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YIELD STABILITY AND ITS COMPONENTS FOR SOME PROMISING LINES DERIVED FROM INTERSPECIFIC HYBRIDIZATION IN WHEAT

El-Hosary, A. A.* ; G. Y. Hamam* ; S. Kh. Mahmoud ; A. A. A. El-Hosary* and Sh. R. M. El-Areed****

[1]Agron. Dep., Fac of Agric., Moshtohor, Banha Univ., Egypt

[2]National Wheat Research Program, FCRI., ARC, Egypt

ABASTRACT

Some promising bread wheat lines (*Triticum aestivum vulgare* L.) generated from interspecific hybridization program at Sids Agricultural Research Station, ARC, Egypt and two standard checks cultivars (Sakha 94 and Sids 1) were evaluated for grain yield performance and its components and phenotypic and genotypic stability across ten environments represent North, Middle and South Egypt. Results of the combined analysis of variance for the traits under study showed highly significant effects for lines, environments, and line by environment interaction. The means of grain yield for individual lines ranged from 2.42 to 3.18 Kg/plot. When the phenotypic grain yields were subjected to stability analysis against an environmental index according to Eberhart and Rusell (1966), the regression coefficients for individual lines ranged from 0.51 to 1.17. Among the lines tested, lines no. 1, 2, 3, 5, 6, 9, 21 and 22 characterized-on phenotypic stability lines across all environments. Regarding the genotypic stability according to Tai (1971), with probability 90%, lines number 3 and 7 have genotypic stability for grain yield under the ten environment.

INTRODUCTION

Wheat is the most widely grown food crop in the world. It is one of the first domesticated food species and has been the major source of calories in Europe, West Asia, and North Africa since the inception of organized farming.

By 2020, wheat production must increase by 40% to meet the global demand – mainly from elevating yield. “Increasing the intensity of production in those ecosystems that lend themselves to sustainable intensification, while decreasing intensity of production in the more fragile ecosystems” may be the only way for agriculture to keep pace with population (Borlaug and Dowswell, 1997). Hence, future crop improvement has to emphasize grain yield potential (GYP), yield stability, and user preferences in concerted, interdisciplinary approaches. Issues of environmental sustainability must be an integral part of the research agenda. To achieve these goals, In developing crops

The intergovernmental panel on climate change (IPCC, 2009) indicate that rising temperatures, drought, floods, desertification and weather extremes will severely affect agriculture, specially in the developing world. While the convergence of population growth and climate change threatens food security on a world wide scale. Egypt, s unique geography provides a serious challenge for adaptation to the changing climate and makes change in sea level or the flow of the Nile an extreme threat to Egypt, s population and economy (David Sterman, 2009, Climate Institute), government and independent analysts alike are waning that if action is not taken curtail global warming and climate change , Egypt will be facing a disaster on unprecedented levels (Joseph Mayton 2009).

for the 21 century, breeders must keep in mind that production environments will be more variable and more stressful, yearly climate variation will be greater, and field sites and test environments will essentially be rabidly moving targets.

Regardless of the breeding strategy used, in any breeding program multi-environment trials (METs) are essential for assessing varietal adaptation and stability, and for studying and understanding genotype × environment (GE) interaction, this study related to Mahak *et al.* (2006), Letta *et al.*(2008), Sakin, *et al.* (2011) and Beyen *et al.* (2011).

MATERIALS AND METHODS

Twenty two promising lines in addition two checks of bread wheat (*Triticum aestivum vulgare* L.) were selected based on preliminary yield trial in growing season 2008/2009 at Sids Agricultural Research Station. Table (1), show the pedigree of wheat genotypes under study that derived from interspecific crosses in wheat. 10 environments overall Egypt are used to test yield stability for 22 promising lines in addition two bread wheat cultivars as checks (Sids 1 and Sakha 94) in growing season 2009/2010.

Table (1): Pedigree of wheat genotypes used in the study.

