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Effect of Planting Patterns and Nk Fertilizers Levels under Two Planting Date on Yield and Yield Components of Egyptian cotton In Middle Egypt

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Abstract

Two separate field experiments were conducted during 2019 and 2020 seasons, at Mallawi region, Minia Governorate, Egypt, to study the effect of two planting date, four planting patterns and three NK fertilizer levels on yield and yield components of Egyptian cotton (*Gossypium barbadense,* L.) promising hybrid cotton (CB58 X Giza 90). The results could be summarized as follows:

Planting date at 20th March was significantly increase of No. of fruiting branches plant^{-1}, No. of open bolls plant^{-1}, Boll weight, Seed index, Lint (%), Seed cotton yield plant^{-1}, Seed cotton yield fed^{-1} in both seasons. Whereas, planting date at 20th April were significantly increase of Plant height, in two season. Regarding planting patterns was significantly effect on plant height, No. of fruiting branches plant^{-1}, No. of open bolls plant^{-1}, Boll weight, Seed index, Lint (%), Seed cotton yield plant^{-1}, Seed cotton yield fed^{-1} in the both seasons. Concerning NK fertilizer levels had a significant effect on plant height, No. of fruiting branches plant^{-1}, No. of open bolls plant^{-1}, Boll weight, Seed index, Lint (%), Seed cotton yield plant^{-1}, Seed cotton yield fed^{-1} in the both seasons. Boll weight, seed index and seed cotton yield fed^{-1} in the first season and seed cotton yield plant^{-1} in the second season were affected by the interaction between planting date and planting patterns. Moreover, plant height and No. open bolls plant^{-1} were affected by the interaction between planting date and NK fertilizer levels in the first and second seasons, respectively. While, plant height and No. open bolls plant^{-1} were affected by the interaction between planting patterns and NK fertilizer levels in the first and second seasons, respectively. Regarding the interaction effect, among planting date, planting patterns and NK fertilizer levels were significant differences of No. fruiting branches plant^{-1} in the first season only. It can be concluded that early planting, 130 cm bed width + 30 cm hill space planted in two sides and fertilized by 75 kg N + 48 kg K_2O fed^{-1} under the conditions of the experiment.

Key Words: *Planting dates, planting patterns, NK fertilizer levels, yield and yield components, Egyptian cotton*

Introduction

Egyptian cotton (*Gossypium barbadense, L.*) is the most important commercial fiber crop in Egypt. Cotton plays a key role in economic activity. It is the oldest among the commercial crops and is regarded as white gold. Egyptian cotton is preferred around the world because it is long fiber cotton that makes it softer and stronger at the same time. For many years, it was so valuable that most of the crop was exported to European countries. Cotton seed meal is used in food products for animal feed due to its high protein and energetic values. So, it is necessary to increase cotton cultivation area and productivity. Cotton is not only the most important fiber crop of the world but also the second best source for plant proteins after soybean and the oil ranking fifth in the world use among edible oils **(Sawan *et al,* 2006).** Any other economic characters are influenced by the various agronomic treatments especially planting date, planting patterns the cotton plants the amount of fertilizers.

In this connection, planting date differ in cotton yield and yield attributes as reported by **El-Sayed *et al* (2016), Emara *et al* (2016), Elhamamsey *et al* (2016), Abd El-Moneim *et al* (2017), Khan *et al* (2017) and Emara *et al* (2018b).**

Effect of planting pattern (row spacing) on cotton yield and yield components were studied by several researches **Başal *et al* (2014), Hamoda and Emara (2014), Wang *et al* (2016), Ghoprial *et al* (2018), Emara *et al* (2020) and Deshish (2021a).**

Consequently, many workers came to reported that NK fertilizer levels is the most limiting factor to increase cotton yield and yield attributes by **Emara *et al* (2016), Elhamamsey *et al* (2016), Kappes *et al* (2016), Emara and Abd el-Aal (2017), Emara *et al* (2018a) and Zakzok *et al* (2018) and Deshish (2021b).**

This study aimed to investigate the suitable agricultural management practices such as planting dates, planting patterns and NK fertilizer levels of new promising hybrid cotton (CB58X Giza 90).

