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GENOTYPIC STABILITY FOR EGYPTIAN COTTON VARIETIES UNDER SOIL SALINITY LEVELS

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Abstract

High productivity and stability of performance over environment are two desired features in cotton cultivars. The objective of the present investigation was to determine genotypic stability for Egyptian cotton varieties under soil salinity levels. Eighteen Egyptian cotton varieties and promising hybrids were grown in a randomized complete block design with four replication in each of the three levels of soil salinity (EC = 8.1, 12.2 and 14.8 mmhos/cm) and control (3.4 mmhos/cm) in two seasons 1998 and 1999 at El-Serw Agric. Experimental Station. Nine traits, including yield and its components and fiber quality were studied. All traits showed highly significant mean squares for varieties, environments and variety x environment interaction. Average genotypic stability was recorded for seed and lint cotton yield for Giza 88, Giza 85 Giza 86, Giza 89, Giza 80 and Ashmoni T./Giza 83; lint percentage and boll weight for Giza 45, Giza 76, Giza 88, Giza 83 R, Bahtim 105/Giza 67/Giza 72/ Delecro (white type) and Ashmoni T./Giza 83, seed index for Giza 85, Giza 75, Giza 89, Giza 83 R, Bahtim 105/Giza 67/Giza 72/Delecro (Brown type) and Giza 89/Giza 86; Pressley index for most varieties; Micronaire reading and fiber length for Giza 45, Giza 76, Giza 75, Giza 89 and Bahtim 105/Giza 67/Giza 72/Delecro/Brown). The best three varieties were Giza 88, Giza 85 and Giza 89 which were stable for yield and yield components and highly productive. This method proved to be useful in cotton breeding programs and in regional and national cultivar testing to indentify high yielding and stable genotypes.

INTRODUCTION

Cotton is very important crop for Egyptian economy, it is greatly influenced by seasonal and environmental fluctuations and soil salinity. Stability of cotton cultivars over varied environmental conditions is critical in modern agriculture for productivity, quality and profit. Plant breeders prefer to produce varieties that have a wide adaptation. In this respect El-Kadi *et al.* (1978) evaluated 13 Egyptian cotton cultivars and lines which showed different degrees of genotypic stability. El-Marakby *et al.* (1986) found that all studied characters showed highly significant mean squares for environments, varieties and genotype by environment interaction. Also, genotypic stability analysis showed that the most stable Egyptian varieties over the six environments were Giza 69, Giza 67 and Giza 80. These varieties were the highest yielder among all other

Egyptian varieties and exhibited the highest number of stable characters among which the seed cotton yield was the most important. Awaad (1989) and Abou Zahra *et al.* (1989) showed that the relatively unpredictable component of variance for the genotype-environment interaction may be more important than the relative predictable component. Estimates of genotypic stability revealed varying degrees of stability for the different genotypes. El-Shaarawy *et al.* (1994) evaluated three cultivars and 27 strains of Egyptian cotton over seven locations in the Nile Delta of Egypt. They showed that the genotypes variance were highly significant for all traits except seed index. The genotypes varied for the estimated, λ_i while the estimated $\hat{\alpha}_i$ did not differ from $\alpha = 0$ which may suggest that the relatively unpredictable component (deviation form linear, λ_i) of the genotype-environment interaction variance may be more important than the relatively predictable component (linear response, $\hat{\alpha}_i$) The best two strains were F_5 (514/90) and F_6 (557/90) showed average level of stability for all traits, but their yield was low. Awaad *et al.* (1994) reported information on genotype environment interaction derived from data on six yield components in 28 genotypes grown at seven locations in Middle and Upper Egypt in 1992. The best three genotypes were F_5-148/90, F_5-160/90 and F_6-197/90 which were stable for all traits recorded. the new cultivar Giza 83 was the highest yielding and most stable commercial cultivar. El-Shishtawy *et al.* (1994) studied the average genotypic stability degrees for boll weight, lint index and lint/boll for Giza 69, boll weight for the promising hybrid Giza 75 x (44 x C.B.58) and lint percentage for hybrid Giza 67 x C.B.58. Seyam *et al.* (1994) recorded moderate genotypic stability degrees for seed index and Micronaire reading for Giza 76, Giza 80, Giza 81 and Giza 83, lint percentage for Giza 83 and lint index for Giza 81 while most varieties were unstable for seed cotton yield per plant, boll weight, lint percentage, lint index and fiber strength traits. Abo-Tour *et al.* (1996), stated that the high yielding genetic potential and the recorded wide adaptability supported the evidence that this cultivar may be recommended to be included in any breeding program for improving lint yield and lint percentage. El-Shaarawy *et al.* (1998) studied 30 genotypes over seven locations for six traits. The variance for genotypes was highly significant for all traits except seed index where it was insignificant. The best strain was F_6 (744/91) where it was stable for lint yield and all other traits.. Moreover, it was highly productive. Badr (1999) showed highly significant mean squares for varieties, environments and variety x environment interaction. Average genotypic stability degrees were recorded for seed and lint cotton for Giza 86, Giza 88; boll weight for Giza 85 and Giza 87; seed index for Giza 85, Giza 86 and Giza 89, Micronaire reading for Giza 88; yarn strength for Giza 86, while all varieties under study were unstable for 2.5% and 50% span length. El-Haroney (2000) showed that the genotypes Giza 75, Giza 83, and Giza

