Improving some Wheat Cultivars Productivity Using Hypertonic and Humic Acid in Saline Soils

Gomaa, M. A., F.I. Radwan, E. E. Kandil and N.A.S. Abdul Mawla
Plant Production Department, The Faculty of Agriculture (Saba Basha), Alexandria University, Egypt

ABSTRACT: In order to improve productivity of three wheat cultivars as affected by soil salinity conditions by using nano- technological compound (Hypertonic) and humic acid, two field experiments were conducted at the Abess Region, Alexandria Governorate, Egypt, during 2014/2015 and 2015/2016 growing seasons, in split plot design in three replications. The main plots included four salinity alleviated compounds namely; Hpertonic (nano-compound), Humic acid (HA), Hypertonic + HA, and control treatments, while three wheat cultivars (Sakha 93, Sids 12 and Giza 168) was allocated in the sub plot. The results revealed that significant increase was recorded on plant height (cm), spike number/m^2, spikelets number/spike, grains number/spike, 1000- kernel weight, grain, straw, and biological yields (tons/ha.) as well as harvest index % by using Hypertonic + humic acid in both growing seasons. Sids cultivar recorded the highest mean values for the previous mentioned characters under study. Sowing Sids 12 cultivar under the application of nano-compound and humic acid recorded the highest mean values of yield and its components as compared with Sakha 93 and Giza 168 cultivars under Alexandria conditions.
Key words: *wheat, cultivars, productivity, humic acid, nano-compound, salinity, hypertonic*

INTRODUCTION

Wheat (*Triticum aestivum,* L.) is the most widely grown crop in the world with its unique protein characteristics that serves as an important source of food and energy (Abedi *et al*., 2010). Mature wheat grains contain 8–14% protein, which are divided into two major categories: prolamins including gliadins and glutenins and non-prolamins consisting of water-soluble albumins and salt-soluble globulins (Singh and Skerritt, 2001).

Introduction of the first generation of technology to agriculture resulted in the green revolution and changed the traditional agriculture to modern intensive agriculture. Today, nanotechnology as a novel technology has solved many problems in different fields of science and industry and has found its position and functions in agriculture. Nanotechnology has various functions in all stages from production, processing, storage, packing and transportation of agricultural products (Scott and Chen, 2003).

The use of nano- compounds leads to reduce the toxicity of the soil and increased efficiency of the elements to at least reach the negative effects caused by the consumption of excessive consumption of fertilizers and reduce the frequency of application of fertilizers (Naderi and Danesh Shahraki, 2011).

The mechanism of humic acid activity in promoting plant growth is not completely known, but several explanations have been proposed by some

researchers such as increasing cell membrane permeability, oxygen uptake, respiration and photosynthesis, phosphate uptake, and root cell elongation (Türkmen *et al.,* 2004), Moreover addition of HA to soil increases the rate of absorption of ions on root surfaces and their penetration into the cells of the plant tissue. Humic acid (HA) application positively affected the plant parameters of plants grown in salinity condition (Türkmen *et al.,* 2005). It also increases both mater and fertilizer retention and stimulate beneficial microbial activity.

Humic acid is an important constituent of soil organic matter which enhances the growth and yield of crops and improves soil physical and chemical characteristics, such as aeration, permeability, water holding capacity, aggregation, availability and transportation of ions through pH buffering (Khan *et al.,* 2012).

This investigation aims to improve some wheat cultivars productivity using nano- technology compound (hypertonic) and humic acid in salt- affected soils.

MATERIALS AND METHODS

Two field experiments were conducted at the Experimental Station Farm of the Faculty of Agriculture (Saba Basha), Alexandria University, Egypt, during 2014/2015 and 2015/2016 growing seasons, to investigate the effect of nanocompound and humic acid on some wheat cultivars under salinity conditions.

A split- plot design with three replicates was used. N and humic acid (HA) application) i.e. Hypertonic (Nano), Humic acid, Hypertonic + humic acid, and control treatment were arranged in main plots. Wheat cultivars (Sakha 93, Sids 12, and Giza 168) were allocated in sub-plots.

