Requirements of some flax cultivars from NPK fertilizers

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Abstract:

This investigation was carried out to study the effect of NPK fertilizer treatments on yield and its components of four flax varieties. Obtained results showed that Vaiking variety surpassed other evaluated varieties regarding total plant height, technical length, straw and fiber yields fad^{-1} and fiber percentage. Meanwhile, Giza 8 significantly surpassed other varieties in main stem diameter, number of capsules/plant, number of seeds/capsule, seed index, seed and oil yields fad^{-1} and seed oil percentage. NPK fertilizer treatments caused significant effects on all studied characters. Adding 60 kg N + 15kg P_2O_5+24 kg K_2O fad^{-1} enhanced most of the studied characters. Oil yield fad^{-1} and seed oil percentage reached the highest values by adding 60 kg N + 30 kg P_2O_5 fad^{-1}. The interaction between flax varieties and NPK fertilizer levels showed significant differences in straw, fiber, seed and oil yields/fad. The highest straw and fiber yields were achieved by Vaiking variety, whereas the greatest seed yield/fad was produced from Giza 8 when both were fertilized with 60 kg N + 15 kg P_2O_5 + 24 kg K_2O fad^{-1}. Meanwhile, the highest oil yield/fad was produced from Giza 8 when fertilized with 60 kg N + 30 kg P_2O_5 fad^{-1}.

Introduction :

As a result of the decrease in flax area nowadays in Egypt, a gap between the production and consumption has been increased. This gap could be minimized by increasing flax yield/unit area through planting high yielding varieties and optimizing agricultural practices. Proper fertilization is among numerous factors involved in this concern. Doubtless, application of NPK fertilizers plays an important role for obtaining high flax yield .

Concerning flax varieties, Momtaz *et al*. (1989) found that Giza 7 and Giza 8 were significantly higher in seed, straw and fiber yields fad^{-1}, plant height and seed index than Giza 5 variety. They also stated that Giza 7 surpassed Giza 8 in straw and fiber yields fad^{-1}, plant height and fiber

percentage. On the other hand, seed yield fad^{-1}, seed index and seed oil percentage from Giza 8 variety were higher than those from Giza 7. El-Gazzar (1990) found that Blanka variety had higher values of fiber percentage, fiber yield fad^{-1} than Giza 5 and family 74/9/1. Meanwhile, Giza 5 CV and Family 2419/1 surpassed Blanka CV in seed oil percentage and oil yield fad^{-1}.

El-Sewify (1993) reported that Giza 7 surpassed other flax varieties in technical length straw yield/fad and fiber percentage. On the other hand, S. 2419/1 was superior in number of capsules/plant, seed yield fad^{-1}, seed index, seed oil percentage and oil yield/fad. El-Kady *et al*. (1995) evaluated six promising genotypes (S.355, S .341, Giza 7, Giza 8, S.2419 and S .297). They reported that S.341 was the best genotype in straw yield and its related characters, followed by Giza 7. They also found that Giza 8 was the best genotype in seed yield and its components in the first season, while S.341 and S.355 were the best in the second season .El -Sweify and Mostafa (1996) found that O.S 2419/1 genotype surpassed Giza 8 and Belinka in all growth characters as well as straw and seed yields fad^{-1}. Belinka genotype gave the highest mean values of technical stem length and fiber percentage. Salama (1996) showed that Giza 8 variety markedly surpassed Giza 7 and Ariana varieties in the number of capsules/plant, 1000 seed weight, seed and straw yields fad^{-1} and seed oil percentage. However, Giza 7 variety ranked second and out yielded the other varieties in plant height and technical length in one season. Ariana CV. was less adapted at Mansoura region.

