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FLAX YIELD AND QUALITY AS AFFECTED BY ROW SPACING AND NITROGEN FERTILIZATION

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ABSTRACT

Two field experiments were carried out at Gemmeiza Agric. Res. Station Farm, El-Gharbia Governorate in 1995/96 and 1996/97 seasons, to study the effect of row spacing and nitrogen levels on yield and quality of Giza 7 flax variety. Each experiment included 20 treatments which were the combination of four row spacings (broadcasting, 15, 20 and 25 cm between rows) and five levels of nitrogen (zero, 15, 30, 45 and 60 kg N/fed). The design of the experiment was split plot design. Results obtained indicated that row spacing did not affect significantly stem diameter, upper branching zone length, seed index and seed yield/ plant in the two seasons. On the other hand, it affected significantly fiber yield/fed, total fiber percentage and fiber fineness in the two growing seasons. Row spacing affected significantly total stem length, technical stem length, number of capsules/ plant, number of seeds/capsule, number of seeds/plant, straw yield/ plant and fiber length in the first season and straw yield/ fed, seed yield/fed, oil yield/fed and oil percentage in the second one. Nitrogen rates caused a significant increase in all previous studied characters in both growing seasons except stem diameter and upper branching zone length. The effect of the interaction between row spacing and nitrogen levels on total fiber percentage and fiber fineness was significant in both seasons. The interaction affected significantly technical length, upper branching zone length and fiber length in the first season and number of capsules/plant, number of seeds/ plant, seed index, as well as straw, seed, fiber and oil yield/fed. in the second one.

It could be concluded that, growing flax at 25 cm between rows with 60 kg N/ fed gave the best characters of this crop.

INTRODUCTION

Flax is considered a very important bast fiber crop, it is grown in Egypt for its fiber and seeds (dual purpose type), its yield and quality are affected by many factors such as row spacing and nitrogen fertilizer levels. In this connection, El- Farouk *et al.* (1982) noticed that flax fiber percentage significantly decreased with decreasing row space. Abd El- Gawad (1983) found that flowering zone length, number of capsules and seed/ plant and straw yield/ plant increased by increasing row spacing with significant differences in most treatments especially between broadcasting and either 15 or 20 cm row spacing. However, varying row spacing had insignificant effect on each of stem diameter, seed index and seed yield/ plant. El- Ganayni *et al.* (1985) mentioned that row spacing had significant effect on number of capsules/ plant, number of seed/ plant, straw yield/ plant and oil percentage. But it did not affect significantly seed yield/ plant. Also, they found that yield components increased as row spacing became wider, In addition, the highest seed yield/plant was obtained at 20 cm row spacing. Guleria and Singh (1985) illustrated that cultivating flax in rows 15, 20 and 25 cm had no effect on oil seed content. El- Gazzar (1990) found insignificant differences between broadcasting treatment and drill method for technical length, stem diameter, straw yield/plant, number of capsules/plant, number of seed/ capsule, seed index, straw, seed and oil yields/fed., fiber percentage, fiber length and fiber fineness. On the other hand, the same author found significant differences for seed yield/ plant, fiber yield/ fed, and oil percentage. Hiremath *et al.* (1991) and Lafond (1993) concluded that yield of linseed did not significantly affect by row spacing. Nasir and Shahid (1993) showed that seed yield/ ha and oil content of flax seed were highest from a 25 x 10 cm row pattern without significant difference with a 25 x 24 cm row pattern. Tomar *et al.* (1993) revealed that yield of flax was higher with 25 than 20 and 30 cm row spacing.

Salwa and El- Farouk (1991) reported that plant height, straw yield/ plant, number of capsules/ plant, number of seeds/ plant, straw yield, fiber, seed and oil yields/ fed and fiber length of flax were significantly increased as N levels increased. El- Azouni (1992) concluded that increasing N level up to 60 kg/ fed caused increment in straw and seed yield/ fed of flax. Singh *et al.* (1993) showed that nitrogen application with 30 kg/ ha improved yield attributes

of flax. Shahidullah *et al.* (1994) stated that increasing nitrogen levels from zero up to 75 kg/ha increased yield components of flax. Zedan (1994) revealed that straw, seed and fiber yield/ fed, oil %, fiber length and fiber % increased by increasing N levels up to 60 kg/fed. Cremaschi *et al.* (1996) found that increasing N levels from zero to 40 and 80 kg/ha increased straw production in all 3 years and seed production in the first and third seasons. Mahdy (1996) stated that increasing N rate up to 90 kg/ fed caused a significant increasing on plant height, technical length, number of capsules/plant, straw yield/ plant, seed and oil yields/fed and fiber length of flax. Also, there were significant increase as N level was increased for straw and fiber yields/fed. Therefore, The aim of this investigation was to study the effect of four row spacings and five nitrogen rates on yield components, yield and technological characters of flax plant variety Giza 7.