Materials and Methods

Two field experiments were carried out in Mallawi region, Minia Governorate, during 2019 and 2020 seasons to study the effect of two planting date (20th March and 20th April), four planting patterns **{**65 cm ridges width +25 cm hills space **(P_1)**, 65 cm ridges width + 30 cm hill space **(P_2)**, 130 cm bed width + 25 cm hill space planted in two sides **(P_3)**, 130 cm bed width + 30 cm hill space planted in two sides **(P_4)}** and

three NK fertilizer levels {45 N + 24 K2 O kg fed^{-1} **(NK_1)**, 60 N + 36 K_2 O kg fed^{-1} **(NK_2),** 75 N + 48 K_2O kg fed^{-1} **(NK_3)}** on yield and yield components of Egyptian cotton (*Gossypium barbadense,* L.) promising hybrid cotton (CB58 X Giza 90). The soil was clay in texture with a pH value of 8.14 and 8.23, an organic matter content of 1.99 and 2.05%, available N of 0.112 and 0.125% and available K of 0.330 and 0.335% during the first and second seasons, respectively. Here, it should be noted that the preceding crop was corn in the two seasons. Data in **Table 1** showed the measured climatic factors (maximum air temperature °C (Max. Temp.), minimum air temperature **°C** (Min. Temp.), Average relative humidity % (Avg. RH) and Soil Temp. °C (Min.Temp.) during the experimental period (March till October during 2019 and 2020 seasons). These data collected from automated weather station of Mallawi location.

Table 1. Average monthly climatic data of Mallawi location during the two studied seasons of 2019 & 2020.

Month	Max. Temp. °C	Min. Temp. °C	Ave. RH%	Soil Temp. °C
		First season (2019)		
March	46.2	19.0	50.8	37.9
April	36.7	18.8	57.4	29.6
May	46.1	15.9	38.5	31.6
June	46.3	19.1	39.2	35.9
July	45.9	19.5	46.2	37.2
August	46.2	19.0	50.0	38.3
September	42.6	17.1	47.9	39.2
October	33.7	18.2	47.4	38.5
		Second season (2020)		
March	47.1	20.1	49.2	38.7
April	36.9	19.4	58.2	28.8
May	44.9	16..9	39.3	32.0
June	46.8	19.5	37.9	36.4
July	44.7	20.0	45.6	38.3
August	47.7	19.7	49.1	38.3
September	44	18.1	48.7	39.4
October	35.9	18.0	48.0	39.1

The variables in each experiment were distributed as randomized complete block design (RCBD) using split split-plot arrangement with 4 replicates. Two sowing dates were arranged in the main plots, the sub plots were assigned random by to the four planting patterns randomly and the three NK fertilizers levels were arranged random in the sub sub-plots. The area of each sub sub-plot was 23.4 m^2 (including 6 ridges width of ridge was 65 cm and the length of ridge was 6 m). Phosphorus fertilizer was added at a levels of 22.5 kg after ridging and before planting in both seasons. Each season contained two separate experiments represented the two planting dates, i.e. 20th March and 20th April. Nitrogen fertilizer in the form of ammonium nitrate (33.5 % N) at the tested levels was applied before the second and third irrigations in two equal doses, Potassium fertilizers in the form of potassium sulfate (48 % K_2O) at the tested levels was applied before third irrigation in one doses. Other agricultural practices were done as recommended in region.

At harvest, random samples of ten plants were chosen from the inner rows of every sub sub-plot. The characters estimated on all the sampled plants at each sampling date were as follows: plant height (cm), No. sympodial plant^{-1}, No. open bolls plant^{-1}, boll weight (g), seed index (g), lint percentage and seed cotton yield plant^{-1}. Seed cotton yield (kentar fed^{-1}) was estimated as the weight of seed cotton yield (kg) picked from the whole plot in each experimental unit collected from two picks, then converted to yield fed^{-1}in kentar (1 Kentar = 157.5 kg seed cotton).

