J. Agric. Sci. Mansoura Univ., 29 (10): 5431 - 5442, 2004

EFFECT OF SOWING DATE AND NITROGEN FERTILIZER LEVELS IN RELATION TO YIELD AND YIELD COMPONENTS OF DURUM WHEAT (TRITICUM TURGIDUM VAR.DURUM) UNDER UPPER EGYPT ENVIRONMENTS.

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ABSTRACT

Two field trials were conducted at Shandaweel Agricultural Experimental Research Station during two Successive seasons of 2002/2003 and 2003/2004. The objectives of this study was conducted study to study the effect of two sowing dates (normal and late planting) and four nitrogen fertilizer rates(25,50,75 and 100kgN/fed) on six durum wheat genotypes, i.e. Sohag 1, Sohag 2, Sohag 3, Bani-Sweif 1, Bani-Sweif 2, Bani-Sweif 3. The results showed that means of squares of all the studied traits, were significant in the recommended sowing date compared to the late planting. Number of days to heading decreased when the sowing date was delayed. The earliest genotype for heading date was Sohag 1, while the genotype Bani-Sweif 3 was the latest for this trait. The recommended sowing date produced the highest number of spike/m2, number of kernels/spike, 1000-kernel weight, biological yield and grain yield/m2. Genotype Sohag 3 gave the highest number of kernels/spike, while the great value of number of spikes/ m2 and grain yield was obtained by Bani-Sweif 3genotype . Heading date, number of spikes /m2, number of kernels/spike, 1000-kernel weight, biological and grain yield-/ha were increased with the increments of nitrogen application levels up to 100kgN/fed. However, the results obtained from the plants supplied with 75kgN/fed except number of spikes/m2 up to 50kgN/fed were not significant different from those provided with 100kgN/fed.

The interaction between sowing date and cultivars had significant effect for all the studied traits. However, the interaction between sowing dates and nitrogen fertilizer levels significant for heading date, biological yield and grain yield/ha, The interaction between genotypes and nitrogen fertilizer levels had a significant effect for heading date and grain yield. Furthermore, the interaction between sowing date, genotypes and nitrogen fertilizer levels was significant for number of kernels per spike, biological and grain yield./ha

Therefore, the conclusion of this study is that executing breeding program on the preceding wheat genotypes as well as adopting the proper agricultural practices in Upper Egypt such as planting in a proper time, and adding 75kgN/fed, in particular, at the first stage of the growth of wheat plants in a season could improve and increase both grain yield of wheat plants and its components in Upper Egypt.

INTRODUCTION

Durum wheat played a great role in producing macaroni and other products derived from durum wheat flour. Durum wheat cultivated mainly, in arid and semi arid regions, so, it is grown well in Upper Egypt. The cultivated area is a bout 1/10 of the wheat area all over Egypt and located mainly in middle and Upper Egypt. Durum wheat tolerates water deficiency through various growth stages (Hefnawy and Wahba, 2003).

High yielding ability is dependent upon improved cultivar and proper agronomical practices, i. e. high seed quality, fertilizers, time of sowing, irrigation and pest control are the five major factors for increased crop

productions. In order to increase efficiency of this factor, it is important to study the influence of some of these factors on yield potential crop cultivars (Cupta *et al.*, 1970).

Abdel –Rahman *et al.*(1979), Sarkar (1987), and Rout and Satapathy (1994), found a progressive decrease in yield components, i.e., number of grains per spike, 1000- kernel weight, effective tillers per plant, and days to 50% spike emergence, when sowing date of wheat was delayed from November to mid January, compared with normal sowing date. Rate of nitrogen between 60-90kg/fed increased number of spikes per plant, grain weight per spike and fertilizer grain yield per feddan.

Rao *et al* (1980) showed that grain yield was markedly influenced by sowing dates. Though The highest yield was recorded when the crop was cultivated on 20th November, wheat could be planted as late 20 th December, without much reduction in yield which was only 10kg/ha for every 10 days delay in sowing up to 20 th December beyond which it was 66 kg/ha for every 10-days delay in sowing. They also reported a reduction of 29 days in the duration of early emergence to heading and 20 days in the durations from heading to maturity, when the date of sowing was delayed beyond 20 November and extended up to 19 January. The late-sown crop was forced to flower and maturity early when sowing was delayed.

