EVALUATION OF SOME INTRODUCED FLAX VARIETIES COMPARING WITH GIZA 4 CULTIVAR UNDER THREE N FERTILIZATION LEVEL IN SANDY SOIL

EI-SWEIFY, AMNA H.H., M.A. ABD EI-DAYEM AND M. M. M. HUSSEIN

Field Crops Research Institute, ARC, Giza Egypt

(Manuscript received 23 February 2006)

Abstract

Two field trails were conducted to evaluate yield components, yield and some quality of five introduced varieties comparing with local cultivar Giza 4 under three nitrogen fertilizer levels in newly reclaimed sandy soil of Ismailia Experimental Res. Station, Ismailia Governorate. The results indicated significant varietal difference in yield components, flax yield and its quality. The fiber type introduced verities out yielded Giza 4 cv. in stem length, straw, fiber yields per plant as well as per fed., biological yield/fed., fiber % and fiber length, while the oil type introduced variety Gentiana surpassed Giza 4 cv. and other tested varieties ((fiber type) in seed yield, its components and oil % in addition to stem thickness (mm). The results revealed that N levels gave high significant positive effect on most of flax yield and its components up to the highest level (60 Kg N/fed.] The genetic material responded differently to the nitrogen rate added.

There were positive and high significant association among straw yield, seed yield and their components.

INTRODUCTION

Flax *(Linum usitatissimum* L.} is an annual crop grown for its fibers and seeds. It is cultivated in three types, flax for best fibers production (in Europe), Linseed for oil production (in Asia and South America countries), and as a dual purpose crop (for seeds and fibers) in Egypt. Thus, different flax products become more acceptable in many foreign markets, therefore more attention has been given latterly to grow high yielding cultivars under more adapted agronomic practices with technological application to increase not only yield but also quality of flax fibers. The sandy soil contain small amounts of nitrogen and organic matter, therefore it could be compensate this case by adding nitrogen fertilizer levels to determine the optimum one for flax growth.

Expansion of flax cultivated area especially in newly reclaimed sandy soils under modern sprinkler irrigation system is promising. Now this adaptation is more conventional to avoid high competition between flax growing with other strategic crops of winter season in old valley lands.

Many investigators obtained varietal differences in yield and quality of flax in many regions. In Egypt, Momtaz, *et al.*, (1989), while in Germany, Bramm and Damborth

(1992), in India Verma and Pathak (1993), also in Egypt El-Sweify et al., (1997), El-Hariri *et al.,* a, b (2002) and EI-Sweify *et al.,* (2003).

Sandy soils are poor in minerals, therefore N is essential to improve productivity and quality of flax. Many researchers reported the positive response of flax plant to nitrogen fertilizer level among them, Bramm and Damborth (1992), in India Jaggi *et al.,* (1995), El-Sweifty *et al.,* (1997), Sharief (1999), and Abd El-Samie *et al.,* (2002).

This work was carried out to study the response of some flax introduced varieties to different levels of N fertilizer in newly reclaimed sandy soil .

Yield components of straw , fiber , and seed of flax were investigated, also the interaction effects between the studied genotypes and the added nitrogen levels on the all flax traits were recorded.

Simple phenotypic correlation coefficients between straw and seed yield and some related characters were carried out in this respect some results were obtained by Momtaz et al, (1977) and El Hariri et al, (2002 a and b).

MATERIALS AND METHODS

Two field trials were per for med during 2003 /2004 and 2004/2005 seasams, to study the respans of six flax genotypes (5 introduce and the local variety Giza 4) to the nitragen levels of 30.45 and 60 kg/ fed applied as ammanium nitrate (33.5% nitrogen) these levels not reach the recommended one (75 kg N/ fed) to avoid the environmental pollution .

Every experiment included eighteen treatment which were the combinations of six flax varieties, and three N levels. The soil of every experiment was newly reclaimed sandy soils. The physical and chemical analysis of the soil are reported in (Table 2). Seeds of these varieties were sown on the 3rd week of November for the two successive growing seasons. Owing to the differences in seed index of every variety, different seeding rate was practiced to achieve 60 Kg. seeds for the four introduced varieties (Istru, Jitka, Daniella and Vaiking), while seed introduced variety (Gentiana) and local cultivar (Giza 4) were sown at 70 Kg, seeds/fed. Drilling in rows of 10 cm. apart was applied. Recommended rate of potassium and phosphorus fertilizers were added during soil preparation at the rate of 24 K_2O and 15.5 P_2O_5 K/fed. respectively. The proposed N levels were splited to equal four doses and added at 10, 25, 40 and 55 days after sowing. Irrigation was carried out using modern irrigation as a center pivot sprinkler system which is more adapted to rationalize irrigation water in field crops, in this kind of reclaimed soil.