Data collected on different parameters were analyzed statistically by using MSTAT-C programme **(Anonymous, 1986)** for analysis of variance. Whenever, the results were found to be significant, the treatments means were compared using LSD at 0.05 level of probability **(Steel *et al.*, 1997).**

Results and Discussion

-Effect of planting dates:

Data in Table 2 showed that plant height, No. sympodial plant^{-1}, No. open bolls plant^{-1}, boll weight, seed index, lint percentage, seed cotton yield plant^{-1} and seed cotton yield fed^{-1} were significantly affected by planting dates in two seasons. The shortest plants were produced by early planting, whereas the tallest plants were recorded by late planting date. The highest values of No. sympodial plant^{-1} (20.36 and 20.45), No. open bolls plant^{-1} (15.12 and 15.62 boll), boll weight (3.01 and 2.68 g), seed index (10.72 and 9.83 g), lint percentage (6.67 and 7.24%), seed cotton yield plant^{-1} (41.09 and 34.79g) and seed cotton yield fed^{-1} (11.74 and 8.12 kentar) in The first and second seasons, respectively.

Table 2. Yield and its components of Egyptian cotton as affected by planting date in 2019 and 2020 seasons.

Characters	2019 season		LSD at 5%	2020 season		LSD at 5%
	20th March	20th April		20th March	20th April	
Plant height (cm)	138.7	148.9	0.82	137.1	140.4	1.43
No. sympodial plant^{-1}	20.36	19.64	0.22	20.45	18.34	0.06
No. open bolls plant^{-1}	15.12	12.66	0.85	15.62	13.81	0.64
Boll weight (g)	3.01	2.87	0.08	2.68	2.29	0.10
Seed index (g)	10.72	10.22	0.07	9.83	9.41	0.23
Lint (%)	6.67	6.08	0.12	7.24	6.63	0.29
Seed cotton yield plant^{-1} (g)	41.09	39.12	1.29	34.79	23.51	2.11
Seed cotton yield fed^{-1} (kentar)	11.74	8.10	0.23	8.12	6.76	0.73

The results indicated that late sown plants grew faster than early sown ones, which is evident that higher temperature provided by late sowing enhanced stem elongation of cotton plants. Cotton growth increases linearly as temperature increases. Similar results were obtained by **Hamed (2012), Deshish (2013), Deho *et al* (2014), Mohamed *et al* (2016), Abd El-Moneim *et al* (2017), Emara *et al* (2018b) and Anwar *et al* (2020).**

-Effect of planting patterns:

Data in Table 3 showed that plant height, No. sympodial plant^{-1}, No. open bolls plant^{-1}, boll weight, seed index, lint percentage, seed cotton yield plant^{-1} and seed cotton yield fed^{-1} were significantly affected by planting patterns in two seasons. The highest values of plant height (146.49 and 141.0) in the first and second seasons, respectively obtained by P1 treatment. While, the highest values of No. sympodial plant^{-1} (20.33 and 20.03) in the first and second seasons, respectively by P2 treatment. Moreover, the highest values of No. open bolls plant^{-1} (14.20 and15.16 boll), boll weight (3.12 and 2.77g), seed index (10.73 and 9.95g), lint percentage (6.71 and 7.29%), seed cotton yield plant^{-1} (40.11 and 32.48 g) and seed cotton yield fed^{-1} (10.16 and 7.94 kentar) in the first and second seasons, respectively obtained by P4 treatment. The narrow ridges decrease the yield contributing traits and ultimately the seed cotton yield and when the cotton was sown in wider ridges, plants were able to receive an additional benefit of soil moisture and nutrients during the growing season,