Ayoub *et al.* (1994), found that grain yield, plant height, lodging, tillers per square meter, spikes per square meter and kernels per spike increased with increasing nitrogen fertility.Abdel Monem (1996) found an increase in the yield and nitrogen uptake of both straw and grain as a response of adding nitrogen fertilizer rates up to 210kg N/ha.

The objectives of this study is aimed to evaluate the six durum wheat genotypes in two sowing dates under four different nitrogen fertilizer levels on grain yield and its components.

MATERIALS AND METHODS

Two field experiments were conducted at Shandaweel Agricultural Research Station, Sohag Governorate, Upper Egypt, during the two successive seasons 2002/2003 and 2003/2004, to study the effect of two sowing dates under four different nitrogen levels on yield and yield components of six durum wheat genotypes.

The variables studied were:

(1) Two sowing dates i.e. 20th November (Normal date) and 20th of December (Late date).

(2) Six durum wheat genotypes, namely, Sohag 1, Sohag 2, Sohag 3, Bani-Sweif 1,Bani- Sweif 2 and Bani-Sweif 3 (Table 1).

(3) Four nitrogen fertilizer rates i.e. 25, 50, 75, and 100kgN/fed.

These treatments were arranged in split-split-plot design with four replications. Sowing dates represented the whole-plots, while six durum wheat genotypes randomly distributed in the sub plots and the four nitrogen fertilizer levels were allocated in the sub-sub-plots. Each plot consisted of 12 rows, 3.5m long and 20cm apart.

Table 1: Pedigree of six durum wheat genotypes are used in the study.

Ent No.	Genotypes	Pedigree
1	Sohag 1	GDOVZ 469/3/jo ' s ' 46/130/LDS
2	Sohag 2	CR " S" /PELISANO// CR 'S" / G "S"
3	Sohag 3	MEXI "S" / MGHA/ 51792// DURUM 6
4	Bani- Sweif 1	JO "S" / AA // G "S"
5	Bani- Sweif 2	
6	Bani-Sweif 3	CORM "S" / RUFO "S"

Soil characterization for the two experiment sites during 200/2003 and 2003/2004 are listed in Table 2 Phosphorous fertilizer (15kg P2O5/fed) as calcium super phosphate (15%P205) was added with land preparation.

Table 2 : Soil status at the experimental farm of ARC in the Shandaweel Sohag (Egypt) in both seasons (2002/2003 and 2003/2004).

Characteristics	2002/2003	2003/2004
PH	7.2	7.2
Ec m mhos/cm	0.004	0.004
Cations meg/100gm soil		
Ca ++	0.97	1.45
Mg++	0.55	0.99
Na+	0.43	0.49
K+	0.22	0.16
Anions,meg/100gm soil		
Hco3-	0.67	1.25
Co3--	Absent	Absent
C l-	0.90	0.88
So4--	0.60	0.96
CaCo3 %	1.25	1.29
Organic matter %	0.70	0.89
Mechanical analysis		
Fine Sand %	46	25.8
Coarse Sand %	3.27	7.03
Silt%	16	38.08
Clay %	34.73	29.09
Soil Texture	Sandy Clay Loom	Loamy Soil

The proceeding crop in the two seasons was Sorghum. Recommended cultural practices for wheat were applied except,for sowing date and nitrogen levels.

Studied Characters:

(1) Days to heading :The number of days from sowing to 50% heading.
(2) Number of spikes/m^2 was counted from each sub-plot.
(3) Number of kernels per spike: As an average of number of kernels from ten main spikes.
(4) 1000-kernel weight in gm: It was determined from three random samples taken from each treatment.
(5) Biological yield in ton/hectare: It represents the total yield of grain+ straw per feddan.
(6) Grain yield in ton/hectare: It was calculated on plot basis.

Statistical analysis

Data were statistically analyzed, combined analysis of variance for the two seasons was undertaken using the appropriate analysis of variance according to Steel and Torrie, 1980 and treatment means were compared by less significant difference (L.S.D.) at 5% levels of probability.

