

SIDS13: A NEW BREAD WHEAT CULTIVAR

Moustafa, M.A.*; M.S.Shrshar*; T.Shehab El-Din*; M.Abo Shereef*; S.Abdel- Majeed*; M.Abdel-Aleem; S. R. S. Sabry*; Iman M. Sadek*; A. Hamada*; A. Abo-Warda*; A. Tammam*; M. Meshref*; E.El-Sayed*; H. Ashowh*; M. Tawfelies*; H. Hendawy*; Hayam S. Mahgoub*; A. K. Mostafa*; H. El-Borhamj*; A. Menshawy*; A. Moussa*; Wafaa M. El-Awady*; A. El-Hag*; R. Koumbor*; S. Seleem*; R. A. Ramadan*; Nadia A. Abdel-Nour*; G. Sharawy*; S. Abdel-Dayem*; Sohair M. Hassan*; A. Sewelam*; S. El-Sawy*; S. Hammad*; Magda A. Abdel-Rahman*; Sabah H. Abo Elela*; M. A. Khaled*; I. A. Amin*; M. Zakaria*; Manal A. Hassan*; A. Gad-Allah*; M. A .El-Maghraby*; A. Morad*; Aza M. Abdel-Al*; .A. Hagraas*; A. T. Mostafa*; M. S. Mahmoud*; M. Y. Mubark*; Hoda M.M El-Gharbawy *, A.A.Mahmoud*, A. Gomaa*; Enayat Ghanem*; R. Mitkees*; M. El-Monofy*; S. kh. Mahmoud*; N. Hanna*; M. A. Moussa*; M. A. Gouda*; A. Ageez*; M. A. Salem* A. Khattab*; A. Abdel-Lattif*; M. Eskandar*; Najwa Abdel-Fattah*; F. Hefnawy and W. Abdel-Samad**.

* Wheat Res.Dep., Field Crops Research Institute, ARC, Giza, Egypt.

** Wheat Diseases Res. Dept., Plant Pathology Res. Intitute, ARC, Egypt.

ABSTRACT

The new bread wheat cultivar Sids 13 has been developed by Wheat Research Department, Field Crops Research Institute, Agriculture Research Center, Egypt and selected from one of the advanced lines among ICARDA collections grown in wheat breeding program at Sids Agricultural Research Station. The grain yield of the new cultivar Sids 13 was evaluated through 66 experiments at two different levels of yield trials (11 preliminary and 55 advanced yield trials) in the three successive seasons 2004/2005, 2005/2006 and 2006/2007, respectively. The obtained results proved the superiority of the new cultivar Sids 13 as compared to the local commercial cultivars, Giza 168, Sakha 93 and Gemmiza 9 in the main five regions of Egypt, i.e. North Delta, South Delta, Middle Egypt, Upper Egypt and Out Valley. Moreover, stability parameters for grain yield cleared that the newly bread wheat cultivar Sids 13 has better stability parameters in both South Delta and Upper Egypt regions and could be recommended for planting in those regions. Also, the results of rust diseases reactions proved that Sids 13 has high resistance to all tested pathotypes of the three rust diseases under local conditions.

INTRODUCTION

Wheat (*Triticum aestivum* L.em. Thell) is the main human food crop in Egypt as well as in many parts of the world. However, there is a great gap between our local consumption (estimated by 12-14 M.tons) and production (estimated by 7-8M. tons, annually). The increasing demand on wheat due to the population increase with the limitation of area cultivated to wheat brings about a serious challenge to wheat breeder. Therefore, the only possible solution for this problem is to develop and grow new wheat cultivars having high yielding ability, resistant to diseases especially rusts and tolerant to

abiotic stresses such as salinity, drought and heat. Actually, this is the main goal of the Egyptian National Wheat Research Program (ENWRP), Field Crops Research Institute, Agricultural Research Center. In addition, increasing wheat production could be possible by growing wheat in the newly reclaimed areas (horizontal expansion). To achieve this goal, developing new cultivars tolerant to the adverse conditions are highly needed. Following this strategy, many cultivars have been developed by (ENWRP) such as Sids 1, Sakha 93, Giza 168, Gemmiza 7, Gemmiza 9, Sakha 94, Gemmiza 10 and Sids 12 during the last two decades. These cultivars are characterized by high yielding ability, resistant to diseases especially rusts, adapted to Egyptian conditions and characterized also by good grain quality.

