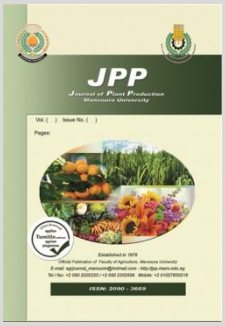
Journal of Plant Production

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

Effect of Plants Distribution Systems on Growth, Yield and Quality of Cotton Variety Giza 96 under Different Levels of NPK Fertilization

Deshish, El-D. El-D.*

Department of Agronomy, Cotton Research Institute, Agricultural Research Center, Egypt.



ABSTRACT

Two field experiments were carried out in Sakha Agricultural Research Station, Egypt during 2018 and 2019 seasons to study the effect of plants distribution systems on growth, yield and quality of Giza 96 cotton variety under different levels of nitrogen, phosphors and potassium fertilization. The experimental design was a split-plot with four replications. The main plots involved four NPK fertilization levels and the sub-plots included seven plants distribution. The results revealed that fertilization levels had a significant effect on plant height, number of fruiting branches, number of bolls/plant, boll weight and seed cotton yield/fed. The rate of NPK 125% gave the highest plant height while the rate of NPK 100% gave the highest values of no. of fruiting branches/plant, seed index and seed cotton yield/fed. Plants distribution had a significant effect on plant height, no. of fruiting branches/plant , no. of open bolls/plant, boll weight, seed index and seed cotton yield/fed. The plants distribution (80 cm row width + 25 cm hill space + 2 plant/hill) significantly increased no. of fruiting branches/plant and seed cotton yield/fed. The interaction between fertilization levels and plants distribution had a significant effect on growth and yield and its components. Fertilization levels, plants distribution and its interaction had no significant effect on fiber properties. The highest seed cotton yield of Giza 96 variety was obtained by using the rate 100% NPK fertilization and plants distribution (80 cm row width + 25 cm hill space + 2 plants/hill under the conditions of Kafr El-Sheikh location.

***Keywords*:** Cotton, Row width. Hill Space, Fertilization Levels, Plants Distribution, Growth, Yield and Fiber Quality

INTRODUCTION

Plant population in cotton is could be adjusted by manipulating inter and intra-row spacing as well as planting density. The suitable plant density per fed. was resulting into higher yield, earlier maturity and reduced cost of insect and weed control. The proper planting pattern is one of the management practices that affect canopy light interception, maturity and vegetative dry matter of the cotton plant, and the suitable distribution for these plants to decrease competition between plants within hill to meet environmental requirements and produce higher yield with good quality. Bednarz, *et al.* (2005) found that fiber properties investigated, micronaire and fineness were most affected by plant density. Obasi and Msaakpa (2005) indicated that wider hill spacing increased no. of sympodia, open bolls, boll weight and seed cotton yield while, it decreased plant height and earliness %. Srinivasan (2006) indicated that the spacing had no significant effects on plant height and number of monopods/plant. El- Shazly (1997) found that row spacing significantly affected number of open bolls and seed cotton yield /plant in favour of wider row spacing (90 cm) and also, found that seed cotton yield/fed. increased by narrow row width (60cm) while seed index and lint % were not affected by row width. Iqbal, *et al.* (2007) showed that significant differences exist for plant height, number of bolls/m2, seed cotton yield kg/ha. due to plant spacing. Boll weight, lint %, staple length, and fiber fineness were not affected significantly by the plant spacing. Molin and Hugie (2010) found that there were no significant differences in seed cotton yield, lint percentage, and lint yield between population densities. Boll numbers and boll weight were not significantly different across populations while, it did not exhibit any significant effect on plant height, micronaire, fiber length, strength, and uniformity. Sawan, *et al.* (2008) reported that number of opened bolls/plant, seed cotton yield/plant and earliness increased as plant density decreased. The intermediate plant density gave the highest yields. Plant density had no significant effect on lint percentage and fiber properties. El-Shahawy and Hamoda (2011) and Hamoda and Emara (2014) reported that decreasing plant population significantly increased number of sympodia/plant, number of open bolls/plant, boll weight and seed cotton yield/fed. while, plant height, first sympodial position, and lint % were decreased. The studied treatments did not exhibit any significant effect on all fiber properties.