86 could be considered as breeding stocks for most yield and yield components traits, while Giza 45, Giza 85 and Giza 89 were the poorest varieties for these traits. Also, Giza 45, Giza 70 and Giza 77 were stable for most fiber properties.

The objective of this investigation was to evaluate 18 *G. barbadense* genotypes for variability and mean performance of each genotype for yield and yield components and fiber traits, also, to determine genotypic stability for each genotype under soil salinity levels.

MATERIALS AND METHODS

Eighteen Egyptian cotton varieties and promising hybrids, namely; Giza 45, Giza 76, Giza 77, Giza 70, Giza 88, Giza 87, Giza 85, Giza 75, Giza 86, Giza 89, Giza 80, Giza 83, Giza 83 R, Bahtim 105/Giza 67/Giza 72/Del Cero (Creamy type), Bahtim 105/ Giza 67/Giza 72/Del Cero (white type), Ashmoni T/Giza 83, Giza 84/Giza 74/Giza 68 and Giza 89/Giza 86 were grown in a randomized complete block design with four replications at each of three levels of soil salinity (EC = 8.2, 12.2 and 14.8 mmhos/cm) and control (EC = 3.4 mmhos/cm), in two successive seasons 1998 and 1999 at El-Serw Agricultural Experimental Station (Damietta Governorate) to study the effect of soil salinity on genotypic stability. Plot size consisted of three rows four meter long and 60 cm apart. Distance between hills was 20 cm and each hill was thinned to two plants. Cultural practices were carried out as recommended. The traits studied were:

1. Seed cotton yield per plot (S.C.Y./plot): Estimated as the weight of seed cotton yield in grams per plot.
2. Lint yield per polt (L.Y./plot): Estimated as weight of lint cotton yield in grams per plot.
3. Lint percentage (L. %): The percent weight of lint obtained from a seed cotton sample:

$$L\% = \frac{\text{Weight of lint in the sample}}{\text{Weight of seed cotton in the sample}} \times 100$$

4. Boll weight (B.W.): The average boll weight in grams of ten bolls picked at random from each plot.
5. Seed index (S.I.): The weight of 100 seeds in grams.
6. Pressly index (P.I.): An indication of fiber strength. It was measured for flat-bundles of fiber using the Pressly tester at zero gauge length.
7. Micronaire reading (M.C.): An indication of fineness and maturity.
8. 50% Span length (50% S.L.): It was determined by the digital fibrograph according

to the standard method for testing the fiber length ASTM (1) 1447-63.

9. 2.5% Span length (2.5% S.L.): It was determined by the digital fibrograph according to the standard method for testing the fiber length ASTM (1) 1447-63.

Statistical analysis:

The genotypic stability analysis was done according to the method described by Tai (1971). A combined analysis of variance was carried out for each traits with fixed genotypic effects and random replicate and environmental effects. Two stability parameters (α_i and λ_i) were estimated for each genotype:

$$\alpha_i = \frac{S^1\ (gL)i}{(MSL - MSB)/vr}$$

$$\lambda_i = \frac{S^2\ (gL)i - \hat{\alpha} i\ S\ (gL)i}{(v-1)\ MSE/vr}$$

Where:

α_i = The linear response of the ith variety to the environmental effect.

λ_i = The deviation from the linear response of the ith variety to the environmental effect.

S1 (gL)i = The sample covariance between the environment and interaction effects.

S2 (gL)i = The sample variance at the interaction effect of the ith variety to the nth environment.

i = The environment effects.

(gL)i = The interaction effect of the ith variety.

MSL = Mean square of environments.

MSB = Mean square for replicates within environments.

MSE = The mean square for error.

r = Number of replicates.

v = Number of genotypes.