MATERIALS AND METHODS

Two field experiments were carried out at El- Gemmiza Agricultural Research Station, Gharbia Governorate, during the two successive seasons of 1995/ 96 and 1996/ 97 to study the effect of row spacing and nitrogen fertilizer levels on yield, yield components and quality of flax variety Giza 7. The soil of the experimental site was clay loam.

Each experiment included four row spacings (15, 20, 25 cm between rows and broadcasting method) and five nitrogen rates (zero, 15, 30, 45 and 60 kg N/fed). The experiment assigned in split- plot design with four replications. The four row spacings were arranged randomly in the main plots; whereas the five nitrogen rates were assigned at random in the sub plots. The sub plot area was six square meters (2 x 3 m) which represents 1/ 700 of fed. Flax seeds of variety Giza 7 were sown on Nov. 11th 1995 and Nov. 5th 1996 for the first and second seasons, respectively. Nitrogen fertilizer (ammonium nitrate 33.5 % N) was applied by broadcasting in two halves. The first was applied before the 1st irrigation and the second half was added before the 2nd irrigation. The seeding rate was 40 kg/ fed. The normal agricultural practices used in flax cultivation were applied.

Before harvesting directly, ten plants were chosen at random to determine: total stem length (cm), technical length (cm), stem diameter (mm), upper branching zone length (cm), number of capsules/plant, number of seeds/capsule, number of seeds/ plant, seed index (g), straw yield/plant (g) and seed yield/plant. After harvesting, straw, seed yields/ fed., and oil yield/fed were determined from the whole plot.

After harvesting, flax straw was left for air drying, then retting was carried out. After retting process had been completed, retted straw was cleaned and left for one week in open air. Afterwards, breaking and scutching of air dried retted straw was done by special machines. After that, fiber yield/fed. (kg), fiber length (cm), fiber percentage and fiber fineness (Nm) were determined. Oil percentage in seeds was determined by the method determined according to the A.O.A.C. (1990).

Statistical analysis was carried out according to Snedecor and Cochran (1982). Duncan's multiple range test was used to compare between means (Duncan, 1955).

RESULTS AND DISCUSSION

A- Effect of row spacing:

1: Yield components:

The effect of row spacing on yield components of flax plant in 1995/ 96 and 1996/ 97 seasons is shown in Table (1). In the first season, stem length and technical stem length increased by 1.06, 0.83 and 1.97, 2.03 cm at 25 cm between rows as compared by 20 and 15 cm between rows, respectively. In the second season, there was a slight increase in stem length and technical stem length by increasing the distance between rows but the differences did not reach the 5% level of significance.

It could be concluded that total stem length and technical stem length of flax plants at 25 cm space exceeded that of other row spacing and broadcasting method. The increase in total and technical stem length of 25 cm between rows may be due to the increasing in plant numbers. These results might be explained by the more competition among plants for growth factors at wider row spacing.

Row spacing did not affect significantly stem diameter and upper branching zone length in the two seasons as shown in Table (1). Number of capsules/plant could be arranged in a descending order according to row spacing as follows: 25, 20, 15 cm and broadcasting in the two seasons. Number of seeds/ capsule and number of seeds/ plant increased significantly at 25 and 20 cm between row than at 15 cm treatment and broadcasting in the first season. Number of seeds/ plant increased by 5.26, 20.05 and 30.87 in the first season; whereas the increment was 2.93, 10.97 and 28.84 in the second season for 15, 20 and 25 cm row spacing, respectively compared with broadcasting method. The increment in number of seeds/plant by increasing row spacing may be due to the increment in number of capsule/ plant and number of seeds/capsule.