In Egypt, a nutrition manner is considered as one of the most important factors affecting cotton growth. Furthermore, NPK forms are the most important plant nutrients limiting plant growth and consequently yield. Cotton growth, yield, and maturity are greatly influenced by NPK fertilizer application which increases yield and yield components and fiber quality. Mohamed *et al.* (2010), found that cotton growth, seed cotton and lint yields were significantly and progressively increased with the rise in the levels of added nitrogen. Saleem *et al.* (2010), found that fertilizer application of 120 kg N /ha proved to be best nitrogen level for obtaining high boll weight, seed cotton yield, nitrogen levels did not exhibit significant effects on fiber quality traits except the lint percentage. Rashidi and Gholami (2011), showed that N application significantly ($P \leq 0.05$) increased boll number, boll weight, seed cotton weight of boll, seed cotton yield and lint yield. Moreover, the highest seed cotton yield was obtained in case of 200 kg N/ha, study showed that effect of different application rates of N was not significant for fiber properties, i.e. fiber length, strength and fineness. Also,

* **Corresponding author.**
E-mail address: rehamdeshish@gmail.com
DOI: 10.21608/jpp.2021.156703

several studies were done to evaluate the response of cotton to different NPK levels, Seadh *et al.*, (2012), Hamoda and Emara, (2014), and Emara *et al.*, (2015) found that the final plant height, number of fruiting branches/plant, number of bolls/plant, boll weight, seed index, lint percentage and seed cotton yield/plant and /fed. increased with increasing rates of NPK applied. Elhamamsey *et al.*, (2016) revealed that the high NPK fertilizer level did not exhibit a significant effect on seed index, lint presenting and fiber properties. Emara and Abdel-Aal (2017) found that the plant height, number of fruiting branches/plant, number of bolls/plant, boll weight, seed index, seed cotton yield/plant and /fad. increased with increasing rates of NPK applied. Our objectives were to study the effect of plants distribution (row width and spacing between hills) under different fertilizer levels on growth, yield and quality of cotton variety Giza 96 under different levels of nitrogen, phosphors and potassium fertilizer.

MATERIALS AND METHODS

Two field experiments were carried out in Sakha Agricultural Research Station at Kafr El-Sheikh Governorate, Egypt, during 2018 and 2019 seasons to study the effect of plants distribution (row width and spacing between hills) on growth, yield and quality of Giza 96 cotton variety under different levels of nitrogen, phosphors and potassium fertilization. Characterized Giza 96 variety showed in Table (1). The experimental design was a split-plot with four replications. The main plots involved the four NPK fertilization levels i.e., (125% NPK, 100% NPK Control, 75% NPK and 50% NPK) of recommended NPK fertilization. The recommended NPK fertilizations (60 kg N, 22.5 kg P and 24kg K/fed.) and the sub-plots included seven plants distribution i.e.

1- 70 cm row width x 25 cm between hills x Two plants/hill Control (70x25x2 cont.),
2- 80 cm row width x 10 cm between hills x One plant /hill (80x10x1),
3- 80 cm row width x 15 cm between hills x One plant /hill (80x15x1),
4- 80 cm row width x 20 cm between hills x One plant /hill (80x20x1),
5- 80 cm row width x 20 cm between hills x Two plants/hill (80x20x2),
6- 80 cm row width x 25 cm between hills x One plant /hill (80x25x1),
7- 80 cm row width x 25 cm between hills x Two plants/hill (80x25x2).

Table 1. Characterized the Giza 96 variety.

Genotype name	**Giza 96**
Species	Barbadense.
Category	Extra-long staple and extra fine.
Pedigree	{Giza 84 x (Giza70 x Giza 51B)} x C62
Characteristics	Extra long staple variety characterized by high yielding, earliness, resistance to Fusarium wilt, high lint percentage (%) about 38%.
Botanical distinguishing characters	The stem has a length with resistance to lodging and also has a green color mixed by dim red with internodes length ranged from short to medium. The leaves have navicular shape; medium size with medium lobes and leather feel. The node of the first fruiting branch ranged from 7-8, the axillaries buds will activate to give a fruiting branch which ended with one or two bolls. Flower petals has shape like a tubular, the petals is rolling. The boll shape is conical shape with shoulder and many glands. Seed is medium-sized and the fuzz cover about 1/4 to 1/2 from the whole size and fuzz color is gray-greenish.
Hybrid bred by	Breeding Res. Section, Cotton Res. Inst., Agric. Res. Center, Giza, Egypt.