The size of each plot was 10.5 m^2 (3.5 x 3.0 m) surrounded by ditches to avoid water movement into adjacent plots.

Humic acid (Table 1) was applied with sowing at rate of 5 kg/fed. While Nano- compound (Hypertonic which structured from 10% Ca, 15 % carbocyclic acids, 10 % Seaweed extract and 5 % Biosac) was applied at rate of 5.00 L/fed., with each irrigation every 25 days.

Table (1). Humic acid analysis

Product analysis	
Product name	Techno Potas- Humic acid
Formula (W/W)	12% K_2O – HA 75 %
Potassium K_2O (on dry basis)	12 % (W/W)
Humic acid (on dry basis)	75 % (W/W)
Moisture	15 (Max.)
P^H (1% solution)	9 -10 (Max.)
Water solubility	95 % (Min.)

The sowing method was broadcasting in both seasons. Sowing dates were 21th and 28th November in both seasons 2014/2015 and 2015/2016, respectively, while, seeding rate was 70 - 80 kg grains/fed., according to wheat cultivar. First irrigation was applied 25 days after sowing and then plants were irrigated every 25 days till the dough stage.

Nitrogen fertilizer at rate of 75 kg N/fed. In the form of urea (46.50 %N), was added in three doses. The first dose (20 kg N/fed.) was added at sowing time, the second dose (35 kg N/fed.) was added with the first irrigation (25 days after sowing) and the third dose (20 kg N/fed.) was added (25 days after the first irrigation). Calcium Super phosphate fertilizer (15.5 % P_2O_5) was applied before sowing at rate of 100 kg/fed., (the recommended dose). Potassium fertilizer was applied before sowing (during seedbed preparation) at rate of 50 kg/fed., in the form of potassium sulphate (48 % K_2O) (the recommended dose).

The preceding crop was maize (*Zea mays* L.) in both cropping seasons. Soil samples of the experimental sites were taken at the depth of (0-30 cm). Physical and chemical analysis were done according to Chapman and Pratt (1978) are presented in Table (2)

Table (2). Some Physical and chemical properties of the experimental soil in 2014 / 2015 and 2015/2016 seasons.

Soil properties	Season	
	2014/2015	2015/2016
A) Mechanical analysis		
Clay %	38	37
Sand %	32	33
Silt %	30	30
Soil texture	Clay loam soil	
B) Chemical properties		
P^H (1 : 1)	8.20	8.31
EC (dS/m)	3.80	3.70
1) Soluble cations (1:2) (cmol/kg soil)		
K^+	1.52	1.54
Ca^{++}	9.4	8.7
Mg^{++}	18.3	18.5
Na^{++}	13.50	13.8
2) Soluble anions (1 : 2) (cmol/kg soil)		
$CO_3^{--} + HCO_3^-$	2.90	2.80
Cl^-	20.4	19.80
SO_4^{--}	12.50	12.60
Calcium carbonate (%)	6.50	7.00
Total nitrogen (%)	1.00	0.91
Available phosphorus (mg/kg)	3.70	3.55
Organic matter (%)	1.41	1.40

Plant height (cm), yield and its components were characterized as spike length (cm), spike number/m^2, spikelets number /spike, grains number /spike, 1000-grains weight (g), grain yield, straw yield, biological yield (kg/fed) and harvest index (%).

All data collected were subjected to analysis of variance according to Gomez and Gomez (1984). All statistical analysis was performed using analysis of variance technique by means of CoStat computer software package (CoStat, Ver. 6.311., 2005).

RESULTS AND DISCUSSION

Data presented in Table (3) reveal the effect of nano- compounds (hypertonic) and humic acid (HA) application on plant height (cm), spikes number/m^2, spikelets number/spike, grains number/spike and 1000- kernel weight (gm) of Sakha 93, Sids 12 and Giza 168 wheat cultivars under salinity soil conditions in 2014/2015 and 2015/2016 seasons. Whereas nano- compounds (hypertonic) and humic acid, significantly, affected on these attributes during both cropping seasons. Whereas, the highest mean values of those characters were recorded with Hypertonic + humic acid as compared with other treatments in both seasons. The increase in these characters may be due to the role of hypertonic and humic acid decreasing salinity effect on wheat plants. These results are in agreement with those obtained by Tahir *et al.* (2009); Saruhan *et al.* (2011); Harsini *et al.* (2014); Akhtar *et al*. (2015) who concluded that humic acid and nano-compound increased growth and yield and its components.