S.N	Pedigree
1	B1/3/ 1346/Lahn//Bcr/Lks4
2	Bow's'/ Vee's'//Bow's' /Tsi/3/Sohage3
3	Maya's'/Mon's'//Cmh74A.592/3/Sakha 8/2*Sakha 8/4/Scars/Gdovz579/ Memos
4	B3/3/Vee's'//Brl's'/Bl 1137/4/Sohag 3
5	Line 81
6	B/Bani Suef3
7	Maya's'/Mon's'//CMH74A.592/3/2*Sakha 8/4/Sohag3
8	Maya's'/Mon's'//CMH74A.592/3/2*Sakha 8/4/Sohag3
9	Sids 8/4/ Cmh 79.1168/Mexi 75/3/Chen/Rbc//Hui/Tub
10	Sids 9/4/ Cmh 79.1168/Mexi 75/3/Chen/Rbc//Hui/Tub
11	SAKHA 61/6/ Maya 's'/Mon's'//CMH 74A.592/3/ 2*Giza571/4/Bani Suef 1/5/Acsad 1037
12	B1/6/Koel/3/Con 67/1/2*7C//Co 1/4/Dove/Buc/5/K 134(60)vee/7/Yuan i/Green 18
13	B1/6/Koel/3/Con 67/1/2*7C//Co 1/4/Dove/Buc/5/K 134(60)vee/7/Yuan i/Green 18
14	Maya's'/Mon's'//CMH74A.592/3/Sakha8*2/4/Scar's'/Gdovz57911.
15	Sids 1/6 Maya 's'/ Mon 's'// Cmh 74A.592/3/2*Giza571/4/Bani Suef1/5/Acsad 1037
16	Sids 11/6/Maya's'/Mon's'// Cmh 74A.592/3/2*sids 8/4/Bani Suef 2/5/Altra 84/Aos
17	Bow's'/Vee's'//Bow's'/Tsi 1/6/Maya's' /Mon's' // CMH 74A.592/3/2* Giza157/4/Bani Suef 2/5/ Tensi
18	Bow's'/Vee's'// Bow's'/Ts1/3/Sohag3
19	B/K134 (60) Vee
20	B 1/Bani suef 1/6/ Maya's'/Mon's'/CMH 74A.592/3/ 2*Giza 157/4/Bani suef 2/5/Omguer 1
21	Maya's'/Mon's'//CMH74A.592/3/*2Sakha 8/4/Sohag3
22	B1/3/Bow's'2/Prl//2mongo*2
23	Sids 1 (Check variety)
24	Sakha 94 (Check variety)

the environments which selected represent North, Middle and Upper Egypt {New Vally (E1), El-Mattana (E2), Shandaweel (E3), Assuit (E4), Sids (E5), Sers El-Lian (E6), Gemmiza (E9), Kafr El-Hamam (E8), Sakha (E9), El-Nubaria (EI0)

Randomized Complete Block Design with three replications was applied, the experimental plot size was 4.2 m^2 (six rows, 3.5 meter long, 20 cm. apart between the rows). Analysis of variance of Randomized Complete Block Design of separate environment was carried out for the trait under study according to Sendecor and Cochran (1967). Regarding stability analysis, Eberhart and Rusell (1966) model is used to measuring phenotypic stability, while genotypic stability measured according to Tai (1971).

RESULTS AND DISCUSSION

Combined analysis of variance for number of spikes/m^2, number of kernels/spike, 1000-kernel weight and grain yield (Kg/plot) of wheat genotypes are presented in table (2). The analysis of variance for single environment and the combined analysis over ten environments were made for the four studied traits. Bartlett's test of homogeneity of variance showed that the variance estimates of error were homogenous.

The analysis of variance for the combined analysis for the four studied traits are given in table (2). Mean squares of environments, genotypes and genotypes × environments interactions for the four traits were highly significant table (2). Significant mean squares for environments were detected for the four traits, indicating that the performance of these traits differed from environment to another. Significant mean squares due to genotypes and genotypes × environments interaction were detected for the four studied traits, revealing that genotypes carried genes with different additive and additive × additive effects which seemed to be inconstant from environment to another. These results emphasize that the environments had stress and non stress conditions. The significant of genotypes × environments interaction is in agreement with Hassan (1997), Tarakanovas and Ruzgas (2006) and Hamada *et al* (2007)

Table (3), show that, the environment no. 2 (El-Mattana) gave the highest number of spikes/m^2 followed by environment no. 6 (Sers El-lain) and environment number 7 (Gemmiza). While the environment number 10 (El-Nubaria) gave the lowest one (table 3). The environment number 6 (Sers El-Lain) had the highest significant mean value for number of kernels/spike than other environments, followed by environment number 8 (Kafr El-Hamam), 7 (Gemmiza) and 9 (Sakha). While the environment number 4 (Assuit) recorded the lowest one. For 1000- kernel weight, the environment number 6 (Sers El-Lain) recorded the highest value followed by environments number 10 (El-Nubaria). While the environment number 1 (New Valley) gave the lowest one. For grain yield (Kg/plot), the environment number 9 (Sakha), 2 (El-Mattana) and 7 (Gemmiza) recorded the highest values followed by environments number 5 (Sids) and 6 (Sers El-Lian). While the environment number 4 (Assuit) gave the lowest one. These results indicating that the climatic conditions and soil properties of environments number 9 (Sakha), 2 (El-Mattana), 7 (Gemmiza), 6 (Sers El-Lian) and 5 (Sids) locations encouraged production of wheat genotypes. Sharma *et al.,* (1987), El-Morshidy *et al.,* (2000) and Ammar *et al.,* (2003) found differences between environments under their studies.

Table (2): Combined analysis of variance for number of spikes/m², number of kernels/spike, 1000-kernel weight and grain yield (Kg/plot) of wheat genotypes.