The eighteen treatments were arranged in split plot design with four replications where the main .plot contains the studied varieties, while nitrogen fertilizer level

occupied the sub-plots which were 6 m^2 in area. Flax plants were hand pulled at the proper ripening stage, then left one week for complete air-draying. Random samples of ten guarded plants were taken and following data were recorded. Total stem length, technical length, thickness of stem, no. of fruiting branches and no. of capsules per plant, no of seeds per capsule, seed index (1000 seeds weight) straw and seed yield/plant in grams. Both of straw, seed and biological (which calculated from summation of straw and seed yield/fed.) yields per fed. were determined on the whole plot area basis. Representative samples of ten guarded plants and the whole plot area were taken and retted by Fiber Crops Res. at Isamailia Experimental Res. Station, after complete retting, the retted straw was air dried then fibers^ were mechanically separated , where the parameters of fiber quality were estimated, i.e fiber length, fiber percentage and fiber yield/plant as well as per fed. The oil percentage in flax seed was determined according to the extraction method described by the American Oil Chemist's Society (1957), using a soxhlet apparatus and petroleum ether with a boiling point of 60-80°C as solvent for six hours, Oil yield Kg/fed was estimated by multiplying seed yield Kg/fed x seed oil percentage, while the harvest index was obtained according to the following formula suggested by Kallo (1988):

HI=EY/W x 100 where: EY= Econmic yield W = Biological yield

Data obtained were subjected to the proper statistical analysis according to Snedecor and Cochran (1982). Similar trend for data obtained from two investigated seasons, therefore combined analysis was carried out where mean values were compared using L.S.D. at 5% and 1% levels.

Table 1. The origin of the studied flax varieties

Varieties	Classification	Year released	Origin
Istru	Fiber	1994	Romanian variety
Jitka	Fiber	1992	Czech variety
Daniela	Fiber	1996	Romanian variety
Gentiana	Oil	1993	Romanian variety
Vaiking	Fiber	1988	French variety
Giza4	Dual	1948	Local cultivar

Table 2. The mechanical and chemical properties of experimental soil

Characters		Values
Coarse Sand (%)	Mechanical analysis	61.65
Fine Sand (%)		30.01
Silt (%)		2.91
Clay (%)		5.43
Soil texture		Sandy
$CaCo_3$ (%)		1.64
Organic matter %	Chemical analysis	1.15
pH		7.89
EC (dsm^{-1} at 25c°)		0.22
Field capacity %		7.66
Available N(ppm)		32.53
Available P(ppm)		5.98
Available K (ppm)		51.29
Cations (meg /L)		-
C		0.85
Mg^{++}		0.95
Na^{+}		0.65
K^{+}		0.13
Anions (meg		-
Co_3		0.00
So_4^{-}		0.57
$C1^{-}$		1.10

RESULTS AND DISCUSSION

I - Yield components:

a-Varietals differences:

Table (3) show yield components of different studied varieties. The results showed that these varieties differed highly significant in all yield component traits under investigation. Istru and Jitka varieties gave the highest values for total and technical length. This may be due to the growth habit however they are of fiber type.

While the local cultivar Giza 4 and the introduced variety Gentiana [which belong to the oil type], recorded the lowest values of total and technical stem length. On the other hand, the maximum values for thickness of stem (mm.), no of fruiting branches as well as no. of capsules per plant, no. of seed/capsule and seed index (1000 seeds weight in grams), were obtained by the introduced variety / Gentiana recording 1.82 mm., 8.67, 7.69, 8.44 and 7.52 gm., respectively.

The noticeable increase in total and technical length might be due to the differences in number and length of internodes of stem which reflect the diversity in genetical make up of plant as well the increase in individual fiber unite of flax fiber types.