RESULTS AND DISCUSSION

The combined analysis of variance shows high significant differences between years for number of spikes /m2,1000-kernel weight, biolcgical and grain yields in tm/ha (Table3).These results reflect the wide differences in climatic conditions prevailing during the growing seasons. The main effect of sowing dates was significant for heading date, spikes/m2, number of kernels/ spike, 1000-kernel weight, biological and grain yields per feddan. The studied genotypes significantly differed for all traits, reflecting the genetic diversity between them. Also the effect of nitrogen fertilizer levels was highly significant for all traits. The first order interaction years x dates was significant for all traits except number of kernels/spike, indicating the different influence of climatic conditions on sowing date. Hence, highly significant interactions between years x genotypes and dates x genotypes were found for all the studied traits.

Table 3 : Combined analysis of variance of days to heading (D.H.), number of spikes/m^2, number of kernels / spike, 1000-kernel weight,biological yield and grain yield of durum wheat cultivars growing under sowing dates and nitrogen fertilizer levels in 2002/2003 and 2003/2004 seasons.

Source of variance	D. F	Mean squares					
		D.H	No. of S/m2	No. of k/s	1000-k.w.g m	B.Y. t/ha.	G.Y.t/ha.
Year((Y)	1	22.04	476793.72**	18.70	3947.27**	194.90**	46.22**
Error	3	4.12	10325.48	37.01	2.37	1.46	0.25
Sowing date(D)	1	4056.00**	7851.77*	154.86*	3946.25**	1401.37**	75.68**
Y x D	1	799.26**	25772.63**	47.85	445.69**	91.90**	19.50**
Error	6	5.80	1052.71	20.34	6.26	5.80	0.41
Genotype(G)	5	362.92**	10626.47**	155.01**	75.09**	217.69**	25.97**
G x Y	5	319.67**	5978.72**	100.28**	153.66**	102.68**	13.33**
G x D	5	122.28**	20313.06**	146.26**	78.61**	22.60**	2.88**
Nitrogen(N)	3	53.31**	21283.80**	827.78**	140.35**	133.59**	13.38**
N x Y	3	9.02**	10403.38**	8.45	15.33	1.06	0.42
N x D	3	31.05**	4331.35	23.41	10.53	12.07**	0.85*
N x G	15	4.76**	2635.95	8.55	6.26	2.36	0.54*
G x D x N	15	2.26	2216.34	30.92**	2.84	5.36*	0.62**
G x D x N x Y	15	5.22**	3302.06*	19.34	4.61	3.63	0.18
Error	276	2.05	1731.61	12.57	6.03	2.66	0.28
C.V.%	-	1.52	10.95	6.67	4.66	8.83	9.33

* and**significant and highly significant at 0.05 and 0.01 Levels of probability, respectively.

These findings demonstrate the variation between dates according to years and genotypes. Moreover, significant interaction between year x nitrogen fertilizer for heading date and number of spikes /m^2, plus the significant interaction between sowing dates and nitrogen fertilizer was significant for

heading date, biological and grain yields, while the interaction between genotypes and nitrogen was significant for heading date and grain yield per feddan. The combined analysis of variance showed significant interaction between sowing date, genotypes and nitrogen levels for number of kernels / spike, biological yields and grain yields t/ha, while the interaction between years, sowing dates, genotypes and nitrogen fertilizer levels were significant for heading date and number of spikes/m2.

Abdel-Rahman *et al.*(1979), showed that yield components were influenced significantly by sowing dates. Number of grains /spike and seed index were distinctly affected by the interaction of cultivar x sowing date. Samre *et al.*(1989) showed that the interaction between sowing dates and varieties was significant.Similar results were obtained by Hindi *et al.*(1990), Abdel-Karim (1991),and Tewari and Singh (1995).

1-Dayes to 50% heading.

Results in Table 4 revealed that,heading date ranged from 94.2 to 103.1 days with normal sowing,meanwhile, it varied from 85.0 to 94.6 days with late sowing.Delay planting reduced days to heading by 6.5 days on average. Days to heading for the six genotypes over the two dates revealed that genotype Sohag 1 was earliest one (90.4 days) and Bani-Sweif 3 was the latest cultivar (97.3days). Late sowing of wheat results on early maturity crop.