This research work was undertaken to obtain additional wheat cultivar resistant to rusts with high yielding potentiality under different environmental conditions.

MATERIALS AND METHODS

The new promising cultivar, Sids 13 has been selected from one of ICARDA collections at Sids Agricultural Research Station, Egypt. However, the cross name and pedigree of the new cultivar is:

Sids 13 = ALMAZ- 19= KAUZ "S" // TSI/SNB "S". ICW94-0375-4AP-2AP-030AP-0APS-3AP-0APS-050AP-0AP-0SD.

Moreover, three yield trials were carried out to test the new cultivar Sids 13:

1- Preliminary Yield Trials (2004/2005):

The newly released cultivar Sids 13 was tested for grain yield ability against those of local check cultivars Giza 168, Sakha 93, Sakha 94, Gemmiza 9, Gemmiza 10 and Sids 1 in eleven preliminary yield trials conducted at eleven research stations representing different ecological zones of wheat growing regions; Sakha (North Delta), El-Gemmiza, Itay El-Barod and Kafr El-Hamam (Middle Delta), Sids and Mallowy (Middle Egypt), Shandaweel, El-Matanaa and Kom Ombo (Upper Egypt), as well as the New Valley and El-Nubaria (Out Valley) in 2004/2005 season. The experimental design used in these trials was the randomized complete block design (RCBD) with four replicates according to Steel and Torrie (1980). The plot area was 6 rows, 3.0m long and 20cm apart (3.6 m²).

2- Advanced Yield Trials (2005/2006 and 2006/2007):

Sids 13 and some other promising lines were tested for yielding ability versus local check cultivars, Giza 168, Sakha 93 and Gemmiza 9 in 27 and 28 advanced yield trials in 2005/2006 and 2006/2007 seasons, respectively. In these advanced yield trials, all promising lines as well as checks were tested in large plot area experiment (3.0m x 3.5m = 10.5m² each). Genotypes under investigation were evaluated in a randomized complete block design experiment with four replications.

In addition, stability parameters for grain yield were calculated according to Eberhart and Russell (1966).

RESULTS AND DISCUSSION

1- Preliminary Yield Trials:

Table (1) presents grain yield (ard/fad) of the preliminary yield trials for Sids 13 and six bread wheat cultivars (checks) in 2004 / 2005 season. In North Delta, Sids 13 exceeded the check mean with 4.33%, while in Middle Delta the increase of Sids 13 over the mean check ranged from 4.87% to 17.81%. These results confirm that Sids 13 has high yielding ability over commercial cultivars in mentioned regions and agreed with that obtained by Hanna *et al.* (1997). Moreover, in Middle Egypt, Sids 13 out yielded the check mean by 14.19% at Mallawy and 16.40% at Sids. These results showed the high adaptability of Sids 13 for Middle Egypt and similar with that obtained by Mitkees *et al.* (1998). In addition, in Upper Egypt, the increase in grain yield for Sids 13 over checks mean ranged from 11.18% at Shandaweel to 13.19% at Kom Ombo. Only, at El-Matanaa the check mean out yielded Sids 13 by 6.75%.

The highest increase in grain yield for Sids 13 over checks mean was obtained in Out Valley at the New Valley experiment (22.82%) while at Nubaria (14.27%). These results cleared that the newly bread wheat cultivar Sids 13 has high yielding ability and good adaptability to be cultivate in old and new lands of Egypt.

2- Advanced Yield Trials:

The results in table (2) appear grain yield (ard/fad.) of the advanced yield trials for Sids 13 and three bread wheat cultivars (checks), i.e. Giza 168, Sakha 93 and Gemmiza 9 at 27 sites all over Egypt in 2005/2006 season. In North Delta, there were insignificant differences between the newly bread wheat cultivar Sids 13 and the check mean. While, in South Delta, Sids 13 significantly out yielded the checks mean at Gemmiza and Kafr El-Hamam. These results are in agreement with those obtained by Shehab El-Din *et al.* 1999, 2000 and 2005. Moreover, in Middle Egypt, the new bread wheat cultivar Sids 13 had significantly exceeded the check cultivars mean only at Sids, while, at Giza the check cultivars mean had significantly surpassed Sids 13. In Upper Egypt region, there was insignificant difference between Sids 13 and the check mean. However, in Out Valley, Sids 13 had the highest significant grain yield at two of the seven tested locations (Ismailia and Monofiaa). These results cleared the superiority and high yielding ability of the newly bread wheat cultivar in the main five regions, i.e. North Delta, South Delta, Middle Egypt, Upper Egypt and Out Valley and confirmed with that obtained by El-Shamy *et al.* (2005).