Table 3. Yield and its components of Egyptian cotton as affected by planting patterns in 2019 and 2020 seasons

Characters	2019 season				LSD at 5%
	P1	P2	P3	P4	
Plant height (cm)	146.49	142.70	144.52	141.58	1.08
No. sympodial plant^{-1}	19.53	20.33	19.89	20.24	0.25
No. open bolls plant^{-1}	13.43	13.80	14.14	14.20	0.35
Boll weight (g)	2.77	2.99	2.87	3.12	0.09
Seed index (g)	10.23	10.50	10.43	10.73	0.14
Lint (%)	6.08	6.42	6.27	6.71	0.16
Seed cotton yield plant^{-1} (g)	30.45	36.44	33.37	40.11	0.99
Seed cotton yield fed^{-1} (kentar)	9.70	10.15	9.68	10.16	0.22
	2020 season				
Plant height (cm)	141.0	138.4	140.0	135.5	0.90
No. sympodial plant^{-1}	18.71	20.03	19.28	19.55	0.40
No. open bolls plant^{-1}	14.19	14.85	14.66	15.16	0.31
Boll weight (g)	2.26	2.53	2.39	2.77	0.12
Seed index (g)	9.36	9.72	9.46	9.95	0.15
Lint (%)	6.65	7.03	6.78	7.29	0.09
Seed cotton yield plant^{-1} (g)	25.75	30.68	27.68	32.48	1.10
Seed cotton yield fed^{-1} (kentar)	7.10	7.56	7.18	7.94	0.28

P1= 65 cm ridges width +25 cm hills space **P2=** 65 cm ridges width + 30 cm hill space
P3= 130 cm bed width + 25 cm hill space planted in two sides
P4= 130 cm bed width + 30 cm hill space planted in two sides

which allowed more flower buds to form, which resulted in additional bolls reaching maturation and an increase in the distance between plants within the row will minimize the effect of plant shading and as aftermath, crop yield will improve. This results are in harmony with those obtained by **Baumhardt *et al* (2018), Ghoprial *et al* (2018), Emara *et al* (2020), Deshish (2021a) and Deshish (2021b).**

-Effect of NK fertilizer levels:

Data in Table 4 showed that NK fertilizer levels had a significant effect on all studied characters

in both seasons. NK3 treatment gave the highest values of plant height, No. sympodial plant^{-1}, No. open bolls plant^{-1}, boll weight, seed index, lint percentage, seed cotton yield plant^{-1} and seed cotton yield fed^{-1} in the first and second seasons. These results could be attributed to the stimulation effect of NK on the formation of more sound seeds with a heavyweight. Similar results were obtained by **Emara and Abd el-Aal (2017), MANJUNATHA *et al* (2017), Zakzok *et al* (2018), Emara *et al* (2018a), Emara *et al* (2020), Deshish (2021a), and Deshish (2021b).**

Table 4. Yield and its components of Egyptian cotton as affected by NK fertilizer levels in 2019 and 2020 seasons

Characters	2019 season			LSD at 5%	2020 season			LSD at 5%
	NK1	NK2	NK3		NK1	NK2	NK3	
Plant height (cm)	140.4	143.9	147.1	1.15	136.5	139.2	140.5	1.36
No. fruiting branches plant^{-1}	19.38	20.08	20.53	0.34	18.60	19.49	20.08	0.30
No. open bolls plant^{-1}	12.33	14.34	15.01	0.75	13.47	14.85	15.82	0.28
Boll weight (g)	2.81	2.96	3.04	0.07	2.33	2.53	2.61	0.09
Seed index (g)	10.29	10.48	10.64	0.14	9.38	9.67	9.81	0.15
Lint (%)	37.47	37.82	38.09	NS	41.37	41.98	42.21	0.37
Seed cotton yield plant^{-1} (g)	30.76	36.04	38.47	1.72	25.23	29.97	32.24	2.12
Seed cotton yield fed^{-1} (kentar)	9.58	9.97	10.21	0.30	7.12	7.49	7.71	0.30