Table 4 : Average of number of days to heading as affected by sowing dates, nitrogen levels and cultivars in 2002 / 2003 and 2003/2004 seasons.

Sowing dates	Nitrogen rates kg/fed	Cultivars						Average
		Sohag1	Sohag2	Sohag3	Bani-sweif1	Bani-sweif2	Bani-sweif3	
20/11	25	94.2	94.8	98.1	99.0	96.5	101.2	97.3
	50	94.6	96.0	98.3	97.2	96.6	102.0	97.4
	75	95.0	96.2	101.1	99.6	97.1	103.1	97.7
	100	94.8	94.3	98.0	98.1	96.1	102.5	97.3
Average		94.6	95.3	98.9	98.5	96.5	102.2	97.7
20/12	25	85.0	90.8	92.0	89.1	90.7	91.5	89.8
	50	85.7	92.3	93.7	88.5	91.3	92.6	90.7
	75	86.7	94.6	94.5	91.0	91.5	92.2	91.7
	100	87.6	93.5	95.3	91.5	93.1	93.7	92.4
Average		86.2	92.8	93.9	90.0	91.6	92.5	91.2
Average over all.	25	89.6	92.8	95.0	94.0	93.6	96.3	93.6
	50	90.1	94.1	96.0	92.8	94.0	97.3	94.1
	75	90.8	95.4	97.8	95.3	94.3	97.6	95.2
	100	91.2	93.9	96.6	94.8	94.6	98.1	94.9
Average		90.4	94.1	96.4	94.2	94.1	97.3	94.4

L.S.D.0.05	
Dates (D)	**0.6**
Genotypes (G)	**0.4**
Nitrogen (N)	**0.4**
D x G	**0.7**
D x N	**0.5**
G x N	**0.9**
D x G x N	**N.S**

These findings may be due to the fact that heat units and the accumulated metabolites required for wheat flowering were reduced in late sowing and the atmospheric temperature starts rising up. Kheiralla and Sherif (1992) stated that delaying the planting date in relation to favorable date reduced the number of days from sowing to heading in wheat plants by 9.0 days,on average. Increasing nitrogen rate from 25 up to 100kgN /fed. significantly increased average heading date. Increasing nitrogen rate from 75 to 100kgN/fed. insignificantly increased this trait.. The average number of days to heading were 93.6, 94.1, 95.2 and 94.90 days with 25, 50, 75 and 100kgN /fed., respectively. These results may be attributed to increasing nitrogen fertilizer rates which increased vegetative growth rates and delayed heading.These results are in harmony with those obtained by Sadek(1985) and Zayed(1990).

2- Number of spikes /m^2.

The results revealed that, number of spikes /m^2 was significantly increased in early sowing date as compared with late sowing date. Average number of spikes /m^2 was384.70 and 375.7 spikes in the first and second date, resp. This could be due to that the climatological conditions prevailing during this period favoured the production of fertil tillers (Table 5). These results are in general, agreement with those reported by Abdel-Rahman *et al.*(1979). Bani-Sweif 3 variety produced higher number of spikes /m2 than Sohag 1.

Table 5 : Average of number of spikes /m2 as affected by sowing dates, nitrogen fertilizer levels and cultivars in 2002 / 2003 and 2003/2004seasons.

Sowing dates	Nitrogen rates kg/fed	Cultivars						Average
		Sohag1	Sohag2	Sohag3	Bani-sweif1	Bani-sweif2	Bani-sweif3	
20/11	25	356.1	376.9	348.0	325.9	351.8	409.5	361.4
	50	377.6	374.3	395.8	336.6	359.3	425.0	378.0
	75	411.9	401.0	392.5	368.6	365.4	448.4	397.9
	100	412.4	391.9	397.2	405.8	390.9	409.4	401.3
Average		389.5	386.0	383.4	359.2	366.8	423.1	384.7
20/12	25	307.0	357.0	342.5	388.2	384.7	356.7	356.0
	50	360.8	379.1	386.1	388.4	400.3	394.1	384.8
	75	352.3	325.5	382.7	412.5	426.2	414.9	385.7
	100	351.2	371.2	390.8	380.8	392.8	368.7	375.9
Average		342.8	358.4	375.5	392.5	401.0	383.6	375.7
Average over all.	25	331.6	367.5	345.3	357.0	368.3	383.1	358.8
	50	369.2	376.7	390.9	362.5	379.8	409.6	381.4
	75	382.1	363.3	387.6	390.6	395.8	431.6	391.8
	100	381.8	381.6	393.9	393.3	391.9	389.0	388.6
Average		366.2	372.0	379.5	375.9	383.9	403.4	380.2