SV	d.f	no.Spikes /m²	no.Kernels /Spike	1000-Kernel weight	Grain yield (Kg./plot)
Environments(E)	9	1178016.570**	5890.077**	1980.1666**	62.323**
Error	20	7975.117**	214.701**	41.382**	0.246**
Genotypes (G)	23	11891.4785**	565.673**	496.2446**	1.182**
GE	207	3916.5991**	211.702**	68.8919**	0.544**
Error	460	1790.1217	126.604	30.665	0.197

Tabl2 (3): Mean values of number of spikes/m², number of kernels/spike, 1000-kernel weight and grain yield as affected by environments.

Traits / Environments		Number of spikes/m²	Number of kernels/spike	1000-kernel weight	Grain yield (Kg/plot)
New Valley	E 1	259.54	53.61	35.19	1.75
El-Mattana	E 2	634.31	55.86	49.33	3.65
Shandaweel	E 3	278.00	55.54	47.28	2.79
Assuit	E 4	240.46	51.47	38.10	0.96
Sids	E 5	373.18	54.10	48.43	3.43
Sers El-Lian	E 6	486.11	78.64	50.38	3.44
Gemmiza	E 7	455.83	66.95	42.26	3.67
Kafer ElHamam	E 8	364.07	69.63	47.96	2.87
Sakha	E 9	325.83	67.50	45.44	3.87
El-Nubaria	E10	238.39	56.14	49.97	2.75
Overall means		365.57	60.94	45.43	2.92
L.S.D 0.05		15.83	3.19	1.52	0.19
L.S.D 0.01		18.97	3.70	1.82	0.27

The differences among genotypes overall environments regarding the four studied traits reached the significant level (Table 2). Table (4), show that, Cultivar number 23 (Sids 1) gave significant highest number of spikes/m² followed by lines number 5 and 13. While the line number 17 gave the lowest value. For number of kernels/spike the line number 9 gave the highest value followed by lines number 13, 15, 2, 8 and 14. While the cultivar number 24 (Sakha 94) gave the lowest one. For 1000-kernel weight, the line number 17 gave the highest value followed by line number 18 and then line number 4. For grain yield (Kg/plot), the lines number 2, 4, 8, 10, 18, 22 and

Sids 1 had the highest values. On the other hand, the lines number 17 and 20 had the lowest values.

Table (4): Mean performance of genotypes for number of spikes/m^2, number of kernels/spike, 1000-kernel weight (Combined analysis).

Traits / Genotypes	Number of spikes/m^2	Number of kernels/spike	1000-kernel weight	Grain yield (Kg/plot)
L 1	358.93	64.23	49.42	2.97
L 2	381.98	64.58	48.49	3.11
L 3	360.80	60.04	45.45	2.73
L 4	353.35	61.40	50.39	3.12
L 5	396.23	55.90	39.59	3.03
L 6	368.73	62.50	44.37	2.89
L 7	355.42	58.98	42.02	2.85
L 8	366.60	64.52	44.52	3.07
L 9	353.88	67.96	38.12	3.01
L 10	351.75	55.46	44.15	3.09
L 11	379.78	60.09	46.35	3.00
L 12	383.63	62.07	46.34	3.03
L 13	391.77	65.46	42.50	2.91
L 14	370.92	64.52	40.29	2.79
L 15	355.72	67.16	42.61	2.99
L 16	357.37	59.30	44.67	2.82
L 17	315.50	58.63	55.28	2.43
L 18	368.10	64.17	50.80	3.11
1 19	350.23	58.08	49.11	2.80
L 20	334.88	61.03	44.79	2.42
L 21	366.77	60.85	42.34	2.90
L 22	362.90	62.77	44.83	3.07
Sids 1	410.07	52.73	45.60	3.18
Sakha 94	378.42	50.21	48.40	2.73
Overall means	365.57	60.94	45.43	2.92
L.S.D 0.05	11.68	2.59	1.14	0.23
L.S.D 0.01	13.92	3.11	1.36	0.32

The stability analysis

Results of the pooled analysis of variance in table (5) showed that the genotypes and genotype × environments interaction mean squares were highly significant for number of spikes/m^2, number of kernels/spike and 1000-kernel weight. The significant of genotype – environment (linear) mean square was detected for the four traits, indicating linearity responses of different genotypes to different environmental conditions when they test of pooled deviations. On the other hand, the highly significant of pooled deviation for the four traits under study, indicating that the major role of deviation from linear regression to determine degree of stability of each genotypes under study. These results confirmed with those previously reached by Salem *et al.,* (1990) and Mevlut *et al.,* (2005). Also, Mishra and Chandraker (1992), Kheiralla and Ismail (1995) and Salem *et al.,* (2000) found in their studies highly significant differences among the studied genotypes, environments and genotypes × environments interactions for number of spikes/m^2, number of kernels/spike. 1000-kernel weight and grain yield (Kg/plot).

Table (5): Mean squares of variance for G×E interaction for number of spikes/m^2, number of kernels/spike, 1000-kernel weight and grain yield.

