

IDENTIFICATION OF BREAD WHEAT CULTIVAR SUITABLE FOR EL-FAYOUM GOVERNORATE CONDITONS

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(Manuscript received 25 November 2001)

Abstract

Seven bread wheat cultivars and lines were evaluated in two locations in El-Fayoum Governorate during 1998/1999 and 1999/2000 growing seasons. The studied characters were grain and straw yields, yield components, harvest index and plant height. The results indicated that the bread wheat cultivar Giza 168 gave the highest grain yield and harvest index, However, Sids 1 cultivar had the highest straw yield, number of spikes/m² and tallest plant height. Moreover, the new bread wheat line Gemmeiza 7 characterized with the heaviest 1000- kernel weight.

INTRODUCTION

The continuous increase in wheat consumption consider an expulsive force to increase the total wheat production and realize self sufficiency of wheat production. So breeding and releasing new high yielding wheat cultivars consider an important mean for this target. These cultivars can recognize through varietal verification trials and determine the ideal environments to cultivate. Fischer and Wood (1979) noticed that the increase in grain yield caused an increase in harvest index. However, Tomar *et al.* (1993), stated that number of tillers, grains/ear and 1000-kernel weight, were responsible for higher wheat grain yield. Also, Abd-El-Ghany (1997), concluded that high yielding wheat varieties produced higher grain yield than the other genotypes owing to their superiority in number and weight of grains/spike, 1000- kernel weight, number of spikes/m² and harvest index. Hanna *et al.* (1997), reported that combined analysis of variance over years and locations cleared that Sids 1 surpassed other tested cultivars and proved high grain yield, number of spikes/m² and 1000- kernel weight. Moreover, Abd-El-Majeed *et al.* (1998), found that the highest number of spikes/m² was obtained from Sids 1 compared to the other tested cultivars. Furthermore, Abd-El-All (1999), reported that Sids 1 produced the greatest number of spikes/m² and had a good yield potentiality and higher straw yield. While, Hanna *et al.* (1999), showed that Sids 1 had the highest straw yield compared to Sakha 69. Shehab El-Din *et al.* (1999), cleared

that the two cultivars Sakha 93 and Giza 168 are superior in yield compared to the commercial checks, furthermore, they had high levels of resistance to rust diseases. Moreover, Iskander (2000), revealed that improving grain yield of wheat cultivars could be achieved through yield components.

The objective of this research was to assess the performance of new bread wheat cultivars and lines compared to the commercial bread wheat cultivar Sakha 69 (check cultivar) in El-Fayoum governorate to choose the ideal cultivars for the environmental conditions.

MATERIALS AND METHODS

Four bread wheat cultivars (Sakha 69, Sids 1, Sakha 93 and Giza 168) and three new bread wheat lines (Gemmeiza 7, 9 and Maya 74A's"/On//1160) were grown at two locations in El-Fayoum Governorate during 1998/1999 and 1999/2000 growing seasons. The soil analysis was performed for the two locations Table 1 (Garfas location characterized with loamy sand texture, while Demo location had sandy loam texture). The experimental design was Latin Square 7x7. Plot size and harvest area was 10.5 m². The experiments were planted at mid – November and harvested at beginning of May. Collected data were grain and straw yields, yield components, harvest index and plant height. Analysis of variance was performed for each location in the two seasons and combined analysis over locations and seasons was computed (Steel and Torrie 1960).

Table 1. Mechanical and chemical soil analysis of the experimental sites in El-Fayoum Governorate.

location	Depth cm	EC mmhos /cm	PH	Sol. N%	Avail. P ppm	Sand %	Silt %	Clay %	Texture class
Garfas	0-20	3.71	7.9	0.02	21	33.0	44.6	22.4	Loamy sand
	20-40	2.08	7.9	0.03	56	37.5	41.0	21.5	
	0-20	0.78	7.8	0.02	25	79.6	15.3	5.1	
Demo	20-40	0.82	7.7	0.02	31	78.6	13.9	7.5	Sandy loam

RESULTS AND DISCUSSION

1. Number of Spikes/m² :

The results in table 2 showed a significant difference between the tested cultivars and lines at each location. Thus in the combined analysis of variance, Grafas location gave higher significant numbers of spikes /m² compared to Demo location. Sids 1 bread wheat cultivar gave the highest number of spikes/m² at each location and in the over all mean of locations and seasons. This could be attributed to its higher tillering capacity. These results confirmed the results obtained by Tomar *et al.* (1993), Abd-El-Ghany (1997), Hanna *et al.* (1997), Abd-El-Majeed *et al.* (1998) and Abd-El- All (1999).

Table 2. Means of number of spikes/m² of bread wheat cultivars and lines over 1998/1999 and 1999/2000 growing seasons at two locations in El-Fayoum Governorate.