A perfectly stable cultivar will not change its performance from one environment to another. This is equivalent to stating that alpha i = -1 and λ_i = 1. Perfectly stable cultivars probably do not exist and plant breeders will have to be satisfied with obtainable levels of stability, i.e. average stability (alpha i = 0 and lambda i = 1) Denoting to tabulated value of the probability level a (a = 1- p) with (n-2) degrees of freedom, as t_a the prediction limits for alpha i corresponded to alpha i = 0 can be shown to be

$$\pm t^2_a = \left[\frac{\lambda o\ (v - 1)\ MSE.MSL}{(MSL - MSB)\ (n - 2)\ MSL - (t^2_a + n - 2)\ MSB} \right]^{\frac{1}{2}}$$

$\lambda_o = 1$ the confidence interval at the probability level P is

$F_a\ (n_2, n_1) \leq \lambda_o \leq F_a\ (n_1, n_2)$.

Where:

$F_a\ (n_2, n_1) = 1/Fa\ (n_1, n_2)$

$n_1 = n - 2$ degrees of freedom

$n_2 = n\ (v\text{-}1)\ (r\text{-}1)$ degrees of freedom

a = 1-P

and P = 0.90

RESULTS AND DISCUSSION

The results of the combined analysis of variance for all studied traits are shown in Table (1). The environment, genotypes and genotypes environment interaction mean squares were highly significant for all studied traits except for S.I. genetic variance. Replicates within environments mean square were highly significant for all traits, except for 50% span length and 2.5% span length which were insignificant.

The results indicated that: (a) as an average overall tested environments of all traits, showed significant difference among genotypes, and (b) for all traits and the genotypes responded differently at the different level of soil salinity. Thus, it was essential to determine the genotypic stability level for each genotype.

For all studied traits, genotypes means in addition to the estimates of the parameters α_i and λ_i for each genotypes are presented in Table (2) and (3). It was evident that: (a) the relative ranking of genotypes according to their mean performance over the environments were not the same for all characters; and (b) the estimated α_i statistics ranged from -1 and +1 for all characters.

The distributions of α_i and λ_i value are shown in Figures 1-9 for seed cotton yield/plot, lint yield/plot, lint percentage, boll weight, seed index, pressly index, Micronaire reading, 50% span length and 2.5% span length, respectively. From the distribution of α_i and λ_i statistics, it could be noted that (a) mostly, the estimated α_i statistics for different varieties, do not differ significantly from $\alpha = 0$, and (b) the varieties varied greatly in the estimated λ_i statistics. Therefore, it could be concluded that relatively

Table 1. Mean squares for stability of some traits for Egyptian cotton genotypes under soil salinity.

Source of variance	d.f	S.C.Y./plot	L.Y./plot	L%	B.W	S.I	P.I	M.C	50% S.L m.m	2.5% S.L. m.m.
Environment (E)	7	10554720**	1468665.5**	90.5665**	0.6586**	11.9775**	4.1291**	1.2791**	7.7192**	18.8105**
Rep. within Env.	24	1371269**	179147.66**	12.5012**	0.2788**	1.0302**	0.6247	0.1493**	0.2644	1.0027
Genotypes (G)	17	741734.5**	121051.9**	112.9204**	0.2589**	1.1900	7.1887**	2.0293**	8.8224**	48.8034**
E x G	119	124169.6**	16335.55**	4.5901**	0.0783	0.7469**	0.7834**	0.1323**	0.6425**	3.1262**
Error	408	91721.90	12035.29	3.1563	0.0681	0.3423	0.4229	0.0438	0.2454	0.6913

* and ** significant at 5% and 1% probability level, respectively.

Table 2. Mean performance of genotypes for some traits under soil salinity.

Genotypes	S.C.Y per plot	L.Y per plot	L%	B.W.	S.I.	B.I	M.C	50% S.L	2.50% S.L
1	982.19	316.87	31.72	2.15	8.65	10.34	2.82	15.93	32.04
2	898.19	297.03	32.73	2.16	8.59	10.80	2.87	16.03	32.71
3	1211.43	407.84	33.33	2.16	8.49	10.59	2.91	15.36	30.91
4	1095.31	368.25	33.46	2.33	8.55	10.86	3.12	15.89	32.31
5	1172.53	393.72	33.24	2.33	8.66	10.73	3.09	15.92	32.27
6	1258.09	388.37	30.67	2.22	8.35	10.81	2.87	15.48	32.13
7	1237.66	447.25	35.82	2.40	8.60	10.24	3.24	15.07	30.10
8	1228.28	437.78	35.46	2.30	9.07	10.27	3.48	14.48	29.23
9	1189.44	436.87	36.59	2.41	8.54	10.25	3.48	14.76	29.61
10	1381.68	486.91	35.13	2.33	8.44	9.96	3.47	14.70	29.73
11	1031.81	381.56	36.82	2.28	8.54	9.57	3.55	14.99	30.42
12	1294.97	467.96	35.77	2.26	8.59	9.48	3.40	14.78	30.25
13	1162.59	435.09	37.23	2.12	8.28	9.69	3.29	14.88	29.65
14	1465.53	517.97	35.20	2.38	8.47	9.77	3.17	14.59	29.13
15	1293.97	471.59	36.32	2.32	8.70	10.29	3.53	14.66	28.92
16	1197.78	439.66	36.50	2.23	8.72	9.39	3.33	14.83	30.13
17	1420.97	487.56	34.34	2.33	8.47	10.31	2.94	15.46	30.35
18	1410.31	509.22	35.99	2.36	8.96	9.89	3.33	15.67	31.63
L.S.D. p = 0.01	195.04	70.65	1.14	0.17	0.38	0.42	0.13	0.32	0.54