Also the increase in number as well as weight of fruiting parts i.e. branches and capsules of oil variety (Gentiana) might be attributes to geneticcal

make up which reflects differences in phonological characters. Moreover, it could be concluded that varitetal differences in flax yield components might be due to differences in varieties genetic potential which in turn reflected on yield components as well differences between genotypes concerning partition of dry matter accumulation, glucose required to plant synthesis, carbon equivalents yield energy/plant and coefficient of energy for crop harvest indices (El-Hariri *et al.,* 2001). Similar varietal differences in flax yield components were obtained by Verma and Pathak (1993), El-Hariri *et at,* (2002 a,b) and El-Sweify *et al.,* (2003).

b) Effect of Nitrogen Levels:

Yield components of six different flax varieties were tested under three levels of nitrogen fertilizer and the-results are reported in Table (3). Flax yield components were highly significant affected by different N levels. There were gradual increments in all studied yield component characters by increasing of applied nitrogen dose. Total stem length, technical length, fruiting branches and capsules number/plants, seed number/capsule and seed index reached maximum values with increasing N level up to the highest level i.e. 60 Kg./fed. These results suggest that high level of nitrogen could be recommended for greater yield components especially in newly reclaimed sandy soil. Nitrogen encourages plant growth as well as root system during vegetative period in addition to the stimulation of cell division and internod elongation and further increase in cell number and size with which result in an overall increase in flax growth and its yield components. These results are in agreement with those reported by Bramm and Damborth (1992), Jaggi *et al.,* (1995), El-Sweify *et al.,* (1997), and Abd El-Samie *et al,* (2002).

II - Flax Yield:

a) Varietal differences:

The results reported in Table (4) indicate clearly that the yield parameters of tested varieties varied significantly. The four fiber type introduced under study i.e. Istru, Jitka, Daniela and Vaiking gave the maximum flax yield in all yield parameters, i.e. straw yield/plant as well as per fed., fiber yield for both plant and fed. and biological yield per fed., which surpassed the other introduced Gentiana and the local cultivar Giza 4 in the above mentioned traits. On the other hand, Gentiana (oil type) and Giza 4 (dual type) varieties out yielded the above mentioned four fiber type varieties in seed yield per plant as well as per fed., oil yield and economic yield per fed. Gentiana variety surpassed Giza 4 in the above mentioned four parameters of flax yield by 0.104 g/plant, 23.24 Kg/fed., 3.91 Kg/fed, and 0.073 ton/fed., respectively.

These results suggested that the differences in yield parameters of flax plant are quite expected, however Istru, Jitka, Daniela and Vaiking varieties are of fiber type whereas Gentiana variety is oil type, while the local cv. is of dual purpose one. In addition these differences might be due to genetic make up of these tested varieties where growth habit depends mainly on genetic constituent which interact with the environmental conditions. The previous finding followed the same trend of those of yield components. Many investigators recorded varietals differences in straw, fiber, seed, oil, biological and economic yield parameters in many differenet region of growing flax in the world (Bramm and Damborth, (1992), in Germany, Verma and Pathak, (1993) in India while in Egypt, El-Sweify *et al.,* (1997), El-Hariri *et al.,* (2001), El-Hariri *et al.,* (2002 a,b) and El-Sweify *et al.*, (2003).

b) Effect of Nitrogen Level:

Nitrogen levels caused considerable and high significant influence on flax yield parameters as reported in Table (4). Straw, fiber, seed in grams per plant and

straw (ton), fiber (ton), seed and Oil in Kgs per fed., in addition to biological yield and economic yield (seed + fiber) in ton per fed. characters were gradually increased by increasing nitrogen level from 30 Kg to 60 Kg N/fed. These results suggest that high level of N could be recommended for greater yield and yield parameters especially in newly reclaimed sandy soil. Such result may be attributed to that nitrogen encourages plant growth during vegetative period which in turn increases yield components and consequently flax yield. Moreover N regulates mobilization of photosynthetic to economic parts of flax yield i.e. seed and fibers, especially splitting N dose into four parts as well sprinkler irrigation system allow to regulate nutritional state which increase flax plant efficiency to uptake N and other nutrients. Similar findings were obtained by many researchers. (Jaggi *et al.,* 1995, El-Sweify *et al.,* 1997, Sharief, 1999 and Abd El-Samie *et al.,* 2002).