Source of varaince	d.f	no. of spikes/m^2	no. of kernels/ spike	1000-kernel weight	Grain yield (Kg/plot)
Total	239				
Genotypes	23	3963.826**	188.5462**	156.4171**	0.394
Env.+(G×E)	216	17612.49	149.432	49.5081	1.039485
Env.(Linear)	1	3534050**	17669.81**	5940.469**	186.9677**
G×E(Linear)	23	2087.87**	65.1945**	16.3379**	0.1724
Pooled Dev.	192	3086.528	182.0482	60.799	0.4666
L 1	8	896.5469	51.0414	38.0434**	0.1122
L 2	8	928.9414	79.7639	8.271	0.0491
L 3	8	790.2578	32.0338	8.7641	0.0640
L 4	8	1073.566	27.8733	16.8929	0.1476*
L 5	8	2744.865**	30.3131	22.6345*	0.0732
L 6	8	467.9492	103.8948*	12.681	0.0769
L 7	8	748.9316	63.8747	39.644**	0.1335*
L 8	8	249.002	67.8155	22.7828*	0.1526*
L 9	8	455.2715	192.6502**	29.3725**	0.0455
L 10	8	2389.074**	19.0721	19.2398	0.1470*
L 11	8	533.5371	33.2247	24.8451**	0.0724
L 12	8	3474.104**	5.8475	28.2203**	0.1894**
L 13	8	1365.295*	140.2609**	9.4606	0.1725**
L 14	8	1589.217*	42.3921	19.0058	0.1579**
L 15	8	655.7852	103.7907*	13.5921	0.1495*
L 16	8	2079.119**	82.5881	16.9454	0.1412*
L 17	8	1641.064**	27.2927	39.0273**	1.0013**
L 18	8	516.0049	29.5334	4.8614	0.3244**
L 19	8	745.8691	85.6808*	5.7532	0.3130**
L 20	8	1558.053*	107.7928**	53.5844**	0.1690**
L 21	8	515.084	68.9948	15.8586	0.1050
L 22	8	308.7422	81.9402	9.9393*	0.0899
Sids 1	8	701.4219	84.7703*	67.7686**	0.1355*
Sakha 94	8	1351.467**	76.0345	19.9741	0.1766*
Pooled error	480	682.6166	43.4262	10.3694	0.0662

Phenotypic and genotypic stability parameters:

The phenotypic stability of the studied genotypes was measured by the three parameters i.e., mean performance over environments, the linear regression and the deviations from regression function. Phenotypic stability parameters of the four studied traits are presented in table (6). The results showed clearly that regression coefficient (b_i) of all genotypes were significantly differed from zero in the four traits.

Number of spikes/m^2

For number of spikes/m^2, regression cofficiens (b_i) were insignificantly differed from unity for all genotypes. The lines number 2, 6, 8,11, 18, 21 and 23 gave mean values above the grand mean and their regression coefficient (b_i) did not differ significantly from unity. Also, the minimum deviation mean squares (S^2_d) were detected, revealing that these genotypes were more stable than others under the environments.

Table (7) and fig (1) showed that the stability parameters α was not significantly differed from zero for lines number 10, 16 and 18 at all the probability levels. The estimated λ statistics were significant differed from λ=1 for all genotypes except genotypes number 1, 2, 3, 4, 5, 7, 8, 11, 14, 17, 18, 16, 22, cultivar 23 (Sids 1) and cultivar 24 (Sakha 94). These results indicated that wheat lines number 1, 4, 5, 7, 14, 22 and cultivar (Sids 1) number 23 were above average stability. While, lines number 2, 3, 8, 11, 17, 18 and cultivar (Sakha 94) number 24 showed below average stability and line number 16 and 18 showed the average stability.

Number of kernels/spike

For number of kernels/spike, the mean averaged over environments and phenotypic stability parameters for number of Kernels/spike are given in table (6). Regression coefficients (b_i) for all genotypes were not significantly differed from unity. With respect to the second stability parameters(S^2_d) the wheat lines number 6, 9, 15, 19 and cultivar (Sids 1) number 23 had significant deviation from regression, indicating that they would be classified as being unstable. These results suggests that only six lines number 1, 2, 4, 8, 18 and 22 were stable for number of kernels/spike because these lines have (S^2_d) values were not significantly different from zero and b_i=1, and higher number of kernels/spike compared to grand mean.

Fig (2) gives a graphic summary that useful in identifying the genetically stable genotypes. It could be noticed that the above average stability are in the figure contained the lines number 1, 3, 11, 15, 18 and 19 ($\alpha < 0$) and($\lambda = 1$).While lines number 2, 4, 6, 7, 9, 21 and cultivar (Sids 1) number 23 were below average stability ($\alpha > 0$) and ($\lambda = 1$).

1000-kernel weight

For 1000-kernel weight, the mean averaged over environments and phenotypic stability parameters for 1000-kernel weight are given in table (6). Regression coefficients (b_i) for all genotypes were not significantly differed from unity. With respect to the second stability parameters (S^2_d) the wheat lines number 2, 3, 4, 18 and 19 gave the minimum deviation mean square S^2_d and these lines had above grand mean, indicating that these lines are more stable than other genotypes.