Table (3) showed grain yield (ard/fad.) of the advanced yield trials for Sids 13 and the same three bread wheat cultivars (checks) in 2006/2007 season. Sids 13 had significantly out yielded the check cultivars mean at two of the tested locations in North Delta and at one of the tested locations in both Upper Egypt and Out Valley. These results revealed that the newly bread wheat cultivar Sids 13 has high potentiality and yielding ability and agreed with that obtained by Shehab El-Din *et al.* 1999, 2000 and 2005. However, in both South Delta and Middle Egypt regions the check cultivars mean had significantly surpassed Sids 13.

Table (2): Grain Yield (ard/fad) of the advanced yield trials for Sids 13 and three bread wheat cultivars (checks) at 27 sites all over Egypt in 2005/2006 season.

Cultivars Location	Giza 168	Sakha 93	Gemmiza 9	Check Mean	Sids 13	LSD 5%
North Delta:						
El-Serw	20.69	20.50	19.17	20.12	19.48	1.09
Dakhliia-1	22.67	23.34	24.00	23.34	24.00	2.02
Dakhliia-2	13.34	14.67	16.54	14.85	16.00	2.23
Sakha	25.90	25.25	24.32	25.16	26.58	2.15
Tag El-Ezz	22.80	22.80	23.67	23.09	23.94	2.43
Behiraa	23.54	25.89	24.34	24.59	24.47	0.54
South Delta:						
Gemmiza	26.74	27.62	25.16	26.51	26.25	1.82
Sers El-Liaan	25.34	22.67	25.34	24.45	28.34*	3.66
Kafr El-Hamam	21.61	24.09	23.84	23.18	24.04*	2.58
Sharkia	18.07	17.37	19.54	18.33	20.74*	1.79
Qalubia	20.00	20.54	19.34	19.96	21.34	3.94
Bahteem	14.87	16.27	15.94	15.69	16.14	2.81
Middle Egypt:						
Giza	30.42	28.36	25.20	27.99*	24.14	2.16
Fayoum	28.67	25.00	26.67	26.78	25.34	2.01
Sids	24.24	26.92	23.41	24.86	27.44*	2.47
Mallawy	18.18	18.45	17.34	17.99	18.64	1.16
Menia	19.84	19.54	18.04	19.14	19.44	1.37
Upper Egypt:						
Shandaweel	20.94	20.20	23.92	21.69	21.80	1.91
Matanaa	20.27	20.14	20.54	20.32	23.14	3.37
Kom Ombo	18.16	14.99	16.59	16.58	17.17	3.69
Out Valley :						
Nubaria	20.66	21.06	19.37	20.36	18.34	3.74
Esmaliaa	8.44	6.91	7.67	7.67	11.74*	0.55
Sharkiaa	19.80	20.40	19.20	19.80	20.27	2.41
Monofiaa	13.74	10.80	14.27	12.94	15.87*	2.76
Asiut	10.50	10.34	9.40	10.08	10.20	1.48
New Vally	20.01	19.32	21.76	20.36	22.40	2.82
Toshky	14.09	12.50	11.43	12.67	14.47	2.05

3- Stability Parameters for Grain Yield:

Stability parameters for grain yield of the advanced yield trials in 2005/2006 season were calculated according to Eberhart and Russell (1966). The stable cultivar according to this method was defined as one which had a high average performance over a wide range of environments, a regression coefficient of 1.0 and no deviation from regression mean square. The results in tables (4 and 5) cleared that the newly bread wheat cultivar Sids 13 has better stability parameters in both South Delta and Upper Egypt regions and could be recommended for planting in those regions. These results are similar to that obtained by Mitkees *et al.* (1998).