Cotton seeds were sown after two cuts of (*Trifolium alexandrinum*, L.) in 2018 and 2019 seasons, respectively. Soil samples were taken in the two seasons before planting cotton to estimate the soil characters using the standard methods as described by Chapman and Parker (1981). The mechanical and chemical analysis of the experiment soil in 2018 and 2019 seasons are shown in Table (2).

Table 2. Mechanical and chemical analysis of the experiment soil in 2018 and 2019 seasons.

Season	**Texture**	**pH**	**Organic Matter (%)**	**EC (m mhos/cm)**	**Bicarbonate (%)**	**Available elements (ppm)**		
						N	**P**	**K**
2018	Clay loam	8.06	1.63	0.77	2.12	25.72	15.70	235.0
2019	Clay loam	8.18	1.78	0.69	1.89	22.32	11.53	224.0

The sub-plot size including six rows 5 m long with the tested row width under study in both seasons, the soil texture was clay loam, low content of organic matter, low calcium carbonate and non-saline. The soils in two seasons were low in total N, Extractable-P, and low to medium in available K. Phosphorus fertilizer as ordinary superphosphate (15.5% P_2O_5) at the tested rates incorporated during seedbed preparation. Nitrogen fertilizer in the form of ammonium nitrate (33.5% N) at the tested levels was applied in two equal doses, immediately before the first and the second irrigations. Potassium in the form of potassium sulphate (48% K_2O) at the tested rates was side-dressed in a single dose before the second irrigation. The other standard agricultural practices were followed throughout the two growing seasons. Five representative hills (10 plants/sub-main plot) were taken at random in order to study the following traits; plant height at harvest (cm), no. of fruiting branches/plant, no. of open bolls/plant, boll weight (g), seed cotton yield/fed., lint percentage (lint %) and seed index (g). The yield of seed cotton in kentars/fed. was estimated from the three inner ridges, (One kentar = 157.5 kg.). Samples of lint cotton under different treatments were tested at the laboratories of the Cotton Technology Research Division, Cotton Research Institute in Giza to determine fiber properties, under controlled conditions of 65% ± 2 of relative humidity and 21° ± 2 C° temperature. Fiber length and uniformity index, fiber strength and Micronaire reading were determined on digital Fibrograph instrument 630, Pressley instrument and Micronaire instrument 675 respectively, according to A.S.T.M. (2012) at the C.R.I. laboratories. Analysis of variance of the obtained data of each season was performed. The measured variables were analysed by ANOVA using M Stat-C statistical package (Freed, 1991). Mean comparisons were done using least significant differences (L.S.D) method at 5% level ($P \leq 0.05$) of probability to compare differences between the means (Snedecor and Cochran, 1989).

RESULTS AND DISCUSSION

The results of growth traits, yield and its components and fiber properties for Giza 96 cotton variety as affected by fertilization levels, plants distribution and its interaction during 2018 and 2019 seasons are shown in Tables (3 to 5).

1- Effect of fertilization levels on growth, yield and fiber quality of cotton:

Data in Table (3) showed that the fertilization treatments had a significant effect on plant height at harvest and no. of fruiting branches/plant in both seasons. The high rate of NPK 125% gave the highest plant height at harvest while the rate of NPK 100% gave the highest no. of fruiting branches/plant in both seasons. Results presented in Table (4) indicated that fertilization levels treatments exhibited a significant effect on the number of open bolls/plant, boll weight, seed index and seed cotton yield/fed. except for lint % in both seasons, in favor of the NPK rate (100%). Similar results were obtained by Seadh *et al.*, (2012) and Emara *et al.*, (2015). The fertilization level treatments had no significant effect on all fiber properties in this investigation in both seasons (Table 5). Similar results were obtained by Elhamamsey *et al.*, (2016)

2- Effect of plants distribution on growth, yield and fiber quality of cotton:

Data in Table (3) showed that plant height at harvest and no. of fruiting branches/plant were significantly affected by plants distribution treatments. Plants distribution treatment (80 cm row width x 10 cm hill space x 1 plants/hill) had significantly increased plant height, While decreased no. of fruiting branches/plant in both seasons. The plants distribution treatment (80 cm row width + 25 cm hill space + 2 plant/hill) significantly increased no. of fruiting branches/plant compared with the other treatments. Data presented in Table (4) indicate that plants distribution treatments had a significant effect on number of open bolls/plant, boll weight, seed index and seed cotton yield/fed. While no significant effect on lint % in the two seasons. Plants distribution treatments (80 cm row width + 25 cm hill space + 2 plants/hill) gave the good values for seed cotton yield/fed. compared with the other treatments of plant distribution this increasing in yield may be to number of plants /fed. with good distribution. Similar results were obtained by El-Shahawy and Hamoda (2011). Also, data in Table (5) showed that plants distribution treatments did not exhibit a significant effect on all fiber properties in both seasons. Similar results were obtained by Iqbal, *et al.* (2007) and Hamoda and Emara (2014).