Regarding the effect of N, P and K fertilizers, Yadav *et al.* (1990) illustrated that increasing rates of N and P increased 1000 - seed weight. Seed oil percentage increased with increasing P rates, but it was not affected by N rates. The optimum N and P_2O_5 rates were 78 and 25 Kg /ha, respectively. Sarode and Naphade (1993) found that seed yield of linseed increased with increasing rate of P up to 10 Kg P $_2O_5$ while seed oil content was slightly increased by P application. Moreover, Chaubey and Dwivedi (1995) reported that P application increased seed yield by 17.3 and 14.1 % in two growing seasons. Dubey (1994) in India found that the highest seed yield and net return of flax CV. JLS-23 came from the applicati on of 60 Kg N and 30 Kg P $_2O_5$/ha. Abd El-Samie and El-Bially (1996) reported that there was a significant increase in plant height, technical length, number of fruiting branches/plant, number of capsules/plant, number of seeds/capsule,

1000 seed weight and yields of seeds and straw fad^{-1} with each increase in the applied nitrogen at the rate of 30, 40 and 60 kg N fad^{-1}. They also found a marked increase in oil yield with increasing nitrogen rates from 30 to 60 Kg fad^{-1}. Salama (1996) showed that application of N fertilizer at 60 or 80 Kg N fad^{-1} did not induce marked increases in the studied characteristics and stated that N fertilizer level should not exceed 40 Kg N fad^{-1} for flax production in Mansoura region. Haniyat El-Nimr *et al*. (1997) reported that increase of nitrogen levels from 45 to 70 Kg N fad^{-1}. caused a significant increase in most of all studied characters (i.e., number of capsules/plant, straw, fiber and seed yields/fad). Application of 95 Kg N fad^{-1} decreased the values of seed index, seed oil percentage and oil yield fad^{-1}. On the other hand, technical length was increased as nitrogen level increased from 45, 70 to 95 Kg N fad^{-1}.

As for the interaction between flax varieties and fertilizer treatments, Hella *et al.* (1987) stated that maximum straw and seed yields fad^{-1}, number of capsules/plant, number of seeds/capsule and seed index were obtained in both Giza 5 and Giza 6 cultivars by applying 60 kg N + 30 Kg P_2O_5 + 30 Kg K_2O fad^{-1}. Leilah (1993) found that the interaction between flax cultivars and nitrogen levels had significant effects on technical length of stem as well as seed and straw yields fad^{-1}. Meanwhile, Giza 7 recorded the highest straw yield with the application of 50 or 60 Kg N fad^{-1}. Dwivedi *et al*. (1994) stated that seed yield of flax Jawahar CV. increased with adding 30 Kg N and 30 Kg P_2O_5 ha^{-1}.

Materials and Methods:

This investigation was carried out at Gemmeza Research Station, Egypt, during the two successive seasons of 1994/1995 and 1995/1996 to study the effect of different N P K fertilizer treatments on yield and its components of two types of flax, i.e. fiber type (Vaiking and Eriana) and dual purpose type (Giza 7 and Giza 8). A spilt plot in a randomized complete block design with four replications was used. The main plots were devoted to four varieties and the sub plots were assigned to the following 12 fertilizer treatments:

N	30	30	30	30	45	45	45	45	60	60	60	60
P	0	15	30	0	0	15	30	0	0	15	30	0
K	0	24	0	48	0	24	0	48	0	24	0	48

The soil of the experimental site was clay loam. Available N, P and K were 38.2, 19.3 and 531 ppm in the first season and 40.6, 13.2 and 612 ppm in the second season, respectively.

Sowing was done by using hand drill in rows on 22th Nov. and 9th Nov. in the first and second seasons, respectively. Sowing rate was 50 kg fad^{-1} for fiber type and 60 kg fad $^{-1}$ for dual type. The experimental plot size was 6.0 m^2. Each plot contained 10 rows 20 cm a part . Phosphorus fertilizer in the form of calcium super phosphate (15.5% P_2O_5) was added broadcasting prior to sowing. Nitrogen in the form of Urea (46% N) and potassium fertilizers in the form of potassium sulphate (48% K_2O) were applied broadcasting to the plots on two equal doses (before the first and second watering). The previous crop was corn *(Zea maize, L)* in both seasons. The experimental field area was well prepared. Irrigation was done on the following day of sowing. Other irrigations were performed approximately at 25 days intervals . Weeds were chemically controlled using Brominal W at a rate of 0.5 L fad $^{-1}$. Normal cultural practices for growing flax crop, except the studied factors, were practiced.

