EVALUATION OF FOUR F6 WHEAT LINES UNDER DIFFERENT N- FERTILIZER LEVELS AND SEEDING RATES

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Abstract

Two fields Experiments were conducted at Etai Elbaroud Agricultural Research Station, Beheira Governorate during 2001/2002 and 2002/2003 seasons to study the effect of three nitrogen levels (40, 60 and 80 kg N/ fed) and three seeding rates (40, 50 and 60 kg / fed) on wheat yield and yield components using four lines: 1) Giza 157// Sx/ Cardinal, 2) Sakha 69// Sx / Cardinal, 3) Sakha 69/ Star"s", 4) Clement/ Ald "s" // Sx / Cardinal and Sakha 69 was used as a check variety. The results indicated that:

1-The highest values of plant height, length and weight of spike, number of spickelets/ spike, weight of grain/ spike, weight of 1000 grains, grain yield (ardab/ fed), straw yield (ton/fed) and chemical quality (ash %, fiber and crude protein) were obtained from the highest level of nitrogen (80 kg N/ fed.).

2-Means of all studied traits decreased with increasing seeding rate, except plant height, number of spikes/ m2, straw yield and grain yields/ fed. in both seasons. Crude protein % increased by increasing seeding rates.

3-The effect of lines indicated that lines # 1, 2 and 3 recorded the highest values for grain yield, while the lowest value was for line # 4 over the two seasons. As for straw yield, lines # 1 and 2 gave the highest values, whereas the lowest value was for lines # 4 over the two seasons. Lines # 1, 2 and 3 improved protein %, while ash % and fiber % behaved opposite way.

4 - The interaction effects of N- levels X seed rates showed that 80 kg N/ fed with 60 kg seeds was the best treatment for grain yield, straw yield and crude protein content, while 40 kg N/ fed X 40 kg seeds gave the lowest value.

5- Nitrogen levels X genotype indicated that 80 kg N/ fed and each of lines # 1, 2 and 3 gave the best values, whereas line # 4 gave the lowest value for the previous characters.

6- The interaction effects of genotypes X seed rates indicated that each of lines # 1, 2 and 3 gave the best values with 60 kg seeds/ fed, whereas line # 4 gave the lowest value for the previous characters.

It could be recommended that using 80 kg N and 60 kg seeds/ fed with lines of Giza 157// Sx / Cardinal, Sakha 69// Sx / Cardinal, Sakha 69/ Star"s" gave higher grain and straw yield and higher protein content than the other treatments.

INTRODUCTION

Wheat is one of the main cereal crops all over the world and one of the most important winter crops in Egypt. Due to the tremendous increases in population in Egypt, wheat production is insufficient to meet local consumption. Wheat yields could be increased by optimal seeding rate, proper nitrogen fertilization and high yielding cultivars.

Abo-Warda (1989) and Nagwa (1995) indicated that grain yield/fed of wheat increased by increasing nitrogen level up to 160 kg N/ fed., straw yield using 120 kg N/ fed., yield components when used 75 kg N/ fed. and protein content at 70 kg N/ fed. Salwau (1994) and El- Badry (1995) found that plant height, spike length, weight of spike, number of grains/ spike, 1000 grain weight, number of spikes/ m2, grain yield/ fed and protein content were significantly increased with increasing nitrogen rates up to 75 kg N/ fed.. Also, the positive effect of fertilization on yield of wheat has already been recognized by several investigators, Haikel and Zohry (1996) stated that the heighest grain yield, number of spikes/ m^2, spike weight, number of grains/ spike, grain weight and straw yield/ fed. were significantly increased with increasing nitrogen fertilizer up to 105 kg N/ fed. El- Douby (1997) and Yakout *et al.* (1998) found that growth, yield components and grain yield / fed increased with increasing rates of N fertilizer.

Haikel and Zohry (1996) reported that maximum values of each of number of grains/ spike, 1000 grain weight, grain yield and straw yield were recorded at seeding rate of 60 kg/ fed, while the highest number of spikes/ m^2 was recorded with seeding rate of 80 kg/ fed. Yakout *et al.* (1998) stated that increasing seeding rates significantly decreased spike length, number of spikelets/ spike, number of grains/ spike, weight of grains/ spike and 1000 grains weight, while plant height and straw yield (ton/ fed) increased significantly up to 80 kg / fed.