Table 3. Effect of fertilization levels, plants distribution and its interaction on growth traits of cotton during 2018 and 2019 seasons

Treatments		Plant height at harvest (cm)		No. of fruiting branches/plant	
Fertilization levels (A)	**Plants distribution (B)**	**2018**	**2019**	**2018**	**2019**
	70x25x2 cont.	160.33	165.00	13.67	12.93
	80x10x1	165.30	167.00	10.97	11.40
	80x15x1	145.30	142.00	12.90	12.83
125% NPK	80x20x1	147.30	152.20	13.07	12.87
	80x20x2	165.00	170.30	12.13	11.90
	80x25x1	143.30	145.00	13.70	13.00
	80x25x2	151.20	147.00	14.50	13.70
Mean		153.96	155.50	12.99	12.66
	70x25x2 cont.	155.33	151.33	15.20	14.10
	80x10x1	160.50	163.33	10.30	12.67
	80x15x1	141.00	140.00	12.70	12.91
100% NPK	80x20x1	143.00	142.00	13.70	13.50
	80x20x2	162.50	157.67	13.00	12.37
	80x25x1	142.30	140.00	15.10	14.00
	80x25x2	145.00	147.00	15.40	14.37
Mean		149.95	148.76	13.63	13.42
	70x25x2 cont.	150.67	152.33	12.93	11.90
	80x10x1	151.67	147.67	9.80	10.93
	80x15x1	140.00	145.00	11.87	11.73
75% NPK	80x20x1	137.50	140.00	12.00	11.97
	80x20x2	151.00	153.33	12.33	11.67
	80x25x1	135.33	139.67	13.10	12.30
	80x25x2	140.00	146.00	13.25	12.80
Mean		143.74	146.29	12.18	11.90
	70x25x2 cont.	140.67	135.00	10.67	11.87
	80x10x1	144.00	137.00	8.07	10.43
	80x15x1	142.00	140.00	10.80	10.97
50% NPK	80x20x1	135.33	133.00	11.73	11.43
	80x20x2	150.33	151.00	9.10	10.83
	80x25x1	133.67	137.33	11.53	10.73
	80x25x2	132.00	135.00	12.10	11.80
Mean		139.71	138.33	10.57	11.15
	70x25x2 cont.	151.75	150.92	13.12	12.70
	80x10x1	155.37	153.75	9.79	11.36
	80x15x1	142.08	141.75	12.07	12.11
General mean of plants distribution (B)	80x20x1	140.78	141.80	12.63	12.44
	80x20x2	157.21	158.08	11.64	11.69
	80x25x1	138.65	140.50	13.36	12.51
	80x25x2	142.05	143.75	13.81	13.17
L.S.D. at 5% for	A	0.72	0.51	0.15	0.21
	B	0.65	0.49	0.12	0.09
	A x B	1.24	1.10	0.24	0.14

Table 4. Effect of fertilization levels, plants distribution and its interaction on yield and yield components of cotton during 2018 and 2019 seasons

