

## **BANI SWEEF 5: A NEW DURUM WHEAT CULTIVAR**

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### **ABSTRACT**

The new durum wheat cultivar Bani Sweef 5 has been selected from one of the advanced lines among CIMMYT collections grown in wheat breeding program at Sids Research Station. The grain yield of the new cultivar Bani Sweef 5 was evaluated through 44 experiments conducted at three different levels (5 micro, 18 macro and 21 verification) in 2001/2002 to 2004/2005 seasons . The results indicated that superiority of the new cultivar Bani Sweef 5 compared to the local commercial checks; Bani Sweef 1, Bani Sweef 3 and Sohag 3 in the Middle and Upper Egypt. Moreover, the new cultivar Bani Sweef 5 expressed its high resistance to the three wheat rusts (stripe, leaf and stem) at both seedling and adult stages. In addition, Bani Sweef 5 showed high semolina percentage content in comparison with the other three local checks (Bani Sweef 1, Bani Sweef 3 and Sohag 3).

It could be summarized that Bani Sweef 5 is recommended to be grown in the Middle Egypt due to maximizing grain yield and its quality under this conditions.

### **INTRODUCTION**

Durum wheat (*Triticum durum*) mainly provides semolina for pasta and macaroni industries. Moreover, its straw is an important fodder for animal feeding. However, some durum wheat cultivars could also be used in making bread similar to that produced from bread wheat cultivars. The durum wheat cultivar Bani Sweef 1 is a good example for that. On the other hand, environment and its interaction with wheat cultivars have great effect on distribution, growth and grain yield of durum wheat cultivars. Therefore, cultivars distribution policy must be based on that concept.

Development of durum wheat cultivars in Egypt was accomplished by releasing Sohag 1 (Gomaa *et al.* 1979), Bani Sweef 1 and Sohag 2 (Abdel Shafi *et al.* 1989), Sohag 3 (Enayat Ghanem *et al.* 1991) and Bani Sweef 3 (Enayat Ghanem *et al.* 1996). As a matter of fact, Bani Sweef 1 is the widely distributed durum wheat cultivar due to its high yielding ability. The objective

of this investigation was aimed for introduction a new durum wheat cultivar Bani Sweef 5.

## **MATERIALS AND METHODS**

The durum wheat cultivar Bani Sweef 5 was developed by selection from CIMMYT materials grown at Sids Agricultural Research Station, ARC, in 1998/1999 season, The cross name and pedigree of the cultivar are: DIPPER-2/BUSHEN-3 and CDSS92B128-1M-0Y-0M-0Y-3B-0Y-0SD.

Afterwards, it was advanced to Sids durum screening nurseries. In 2000/2001 season, Bani Sweef 5 was tested in five preliminary yield trials. In the next season, it was transferred to advanced yield trials. Eighteen yield trials were conducted at the Middle and Upper Egypt for the two successive seasons 2002/2004 and 2003/2004. Finally, the new durum wheat cultivar Bani Sweef 5 was evaluated in 21 on-farm yield trials compared with the commercial bread durum wheat cultivars Sakha 93, Sakha 94, Giza 168, Gemmeiza 10 and Sids 1, as well as with the durum wheat cultivars Bani Sweef 1, Bani Sweef 3 and Sohag 3. The experimental plot area was 6 rows, 4 m long and 20 cm apart (4.8m<sup>2</sup>) for the screening and preliminary yield trials. Meanwhile, it was 10.5m<sup>2</sup> for the broadcasted advanced yield trials. For all experiments, the Randomized Complete Block Design (RCBD) was used according to Steel and Torrie (1980).

## **RESULTS AND DISCUSSION**

### **1- Preliminary Yield Trials:**

The results in Table 1 illustrated grain yield expressed as ardab/faddan, of the preliminary yield trials for the new durum wheat cultivar Bani Sweef 5 and two durum wheat checks Sohag 3 and Bani Sweef 3 in 2001/2002 season.