NK1=45 kg N + 24 kg K_2O fed^{-1} **NK2=**60 kg N + 36 kg K_2O fed^{-1} **NK3=**75 kg N + 48 kg K_2O fed^{-1} **NS=**No significance

-Effect of the interactions:

Boll weight, seed index, seed cotton yield plant^{-1} and seed cotton yield fed^{-1} were affected by the interaction between planting date and planting patterns in the first season (Table 5A). Sown in 20th March under P4 treatment gave the highest values of boll weight (3.27 g), seed index (10.89 g), seed cotton yield plant^{-1} (39.64 g) and seed cotton yield fed^{-1} (12.19 kentar) in the first season. On the other hand, the lowest values of boll weight, seed index, seed cotton yield plant^{-1} and seed cotton yield fed^{-1} were obtained by sown in 20th April under P1 treatment in both seasons. Concerning, plant height and No. open bolls plant^{-1} were affected by the interaction between planting date and NK fertilizer levels in the first and second seasons, respectively (Table 5B). The tallest plants (153.94 cm) of cotton produced by sown in 20th April under NK3 treatment, while sown in 20th March under NK3 treatment gave the maximum value of No. open bolls plant^{-1}. On the other hand, the lowest value of plant height gave by sown in 20th March under NK1 treatment and the minimum value of No. open bolls plant^{-1} obtained by sown in 20th April under NK1 treatment.

Table 5A. Effect of the interaction between of planting date and patterns on some yield and its components in 2019 and 2020 seasons

Planting date	2019 season				2020 season			
	Planting patterns							
	P1	P2	P3	P4	P1	P2	P3	P4
				Boll weight (g)				
20th March	2.81	3.09	2.87	3.27	2.46	2.72	2.59	2.96
20th April	2.73	2.90	2.87	2.97	2.06	2.35	2.19	2.58
L.S.D at 5%		**0.12**				**NS**		
				Seed index (g)				
20th March	10.63	10.65	10.72	10.89	9.51	10.06	9.61	10.16
20th April	9.82	10.34	10.14	10.56	9.22	9.37	9.31	9.74
L.S.D at 5%		**0.20**				**NS**		
				Seed cotton yield plant^{-1} (g)				
20th March	31.88	38.05	34.77	41.09	30.00	36.40	33.11	39.64
20th April	36.45	29.02	34.84	31.97	21.49	24.97	22.25	25.32
L.S.D at 5%		**NS**				**1.56**		
				Seed cotton yield fed^{-1} (kentar)				
20th March	11.60	12.19	11.48	11.69	7.84	8.22	7.83	8.60
20th April	7.80	8.10	7.88	8.63	6.35	6.89	6.52	7.27
L.S.D at 5%		**0.31**				**NS**		

P1= 65 cm ridges width +25 cm hills space **P2=** 65 cm ridges width + 30 cm hill space **NS=**No significance
P3= 130 cm bed width + 25 cm hill space planted in two sides **P4=** 130 cm bed width + 30 cm hill space planted in two sides

Table 5B. Effect of the interaction between planting date and NK fertilizer levels on plant height and No. open bolls plant^{-1} in 2019 and 2020 seasons

Planting date	2019 season			2020 season		
	NK fertilizer levels kg fed^{-1}					
	NK1	NK2	NK3	NK1	NK2	NK3
	Plant height (cm)					
20th March	136.97	138.85	140.39	135.15	137.31	138.84
20th April	143.84	148.95	153.94	137.89	141.13	142.29
L.S.D at 5%	1.63			NS		
	No. open bolls plant^{-1}					
20th March	13.41	15.45	16.51	14.38	15.73	16.74
20th April	11.24	13.23	13.51	12.56	13.98	14.91
L.S.D at 5%	NS			0.40		