Significant, differences among wheat cultivars for plant height (cm), spikes number/m^2, spikelets number/spike, grains number/spike and 1000- kernel weight (gm) are shown in Table (3) during the two cropping seasons. The cultivar “Sids 12” recorded the highest mean values of above mentioned attributes, while “Giza 168” cultivar gave the lowest ones during the two growing seasons. These differences between wheat cultivars are mainly due to genetic differences between the three cultivars. Hafez (2007); Majer *et al.* (2008); Abo-Marzoka (2009); Jatoi *et al.* (2011); Raza *et al.* (2012); Al-Temimi *et al.* (2013) who found high significant differences between the wheat cultivars under their studies for plant height.

Salinity alleviated compounds interact, significantly, with wheat cultivars for plant height (cm), spikes number/m^2, spikelets number/spike, grains number/spike and 1000- kernel weight (g) in both cropping seasons Table (3). Likewise, “Sids 12” cultivar treated with hypertonic + humic acid gave the highest values of these traits. Meanwhile the lowest ones were recorded by the untreated “Giza 168” cultivar (without hypertonic or humic acid) in the first and the second season, respectively.

Table (3). Average of plant attributes for three wheat cultivars (C) as affected by hypertonic, humic acid (S) and their interaction during 2014/2015 and 2015/2016 seasons

Attributes	Salinity alleviated compounds (S)	Season 2014/2015							Season 2015/2016						
		Sakha 93	Sids 12	Giza 168	Average (S)	L.S.D (S) at 0.05	L.S.D (C) at 0.05	L.S.D (CxS) at 0.05	Sakha 93	Sids 12	Giza 168	Average (S)	L.S.D (S) at 0.05	L.S.D (C) at 0.05	L.S.D (CxS) at 0.05
Plant height (cm)	Hypertonic(Nano)	99.23	108.20	88.33	98.59b	3.53	3.78	7.55	97.93	107.67	87.13	97.58b	2.47	3.70	7.39
	Humic	93.67	106.67	92.67	97.67b				88.63	108.57	91.23	96.14b			
	Hypertonic +humic	110.00	119.60	104.00	111.20a				108.70	118.90	103.47	110.36a			
	Control	98.83	111.17	84.33	98.11b				96.40	109.97	83.47	96.61b			
Average (C)		100.43b	111.41a	92.33c					97.92b	111.28a	91.33c				
Spikes number /m^2	Hypertonic(Nano)	211.67	245.00	204.00	220.22ab	43.85	30.10	60.21	213.50	253.33	215.33	227.39ab	40.10	29.51	59.01
	Humic	245.00	270.33	219.33	244.89ab				260.50	285.83	234.83	260.39a			
	Hypertonic +humic	231.67	281.33	266.00	259.67a				243.00	280.67	264.00	262.56a			
	Control	152.33	243.00	210.33	201.89b				153.17	260.00	217.17	210.11b			
Average (C)		210.17b	259.92a	224.92b					217.54b	269.96a	232.83b				
Spikelets number/spike	Hypertonic(Nano)	17.67	20.67	18.37	18.90bc	1.23	1.06	2.12	16.00	18.67	17.20	17.29c	0.741	1.08	2.15
	Humic	17.17	22.83	17.67	19.22b				17.37	22.33	16.33	18.68b			
	Hypertonic +humic	20.83	22.13	22.83	21.93a				20.33	22.33	21.83	21.50a			
	Control	17.50	19.53	16.67	17.90c				16.17	18.50	15.33	16.67c			
Average (C)		18.29b	21.29a	18.89b					17.47b	20.46a	17.67b				
Grains number/spike	Hypertonic(Nano)	47.17	55.00	48.50	50.22c	2.06	1.41	2.82	47.17	55.00	48.50	50.22c	2.06	1.41	2.82
	Humic	52.53	65.67	48.17	55.46b				52.53	65.67	48.17	55.46b			
	Hypertonic +humic	56.00	70.33	53.00	59.78a				56.00	70.33	53.00	59.78a			
	Control	47.27	52.37	43.67	47.77d				47.27	52.37	43.67	47.77d			
Average (C)		50.74b	60.84a	48.34c					50.74b	60.84a	48.34c				
1000- kernel weight (g)	Hypertonic(Nano)	46.20	50.17	42.83	46.40c	1.280	1.284	2.56	47.67	53.37	44.83	48.62c	1.81	1.34	2.67
	Humic	46.90	53.50	48.57	49.66b				48.33	56.00	48.27	50.87b			
	Hypertonic +humic	48.43	59.00	52.87	53.43a				50.53	61.67	54.20	55.47a			
	Control	38.43	48.00	38.33	41.59d				38.00	44.67	38.93	40.53d			
Average (C)		44.99b	52.67a	45.65b					46.13b	53.93a	46.56b				