Abo- Shetaia and Abd El- Gawad (1995) found that Giza 163 plants were taller than Sakha 69. Also, they added that there was no varietal differences detected between grain and straw yields of Giza 163 and Sakha 69. Ewida *et al.* (1985) and Nagwa (1995) showed that significant varietal differences regarding plant height, number of spikes/ m2, spike characters and yield of wheat grain and straw were recorded for Giza 157, Sakha 8, Sakha 61 and Sakha 62.

Pomeranze (1988) reported that wheat grains (14 % moisture) content 2.0-2.7 % crude fiber and 1.4- 2.0 % ash. Both crude fiber and ash content are inversely related to the amount of bran in the grain. El- Douby (1997) indicated that protein content of wheat kernel increased gradually by increasing N level for Sakha 69 and Giza 164 varieties which also differed in protein content.

The aim of this research was to evaluate some F6 wheat lines with sakha 69 and Giza 157 under three N- fertilizer levels and three seed rates on yield components, grain yield and some chemical quality attributes.

MATERIALS AND METHODS

The present investigation was carried out at Etai Elbaroud Experimental Research Station in El- Beheira governorate during the two growing seasons of 2001/2002 and 2002/2003 to study the effect of nitrogen fertilization levels (40, 60 and 80 kg N/ fed), seeding rates (40, 50 and 60 kg/ fed) for four F6 lines : 1) Giza 157// Sx/ Cardinal, 2) Sakha 69// Sx / Cardinal, 3) Sakha 69/ Star"s", 4) Clement/ Ald "s" // Sx / Cardinal and Sakha 69 was used as a check variety on yield, yield components and some chemical quality characters of wheat.

The treatments were assigned in a split- split plot design with three replications. Nitrogen fertilization were arranged at random in the main plots, seeding rates were arranged in the sub-plots, whereas genotypes treatments were allocated to sub-sub plots. The sub-sub plot was 3.5 m long and 3 m wide (10.5 m2). The preceding summer crop was maize in both seasons. Sowing date was on Nov. 25 th and 22 nd in the first and second seasons, respectively.

Nitrogen fertilizer levels were added in three equal doses, after the first, second and third irrigations as urea (46.5 N %). Normal agronomic practices, except the studied factors were adopted as recommended. The preceding crop was cotton in both seasons.

At harvest time, random sample of ten plants were collected from each sub- sub plot to determine the mean values of the following characteristics: plant height (cm), spike length (cm), and weight of spike (g). Weight of 1000 grains (g) and number of spikes/ m2 were estimated as the means of five measurements. Grain yield/ fed and straw yield/ field (ton/ fed) were determined by weight of the whole plot yield.

Wheat kernels were chemically analyzed for ash, fiber and crude protein content according to the methods outlined in A.O.A.C. (1980). Results were adjusted to 14 % moisture content.

Data were statistically analyzed using the combined analysis of variance according to (Gomez and Gomez (1984). Comparison among treatment means were made by the L.S.D test according to Snedecor and Cochran (1981).

Pedigree of the four F6 lines used in the study.

Line #	Pedigree
1	Giza 157 // S x / Cardinal
2	Sakha 69 // S x / Cardinal
3	Sakha 69 / Star"s"
4	Clement/ Ald "s" // Sx / Cardinal

Table 1. Physical and chemical analysis of the soil of the experimental site at Etai-Elbaroud Research Farm.

A: Physical analysis				
Coarse sand %	Fine sand %	Silt %	Clay %	Textural class
3.30	8.20	35.20	53.30	Clay

B: Chemical Analysis (Available nutrients)					
N Ppm	P Ppm	K Ppm	CaCo3 %	ESP %	PH
47.0	13.0	315.0	1.38	0.41	7.8

Available N,P and K were determined according to methods outlined by Black (1965)

RESULTS AND DISCUSSION

1- Effect of nitrogen levels

The results in Table (2) showed that yield and yield components of wheat were significantly affected by nitrogen levels in 2001/2002 and 2002/2003 seasons and the combined analysis of variance. Wheat plants which were fertilized with 80 kg N/ fed. gave the highest values of plant height followed by those fertilized with 60 kg N/fed., whereas 40 kg N/ fed. gave the lowest values in each studied character. The increase in plant height due to the increase in nitrogen application may be attributed to the increase in meristematic activity and to the increased cell elongation .

