*J. Agric. Sci. Mansoura Univ., 34 (5): 4753 - 4760, 2009*

# GENETIC STABILITY OF SOME WHEAT GENOTYPES UNDER FOUR VAROUS ENVIRONMENTS

**Ramadan, R. A.**
**Field Crop Institute, Wheat Res. Section (A.R.C.) ,Giza , Egypt**

## ABSTRACT

Ten wheat genotypes (*Triticum aestivum* L.) were Evaluated for yield and its attributing characters under four environments(two locations x two seasons).The genotypes were; Sakha 93, Sakha 94, Giza 168, Sids 1, Sids4, Sids6, Sids9, Sakha61, Gemmeiza 9 and Gemmeiza 10 The mean performance, phenotypic stability and interrelationship between various characters were computed. The results indicated that, significant genotypes; genotype x environment, environmental linear and genotype x environment linear variance for all studied characters. Regression coefficient (b) deviated significantly from unity (b > 1) for genotypes, Sids 1 and Sakha 61 for plant height , Sids9 and Gemmeiza 9 for spike length and Sids 9 for 1ooo grain weight; indicating that these genotypes were adapted to favorable environments for these characters.

The "b" value deviated significantly from unity and was less than one (b < 1) in Sids 1, Sids 4 and Sids 9 for1000 grain weight , grain weight / spike, and grain yield ardab / fad . The genotypes for considering the stability parameters (C.V% and $S^2d$ accompanished with mean performance (X), the most desired and stable wheat genotypes were Gemmeiza9 for plant height, spike grain weight and grain yield (ard /fad), Sids 1 for spike length , grain weight/spike . While Sakha 94 was stable for number of spikes/plant.

Correlation coefficients values were positive and significant between yield /fad and each of all studied characters except plant height.

## INTRODUCTION

Plant breeders make efforts to evolve new varieties characterize by high yielding ability for seed yield in addition to their quality. Seed yield is a complex characters which is greatly affected by environments (E) which include edaphic and climatic conditions. Plant breeders faced the problem of genotypes x environment interaction in the development of bread wheat cultivars. The interactions GxE interactions complicates selection of genotypes with superior performance. It has been suggested that a significant G x E interaction reduced the correlation between phenotypic and genotypic values as well as progress from selection (Kang and Martin, 1987). Across environment it is of great attention that it forms a challenge difficulty to the breeder when improving and developing superior genotypes (Eberhart and Russel, 1966). The effect of environmental stress on plant metabolism completely and thereby reduction both growth and development of crop is still not completely understood (Pessarakli, 1994). Many researches on wheat studied the inheritance and environmental effects Misra *et al.* 1991; Deswal *et al.* 1996; Kara 1997 Salem *et al.* 1998; Haji and Hunt 1999; Kara 2000, El-Morshidy *et al.* 2001 and salama *et al* 2008 .The present study was designed to estimate stability of grain yield / fad and related characters for ten released bread wheat cultivars.

## MATERIALS AND METHODS

Four field experiments, including ten genotypes of wheat (*Triticum aestivum* L.) were undertaken at the two locations; Tag El- Ezz Research Station, (Dakahilia Governorate) Agricultural Research Center (A.R.C).and Experimental Farm, of Fac. Agriculture, Swease Univ. Ismalia Governorate, Souse University. Egypt during the two successive winter growing seasons (2006/2007 and 2007/2008) for each trial. The planting date was10$^{th}$ November in both seasons. The ten wheat genotypes were; Sakha 93, Sakha 94, Giza 168, Sids 1, Sids4, Sids6, Sids9, Sakha 61, Gemmeiza 9and Gemmeiza10. The randomized complete block design with three replications was used for each trial. The experimental plot consisted of 5 rows, row length was 2 m, row to row spacing was 20 cm., plant spacing was 10 cm. Data of the following characters (yield and its components) were estimated.

1- Plant height (cm)
2- Spike length(cm)
3- Number of spikelet's / spike
4- Number of grains / spike
5- Number of spikes / plant
6- 1000-grain weight (g.)
7- Grain weight / spike (g.)
8- Grain yield ardab / fad

**Biometric analysis:**

Analysis of variance was performed for different characters through the two growing seasons according to Steel and Torrie (1980). Parameters of stability for studied characters of wheat genotypes under 4 environments (2 seasons x 2 location) were calculated according to Eberhart and Russel (1966) method.