Cultivars & lines	Location		Mean
	Gorfas	Demo	
1. Sakha 69	418.14	385.28	401.71
2. Sids 1	450.43	395.00	422.72
3. Sakha 93	388.86	329.57	359.22
4. Giza 168	401.14	348.57	374.86
5. Gemmeiza 7	387.71	299.72	343.72
6. Gemmeiza 9	393.14	372.72	382.93
7. Maya 74A"s"/On//1160	407.72	338.00	372.86
Mean	406.73	352.70	379.71
CV %	10.22	14.07	12.06
LSD 5% :			
Location			22.50
Cult. & Lines	45.36	54.18	34.60
Interaction			48.94

2. Number of Kernels/Spike :

Table 3 showed a non significant difference between locations for number of kernels/spike. However, there was a significant difference between cultivars and lines at each location and in combined analysis of variance. The new bread wheat line Gemmeiza 9 had the highest significant number of kernels/spike compared to Sakha 69 (check

cultivar) at Garfas location and in the over all mean of locations and seasons. However, the new line Gemmeiza 7 gave the highest significant number of kernels/spike at Demo location only. This may be due to their characteristic long spike. These results are in the same trend with those obtained by Tomar *et al.* (1993), Abd-El-Ghany (1997) and Iskandar (2000).

3. 1000-kernel Weight, (gm) :

Location, cultivars and lines and their interaction had significant effects on 1000-kernel weight (Table 4). Demo location gave the heavier significant 1000-kernel weight compared to Garfs location. The new bread wheat line Gemmeiza 7 had the heaviest 1000-kernel weight compared to the check cultivar in both locations and in their over all mean. This could be attributed to heavy weight and big size of kernels for the new bread wheat line Gemmeiza 7. These results are in agreement with those obtained by Tomar *et al.* (1993), Abd-El-Ghany (1997), Hanna *et al.* (1997) and Iskandar (2000).

4. Grain Yield (ard/fad) :

The results in table 5 showed means of grain yield (ard. /fad) of bread wheat cultivars and lines over the two growing seasons 1998/99 and 1999/2000. Demo location gave a higher significant grain yield compared to Garfas location. However, there was insignificant difference between cultivars and lines either in each location and in combined analysis of variance. This may be due to the equal high yield potentiality of the tested cultivars and lines. Giza 168 bread wheat cultivar, however gave the highest grain yield in the over all mean of the two locations and seasons followed by the new line Gemmeiza 9, then the two wheat cultivars Sakha69 and Sids 1 which gave the same yield. These cultivars and lines are characterized with their superiority in yield components. These results are in accordance with the results obtained by Tomar *et al.* (1993), Abd-El-Ghany (1997), Hanna *et al.* (1999), Abd-El-Majeed *et al.* (1998), Abd-El-All (1999), Hanna *et al.* (1999), Shehab El-Din *et al.* (1999) and Iskandar (2000).

5. Harvest Index (%) :

Locations had insignificant effect on harvest index, while cultivars and lines and their interaction had significant effects on this character (Table 6). Giza 168 cultivar followed by Sakha 93 cultivar had the highest harvest index at the two locations and in their over all mean of locations and seasons, this may be attributed to their higher yielding ability. These results are in harmony with those obtained by Fischer and Wood

Table 3. Means of number of kernels/spike of bread wheat cultivars and lines over 1998/1999 and 1999/2000 growing seasons at two locations in El-Fayoum Governorate.

Cultivars & lines	Location		Mean
	Gorfas	Demo	
1. Sakha 69	46.08	49.48	47.78
2. Sids 1	53.09	54.00	53.54
3. Sakha 93	50.78	54.99	52.88
4. Giza 168	50.18	51.98	51.08
5. Gemmeiza 7	50.20	59.94	55.07
6. Gemmeiza 9	61.98	56.76	59.37
7. Maya 74A"s"/On//1160	47.56	54.66	51.11
Mean	51.41	54.54	52.98
CV %	15.98	14.80	15.37
LSD 5% :			
Location			----
Cult. & Lines	8.97	8.81	6.16
Interaction			8.71

Table 4. Means of 1000-kernel weight (gm) of bread wheat cultivars and lines over 1998/1999 and 1999/2000 growing seasons at two locations in El-Fayoum Governorate.

Cultivars & lines	Location		Mean
	Gorfas	Demo	
1. Sakha 69	52.80	54.90	53.85
2. Sids 1	46.40	49.82	48.11
3. Sakha 93	50.44	51.59	51.02
4. Giza 168	45.66	47.31	46.48
5. Gemmeiza 7	56.50	58.22	57.36
6. Gemmeiza 9	45.48	49.84	47.66
7. Maya 74A"s"/On//1160	46.54	49.94	48.24
Mean	49.12	51.66	50.39
CV %	7.00	3.42	5.42
LSD 5% :			
Location			1.23
Cult. & Lines	3.75	1.93	2.06
Interaction			2.92

Table 5. Means of grain yield (ard/fad) of bread wheat cultivars and lines over 1998/1999 and 1999/2000 growing seasons at two locations in El-Fayoum Governorate.