-Mean values in the same column/row marked with the same letters are not significantly different at 0.05 level of probability.

The obtained data in Table (4) indicate the effect of nano- compounds (hypertonic) and humic acid (HA) application on grain, straw, and biological yields, and harvest index (H.I. %) of Sakha 93, Sids 12 and Giza 168 wheat cultivars under salinity soil conditions in 2014/2015 and 2015/2016 seasons. Whereas salinity alleviated compounds (nano- compounds (hypertonic) and humic acid), significantly, affected on these characters in both cropping seasons. Whereas, the highest mean values of these character were recorded with the hypertonic + humic as compared with other treatments in both seasons. The increase in these characters may be due to the role of hypertonic and humic acid in decreasing salinity effect on wheat plants. These results are in harmony with those obtained by Saruhan *et al.* (2011); El-Bassiouny *et al*. (2014); Akhtar *et al*. (2015); Vafa *et al.* (2015) who reported that humic acid and nano- compound increased growth and yield and its components.

Significant, differences among wheat cultivars for grain, straw, and biological yields, and harvest index (H.I. %) are shown in Table (3) during the two cropping seasons. The cultivar “Sids 12” recorded the highest mean values of above mentioned attributes, while “Giza 168” cultivar gave the lowest ones during the two growing seasons. These differences between wheat are mainly due to genetic differences between the three cultivars. El-Esh (2007); Ganbalani *et al*., (2009); Buhedma (2011); Raza *et al.* (2012); Al-Temimi *et al.* (2013); Bakry *et al.* (2013) found high significant differences between the wheat cultivars under their studies for yield and its components.

Salinity alleviated compounds interact, significantly, with wheat cultivars for grain, straw, biological yields, and harvest index (H.I. %) in both cropping seasons Table (4). Likewise, “Sids 12” cultivar treated with hypertonic + humic acid achieved the highest mean values of these traits. Meanwhile the lowest ones were recorded by the untreated “Giza 168” cultivar (without hypertonic or humic acid) in the first and the second season, respectively.

Table (4). Average of plant attributes for three wheat cultivars (C) as affected by hypertonic, humic acid a(S) nd their interaction during 2014/2015 and 2015/2016 seasons