**2- Correlation studies:**

Interrelation ships between different wheat characters were calculated according to the method described by Sndecor and Cochran (1980).

## RESULTS AND DISCUSSION

Analysis of variance due to stability parameters of eight studied characters for ten wheat genotypes under two locations i.e. Tag El-Ezz Research Station, and Experimental Farm Agriculture , El Ismailia, Ismalia Governorate, Swease canal University are presented in Table (1). Statistical analysis exhibited that the mean squares among the wheat genotypes were highly significant for all studied characters suggesting that wheat genotypes were genetically different.

Genotypes (G) and environments (E) (two locations) had highly significant effect on all characters under study, indicating that these characters are affected by changes which happened in each location. Moreover the variances due to environments (Linear) was significant for all studied traits, indicating that these characters were highly influenced by the combination of environmental conditions (seasons and locations).

Table ( 1 ): Variance to stability analysis for plant height, spike length, number of spikelet's /spike, number of grains /spike, number of spikes / plant, 1000- grain weight(g), spike grain weight (g) and grain yield (ardab / Faddan) for genotypes under two locations during 2006/2007 and 2007 f 2008 winter growing seasons

| S.O.V | d.f | Plant height | Spike length (cm) | Number of spikelet's / spike | Number of grains /spike | Number of spikes/plant | 1000 - grain weight (gm) | Spike grain weight (gm) | Grain yield ardab / Faddan |
|---|---|---|---|---|---|---|---|---|---|
| Genotypes ( G ) | 9 | 27.51** | 13.17** | 21.11** | 11.03** | 4.16** | 22.64** | 0.7 5** | 10.15** |
| Environmental ( Env. X G ) | 30 | 55.82** | 22 .26** | 12.26** | 21.26** | 2.19** | 31.22 * | 0.5 1** | 10.21** |
| Environmental ( liner ) | 1 | 32.17** | 12.11** | 11.47** | 20.36** | 2.17** | 19.2 7** | 023** | 06.13** |
| G X Env.(liner) | 9 | 24.3 3** | 11.12** | 997** | 17.41** | 2.10** | 17.96** | 0.410* | 05.10* |
| Pooled deviation | 20 | 18.56 | 09.51* | 11.32** | 13.92** | 1.02 | 08.83** | 0.229** | 10.9** |
| Genotypes | | | | | | | | | |
| Sakha 93 | 2 | 11.81** | 07.93* | 6.51** | 06.77** | 0.4 1 | 07.11* | 0.19** | 09.09** |
| Sakha94 | 2 | 11.17** | 06.16** | 5.36* | 06.91** | 0.5 2 | 08.5 7** | 0.15** | 10.05 |
| Giza 168 | 2 | 21.36** | 08.88** | 7.21** | 07.36** | 02.09** | 08.39** | 0.12** | 04.02 |
| Sids 1 | 2 | 17.82** | 07.53** | 8.11** | 05.04** | 02.14** | 05.8 1 | 0.11** | 0.5.04 |
| Sids 4 | 2 | 9.92** | 09.24** | 4.21* | 03.52** | 0.31 | 09.7 3** | 0.13** | 03.13** |
| Sids6 | 2 | 7 5* | 11.11** | 9.3 6** | 11.07** | 02.12* | 08.68** | 0.10** | 04.10** |
| Sids 9 | 2 | 6.87 | 6.24** | 7. 3** | 11.00** | 01.17** | 05.4 2 | 0. 07* | 07. 07** |
| Sakha 61 | 2 | 3.84 | 10.36** | 4.1 9* | 06.34** | 02.15** | 04.46 | 0.10** | 03.10** |
| Gemmeiza9 | 2 | 15.58** | 10.29** | 7.2 2** | 07.85** | 01.02** | 06.89* | 0.1 9** | 07.79** |
| Gemmeiza10 | 2 | 19.36** | 11.52** | 8 3** | 10.63** | 02.18* | 07.22* | 0.15** | 09.15** |
| Pooled error | 120 | 3.92 | 1.79 | 2.12 | 1.20 | 0.24 | 0.916 | 0.03 | 0.53 |

The interaction between genotypes and environments (Linear) had highly significant effect on the studied characters. These results are in agreement with those reported by Salem *et al.* (1990) and (2002).