Spike length and weight were significantly affected by N level in both seasons and their combined. Nitrogen fertilizer significantly increased number of spiceklets and weight of grains/ spike and number of spikes/ m^2; 80 kg N level was superior over the two seasons and combined, as compared with 40 kg N/ fed. Significant differences

were obvious with 40 kg N/ fed. for weight of spike. The differences between 40 kg N/ fed and both of 60 and 80 kg N/ fed were significant for number of spike/ m^2, while insignificant differences were detected for the later two N- levels for the same used character. Significant differences were shown between 40 kg N and 60 kg N for weight of grains/ spike in both seasons and combined. Weight of 1000- grain was significantly affected by N level. These results are in agreement with those obtained by Fayed (1992), Abo-Warda (1993) and Nagwa (1995).

The application of N significantly increased grain yield/ fed. in both seasons. Increasing N application from 60 to 80 kg N/ fed increased grain yield/ fed. by 3.20 and 7.87 % as compared with 40 kg N/ fed in the first and second seasons, respectively. The combined analysis of two seasons showed increasing in grain yield by increasing the level from 60 to 80 kg N/ fed. (5.57 %) as compared with 40 kg N/ fed. The increase in grain yield / fed. with increasing nitrogen levels up to 80 kg N/ fed. may be due to higher weight and number of grains/ spike, weight of 1000 grains and number of spikes/ m^2. which were encouraged by nitrogen. These results are in accordance with those obtained by Haikle and Zohry (1996) and El Douby (1997).

With regard to straw yield, the application of 40 to 80 kg N/ fed. increased yield by 5.09 and 13.07 % in the first season, being 5.94 and 12.80 %, respectively in the second season. Whereas, increasing in straw yield for the combined was 5.52 and 12.95 %, respectively. The increase in straw yield (ton/ fed) by N fertilizer application levels might be due to the increase in plant height, spike length and number of spickelets/ spike. These results are in accordance with those obtained by Haikle and Zohry (1996) and Yakout *et al.* (1998).

Ash and fiber contents were significantly affected by N- fertilizer levels. Increasing N levels increased ash percentage by 4.17 % with 60 or 80 kg N/fed., combared with 40 kg N/ fed.. The same trend was obtained for fiber content which increased by 1.27 and 10.19 % for 60 and 80 kg N, combared to 40 kg N/ fed. These results are in agreement with those obtained by Pomeranze (1988).

Concerning protein content, the percentages were significantly increased by increasing nitrogen levels. Increasing protein content was related with grain yield/ fed in both seasons. These results affirmed with Zohry et al; (1998) and Yakout et al; (1998).

2-Effect of seed rates

Data in Table (3) showed that the effect of seeding rates (40, 50 and 60 kg/ fed) were significant on plant growth and yield components. Plant height was significantly increased by increasing seed rates for the two seasons and their combined. Length and weight of spike, number of spikelets/ spike and weight of grains/ spike were significantly decreased by increasing seed rates. Significant difference was observed between 40 kg and 60 kg for the same characters. On the other hand, insignificant difference between 40 and 50 kg seed rates indicated in both seasons for the same traits. The combined analysis of two seasons take the same trend.

With respect to weight of 1000- grain, the results revealed that there were insignificant difference between 40 and 50 kg / fed, whereas between 40 and 60 kg/ fed, significant difference was obtained for the two seasons and the combined.

Seeding rate significantly increased grain yield/ fed in both seasons and in the combined. The increments of grain yield/ fed at application of 50 and 60 kg seed/ fed, compared to 40 kg were 5.65 and 7.99 %, respectively in the first season, 1.23 and 5.40 % in the second season, respectively. The combined analysis stated that increasing in grain yield was 3.44 and 8.43 %, compared to 40 kg seeds.

With regard to straw yield, the application of 50 and 60 kg/ fed, compared to 40 kg significantly increased by 1.35 and 5.67 %, respectively in the first season, while it increased by 2.05 and 4.37 % in the second season, respectively. The combined of the two seasons gave 1.68 and 5.02 % increase, respectively. The increase in straw yield/ fed may be due to the increase in plant height.

The increase in grain yield and straw yield/ fed may be due to the increase in number of spikes/ m2. These results are in accordance with those of Haikle and Zohry (1996), where they reported that the highest number of spikes at 80 kg seeds/ fed gave the highest grains and straw yield/ fed.

The effect of seed rates on chemical properties indicated that ash and fiber % were significantly decreased by increasing seed rates, while Crude protein % was significantly increased with increasing seed rates/ fed in both seasons, El- Douby (1997).