Genotypes:

1. Giza 45	7. Giza 85	13. Giza 83 R
2. Giza 76	8. Giza 75	14. Bh. 105 x Giza 67 x Giza 72 x Del. (Creamy type)
3. Giza 77	9. Giza 86	15. Bh. 105 x Giza 67 x Giza 72 x Del. (White. type)
4. Giza 70	10. Giza 89	16. Ash. T. x Giza 83
5. Giza 88	11. Giza 80	17. Giza 84 x Giza 74 x Giza 68
6. Giza 87	12. Giza 83	18. Giza 89 x Giza 86

Table 3. Estimates of stability parameters (α_i and λ_i) for some traits under soil salinity.

		S.C.Y/ plot	L.Y./ plot	L %	B.W	S.I	P.I	M.C.	50% SL (mm)	2.5% S.L (mm)
1	α_i	-0.00675	-0.1098	0.5967	-1.3458	0.6579	-1.0274	-0.3435	0.8653	1.4004
	λ_i	0.5181	0.4414	0.7786	1.2746	0.5116	0.6017	1.4831	0.8583	0.8059
2	α_i	-0.2549	-0.2513	0.1454	-0.2248	0.3425	0.5481	0.2369	-0.1776	-0.3641
	λ_i	0.3902	0.2864	0.9140	0.6830	3.1235	2.1037	0.5934	0.9392	3.7768
3	α_i	0.0083	0.0304	0.4910	-1.5336	0.5367	-0.3779	0.0788	0.4589	0.7404
	λ_i	0.3709	0.4857	0.7343	-0.0147	2.4943	3.2816	2.0511	3.4714	7.4055
4	α_i	-0.0906	-0.0659	0.6418	0.4378	0.5836	0.2650	0.1733	0.0990	-0.5195
	λ_i	0.3620	0.2782	0.8294	0.2631	0.3429	0.5339	4.1301	1.8233	1.8386
5	α_i	0.0989	0.1222	0.5491	-1.0468	0.3366	0.2162	-1.1107	-0.6374	-1.3410
	λ_i	0.9568	0.8316	0.7133	1.5241	2.5391	2.3381	0.2889	2.8451	5.3140
6	α_i	-0.3638	-0.3818	0.5933	0.3217	-0.1385	0.7273	-1.3842	-0.3156	-0.1485
	λ_i	0.3185	0.1347	0.2754	1.7505	0.3292	1.1561	4.4666	2.4552	2.9551
7	α_i	0.5542	0.5793	0.2237	-0.4094	0.3422	0.1390	0.2195	-0.2210	0.0843
	λ_i	1.3117	1.0036	0.3735	0.1225	0.6896	1.3838	1.9102	0.3932	1.6578
8	α_i	0.540	0.0817	0.2196	-0.0636	0.5916	2.1064	0.4746	0.9043	1.2443
	λ_i	0.2956	0.2784	0.0973	2.0081	0.7304	3.7999	0.5047	0.5012	0.5698
9	α_i	0.0633	0.0458	-0.6117	1.5012	-0.7075	-1.0698	0.8381	2.0281	1.4573
	λ_i	0.6729	0.7375	0.7514	2.0790	3.7121	0.7936	2.7521	2.2828	6.0008
10	α_i	0.4302	0.3378	-0.0544	1.0732	-0.3310	-0.0990	0.4733	0.1565	-0.0134
	λ_i	1.1583	0.7209	1.8263	1.9468	1.4573	1.3544	0.8177	1.5779	1.5501
11	α_i	-0.1521	-0.1215	-0.4341	0.4066	-0.0169	-0.1524	-0.1760	-0.8326	-1.5317
	λ_i	1.3249	1.4275	1.8859	0.1985	3.1332	0.4642	3.1259	2.7510	2.1328
12	α_i	0.0587	0.0655	0.5809	2.0324	0.0981	0.9496	0.0858	-0.2712	-1.7313
	λ_i	0.2968	0.5224	2.4995	0.2265	2.7259	1.3764	0.3145	1.6315	3.5411
13	α_i	0.3251	0.3858	-0.5748	-0.2500	-0.0917	-0.9322	0.4085	-0.1549	-0.1315
	λ_i	0.6236	0.4181	1.6728	0.5846	0.9466	3.0370	3.6062	2.1521	2.0459
14	α_i	-0.1254	-0.1411	0.0027	1.0375	-0.4006	0.7491	-0.4532	0.1851	0.5287
	λ_i	2.1922	1.8034	0.4043	0.2963	1.2495	1.7337	1.5970	0.7876	3.0562
15	α_i	0.1961	0.2345	-0.0369	0.7571	-0.4649	-0.3454	0.4860	-0.1181	0.5726
	λ_i	0.9277	0.5046	1.6609	0.5648	2.3726	1.3638	2.0325	0.4330	1.4666
16	α_i	-0.2387	-0.2123	-0.3242	-0.0549	-0.0550	-0.3449	0.6033	-0.9491	-0.9761
	λ_i	0.8280	0.8573	0.5579	0.6593	2.7886	1.3906	4.9516	1.8143	1.2387
17	α_i	-0.2935	-0.3495	-0.8469	-1.3746	-0.3808	-1.0506	-0.9350	0.3047	1.7137
	λ_i	2.1370	2.1434	1.7687	0.0236	2.0268	0.3521	2.5195	0.4817	1.3411
18	α_i	-0.2023	-0.2498	-1.1613	-1.2638	-0.9023	-0.3011	0.3244	-1.3245	-0.9848
	λ_i	3.2655	4.1688	0.8959	0.3890	1.0386	0.6580	7.2516	1.9935	5.7072