L.S.D.0.05	
Dates (D)	**8.1**
Genotypes (G)	**14.4**
Nitrogen (N)	**11.7**
D x G	**20.3**
D x N	**N.S**
G x N	**N.S**
D x G x N	**N.S**

The average number of spikes /m2 was 403.40 and 366.20 spikes for Bani-Sweif 3 and Sohag 1 cultivars, respectively as shown in (Table5) Increasing nitrogen fertilizer rate from 25 up to 50kgN /fed. significantly increased average number of spikes /m^2. Increasing nitrogen fertilizer rate from 50 up to 100kgnN/ fed. insignificantly increased this average. These results may be attributed to increasing nitrogen fertilizer rate which increased plant ability to produce more tillers which gave more spikes. Similar results were obtained by Ali (1982) and Zayed (1990).

3-Number of kernels /spike

The normal sowing date produced higher number of kernels /spike compared with the second date. The average number of kernels /spike for the six wheat cultivars over dates and nitrogen fertilizer levels varied from 50.7 to 55.4 for genotypes Bani-Sweif 2 and Sohag 3, Genotype respectively (Table 6).The behavior of these varieties could be attributed to the different genetic systems of the six wheat cultivars. Increasing nitrogen fertilizer rate from 25 up to 75kg N/fed. significantly increased number of grains per spike. Application of 100kgN/fed.insignificantly increased number of grains per spike. These results may be due to increasing nitrogen fertilizer rates caused an increase in spike length and number of spikelets per spike which resulted in higher number of grains per spike.

Table 6 : Average of number of kernels/spike as affected by sowing dates, nitrogen fertilizer levels and cultivars in 2002 / 2003 and 2003/2004 seasons.

Sowing dates	Nitrogen rates kg/fed	Cultivars						Average
		Sohag1	Sohag2	Sohag3	Bani-sweif1	Bani-sweif2	Bani-sweif3	
20/11	25	52.4	54.5	52.0	51.4	44.0	47.8	50.4
	50	54.5	57.4	57.8	52.1	49.8	52.2	54.0
	75	58.3	58.1	58.7	57.4	52.4	54.8	56.7
	100	56.2	52.9	55.3	54.7	49.0	55.4	53.9
Average		55.3	55.7	55.9	54.0	48.8	52.5	53.7
20/12	25	47.6	43.6	50.8	48.3	48.8	48.7	48.0
	50	51.8	49.4	55.2	53.8	51.8	51.5	52.3
	75	53.1	55.3	57.8	57.0	56.1	55.5	55.8
	100	54.0	54.7	55.9	51.6	53.4	53.2	53.8
Average		51.6	50.8	54.9	52.7	52.5	52.2	52.5
Average over all.	25	50.0	49.1	51.4	49.9	46.4	48.2	49.2
	50	53.2	53.4	56.5	52.9	50.8	51.8	53.1
	75	55.7	56.7	58.2	57.4	54.3	55.1	56.2
	100	55.1	53.8	55.6	53.1	51.2	54.3	53.8
Average		53.5	53.3	55.4	53.3	50.7	52.4	53.1

L.S.D.0.05	
Dates (D)	1.1
Genotypes (G)	1.2
Nitrogen (N)	1.0
D x G	1.7
D x N	N.S
G x N	N.S
D x G x N	3.47

These findings are in agreement with those obtained by Gomaa(1983) and Mahmoud(1987).