**Table 1: Grain yield (ardab/faddan) of the preliminary yield trials for Bani Sweef 5 and two durum wheat cultivars at five locations in 2001/2002 season.**

<b>Cultivar</b>	<b>Location</b>					<b>Mean</b>
	<b>Sids</b>	<b>Mallawy</b>	<b>Shandaweel</b>	<b>KomOmbo</b>	<b>NewValley</b>	
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 5	31.94	26.86	31.32	31.53	13.51	27.03
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

It is obvious from these data that there were insignificant differences among grain yield of Bani Sweef 5 and those of each of the two checks at all locations ,except for Kom–Ombo. The results indicated that grain yield of Bani Sweef 5 exceeded that of Sohag 3 at all locations, except for Sids. On

the other hand, grain yield of Bani Sweef 3 surpassed that of Bani Sweef 5 at both Shandaweel and New Valley locations but without significant differences between them. These results are in general agreement with those obtained by Gomaa *et al* (1979), Abdel Shafi *et al* (1989) and Enayat Ghanem *et al.* (1996).

**2- Advanced Yield Trials :**

Although the grain of the new durum wheat cultivar Bani Sweef 5 exceeded that of the local check Sohage 3, at all advanced trials at the Middle Egypt in 2002/2003 season, the differences were insignificant ,except for El-Minia location as shown in Table 2 a. On the other side, the grain yield of Bani Sweef 5 significantly surpassed that of Bani Sweef 3 at Sids, Mallawy and El-Minia, while Bani Sweef 3 non significantly exceeded Bani Sweef 5 at Bani Sweef Location (Table 2a).

The results presented in Table 2b for the advanced yield trials carried out at Upper Egypt in 2002/2003 season, the grain yield of the new durum wheat cultivar Bani Sweef 5 insignificantly exceeded those of the two checks at Shandaweel and El-Mattana locations. Moreover, it significantly surpassed the grain yield of the durum cultivar Bani Sweef 1 at Kom-Ombo location. On the other hand, no significant differences among the grain yield of the three cultivars were detected at the New Valley location. These results are in general agreement with those of Abdel Shafi *et al.* (1989) and Enayat Ghanem *et al.* (1991).

**Table 2a: Grain yield (ard/fad ) of the advanced yield trials for Bani Sweef 5 and two durum wheat cultivars at Middle Egypt in 2002/2003 season.**

Cultivar	Location				Mean
	Sids	Bani Sweef	Mallawy	El-Minia	
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 5	31.56	19.17	27.10	26.24	26.02
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

**Table 2b: Grain yield (ard/fad) of the advanced yield trials for Bani Sweef 5 and two durum wheat cultivars in Upper Egypt in 2002/2003 season.**

Cultivar	Location				Mean
	Shandaweel	El-Mattana	Kom Ombo	New Valley	
Sohag 3	23.03	28.50	22.17	12.28	21.50
Bani Sweef 1	20.84	27.60	18.01	14.21	20.17
Bani Sweef 5	23.95	28.65	20.66	12.62	21.47
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

Data of the advanced yield trials at the Middle Egypt in 2003/2004 season are shown in Table 3a, The durum wheat cultivar Bani Sweef 5 significantly overcame the durum wheat check Bani Sweef 1 at Bani Sweef location. Bani Sweef 5, new cultivar exceeded all checked cultivars at all locations except Bani Sweef but did not reach to the significance level. These results are in harmony with those obtained by Enayat Ghanem *et al.* (1996).

**Table 3a: Grain yield (ard/fad) of the advanced yield trials for Bani Sweef 5 and two durum wheat cultivars in the Middle Egypt in 2003/2004 season.**

Cultivar	Location				Mean
	Sids	Bani Sweef	Mallawy	El-Minia	
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 5	25.87	22.93	21.94	27.80	24.64
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

The results indicated that there is a significant difference between studied cultivars in grain yield . The newly durum wheat cultivar Bani Sweef 3 significantly exceeded Bani Sweef 1 and Bani Sweef 5 in advanced yield trials at the Upper Egypt and New Valley in 2003/2004 season but not reach to the level of significant (Tables 3b and 3c). At New Vally location Bani Sweef 5 cultivar significantly exceeded check cultivar but not reach to the level of significant in Out Vally .These results approved that Bani Sweef 5 is a good durum wheat cultivar and agreed with those obtained by Gomma *et al.* (1979) and Enayat Ghanem *et al.* (1991).