Table 1: Effect of row spacing on yield components of flax in 1995/96 and 1996/97 seasons.

Characters / Row spacing	Total length (cm)	Technical stem length (cm)	Stem diameter (mm)	Upper branching zone length (cm)	Number of capsules/ plant	Number of seeds/ capsule	Number of seeds/ plant	Seed index (g)	Straw yield/ plant (g)	Seed yield/ plant (g)
Season 1995/ 96										
Broadcasting	89.35 c	72.54 d	1.83 a	16.81 a	13.93 b	7.44 b	105.41 b	8.12 a	1.07 c	0.70 a
15 cm	89.52 c	72.86 c	1.84 a	16.66 a	14.05 b	7.71 b	110.67 b	8.29 a	1.22 bc	0.75 a
20 cm	90.43 b	74.06 b	1.84 a	16.37 a	15.13 ab	8.17 a	125.46 a	8.56 a	1.34 b	0.83 a
25 cm	91.49 a	74.89 a	1.85 a	16.60 a	16.25 a	8.13 a	136.28 a	8.72 a	1.67 a	0.88 a
Season 1996/ 97										
Broadcasting	84.46 a	69.46 a	1.85 a	15.00 a	10.99 a	6.63 a	75.44 a	8.09 a	1.51 a	0.84 a
15 cm	85.71 a	70.85 a	1.85 a	14.86 a	11.36 a	6.74 a	78.37 a	8.27 a	1.53 a	0.86 a
20 cm	85.71 a	70.87 a	1.86 a	14.85 a	12.07 a	6.80 a	86.41 a	8.30 a	1.62 a	0.92 a
25 cm	85.92 a	71.11 a	1.86 a	14.81 a	14.65 a	6.85 a	104.28 a	8.41 a	1.66 a	0.94 a

Seed index was reduced from 8.72 and 8.41 g at row spacing to 8.12 and 8.09 g at broadcasting treatment in the first and second seasons, respectively without significance in the two seasons. Flax straw yield/ plant increased significantly at 25 cm row spacing than other row spacing treatments and broadcasting method in the first season. Straw and seed yields per plant reached its maximum yield at 25 cm row spacing treatment in the two seasons, whereas it reached its minimum value at broadcasting in both seasons. The increase in straw and seed yields per plant at the treatment of 25 cm between rows in the two seasons may be due to the increase in plant height, stem diameter, number of capsules/ plant, number of seeds/ plant and seed index at 25 cm row spacing treatment than other row spacing and broadcasting as shown in Table (1). These results are in harmony with those reported by Abd El- Gawad (1983), El-Ganayni *et al.* (1985) and El- Gazzar (1990).

2- Yield :

The effect of row spacing on yield of flax is shown in Table (2). In the first season, straw, seed and oil yields per fed increased consistently as row spacing increased without significant differences. At 25 cm spacing, straw, seed and oil yields increased by 15.73%, 18.69% and 20.85 % than that of broadcasting, respectively. In the second season, the same trend was obtained with significant differences between all treatments as shown in Table (2).

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Row spacing affected significantly fiber yield/fed of flax in the two successive seasons, at the treatment of 25 cm between rows, fiber yield increased significantly by 28.12 % in the first season and 18.87 % in the second one than at broadcasting.

The increase in straw, seed, fiber and oil yields/fed by increasing row spacings may by due to the increase in straw yield/plant, number of capsules and seeds/plant, number of seeds/capsule, seed index and oil percentage for the same treatment as shown in Tables (1 and 3). These results are in good agreement with those reported by El- Gazzar (1990), Hiremath *et al.* (1991), Lafond (1993), Nasir and Shahid (1993) and Tomar *et al.* (1993).

Table 2: Effect of row spacing on yield of flax in 1995/ 96 and 1996/ 97 seasons.