The data obtained revealed significant variations for pooled devation regarding all studied characters exhibiting that stability of these characters are different Coefficient of variability (C.V.%) as standard measurement of stability (Tables 2and3) exhibited that the C.V. estimates diverted from either genotypes or character to another, these values ranged from 09.82 to 27.71 % for plant height, 2.10 to 10.33 % for spike length, 3.35 to 8.47 % for number of spikelet's / spike, 10.33 to 21.32 % for number of grains / spike, 1.82 to 6.80 for number of spikes / plant, 15.28 to 47.32 for 1000 grain weight, 0.71 to 2.0 for grain weight/spike and 0.82 to 9.52 for grain yield ardab / faddan, it could be noticed from the obtained data that the stable genotypes were Gemmeiza 9 for plant height, number of spikes/plant and number of grains/spike, Sakha 93 for number of spikeles/spike, grain weight/spike and grain yield / faddan, as they exhibited low value of C.V. and the b value near from unity on the other hand the wheat genotypes Sids 4 for plant height , Sids 9 for spike length and Sids 1 for number of spikes /plant, that recorded the highest coefficient of variation regression "b" (Table 2 and 3) deviated from unity (b > 1) in these genotypes indicating that the genotypes were adapted to favorable environments.

Otherwise, the "b" value deviated from unity and was less than one (b < 1) in genotypes Sids 9 for plant height, number of grains / spike and number of spikes / plant. Gemmeiza 10 for number of spikelets / spike Sids1 for number of spikelet's/spike indicating that these genotypes were more adapted to stress environments.

Considering the stability parameters (C.V.%), b and $S^2d$) accompanished and mean performance ($\bar{X}$), the most desired and stable wheat genotypes were; Gemmeiza 9 for plant height, spike length, number of spikelets / spike, number of grains/spike, number of spikes / plant and grain yield /faddan.

Genotype Giza 168 recorded the highest value of mean performance for plant height, Sids 9 for spike length, number of spikelets/spike, number of grains/spike, grain weight / spike and grain yield / faddane, Meanwhile Sakha 94 recorded the highest estimates for number of spikes/plant. In this respect; Haji and Haunt (1999), Salem *et al* (2000), El-Morshidy *et al* (2001) Soheir Abd-Allah (2002) ,Salem *et al.* (2002) and salama *et al.* (2008).

**2- Simple correlation analysis:**

Simple correlation coefficients, among studied characters are given in Table (4). Results showed that significant positive correlation was found between grain yield / faddan and all studied characters except plant height, between 1000-grain weight and plant height, between grain weight / spike and all studied characters except plant height, between number of grains/spike and, each of spike length and number of spikelet's / spike, between number of spikelets / spike and each of plant height, spike length, between spike length and plant height.

**Table ( 2 ): Estimates of stability analysis for plant height(cm), spike length(cm), number of spikelet's /spike, number of grains /spike of ten wheat genotypes under two locations during 2006 / 2007and 2007/ 2008 winter growing seasons**

| Characters | Plant height(cm) | | | | Spike length(cm) | | | | Number of spikelet's / spike | | | | Number of grains /spike | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Genotypes | $\bar{x}$ | c.v | bl | $S^2d$ | $\bar{x}$ | c.v | bl | $S^2d$ | $\bar{x}$ | c.v | bl | $S^2d$ | $\bar{x}$ | c.v | bl | $S^2d$ |
| Sakha 93 | 96.69 | 16.80 | 1.0 1 | 07.51 | 10.39 | 04.21 | 1.03 | 02.21** | 22.26 | 06.55 | 1.04 | 3.82** | 53.53 | 21.11 | 1.09 | 10.71 |
| Sakha94 | 97.97 | 24.11 | 1.0 3 | 10.32** | 10.57 | 02.1 | 1.31 | 01.48 | 22.50 | 07.22 | 1.15 | 4.71 | 53.92 | 21.05 | 0.62 | 10.91** |
| Giza 168 | 100.03 | 18.21 | 1.25 | 08.13 | 10.37 | 06.62 | 1.20 | 02.77 | 21.25 | 06.44 | 0.60 | 5.41 | 53.27 | 21.32 | 0.14 | 09.17 |
| Sids 1 | 94.21 | 15.16 | 1.22 | 06.29 | 12. 97 | 09.32 | 1.01 | 02.32** | 26.23 | 06.33 | 0.04 | 3.51** | 65.09 | 11.61 | 0.15 | 08.29 |
| Sids 4 | 89.00 | 26.21 | 1.11 | 09.36* | 12. 70 | 09.22 | 0.20 | 04.61 | 25.66 | 08.47 | 0.05 | 4.83 | 63.77 | 10.82 | 0.71 | 10.10 |
| Sids6 | 88.77 | 20.53 | 1.60 | 08.20 | 11.97 | 10.31 | 0.36 | 04.38 | 25.15 | 07.22 | 0.06 | 3.81 | 55.18 | 20.72 | 0.19 | 10.50** |
| Sids 9 | 95.12 | 27.71 | 0.04 | 08.10* | 12.73 | 10.33 | 1.42 | 02.83 | 26.00 | 05.36 | 0.19 | 2.51** | 64.77 | 20.52 | 0.06 | 10.36 |
| Sakha 61 | 85.95 | 15.20 | 1.50 | 04.51 | 10.33 | 08.19 | 1.33 | 03.31** | 21.14 | 07.34 | 0.19 | 4.19 | 51.95 | 18.88 | 1.05 | 05.46** |
| Gemmeiza9 | 99.46 | 09.82 | 1.02 | 03.82 | 11. 70 | 09.61 | 1.1 1 | 02.32 | 24.02 | 03.35 | 1.06 | 3.77** | 54.40 | 17.99 | 0.99 | 06.56 |
| Gemmeiza10 | 99.35 | 18.11 | 1.36 | 03.31 | 11. 40 | 07.28 | 1.08 | 01.52 | 23.41 | 04.22 | 0.05 | 3.52 | 54.08. | 10.33 | 0.98 | 04.16 |
| Overall mean | 94.15 | | | | 11.52 | | | | 23.76 | | | | 56.99 | | | |