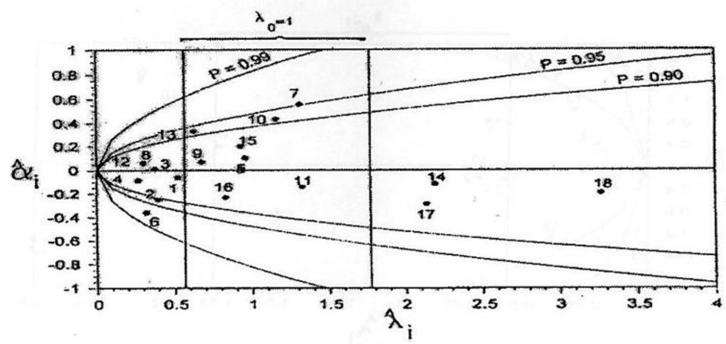

Fig. 1. Distribution of estimated stability for Egyptian cotton varieties under salinity for seed cotton yield.

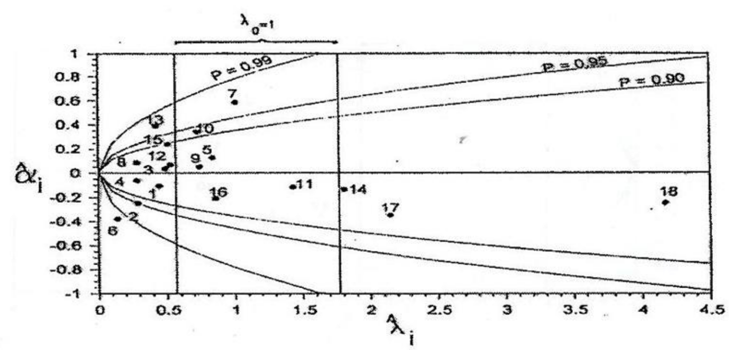

Fig. 2. Distribution of estimated stability for Egyptian cotton varieties under salinity for lint yield.

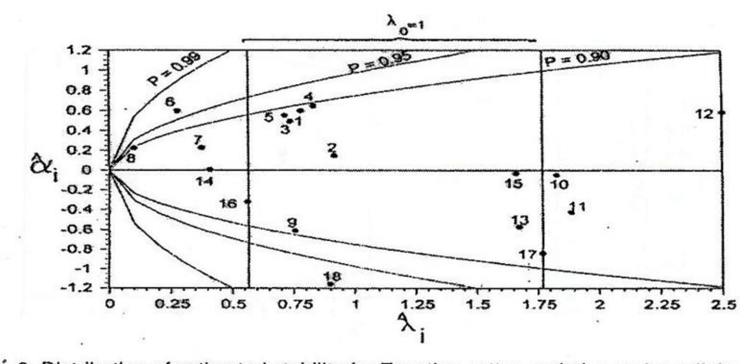

Fig. 3. Distribution of estimated stability for Egyptian cotton varieties under salinity for lint percentage.