Studied characters :

At the full maturing stage, ten guarded plants were chosen at random from each plot for yield components determination as follows:

- Total plant height (cm): The length of the main stem from the cotyledonary node to the top of the plant.
- Technical stem length (cm): The length of the main stem from cotyledonary node to the lowest branching zone.
- Number of capsules/plant.
- Number of seeds/capsule.
- Seed index (1000 seed weight in grams).
- Seed and straw yields/fad were estimated from the central area of four square meters using wooden frame (2 * 2 m), which were converted to the recorded seed and straw yields in ton/fad.
- Fiber yield (kg fad^{-1}): The harvested straw was arranged in bundels and rotted in cement basin at the Fiber Crop Research Section, Giza. After soaking flax straw for 12 hours, the water was changed to leach out all the soluble materials. During the rest of the retting period, Ph value of retting water was estimated by Bechman apparatus. The optimum

temperature of water during retting process was maintained at 28 – 32° C and the acidity at 6 - 7 Ph, while the ratio between straw and water was 1:13. The retted straw was washed thoroughly with clean water and dried in the open air. After breaking the retted dried straw by machine and scotching by hand, fiber of individual plants were separated and fiber weight/m^2 and determined. Thereafter, it was converted to the recorded fiber yield in kg fad^{-1}.

- Fiber percentage : Fiber percentage was calculated as a percentage of the fiber yield to the air dried straw yield after removing fruit capsules.
- Seed oil percentage : It was determined according to Horwitz *et al.*(1965) using soxhlet apparatus.
- Oil yield (kg fad^{-1}): It was estimated by multiplying seed oil percentage by seed yield fad^{-1}.

Statistical analysis:

The obtained data were statistically analysed by the technique of analysis of variance for the split plot design as mentioned by Gomez and Gomez (1984). The treatment means were compared using the Newly Least Significant Difference (NLSD) test at 5 % level of probability (Waller and Duncan, 1969).

RESULTS AND DISCUSSION

- Flax variety differences:

Varietal effects:

In both seasons, the evaluated four flax varieties markedly varied in all estimated characters in both seasons, except number of seeds/capsule in the first season (Tables 1,2and 3). The fiber type "Vaiking cv. significantly exceeded the other studied flax varieties in total plant height, technical length, straw and fiber yields fad^{-1} and fiber percentage. Meanwhile, the dual type flax variety "Giza 8 significantly surpassed other evaluated varieties in the number of capsules/plant, number of seeds/capsules, seed index, seed and oil yields fad^{-1} and seed oil percentage. Over both seasons, the highest straw and fiber yields (3.634t fad^{-1} and 519.1kg fad^{-1}) were produced from the fiber type "Vaiking CV . The other fiber type "Eriana CV. came in the second rank which yielded 3.350 t fad^{-1} and 509.6kg fad^{-1}. Meanwhile, the lowest straw and fiber yields were obtained from the dual

type Giza 8 CV. Giza 7 CV. came in the intermediate in this concern. The highest values of seed and oil yields (799.5 and 329.2kg fad $^{-1}$) were obtained from Giza 8 CV, while the lowest values of the previously mentioned characters were produced from Eriana CV. The present results are mainly due to the genetical variation of the tested varieties. These results are in agreement with those obtained by El - Swify and Mostafa(1996).

NPK fertilizer level effects :

Data in Tables 1, 2 and 3 revealed that NPK fertilizer treatments had significant effects on all studied characters in both seasons. Adding 60Kg N + 15Kg P $_2O_5$+24Kg K $_2O$ fad^{-1} was the most effective treatment for enhancing most of the studied characters and surpassed the other combinations of NPK fertilizers in all studied characters except seed oil percentage and oil yield fad^{-1}, which reached their maximal values with the addition of 60Kg N + 30Kg P $_2O_5$ fad^{-1}. Over both seasons, the lowest averages of the estimated characters were found with the addition of 30Kg N fad^{-1}.

In general, the increase in nitrogen and phosphorus levels was associated with the increase in growth and development of plant, which led to the increase in oil yield fad^{-1}. The increase of oil yield could be interpreted by the increments in seed yield and seed oil percentage. These findings are in harmony with those obtained by Hella *et al*. (1987) , El - Sweify and Mostafa (1996) and Salama (1996). The decrease in oil yield with the increase in potassium levels may be due to the role of potassium in encouraging the absorption of nitrogen by the plant which might cause an increase in protein percentage in the seed leading to a decrease in the oil percentage and oil yield.

