS	NS	NS	NS	NS	3.12	NS	5.43

Regarding the number of spikes/m^2 the highest number was recorded by Misr 3 (417 and 419) followed by Sakha 95 (398 and 399) and Sids 14 (376 and 377) in first and second seasons, respectively. Data in table 3 also showed that Sakha 95 gave in the two seasons the highest number of kernels/spike (53 and 54*),* while Sids 14 gave the lowest number(44and 46).

Regarding 1000kernel weight, Misr 3 recorded the hi ghest mean values (50.4 and 52.18 g) over the two seasons, whereas Sids 14 recorded the lowest values (41.72 and 43.20 g) as showed in Table 4. In addition, Misr 3 had the highest biological yield values (10.66 and 11.51 ton/fed), straw yield (7.51 and 7.88) and harvest index (29.39 and 31.93) in the two seasons but Sids 14 had the lowest values for biological yield (8.93 and 9.59 ton/fed), straw yield (6.61 and 7.03) and harvest index (25.70 and 25.99).

When considering data of grain yield ard/fed, Misr 3 was noticed to show the highest mean values (21 and 24.25 ard/fed), followed by Sakha 95 (18.42 and 20.79ard/fed) then Sids 14 (15.45 and 17.02 ard/fed) in the two seasons, respectively; table 4. Differences in leaf chlorophyll a &b were noticed between the grown cultivars in both seasons, table (5). Misr 3 had the highest chlorophyll a &b followed by Sakha 95.Whereas, Sids 14 leaves had the lowest chlorophyll content. The variations observed among wheat cultivars may stem from their genetic characters and their environmental interaction during development. These results were confirmed by (Nabila *et al*.,2015 and Hassanein *et al*.,2018).

Effect of bio-mineral nitrogen fertilizer:

Bio-fertlization treatment was noticed to significantly enhance all the studied traits as compared to the control in both seasons (Table 3and 4). Plants treated by B4 showed the highest mean of days to heading (101 and 100), number of spikes/m^2 (471 and 474), 1000-kernel weight (53.84 and 56.83 g), grain yield (24.65 and 27.22ard/fed) and harvest index (35.02 % and 33.98%), in first and second seasons, respectively. While plants treated by B2 showed the highest values of days to maturity (156 and 154), plant height (110 and 109.10 cm), number of kernels/spike (59 and 61), biological yield (12.78 and 13.88 ton/fed) and straw yield (9.26 and 9.99 ton/fed) in the first and second seasons, respectively. On the other hand, the lowest values, in the two seasons, for heading date (97 and 95), days to maturity (139. and 138) , plant height (99.50 and 98.10cm), number of spikes/m^2 (311 and 312), number of kernels/spike (37 and 38).1000-kernel weight (35.69 and 36.31g), biological yield (7.41 and 7.71ton/fed), straw yield (5.64and 5.55 ton/fed) and grain yield (11.80 and 15.05ard/fed) were recorded with the control treatment B1. While the lowest mean values of harvest index (23.56 and 25.40) were obtained from plants treated by B8. Regarding the effect on leaf chlorophyll a &b content, significant effects were noticed in both seasons (table 5). B4 treatment recorded the highest content but B1 treatment showed the lowest one. Plant phytohormones like IAA, GA, and CKS may play a part in this. They encourage plant growth and cell division while upending certain dominances, which in turn promotes photosynthesis and the accumulation of assimilates.This findings agreed with (Shaalan and Hassan, 2019).

Table 5. Effect of wheat cultivars, bio and mineral nitrogen fertilizer and their interaction on chlorophyll a and chlorophyll b in 2019/2020 and 2020/2021 seasons.

Cultivars	Chlorophyll a (mg/ml^{-1})		Chlorophyll b (mg/ml^{-1})	
(V)	2019/2020	2020/2021	2019/2020	2020/2021
Misr3	1.93	1.76	1.59	1.48
Sakha95	1.84	1.70	1.49	1.42
Sids 14	1.77	1.60	1.39	1.41
LSD 0.05	0.04	0.04	0.08	0.03
Bio-mineral fertilizer(B)				
B1	1.13	0.87	0.70	0.62
B2	2.26	2.04	1.85	1.76
B3	2.24	2.00	1.82	1.74
B4	2.34	2.19	1.88	1.82
B5	2.21	1.96	1.80	1.67
B6	1.82	1.64	1.40	1.34
B7	1.31	1.38	1.23	1.25
B8	1.45	1.42	1.21	1.26
LSD 0.05	0.08	0.09	0.08	0.06
Interaction				
LSD0.05(VXB)	0.16	NS	NS	NS

Effect of interactions between wheat cultivars and bio-mineral nitrogen fertilizer:

Table 6 showed that there were highly significant interactions between wheat cultivars and bio-mineral nitrogen fertilizer (V × B) concerning with number of spikes/m^2 in both seasons.

