

BANI SWEEF 4: A NEW DURUM WHEAT CULTIVAR

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ABSTRACT

The new durum wheat cultivar Bani Sweef 4 has been selected from one of the advanced lines among exotic collections grown in wheat breeding program at Sids Research Station. The grain yield of the new cultivar Bani Sweef 4 was evaluated through 44 experiments conducted three different levels (5 micro, 18 macro and 21 verification yield trials) from 2001/2002 to 2005/2006 seasons. The obtained results proved the superiority of the new cultivar Bani Sweef 4 compared with the local commercial checks; Bani Sweef 1 , Bani Sweef 3 and Sohag 3 in Middle Egypt and in some other parts in Upper Egypt in yield ,physical and chemical content. Moreover, the new cultivar Bani Sweef 4, expressed its high resistance to the three wheat rusts (stripe , leaf and stem) at both seedling and adult stages . In addition, Bani Sweef 4 showed high semolina percentage content comparing to the other three local checks (Bani Sweef 1 , Bani Sweef 3 and Sohag 3) . It could be concluded that Bani Sweef 4 is recommended for Middle Egypt for high grain production and grain quality per unit area .

INTRODUCTION

Durum wheat has been under cultivation since early time in Egypt. By mid seventies, intensive efforts have been paid, to develop high yielding and diseases resistant bread wheat cultivars. Since then the bread wheat cultivars have been given full interest while, durum wheat was rendered due to low productivity, susceptibility to rust diseases and poor quality.

Recently, work on the improvement of durum wheat has been in progress, being restricted to the southern regions in Middle and Upper Egypt. The first out-come was the durum wheat cultivar Sohag 1 (Gomaa *et al* 1979). In addition, Enayat Ghanem *et al* (1991) found that Sohag 3 equaled both Sohag 1 and Bani Sweef 1 in kernel weight, semolina extract percentage, gluten and protein contents. Moreover, Sohag 2 and Beni Sweef

1 was developed by (Abdel Shafi *et al*, 1989), and then Sohag 3 by Enayat Ghanem *et al.*, (1996). However, Mitkees *et al*, (1989) stated that Sohag 1 was quite stable over both Middle and Upper Egypt due to its tolerance to high temperatures in these regions. Both Sohag 2 and Beni sweef 1 were recommended for Middle Egypt, while in Upper Egypt, Sohag 2 only proved its superiority (Abdel Shafi *et al*, 1989). In addition, Enayat Ghanem *et al*, (1996) found that Bani Sweef 3 mean grain yield was significantly the highest in Middle and Upper Egypt. Therefore, they recommended that cultivar to both two regions. The objective of this investigation was aimed to improve durum wheat to borne a new durum wheat cultivar Bani Sweef 4 .

MATERIALS AND METHODS

The new promising cultivar Bani Sweef 4 has been selected from the exotic materials tested and selected at Sids Agricultural Research Station, Bani Sweef governorate, Egypt. The cross name and pedigree of the new cultivar is: AINZEN 1: ICD88-1120-ABL-0TR-1BR-0TR-6AP-0AP-0SD.

The newly released cultivar, Beni Sweef 4, has been tested for yielding ability with the commercial checks Beni Sweef 1, Beni Sweef 3, and Sohag 3 during the three successive growing seasons of 2001/2002 to 2003/2004, at the levels of preliminary and the advanced yield trials and at the on-farm yield trials level during the two growing seasons of 2004/2005 and 2005/2006 .

To represent all cultivated areas, experiments were carried out over Middle and Upper Egypt regions. Some of them were conducted at research stations and others at farmer's fields. The recommended cultural practices were implemented in these trials. For all experiments, the randomized complete blocks design (RCBD) was used according to Steel and Torrie (1980).

Considering the environmental differences among Egyptian regions, analysis of variance was calculated at regional level using the average of the tested checks as a local check (Joppa *et al.*, 1971 and Mitkees *et al*, 1989).

Taking the on-farm trials into consideration, 17 experiments were carried out in Middle and Upper Egypt in 2004/2005 season. In addition, four experiments were conducted in 2005/2006 season . The area of each selected fields was at least 3 faddans . Five bread wheat cvs; Giza 168, Sakha 94, Sakha 93, Gemmiza 10, and Sids 1 as well as the durum wheat cultivar Beni Sweef 3, were sown with Beni Sweef 4 as checks.

At harvesting time , randomly selected samples (4m² each) from each tested cultivar were harvested and threshed to estimate grain yield, the clean kernels of each sample were weighed and adjusted to ardab/faddan.