Treatments		No. of open bolls/plant		Boll weight (g)		Lint %		Seed index (g)		Seed cotton yield (Ken./fad.)	
Fertilization levels (A)	Plants Distribution (B)	2018	2019	2018	2019	2018	2019	2018	2019	2018	2019
	70x25x2 cont.	13.30	13.46	2.10	2.05	38.67	38.45	9.60	9.51	7.77	7.73
	80x10x1	12.53	12.76	1.80	1.76	38.80	38.96	9.15	9.33	6.80	6.93
	80x15x1	14.80	15.80	2.20	2.15	38.61	38.79	9.85	9.67	6.90	7.13
125% NPK	80x20x1	17.80	17.83	2.50	2.41	38.33	38.64	9.87	9.70	6.43	6.57
	80x20x2	12.30	12.54	2.07	2.00	38.56	38.90	9.35	9.45	7.20	7.60
	80x25x1	20.10	21.30	2.71	2.65	38.66	38.87	9.40	9.61	6.93	7.27
	80x25x2	15.10	14.35	2.21	2.25	38.78	38.75	9.70	9.85	8.13	7.93
Mean		15.13	15.43	2.23	2.18	38.63	38.77	9.56	9.59	7.17	7.31
	70x25x2 cont.	14.00	14.63	2.20	2.14	38.30	38.67	9.80	9.74	8.60	8.77
	80x10x1	13.10	12.50	1.72	1.79	38.90	38.60	9.65	9.74	6.60	6.73
	80x15x1	16.00	16.00	2.15	2.17	38.50	38.40	9.87	9.85	7.07	7.17
100% NPK	80x20x1	19.10	18.78	2.45	2.35	38.63	38.45	10.20	9.89	6.97	7.03
	80x20x2	13.10	13.45	2.10	2.05	38.60	38.74	9.68	9.75	8.33	8.50
	80x25x1	23.00	22.50	2.61	2.54	38.40	38.20	10.20	9.92	7.83	7.93
	80x25x2	16.20	16.32	2.41	2.36	38.61	38.70	9.89	9.80	9.37	9.27
Mean		16.36	16.31	2.23	2.20	38.56	38.54	9.90	9.81	7.82	7.91
	70x25x2 cont.	12.68	12.25	2.03	2.10	38.70	38.75	9.45	9.35	7.17	7.17
	80x10x1	12.67	11.90	1.71	1.83	38.90	38.96	9.17	9.25	6.90	6.93
	80x15x1	14.00	14.85	2.25	2.15	38.72	38.88	9.55	9.46	6.47	6.60
75% NPK	80x20x1	16.58	17.05	2.61	2.63	38.39	38.64	9.58	9.55	6.97	7.00
	80x20x2	12.00	13.10	1.98	1.73	38.60	38.95	9.29	9.34	7.00	7.07
	80x25x1	20.21	21.20	2.80	2.65	38.61	38.79	9.61	9.54	7.07	7.20
	80x25x2	13.00	13.10	2.30	2.26	38.82	38.55	9.54	9.42	7.40	7.60
Mean		14.45	14.78	2.24	2.19	38.68	38.79	9.46	9.42	7.00	7.08
	70x25x2 cont.	12.97	13.00	1.82	1.72	38.75	38.95	9.41	9.30	6.43	6.53
	80x10x1	11.87	12.00	1.70	1.78	38.95	38.93	9.22	9.25	6.43	6.40
	80x15x1	16.70	15.87	1.90	1.87	38.60	38.78	9.49	9.41	6.10	5.95
50% NPK	80x20x1	17.30	17.87	2.37	2.32	38.70	38.71	9.22	9.49	6.57	6.63
	80x20x2	10.30	11.10	1.84	1.73	38.78	38.98	9.21	9.36	6.03	6.13
	80x25x1	18.75	19.50	2.40	2.35	38.78	38.80	9.51	9.45	5.90	5.97
	80x25x2	14.00	14.35	1.98	1.95	38.91	38.67	9.45	9.37	6.90	6.93
Mean		14.56	14.81	2.00	1.96	38.78	38.83	9.36	9.38	6.34	6.36
	70x25x2 cont.	13.24	13.34	2.04	2.00	38.61	38.71	9.57	9.48	7.49	7.55
	80x10x1	12.54	12.29	1.73	1.79	38.89	38.86	9.30	9.39	6.68	6.75
General mean of plants distribution (B)	80x15x1	15.38	15.63	2.13	2.09	38.61	38.71	9.69	9.60	6.64	6.71
	80x20x1	17.70	17.88	2.48	2.43	38.51	38.61	9.72	9.66	6.74	6.81
	80x20x2	11.93	12.55	2.00	1.88	38.64	38.89	9.38	9.48	7.14	7.33
	80x25x1	20.52	21.13	2.63	2.55	38.61	38.67	9.68	9.63	6.93	7.09
	80x25x2	14.58	14.53	2.23	2.21	38.78	38.67	9.65	9.61	7.95	7.93
L.S.D. at 5% for	A	0.12	0.17	0.01	0.02	N.S	N.S	0.10	0.09	0.09	0.07
	B	0.10	0.09	0.02	0.03	N.S	N.S	0.03	0.06	0.06	0.04
	A x B	0.22	0.26	0.03	N.S	N.S	N.S	0.13	0.15	0.16	0.10

3- Effect of the interaction between fertilization levels and plants distribution on growth, yield and fiber quality of cotton.