Characters Row spacing	Straw yield/faddan (ton)	Seed yield/faddan (kg)	Fiber yield/faddan (kg)	Oil yield/faddan (kg)
Season 1995/ 96				
Broadcasting	2.67 a	460.81 a	508.29 b	193.96 a
15 cm	2.75 a	478.33 a	530.68 b	202.90 a
20 cm	2.97 a	503.59 a	606.05 ab	213.69 a
25 cm	3.09 a	546.96 a	651.27 a	234.41 a
Season 1996/ 97				
Broadcasting	2.79 d	474.77 d	536.53 d	198.73 d
15 cm	2.87 c	489.93 c	561.74 c	207.10 c
20 cm	2.97 b	505.01 b	604.69 b	214.49 b
25 cm	3.07 a	517.85 a	637.79 a	221.60 a

3- Technical characters:

Effect of row spacing on fiber length, total fiber percentage, fiber fineness and oil percentage of flax is shown in Table (3). In the first season, fiber length decreased by 0.94, 2.11 and 2.72 cm at 20, 15 and broadcasting treatment as compared with 25 cm row spacing, respectively. In the second season, the same trend was obtained without significant differences. Total fiber percentage increased at the treatment of 25 cm between rows by 2.08 and 1.53 % in the first and second seasons, respectively, as compared with the broadcasting treatment. Fiber fineness increased significantly at the treatment of 25 cm between rows than all other treatments in the two seasons. On the other hand, fiber fineness decreased at broadcasting treatment by 3.14, 5.19 and 6.57 Nm in the first season and 3.47, 5.90 and 7.08 Nm in the second one as compared with the treatments 15, 20 and 25 cm between rows, respectively, as shown in Table (3). Oil percentage increased significantly at the treatment of 25 cm between rows than other treatments in the second season only. The increase percent was 0.84 and 0.95% at the treatment of 25 cm between rows than the broadcasting treatment in the first and second seasons, respectively.

Table 3: Effect of row spacing on technological characters of flax in 1995/96 and 1996/ 97 seasons.

Characters Row spacing	Fiber length (cm)	Total fiber %	Fiber fineness (Nm)	Oil %
Season 1995/ 96				
Broadcasting	70.41 d	18.95 b	184.28 d	42.01 a
15 cm	71.02 c	19.17 b	187.42 c	42.27 a
20 cm	72.19 b	20.25 a	189.47 b	42.33 a
25 cm	73.13 a	21.03 a	190.85 a	42.85 a
Season 1996/ 97				
Broadcasting	67.30 a	19.14 c	183.90 d	41.81 c
15 cm	68.84 a	19.41 c	187.37 c	42.23 b
20 cm	68.94 a	20.22 b	189.80 b	42.44 b
25 cm	69.16 a	20.67 a	190.98 a	42.76 a

Generally, it looks to be true that all technological characters studied increased as row spacing increased up to 25 cm between rows. This result was true for the two successive seasons. Similar results were obtained by El-Farouk *et al.* (1982), El- Ganayni *et al.* (1985), Guleria and Singh (1985), El- Gazzar (1990) and Nasir and Shahid (1993).

B- Effect of nitrogen fertilizer levels :

1- Yield components :

Effect of nitrogen fertilizer rates on yield components of flax is shown in Table (4). Nitrogen fertilizer affected significantly total stem length, technical stem length, number of capsules/plant, number of seeds/ capsule, number of seeds/ plant, seed index, straw and seed yields/plant in the two successive seasons. These aforementioned traits increased by increasing nitrogen fertilizer up to 60 kg N/ fed. On the other hand, stem diameter and upper branching zone length decreased by increasing nitrogen rates up to 60 kg N/ fed. in the two seasons. These results may be explained on the basis that N is essential for building up protoplasm and proteins which induce cell division and elongation and this was reflected on total stem length and stem technical length than that of stem diameter. Similar results were obtained on flax by Singh *et al.* (1993), Shahidullah *et al.* (1994) and Mahdy (1996).

Table 4: Effect of nitrogen fertilizer levels on yield components of flax in 1995/96 and 1996/97 seasons.