4- Rust Diseases Reaction:

Data shown in table (6) revealed the reactions of the new bread wheat cultivar Sids 13 against the three wheat rusts, yellow (YR), leaf (LR) and stem (SR) in advanced yield trials at Sakha and El-Nubaria agricultural research stations in 2006/2007 season. These data proved that Sids 13 posses high resistance to all tested pathotypes of the three rust diseases. Moreover, the

calculated Average Coefficient of Infection (ACI) for the three rust diseases for Sids 13 and the three commercial cultivars at the adult stage at Sakha and El-Nubaria Agricultural Research Stations in 2006/2007 season is presented in table 7. These data confirm the high resistance of the newly bread wheat cultivar Sids 13 to the three wheat rust disease

Table (3): Grain Yield (ard/fad) of the advanced yield trials for Sids 13 and three bread wheat cultivars (checks) at 28 sites all over Egypt in 2006/2007 season.

Cultivars	Giza 168	Sakha 93	Gemmiza 9	Check Mean	Sids 13	LSD 5%
Location						
North Delta:						
El-Serw	15.76	13.72	13.34	14.27	12.40	3.85
Sakha	27.43	26.66	25.58	26.56	28.64*	1.86
Tag El-Ezz	19.27	22.67	19.40	20.45	21.40	3.52
Dakhliaa-1	14.67	17.67	12.00	14.78	18.00*	2.63
Dakhliaa-2	17.35	20.19	20.96	19.50	18.02	3.39
Etai El-Barod	23.90	21.04	24.54	23.16	23.34	2.31
Behiraa	23.67	24.64	18.57	22.29*	18.90	0.99
South Delta						
Gemmiza	27.30	25.50	24.94	25.91	26.84	--
Sers Elliaan	22.84	26.80	20.04	23.23	26.17	3.11
Kafr El-Hamam	21.81	22.80	25.48	23.36*	20.62	2.71
Sharkia -1	17.70	16.85	19.86	18.14*	15.58	1.96
Sharkia -2	23.65	21.03	18.46	21.05	21.74	2.64
Monofia	27.94	21.60	26.60	25.38	27.94	4.07
Qalubia	26.40	23.87	28.14	26.14	22.94	--
Middle Egypt:						
Giza	29.19	26.74	26.88	27.60	25.69	2.27
Fayoum	28.47	26.34	27.34	27.38	25.27	--
Sids	28.64	30.20	28.57	29.14	29.80	--
Mallawy	19.58	21.88	19.66	20.37	22.69	2.69
Menia	24.50	23.10	23.10	23.57*	19.95	2.91
Upper Egypt:						
Shandaweel	19.17	20.84	17.71	19.24	18.94	2.02
Matanaa	24.27	23.47	23.27	23.67	26.47	--
Kom Ombo	17.16	14.65	17.05	16.29	20.34*	3.24
Out Valley :						
Nubaria	26.46	26.65	26.50	26.54	26.74	--
Esmaliaa	10.18	7.27	7.76	8.40	12.45*	0.55
Asiut	14.47	14.87	11.67	13.67	14.94	1.79
New Vally	14.80	14.67	16.04	15.17	15.97	1.79
Tashky	15.96	17.32	12.69	15.32	15.23	2.55
Eoinaat	13.30	15.07	11.44	13.27	14.70	--

Table (4): Grain Yield Stability Parameters for Sids 13 as Compared with Local Checks in 2005/2006 Season.

Region / Cultivar	Grain Yield (ard/fad)	Stability Parameters	
		B	S ² _d
North Delta:			
Giza 168	21.49	0.88	0.36
Sakha 93	22.08	0.85*	-0.11
Gemmiza 9	22.01	0.64	1.69**
Check Mean	21.86		
Sids 13	22.41	0.76	1.80**
LSD 5%	0.75		
South Delta:			
Giza 168	21.11	1.18	-0.66
Sakha 93	21.43	1.04	2.79**
Gemmiza 9	21.53	0.99	0.02
Check Mean	21.36		
Sids 13	22.81*	1.13	0.56
LSD 5%	1.14		
Middle Egypt:			
Giza 168	24.27	1.16	9.15**
Sakha 93	23.65	1.05	2.49**
Gemmiza 9	22.13	1.00	2.11**
Check Mean	23.35		
Sids 13	23.00	0.92	1.06*
LSD 5%	0.82		
Upper Egypt:			
Giza 168	19.79	0.57	-0.88
Sakha 93	18.44	1.21	-1.13
Gemmiza 9	20.35	1.30	5.10*
Check Mean	19.52		
Sids 13	20.70	1.24	-0.44
LSD 5%	1.72		
Out Valley :			
Giza 168	15.32	0.94	0.28
Sakha 93	14.47	1.05	3.08**
Gemmiza 9	14.73	1.50**	0.19
Check Mean	14.84		
Sids 13	16.18*	0.82	1.77**
LSD 5%	0.89		

Table (5): Grain Yield Stability Parameters for Sids 13 as Compared with Local Checks in 2006/2007 Season.