**Table ( 3 ): Estimates of stability analysis for number of spikes / plant, 1000 - grain weight(g), spike grain weight(g) and grain yield ( ardab / Faddan) of ten wheat genotypes under two locations during 2006 / 2007and 2007/ 2008 winter growing seasons**

| Characters | Number of spikes /plant | | | | 1000-grain weight (g) | | | | Grain weight /spike(g) | | | | Grain yield( ardab /faddan) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Genotypes | x | c.v | bi | $S^2d$ | x | c.v | bi | $S^2d$ | x | c.v | bi | $S^2d$ | x | c.v | bi | $S^2d$ |
| Sakha 93 | 9.00 | 6.80 | 1.41 | 2.51 | 55.97 | 24.21 | 1.03 | 10.21** | 2.6 2 | 1.31 | 1.04 | 0.82** | 15.95 | 07.11 | 1.09 | 3.71 |
| Sakha94 | 11.35 | 4.11 | 0.93 | 2.32** | 54.40 | 22.1 | 1.01 | 10.48 | 2.68 | 1.02 | 1.0 5 | 0.71 | 16.77 | 06.05 | 0.92 | 4.91** |
| Giza 168 | 7.97 | 5.21 | 0.95 | 2.13 | 54.70 | 21.62 | 1.20 | 19.77 | 2.23 | 2.0 | 0.60 | 0.41 | 15.53 | 06.32 | 0.94 | 3.17 |
| Sids 1 | 4.69 | 5.16 | 1.22 | 1.29 | 59.70 | 47.32 | 1.01 | 15.32** | 2.9 9 | 1.41 | 0.04 | 0.51** | 15.27 | 05.61 | 0.15 | 4.29 |
| Sids 4 | 5.12 | 4.21 | 1.11 | 1.36* | 56.39 | 29.22 | 0.20 | 9.61 | 2.94 | 1.31 | 0.05 | 0.83 | 15.09 | 0.82 | 0.71 | 2.10 |
| Sids6 | 4.21 | 4.53 | 1.60 | 2.20 | 59.33 | 30.31 | 0.36 | 15.38 | 2.89 | 1.48 | 0.06 | 0.81 | 15.18 | 08.72 | 0.19 | 3.50** |
| Sids 9 | 5.77 | 3.71 | 0.04 | 1.10* | 57.97 | 30.33 | 1.42 | 8.83 | 2.96 | 1.52 | 0.19 | 0.51** | 14.40 | 09.52 | 0.46 | 6.36 |
| Sakha 61 | 7.95 | 3.20 | 1.10 | 1.01 | 53.37 | 21.19 | 1.03 | 17.31** | 2.22 | 1.14 | 0.19 | 0.19 | 14.08 | 08.88 | 1.05 | 5.46** |
| Gemmeiza9 | 6.03 | 1.82 | 1.07 | 1.02 | 65.73 | 16.61 | 1.11 | 15.32 | 2.86 | 0.92 | 1.06 | 0.3 7** | 17.77 | 06.91 | 0.97 | 2.56 |
| Gemmeiza10 | 7.46 | 2.11 | 1.06 | 0.81 | 63.57 | 15.28 | 1.08 | 10.52 | 2.76 | 0.71 | 1.05 | 0.52 | 16.92 | 03.33 | 0.81 | 2.16 |
| Overall mean | 7.15 | | | | 58.31 | | | | 2.55 | | | | 15.50 | | | |