Also, significant interaction was noticed in the second season only with grain yield (ardab fed^{-1}) and harvest index % (table 7); in agreement with (Zaghloul *et al.*,2010) and (El-Naggar, 2018) and (Shaalan and Hassan, 2019)

Table 6. Effects of interactions between wheat cultivars, bio and mineral nitrogen fertilizer on number of spikes/m² in 2019/20 and 2020/21 seasons.

Characters	Number of Spikes/ m²					
Bio-mineral	Wheat cultivars (V)					
	2019/20			2020/21		
fertilizer(B)	Misr3	Sakha95	Sids 14	Misr3	Sakha95	Sids 14
B1	330	307	295	331	308.	297
B2	479	469	452	481	471	454
B3	443	434	413	444	436	414
B4	483	472	458	487	474	461
B5	447	424	392	448	426	393
B6	441	402	375	442	403	376
B7	378	356	317	379	356	318
B8	337	319	306	337	320	307
LSD 0.05		13.1			11.3	

Table 7. Effects of interactions between wheat cultivars, bio and mineral nitrogen fertilizer on grain yield (ardab/fed) and harvest index (%) in 2020/21 season.

Characters	Grain yield (ardab/fed)			Harvest index (%)		
Bio-mineral	Wheat cultivars (V)			Wheat cultivars (V)		
	2020/21			2020/21		
fertilizer(B)	Misr3	Sakha95	Sids 14	Misr3	Sakha95	Sids 14
B1	21.18	14.40	9.57	37.18	29.08	20.35
B2	26.66	26.49	24.79	26.51	29.52	28.56
B3	29.98	25.96	22.85	33.05	30.89	30.42
B4	29.31	27.80	24.56	33.01	34.77	34.16
B5	25.52	22.66	17.64	31.91	32.06	28.19
B6	22.09	19.19	13.19	30.34	27.36	21.40
B7	21.18	16.40	12.07	33.47	28.05	22.54
B8	18.09	13.45	11.53	29.97	23.90	22.34
LSD 0.05		3.12			5.43	

CONCLUSION

It can be concluded that the application of mineral nitrogen with either blue green algae or azotobacter had a significant effect on yield, yield attributes and chlorophyll a & b. Therefore, it can be popularized that use of Misr 3 followed by Sakha 95 and Sids 14 and bio and mineral fertilizers, to maintain high grain yield and reduce environmental pollution and production costs.

REFERENCES

A.O.A.C.(1995).Association of Official Analysis Chemists. Official Methods of Analysis",15th ed., Washington, D.C., U.S.A.

Al-Erwy, A. S., A.Al-Toukhy and S.O. Bafeel (2016). Effect of chemical, organic and bio fertilizers on photosynthetic pigments, carbohydrates and minerals of wheat (*Triticum aestivum* L.) irrigated with sea water. Int. J. Adf. Res. Biol. Sci, 3(2): 296-310.

El-Khateeb, N. M. and M. M. Metwaly (2019). Influence of some bio-fertilizers on wheat plants grown under graded levels of nitrogen fertilization. Int. J. Environ, 8(1): 43-56.

El-Naggar, N. Z. (2018).Impact of cultivars, bio-fertilizer and n fertilizer levels on nitrogen use efficiency (NUE) and yield of wheat (*Triticum aestivum* L.). Zagazig Journal of Agricultural Research 45 (6): 1843-1854.

Fasusi, O. A., C.Cruz and O. O. Babalola (2021). Agricultural sustainability: microbial biofertilizers in rhizosphere management. Agriculture, 11(2): 163.

Gomez, K. A. and A. A.Gomez (1984).Statistical procedures for Agricultural Research., (2nd ed.), pp.20-29&359-387.John Wiley& Sons, Inc. New York 10158, USA.

Hadwan, H. A., A.J. Francis, E. M. Rafal and M.H. Muntaser (2019).Effect of biofertilizers on yield and yield components of wheat (*Triticum aestivum*. L) under Iraqi conditions. Int. J. of Appl.Agric.Sci.,5(2): 45-49

Hassanein, M. S., A. G. Ahmed and N. M. Zaki (2018). Effect of nitrogen fertilizer and bio-fertilizer on yield and yield components of two wheat cultivars under sandy soil. Middle East J. Appl. Sci., 8(1): 37-42.

Mahdi, A. H. and S. K. Ismail (2015). Wheat productivity as affected by plant density and nitrogen fertilizer. International Journal of Current Microbiology and Applied Sci., 4(6): 870-877.

Mohammadi, K. and Y.Sohrabi (2012). Bacterial biofertilizers for sustainable crop production: a review. ARPN. J. Agric. Biol. Sci., 7(5): 307-316.

Moran, R. (1982).Formulae for determination of chlorophyll pigments with N, N-Dimethylformamid. Plant Physiol., 69 (6): 1376-1381.