Region / Cultivar	Grain Yield (ard/fad)	Stability Parameters	
		b	S ² _d
North Delta:			
Giza 168	20.29	1.02	0.23
Sakha 93	20.94	0.79	5.79**
Gemmiza 9	19.20	1.04	3.33**
Check Mean	20.14		
Sids 13	20.10	0.95	7.21**
LSD 5%	1.04		
South Delta:			
Giza 168	23.95	1.21	0.85
Sakha 93	22.64	0.98	2.78*
Gemmiza 9	23.36	0.82	9.96**
Check Mean	23.32		
Sids 13	23.12	1.45	1.80*
LSD 5%	1.22		
Middle Egypt:			
Giza 168	26.08	0.94	3.85**
Sakha 93	25.65	0.82	0.14
Gemmiza 9	25.11	0.91	0.55
Check Mean	25.61		
Sids 13	24.68	0.86	2.52**
LSD 5%	1.13		
Upper Egypt :			
Giza 168	20.20	1.29	-1.00
Sakha 93	19.65	1.41	8.20**
Gemmiza 9	19.34	1.19	-0.40
Check Mean	19.73		
Sids 13	21.92*	1.28	4.67*
LSD 5%	1.62		
Out Valley :			
Giza 168	15.86	1.04	0.100
Sakha 93	15.98	1.13*	-0.36
Gemmiza 9	14.35	1.21	0.65
Check Mean	15.40		
Sids 13	16.67*	0.95	-0.04
LSD 5%	0.90		

Table (6): Reactions of Sids 13 and three other bread wheat cultivars to yellow, leaf and stem rusts of advanced yield trials at Sakha and El-Nubaria Agricultural Research Stations in 2006/2007 season.

Cultivar	Yellow Rust	Leaf Rust		Stem Rust	
	Sakha	Sakha	El-Nubaria	Sakha	El-Nubaria
Sids 13	0	5 MR	0	Tr R	0
Giza 168	0	Tr R	0	Tr MS	10 S
Sakha 93	0	50 S	60 S	0	10 MR
Gemmiza 9	0	5 MS	0	0	10 S

Table (7): Mean average coefficient of infection (ACI) for Sids 13 and three commercial cultivars at the adult stage at Sakha and El-Nubaria Agricultural Research Stations in in 2006/2007 season.

Cultivar	Yellow Rust	Leaf Rust		Stem Rust	
	Sakha	Sakha	El-Nubaria	Sakha	El-Nubaria
Sids 13	0.05	2.00	0.05	1.00	0.05
Giza 168	0.05	1.00	0.05	4.00	10.00
Sakha 93	0.05	50.00	60.00	0.05	4.00
Gemmiza 9	0.05	4.00	0.05	0.05	10.00

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سدس ١٣ : صنف قمح خبز جديد .

مصطفى عزب مصطفى*، محمد صفاء الدين شرشر*، تاج الدين شهاب الدين*، محروس ابو شريف*، صلاح عبد المجيد*، مسعد عبد العليم*، سامى رضا صابر صبرى*، ايمان صادق*، اسعد حمادة*، أبوبكر ابو وردة*، احمد تمام*، محمد خلف مشرف*، عز الدين عبد الرحمن السيد*، حسن عشوش*، مورييس توفيلس*، حمدى هندواوى*، هيام محجوب*، احمد كمال مصطفى*، هانى البرهامى*، عبد السلام منشواوى*، احمد موسى*، وفاء العوضى*، عبد ربه الحاج*، رضا قمبر*، صبرى سليم*، رمضان عبد السلام رمضان*، نادية عبد النور*، جمال شعراوى*، سهير محمود حسن*، عبد الله سويلم*، سيد الصاوى*، صبحى عبد الدايم*، ماجدة عبد الرحمن*، صباح ابو العلا*، محمد عبد الكريم خالد*، ابراهيم عبد الهادى امين*، محمد زكريا*، منال عبد الصمد*، احمد جاد الله*، سعيد حماد*، ماهر المغربى*، عبد الفتاح مراد*، عزة عبد العال*، عادل هجرس*، احمد طه مصطفى*، محمود شمروخ*، محمد يوسف مبارك*، هدى الغرباوى*، احمد عبد ربه*، عبد السلام جمعة*، عنايات غانم*، رافت مينكس*، مصطفى المنوفى*، سيد خليل محمود*، نبيل سليمان حنا*، محمد على موسى*، محمد عادل جودة*، انور عجيز*، محمد عبد الفتاح سالم*، عبد الخالق خطاب*، عبد اللطيف حسين*، محمد اسكندر*، نجوى عبد الفتاح*، فرغل حفناوى* و واصف عبد الصمد**

