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EFFECT OF DIFFERENT ENVIRONMENTAL CONDITIONS ON THE INHERITANCE OF ECONOMICAL TRAITS IN EGGPLANT.

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ABSTRACT

In this investigation, six varieties of eggplant were set up in a factorial mating design (3 x 3) to obtain nine F_1 hybrids. The resulted genetic material could help to obtain estimates for the different genetic parameters in addition to the estimation of heterosis. All genotypes were planted in two different locations (Mansoura and Sohag) to allocate the best genotype for each given location.

The data showed variable results with respect to the performances of all genotypes. The best parent and the best F_1 hybrid was not the same at both locations.

The obtained values of heterosis from the mid-parents according to the combined data were 22.06, 29.15, 33.33, 13.59, 23.28, 15.46 and 72.10% for plant height (P.H.), number of branches per plant (No. B./P.), number of leaves per plant (No. L./P.), weight of fruit (W.F.), fruit length (F.L.), fruit diameter (F.D.) and average yield per plant (A.Y./P.), respectively. In the same time, the highest value of heterosis against the better parent was 26.92% for A.Y./P. trait.

The estimates of genetic variance components obtained from the factorial mating design showed the importance of additive (σ^2_A) and non-additive genetic variances including dominance (σ^2_D), although the magnitudes of (σ^2_D) were larger than their corresponding (σ^2_A).

Concerning heritability values, the results indicated that the magnitudes of h^2_b% were larger than those of h^2_n% for all studied traits. These results illustrated the possibility of producing vigorous hybrids to increase the productivity of eggplant.

INTRODUCTION

In Egypt, eggplant is considered one of the popular vegetable crops. Accordingly, increasing productivity and quality of this plant is so essential. The present investigation was an attempt to study the nature of gene action and then the suitable breeding program that it could be used to improve the economical traits of this crop.

Singh and Rai (1990) obtained heterosis values for No. D/F., P.H. and No. S./F. In this respect, Sawant *et al.* (1992) evaluated different lines of eggplant and the F_1 hybrids among them. They recorded significant values of heterosis for No. D./F., P.H. and No. F./B. Mandal and Dana (1993) illustrated that yield per plant showed heterosis value of 136.82%.

El-Sharkawy *et al.* (1998) regarded moderate values of heterosis against the bellir parent. They also mentioned that the highest value of heterosis; was 77.68% for total yield per plant. In the same time, Chadha *et al.* (2001) revealed that fruit yield per plant exhibited high estimates of heterosis with the mean of 70.34%.

Concerning the nature of gene action and heritability, Narandra-Kumar and Ram (1981) claimed that both additive and non-additive genetic variances including dominance were important for the inheritance of P.H., No. F./P. and F.W. traits. Similar results were obtained by Sidhu *et al.* (1981) for L.F. cm. and No. D./F.

Kumar and Ram (1987) illustrated that additive genetic variance were predominant in the inheritance of D.F., F.L., F.D. and P.H. traits. In this respect, Lawande *et al.* (1992) revealed that the additive variance (σ^2A) was important for No. F./P., F.W. and W.Y./Pl. traits. On the other hand, Rai *et al.* (1998) indicated the importance of (σ^2D) for the inheritance of No. B./P. and F./L. similarly, Vagasiya *et al.* (2000) regarded that dominance variances (σ^2D) were important for F.W. and No. D.F. traits.

Mehrotra and Dixit (1977) obtained high values of heritability for No. B./P. and P.H. traits. In this respect, Saha *et al.* (1991) regarded that the estimated values of heritability in narrow sense were 69.57 and 38.98% for P.H. and No. B./P., respectively. Similarly, Rai *et al.* (1998) indicated that fruit weight showed highly h^2_b% value of 93.5%. In the same time, Sharma *et al.* (2000) obtained high estimates of heritability for length of fruit, No. F./P. and yield per plant.

Mandal and Dana (1992) mentioned that No. F./P. was significantly and positively correlated with other yield traits. Similarly, Bora and Shadeque (1993) indicated that fruit yield was significantly correlated with P.H. In this respect, Baruah *et al.* (2000) revealed that P.H. showed positive and significant correlation with yield trait.

Singh *et al.* (1981) evaluated the nature of linkage among different traits in eggplant. They cleared that yield were positively linked with P.H., No. F./P. and F.D. Similarly, Charussrj *et al.* (1986) indicated that No. F./P. was correlated with Y./P. In this respect, Vadivel and Bapu (1989) observed that F.Y. positively correlated with No. F./P., F.L. and No. B./P. Mohanty (1999) mentioned that yield was significantly correlated with P.H. and No. F./P.

MATERIALS AND METHODS

The genetic materials used in this investigation included six varieties of eggplant (*Solanum melongeno,* L.). Three of them (Longpurple, Black beauty and Black dark Long) were used as male parents. The other three varieties (Floranait Market, Balady darkround and Balady white long) were used as female parents.

In the growing season of 2002, each of male parent was crossed with the three female parents according to factorial mating divine. Thus, nine F_1 hybrids were obtained. In addition each variety was selfed to obtain more seeds. In the 2003 growing season, the nine F_1 hybrids, the three male parents and the three female parents were evaluated at two locations. These two locations are: El-Mansoura (horticulture research station at El-Bramoun, Mansoura) and Sohag (agricultural research station of Fac. of Agric., Sohag, South Vally University). At both locations, all (15) genotypes were grown in a randomized complete blocks design with three replications. Each genotype was planted in two rows 2.0 m. long and 0.6 m. wide. Hills were spaced 0.3 m apart. Data were recorded on the important traits specially those of yield traits. These traits were:

Plant height in centimeters (P.H. Cms.),
Number of branches per plant (No. B./P.),
Number of leaves per plant (No. L./P.),
Weight of fruit in grams (W.F./gs.),
Fruit length in centimeters (F.L. Cms.),
Fruit diameter in centimeters (F.D. Cms.), and
Average yield per plant (A.Y./P.).