The values of α and λ for 1000-kernel weight are presented in Table (7) and graphically illustrated in figure 3. The results indicated that, 11 bread wheat genotypes were differed from unity for λ ($\lambda \neq 1$), and lines number 3, 4, 6, 16 and 19 had above average stability ($\alpha < 0$) and ($\lambda = 1$) while lines number 2, 10, 13, 14, 15, 21 and 22 had below average stability ($\alpha > 0$) and ($\lambda = 1$).

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grain yield (Kg/plot)

Table (6) presents mean grain yield (Kg/plot), b_i and S^2_d parameters for the 24 wheat genotypes. The genotypes were differentially response at different environments. The b_i were significantly differed from zero and did not differed significantly than one (b_i = 1) in all genotypes. The lines number 1, 2, 3, 5, 6, 9, 21 and 22 gave grain yield (Kg/plot) above grand mean and their values of S^2_d were not differed from regression, indicating that these lines are phenotypically stable over environments studied.

The graphic analysis fig (4) showed that could be useful in identifying stable genotypes. The lines number 3 and 7 had above genetically stable for grain yield under the environments. While, the lines number 1, 2, 5, 6, 9, 11, 21, 22 and cultivar (Sids 1) number 23 gave below average stability. Genotypes number 3 showed above stable and it gave the highest mean value compared with grand mean, indicating that this line more genetic stability overall environments under study. On the other hand, line number 7 showed a bove genetically stable for grain yield and it gave the high mean value (2.85 Kg./plot) compared with grand mean (2.92 Kg./plot). The previous line can be used on a source for stability crossed with high yielding genotype and practice selection for genotypes with high yield and good stability.

Table (7): Parameters og genotypic stability for number of spikes/m², number of kernels/spike, 1000-kernel weight and grain yield (Kg/plot) of twenty four wheat genotypes.

Traits	Number of spikes/m²		Number of kernels/spike		1000-kernel weight		Grain yield (Kg/plot)	
Genotypes	α	λ	α	λ	α	λ	α	λ
L 1	-0.1701	1.3881	-0.3217	1.114	-0.0626	3.4522	0.0351	1.5880
L 2	0.0939	1.4423	0.0310	1.7530	0.1715	0.7490	0.0197	0.6943
L 3	-0.0247	1.2282	0.0851	0.7035	-0.3150	0.7896	-0.0632	0.9060
L 4	0.0341	1.6685	-0.0626	0.6123	-0.0430	1.5330	-0.0965	2.0880
L 5	0.0143	4.2666	-0.1555	0.6645	-0.2616	2.0502	0.1086	1.0350
L 6	0.1369	0.7238	0.4997	2.2657	-0.4066	1.14114	0.0146	1.0875
L 7	0.04611	1.1637	-0.0839	1.4034	0.5265	3.58118	-0.0386	1.8895
L 8	-0.0065	0.3870	0.1114	1.4896	0.3934	2.0587	0.1306	2.1588
L 9	0.0461	0.7073	-0.1706	4.2320	-0.0465	2.6655	0.1109	0.6435
L 10	0.0165	3.7135	0.0072	0.4192	0.0912	1.7455	0.0399	2.0796
L 11	-0.0469	0.8289	0.2787	0.7247	0.1344	2.2537	0.1027	1.0232
L 12	0.1439	5.3962	0.3747	0.1186	-0.2071	2.5585	0.0855	2.6788
L 13	0.2373	2.11114	-0.3135	3.0757	0.0717	0.8583	0.0884	2.4408
L 14	0.1500	2.4659	0.5020	0.9138	0.0149	1.7248	0.0974	2.2330
L 15	-0.1153	1.0168	0.3591	2.2720	0.0511	1.2333	0.0581	2.1158
L 16	-0.0085	3.2318	0.0115	1.8151	-0.4172	1.5278	-0.0725	1.9978
L 17	-0.2708	2.5368	0.4873	0.5830	-0.1869	3.5398	-0.4880	14.1547
L 18	-0.1558	0.7974	0.0093	0.6491	-0.0367	0.4411	0.0382	4.5895
L 19	-0.0871	1.1579	-0.1899	1.8806	-0.0997	0.5216	-0.2654	4.4250
L 20	-0.0214	2.4217	-0.5173	2.3501	-0.2262	4.8599	-0.1456	2.3904
L 21	0.1090	0.7984	-0.2054	1.5134	0.3900	1.4305	0.1705	1.4846
L 22	-0.0300	0.4797	-0.4471	1.7867	0.3870	0.8934	0.1718	11.2705
Sids 1	0.0769	1.0892	-0.4859	1.8463	0.2914	6.1452	0.0353	1.9172
Sakha 94	-0.1679	2.0953	0.1964	1.6684	-0.2141	1.8100	-0.1374	2.4979