Cultivars & lines	location		Mean
	Gorfas	Demo	
1. Sakha 69	18.62	22.12	20.37
2. Sids 1	18.90	21.84	20.37
3. Sakha 93	19.35	20.66	20.00
4. Giza 168	20.22	21.62	20.92
5. Gemmeiza 7	18.14	20.72	19.43
6. Gemmeiza 9	19.85	21.56	20.70
7. Maya 74A"s"/On//1160	18.20	21.06	19.63
Mean	19.04	21.36	20.20
CV %	10.04	10.89	10.54
LSD 5% :			
Location			1.34
Cult. & Lines	-----	-----	--
Interaction			2.28

Table 6. Means of harvest index (%) of bread wheat cultivars and lines over 1998/1999 and 1999/2000 growing seasons at two locations in El-Fayoum Governorate.

Cultivars & lines	location		Mean
	Gorfas	Demo	
1. Sakha 69	33.65	34.16	33.90
2. Sids 1	31.73	31.02	31.38
3. Sakha 93	36.22	35.64	35.93
4. Giza 168	37.15	36.22	36.68
5. Gemmeiza 7	34.26	32.96	33.61
6. Gemmeiza 9	33.18	30.95	32.06
7. Maya 74A"s"/On//1160	34.01	30.90	32.46
Mean	34.31	33.12	33.72
CV %	9.56	10.76	10.16
LSD 5% :			
Location			-----
Cult. & Lines	3.58	3.89	2.59
Interaction			3.66

(1979), Abd-El-Ghany (1997) and Shehab El-Din *et al.* (1999).

6. Plant Height, (cm) :

Data in table 7 showed that locations, cultivars & lines and their interaction had significant effects on plant height. Sids 1 cultivar followed by the new lines Gemmeiza 7 and Gemmeiza 9 had the tallest plant height. However, Sakha 93 cultivar had the shortest plant height at the tested locations and in their over all mean.

7. Straw Yield (ton/fad) :

The results in table 8 revealed that there were significant differences between locations, cultivars & lines and their interaction for straw yield. Demo location gave a higher significant straw yield compared to Garfas location. Sids 1 cultivar followed by the new line Gemmeiza 9 gave the highest straw yield at the two location and in the over all mean of locations and seasons. This may be due to their characteristic high tillering. These results are in accordance with those obtained by Abd-El-All (1999) and Hanna *et al.* (1999).

Table 7. Means of plant height (cm) of bread wheat cultivars and lines over 1998/1999 and 1999/2000 growing seasons at two locations in El-Fayoum Governorate.

Cultivars & lines	location		Mean
	Gorfas	Demo	
1. Sakha 69	113.45	116.43	114.94
2. Sids 1	117.14	121.54	119.34
3. Sakha 93	99.40	103.57	101.48
4. Giza 168	100.96	106.66	103.81
5. Gemmeiza 7	116.07	117.50	116.78
6. Gemmeiza 9	116.42	116.19	116.30
7. Maya 74A"s"/On//1160	110.36	115.36	112.86
Mean	110.54	113.89	112.22
CV %	5.13	5.83	5.50
LSD 5% :			
Location			3.08
Cult. & Lines	6.19	7.24	4.66
Interaction			6.60

Table 8. Means of straw yield (ton/fad.) of bread wheat cultivars and lines over 1998/1999 and 1999/2000 growing seasons at two locations in El-Fayoum Governorate.

Cultivars & lines	location		Mean
	Gorfas	Demo	
1. Sakha 69	5.71	6.46	6.08
2. Sids 1	6.15	7.37	6.76
3. Sakha 93	5.11	5.62	5.36
4. Giza 168	5.14	5.82	5.48
5. Gemmeiza 7	5.28	6.35	5.82
6. Gemmeiza 9	6.04	7.33	6.68
7. Maya 74A ^s /On//1160	5.48	5.69	5.58
Mean	5.56	6.38	5.97
CV %	11.52	13.72	12.85
LSD 5% :			
Location			0.59
Cult. & Lines	0.7	0.95	0.58
Interaction			0.82

CONCLUSIONS AND RECOMMENDATIONS

These results revealed that the bread wheat cultivars and lines Giza 168, Gemmeiza 9, Sids 1 and Sakha 69 had the highest grain yield and could be recommended for planting in El-Fayoum.

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اختيار صنف قمح خبز ملائم لظروف محافظة الفيوم

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تم زراعة سبعة أصناف وسلالات جديدة من قمح الخبز بمحافظة الفيوم في موسمي
1998/1999، 1999/2000 وتمت دراسة صفات محصول الحبوب والقش ومكونات المحصول ودليل
الحصاد وطول النبات ولقد أوضحت النتائج أن الصنف جمييزة ١٦٨ قد أعطى أعلى حاصل حبوب
ودليل حصاد بينما أعطى الصنف سدس ١ أعلى حاصل من القش وأكبر عدد من السنابل/م² وأقصى
طول نبات كما تميزت السلالة الجديدة جمييزة ٧ بأثقل وزن ١٠٠٠ حبه.