III- Technological properties:

a) Varietal differences:

Table [5] revealed that the flax varieties were significantly differed in fiber %, fiber length , oil % and harvest index, the fiber type introduced Jitka excesseded the other five tested varieties in fiber percentage being 11.1%, in this respect, Pavelek and Staud (1996) stated that the new flax variety Jitka has high fiber content of the stems. Fiber length ranged from 69.25cm. for introduced Istru (Fiber type) to 53.38cm. for the imported Gentiana (Oil type). On the other hand oil percentage recorded the maximum value being 38.69% in the introduced Gentiana seeds, while the minimum values for this trait were 32.50%, 33.57%, 34.61% and 34.98% recorded by the fiber type varieties Istrau, Jitka, Daniela and Vaiking, respectively.

Regarding the local dual purpose cultivar Giza 4 gave the medium values for fiber percentage, fiber length and oil percentage recording 9.15%, 56.61 cm and 36.80%, respectively, in the same time it gave the highest value for the harvest index being 0.2046. This finding may^be due to, that Egyptian cvs are more adapted to the edaphic as well climatic conditions. This finding is in harmony with that of El-Sweify *et al.,* (1997), El-Hariri *et al.,* (2001) and El-Hariri *et al.,* (2002 a,b).

b) Effect of Nitrogen Level:

Data in Table (5), show high significant differences among N levels in technological properties of flax except to harvest index trait which was in significantly responded to N levels. The estimated value of fiber percentage increased with increasing N level from 30 to 45 Kg/fed., recording 10.30% then, decreased to 9.92% when the N level increased up to 60 Kg/fed., while the fiber length trait recorded the highest value by 65.66 cm when N fertilizer was applied at 60 Kg/fed, this behaviour may be due to the increment of secondary xylem towards the highest nitrogen level. This increment was in similar trend as shown in technical length. It could be also detected from Table (5) that seed oil percentage increased by increasing the N level from 30 to 60 Kg/fed, recording 33.96% and 36.21%, respectively. Similar results were reported by various researchers including, El-Sweify *et al.,* (1997) and Abd El-Samie *et al.,*(2002).

IV- Effect of the Interaction:

The interaction effects between the two studied factors, on some flax yield components are shown in tables (6and 7). Total length, straw yield / plant, fiber

yield/plant, straw yield/fed., fiber percentage and fiber length were responded high significantly by the interaction between genotypes and nitrogen level (table 6). Highest mean values were gave by the fiber type introduced (Istru) when it fertilizered by 60 kg N/fed., recording 78.75 cm, 1.774 g, 0.175 g. 0.487 ton and 72.42 cm .for total length , straw yield/plant .fiber yield/plant, fiber yield/fed. and fiber length , respectively while fiber percentage trait produced the highest mean value (11.30 %) by Jitka when received only 45 N/fed.

Table (7), show some seed yield components of flax in addition to the economic yield/fed, trait as significantly affected by interaction effect between two studied factors. The highest mean values for no. of fruiting branches , no. of capsules/plant, no. of seeds/capsule, seed yield g./plant, oil yield kg/fed, and economic yield ton/fed were yielded from the oil type introduced "genotype (Gentiana) when fertilized by nitrogen at 60 kg/fed. rate.

From the previous data it could concluded that the fiber type genotypes produced the highest mean value for straw yield and its related characters, while seed

yield and its components gave the highest mean value by the oil type varieties. In addition, the best nitrogen level for the experiment condition was 60 kg\fed.

V- Simple Correlation Coefficient:

Simple correlation coefficient (r) between both of straw and seed yields and their some related traits i.e. fiber yield/plant, technical length, no. of fruiting branches as well as capsules/plant, and seed index (1000 seeds weight), is shown in Table (8). Results indicated that positive and highly significant correlation coefficient was obtained between straw yield and both of fiber yield, technical length and fiber length, also, the correlation coefficient between seed yield and some its components i.e. no. of fruiting branches as well as no. of capsules/plant and seed index was highly significant and positive correlated. While there was positive and only significant correlation was shown among of fiber yield/plant and both of technical stem length and fiber length. Table (8) indicated that seed index was positive significantly correlated with no. of fruiting branches as well as capsules/plant. On the other hand, insignificant negative correlation coefficient was found between seed yield and technical length as well as fiber length, also between seed index and straw yield, technical length, fiber length. Insignificant positive correlation coefficient was found between straw yield and tested seed components. From the previous obtained results, it could be concluded that kind of association supports the evidence for the possibility of selecting varieties characterized with high straw and seed yielding ability, high fiber length and seed index. Similar association among flax straw, seed yields and their components was reported by Momtaz *et al.,* (1977) and EI-Hariri *et al.,* (2002 a,b).