4-1000-kernel weight (gm)

The results in Table(7)showed that normal sowing date at 20th Nov. gave heavy kernels and this May be due to that grains reached maturity without being affected by high temperature which results in shrine kernels. Meanwhile, the average of this trait for cultivars over dates and all nitrogen fertilizer treatments ranged from 50.93 to 53.92gm for cultivars Sohag 3 and Sohag 1, respectively. Regarding to nitrogen fertilization it seemed that 1000-kernel weight was increased due to the application of nitrogen fertilization up to 75kgN/fed. In general the percentage for increasing seed index was 2.95, 5.78 and 2.83 with nitrogen fertilization increase from 25 to 50,75 and 100kgN/fed., respectively. These findings are supported with those obtained by El-Monoufi(1980), Sadek(1985) and El-Sayed (1990).

Table 7 : Average of 1000-kernel weight (gm) as affected by sowing dates, nitrogen fertilizer levels and cultivars in 2002 / 2003 and 2003/2004 seasons.

Sowing dates	Nitrogen rates kg/fed	Cultivars						Average
		Sohag1	Sohag2	Sohag3	Bani-sweif1	Bani-sweif2	Bani-sweif3	
20/11	25	54.85	54.14	55.44	53.03	55.62	55.16	54.71
	50	56.15	56.03	55.85	55.93	56.37	56.13	56.08
	75	57.15	57.30	56.95	55.64	56.58	57.83	56.91
	100	57.07	55.84	54.33	55.78	56.02	55.79	55.80
Average		56.30	55.83	55.64	55.09	56.15	56.23	55.87
20/12	25	49.44	45.83	45.50	49.93	46.95	48.35	47.66
	50	50.76	48.40	46.52	51.96	48.89	49.37	49.32
	75	53.35	50.61	47.38	54.88	50.34	51.75	51.38
	100	52.62	47.96	45.46	51.20	50.55	49.13	49.49
Average		51.54	48.20	46.21	51.99	49.18	49.65	49.46
Average over all.	25	52.14	49.99	50.47	51.48	51.28	51.75	51.19
	50	53.45	52.22	51.19	53.95	52.63	52.75	52.70
	75	55.25	53.95	52.16	55.26	53.46	54.79	54.15
	100	54.84	51.90	49.90	53.49	53.28	52.46	52.64
Average		53.92	52.02	50.93	53.54	52.66	52.94	52.67

L.S.D.0.05	
Dates (D)	0.62
Genotypes (G)	0.85
Nitrogen (N)	0.69
D x G	1.20
D x N	N.S
G x N	N.S
D x G x N	N.S

5-Biological yield ton/ha.

The results in Table 8 showed that the average of biological yield was (20.376)with significantly incresed. in 1st—sowing date and decreased(16.555) t/ha. in the 2nd increasing in nitrogen fertilizer planting to 20th Decomber reduced biological yield by about 18.75%. Meanwhile, the

average of the six wheat cultivars varied from 15.061 to 19.855 ton/ha. for cultivar Bani-Sweif 1 and Bani-Sweif 2, genotypes respectively, with an average of 18.465 t/ha compared with early planting. Increasing levels of nitrogen increased significantly the biological yield. In compare with The studied nitrogen fertilizer levels of 50, 75 and 100kgN/fed with 25kgN/fed, it could be concluded that this trait was increased by 9.62, 15.82 and13.72%. This could be attributed increase in plant hight as well as, number of spikes per square meter and 1000-kernels weight. The favorable effect of increasing nitrogen fertilizer levels on dry matter might be due to the fact that nitrogen fertilizer is considered as one of the essential nutrients for growth of wheat and subsequently the grain and straw yield. These results are in line with those obtained by Zayed (1990).

Table 8 : Average of biological yield (ton/ha) as affected by sowing dates, nitrogen fertilizer levels and cultivars in the two growing seasons 2002 / 2003 and 2003/2004 seasons.