Table 2. Effect of N fertilizer on wheat growth, yield components and grains yield.

Characters Nitrogen kg/ fed.	Plant height (cm)	Spike length (cm)	No. of spickelets/ spike	Weight of spike (gm)	Weight of grains/ spike	Weigh of 1000 grains (gm)	No. of spikes/ m2	Grain yield/ Ardab (fed)	Straw yield/ ton (fed)	Chemical properties		
										Ash %	Fiber %	Protein %
2001/ 2002 season												
40	114.61	11.19	18.81	1.59	1.25	55.02	456.00	16.26	3.28	1.70	1.60	12.05
60	115.36	11.90	19.10	1.82	1.31	56.25	474.02	17.65	3.45	1.77	1.62	12.89
80	115.76	12.14	19.71	1.88	1.37	57.05	507.05	18.17	3.71	1.77	1.76	13.06
L.S.D. at (0.05)	1.09	0.84	0.58	0.24	0.08	1.25	31.15	1.88	0.19	0.06	0.08	0.13
2002/ 2003 season												
40	115.10	12.61	21.89	1.93	1.47	54.94	313.73	16.40	3.24	1.66	1.54	10.05
60	118.26	12.69	22.30	2.42	1.79	56.44	354.93	17.27	3.43	1.73	1.56	10.89
80	120.36	13.21	22.59	2.59	1.94	57.44	431.13	18.56	3.65	1.73	1.70	11.06
L.S.D. at (0.05)	2.75	0.50	0.21	0.58	0.42	2.15	38.27	1.29	0.18	0.05	0.04	0.12
Combined												
40	114.85	11.90	20.35	1.76	1.36	54.98	384.87	16.33	3.26	1.68	1.57	11.05
60	116.81	12.30	20.70	2.12	1.55	56.35	414.48	17.46	3.44	1.75	1.59	11.89
80	118.06	12.68	21.15	2.24	1.66	57.25	469.09	18.37	3.68	1.75	1.73	12.06
L.S.D. at (0.05)	1.92	0.28	0.35	0.36	0.28	0.52	25.00	1.12	0.17	0.05	0.08	0.12

Table 3. Effect of plant population on wheat growth, yield components and grain yield.

Characters Seed rates kg/ fed.	Plant height (cm)	Spike length (cm)	No. of spicklets/ spike	Weight of spike (gm)	Weight of grains/ spike	Weigh of 1000 grains (gm)	No. of spikes/ m2	Grain yield/ Ardab (fed)	Straw yield/ ton (fed)	Chemical properties		
										Ash %	Fiber %	Protein %
2001/ 2002 season												
40	112.94	11.99	19.57	1.86	1.45	56.59	452.13	16.65	3.402	1.76	1.68	11.08
50	116.05	11.69	19.17	1.80	1.26	56.23	481.93	17.59	3.448	1.73	1.60	11.10
60	116.74	11.55	18.87	1.63	1.21	55.49	503.00	17.98	3.595	1.70	1.55	11.27
L.S.D. at (0.05)	1.36	0.59	0.64	0.21	0.23	1.03	22.78	0.97	0.122	0.04	0.04	0.13
2002/ 2003 season												
40	116.75	12.95	22.41	2.10	1.90	56.72	331.69	17.03	3.365	1.80	1.72	12.08
50	117.73	12.80	22.26	2.34	1.75	56.30	341.71	17.24	3.434	1.77	1.62	12.10
60	119.23	12.63	22.11	2.50	1.55	55.67	420.18	17.95	3.512	1.74	1.59	12.27
L.S.D. at (0.05)	0.53	0.06	0.08	0.22	0.32	0.92	32.88	0.38	0.118	0.03	0.02	0.11
Combined												
40	114.85	12.47	20.99	1.98	1.68	56.66	391.91	16.84	3.384	1.78	1.70	11.58
50	116.89	12.25	22.28	2.07	1.51	56.27	411.82	17.42	3.441	1.75	1.61	11.60
60	117.99	12.09	22.35	2.07	1.38	55.58	461.59	18.26	3.554	1.72	1.57	11.77
L.S.D. at (0.05)	1.95	0.23	0.79	0.05	0.25	0.30	42.83	0.75	0.120	0.04	0.06	0.15

3- Effect of genotypes:

Data in Table (4) showed significant differences between wheat genotypes on plant height, spike length, weight of spike, weight of grain/ spike, weight of 1000 grains and no. of spikes/ m2 during the two seasons and combined. Wheat line # 1 and 2 gave the highest plants as compared with the other genotypes. The difference in plant height may be attributed to the difference in number and/ or length of internodes as result of the different genetic make up. This result is in agreement with those obtained by Abo- Shetaia and Abdel- Gawad (1995).