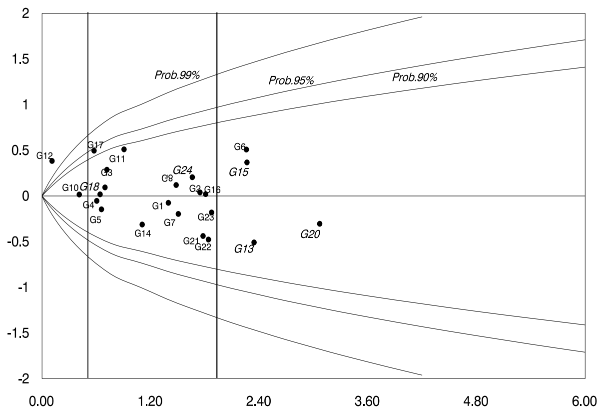

Fig (1): Distribution of genetic stability statistics of number of spikes/m^2 in wheat according to Tai (1971).

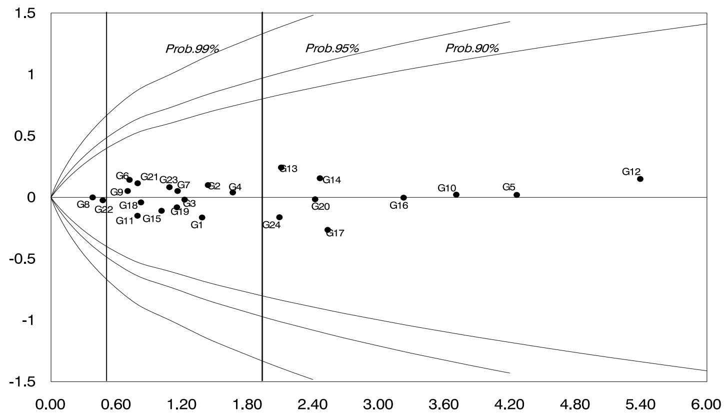

Fig (2): Distribution of genetic stability statistics of number of kernels/spike in wheat according to Tai (1971).

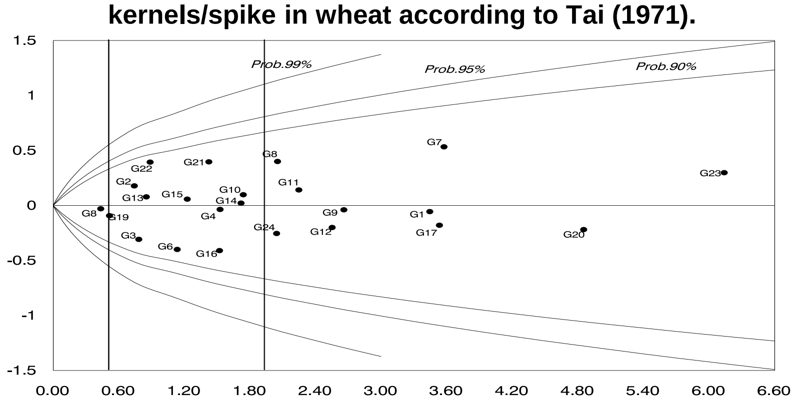

Fig (3): Distribution of genetic stability statistics of 1000-kernel weight in wheat according to Tai (1971).

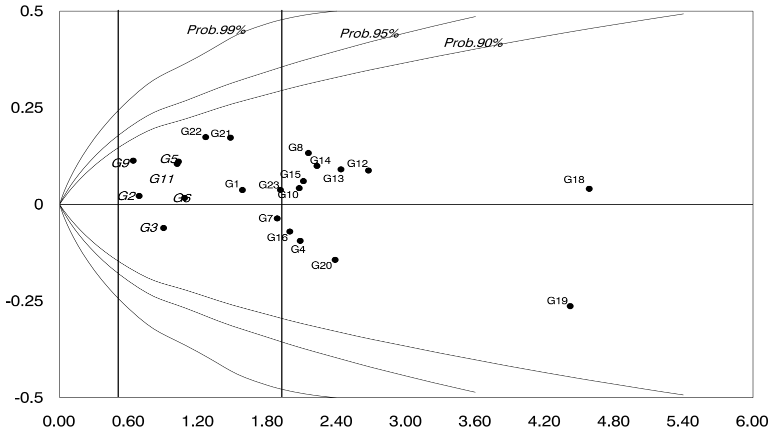

Fig (4): Distribution of genetic stability statistics of grain yield (Kg/plot) in wheat according to Tai (1971).

Conclusion:

The results of this study indicated that, highly significantly were observed due to effect of genotypes (G), environments (E) and G×E, also lines number 1, 2, 3, 5, 6, 9, 21 and 22 have phenotypic stability for grain yield according to Eberhart and Russell (1966), and lines number 1, 2, 3, 5, 6, 7 9, 11, 21, 22 and cultivar number 23 (Sids 1) have genotypic stability for grain yield according to Tai (1971).