NK1=45 kg N + 24 kg K_2O fed^{-1} **NK2=**60 kg N + 36 kg K_2O fed^{-1} **NK3=**75 kg N + 48 kg K_2O fed^{-1} **NS=**No significance

Regarding, plant height and No. open bolls plant^{-1} were affected by the interaction between planting patterns and NK fertilizer levels in the first and second seasons, respectively (Table 5C). The highest value of plant height gave by P1 treatment under NK3 treatment, whereas, the highest No. open bolls plant^{-1} produced by P2 treatment under NK3 treatment. On the contrary, the lowest values of plant height and No. open bolls plant^{-1} were obtained by NK1 treatment under P2 and P1 treatments, respectively.

Table 5C. Effect of the interaction between planting patterns and NK fertilizer levels on plant height and No. open bolls plant^{-1} in 2019 and 2020 seasons

Planting patterns	2019 season			2020 season		
	NK fertilizer levels kg fed^{-1}					
	NK1	NK2	NK3	NK1	NK2	NK3
	Plant height (cm)					
P1	143.13	146.85	149.50	138.24	141.75	143.04
P2	137.00	144.31	146.78	135.45	139.66	140.25
P3	141.69	143.88	148.00	137.28	139.86	142.96
P4	139.81	140.56	144.38	135.13	135.60	136.01
L.S.D at 5%	2.30			NS		
	No. open bolls plant^{-1}					
P1	11.88	14.06	14.36	12.71	14.36	15.49
P2	12.69	13.98	14.74	13.24	14.59	16.74
P3	12.30	14.86	15.24	13.54	15.04	15.41
P4	12.44	14.46	15.69	14.39	15.43	15.66
L.S.D at 5%	NS			0.56		

P1= 65 cm ridges width +25 cm hills space **P2=** 65 cm ridges width + 30 cm hill space **NS=**No significance
P3= 130 cm bed width + 25 cm hill space planted in two sides **P4=** 130 cm bed width + 30 cm hill space planted in two sides
NK1=45 kg N + 24 kg K_2O fed^{-1} **NK2=**60 kg N + 36 kg K_2O fed^{-1} **NK3=**75 kg N + 48 kg K_2O fed^{-1}

Regarding the interaction effect, among planting date, planting patterns and NK fertilizer levels were significant differences of No. sympodial plant^{-1} in the first season only (Table 6). The highest value of No. sympodial plant^{-1} produced by sown in 20th March with P2 treatment under NK3 treatment. While, sown in 20th April with P3 treatment under NK1 treatment gave the lowest value of No. sympodial plant^{-1}.

Table 6. Effect of the interaction between planting date, planting patterns and NK fertilizer levels on No. sympodial plant^{-1} in 2019 and 2020 seasons

Planting date	Planting patterns	2019 season			2020 season		
		NK fertilizer levels kg fed^{-1}					
		NK1	NK2	NK3	NK1	NK2	NK3
20th March	P1	19.48	19.70	20.03	19.15	19.96	20.40
	P2	19.90	20.68	21.88	20.08	20.90	22.03
	P3	19.70	20.38	20.88	19.75	20.40	20.88
	P4	19.78	20.58	21.33	19.63	20.68	21.50
20th April	P1	18.15	20.63	19.23	16.93	17.73	18.08
	P2	19.70	19.68	20.13	18.15	19.08	19.95
	P3	19.03	19.23	20.13	17.65	18.38	18.63
	P4	19.30	19.83	20.65	17.50	18.78	19.21
L.S.D at 5%		0.97			NS		

P1= 65 cm ridges width +25 cm hills space **P2=** 65 cm ridges width + 30 cm hill space **NS=**No significance
P3= 130 cm bed width + 25 cm hill space planted in two sides **P4=** 130 cm bed width + 30 cm hill space planted in two sides
NK1=45 kg N + 24 kg K_2O fed^{-1} **NK2=**60 kg N + 36 kg K_2O fed^{-1} **NK3=**75 kg N + 48 kg K_2O fed^{-1}
It can be concluded that early planting, 130 cm bed width + 30 cm hill space planted in two sides and fertilized by 75 kg N + 48 kg K2 O fed^{-1} under the conditions of the experiment.