Attributes	Salinity alleviated compounds (S)	Season 2014/2015							Season 2015/2016						
		Sakha 93	Sids 12	Giza 168	Average (S)	L.S.D. (S) at 0.05	L.S.D. (C) at 0.05	L.S.D. (C x S) at 0.05	Sakha 93	Sids 12	Giza 168	Average (S)	L.S.D. (S) at 0.05	L.S.D. (C) at 0.05	L.S.D. (C x S) at 0.05
Grain yield (kg/fed.)	Hypertonic (Nano)	1975.00	2487.04	1591.00	2017.68c	84.79	60.01	120.02	1980.00	2320.00	1656.00	1985.33b	83.75	110.57	221.14
	Humic	1949.67	2495.33	1966.89	2137.30b				1878.00	2141.67	1944.80	1988.16b			
	Hypertonic+humic	2357.27	3085.27	1955.13	2465.89a				2658.67	3226.60	1914.50	2599.92a			
	Control	1624.23	1986.53	1299.17	1636.64d				1662.23	1862.67	1316.50	1613.80c			
Average (C)		1976.54b	2513.54a	1703.05c					2044.73b	2387.74a	1707.95c				
Straw yield (kg/fed.)	Hypertonic (Nano)	2424.47	2767.49	1835.63	2342.53c	114.27	202.43	404.86	2851.83	2959.63	1900.50	2570.65b	164.68	95.56	191.13
	Humic	2421.00	2714.87	2340.87	2492.25b				2435.33	3214.67	2452.60	2700.87b			
	Hypertonic+humic	2846.67	3247.10	2206.13	2766.63a				2933.53	3839.13	2559.33	3110.66a			
	Control	2133.00	3220.53	1543.63	2299.05c				2196.60	3284.13	1679.22	2386.65c			
Average (C)		2456.29b	2987.50a	1981.57c					2604.32b	3324.39a	2147.91c				
Biological yield	Hypertonic(Nano)	4399.47	5254.53	3426.63	4360.21c	114.21	236.12	472.23	4831.83	5279.63	3556.50	4555.99b	189.83	128.58	257.16
	Humic	4370.67	5210.20	4307.76	4629.54b				4313.33	5356.34	4397.40	4689.02b			
	Hypertonic+humic	5203.94	6332.37	4161.26	5232.52a				5592.20	7065.73	4473.83	5710.59a			
	Control	3757.23	5207.06	2842.80	3935.70d				3858.83	5146.80	2995.72	4000.45c			
Average (C)		4432.83b	5501.04a	3684.61c					4649.05b	5712.13a	3855.86c				
Harvest index(H.I. %)	Hypertonic(Nano)	44.89	47.33	46.43	46.22a	1.80	1.92	3.85	40.98	43.94	46.56	43.83ab	1.73	1.69	3.38
	Humic	44.61	47.89	45.66	46.05a				43.54	39.98	44.23	42.58bc			
	Hypertonic+humic	45.30	48.72	46.98	47.00a				47.54	45.67	42.79	45.33a			
	Control	43.23	38.15	45.70	42.36b				43.08	36.19	43.95	41.07c			
Average (C)		44.51a	45.52a	46.19a					43.78a	41.45b	44.38a				

-Mean values in the same column/row marked with the same letters are not significantly different at 0.05 level of probability.

CONCLUSION

From the above results of this two growing seasons field's study, it was concluded that nano compound and humic acid increased yield and its components of wheat crop by decreasing the effect of salinity and Sids 12 cultivar gave more response with this treatment under study conditions at Abess Region, Alexandria governorate, Egypt.

REFERENCES

Abedi, T., A. Alemzadeh and S. A. Kazemeini (2010). Effect of organic and inorganic fertilizers on grain yield and protein banding pattern of wheat. Aust. J. Crop. Sci., 4:384-389.

Abo-Marzoka, S. A. M. (2009). Response of some wheat cultivars to bio-fertilization. Ph. D . Thesis Fac. of Agric. Kafr El-Sheikh Univ., Egypt.

Akhtar, K., A. Khan, M. T. Jan, M.Z. Afridi, S. Ali and S. Zaheer (2015). Effect of humic acid and crop residue application on emergence and wheat phenology, Pure Appl. Bio., 4(1): 97-103.

Al-Temimi, H. N. Gh., I. S. Alsaadawi and A. W. Al-Shahwany (2013). Screening of bread wheat (*Triticum aestivum* L.) genotypes for drought tolerance under field conditions. A Thesis Submitted to the Biology Department College of Science University of Baghdad.

Bakry, B. A., T. A. Elewa, M. F. El-Kramany and A. W. Wali (2013). Effect of humic and ascorbic acids foliar application on yield and yield components of two wheat cultivars grown under newly reclaimed sandy. Int. J. of Agron. & pl. prod. 4(6):1125-1133.

Buhedma, A. S. I. (2011). Response of some wheat varieties to nitrogenous fertilization biofertilization and seeding rates. Ph.D. thesis, Fac. of Agric. (Saba Basha) Univ. Alex.