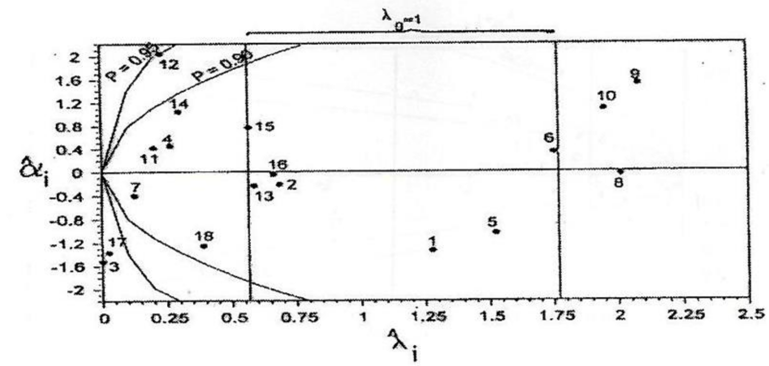

Fig. 4. Distribution of estimated stability for Egyptian cotton varieties under salinity for boll weight.

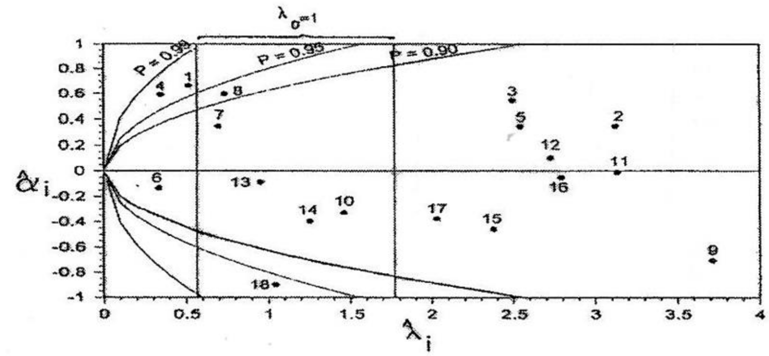

Fig. 5. Distribution of estimated stability for Egyptian cotton varieties under salinity for seed index.

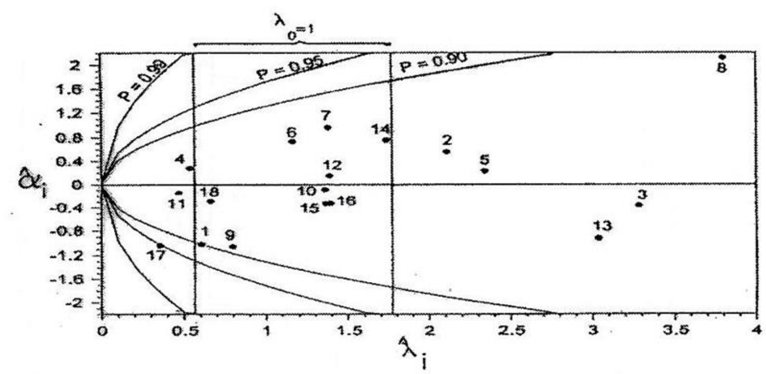

Fig. 6. Distribution of estimated stability for Egyptian cotton varieties under salinity for Pressley index.

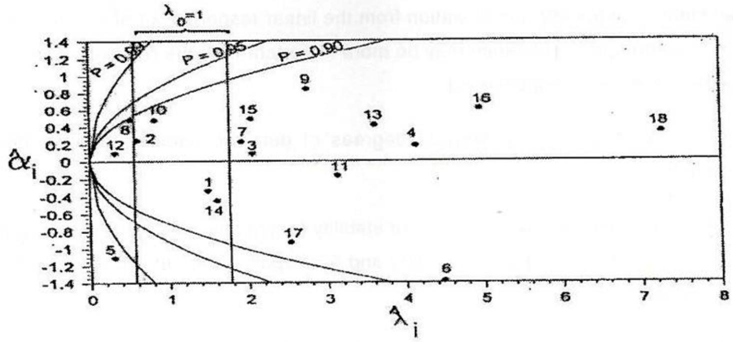

Fig. 7. Distribution of estimated stability for Egyptian cotton varieties under salinity for Micronaire readings.

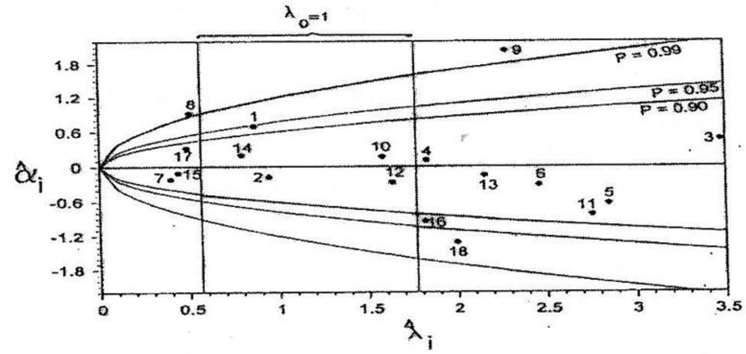

Fig. 8. Distribution of estimated stability for Egyptian cotton varieties under salinity for 50% span length.