Table (1)

Averages of total plant height, technical stem length, number of capsules / plant and number of seeds/capsule as affected by studied factors

Characters	Plant height (cm)		Technical length (cm)		Capsules/plant (No)		Seeds/capsule (No)	
	94/95	95/96	94/95	95/96	94/95	95/96	94/95	95/96
A: Flax varieties								
Giza 7	91.6	92.1	75.6	81.5	16.07	11.95	8.05	7.31
Giza 8	84.8	90.2	68.2	78.2	16.85	18.84	8.22	7.79
Vaiking	95.7	102.5	83.0	90.4	8.54	8.21	7.88	6.86
Eriana	91.1	96.6	79.4	84.3	12.04	10.11	8.15	7.02
F – Test	**	**	**	**	**	**	N.S	**
N.L.S.D (0.05)	0.4	0.7	0.5	1.0	0.64	0.42	-	0.14
B: NPK (Kgfad-1):								
30 + 0 + 0	85.1	89.6	71.7	77.7	11.53	9.88	7.29	6.46
30 + 15 + 24	87.1	91.4	73.5	80.6	12.90	10.71	7.65	6.88
30 + 30 + 0	85.9	90.1	72.4	79.5	12.27	10.30	7.46	6.58
30 + 0 + 48	85.2	90.4	71.5	78.6	11.65	9.88	7.30	6.47
45 + 0 + 0	91.5	94.9	76.8	83.7	13.61	11.23	8.09	7.06
45 + 15 + 24	92.9	96.8	78.5	86.0	14.04	11.85	8.32	7.58
45 + 30 + 0	92.5	96.0	77.6	85.3	13.72	11.50	8.18	7.24
45 + 0 + 48	91.9	95.9	77.2	84.7	13.65	11.15	8.04	7.29
60 + 0 + 0	94.5	99.3	80.1	86.9	14.08	12.08	8.49	7.78
60 + 15 + 24	95.1	100.5	80.7	87.3	14.58	12.39	8.78	8.13
60 + 30 + 0	94.5	99.9	79.5	86.7	14.54	12.23	8.68	7.83
60 + 0 + 48	93.8	99.6	79.2	86.3	14.22	12.10	8.62	7.61
F – Test	**	**	**	**	**	**	**	**
N.L.S.D (0.05)	1.0	1.7	1.5	1.5	0.39	0.29	0.28	0.18

** = Significant at 1% level of probability

n.s = not signifcant

Table (2)
Averages of seed index (g), seed and straw yields fad^{-1} and seed oil percentage as affected by studied factors.

Characters	Seed index (g)		Seed yield (t fad^{-1})		Straw yield (t fad^{-1})		Seed oil percentage	
	94/95	95/96	94/95	95/96	94/95	95/96	94/95	95/96
A: Flax varieties								
Giza 7	9.10	8.80	0.765	0.746	3.264	3.336	39.38	39.20
Giza 8	9.86	9.69	0.806	0.793	2.913	2.964	41.03	40.84
Vaiking	7.29	6.46	0.628	0.614	3.546	3.612	37.92	37.75
Eriana	7.40	6.55	0.620	0.600	3.503	3.567	37.77	37.59
F – Test	**	**	**	**	**	**	**	**
N.L.S.D (0.05)	0.03	0.03	0.052	0.030	0.039	0.017	0.04	0.04
B: NPK (Kgfad-1):								
30 + 0 + 0	8.06	7.52	0.621	0.598	2.738	2.836	38.15	37.97
30 + 15 + 24	8.21	7.68	0.677	0.651	2.932	2.976	36.46	36.30
30 + 30 + 0	8.14	7.59	0.650	0.622	2.860	2.892	38.35	38.17
30 + 0 + 48	8.13	7.58	0.621	0.608	2.792	2.868	36.26	36.08
45 + 0 + 0	8.36	7.81	0.720	0.710	3.433	2.482	38.92	38.73
45 + 15 + 24	8.52	7.99	0.741	0.728	3.543	3.600	38.08	38.01
45 + 30 + 0	8.44	7.89	0.735	0.720	3.487	3.527	39.09	38.90
45 + 0 + 48	8.40	7.85	0.721	0.711	3.433	3.514	38.72	38.53
60 + 0 + 0	8.61	8.08	0.735	0.722	3.588	3.657	39.59	39.41
60 + 15 + 24	8.74	8.22	0.749	0.732	3.648	3.731	39.28	39.19
60 + 30 + 0	8.66	8.14	0.739	0.725	3.617	3.685	40.76	40.58
60 + 0 + 48	8.64	8.13	0.737	0.723	3.607	3.672	39.17	39.08
F – Test	**	**	**	**	**	**	**	**
N.L.S.D (0.05)	0.07	0.03	0.013	0.079	0.037	0.039	0.09	0.10