**Table 3b: Grain yield (ard/fad) of the advanced yield trials for Bani Sweef 5 and two durum wheat cultivars in Upper Egypt in 2003/2004 season.**

Cultivars	Location			Mean
	Shandaweel	El-Mattana	Kom Ombo	
Bani Sweef 1	18.24	23.27	20.05	20.52
Bani Sweef 3	19.84	25.60	18.78	21.41
Bani Sweef 5	16.37	23.94	20.14	20.15
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

**Table 3c: Grain yield (ard/fad) of the advanced yield trials for Bani Sweef 5 and two durum wheat cultivars in Out Valley in 2003/2004 season.**

Cultivar	Location			Mean
	New Vally	Asuit	Elwoinaat	
Bani Sweef 1	11.89	13.40	11.42	12.24
Bani Sweef 3	10.99	12.87	14.09	12.65
Bani Sweef 5	12.60	12.87	11.65	12.37
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 presented grain yield (ard/fad) of on-farm yield trials for the newly released cultivar Bani Sweef 5 in 2004/2005 season.

**Table 4: Grain yield (ard/fad) of On-Farm yield trials of Bani Sweef 5 in 2004/2005 season.**

Governorate	No. of Trials	Bani-Sweef 5	Check		± %
			Cultivar	Yield	
Middle Egypt Giza	1	23.10	Gem. 10	18.90	22.22
	2	25.90	Sak. 94	22.40	15.63
	3	28.00	Sids 1	22.96	21.95
Mean of Giza		25.67		21.42	19.84
El-Fayoum	1	25.20	Giza 168	22.12	13.92
	2	25.20	"	29.12	-13.46
	3	8.40	Sak.94	8.60	-2.33
Mean of El-Fayoum		19.60		19.95	-1.75
Bani Sweef	1	28.00	Sak.94	19.60	42.86
	2	16.94	Gem.10	17.50	-3.20
Mean of Bani Sweef		22.47		18.55	21.13
El-Minia	1	18.86	B.S.3	19.06	-1.05
	2	19.64	"	19.73	-0.46
Mean of El-Minia		19.25		19.40	-0.77
Mean of Middle Egypt		21.92	Gem.10	18.20	20.44
			Sek.94	16.87	29.93
			Sids 1	22.96	-4.53
			Giza 168	25.62	-14.44
			B.S. 3	19.40	12.99
Upper Egypt Asuit	1	22.57	Sids 1	19.71	14.51
Mean of Asuit			2	22.56	B.S.3
		22.57		19.39	16.40
Sohag	1	22.26	Sak.94	20.86	6.71
Qena	1	22.40	Giza 168	15.12	48.15
Mean of Qena	2	19.60	Sids 1	17.36	12.90
		21.00		16.24	29.31
New Valley	1	18.95	Sak. 93	16.13	17.48
Mean of New Valley	2	18.95	"	16.13	17.48
		18.95		16.13	17.48
Mean of Upper Egypt		21.04	Sids 1	18.54	13.48
			B.S.3	19.06	10.39
			Sak. 94	20.86	0.86
			Giza 168	15.12	39.15
Mean			Sak.93	16.13	30.44
Over all Egypt		21.04		17.77	18.40
		21.56	Gem.10	18.20	18.46
			Sak.94	17.87	20.65
			Sids 1	20.01	7.75
			Giza 168	22.12	-2.53
			B.S.3	19.29	11.77
			Sak.93	16.13	33.66
Mean		21.56		19.08	13.00

Grain yield (ard/fad) of the newly durum wheat cultivar Bani Sweef 5 ranged from 8.40 to 28.00 with an average of 21.92 ardab/faddan in the Middle Egypt, which outyielded the average of durum checks by 9.60%. In Upper Egypt Bani Sweef 5 gave an average grain yield of 21.04 ardab/faddan and surpassed the average of durum checks by 18.40%, while, in the over all mean of Egypt, Bani Sweef 5 gave an average grain yield of 21.56 ardab/faddan with an increase of 13.00% over the checks. These results are in agreement with those obtained by Abdel Shafi *et al.* (1989) and Enayat Ghanem *et al.*(1996).