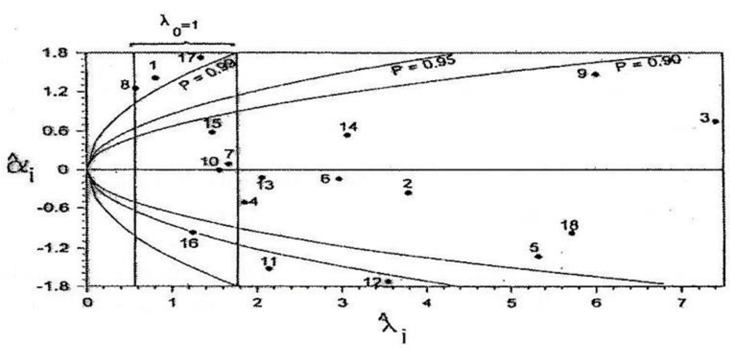

Fig. 9. Distribution of estimated stability for Egyptian cotton varieties under salinity for 2.5% span length.

unpredictable component (the deviation from the linear response, λ_i) of the genotype x environment interaction variance may be more important than the relatively predictable component (the linear response, α_i).

The varieties showed different degrees of genotyic stability for the different traits as follows:

Giza 45 showed average degrees level of stability for lint percentage, boll weight, while pressly index, Micronaire reading and 50% span length. it was unstable for the other traits.

Giza 76 showed average degrees level of stability for lint percentage, boll weight, Micronaire reading and 50% span length. whereas was unstable for other traits.

Giza 77 had high yielding and average degrees level of stability for lint percentage, however it was unstable for other traits.

Giza 70 showed average degrees level of stability for lint percentage, and it was unstable for other traits.

Giza 88 showed average degrees level of stability for seed cotton yield/plot, lint yield/plot, lint percentage and boll weight, but it was unstable for other traits.

Giza 87 had high yielding and average degrees of level stability for boll weight and pressly index, while it was unstable for other traits.

Giza 85 had high yielding and average degrees level of stability for seed cotton yield/plot, lint yield/plot, seed index, pressly index and 2.5% span length, and it was unstable for other trait.

Giza 75 had high yielding and average degrees level of stability for seed index, Micronaire reading and 2.5% span length, however, it was unstable for seed cotton yield/plot, lint yield/plot, lint percent age and boll weight.

Giza 86 showed average degrees level of stability for seed cotton yield/plot, lint yield/plot, lint percentage and pressly index. It was unstable for other traits.

Giza 89 had high yielding ability and average level of stability for all studied traits except for lint percentage and boll weight, where, it was unstable for the remaining traits.

Giza 80 showed average degrees level of stability for seed cotton yield/plot and lint yield/plot, while it was unstable for the other traits.

Giza 83 this variety had high yield while it was unstable for all studied trait except pressly index and 50% span length.

Giza 83 R showed average degrees level of stability for lint percentage, boll weight and seed index, whereas, it was unstable for the other traits.

Bahtim 105/Giza 67/Giza 72/Del Cero (creamy type) had high yielding ability and average level of stability for seed index, pressly index, Micronaire reading and 50% span length, while it was unstable for other traits.

Bahtim 105/Giza 67/Giza 72/Del Cero (white type) had high yield and average level of stability for seed cotton yield/plot, lint percentage, boll weight, pressly index and 2.5% span length. It was unstable for other traits.

Ashmoni T./Giza 83 showed average degrees level of stability of seed cotton yield/plot, lint yield/plot, lint percentage, boll weight, seed index and 2.5% span length while, and it was unstable for other traits.

Giza 84/Giza 74/Giza 68 had high yielding ability, while, it was unstable for all studied traits except lint percentage and 2.5% span length.

Giza 89/Giza 86 had high yielding ability and average level of stability for lint percentage seed index and pressly index.

These results are in agreement with those reported by El-Kady *et al.* (1978), El-Hariry, (1986), El-Marakby *et al.* (1986), Abdel-Rahman and El-Mazar (1987), El-Shaarawy *et al.* (1988), Abou-Zahra *et al.* (1989), Awaad (1989), El-Shaaraway *et al.* (1994), El-Shishtawy *et al.* (1994) Seyam *et al.* (1994), Bhatade *et al.* (1996), Badr (1999), and El-Harony *et al.* (2000) who found that cotton varieties showed different degrees of genotypic stability for agronomic and fiber characteristics.

It could be concluded that the genotypes which had the advantage of high genetic stability could be planted in an area with a wide range of environmental conditions, without marked reduction in yield.