Yield attributes of grain yield/ fed., i.e., number of spikes/ m^2, weight of grain/ spike and weight of 1000- grain recorded the highest values for line # 2 followed by line # 1 and line # 3, while the lowest values were recorded for line # 4 in the combined analysis of the two seasons.

As for straw yield attributes, i.e. spike length, weight of spike and number of spikeletes/ spike, it is clear that line # 1 gave the highest values followed by line # 2, then line # 3, whereas the lowest values were recorded by line # 4 in the combined analysis of the two seasons. These results were confirmed with those obtained by Shams El- Din and El Habbak (1992).

These findings might be attributed to the differences in their genetical constitution. In this respect, Ewida *et al.*; (1985) and Nagwa (1995) found that significant differences were recorded for plant height, no. of spikes/ m^2, spike characters, grain and straw yields as affected by different genotypes.

4- Interaction effects:

Results in Table (5, 6 and7) showed significant interaction effects between each of N levels X seeding rates, N levels X genotypes and seed rates X genotypes as combined of two seasons for plant height, spike length, weight of grain/ spike, number of spikes/ m2, weight of 1000 grains, grain yield (ardab/ fed) and straw yield (ton/ fed).

The effect of N levels X seeding rates (Table 5) showed that 80 kg N/fed and 60 kg seeds produced higher values for plant height, grain yield/ fed and straw yield, as compared with 60 kg N kg/ fed with 40 kg seeds which gave the lowest values. Meamwhile, 80 kg N/ fed and 40 kg seeds produced higher spike length, weight of grain/ spike, number of spikes/ m2 and weight of 1000 seeds. Ash, fiber and crude protein contents were increased by increasing N fertilizer and significant difference was showed between each seeding rate.

Data in Table (6) revealed that all the means of genotypes and check var. (Sakha 69) responded to adding N fertilizer up to 80 kg/ fed. Lines // 1, 2 and 3 gave higher values with 60 kg N/ fed, compared to 40 kg N/ fed. Line // 4 and check var. announced the lowest values with 40 kg N/ fed. Also, ash, fiber and crude protein % were increased by increasing N fertilizer and insignificant difference was recorded between these lines under the one level of N fertilizer.

Results in Table (7) showed higher values of plant height, number of spikes/ m2, 1000 grain, grain and straw yield/ fed. produced by genotypes //1 and 2 with 60 kg seeds/ fed, compared with 40 kg seeds/ fed which give lower value. Using 40 kg seeds/ fed produced higher spike length and weight of grain/ spike for all lines. Ash and fiber were reduced by increasing seeding rates, Meanwhile crude protein take the opposite way. Insignificant difference was observed between the lines under seeding rate.

It could be recommended that using 80 kg N and 60 kg seeds/ fed with lines # 1, and 3 gave higher grain and straw yield and higher protein content.

The second order interaction Nitrogen Levels X Seeds rates X Genotypes was not significant in the first and second season and also was the combined analysis.

It could be concluded that Genotypes 1, 2 and 3 as new lines can give good results using 80 kg N fertilizer and 80 kg seeds/ fed.

Table 4. Effect of F6 lines on wheat growth, yield components and grains yield.