The results in Table 5 revealed the grain yield (ard/fad) of on-farm yield trials in the Middle Egypt in 2005/2006 season. The grain yield of the newly durum wheat cultivar Bani Sweef 5 ranged from 20.30 to 25.20 with average of 22.58 ard/fad and surpassed the average of check cultivar by 0.53%. These results are confirmed that results of Gomaa *et al.* (1979) and Enayat Ghanem *et al.* (1991).

**4- Physical and Chemical Components in The Kernel:**

The results in Table 6 showed that new durum wheat cultivar Bani Sweef 5 surpassed the other check cultivars in physical components. Bani Sweef 5 produced the highest 1000-grain weight (55.48gm) followed by Bani Sweef 3, Bani Sweef 1 and Sohag 3. Bani Sweef 5 exceeded the other three check cultivars in hectoliter test.

**Table 5: Grain Yield (ardab/faddan) of On-farm yield trials of Bani Sweef 5 in Middle Egypt in 2005/2006 season.**

Governorate	No. Trials	Bani-Sweef 5	Check		± %
			Cultivar	Yield	
Fayoum	1	20.30	Giza 168	16.10	26.09
	2	25.20	B.S.1	23.33	8.02
Mean of El-Fayoum		22.75		19.72	15.37
El-Minia	1	22.40	B.S.1	26.32	-14.89
	2	22.40	Giza 168	24.08	-6.98
Mean of El-Minia		22.40		25.20	-11.11
Mean of Middle Egypt		22.58	Giza 168	20.09	12.39
			B.S.1	24.83	-9.06
Mean		22.58		22.46	0.53

**Table 6: Physical and chemical components in the kernel of Bani Sweef 5.**

Cultivar	Physical Components			Chemical Components			
	1000-kw, gm	Hectoliter Kg/hec.	Semo-lina %	Ash %	Protein %	Glotein %	
						Humid	Dry
Sohag 3	48.00	83.18	64.90	1.50	12.50	25.22	9.7
Bani Sweef 1	48.40	83.90	65.64	1.50	11.50	25.22	9.7
Bani Sweef 3	48.58	81.96	62.60	1.80	13.10	28.34	10.9
Bani Sweef 5	55.48	86.00	81.60	1.30	12.90	25.74	9.9

The highest semolina percentage content was obtained from Bani Sweef 5 (81.6%) compared to the other three checks as shown in Table 6. Chemical analysis results recorded in Table 6 showed that Bani Sweef 5 come in the second rank after cultivar Bani Sweef 3 concerning the studied characters i.e. ash%, protein% and gluten %. These results are similar to that obtained by Enayat Ghanem *et al*, (1991).

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تم استنباط الصنف الجديد من قمح الديورم بنى سويف ٥ من خلال البرنامج القومى لبحوث القمح فى محطة البحوث الزراعية بسدس، محافظة بنى سويف، من خلال انتخاب سلالة متفوقة من إحدى المجاميع المستوردة من المركز الدولى لتحسين الذره والقمح بالمكسيك .

تم إجراء ٤٤ تجر به حقلية لمقارنة المحصول (٥ تجارب مصغرة، ١٨ تجر به مكبرة و ٢١ تجرية تأكيدية) خلال المواسم من ٢٠٠٢/٢٠٠١ إلى ٢٠٠٥/٢٠٠٤ . أظهرت النتائج تفوق الصنف الجديد بنى سويف ٥ على الأصناف التجارية المحلية المستخدمة للمقارنة وهى بنى سويف ١ ، بنى سويف ٣ وسوهاج ٣ فى مصر الوسطى ومصر العليا . كما أثبت الصنف بنى سويف ٥ مقاومته العالية لأصداء القمح الثلاثة (الأصفر، البرتقالى والأسود) فى طور البادره وفى الطور البالغ. بالإضافة الى هذا يتميز الصنف بنى سويف ٥ باحتوائه على نسبة مرتفعة من السيمولينىا وهى المادة الرئيسية اللازمة لصناعة المكرونة ولهذا ينصح بزراعة الصنف بنى سويف ٥ فى مصر الوسطى.