** = Significant at 1% level of probability

Table (3)
Averages of oil yield (kg/fad), fiber percentage and fiber yield (t/fad) as affected by studied factors

Characters	Oil yield (kg/fad)		Fiber percentage		Fiber yield (t/fad)	
	94/95	95/96	94/95	95/96	94/95	95/96
A: Flax varieties						
Giza 7	301.56	292.74	13.93	14.35	455.3	480.8
Giza 8	333.63	324.84	13.97	14.19	406.8	419.6
Vaiking	240.97	234.65	14.34	14.48	504.7	533.5
Eriana	234.32	225.67	14.21	14.32	498.7	520.5
F – Test	**	**	**	**	**	**
N.L.S.D (0.05)	6.25	5.76	0.03	0.03	2.2	1.5
B: NPK (Kgfad-1):						
30 + 0 + 0	237.68	228.11	13.34	13.69	370.6	386.8
30 + 15 + 24	246.93	236.82	13.79	14.13	403.9	424.4
30 + 30 + 0	250.23	238.13	13.42	13.79	380.9	404.0
30 + 0 + 48	225.85	219.57	13.45	13.84	372.8	391.0
45 + 0 + 0	281.07	264.16	14.05	14.19	484.7	504.3
45 + 15 + 24	282.12	276.83	14.34	14.46	506.6	527.6
45 + 30 + 0	288.27	282.09	14.16	14.39	492.9	515.9
45 + 0 + 48	279.12	273.97	14.17	14.43	487.6	512.5
60 + 0 + 0	292.09	285.66	14.42	14.64	520.5	544.4
60 + 15 + 24	294.92	286.30	14.66	14.88	535.0	557.9
60 + 30 + 0	301.12	294.21	14.46	14.80	526.1	549.9
60 + 0 + 48	290.45	284.72	14.44	14.84	523.7	544.5
F – Test	**	**	**	**	**	**
N.L.S.D (0.05)	8.85	6.75	0.04	0.03	3.2	3.4

** = Significant at 1% level of probability

Similar results were reported by Dixit and Sharma (1999) , who found that potassium application increased N uptake in flax plant. The increase in total plant height with the addition of 60Kg N +15Kg P_2O_5 + 24Kg K_2O fad^{-1} could be explained by the stimulation effect for cell elongation, directly after division where nitrogen combined with P and K plays an important role in this concern. These findings are similar to the previous results obtained by El-Sweify and Mostafa (1996).

The interaction effects:

Results presented in Tables (4, 5 and 6) show the effect of the interaction between flax varieties and NPK fertilization. It is evident that the interaction between flax varieties and NPK fertilizer levels resulted in significant differences in straw, seed and fiber yields/fad. The highest straw and fiber yields fad^{-1} (Tables 4 and 6) were produced from Vaiking CV when fertilized with 60Kg N + 15 kg P_2O_5 + 24Kg K_2O fad^{-1}. Meanwhile, the greatest seed yield fad^{-1} (0.834 fad^{-1}) was produced from the dual type flax cultivar "Giza 8 when fertilized with 60K g N + 15Kg P_2O_5 +24Kg K_2O fad^{-1} (Table 5). These finding are in agreement with those obtained by Dubey (1994).