Table 3. Flax yield components of some introduced varieties under three N fertilizer levels in newly sandy soil (combined analysis over 2003/2004 and 2004/2005 seasons).

Traits / Treatments	Total stem length (cm)	Technical length (cm)	Thickness of Stem (mm)	No. of fruiting branches/plant	No. of Capsules per plant	No. of seeds per capsule	Seed index (1000 seed weight(g.)
A.Varieties (V)							
Istru	75.76	66.28	1.80	7.52	6.61	6.80	6.39
Jitka	73.61	63.92	1.64	7.25	6.02	7.28	6.81
Daniela	72.70	62.61	1.78	6.59	6.46	7.52	6.44
Gentiana	61.14	49.43	1.82	8.67	7.69	8.44	7.52†
Vaiking	66.07	54.54	1.74	6.91	5.87	7.12	6.64
Giza 4	63.69	53.28	1.71	7.63	6.48	7.30	7.47
F. test **	**	**	**	**	**	**	**
L.S.D. 0.05	1.47	2.13	0.09	0.21	0.24	0.23	0.20
L.S.D. 0.01	2.01	2.91	0.12	0.29	0.33	0.31	0.27
B. Nitrogen level							
30 Kg N/(fed.	64.41	53.52	1.49	5.38	4.37	6.63	6.41
45 Kg N/fed.	69.69	58.74	1.77	7.99	6.82	7.50	6.96
60 Kg N/fed.	72.39	62.76	1.98	8.92	7.87	8.09	7.24
F. Test	**	**	*	**	**	**	**
L.S.D. 0.05	0.88	1.05	0.05	0.18	0.21	0.16	0.15
L.S.D. 0.01	1.18	1.40	0.07	0.24	0.28	0.21	0.20
C. Interaction							
(V x N)	**	N.S.	N.S.	**	*	*	N.S.

Table 4. Flax yield of some introduced varieties under three N. fertilizer levels in newly sandy (Combined analysis over 2003/2004 and 2004/2005 seasons).

Traits / Treatments	Straw yield per plant (g)	Straw yield per fed. (ton)	Fiber yield per plant (g)	Fiber yield per fed. (ton)	Seed yield per plant (g)	Seed yield per fed. (Kg.)	Oil yield per fed. (Kg)	Biological yield/fed. (ton)	Economic yield/fed. (ton) (Seeds+Fiber per fed.)
A. Varieties (V):									
Istru	1.215	4.146	0.110	0.372	0.218	316.00	103.19	4.461	0.685
Jitka	1.033	3.892	0.095	0.357	0.232	367.12	123.56	4.259	0.724
Daniela	0.934	3.709	0.091	0.370	0.249	381.95	132.47	4.091	0.752
Gentiana	0.646	3.225	0.071	0.318	0.382	453.59	166.88	3.679	0.805
Vaiking	0.863	3.505	0.082	0.352	0.259	417.56	146.63	3,922	0.747
Giza 4	0.867	3.264	0.080	0.330	0.278	430.35	162.97	3.695	0.732
F. Test	**	**	**	*	**	**	**	**	**
L.S.D. 0.05	0.078	0.264	0,007	0.037	0.024	21.26	10.15	0.261	0.042
L.S.D. 0.01	0.107	0.361	0.009	-	0.032	28.99	13.84	0.356	0.059
B. Nitrogen level									
30 Kg N/fed.	0.549	2.883	0.047	0.253	0.150	330.61	113.02	3.213	0.583
45 Kg N/fed.	0.937	3.769	0.089	0.368	0.283	406.79	142.65	4.176	0.775
60 Kg N/fed.	1.294	4.219	0.129	0.427	0.376	445.88	162.19	4.664	0.865
F. Test	**	**	**	**	**	**	**	**	**
L.S.D. 0.05	0.012	0.150	0.004	0.024	0.014	12.72	4.93	0.150	0.027
L.S.D. 0.01	0.016	0.201	0.006	0.032	0.019	17.02	6.59	0.200	0.036
C. Interaction:									
(V x N)	**	N.S.	**	**	**	N.S.	*	N.S.	*

Table 5. Technological quality of flax of some interduced varieties under these N Fertilizes levels in newly sandy soil (combined analysis over 2003/2004 and 2004/2005 seasons).