* قسم بحوث القمح-معهد بحوث المحاصيل الحقلية-مركز البحوث الزراعية-مصر.
** قسم بحوث القمح -معهد بحوث امراض النبات- مركز البحوث الزراعية-مصر.

تم استنباط صنف قمح الخبز الجديد سدس ١٣ فى محطة البحوث الزراعية بسدس بالانتخاب من إحدى المجموعات المستوردة من المركز الدولى للبحوث الزراعية فى المناطق الجافه (اكاردا) . وقد أجريت ٦٦ تجربة حقلية لمقارنة محصول الصنف الجديد (١١ تجربة مصغرة و ٥٥ تجربة مكبره) فى الفترة من ٢٠٠٤-٢٠٠٧ وقد أوضحت النتائج تفوق صنف القمح الجديد سدس ١٣ على أصناف القمح التجارية جيزة ١٦٨ وسخا ٩٣ وجميزة ٩ فى المناطق الرئيسية بمصر فى شمال وجنوب الدلتا ومصر الوسطى والعليا وخارج الوادى .

وأوضح تحليل الثبات لمحصول حبوب الصنف الجديد سدس ١٣ أنه يتميز بالثبات فى منطقتى جنوب الدلتا ومصر العليا وملائمته للزراعة فى هاتين المنطقتين . كما أوضحت النتائج مقاومة صنف القمح الجديد سدس ١٣ لأمراض أصداء القمح الثلاثة .

قام بتحكيم البحث

كلية الزراعة – جامعة المنصورة
كلية الزراعة – جامعة الزقازيق

أ. د/ محمود سليمان سلطان
أ. د/ عبد الحميد حسن سالم

Table (1): Grain Yield (ard / fad) of Sids 13 and Six Bread Wheat Cultivars (Checks) at eleven Research Stations in the preliminary yield trials of 2004/2005 season.

Loc.	Cultivars	Giza 168	Sakha 93	Sakha 94	Gemmiza 9	Gemmiza 10	Sids 1	Check Mean	Sids 13	±%	LSD 5%
North Delta											
	Sakha	28.02	26.43	30.50	27.87	29.56	28.08	28.41	29.64	+4.33	2.12
Middle Delta											
	El-Gemmiza	27.50	27.42	30.41	27.07	26.68	24.00	27.18	28.99	+6.66	4.26
	Itay El-Barood	23.33	19.54	26.83	25.96	26.83	23.04	24.26	28.58*	+17.81	3.50
	Kafr El-Hamam	22.33	22.23	19.27	21.23	21.87	20.10	21.17	22.20	+4.87	4.08
Middle Egypt											
	Sids	24.50	28.38	24.33	22.02	27.80	23.33	25.06	29.17	+16.40	4.26
	Mallawy	17.94	19.25	22.90	19.67	17.35	25.08	20.37	23.26	+14.19	--
Upper Egypt											
	Shandaweel	27.73	25.33	24.50	21.57	28.20	27.17	25.75	28.63	+11.18	6.08
	El-Matanaa	17.03	16.54	16.09	16.16	16.95	17.66	16.74	15.61	-6.75	6.76
	Kom Ombo	14.08	19.61	18.77	19.98	20.14	20.21	18.80	21.28	+13.19	5.94
Out Valley											
	New Valley	12.09	11.02	11.33	9.78	9.31	11.66	10.87	13.35	+22.82	2.77
	El-Nubaria	16.71	16.00	16.54	17.18	16.99	15.79	16.54	18.90	+14.27	--