**Table ( 4 ) : Simple correlation coefficients between different studied characters (combined data over two seasons)**

| | Characters | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Plant height (cm) | - | 0.7 24** | 0.6 82** | 0.241 | 0.363 | 0.5 71* | 0.3 63 | 0.384 |
| 2 | Spike length(cm) | | - | 0.896** | 0.8 10** | -0.816** | -0.523* | 0.611** | 0.526* |
| 3 | Number of spikelet's /spike | | | - | 0.552* | -0.891** | -0.789** | 0.6 36** | 0.891** |
| 4 | Number of grains /spike | | | | - | -0.516* | -0.743** | 0.986** | 0.741* |
| 5 | Number of spikes/plant | | | | | - | -0.977** | 0.991** | 0.892** |
| 6 | 1000- grain weight (gm ) | | | | | | - | 0.7 52** | 0.5 45* |
| 7 | Grain weight / spike(g) | | | | | | | - | 0.903** |
| 8 | Grain yield (ardab /Fadden) | | | | | | | | - |

* Significant at 0.05 levels significance

** Significant at 0.01 levels significance

Positive and significant correlation between characters, indicated that selection of these characters may improve wheat genotypes concerning high yielding ability. These results are in agreement with those obtained by Hamada (1988), Fayed (1992), El-Bana and Aly (1993) and Salama *et al* (2008 ).

## REFERENCES

Deswal, R.K., D. Singh; K.K. Berwal and Lekhraj (1996). Stability analysis for harvest index and some yield components in wheat. Annals of Agric. Bio. Research, 1:83-87.

Eberhart, S.A. and W.A. Russel (1966). Stability parameters for comparing varieties. Crop Sci., 6:36-40.

El-Bana, A.Y.A. and R.M. Aly (1993). Effect of nitrogen fertilization levels on yield and yield attributes of some wheat cultivars *(Triticum aestivum* L.) in newly cultivated sandy soil. Zagazig J. Agric. Res. Vol. 20 No. (6): 1739-1749.

El-Morshidy, M.A.; K.A.Kheiralla; A.M. Abdel-Ghani and A.A. Abdel-Karim (2001). Stability analysis for earliness and grain yield in bread wheat. The Second Plant Breeding Conference, October 2:199-217 (Assiut University).

Fayed, E.H. (1992): Effect of nitrogen, phosphorus and potassium fertilization on yield and yield attributes of wheat in newly cultivated sandy soil. Egypt. J. Appl. Sci. 7 (12): 886-898.

Haji, H.M. and L.A. Hunt (1999). Genotype x environment interactions and underlying environmental factors for winter wheat in Ontario. Canadian J. of Plant Sci., 79:497-595.

Hamada, A.A. (1988). Studies on some selection criteria in wheat. M. Sc. Thesis, Fac. Agric. Zagazig. Univ., Egypt.

Kang, M.S. and F.A. Martin (1987). A review of important aspects of genotype-environmental interactions and practical suggestions for sugarcane breeders. J. of American Society of Sugar Cane Technology, 7:36-38.

Kara, S.M. (1997). Genotype x environment interactions and stability analysis for yield of bread wheat. Rachis, 16:58-62.

Kara, S.M. (2000). Adaptation and stability analysis in some bread wheat genotypes. Turkish J. of Agric. & Forestry, 24:413-419.

.Misra, S.C.; A.D. Bhagwat; R.N. Dixit; V.S. Prao and V.P. Patil (1991). Stability of component characters and yield in rainfed wheat *(Triticum aestivum L. and T. Durum L.).* Indian J. of Agric., Sci. 61:7-10.

Pessarakli, M. (1994). Handbook of plant and crop stress *(M. Pessarakli, ed.)* Marcel Dekker, Inc New York Basel Hong Kong.