Characters / N kg/ fed.	Total length (cm)	Technical stem length (cm)	Stem diameter (mm)	Upper branching zone length (cm)	Number of capsules/ plant	Number of seeds/ capsule	Number of seeds/ plant	Seed index (g)	Straw yield/ plant (g)	Seed yield/ plant (g)
Season 1995/ 96										
Zero	89.37 e	72.38 e	2.13 a	16.99 a	10.10 e	7.16 d	72.98 e	7.48 e	0.79 e	0.56 e
15	89.88 d	73.06 d	1.95 b	16.82 ab	12.12 d	7.49 c	91.19 d	7.98 d	1.16 d	0.64 d
30	89.98 c	73.74 c	1.81 c	16.24 c	15.49 c	8.05 b	125.04 c	8.41 c	1.41 c	0.79 c
45	90.56 b	74.19 b	1.72 d	16.37 c	17.43 b	8.25 b	143.97 b	8.86 b	1.56 b	0.91 b
60	91.22 a	74.58 a	1.61 e	16.64 e	19.06 a	8.59 a	164.08 a	9.38 a	1.71 a	1.06 a
Season 1996/ 97										
Zero	77.01 e	62.78 d	2.16 a	14.23 a	6.84 e	5.40 d	37.62 e	7.58 d	1.06 e	0.64 e
15	81.16 d	66.95 c	1.94 b	14.21 a	9.78 d	6.26 c	61.36 d	8.10 c	1.39 d	0.80 d
30	85.76 c	71.88 b	1.82 c	13.88 a	12.03 c	6.99 b	84.43 c	8.31 bc	1.61 c	0.88 c
45	88.83 b	73.86 b	1.72 d	14.98 a	14.33 b	7.32 b	105.02 b	8.55 ab	1.75 b	0.98 b
60	94.48 a	77.39 a	1.63 e	17.09 a	18.36 a	7.79 a	142.13 a	8.79 a	2.08 a	1.14 a

2- Yield :

Effect of nitrogen fertilizer levels on yield of flax plant in 1995/ 96 and 1996/ 97 is shown in Table (5).

Table 5: Effect of nitrogen fertilizer levels on yield of flax in 1995/ 96 and 1996/ 97 seasons.

Characters / N kg/ fed	Straw yield/faddan (ton)	Seed yield/faddan (kg)	Fiber yield/faddan (kg)	Oil yield/faddan (kg)
Season 1995/ 96				
Zero	2.26 d	391.83 d	420.95 e	161.85 d
15	2.57 c	465.24 c	494.31 d	194.60 c
30	2.90 b	490.27 c	576.69 c	209.05 c
45	3.19 a	532.27 b	643.07 b	229.14 b
60	3.41 a	607.52 a	735.34 a	261.56 a
Season 1996/ 97				
Zero	2.29 e	444.67 e	427.97 e	184.45 e
15	2.62 d	467.56 d	503.16 d	195.86 d
30	2.88 c	503.34 c	572.27 c	213.30 c
45	3.33 b	522.76 b	680.50 b	223.79 b
60	3.50 a	546.11 a	742.03 a	235.00 a

It is quite clear from Table (5) that nitrogen fertilizer rates affected significantly straw yield, seed yield, fiber yield and oil yield per feddan in the two growing seasons. Straw, seed, fiber and oil yields reached their maximum value at the higher nitrogen level (60 kg N/ fed.). The minimum weight of these characters were obtained at zero level of nitrogen in the two seasons. There was a consistent increase in these traits as nitrogen level increased. These results reflect the important role of nitrogen to flax plants. Nitrogen is an essential element for plant growth and development as well as yield production. Nitrogen also represents one of the main components of protein in flax seed. These results coincide with the findings of Salwa and El- Farouk (1991), El- Azonuni (1992), Zedan (1994), Cremaschi *et al.* (`1996) and Mahdy (1996).

3- Technological characters :

Nitrogen fertilizer affected significantly fiber length, total fiber percentage, fiber fineness and oil percentage of flax in 1995/ 96 and 1996/ 97 seasons as shown in Table (6). Fiber length, total fiber percentage and oil percentage reached its maximum values at 60 kg N/fed. whereas, it reached its minimum values at zero level in the two seasons. Increasing nitrogen rate up to 45 kg N/fed. caused a significant increase in fiber fineness in the two seasons. Further nitrogen application rate of 60 kg N/fed decreased significantly fiber fineness as compared with rate of 45 kg N/ fed in the two seasons.

Table 6: Effect of nitrogen fertilizer levels on technological characters of flax in 1995/96 and 1996/97 seasons.