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الثبات الوراثى لأصناف القطن المصرى تحت مستويات ملوحة التربة

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ان المحصول العالى مع ثبات الإنتاج يعتبران من أهم الصفات الواجب توافرها فى أى صنف قطن. لهذا أجرى البحث لدراسة الثبات الوراثى فى أصناف القطن المصرى وهى ثمانية عشر صنف قطن وهجين مبشر جيزه ٤٥ ، جيزه ٧٦ ، جيزه ٧٧ ، جيزه ٧٠ ، جيزه ٨٨ ، جيزه ٨٧ ، جيزه ٨٥ ، جيزه ٧٥ ، جيزه ٨٦ ، جيزه ٨٩ ، جيزه ٨٠ ، جيزه ٨٣ ، جيزه ٨٣ المشع ، الهجن المبشر (بهتيم ١٠٥/جيزه ٦٧/جيزه ٧٢/دليسرو) الطرز الكريمى ، الهجن المبشر (بهتيم ١٠٥/جيزه ٦٧/جيزه ٧٢/دليسرو) الطرز الأبيض ، والهجين (الأشمونى المعامل/جيزه ٨٣) ، الهجين المبشر (جيزه ٨٤/جيزه ٧٤/جيزة ٦٨) والهجين المبشر جيزه ٨٩/جيزه ٨٦ تحت ثلاث مستويات لملوحة التربة (٨,١ ، ١٢,٢ ، ١٤,٨ .E.C مللى موز/سم) ومستوى مقارنة (٣,٤ .E.C مللى موز/سم). خلال موسمى ١٩٩٨ ، ١٩٩٩ بمحطة البحوث الزراعية بالسرو مع إستخدام تصميم القطاعات كاملة العشوائية فى أربعة مكررات لكل مستوى من هذه المستويات وكانت الصفات المدروسة هى محصول القطن الزهر - محصول القطن الشعر - تصافى الحليج - وزن اللوزة - معامل البذرة - معامل برسيلى - قراءة الميكرونير - طول التيله عند نسبة توزيع ٥٠٪ - طول التيلة عند نسبة توزيع ٢,٥٪.

ويمكن تلخيص النتائج المتحصل عليها فيما يلى:

١- كانت الفروق بين الأصناف (كمتوسطات لكل البيئات المدروسة) عالية المعنوية لكل الصفات سالفة الذكر وتأثير البيئات (مستويات الملوحة) على كل الصفات المدروسة عالى المعنوية. كما أوضحت النتائج أن كل الصفات أظهرت اختلافا عالى المعنوية فى إستجابة الأصناف للبيئات المختلفة أى أن تأثير كل من الصنف والبيئة وتفاعل الصنف مع البيئة (مستوى الملوحة) كان عالى المعنوية على الصفات المدروسة.

أثبتت نتائج تحليل الثبات الوراثى أن قيمة λ (إستجابة التراكيب الوراثية الغير خطية والبيئات) أكثر أهمية من قيمة α (الأستجابة الخطية) فى تحديد الثبات الوراثى أوضحت النتائج أن الأصناف جيزه ٨٨ ، جيزه ٨٥ ، جيزه ٨٦ ، جيزه ٨٩ ، جيزه ٨٠ والهجين (أشمونى معامل/جيزه ٨٣) كانت متوسطة فى الثبات الوراثى لصفات محصول القطن الزهر ومحصول القطن الشعر. أما الأصناف جيزه ٤٥ ، جيزه ٧٦ ، جيزه ٨٨ وجيزة ٨٣ المشع والهجينين (بهتيم ١٠٥/جيزه ٦٧/جيزه ٧٢/دليسرو (الطرز الابيض) و(الأشمونى معامل/جيزه ٨٣) كانت متوسطة الثبات الوراثى لصفة وزن اللوزة. أغلب الأصناف كانت لها درجة متوسطة الثبات الوراثى لصفة معامل البذرة ومعامل برسيلى أما الأصناف جيزه ٤٥ ، جيزه ٧٦ ، جيزه ٧٥ ، جيزه ٨٩ والهجين (بهتيم ١٠٥/جيزه ٦٧/جيزه ٧٢/دليسرو) الطرز الكريمى) كانت لها درجة متوسطة الثبات الوراثى لصفة قراءة الميكروفير وطول التيلة.

كما أوضحت النتائج أن الأصناف جيزه ٨٨ ، جيزه ٨٥ وجيزة ٨٩ كانت أفضل الأصناف حيث تتميز بالمحصول العالى والثبات لمحصول القطن الشعر ومعظم مكوناته وجدير بالذكر أن هذه الطريقة مفيدة فى تحديد الأصناف المتفوقة فى المحصول والثبات الوراثى فى الظروف البيئية غير المناسبة مثل الملوحة.