RESULTS AND DISCUSSION

1- Preliminary Yield Trials:

The results in Table 1 showed grain yield (ard/fad) , of the preliminary yield trials for the new durum wheat cultivar Bani Sweif 4 and two durum wheat cultivars in 2001/2002 season. The new durum wheat cultivar Bani Sweif 4 had significantly overcome the check cultivar Bani Sweif 3 at Sids location and had significantly surpassed the two durum checks at Mallawy location. These results are agreed with those obtained by Abdel Shafi *et al* 1989 and Enayat Ghanem *et al* (1991). However, there was insignificant difference between the new durum wheat cultivar Bani Sweef 4 and the two checks at the last locations. In the over all mean of the preliminary yield trials Bani Sweef 4 had significantly overcome Sohag 3 and had insignificant difference with Bani Sweef 3 cultivar .In addition, grain yield of the new Beni Sweef 4 cultivar was reduced compared with Beni Sweef 3 cultivar at Shandawell, Kom Ombo and the new Vally locations .

Table 1: Grain yield (ard/fad) of the preliminary yield trials for Bani Sweef 4 and two durum wheat cultivars in 2001/ 2002 season.

Locations. Cultivars.	Sids	Mallawy	Shandaweel	Kom Ombo	The NewValley	Mean
Sohag 3	34.12	25.93	28.34	22.32	13.12	24.77
Bani Sweef 3	29.89	25.36	34.12	30.46	15.14	27.00
Bani Sweef 4	35.44	29.25	29.35	26.96	12.81	26.76
Mean	32.79	25.67	27.92	27.04	13.79	25.44
LSD 5%	5.02	2.17	5.34	5.18	4.10	1.98
CV %	10.76	5.94	13.44	13.46	20.91	12.48

2- Advanced Yield Trials :

The newly durum wheat cultivar Bani Sweef 4 gave the highest grain yield comparing to those of the two checks at Sids location in 2002/2003 season (Table 2-a). The results indicated that grain yield of Bani Sweef 4 cultivar at Mallawy and in the over all mean, had significantly overcome Bani Sweef 1 only. The differences among the cultivars in their yielding abilities could be attributed to their genetic constitutions and to the interaction between their genotypes and prevailing environmental conditions (Shehab El-Din 1993). These results in accordance with those obtained by Mitkees *et al*, 1989. In addition ,grain yield of Bani Sweef 4 cultivar at Mallawy and El-Minia location was reduced compared with Sohag 3 cultivar .

Table 2a: Grain yield (ard/fad) of the advanced yield trials for Bani Sweef 4 and two durum wheat cultivars in Middle Egypt in 2002/2003 season.

Locations. Cultivars.	Sids	Bani Sweef	Mallawy	El-Minia	Mean
Sohag 3	29.33	18.93	25.65	22.50	24.10
Bani Sweef 3	24.26	20.16	22.73	19.56	21.67
Bani Sweef 4	32.16	18.44	24.74	19.47	23.70
Mean	29.23	18.40	24.76	21.25	23.41
LSD 5%	2.32	1.72	1.65	1.72	0.92
CV %	5.43	7.12	4.57	5.53	5.61

The results in Table 2-b present the grain yield of the advanced yield trials for Bani Sweef 4 and the two durum checks in Upper Egypt in 2002/2003 season. Bani Sweef 4 had significantly surpassed Bani Sweef 3 at Kom Ombo and in the over all mean. Moreover, Bani Sweef 4 did not significantly differ from the other two checks in grain yield at Shandaweel and The New Valley locations. On the other hand, the grain yield of Sohag 3 was superior to that of Bani Sweef 4 at El-Mattana location. These results are in harmony with those obtained by Gomaa *et al* (1979) and Abdel Shafi *et al*, (1989).

Table 2b: Grain yield (ard/fad) of the advanced yield trials for Bani Sweef 4 and two durum wheat cultivars in Upper Egypt in 2002/2003 season.

Locations. Cultivars.	Shandaweel	El-Mattana	Kom Ombo	The New Valley	Mean
Sohag 3	23.03	28.50	22.17	12.28	21.50
Bani Sweef 3	20.84	27.60	18.01	14.21	20.17
Bani Sweef 4	23.19	25.15	23.56	13.44	21.34
Mean	22.13	27.72	21.50	12.20	20.89
LSD 5%	3.43	2.88	2.48	2.02	1.11
CV %	10.63	7.14	7.89	11.34	9.03

The results of advanced yield trials in Middle Egypt in 2003/2004 season revealed that Bani Sweef 4 had significantly overcome the two checks at Sids and in the over all mean , and had significantly overcome only one check at Bani Sweef and Minia. However, at Mallawy, Bani Sweef 4 had surpassed the two checks with insignificant difference (Table 3-a). These results revealed that the new durum wheat cultivar Bani Sweef 4 is very suitable to grow in Middle Egypt. Similar results were reported by Enayat Ghanem *et al*, 1991 and 1996.

Table 3a: Grain yield (ard/fad) of the advanced yield trials for Bani Sweef 4 and two durum wheat cultivars in Middle Egypt in 2003/2004 season.