Data in Table (3) showed that the interaction between fertilization levels and plants distribution treatments had a significant effect on plant height at harvest and no. of fruiting branches/plant in both seasons. NPK fertilization (125%) with plants distribution treatment (80 cm row width x 10 cm hill space x 1 plants/hill) had significantly increased plant height compared with the other interactions, While NPK fertilization (100%) with plants distribution treatment (80 cm row width + 25 cm hill space + 2 plant/hill) significantly increased no. of fruiting branches/plant in both seasons compared with the other interaction. Results presented in Table (4) showed that yield and yield components traits were significantly affected by the interaction between fertilization levels and plants distribution treatments except lint % in both seasons. The planting pattern (80 cm row width + 25 cm hill space + 2 plants/hill) and rate of NPK fertilizer (100%) gave the highest values for seed cotton yield/fed. compared with the other interactions in both seasons. Similar results were obtained by Hamoda and Emara (2014). The interaction between fertilization levels and plants distribution treatments did not exhibit any significant effect on all fiber properties in our study in both seasons (Table 5). This may be attributed to the realization that these characteristics were less affected by environmental factors.

Table 5. Effect of fertilization levels, plants distribution and its interaction on fiber properties of cotton during 2018 and 2019 seasons.

Treatments		Fiber length		Uniformity index		Fiber strength		Micronaire reading	
Fertilization levels (A)	**Plants distribution (B)**	**2018**	**2019**	**2018**	**2019**	**2018**	**2019**	**2018**	**2019**
	70x25x2 cont.	35.40	35.40	85.70	85.70	10.78	10.61	4.10	4.12
	80x10x1	35.60	35.53	86.30	87.30	10.65	10.72	3.95	4.00
	80x15x1	36.50	36.20	87.30	87.30	12.30	12.10	4.21	4.15
125% NPK	80x20x1	36.23	36.11	87.60	86.20	11.54	11.71	4.24	4.35
	80x20x2	35.17	35.20	87.06	87.06	10.90	10.85	3.95	3.90
	80x25x1	36.30	36.55	87.20	87.20	12.20	12.35	4.23	4.27
	80x25x2	35.70	35.62	86.60	86.60	11.35	11.30	4.25	4.14
Mean		35.84	35.80	86.82	86.77	11.39	11.38	4.13	4.13
	70x25x2 cont.	35.31	35.35	86.40	86.36	10.75	10.62	4.21	4.11
	80x10x1	35.35	35.45	86.60	36.71	10.65	10.78	3.85	3.96
	80x15x1	36.20	36.35	86.90	87.10	12.35	12.45	4.15	4.13
100% NPK	80x20x1	35.20	35.20	86.45	86.40	11.85	12.01	4.17	4.23
	80x20x2	35.45	35.30	86.50	86.45	10.62	10.76	3.92	3.98
	80x25x1	36.10	36.25	86.70	87.10	12.10	12.23	4.21	4.25
	80x25x2	35.61	35.54	86.70	86.55	10.61	10.48	4.15	4.17
Mean		35.60	35.63	86.61	79.52	11.28	11.33	4.09	4.12
	70x25x2 cont.	35.29	35.30	85.97	85.95	10.54	10.58	4.15	4.05
	80x10x1	35.30	35.60	85.60	85.63	10.54	10.62	3.78	3.89
	80x15x1	36.11	36.10	86.60	86.87	12.32	12.21	4.25	4.10
75% NPK	80x20x1	36.05	36.50	86.71	86.35	11.78	11.70	4.14	4.18
	80x20x2	35.35	35.80	86.10	86.15	10.45	10.65	3.95	3.93
	80x25x1	36.11	36.40	86.65	86.60	11.87	12.10	4.12	4.21
	80x25x2	35.55	35.51	86.50	86.31	10.54	10.70	4.18	4.20
Mean		35.68	35.89	86.30	86.27	11.15	11.22	4.08	4.08
	70x25x2 cont.	35.17	35.23	86.50	86.50	10.98	10.70	4.00	4.11
	80x10x1	35.10	35.25	86.40	86.40	10.55	10.49	3.82	3.71
	80x15x1	36.11	36.01	87.20	87.20	11.90	12.20	4.15	4.01
50% NPK	80x20x1	36.05	36.00	87.30	87.30	11.52	12.40	4.10	4.05
	80x20x2	35.11	35.20	86.30	86.30	10.35	10.42	3.80	3.70
	80x25x1	35.97	36.00	87.10	87.10	11.89	12.00	4.10	4.19
	80x25x2	35.45	35.40	86.20	86.20	11.50	12.20	4.15	4.11
Mean		35.57	35.58	86.71	86.71	11.24	11.49	4.02	3.98
	70x25x2 cont.	35.29	35.32	86.14	86.13	10.76	10.63	4.12	4.10
	80x10x1	35.34	35.46	86.23	74.01	10.60	10.65	3.85	3.89
	80x15x1	36.23	36.17	87.00	87.12	12.22	12.24	4.19	4.10
General mean of plants distribution (B)	80x20x1	35.88	35.95	87.02	86.56	11.67	11.96	4.16	4.20
	80x20x2	35.27	35.38	86.49	86.49	10.58	10.67	3.91	3.88
	80x25x1	36.12	36.30	86.91	87.00	12.02	12.17	4.17	4.23
	80x25x2	35.58	35.52	86.50	86.42	11.00	11.17	4.18	4.16
	A	N.S	N.S	N.S	N.S	N.S	N.S	N.S	N.S
L.S.D. at 5% for	B	N.S	N.S	N.S	N.S	N.S	N.S	N.S	N.S
	A x B	N.S	N.S	N.S	N.S	N.S	N.S	N.S	N.S