Traits / Treatments	Files Fiber percentage	Files length (Cm) Fiber	Seed oil percentage	Harvest index
A. Varieties (V):				
Istru	9.64	69.25	32.50	0.1541
Jitka	11.10	66.98	33.57	0.1722
Daniela	10.11	65.54	34.61	0.1875
Gentiana	8.89	53.38	38.69	0.2242
Vaiking	9.53	58.43	34.98	0.1950
Giza 4	9.15	56.61	36.80	0.2046
F. Test	**	**	**	**
L.S.D. 0.05	0.67	1.43	0.53	0.0100
L.S.D. 0.01	0.92	1.95	0.73	0.0149
B. Nitrogen level (N):				
30 Kg N/fed.	8.99	57.14	33.96	0.1866
45 Kg N/fed.	10.30	62.29	35.41	0.1916
60 Kg N/fed.	9.92	65.66	36.21	0.1905
F. Test	**	**	**	N.S
L.S.D. 0.05	0.53	0.78	0.19	-
L.S.D. 0.01	0.71	1.05	0.26	-
C. Interaction:				
(V x N)	**	**	N.S	N.S

able 6. Mean values of Flax straw yield and som related characters as ffected by the interaction between flax genotypes and nitrogen levels (combined data).

enotypes	Total length			Straw yield/plant			Fiber yield/plant			Fiber yield/fad.			Fiber percentage			Fiber length		
	N_1	N_2	N_3	N_1	N_2	N_3	N_1	N_2	N_3	N_1	N_2	N_3	N_1	N_2	N_3	N_1	N_2	N_3
Istru	73.06	75.46	78.75	0.731	1.140	1.774	0.056	0.099	0.175	0.245	0.384	0.487	7.82	8.90	9.96	66.79	68.54	72.42
Jitka	69.85	74.34	76.63	0.530	1.086	1.483	0.040	0.112	0.133	0.235	0.424	0.411	7.95	11.30	10.23	62.55	67.68	67.68
Daniela	68.49	73.85	75.77	0.557	1.022	1.249	0.053	0.081	0.134	0.304	0.349	0.456	10.30	9.26	10.76	61.21	66.30	69.11
Gentiana	56.94	62.23	64.25	0.448	0.647	0.842	0.048	0.073	0.092	0.272	0.384	0.400	10.89	10.53	10.89	49.34	53.84	56.47
Vaiking	58.82	67.81	71.60	0.519	0.770	1.302	0.043	0.081	0.117	0.230	0.380	0.379	8.13	10.29	10.16	51.31	59.92	64.04
Giza 4	59.30	64.44	67.35	0.536	0.955	1.110	0.045	0.080	0.121	0.235	0.289	0.431	8.88	9.22	10.82	51.63	57.48	60.72
F.test	**			**			**			**			**			**		
L.S.D 0.05	2.17			0.041			0.011			0.059			1.30			1.92		
L.S.D 0.01	2.90			0.038			0.014			0.079			1.74			2.56		

Table 7. Mean values of some seed traits which affected by the interaction between flax genotypes and nitrogen levels (combined data).

cenotypes	No.of fruiting branchas			No.of capsules/plant			No.of seeds/ capsule			Seed yield gm/plant			Oil yield kg./fad.			Economic yield ton/fad.		
	N_1	N_2	N_3	N_1	N_2	N_3	N_1	N_2	N_3	N_1	N_2	N_3	N_1	N_2	N_3	N_1	N_2	N_3
Istru	5.13	8.40	9.03	4.44	7.19	8.19	6.18	6.67	7.55	0.145	0.209	0.300	81.44	105.51	122.63	0.500	0.705	0.850
Jitka	5.17	8.00	8.59	3.80	6.76	7.49	6.30	7.59	7.95	0.143	0.237	0.314	102.73	130.27	137.67	0.553	0.810	0.809
Daniela	5.04	6.90	7.84	3.77	5.72	6.70	7.00	7.57	8.00	0.147	0.254	0.345	107.81	135.42	154.17	0.625	0.740	0.891
Gentiana	6.50	9.44	10.07	5.50	8.30	9.28	7.64	8.67	9.00	0.152	0.449	0.545	134.96	158.32	195.64	0.651	0.845	0.921
Vaiking	5.00	7.32	8.44	3.91	6.22	7.48	6.05	7.22	8.07	0.157	0.275	0.344	115.09	154.10	170.70	0.572	0.819	0.851
Giza 4	5.42	7.91	9.57	4.59	6.75	8.10	6.64	7.30	7.97	0.156	0.273	0.405	136.09	172.25	192.29	0.596	0.733	0.868
F.test	*			*			*			**			*			*		
L.S.D 0.05	0.44			0.51			0.39			0.035			12.07			0.067		
L.S.D 0.01	------			------			-------			0.047			------			------		

N_1 = 30 kgN / fad .