Characters / Genotype	Plant height (cm)	Spike length (cm)	No. of spike Lets/ spike	Weight of spike (g)	Weight of grains/ spike	Weight of 1000 grains (g)	No. of spikes/ m2	Grain Yield/ Ardab (fed)	Straw Yield/ton (fed)	Chemical properties		
										Ash %	Fiber %	Protein %
2001/2002 season												
Giza 157//Sx/Cardinal	127.30	12.30	19.64	2.01	1.29	63.73	504.63	17.57	4.06	1.75	1.70	11.30
Sakha 69//Sx/Cardinal	124.50	11.85	19.52	1.72	1.51	65.35	514.26	17.63	3.58	1.87	1.57	10.94
Sakha69/Star"s"	122.76	11.72	19.24	1.66	1.24	50.92	480.82	16.31	3.51	1.70	1.72	11.20
Clement/Ald"s"//Sx /Cardinal	85.63	11.19	18.51	1.63	1.22	49.82	444.63	15.50	3.10	1.88	1.60	11.32
Sakha 69	116.04	11.66	19.12	1.64	1.23	50.67	450.78	16.03	3.12	1.77	1.75	11.04
L.S.D. at (0.05)	2.55	0.58	0.67	0.25	0.02	1.87	24.55	1.31	0.15	0.04	0.03	0.09
2002/2003 season												
Giza 157//Sx/Cardinal	128.98	13.53	22.76	2.61	1.77	63..54	367.04	18.15	3.69	1.65	1.62	12.30
Sakha 69//Sx/Cardinal	127.65	12.79	22.36	2.54	1.80	65.40	487.30	18.46	3.63	1.77	1.49	11.94
Sakha 69/Star"s"	123.41	12.70	22.20	2.35	1.66	51.14	362.26	16.95	3.39	1.60	1.64	12.20
Clement/Ald"s"//Sx /Cardinal	88.01	12.52	21.84	1.80	1.35	50.54	298.85	16.36	3.27	1.87	1.52	12.32
Sakha 69	120.83	12.59	22.13	2.23	1.64	50.73	307.33	16.38	3.28	1.67	1.67	12.04
L.S.D. at (0.05)	1.75	0.60	0.85	0.30	0.28	2.01	148.06	1.44	0.11	0.05	0.04	0.08
Combined												
Giza 157//Sx/Cardinal	128.14	12.92	21.20	2.31	1.53	63.64	435.84	17.86	3.88	1.70	1.66	11.80
Sakha 69//Sx/Cardinal	126.08	12.32	20.94	2.13	1.66	65.38	500.78	18.04	3.58	1.82	1.53	11.44
Sakha 69/Star"s"	123.09	12.21	20.72	2.01	1.45	51.03	421.54	16.63	3.45	1.65	1.68	11.70
Clement/Ald"s"//Sx /Cardinal	86.82	11.86	20.18	1.72	1.29	50.18	371.74	15.93	3.19	1.83	1.65	11.82
Sakha 69	118.44	12.13	20.63	1.94	1.44	50.70	379.06	16.21	3.24	1.72	1.71	11.54
L.S.D. at (0.05)	2.13	0.55	0.73	0.28	0.23	1.95	41.31	1.12	0.13	0.06	0.08	0.12

Table 5. The interaction effects of nitrogen level X seeding rate on wheat growth,yield components and grains yield/fed. (combined two seasons)

Characters		Plant height (cm)	Spike length (cm)	Weight of grains/ spike	No. of spikes/ m2	Weigh of 1000 grains (g)	Grain yield/ Ardab (fed)	Straw yield/ ton (fed)	Chemical properties		
N Fertilizer / Seeding rate									Ash %	Fiber %	Protein %
N1	D1	112.46	12.59	1.50	358.99	55.62	16.72	3.28	1.69	1.56	10.76
	D2	115.63	12.14	1.42	393.08	55.31	16.62	3.29	1.66	1.57	10.87
	D3	117.31	11.59	1.31	399.94	53.96	17.05	3.31	1.64	1.53	11.28
N2	D1	114.84	12.50	1.55	401.99	56.47	16.81	3.35	1.75	1.58	11.75
	D2	117.29	12.27	1.47	402.55	56.39	16.64	3.43	1.72	1.44	11.75
	D3	118.12	12.22	1.39	430.91	56.10	18.73	3.48	1.71	1.72	11.83
N3	D1	117.26	12.68	2.04	414.76	57.90	17.00	3.52	1.91	1.96	12.23
	D2	117.64	12.31	1.64	439.81	57.11	18.99	3.61	1.87	1.66	12.19
	D3	118.63	12.47	1.46	553.91	56.68	19.00	3.68	1.82	1.62	12.23
L.S.D. at (0.05)		3.35	1.25	0.10	126.14	0.22	2.67	0.25	0.05	0.03	0.18

Table 6. The interaction effects of nitrogen level X lines on wheat growth, yield components and grains yield/fed. (combined two seasons)