CONCLUSION

The results revealed that using plants distribution (80 cm row width + 25 cm hills space + 2 plants/hill) and the rate of NPK fertilization (100% NPK) gave the highest seed cotton yield/fed. for Giza 96 cotton cultivar under the conditions of Kafr El-Sheikh location.

REFERENCES

A.S.T.M. (2012). American Society Testing and Materials. D4605, 7(1), Easton, MD, USA.

Bednarz, C.W.; W.D. Shurley; W.S. Anthony and R.L. Nichols (2005). Yield, quality, and profitability of cotton produced at varying plant densities. Agron. J., 97(1): 235-240.

Chapman, H.D. and P.P. Pratt (1981). Methods of analysis of soil, plants and water. Univ. of California, Div. of Agric. Sci., Second Printing, Priced Publ. 4034.

El- Shazly, W.M.O. (1997). Response of transplanting cotton to row width and nitrogen rates. Alex. Sci. Exch. 18(4):475-490

Elhamamsey, M.H.; E.A. Ali and M.A. Emara (2016). Effect of some cultural practices on shedding and yield of Egyptian cotton. Assiut J. of Agric. Sci., 47(4): 41 – 51.

El-Shahawy, M.I.M. and S.A.F. Hamoda (2011). The proper agricultural management practices for the new promising hybrid cotton (Giza 77 x Pima S6). J. plant production, Mansoura Univ., 2:1551-1561

Emara, M.A. and A.S. Abdel-Aal. (2017). Effect of nano-fertilizer on productivity of cotton under nutrient stress conditions. Egypt. J. Appl. Sci., 32 (12 B): 445 – 458.

Emara, M.A.; A.S. Abdel-Aal and S.A. Hamoda (2015). Effect of water stress and foliar feeding with boron and zinc under NPK fertilizer levels on growth and yield of the new promising cotton genotype (Giza 86 x 10229). Fayoum J. Agric. Res. & Dev., 30(1):27-48.

Freed, R.D. (1991). M Stat-C Microcomputer Statistical Program. Michigan State Univ., ast Lansing, Michigan, USA.

Hamoda, S.A. and M.A. Emara (2014). Effect of Planting Patterns and Fertilization Under two Planting Dates on Growth, Yield and Quality for New Hybrid Cotton [Giza 83 (Giza 75 X 5844)] X Giza 80. The 1st International Cotton Conference "Challenges to sustainable cotton production & quality ". Giza, Egypt. Feb., 25 - 26th, 2014. pp: 26 - 27.

Iqbal, M.; Kh. Hayat and Noor-ul-islam (2007). Cotton response to mepiquat chloride and nitrogen under ultra narrow plant spacing. Asian J. Plant Sci., 6(1): 87-92.

Mohamed A.S.I.; E.A. Kamal; O. Siraj; S.A. El-Tahir, and A.H. Azhari (2010). Response of new cotton varieties to nitrogen fertilization in Sudan Gezira. African Journal of Agricultural Research. 5(11), pp. 1213-1219.

Molin, W.T. and J.A. Hugie (2010). Effects of population density and nitrogen rate in ultra-narrow row cotton. S.R.X. Agric., 868723:1- 6.