Salama ,S .M.;R.A. Ramadan and S.S.Awaad (2008) .Estimates of stability parameters and path analysis for some wheat genotypes under different environment.J. Agri. Sci. Mansoura Univ .,33:7053-7061.

Salem, A.H.; H.A. Rabie and M.S. Selim (1990). Stability analysis for wheat grain yield. Egypt. J. Appl. Sci., 5:225-237.

Salem, A.H., M.M. Eissa; A.A. Swelam and A.A. Jaradat. (1998). Yield components and yield stability of bread wheat in water limited environments. Triticeae III. Proceedings of the Third International Triticeae Symposium, Aleppo, Syria, 4-8 May, 405-410; 13 ref.

Salem A.H., M.M. Eissa and A.A. Swelam (2002). Genotype – Environment interaction and stability for grain yield and its related characters in bread wheat. Egypt J. Appl. Sci.; 17 :141-161.

Salem, A.H.; S.A. Nigem; M.M. Eissa and H.F. Oraby (2000). Type and magnitude of gene action for some quantitative characters and their implications in applied wheat breeding, Zagazig J. Agric. Res., 27 : 805-818.

Snedecor, G.W. and W.G. Cochran (1980). Statistical method. 7th Ed. Iowa State Univ. Press. Lowa U.S.A.

Soheir, M.H. Abd-Allah (2002). Evaluation of some wheat genotypes under drought conditions. Ph.D. Thesis Faculty of Agric. (Saba Basha). Alexandria University.

Steel, R.G.D. and J.H. Torrie (1980). Prenciples and Procedures of Statistices. A biometrical approach. 2nd ed, MC Graw Hill book Company London.

## الثبات الجينى لبعض التراكيب الوراثية فى القمح تحت اربع بيئات مختلفة

**رمضان عبد السلام رمضان**

**معهد بحوث المحاصيل الحقلية – قسم بحوث القمح – مركز البحوث الزراعية – الجيزة – مصر**

أقيمت أربعة تجارب حقلية فى موقعين مختلفين وهما محطة البحوث الزراعية بتاج العز – دقهلية (مركز البحوث الزراعية) ومزرعة كلية الزراعة جامعة قناة السويس بالاسماعلية خلال الموسمين ٢٠٠٦/٢٠٠٧ و ٢٠٠٧/٢٠٠٨ وذلك لدراسة الثبات الوراثى لعشرة تراكيب من قمح الخبز المصرى وذلك لمحصول الحبوب وبعض الصفات ذات العلاقة بالمحصول وهى ارتفاع النبات وطول السنبله وعدد السنيبلات وعدد حبوب السنبلة وعدد السنابل للنبات ووزن الالف حبة ووزن حبوب السنبلة وتم إستخدام الأصناف التالية :- سخا٩٣ ، سخا٩٤ ، جيزة ١٦٨ ، سدس١ ، سدس ٤ ، سدس٦ ، سدس ٩ ، سخا ٦١ ، جميزة ٩ و جميزة ١٠ وكان التصميم المستخدم هو القطاعات الكاملة العشوائية فى ثلاث مكررات.

وقد أوضحت النتائج الآتى:

١-إختلاف التراكيب الوراثية تحت الدراسة فى إستجابتها لظروف الموقع والموسم الزراعى وأظهرت نتائج الثبات أن الأصناف سدس٦ وسخا ٦١ متفوقة فى صفة ارتفاع النبات وسدس ٩ سخا ٦١ متفوقة فى طول السنبلة وسدس ٩ لوزن الالف حبة كانت الأصناف المتأقلمة لظروف خاصة وعالية الصفات المختلفة حيث كانت قيمة b لهذه الأصناف أكبر من الوحدة بينما كانت b أقل من الوحدة للصنف سدس ٤ ، سدس ٦ ، وذلك لصفة وزن الألف حبة وسدس ١ وسدس ٤ وسدس ٦ لصفات وزن حبوب السنبلة ومحصول الحبوب للفدان وهذه الأصناف يمكن أن تتحمل الظروف البيئية القاسية.

بينما كان الصنف سخا ٦١هو أكثر الأصناف ثباتا لصفات وزن الالف حبة ومحصول الحبوب للفدان وكان الصنف سخا ٩٤ أفضل الأصناف ثباتا بالنسبة لارتفاع النبات وجميزه ٩لعدد السنابل للنبات.

٢-وجود إرتباط موجب ومعنوى بين محصول الحبوب للفدان وجميع الصفات ما عدا صفة إرتفاع النبات.