Characters N kg/ fed	Fiber length (cm)	Total fiber %	Fiber fineness (Nm)	Oil %
Season 1995/ 96				
Zero	70.48 e	18.58 d	172.43 e	41.29 c
15	71.15 d	19.21 c	180.48 d	41.78 b
30	71.73 c	19.86 b	186.96 c	42.64 a
45	72.35 b	20.08 b	203.09 a	43.05 a
60	72.74 a	21.53 a	197.08 b	43.06 a
Season 1996/ 97				
Zero	60.43 e	18.70 e	172.98 e	41.46 e
15	64.82 d	19.20 d	180.16 d	41.88 d
30	69.84 c	19.81 c	187.04 c	42.38 c
45	72.12 b	20.39 b	203.00 a	42.80 b
60	75.58 a	21.19 a	196.88 b	43.03 a

These results are in agreement with those reported by Salwa and El- Farouk (1991), Zedan (1994) and Mahdy (1996).

C- Effect of the interaction between row spacing and N levels :

The interaction effect between row spacing and nitrogen fertilizer levels did not affect significantly total stem length, stem diameter, number of seeds/capsule, straw and seed yields/plant and oil % of flax plant in the two seasons. Consequently, the data were excluded. On the other hand, this interaction was significant on total fiber percentage and fiber fineness in the two seasons. The interaction affected significantly technical length, upper branching zone length and fiber length in the first season and number of capsules/ plant, number of seeds/plant, seed index, straw and seed yields/ fed, fiber yield/ fed and oil yield/ fed in the second one as shown in Table (7).

Table 7: Summary of the interaction effects between row spacing and nitrogen levels showing highest and lowest values recorded for the studied characters of flax in 1995/ 96 and 1996/ 97 seasons.

Characters	Significance (0.05 level)	R x N	Highest values	R x N	Lowest values	Significance (0.05 level)	R x N	Highest values	R x N	Lowest values
		1995/ 96 season					1996/ 97 season			
Technical length (cm)	*	$R_3 \times N_4$	76.40	$R_1 \times N_0$	72.07	N.S	$R_3 \times N_4$	79.05	$R_0 \times N_0$	58.20
Upper branching zone length (cm)	*	$R_3 \times N_0$	17.77	$R_2 \times N_3$	15.87	N.S	$R_0 \times N_4$	18.30	$R_0 \times N_2$	11.50
Number of capsules/ plant	N.S	$R_3 \times N_4$	20.03	$R_1 \times N_0$	9.67	*	$R_3 \times N_4$	25.50	$R_3 \times N_0$	6.20
Number of seeds/ plant	N.S	$R_3 \times N_4$	176.30	$R_0 \times N_0$	51.47	*	$R_3 \times N_4$	193.58	$R_2 \times N_0$	32.70
Seed index (g)	N.S	$R_2 \times N_3$	9.80	$R_0 \times N_0$	6.90	*	$R_2 \times N_4$	9.00	$R_0 \times N_0$	7.04
Straw yield/ fed. (ton)	N.S	$R_2 \times N_4$	3.54	$R_2 \times N_0$	2.01	*	$R_3 \times N_4$	3.59	$R_0 \times N_0$	2.09
Seed yield/ fed. (kg)	N.S	$R_3 \times N_4$	660.63	$R_1 \times N_0$	346.77	*	$R_3 \times N_4$	573.60	$R_0 \times N_0$	402.38
Fiber yield/ fed. (kg)	N.S	$R_2 \times N_4$	783.53	$R_1 \times N_0$	373.63	*	$R_3 \times N_4$	791.58	$R_0 \times N_0$	382.90
Oil yield/ fed. (kg)	N.S	$R_3 \times N_4$	284.27	$R_1 \times N_0$	143.73	*	$R_3 \times N_4$	248.67	$R_0 \times N_0$	165.00
Fiber length (cm)	*	$R_3 \times N_4$	74.63	$R_0 \times N_0$	69.93	N.S	$R_3 \times N_4$	77.48	$R_0 \times N_0$	55.88
Fiber percentage	*	$R_3 \times N_4$	22.17	$R_0 \times N_0$	18.10	*	$R_3 \times N_4$	22.05	$R_0 \times N_0$	18.33
Fiber fineness (Nm)	*	$R_3 \times N_3$	204.93	$R_0 \times N_0$	165.50	*	$R_3 \times N_3$	205.10	$R_0 \times N_0$	165.33

R = Row spacing R_0 = Broadcasting, R_1 = 15 cm, R_2 = 20 cm, R_3 = 25 cm row spacing.
N = Nitrogen fertilization: N_0 = zero N kg/fed., N_1 = 15 kg N/fed., N_2 = 30 kg N/fed., N_3 = 45 kg N/ fed., N_4 = 60 kg N/fed.