N_2 = 45 kg N / fad.

N_3 = 60 kg N / fad .

Table 8. Simple correlation coefficient among both of straw and seed yields and their related characters (combined analysis over 2003/2004 and 2004/2005 seasons).

		1	2	3	4	5	6	7	8
1-	Straw yield/plant	-	0.976**	0.838**	0.835**	0.040	0.484	0.476	0.022
2-	Fiber yield/plant		-	0.753*	0.748*	0.437	0.628	0.620	0.125
3-	Technical length			-	0.999**	-0.191	0.063	0.041	-0.458
4-	Fiber length				-	-0.197	0.051	0.039	-.0472
5-	Seed yield/plant					-	0.910**	0.906**	0.779**
6-	No. of Fruiting branches/plant						-	0.996**	0.737*
7-	No. of capsules/plant							-	0.712*
8-	Seed Index (1000 seed weight)								-

* Significant at 5% and 1 % level of probability

r 0.05 = 0.632
r 0.01 = 0.765

REFERENCES

1. Abd El-Samie, F.S., M.A. Abd El-Dayem and S.Z.A. Zedan. 2002. Response of some flax genotypes to Bacterial inoculation and nitrogen levels under newly reclaimed land. Annals ofagric.Sc., Moshtohor.40 (2):713-722
2. American Oil Chemist's Society 1957. Official and Tentative Methods, 2nd Ed., Chicago.USA.
3. Bramm, A. and M. Dam-Borth. 1992. Influence of genotype, crop density and N fertilizer application on the yield potential of oilseed flax *(Linum usitatissimum L.)* Land Bauforschung Volkenrrode 42 (3): 193-198.(c.F. file 50: CAB Abstracts 1972-1994/Jun.02856544.)
4. EI-Hariri, D.M., M.A. Abd El-Daim and M.S. Hassanein. 2001. Response of yield and quality of flax grown on newly reclaimed sandy soils to cultivars and potassium levels . Proc. of the Intern. Conf Bast Fibrous Plant on the turn of second and third Millenium . 18 - 22 Sept - 2001, Shergang China .
5. El-Hariri, D.M., Amna, H.H. El-Sweify and M.S. Hassanein. 2002a. Evaluation of some flax genotypes. II-Seed yield, yield components and oil percentage. Annals ofAgric. Sci, Moshtohor, 40 (I): 13-25.
6. El-Hariri, D.M., M.S. Hassanein and Amna H.H. El-Sweify. 2002b. Evaluation of some flax genotypes. I-Straw yield, yield components and technological characters. Annals ofAgric. Sci. Moshtohor, 40 (1): 1-12.
7. El-Sweify, Amna H.H., M.A. Tag El-Din and H.A.M. Sharaf El-Deen. 2003. Effect of some flax genotypes and harvesting dates on seed chemical.
8. El-Sweify, Amna H.H., Zahira M. Attia and F.M. Sief El-Nasr. 1997. Effect of preceding crop on yield and quality of some flax genotypes under three nitrogen fertilizer levels. Annals Agric. Sci., Ain Shams Univ. Cairo, Egypt 42(2): 337-353. .
9. Jaggi, R.C, R.S. Kanwal and S.P. Dixit. 1995. Effect of fertilizer N and S interaction on composition and uptake of nutrients by Linseed on acid alfisoil. J. Ind. Soc. Soil Sci. 43 (4): 611-615.
10. Kallo. 1988. Vegetable breeding Vol. Ill CRC. Pr., Inc Baco Ration, Florida 174p.USA.
11. Momtaz,A., M. El- Farouk, N. Mourad, T. Nasr El-Dean and A. Hella. 1989. Anew flax varieties Giza 7 and Giza 8. Agric. J. 68(7):1461-1475.
12. Momtaz, A., A.T.A. Selim and G.H. El-Shimy. 1977. Correlation studies in some flax

crosses and their reciprocals in Egypt, two association studies between flax seed yield and some other characters. Agric. Res. Reve. 55:45-55.