Table (4)

Averages of straw yield (ton/fad^{-1}) as affected by the interaction between varieties and NPK fertilization

NPK (Kg fad^{-1})	1994/1995				1995/1996			
	G.7	G.8	Vaiking	Eriana	G.7	G.8	Vaiking	Eriana
30 + 0 + 0	2.660	2.303	2.927	3.063	2.760	2.353	3.150	3.080
30 + 15 + 24	2.957	2.427	3.207	3.137	2.997	2.480	3.250	3.177
30 + 30 + 0	2.880	2.350	3.100	3.110	2.840	2.393	3.183	3.150
30 + 0 + 48	2.677	2.327	3.070	3.093	2.780	2.377	3.170	3.147
45 + 0 + 0	3.383	3.080	3.653	3.617	3.397	3.143	3.727	3.660
45 + 15 + 24	3.463	3.250	3.757	3.703	3.543	3.310	3.803	3.743
45 + 30 + 0	3.400	3.173	3.720	3.653	3.450	3.200	3.760	3.700
45 + 0 + 48	3.313	3.080	3.693	3.643	3.440	3.187	3.750	3.680
60 + 0 + 0	3.593	3.200	3.830	3.730	3.677	3.263	3.857	3.833
60 + 15 + 24	3.627	3.273	3.903	3.790	3.747	3.303	3.953	3.920
60 + 30 + 0	3.613	3.247	3.857	3.750	3.710	3.283	3.883	3.863
60 + 0 + 48	3.597	3.247	3.840	3.743	3.697	3.277	3.860	3.857
F – Test	**				**			
N.L.S.D (0.05)	0.099				0.093			

** = Significant at 1% level of probability

Table (5)
Averages of fiber yield (kg fad^{-1}) as affected by the interaction between varieties and NPK fertilization

NPK (Kg fad^{-1})	1994/1995				1995/1996			
	G.7	G.8	Vaiking	Eriana	G.7	G.8	Vaiking	Eriana
30 + 0 + 0	365.9	310.0	410.4	396.1	377.0	327.6	431.8	410.7
30 + 15 + 24	407.4	331.9	445.5	430.9	424.5	355.1	472.8	445.4
30 + 30 + 0	379.1	317.4	425.7	401.4	414.1	340.6	447.2	414.1
30 + 0 + 48	367.4	311.5	415.4	396.7	379.5	335.1	436.0	413.4
45 + 0 + 0	469.3	433.4	521.6	514.4	496.7	430.9	554.1	535.5
45 + 15 + 24	483.3	459.0	540.6	543.2	515.1	451.4	575.2	568.9
45 + 30 + 0	468.9	446.4	524.5	531.6	497.8	444.6	560.3	560.7
45 + 0 + 48	460.1	433.9	523.4	532.8	494.5	441.9	555.4	558.4
60 + 0 + 0	509.6	461.1	557.3	554.2	540.7	472.0	585.3	579.4
60 + 15 + 24	529.9	469.4	572.7	568.2	549.9	488.3	602.9	590.6
60 + 30 + 0	513.8	452.2	561.4	561.1	540.5	481.5	591.2	586.2
60 + 0 + 48	508.8	456.1	559.2	554.2	539.7	465.6	489.4	583.4
F – Test	**				**			
N.L.S.D (0.05)	6.8				7.2			

** = Significant at 1% level of probability

Table (6)
Means of seed yield(ton fad^{-1}) as affected by the interaction between varieties and NPK fertilization

NPK (Kg fad^{-1})	1994/1995				1995/1996			
	G.7	G.8	Vaiking	Eriana	G.7	G.8	Vaiking	Eriana
30 + 0 + 0	0.675	0.753	0.540	0.514	0.653	0.722	0.525	0.444
30 + 15 + 24	0.739	0.798	0.608	0.563	0.719	0.774	0.575	0.535
30 + 30 + 0	0.732	0.764	0.571	0.534	0.672	0.744	0.553	0.518
30 + 0 + 48	0.677	0.752	0.541	0.516	0.663	0.737	0.537	0.497
45 + 0 + 0	0.781	0.812	0.652	0.634	0.777	0.809	0.649	0.651
45 + 15 + 24	0.793	0.830	0.669	0.683	0.781	0.819	0.649	0.651
45 + 30 + 0	0.783	0.823	0.668	0.666	0.773	0.817	0.648	0.642
45 + 0 + 48	0.781	0.810	0.654	0.638	0.771	0.809	0.636	0.626
60 + 0 + 0	0.801	0.827	0.649	0.661	0.781	0.817	0.643	0.647
60 + 15 + 24	0.807	0.842	0.653	0.693	0.794	0.826	0.645	0.662
60 + 30 + 0	0.804	0.829	0.651	0.671	0.784	0.821	0.644	0.654
60 + 0 + 48	0.802	0.828	0.650	0.666	0.781	0.818	0.643	0.649
F – Test	**				**			
N.L.S.D (0.05)	0.048				0.048			