Nabila, M. Z., G. A.Amal, M. S.Hassanein and E. G. Mirvat (2015). Response of two wheat cultivars to foliar fertilizer in newly cultivated land. Middle East J. Agric. Res, 4(2):283-290.

Namvar, A.and T.Khandan (2013). Response of wheat to mineral nitrogen fertilizer and biofertilizer (*Azotobacter sp. and Azospirillum sp.*) inoculation under different levels of weed interference. Ekologija. Res. Club., Ardabil, Islamic Azad Univ.,59(2):85-94.

Sahoo, R. K., M. W.Ansari, T. K.Dangar, S.Mohanty and N.Tuteja (2014). Phenotypic and molecular characterisation of efficient nitrogen-fixing Azotobacter strains from rice fields for crop improvement. Protoplasma, 251: 511-523.

Shaalan, A., M. A.Attia and M. A. Hassaan (2019). Response of some wheat cultivars to sowing dates and biofertilizers under North- West coast of Egypt. J. of Agron., *41*(3): 313-324.

Taha, A., T.El-Zehery, A. El-Aal and T.El-khadrwy (2017). Comparative of some micro organisms on sandy soil fertility and wheat productivity. Journal of Soil Sciences and Agricultural Engineering, 8(5): 203-208.

Yasin, M., K.Ahmad, W.Mussarat and A.Tanveer (2012). Bio-fertilizers, substitution of synthetic fertilizers in cereals for leveraging agriculture. Crop Environ, 3(1-2): 62-66.

Zaghloul, R. A., T. M.El-Husseiny, E. A.Hanafy and A.GH (2010). Effect of biofertilization and organic manuring on soil dehydrogenase activity, macronutrients and essential oil content of marjoram. Egypt J Microbiol Special, (13th), 15-32.

تأثيرالتسميد النيتروجينى الحيوى والمعدني على محصول و نمو ثلاثة أصناف من قمح الخبز فى التربة الطينية

محمد عمر الفاروق [1]، حنان عيسي غانم[1] و بسمة السيد محمد السماحي[2]

[1] قسم بحوث القمح- معهد بحوث المحاصيل الحقلية – مركز البحوث الزراعية – مصر

[2] قسم بحوث تكنولوجيا البذور- معهد بحوث المحاصيل الحقلية – مركز البحوث الزراعية - مصر

الملخص

أجريت هذه الدراسة بمحطة البحوث الزراعية بالجميزة ، مركز البحوث الزراعية خلال موسمي 2020/2019 و2021/2020. لدراسة تأثير ثمانية معاملات من الطحالب الخضراء المزرقة والأزوتوباكتر منفردا أو متحدا مع نسبة من التسميد النيتروجيني المعدنى 1:(بدون تسميد)، 2:(75 وحدة نيتروجين للفدان)، 3:(50 وحدة نيتروجين للفدان + 5كجم طحالب خضراء مزرقة للفدان)، 4: (50 وحدة نيتروجين للفدان + 5كجم الأزوتوباكترللفدان)، 5: (25 وحدة نيتروجين للفدان+ 5كجم طحالب خضراء مزرقة للفدان + 5 كجم الأزوتوباكترللفدان)، 6: (5كجم طحالب خضراء مزرقة للفدان + 5 كجم الأزوتوباكترللفدان)، 7: (5 كجم طحالب خضراء مزرقة للفدان)، 8:(5كجم الأزوتوباكترللفدان) علي إنتاجية ثلاثة أصناف من القمح (مصر3 و سخا 95 وسدس 14) ومحتوي النبات من كلوروفيل A وكلوروفيل B. وتم تنفيذ التجربة فى تصميم القطع المنشقة في ثلاث مكررات. إختلفت أصناف القمح بشكل كبير في جميع الصفات حيث سجل الصنف مصر 3 أكبر عدد السنابل/ م² ، وزن الألف حبة ، المحصول البيولوجي ، محصول الحبوب ، دليل الحصاد و محتوي الكلوروفيل فى النبات في كلا الموسمين. وأظهرت النتائج أن معامله التسميد الحيوي 4 سجلت أعلى عدد من السنابل/ م² ، وزن الألف حبة ، محصول الحبوب ، دليل الحصاد والكلوروفيل أ و ب. كما أظهرت النتائج أن تأثير التفاعل بين معاملات الأسمدة وأصناف القمح كان معنويا على عدد السنابل/ م² ، محصول الحبوب ، دليل الحصاد والكلوروفيل.و أشارت أيضا هذه النتائج إلى أن الصنف مصر 3 أعطى أعلى محصول حبوب للفدان في كلا الموسمين بمعاملات السماد الحيوي متحدا مع التسميد النيتروجيني. وبالتالي فإن استخدام السماد الحيوي أدى إلى زيادة معنوية في المحصول ومحتوى الكلوروفيل بالنبات.