Characters		Plant height (cm)	Spike length (cm)	Weight of grains/ Spike	No. of spikes/ m2	Weigh of 1000 grains (g)	Grain yield/ Ardab (fed)	Straw yield/ ton (fed)	Chemical properties		
N Fertilizer	Lines								Ash %	Fiber %	Protein %
N1	Line //1	125.58	12.36	1.41	406.35	60.34	16.64	3.86	1.59	1.51	11.60
	Line //2	123.94	12.01	1.53	481.67	64.40	17.18	3.43	1.72	1.37	11.00
	Line //3	125.72	11.83	1.40	412.78	49.75	15.44	3.36	1.61	1.65	10.70
	Line //4	85.09	11.37	1.08	350.67	48.41	14.98	3.04	1.79	1.54	10.07
	Sakha 69 var.	118.16	11.89	1.32	366.99	49.27	15.79	3.33	1.68	1.63	10.30
N2	Line //1	128.88	13.04	1.41	444.10	65.23	17.43	3.79	1.74	1.59	11.80
	Line //2	126.61	12.33	1.63	493.55	65.08	18.31	3.56	1.80	1.55	11.50
	Line //3	126.31	12.41	1.54	410.89	50.78	16.36	3.49	1.67	1.67	11.93
	Line //4	85.99	11.96	1.34	362.11	50.46	15.75	3.19	1.85	1.67	12.30
	Sakha 69 var.	118.16	12.19	1.43	381.15	51.42	16.17	2.39	1.69	1.75	11.53
N3	Line //1	129.95	13.35	1.78	457.07	65.36	19.52	3.99	1.80	1.88	11.97
	Line //2	127.69	12.61	1.83	527.11	66.64	18.63	3.74	1.94	1.68	11.83
	Line //3	126.72	12.69	1.68	441.00	52.56	18.08	3.47	1.68	1.73	12.47
	Line //4	88.37	12.26	1.46	402.45	51.66	17.05	3.34	1.86	1.76	12.86
	Sakha 69 var.	121.31	12.58	1.58	389.04	51.42	16.68	3.41	1.79	1.76	12.47
L.S.D. at (0.05)		3.55	0.58	0.22	41.22	2.11	1.80	0.433	0.14	0.16	0.42

Table 7. The interaction effects of seeding rate X lines on wheat growth, yield components and grains yield/fed. (combined two seasons).

Characters		Plant height (cm)	Spike length (cm)	Weight of grains/ Spike	No. of spikes/ m2	Weigh of 1000 grains (g)	Grain yield/ Ardab (fed)	Straw yield/ ton (fed)	Chemical properties		
Seeding rate / Lines									Ash %	Fiber %	Protein %
D1	Line //1	126.38	13.10	1.66	404.39	62.28	17.09	3.48	1.75	1.78	11.50
	Line //2	124.35	12.40	1.73	459.09	63.92	17.32	3.13	2.02	1.66	11.14
	Line //3	127.15	12.34	1.58	404.40	47.39	16.39	3.00	1.73	1.88	11.40
	Line //4	85.81	12.13	1.35	360.98	46.94	15.52	2.84	1.94	1.76	11.52
	Sakha 69 var.	116.87	12.27	1.69	336.02	49.57	15.85	2.93	1.77	1.85	11.24
D2	Line //1	128.99	13.08	1.64	422.44	63.74	17.96	3.88	1.68	1.67	11.75
	Line //2	126.69	12.34	1.70	509.82	65.65	17.69	3.58	1.73	1.54	11.40
	Line //3	129.92	12.21	1.45	425.22	52.62	16.67	3.45	1.64	1.59	11.65
	Line //4	87.24	12.07	1.31	367.98	50.30	15.70	3.19	1.81	1.67	11.80
	Sakha 69 var.	118.76	12.25	1.33	397.18	51.07	16.33	3.24	1.71	1.56	11.50
D3	Line //1	129.04	12.60	1.29	480.67	64.89	18.53	4.28	1.67	1.53	12.15
	Line //2	127.19	12.22	1.52	533.43	66.57	19.12	4.04	1.70	1.40	11.78
	Line //3	130.09	12.16	1.53	449.77	53.10	16.82	3.90	1.59	1.58	12.05
	Line //4	87.81	11.39	1.21	386.26	53.75	16.58	3.54	1.75	1.60	12.14
	Sakha 69 var.	119.69	11.88	1.31	403.97	51.48	16.46	3.56	1.69	1.63	11.88
L.S.D. at (0.05)		4.42	1.00	2.0	42.52	3.25	2.26	0.45	0.16	0.18	0.40