Locations Cultivar	Sids	Bani Sweef	Mallawy	El-Minia	Mean
Bani Sweef 1	23.74	18.73	21.77	26.90	22.78
Bani Sweef 3	23.20	20.48	21.45	24.87	22.50
Bani Sweef 4	27.20	23.45	22.33	28.77	25.44
Mean	24.14	22.47	21.24	24.00	22.96
LSD 5%	2.98	3.96	1.71	3.28	1.48
CV %	8.39	11.97	5.49	9.28	9.15

In advanced yield trials of Upper Egypt in 2003/2004 season, (Table 3-b), Bani Sweef 4 had significantly overcome Bani Sweef 3 (Check) only at Kom Ombo, while it had insignificantly surpassed the two checks at El-Mattana and in the over all mean. These results are in harmony with those of Abdel Shafi *et al*,(1989) and Mitkees *et al*, (1989).

Table 3b: Grain yield (ard/fad) of the advanced yield trials for Bani Sweef 4 and two durum wheat cultivars in Upper Egypt in 2003/2004 season.

Locations. Cultivars	Shandaweel	El-Mattana	Kom Ombo	Mean
Bani Sweef 1	18.24	23.27	20.05	20.52
Bani Sweef 3	19.84	25.60	18.78*	21.41
Bani Sweef 4	17.44	25.80	21.70	21.65
Mean	18.71	24.45	20.09	21.08
LSD 5%	3.38	2.99	2.72	1.69
CV %	12.30	8.32	9.19	9.81

The results of advanced yield trials in out valley in 2003/2004 season presented in (Table 3-c) reveal that there were insignificant differences between the grain yield of the new durum wheat cultivar, Bani Sweef 4, and each of the two durum checks in all locations and in the over all mean. However, the grain yield of Bani Sweef 4 surpassed those of the two checks at the New Valley and vice versa at El-Ewainat. These results are supported by those obtained by Mitkees *et al* (1989) and Enayat Ghanem *et al* (1991).

Table 3c: Grain yield (ard/fad) of the advanced yield trials for Bani Sweef 4 and two durum wheat cultivars in Out Valley in 2003/2004 season.

Locations. Cultivars	New Valley	Asuit	El-Ewainat	Mean
Bani Sweef 1	11.89	13.40	11.42	12.24
Bani Sweef 3	10.99	12.87	14.09	12.65
Bani Sweef 4	11.99	12.94	11.12	12.01
Mean	12.12	11.95	12.13	12.07
LSD 5%	3.32	1.01	2.54	1.38
CV %	18.60	5.73	14.24	13.98

3- On Farm Yield Trials:

The results in Table 4 presents the grain yield of on farm yield trials of the newly released cultivar Bani Sweef 4 in 2004/2005 season. In Middle Egypt, grain yield of Bani Sweef 4 ranged from 7.60 to 28.56 (ard/fad) with an average of 20.94 (ard/fad) , which surpassed the average of checks cultivars with 4.70 %. Moreover, in Upper Egypt , average grain yield (ard/fad)of Bani Sweef 4 surpassed the average of the checks cultivars with 12.44%. However, in the over all mean of Egypt, grain yield of Bani Sweef 4 out yielded the average of the two cultivars (checks) with 7.65%. These results are supported by those obtained by Gomaa *et al*, (1979), Abdel Shafi *et al* (1989) and Enayat Ghanem *et al* (1991).

In 2005/2006 season, on farm yield trials were conducted at four locations in Middle Egypt only (Table 5). The new durum wheat cultivar Bani Sweef 4, gave an average grain yield ranged from 16.80 to 26.32 (ard/fad) with an average of 23.15 (ard/fad) and overcame the average of the checks

with 3.07%. These results agree with those obtained by Enayat Ghanem *et al* (1991) and (1996).

Table 4: Grain yield (ard/ fad)of On Farm yield trials of the newly released cultivar Bani Sweef 4 in 2004/2005 season.