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ثبات محصول الحبوب ومكوناته لبعض السلالات المبشرة الناتجة من التهجين النوعى فى القمح

على عبد المقصود الحصرى[1] ، جابر يحيى همام[1]، سيد خليل محمود[2]، أحمد على عبدالمقصود الحصرى شريف[1] و رجب محمد العريض[2]
١ قسم المحاصيل – كلية الزراعة بمشتهر- جامعة بنها
٢ مركز البحوث الزراعية – معهد بحوث المحاصيل الحقلية - قسم بحوث القمح

اجريت هذة الدراسة بهدف معرفة التفاعل بين التراكيب الوراثية تحت الدراسة والبيئات المختلفة وكذلك بهدف تقدير الثبات المظهرى و الوراثى للتراكيب الوراثية ، والتراكيب الوراثية تحت الدراسة عبارة عن ٢٢ سلالة من قمح الخبز الناتجة من برنامج التهجين النوعى فى القمح التابع لقسم بحوث القمح بمركزالبحوث الزراعية - محطة البحوث الزراعية بسدس بالاضافة الى صنفى سدس ١ وسخا ٩٤ للمقارنة ، وتم اختيار ١٠ بيئات مختلفة فى انحاء جمهورية مصر العربية. وقد اظهرت نتائج هذة الدراسة ما يلى

١- وجد ان هناك فروق عالية المعنوية للمناطق فى محصول الحبوب و صفة عدد السنابل فى المتر المربع وصفة عدد الحبوب فى السنبلة ووزن الالف حبة وجاءت المنطقة رقم ٢(محطة بحوث المطاعنة) فى المركز الاول بين المناطق كلها فى صفة عدد السنابل فى المتر المربع وجاءت المنطقة رقم ٦ (محطة بحوث سرس الليان) فى المركز الاول فى صفة عدد الحبوب فى السنبلة وصفة وزن الالف حبة بينما جاءت المنطقة رقم ٩ (محطة بحوث سخا) فى المركز الاول فى صفة محصول الحبوب٠
٢- اظهرت التراكيب الوراثية معنوية عالية فى صفات عدد السنابل فى المتر المربع و عدد الحبوب فى السنبلة ووزن الالف حبة ومحصول الحبوب, واعطى الصنف المنزرع رقم ٢٣ (سدس ١) اعلى قيمة بالنسبة لصفة عدد السنابل فى المتر المربع و اظهرت السلالة رقم ٩ اعلى قيمة لصفة عدد الحبوب فى السنبلة بينما اظهرت السلالة رقم ١٧ اعلى قيمة لصفة وزن الالف حبة واخيرا اظهرت السلالات رقم ٢, ٨, ١٠, ١٨, ٢٢ وكذلك صنف سدس ا اعلى قيمة بالنسبة لمحصول الحبوب٠
٣- كان تاثير التفاعل بين التراكيب الوراثية والبيئات عالى المعنوية لجميع الصفات تحت الدراسة٠
٤- اوضحت النتائج ثبات محصول الحبوب مظهريا للسلالات رقم ١, ٢, ٣، ٥، ٦, ٩, ٢١، ٢٢ بينما كان الثبات الوراثى الافضل هو للسلالات رقم ٣ ,٧ لصفة محصول الحبوب٠

قام بتحكيم البحث

أ.د / محمود سليمان سلطان	**كلية الزراعة – جامعة المنصورة**
أ.د / احمد عبد العزيز مرسى	**مركز البحوث الزراعية**

Table (6): Estimates of phenotypic stability for number of spikes/m^2, number of kernels/spike, 1000-kernel weight and grain yield (Kg/plot) of twenty four wheat genotypes.