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تأثير مسافة الزراعة والتسميد النيتروجينى على المحصول ونوعية الالياف فى الكتان

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أقيمت تجربتان حقليتان بمحطة البحوث الزراعية بالجميزة- محافظة الغربية فى موسمى ٩٥/ ١٩٩٦، ٩٦/ ١٩٩٧ لدراسة تأثير المسافة بين السطور ومستويات التسميد الآزوتى على مكونات محصول الكتان والمحصول والصفات التكنولوجية للالياف والبذور فى صنف جيزة ٧ . وتضمنت التجربة على (٢٠) عشرون معاملة عبارة عن أربعة معاملات للمسافة بين السطور (بدار - ١٥ - ٢٠ - ٢٥ سم بين السطور) وخمسة معدلات من التسميد الآزوتى (صفر - ١٥- ٣٠- ٤٥- ٦٠ كجم ن / فدان) ، وكان التصميم المستخدم هو قطع منشقة مرة واحدة فى اربعة مكررات حيث وزعت معاملات المسافة بين السطور فى القطع الرئيسية ومعدلات التسميد فى القطع الشقية . وتتلخص أهم النتائج فيما يلى :

- لم يكن هناك تأثير معنوى للمسافة بين السطور على سمك الساق وطول المنطقة الثمرية ودليل البذرة ومحصول البذور للنبات خلال موسمى الدراسة ، بينما كان هناك تأثير معنوى لمعاملة المسافة بين السطور خلال موسى الدراسة على كل من محصول الالياف/ فدان

ونسبة الالياف الكلية والنعومة وكان لهذه المعاملة تأثير معنوى فى الموسم الأول فقط على كل من الطول الكلى والطول الفعال وعدد الكبسولات للنبات وعدد البذور فى الكبسولات وعدد بذور النبات ومحصول القش للنبات وطول الالياف . أما الصفات التى تأثرت معنوياً فى الموسم الثانى فقط فهى محصول القش والبذور والزيت للفدان وكذلك النسبة المئوية للزيت فى البذرة .

- أدت الزيادة من التسميد الآزوتى الى زيادة معنوية فى كل من الطول الكلى للساق والطول الفعال وعدد الكبسولات للنبات وعدد البذور للنبات والكبسولة ودليل البذرة ومحصول القش والبذور للنبات ومحصول القش والالياف والبذور والزيت للفدان وطول الالياف والنسبة المئوية للالياف الكلية ونعومة الالياف وكذلك نسبة الزيت فى البذرة خلال موسمى الدراسة وكان أفضل معدل للتسميد الآزوتى هو ٦٠ كجم ن/ فدان فى الموسمين . وعلى العكس فقد أدت الزيادة فى معدل السماد الأزوتى عن صفر الى نقص مستمر ومعنوى فى سمك الساق فى كلا الموسمين وكذلك نقص معنوى لطول المنطقة الثمرية فى الموسم الأول فقط بينما لم تتأثر هذه الصفة فى الموسم الثانى .
- لم يكن للتفاعل بين المسافة بين السطور ومعدلات التسميد الآزوتى تأثير معنوى على الطول الكلى وسمك الساق وعدد البذور فى الكبسولة ومحصول القش والبذور للنبات والنسبة المئوية للزيت خلال موسمى الدراسة . ولكن كان هناك تأثير معنوى للتفاعل خلال موسمى الدراسة على نسبة الالياف الكلية ونعومة الالياف. بينما كان التأثير معنوى للتفاعل فى الموسم الاول فقط على كل من الطول الفعال، طول المنطقة الثمرية وطول الالياف وفى الموسم الثانى كان تأثير التفاعل معنوى على كل من عدد كبسولات النبات - عدد بذور النبات - دليل البذرة - محصول القش والبذور والالياف والزيت للفدان .

من النتائج يمكن القول بأن أفضل معاملة فى معظم صفات التفاعل المعنوية هى معاملة المسافة ٢٥ سم بين السطور مع معدل ٦٠ كجم ن/ فدان .