Governorate	No.of Trials	Bani-Sweef 4	Check		± %
			Cultivar	Yield	
<u>Middle Egypt</u>					
Giza	1	18.20	Gem. 10	18.90	- 3.70
	2	23.80	Sak. 94	22.40	6.25
	3	25.20	"	22.96	9.76
Mean of Giza		22.40		21.42	4.58
El-Fayoum	1	27.16	Giza 168	22.12	22.78
	2	28.56	"	29.12	-1.92
	3	7.60	Sak.94	8.60	-11.63
Mean of El-Fayoum		21.16		19.95	6.06
Bani Sweef	2	21.00	Sak.94	19.60	7.14
		18.90	Gem.10	17.50	8.00
Mean of Bani Sweef		19.95		18.55	7.55
El-Minia	1	19.20	B.S.3	19.06	0.73
	2	19.60	"	19.73	-0.66
Mean of El-Minia		19.40		19.40	0
Mean of Middle Egypt		20.94	Gem.10	18.20	15.05
			Sek.94	18.39	13.87
			Giza 168	25.62	-18.27
			B.S. 3	19.40	7.94
Mean		20.94		20.00	4.70
<u>Upper Egypt</u>					
Asuit	1	21.28	Sids 1	19.71	7.97
	2	21.28	B.S.3	19.06	11.65
Mean of Asuit		21.28		19.39	9.75
Sohag	1	21.14	Sak.94	20.86	1.34
Qena	1	19.60	Sak.93	15.12	29.63
	2	19.60	Sids 1	17.36	12.90
Mean of Qena		19.60		16.24	20.69
New Valley	1	18.48	Sak. 93	16.13	14.57
	2	18.48	"	16.13	14.57
Mean of New Valley		18.48		16.13	14.57
Mean of Upper Egypt		19.98	Sids 1	18.54	7.77
			B.S.3	19.06	4.83
			Sak. 94	20.86	-4.22
			Sak.93	15.79	26.54
Mean		19.98		17.77	12.44
Over		20.54	Gem.10	18.20	12.86
			Sak.94	18.88	8.79
			Giza 168	25.62	19.83
			B.S.3	19.28	6.54
Egypt			Sids 1	18.54	10.79
			Sak.93	15.79	30.08
Mean		20.54		19.08	7.65

Table 5: Grain yield (ard/fad)of On Farm yield trials of the newly Released cultivar Bani Sweef 4 in Middle Egypt in 2005/2006 season.

Governorate	No.of Trials	Bani-Sweef 4	Check		± %
			Cultivar	Yield	
Fayoum	1	16.80	Giza 168	16.10	4.35
	2	24.27	B.S.1	23.33	4.03
Mean of Fayoum		20.54		19.72	4.16
Minia	1	25.20	B.S.1	26.32	-4.26
	2	26.32	Giza 168	24.08	9.30
Mean of Minia		25.76		25.20	2.22
Mean of Middle Egypt		23.15	Giza 168	20.09	15.23
			B.S.1	24.83	-6.77
Mean		23.15		22.46	3.07

4- Physical and Chemical Components of Wheat Kernels:

The results in Table 6 revealed that, the new durum wheat cultivar Bani Sweef 4, overcame the durum wheat checks in the physical components,i.e. Kernel weight, Hectoliter and Semolina. However, for the chemical components in the kernels, Bani Sweef 4 overcame the three checks in Ash %, while for Protein % and Glotein % Bani Sweef 4 surpassed only two of the three durum check namely Bani Sweef 1 and Sohag 3. These results are in general accordance with those obtained by Enayat Ghanem *et al*,(1989).

Table 6: Physical and chemical components in the kernels of the newly released cultivar, Bani Sweef 4.

Cultivars	Physical Components			Chemical Components			
	1000 - K.W. (gm)	Hectoliter	Semolina	Ash %	Protein %	Glotein %	
						Humid	Dry
Sohag 3	48.00	83.18	64.90	1.50	12.50	25.22	9.70
Bani Sweef 1	48.40	83.90	65.64	1.50	11.50	25.22	9.70
Bani Sweef 3	48.58	81.96	62.60	1.80	13.10	28.34	10.90
Bani Sweef 4	49.72	84.40	67.40	1.40	12.90	25.74	9.90

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تم استنباط صنف قمح الديورم الجديد (بنى سويف ٤) من خلال البرنامج القومى لبحوث القمح فى محطة بحوث سدس بمحافظة بنى سويف بمنطقة مصر الوسطى من خلال انتخاب سلالة متفوقة من إحدى المجاميع المستوردة من المركز الدولى لتحسين الذره والقمح بالمكسيك.

تم إجراء ٤٤ تجريبه حقلية لمقارنة المحصول (٥ تجارب مصغرة، ١٨ تجريبه مكبرة و ٢١ تجربة تأكيدية) خلال المواسم من ٢٠٠٢/٢٠٠١ إلى ٢٠٠٦/٢٠٠٥.

أظهرت النتائج تفوق الصنف الجديد بنى سويف ٤ على الأصناف التجارية المستخدمة للمقارنة وهى بنى سويف ١، بنى سويف ٣ وسوهاج ٣ فى مصر الوسطى ومصر العليا. كما أثبت الصنف بنى سويف ٤ مقاومته العالية لأصداء القمح الثلاثة (الأصفر- البرتقالى- الأسود) فى طور البادرة وفى طور البالغ. بالإضافة الى هذا يتميز الصنف بنى سويف ٤ باحتوائه على نسبة مرتفعة من السيمولينا وهى المادة الرئيسية اللازمة لصناعة المكرونة ولهذا يوصى بزراعة الصنف بنى سويف ٤ فى مصر الوسطى.