G.	$\bar{X}_i$	Number of spikes/m^2				$\bar{X}_i$	Number of kernels/spike				$\bar{X}_i$	1000-kernel weight				$\bar{X}_i$	Grain yield (Kg/plot)			
		b_i	S^2_d	t=1	t=0		b_i	S^2_d	t=1	t=0		b_i	S^2_d	t=1	t=0		b_i	S^2_d	t=1	t=0
L 1	358.93	0.8310	299.8463	-.167	5.7401	64.23	0.6900	8.8398	-0.623	1.3876	49.42	0.9387	27.8219	-0.124	1.8940	2.97	1.0349	0.0467	0.143	4.2289
L 2	381.98	1.0932	332.2408	0.644	7.5510	64.58	1.0299	37.5623	0.060	2.0712	48.49	1.1680	-1.9505	0.339	2.3566	3.11	1.0196	`-0.0165	0.080	4.1662
L 3	360.80	0.9755	193.5572	-0.169	6.7380	60.04	1.0820	-10.1677	0.165	2.1759	45.45	0.6916	-1.4574	-0.622	1.3954	2.73	0.9371	-0.0015	-0.257	3.8289
L 4	353.35	1.0338	476.8658	0.234	7.1408	61.40	0.9397	-14.3282	-0.121	1.8898	50.39	0.9579	6.6714	-0.085	1.9328	3.12	0.9039	0.0821	-0.393	3.6933
L 5	396.23	1.0142	2148.1646	0.098	7.0054	55.90	0.8502	-11.8884	-0.301	1.7097	39.59	0.7439	12.4130	-0.517	1.5009	3.03	1.1082	0.0076	0.442	4.5282
L 6	368.73	1.1359	-128.7514	0.939	7.8461	62.50	1.4815	61.6932	0.968	2.9794	44.37	0.6019	2.4595	-0.803	1.2144	2.89	1.0145	0.0113	0.059	4.1454
L 7	355.42	1.0458	152.2310	0.316	7.2233	58.98	0.9191	21.6732	-0.163	1.8484	42.02	1.5155	29.4225	1.040	3.0579	2.85	0.9615	0.0680	-0.157	3.9289
L 8	366.60	0.9936	-347.6987	-0.044	6.8627	64.52	1.1074	25.6140	0.216	2.2270	44.52	1.3852	12.5613	0.777	2.7948	3.07	1.1300	0.0871	0.531	4.6175
L 9	353.88	1.0458	-141.4291	0.316	7.2235	67.96	0.8356	150.4487	-0.331	1.6805	38.12	0.9544	19.1510	-0.092	1.9257	3.01	1.1104	-0.0200	0.451	4.5374
L 10	351.75	1.0164	1792.3735	0.113	7.0205	55.46	1.0070	-23.1294	0.014	2.0251	44.15	1.0893	9.0183	0.180	2.1978	3.09	1.0398	0.0814	0.163	4.2487
L 11	379.78	0.9535	63.1635	-0.321	6.5856	60.09	1.2686	-8.9768	0.540	2.5511	46.35	1.1316	14.6237	0.266	2.2833	3.00	1.1023	0.0068	0.418	4.5041
L 12	383.63	1.1429	2877.4028	0.987	7.8941	62.07	1.3610	-36.3540	0.726	2.7371	46.34	0.7972	17.9988	-0.409	1.6085	3.03	1.0851	0.1238	0.348	4.4340
L 13	391.77	1.2356	768.5943	1.628	8.5347	65.46	0.6979	98.0594	-0.608	1.4035	42.50	1.0702	-0.7609	0.142	2.1593	2.91	1.0880	0.1070	0.360	4.4458
L 14	370.92	1.1490	992.5162	1.029	7.9362	64.52	1.4837	0.1906	0.973	2.9837	40.29	1.0146	8.7843	0.029	2.0472	2.79	1.0970	0.0923	0.396	4.4826
L 15	355.72	0.8855	59.0845	-0.791	6.1163	67.16	1.3460	61.5892	0.696	2.7069	42.61	1.0501	3.3706	0.101	2.1187	2.99	1.0579	0.0840	0.237	4.3227
L 16	357.37	0.9916	1482.4185	-0.058	6.8488	59.30	1.0110	40.3866	0.022	2.0333	44.67	0.5915	6.7239	-0.824	1.1936	2.82	0.9278	0.0757	-0.295	3.7911
L 17	315.50	0.7311	1044.3628	-1.857	5.0496	58.63	1.4696	-14.9088	0.944	2.9554	55.28	0.8170	28.8058	-0.369	1.6484	2.43	0.5139	0.9357	-1.986	2.1000
L 18	368.10	0.8453	-80.6957	-1.069	5.8384	64.17	1.0090	-12.6681	0.018	2.0291	50.80	0.9641	-5.3601	-0.073	1.9452	3.11	1.0380	0.2588	0.155	4.2416
L 19	350.23	0.9135	149.1685	-0.598	6.3094	58.08	0.8170	43.4793	-0.368	1.6431	49.11	0.9024	-4.4683	-0.197	1.8208	2.80	0.7357	0.2474	-1.080	3.0060
L 20	334.88	0.9787	961.3521	-0.147	6.7602	61.03	0.5016	65.5913	-1.0012	1.0087	44.79	0.7786	43.3629	-0.447	1.5709	2.42	0.8550	0.1035	-0.593	3.4935
L 21	366.77	1.1083	-81.6166	0.748	7.6549	60.85	0.8021	26.7932	-0.398	1.6130	42.34	1.3819	5.6371	0.770	2.7882	2.90	1.1699	0.0395	0.694	4.7802
L 22	362.90	0.9702	-287.9584	-0.206	6.7011	62.77	0.5692	39.7387	-0.866	1.1446	44.83	1.3790	-0.2822	0.765	2.7823	3.07	1.1712	0.0244	0.699	4.7855
Sids 1	410.07	1.0764	104.7213	0.527	7.4346	52.73	0.5318	42.5688	-0.394	1.0695	45.60	1.2853	57.5471	0.576	2.5934	3.18	1.0352	0.0699	0.144	4.2298
Sakha 94	378.42	0.8332	754.7662	-1.152	5.7551 ,	50.21	1.1892	33.8330	0.381	2.3916	48.40	0.7903	9.7526	-0.423	1.5947	2.73	0.8632	0.1111	-0.559	3.5271
Overall means	365.57					60.94					45.43					2.92				