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تأثير نظم الزراعة ومستويات التسميد النيتروجيني والبوتاسي تحت ميعادي زراعه علي المحصول ومكوناته للقطن المصري في مصر الوسطي

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أجريت هذه الدراسة بمنطقه ملوي – محافظة المنيا خلال موسمي الزراعة 2019 و2020 لدراسة تأثير أربعة نظم الزراعة وثلاث معدلات من التسميد النيتروجيني والبوتاسي تحت ميعادي زراعه علي المحصول ومكوناته لهجين مبشر من القطن المصري في مصر الوسطي . حيث كان التصميم المستخدم قطاعات كامله العشوائية في أربعة مكررات بتوزيع القطع المنشقة مرتين حيث وضع ميعادي الزراعة في القطع الرئيسية ووضعت نظم الزراعة في القطع الشقية الأولي بينما وضعت معدلات التسميد في القطع الشقية الثانية.

ويمكن تلخيص أهم النتائج فيما يلي:.

زاد معنويا كل من عدد الافرع الثمرية نبات$^{-1}$، عدد اللوز المتفتح نبات$^{-1}$ ، وزن اللوز (جم) ، دليل البذرة ، النسبة المئوية للتصافي ، محصول النبات الفردي (جم) , محصول القطن الزهر فدان$^{-1}$ (قنطار) عند الزراعة فى 20 مارس في كلا موسمي الزراعة. بينما عند الزراعة فى 20 إبريل كانت هناك زياده معنويه في ارتفاع النبات في كلا الموسمين.

كان لنظم الزراعة تأثير معنوي لكل الصفات تحت الدراسة في كلا موسمي الزراعة. حيث كانت هناك زيادة معنوية لمعاملة الزراعة علي مصاطب **P4** لكل من عدد اللوز المتفتح نبات$^{-1}$ ، وزن اللوز (جم) ، دليل البذرة ، النسبة المئوية للتصافي ، محصول النبات الفردي (جم) ، محصول القطن الزهر فدان$^{-1}$ (قنطار) مقارنة بمعاملات نظم الزراعة الأخرى للموسمين الزراعيين.

تأثر معنويا كل الصفات تحت الدراسة بمعدلات الأسمدة النيتروجينية والبوتاسيه في كلا موسمي الزراعة. حيث أعطت معاملة إضافة 75 كجم ن + 48 كجم بو$_2$ أ فدان$^{-1}$ زيادة معنوية لكل الصفات المدروسة مقارنة بمعاملات معدلات التسميد النيتروجيني والبوتاسي الأخرى في موسمي الزراعة.

تأثر معنويا وزن اللوزة ، دليل البذرة ، محصول القطن الزهر ف$^{-1}$ في الموسم الأول فقط بينما محصول النبات الفردي في الموسم الثاني فقط بالتفاعل بين مواعيد الزراعة ونظم الزراعة. بينما تاثر معنويا طول النبات وعدد اللوز المتفتح نبات$^{-1}$ في الموسم الأول والثاني على الترتيب بالتفاعل بين مواعيد الزراعة ومعدلات التسميد النيتروجيني والبوتاسي وكذلك بالتفاعل بين نظم الزراعة ومعدلات التسميد النيتروجيني والبوتاسي. وأخيرا تأثر معنويا عدد الأفرع الثمرية نبات$^{-1}$ بالتفاعل بين مواعيد الزراعة ونظم الزراعة ومستويات التسميد النيتروجيني والبوتاسي في الموسم الأول فقط.

توصي هذه الدراسة بالزراعة في ميعاد 20 مارس والزراعة علي مصاطب مع التسميد بمعدل 75كجم نيتروجين+48كجم بوتاسيوم ف$^{-1}$.