Chapman, H.D. and R.T. Pratt (1978). Methods of Analysis for Soils, Plants and Water. Univ. California, Div.Agric Sci.169.

CoStat 6.311(2005). Cohort software798 light house Ave. PMB320, Monterey, CA93940,andUSA.email:info@cohort.com.http://www.cohort.com/Download CoStatPart2.html .

El-Bassiouny, H.S.M., A.B. Bakry, A. A. Abd El-Monem and M.M. Abd Allah (2014). Physiological Role of Humic Acid and Nicotinamide on Improving Plant Growth, Yield, and Mineral Nutrient of Wheat (*Triticum durum*) Grown under Newly Reclaimed Sandy Soil. Agric. Sci., 5: 687-700.

El-Esh, I. F. I. (2007). Effect of both mineral and biofertilization on yield and quality of wheat. Ph. D. Thesis, Fac. of Agric. (Saba Basha) Univ. Alex.

Ganbalani, A. N., G. N. Ganbalani and D. Hassanpanah (2009). Effects of drought stress condition on the yield and yield components of advanced wheat genotypes in Ardabil**.** Iran J. of Food, Agric. & Environ., 7: 228 - 234.

Gomez, W. K. and A. A. Gomez (1984). Statistical Procedures for Agric. Res., An international Rice Res. Institute Book, John Wiley and Sons. Inc. New York, USA.

Hafez, E. M. (2007). Effect of some agricultural practices on growth and productivity of wheat, M. Sc. Thesis, Kafr El-Sheikh Univ., Egypt.

Harsini, M.G., H. Habibib and G.H. Talaeic (2014). Study the effects of iron nano chelated fertilizers foliar application on yield and yield components of new line of wheat cold region of kermanshah provence. Agricultural Advances, 3(4): 95-102.

Jatoi, W. A., M. J. Baloch, M. B. Kumbhar, N. U. Khan and M. I. Kerio (2011). Effect of water stress on physiological and yield parameters at anthesis stage in elite spring wheat cultivars. Sarhad J. Agric., 27(1): 59-65.

Khan, A., A.L.I.R.Gurmani, M.Z. Khan, F. Hussain, M.E. Akhtar and S. Khan (2012). Effect of humic acid on the growth, yield, nutrient composition, photosynthetic pigment and total sugar contents of peas (*Pisum sativum* L.). Journal of the Chemical Society of Pakistan, 1: 1–7.

Majer, P., L. Sass, T. Lelley, L. Cseuz, I. Vass, D. Dudits and J. Pauk, (2008). Testing drought tolerance of wheat by a complex stress diagnostic system installed in greenhouse. Acta Biol. Szeged, 52: 97-100.

Naderi, M. R. and A. R. DaneshShahraki (2011). The optimization of fertilizers formula using nanotechnology. J. of Nanotechno., I165(4):20-22.

Raza, **M.A. S., M. F. Saleem, I. H. Khan, M. Jamil, M. Ijaz and M.A. Khan (2012).** Evaluating the drought stress tolerance efficiency of wheat (*triticum aestivum l.*) cultivars. Russian J. of Agric. and Socio-Economic Sci., 12 (12):41- 46.

Saruhan, V., A. Kusvuran and S. Babat (2011). The effect of different humic acid fertilization on yield and yield components performances of common millet (*Panicum miliaceum* L.) Scientific Research and Essays, 6(3): 663-669.

Scott, N. and H. Chen (2003). Nanoscale science and engineering for agriculture and food systems. A Report Submitted to Cooperative State Research, Education, and Extension Service, the USDA. National.

Singh, J. and J.H. Skerritt (2001). Chromosomal control of albumins and globulins in wheat grain assessed using different fractionation procedures. J. Cereal. Sci., 33, 163–181.

Tahir, M., A. Tanveer, T.H. Shah, N. Fiaz and A. Wasaya (2009). Yield response of wheat (*Triticum aestivum* L.) to boron application at different growth stages. Pak. J. Life Soc. Sci., 7:39-42.