13. Pavelek, M. and J. Staud. 1996. New flax variety Jitka. Nova Odruda Pradneho Inu. Jitka. Genetika a Slechteni, 32 (3): 193-206.(c.F. Field Crop Abst., 50(5), 3371,1997).
14. Sharief, A.E. 1999. Performance of some flax cultivars in response to nitrogen fertilizer rates and yield analysis. Bulletin of Fac. Agric. Cairo Univ., 50 (3): 394-415.
15. Snedecor, G.W. and W.G. Cochran. 1982. Statistical methods. 7th edition, Iowa State Univ. Res. Ames, Iowa, USA.
16. Verma K.P. and P.K. Pathak. 1993. Response of linseed *(Limum unitatissimumL.)* varieties to different dates of sowing. India J. of Agron, 38(1): 160-163.

تقييم لبعض المستوردات من الكتان مقارنة بالصنف التجارى جيزة ٤ تحت ثلاث مستويات من النيتروجين فى الأرض الرملية

آمنة حافظ حسن السويفى، مصطفى أمين عبد الدايم، مهدى محمد مهدى حسين

قسم بحوث محاصيل الألياف – معهد بحوث المحاصيل الحقلية – مركز البحوث الزراعية

أجريت تجربتان حقليتان بمحطة البحوث الزراعية بالإسماعيلية لتقييم المحصول ومكوناته لأربعة مستوردات ليفية (استرو – جتكا – دانيلا – فايكنج) ومستورد زيتى (جنتيانا) مقارنة بالصنف التجارى المحلى جيزة ٤ (ثنائى الغرض) وذلك تحت تأثير ثلاث مستويات من التسميد الأزوتى وهى ٣٠، ٤٥، ٦٠ كجم ن/فدان، وذلك خلال الموسمين الزراعيين ٢٠٠٣/٢٠٠٤ ، ٢٠٠٤/٢٠٠٥م تحت نظام الرى بالرش المحورى بأرض رملية.

* وجدت اختلافات معنوية بين الأصناف فى المحصول ومكوناته وصفات الجودة للألياف والزيت ببذرة الكتان.
* تفوقت الأصناف الليفية على الصنف جيزة ٤ والصنف الزيتى جنتيانا فى الطول الكلى والفعال ومحصول القش والألياف للنبات والفدان وكذلك المحصول البيولوجى للفدان– وكذلك صفات الجودة للألياف وهى النسبة المئوية للألياف وطول الألياف – بينما تفوق الصنف جنتيانا على الصنف التجارى جيزة ٤ وباقى المستوردات الليفية فى محصول البذرة ومكوناته وكذلك النسبة المئوية للزيت فى البذور.
* كان تأثير إضافة السماد النتروجينى معنوياً على كل صفات المحصول ومكوناته حيث وصلت القيم إلى أعلاها عند إضافة ٦٠ كجم ن/فدان لأغلب الصفات.
* كان تأثير التفاعل بين عاملى التجربة معنوياً لمعظم الصفات المدروسة. كما تم دراسة معامل الارتباط البسيط ووجد أن كلاً من محصول القش والبذرة أرتبط ارتباطاً معنوياً وموجب مع مكوناته كلا منهما.
* وجدت اختلافات معنوية بين الأصناف فى المحصول ومكوناته وصفات الجودة للألياف والزيت ببذرة الكتان.
* تفوقت الأصناف الليفية على الصنف جيزة ٤ والصنف الزيتى جنتيانا فى الطول الكلى والفعال ومحصول القش والألياف للنبات والفدان وكذلك المحصول البيولوجى للفدان – وكذلك صفات الجودة للألياف وهى النسبة المئوية للألياف وطول الألياف – بينما تفوق الصنف جنتيانا على الصنف التجارى جيزة ٤ وباقى المستوردات الليفية فى محصول البذرة ومكوناته وكذلك النسبة المئوية للزيت فى البذور.
* كان تأثير إضافة السماد النتروجينى معنوياً على كل صفات المحصول ومكوناته حيث وصلت القيم إلى أعلاها عند إضافة ٦٠ كجم ن/فدان لأغلب الصفات.
* كان تأثير التفاعل بين عاملى التجربة معنوياً لمعظم الصفات المدروسة. كما تم دراسة معامل الارتباط البسيط ووجد أن كلا من محصول القش والبذرة أرتبط ارتباطاً معنوياً وموجب مع مكونات كلاً منهما.