Obasi, M.O. and T.S. Msaakpa (2005). Influence of topping, side branch pruning and hill spacing on growth and development of cotton (*Gossypium barbadense,* L.) in the Southern Guinea Savanna location of Nigeria. J. of Agric. and Rural Development in the Tropics and Subtropics, 106(2):155-165.

Rashidi, M. and M. Gholami (2011). Nitrogen and boron effects on yield and quality of cotton (*Gossypium hirsutum* L.). International Research Journal of Agricultural Science and Soil Science. 1(4) pp. 118-125.

Saleem, M.; F. Bilal; M. Awais; M.Q. Shahid and S.A. Anjum (2010). Effect of nitrogen on seed cotton yield and fiber qualities of cotton *(Gossypium hirsutum, L.*) cultivars. The Journal of Animal and Plant Sciences, 20 (1): 23-27.

Sawan, Z.M.; M.H. Mahmoud and A.H. Fahmy (2008). Cotton (*Gossypium barbadense L.*) yield and fiber properties as affected by plant growth retardants and plant density. J. Crop Improv. 21(2): 171-189.

Seadh, S.E.; M.H. El-Hendi and O. E. S. Shaimaa (2012). Effect of NPK rates and humic acid applications on growth of Egyptian cotton. J. Plant Prod. Mansoura, 3(8): 2287-2299.

Snedecor G.W. and W. Cochran (1989). Statistical Methods, 8th ednIowa State University, 115 (1):153 -157.

Srinivasan, G. (2006). Agronomic evaluation of Bt cotton hybrids in summer irrigated tract of southern Tamil Nadu. J. Cotton Res. and Dev., 20(2): 224-225.

تأثير نظم توزيع النباتات على النمو والمحصول وجودة صنف القطن جيزة 96 تحت مستويات مختلفه من التسميد النتروجينى والفوسفورى والبوتاسى

الدسوقى الدسوقى دشيش*

قسم المعاملات الزراعية - معهد بحوث القطن – مركز البحوث الزراعية - الجيزة - مصر

أجريت تجربتان حقليتان بمحطة البحوث الزراعية بسخا، محافظة كفر الشيخ خلال موسمي 2018 و2019 بهدف دراسة تأثير نظم توزيع النباتات على النمو والمحصول وجودة صنف القطن جيزة 96 تحت مستويات مختلفه من التسميد النتروجينى والفوسفورى والبوتاسى لاعداد التوصيات الفنيه له. اجريت التجربه تحت تصميم القطع المنشقة مرة واحدة فى أربع مكررات حيث وضعت معدلات التسميد فى القطع الرئيسية ووضعت نظم توزيع النباتات في القطع الشقية وتتلخص أهم النتائج فيما يلى: 1- اثرت مستويات التسميد معنويا على ارتفاع النبات، عدد الافرع الثمريه وعدد اللوز المتفتح /النبات، متوسط وزن اللوزه ومحصول القطن الزهر/ الفدان حيث اعطى معدل التسميد 125 % افضل القيم لصفة طول النبات بينما اعطى المعدل 100% اقضل القيم لصفات عدد الافرع الثمرية، وزن 100 بذره و محصول القطن الزهر/ فدان 2- اثرت نظم توزيع النباتات معنويا على صفات طول النبات، عدد الافرع الثمريه وعدد اللوزالمتفتح /النبات، وزن اللوزه ووزن 100 بذره ومحصول القطن الزهر/ الفدان حيث اعطى نظام الزراعه 80 سم بين الخطوط × 25 سم بين الجور × نباتين فى الجوره زيادة معنويه لمحصول القطن الزهر/ فدان . 3- أعطى التفاعل بين معدلات التسميد ونظم توزيع النباتات تاثير معنوى على صفات النمو والمحصول. لم توثر معدلات التسميد ونظم توزيع النباتات والتفاعل بينهم على صفات التيلة. 4-يمكن استخدام التسميد بالمعدل 100% (60 ك جرام نتروجين/ فدان + 22.5 ك جرام فوسفور/ فدان + 24 ك جرام بوتاسيوم/ فدان) مع الزراعه على مسافة 80 سم بين الخطوط و25 سم بين الجورعلى نباتين فى الجوره للحصول على اعلى محصول من القطن الزهر لصنف القطن جيزه 96 تحت ظروف منطقه كفر الشيخ