Sowing dates	Nitrogen rates kg/fed	Cultivars						Average
		Sohag1	Sohag2	Sohag3	Bani-sweif1	Bani-sweif2	Bani-sweif3	
20/11	25	17.902	20.000	19.152	13.705	20.759	17.679	18.199
	50	18.839	22.455	20.759	17.366	22.411	21.158	20.558
	75	19.598	22.545	22.054	18.661	23.973	22.589	21.570
	100	19.821	21.920	23.304	17.589	22.366	22.054	21.176
Average		19.040	21.730	21.317	16.830	22.377	20.960	20.376
20/12	25	15.714	16.696	15.045	11.741	15.670	17.768	15.439
	50	16.652	16.741	16.161	12.634	17.188	18.527	16.317
	75	17.321	19.196	16.830	13.884	17.946	19.152	17.388
	100	16.652	18.304	16.116	14.911	18.527	17.946	17.076
Average		16.585	17.734	16.038	13.292	17.333	18.348	16.555
Average over all.	25	16.808	18.348	17.098	12.723	18.214	17.723	16.819
	50	17.746	19.589	18.460	15.000	19.799	20.022	18.438
	75	18.460	20.871	19.442	16.272	20.960	20.871	19.479
	100	18.237	20.112	19.710	16.250	20.446	20.000	19.126
Average		17.813	19.732	18.677	15.061	19.855	19.654	18.465

L.S.D.0.05	
Dates (D)	0.601
Genotypes (G)	0.564
Nitrogen (N)	0.461
D x G	0.798
D x N	0.652
G x N	1.129
D x G x N	1.597

6- Grain yield ton/ha.

Results in Table 9 exhibited that the average of accessions grain yield ton/ha. for normal and late sowing dates were 6.070 and 5.183 ton/ha with an average of 5.626 ton/ha. There for, late sowing date compared to normal sowing date lowered the yield by14.61% over both season. The average of grain yield for the different genotypes over dates and all nitrogen fertilizer treatments varied from 4.476 ton/ha. for cultivars Bani-Sweif 1 to 6.245 ton/ha. for cultivar Bani-Sweif 3 with an average 5.626 ton/ha. (Table

9).The obtained data here indicated that cultivars showed wide variations either in yield or in its components in response to both heat (sowing dates) and nitrogen fertilizer levels. As a result of that the assessments of wheat genotypes must take place under various environments to identify the best genotype for a particular environments, Kheiralla and Sherif(1992) founed the same conclusion from their study on wheat genotypes. These results are in agreement with those found by Eissa (1991), EL-Morshidy *et al.*(1998) and Abdel-Shafi *et al.*(1999).

Increasing nitrogen fertilizer levels had a significant influence in increasing grain yield up to 75kg N/fed. increased grain yield from 5.222 to 6.109 ton/ha. It was observed that increasing nitrogen fertilizer levels caused an increase in grain yield by 8.86, 16.98 and 5.15% with 50,75 and 100kg N/fed as compared with 25kg N/fed. This could be due to the increasing number of spikes/m2, number of grains/spike and 1000-kernel weight. These finding are supported with those obtained by, EL- Monoufi(1980), Kumar (1985) and Zayed (1990).

Table 9 : Average of grain yield (ton/ha) as affected by sowing dates, nitrogen fertilizer levels and cultivars in 2002 / 2003 and 2003/2004 seasons.

Sowing dates	Nitrogen rates kg/fed	Cultivars						Average
		Sohag1	Sohag2	Sohag3	Bani-sweif1	Bani-sweif2	Bani-sweif3	
20/11	25	5.424	6.366	5.853	4.083	6.087	5.531	5.557
	50	5.590	6.960	6.446	5.074	6.174	6.536	6.130
	75	6.272	6.960	6.915	6.187	6.893	6.813	6.673
	100	5.330	6.288	6.672	4.478	6.308	6.451	5.921
Average		5.654	6.643	6.472	4.955	6.366	6.333	6.070
20/12	25	4.862	5.031	5.129	3.562	4.804	5.929	4.886
	50	5.250	5.335	5.406	3.882	5.402	6.165	5.240
	75	5.384	5.585	5.518	4.491	5.670	6.616	5.544
	100	4.571	5.366	4.835	4.049	5.618	5.922	5.060
Average		5.017	5.329	5.222	3.996	5.373	6.158	5.183
Average over all.	25	5.143	5.699	5.491	3.823	5.445	5.730	5.222
	50	5.420	6.147	5.926	4.478	5.788	6.350	5.685
	75	5.828	6.272	6.217	5.339	6.281	6.714	6.109
	100	4.951	5.827	5.753	4.263	5.963	6.186	5.491
Average		5.335	5.986	5.847	4.476	5.869	6.245	5.626