DISCUSSION

These studies have shown that, under some agronomic conditions, i.e. N fertilizer and seeding rate using F6 new lines // Giza 157// Sx/ Cardinal, 2) Sakha 69// Sx / Cardinal, 3) Sakha 69/ Star"s", 4) Clement/ Ald "s" // Sx / Cardinal and Sakha 69 was used as a check variety. Lines // 1,2 and 3 utilized high proportion of N fertilized and produced yields of grains and crude protein content, comparable to those from Sakha 69 which used as a check var. These lines accepted N fertilizer up to 80 kg N/ fed, in addition to N that available in soil (47.0 ppm). Furthermore, highly yields of lines //1, 2 and 3 was much less satisfactory from nitrogen fertilized than from Sakha 69 var. This weakness of results between these lines and Sakha 69 could perhaps have been overcome in part by growing those lines in new lands and know exactly how much N fertilizer could supply.

Inside the one line all the growth characters, yields and chemical contents were increased by increasing N fertilizer up to 80 kg N/ fed, but at the rate of 60 kg N/ fed significant difference was recorded between lines //1, 2, 3 and check var. That means these lines could be grown as improved new genotypes.

With respect to seeding rate X lines, significant difference was showed between line //1, 2 and check var. at 60 kg seeding rate, but // lines 3 and 4 responded up to 50 kg seeding rate only. That mean lines 1 or 2 can be grown up to 60 kg/ fed, while lines 3 or 4 up to 50 kg seed/ fed.

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تقييم أربع سلالات جيل سادس للقمح باستخدام معدلات سماد نتروجينى ومعدلات تقاوى مختلفة

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أجريت تجربتان حقليتان موسم ٢٠٠٢/ ٢٠٠٣ بمحطة البحوث الزراعية بايتاى البارود محافظة البحيرة لدراسة تأثير ثلاث معدلات للتسميد النتروجينى "٤٠ ٦٠ و ٨٠) كجم للفدان مع ثلاث معدلات تقاوي (٤٠ و ٥٠ و ٦٠) كجم للفدان على محصول القمح واستخدام أربع سلالات هم (1 Giza 157// Sx/ Cardinal, 2) Sakha 69// Sx / Cardinal, 3) Sakha 69/ Star"s", 4) Clement / Ald"s" x / Cardinal وصنف سخا ٦٩ كصنف مقارن وذلك على النمو وانتاج المحصول وعلى بعض الصفات الكيمائية للقمح.

وكانت النتائج المتحصل عليها كالتالي : -

١- زاد ارتفاع نبات القمح وصفات النمو ومحصول الحبوب والتبن وكذلك الصفات الكيميائية بزيادة التسميد النتروجينى حتى ٨٠ كجم/ للفدان.

٢- قل ارتفاع النبات وطول السنبلة و عدد السنيبلات بالسنبلة وو زن السنبلة و وزن الحبوب بالسنبلة و وزن ال ١٠٠٠ حبة و % للقش والالياف، بينما زاد عدد الاشطاء و وزن الحبوب و التبن للفدان.

٣- أظهرت السلالات رقم ١ ورقم ٢ ورقم ٣ اعلا انتاجية لحبوب المحصول/ لأردب ولكمية القش (طن للفدان).

٤-١ أظهر التفاعل بين معدل التسميد النتروجينى وكمية التقاوي على طول السنبلة/ للنبات ، وزن حبوب السنبلة ، عدد الأشطاء/ متر ٢ ، وزن ال ١٠٠٠ حبة، وزن محصول الحبوب والقش للفدان والنسبة المئوية للبروتين الخام أنة باستخدام ٨٠ كجم سماد نتروجينى و ٨٠ كجم معدل تقاوى الحصول على أعلا ناتج للصفات السابقة.

٤-٢ كذلك أظهر التفاعل بين معدل التسميد النتروجينى والسلالات أنة باستخدام ٨٠ كجم سماد نتروجينى وسلالات رقم ١ ورقم ٢ ورقم ٣ تم الحصول على اعلا انتاجية للصفات السابقة.

٤-٣ كذلك أظهر التفاعل بين كمية التقاوي والسلالات أنة باستخدام ٦٠ كجم تقاوى و سلالات رقم ١ ورقم ٢ ورقم ٣ تم الحصول على اعلا انتاجية للصفات السابقة.

نستنتج مما سبق بأنة يمكن استخدام السلالات رقم ١ ورقم ٢ ورقم ٣ مع معدل التسميد النتروجيني ٨٠ كجم ومعدل تقاوي ٦٠ كجم للفدان للحصول على انتاجية عالية للقمح.