Türkmen, O., A. Dursun, M. Turan and C. Erdinc (2004). 'Calcium and humic acid affect seed germination, growth, and nutrient content of tomato (*Lycopersicon esculentum* L.) seedlings under saline soil conditions', Acta Agric. Scandinavica, Section B- Plant Soil Sci., 54(3): 168- 174.

Türkmen, Ö., S. Demir, S. Ensoy and A. Dursun (2005). Effects of mycorrhizal fungus and humic acid on the seedling development and nutrient content of pepper grown under saline soil conditions. J. Biol. Sci., 5(5): 568-574.

Vafa, Zahra, N., A. R. Sirousmehr, A. Ghanbari, I. Khammari, and N. Falahi (2015). Effects of nano zinc and humic acid on quantitative and qualitative characteristics of savory (*Satureja hortensis* L.). International J. of Biosciences, 6(3):124-136.

الملخص العربي

تحسين انتاجية بعض أصناف القمح بإستخدام الهيبرتونيك وحامض الهيوميك فى الأراضى الملحية

محمود عبد العزيز جمعة ، فتحى ابراهيم رضوان ، عصام إسماعيل قنديل

ناصر علي صالح عبد المولى

قسم الانتاج النباتى – كلية الزراعة سابا باشا – جامعة الاسكندرية – الاسكندرية – مصر

أجريت تجربتان حقليتان بالمزرعة البحثية بكلية الزارعة سابا باشا بمنطقة أبيس جامعة الإسكندرية خلال الموسمين ٢٠١٤/٢٠١٥ و2015/2016،وذلك لتحسين أنتاجية ثلاثة أصناف من القمح بإستخدام مركب الهيبرتونيك المصنع بتكنولوجيا النانو ، حامض الهيوميك تحت ظروف التربة المتأثرة بالملوحة. تم توزيع المعاملات في تصميم القطع المنشقة مرة واحدة في ثلاث مكررات ، حيث وزعت أربع معاملات (الهيبرتونيك ، حامض الهيوميك ، الهيبرتونيك + الهيوميك اسيد ، المقارنة) على القطع الرئيسية ، ووزعت الثلاثة أصناف من القمح (سخا ٩٣ ، سدس ١٢ ، جيزة ١٦٨) فى القطع تحت الرئيسية.

ويمكن تلخيص أهم النتائج فيما يلي:

- تفوق صنف القمح سدس ١٢ على سخا ٩٣ ، وجيزة ١٦٨ معنوياً في أرتفاع النبات وعدد السنابل/م^{٢} ، عدد السنيبلات/سنبلة ، عدد الحبوب/سنبلة ، وزن ١٠٠٠ حبة ، محصول الحبوب ، القش والبيولوجى ودليل الحصاد في الموسمين. حيث أعطى سدس ١٢ أعلى متوسطات قيم لهذه الصفات فى حين أن صنف جيزة ١٦٨ اعطى أقل القيم فى موسمى الدراسة.
- معاملة نباتات القمح بمركب النانو تكنولوجى (الهيبرتونيك) وحامض الهيوميك حقق أعلى قيم للصفات تحت الدراسة ، بينما معاملة المقارنة (بدون مركب او حامض هيوميك) أعطت أقل قيم بالنسبة لارتفاع النبات والمحصول ومكوناته في موسمي الزراعة.

- كان التداخل بين عاملى الدارسة معنوياً فى معظم الصفات المدروسة خلال موسمى الزراعة حيث أعطت المعاملة بمركب الهيبرتونيك + حامض الهيوميك لصنف سدس ١٢ أعلى متوسطات قيم لأرتفاع النباتات ومحصول الحبوب ومكوناته ودليل الحصاد مقارنة بالمعاملات الأخرى خلال موسمى الدراسة. ومن الناحية الأخرى كانت أقل القيم لمعاملة المقارنة مع صنف جيزة ١٦٨ خلال الموسمين.

التوصية:

يوصى البحث بزراعة صنف سدس ١٢ ومعاملته بمركب الهيبرتونيك + حامض الهيوميك وتحسين صفات التربة عن طريق تقليل تأثير الملوحة لزيادة أنتاجية محصول القمح تحت ظروف منطقة ابيس ، الأسكندرية.