L.S.D.0.05	
Dates (D)	0.160
Genotypes (G)	0.180
Nitrogen (N)	0.148
D x G	0.257
D x N 0.210 G x N	0.363
D x G x N	0.514

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تأثير مواعيد الزراعة والتسميد النتروجينى على المحصول ومكوناته فـي قمـح الديورم تحت الظروف البيئية لمصر العليا

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أجريت هذه الدراسة في محطة البحوث الزراعية فى شـندويل خـلال موسـمي ٢٠٠٢/٢٠٠٣ و٢٠٠٣/٢٠٠٤ تهدف هذه الدراسة لدراسة تأثيرميعاد الزراعة (الميعاد الموصى بة و والميعـاد المتـأخر) وأربعة معدلات من التسميد الازوتى (٢٥-٥٠-٧٥-١٠٠ كيلو جرام نتروجين للفـدان) علـى محصـول الحبوب ومكوناته لستة أصناف من قمح الديورم وهى سوهاج١- سوهاج٢-سوهاج٣- بني سويف١ -بنـي سويف٢ – بني سويف٣.

١-أوضحت النتائج تأثير معنوي لميعاد الزراعة على كل الصفات المدروسة. تناقص المتوسط العام لصـفة عدد الأيام من الزراعة حتى طرد السنابل بتأخير ميعاد الزراعة عن الميعاد الموصى بـة. وكـان أكثـر الأصناف تبكيرا هو الصنف سوهاج١ بينما كان الصنف بني سويف٣ أكثر الأصناف تأخيرا فـي ميعـاد طرد السنابل.

٢-أشارت النتائج أن ميعاد الزراعة الموصى به سجل أكبر قيم بالمقارنة بالميعاد المتأخر لكـل مـن عـدد السنابل للمتر المربع – عدد حبوب السنبلة – وزن الألف حبة – المحصـول البيولـوجي -ومحصـول الحبوب للفدان.أعطى الصنف سوهاج٣ أعلى قيم لعدد حبوب السنبلة بينما تحصل على أعلى عـدد مـن السنابل للمتر المربع ومحصول الحبوب للفدان من الصنف بني سويف ٣.

٣- أظهرت النتائج زيادة كل من الصفات عدد السنابل للمتر المربع -عدد حبوب السنبلة- وزن الألف حبه- المحصول البيولوجي ومحصول الحبوب للفدان بزيادة معدل التسميد الازوتى من ٧٥ إلـى ١٠٠ كيلـو جرام نتروجين للفدان مع عدم وجود فروق معنوية لهذه الصفات تحت مسـتوى ٧٥،١٠٠ كيلـو جـرام نتروجين للفدان ماعدا صفه عدد السنابل للمتر المربع زادت حتى ٥٠ كيلو جرام نتروجين للفـدان ولـم تظهر أية فروق معنوية بين باقي المستويات.

٤-أظهرت النتائج أن التفاعل الثنائي بين مواعيد الزراعة والأصناف تأثير معنوي لكل من الصـفات تحـت الدراسة..بينما سجل التفاعل بين مواعيد الزراعة والنتروجين تاثير معنوي بالنسـبة لعـدد أيـام طـرد السنابل- والمحصول البيولوجي ومحصول الحبوب للفدان، وكذلك التفاعل بين الأصناف والنتـروجين ذو تأثير معنوي بالنسبة لصفتى عدد أيام طرد السنابل ومحصول الحبوب فقط. بينمـا أظهـرت النتـائج أن التفاعل الثلاثي بين مواعيد الزراعة والأصناف والتسميد النتروجينى تأثير معنوى بالنسبة لعدد الحبـوب في السنبلة والمحصول البيولوجي ومحصول الحبوب للفدان.

ولذا توصى الدراسة أن استخدام الطرز الوراثية السابقة في برامج التربيـة وتطبيـق المعـاملات الزراعية المناسبة في تلك المنطقة(خاصة الزراعة في الوقت المناسب و التسميد الازوتى بمعدل ٧٥ وحـدة نتروجين للفدان) لكى تحسن وتزيد إنتاج محصول القمح لمنطقة مصر العليا.