** = Significant at 1% level of probability

Conclusion:

It can be stated that the highest flax fiber yield can be achieved by sowing the fiber type flax variety Vaiking and the highest seed yield can be obtained from the dual purpose flax variety "Giza 8 when fertilized with 60kg N + 15kg P_2O_5 + 24kg K_2O fad^{-1}.

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متطلبات بعض أصناف الكتان من الأسمدة النتروجينية والفوسفاتية والبوتاسية

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الملخص :

أجري هذا البحث في محطة البحوث الزراعية بالجميزة - محافظة الغربية لدراسة تأثير التسميد النيتروجينى والفسفورى و البوتاسى على المحصول ومكوناته لنوعين من الكتان (نوع ليفى ويمثله الصنفين المستوردين فايكنج وإيريانا ونوع ثنائي الغرض ويمثله الصنفين المحليين جيزة ٧ وجيزة ٨. وقد اتبع تصميم القطع المنشقة مرة واحدة في قطاعات كاملة العشوائية ذو أربع مكررات و خصصت القطع الرئيسية للأصناف والقطع الشقية للمعادلات السمادية٠ ويمكن تلخيص أهم النتائج فيما يلي:

- تفوق الصنف فايكنج على جميع الأصناف بزيادة معنوية في كل من صفات الطول الكلى والطول الفعال ومحصول القش للفدان والنسبة المئوية للألياف، بينما تفوق صنف الكتان جيزة ٨ على جميع الأصناف في صفات عدد الكبسولات بالنبات، عدد البذور بالكبسولة، ودليل البذرة (وزن الألف بذرة) ومحصول البذور للفدان وكذلك النسبة المئوية للزيت بالبذور.
- تفوقت معاملة التسميد بـ ٦٠ كيلوجرام نيتروجين +١٥ كيلو جرام فوسفور +٣٠ كيلو جرام بوتاسيوم على جميع المعاملات السمادية مسجلة أعلى القيم من صفات الطول الكلى للنبات والطول الفعال ومحصول القش والألياف للفدان وعدد الكبسولات بالنبات وعدد البذور بالكبسولة ووزن الألف بذرة ومحصول بذور الفدان ونسبة الألياف. وقد حصل على أكبر محصول زيت للفدان و أعلى نسبة مئوية للزيت في البذرة بإضافة ٦٠ كيلو جرام نيتروجين +٣٠ كيلو جرام فوسفور/فدان.

- أوضحت نتائج الدراسة أن التفاعل بين الأصناف والمعاملات السمادية تحت الدراسة كان معنويا في صفات محصول القش والبذور والألياف للفدان والنسبة المئوية للزيت بالبذرة. وقد أظهرت النتائج أن أكبر محصول من القش والألياف يمكن الحصول عليه من الصنف الليفي فايكنج عند تسميده بمعدل ٦٠ كيلو جرام نيتروجين + ١٥ كيلو جرام فوسفور + ٢٤ كيلو جرام بوتاسيوم. وقد حصل على أعلى محصول بذور للفدان من الصنف ثنائي الغرض "جيزة ٨ " عند تسميده بمعدل ٦٠ كيلو جرام نيتروجين +٣٠ كيلو جرام فوسفور/للفدان .

توصى الدراسة بزراعة الصنف الليفي فايكنج للحصول على أعلى محصول من القش والألياف و الصنف ثنائي الغرض "جيزة ٨ " للحصول على أعلى محصول من البذرة مع التسميد بمعدل ٦٠ كجم ن +١٥ كيلو جرام فوسفور + ٢٤ كيلو جرام بوتاسيوم/فدان وذلك تحت ظروف المنطقة التي أجريت بها الدراسة .