The analyses of variance and tests of significance were made as outlined by Cochran and Cox (1957) and Comstock and Robinson II (1952). The estimates from data were concerned with the values of heterosis and the different genetic parameters including the estimates of heritability. The least significant difference (L.S.D) values were calculated according to Steel and Torrie (1960). All genetic parameters were obtained by manipulation of the mean squares presented in Table 1. Additive genetic variances (σ^2_A) were estimated from either the paternal variance (σ^2_m), the maternal variance (σ^2_f) or from both of them, while non-additive genetic variances including dominance (σ^2_D) were estimated from paternal X maternal variances (σ^2_{mf}). The estimates of heritability values in both broad (h^2_b%) and narrow (h^2_n%) senses were obtained according to the following equations:

$$h^2_n = \frac{\sigma^2_m + \sigma^2_f}{\sigma^2_m + \sigma^2_f + \sigma^2_{mf} + \sigma^2_{e/r}}$$

$$h^2_b = \frac{\sigma^2_m + \sigma^2_f + \sigma^2_{mf}}{\sigma^2_m + \sigma^2_f + \sigma^2_{mf} + \sigma^2_{e/r}}$$

Genotypic (r_g) and phenotypic (r_{ph}) correlations for any pair of studied traits were estimated as outlined by Steel and Torrie (1960) as presented in Table 2.

The significance of (r_g) and (r_{ph}) was tested using the "t" test at 5% and 1% levels of significances as described by Cochran and Cox (1957) as follows:

$$\text{Calculated "t" for genotypic correlation } (r_g) = \frac{(r_g)}{\sqrt{\frac{1-(r_g)^2}{n-2}}}$$

$$\text{Calculated "t" for phenotypic correlation } (r_g) = \frac{(r_{ph})}{\sqrt{\frac{1-(r_{ph})^2}{n-2}}}$$

Where: n : is number of error degrees of freedom.

Table 1: The form of the analysis of variances of the factorial mating design over locations.

S.V.	d.f	M.S.	E.M.S.
Locations	$L-1$		
Reps. within Loc.	$L(r-1)$		
Crosses	mf-1	MS_c	$\sigma^2_e + r\sigma^2_{cl} + rL\sigma^2_c$
Paternal	$m-1$	MS_m	$\sigma^2_e + r\sigma^2_{mfL} + rL\sigma^2_{mf} + rf\,\sigma^2_{mll} + rfL\sigma^2_m$
Maternal	$f-1$	MS_f	$\sigma^2_e + r\sigma^2_{mfL} + rL\sigma^2_{mf} + rm\sigma^2_{fL} + rmL\sigma^2_f$
Pat. X Mat.	(m-1)(f-1)	MS_{mf}	$\sigma^2_e + r\sigma^2_{mfL} + rL\sigma^2_{mf}$
Crosses X Loc.	(m-1)(L-1)	MS_{cL}	$\sigma^2_e + r\sigma^2_{cL}$
Pat. X Loc.	(m-1)(L-1)	MS_{mL}	$\sigma^2_e + r\sigma^2_{mfL} + rf\sigma^2_{mL}$
Mat. X Loc.	(f-1)(L-1)	MS_{fL}	$\sigma^2_e + r\sigma^2_{mfL} + rm\sigma^2_{fL}$
Pat. X Mat. X Loc.	(m-1)(f-1) (L-1)	MS_{mfL}	$\sigma^2_e + r\sigma^2_{mfL}$
Error.	L.X(r-1) X (mf-1)	MS_e	σ^2_e

Where:

L: number of locations
r: number of replications
m: number of paternal
f: number of maternal
σ^2_e: error variance
σ^2_{mfL}: paternal by maternal by locations variance
σ^2_{mL}: pat. by loc. variance
σ^2_{fL}:mat. by loc. variance.
σ^2_{mf}: pat. by mat. variance
σ^2_m : paternal variance
σ^2_f: maternal variance

Table 2: The analysis of variances and the mean squares for all studied traits from the combined data.

S.V.	d.f	P.H. cm.	No. B/P.	No. L./P.	W.F./ gm.	F.L.	F.D.	A.Y./ PL.
Locations	1	147.11**	84.77**	66.51**	181.71**	18.44**	3.19**	2.17**
R (Lx.)	6	11.73*	7.09	8.14	13.11	1.07**	0.119	2.47
Genotypes	14	84.18**	47.17**	101.11**	15.07**	8.15**	11.17**	24.81**
Gen. Loc.	14	31.07**	16.22**	42.18**	55.19**	4.42**	7.08**	11.71**
Error	36	2.73	2.73	8.72	4.122	0.123	0.027	1.08

RESULTS AND DISCUSSION

Plant breeders always perform breeding programs aiming to increase the productivity of eggplant as well as many other vegetable crops. In this respect, either they bread superior F_1 hybrids or develop new varieties. Each approach would require a specific breeding method depends on the magnitudes of siteable additive and non-additive genetic variances. The presence of additive genetic variances suggest the production of new inbred lines, but when non-additive genetic variances including dominance compose the largest portion at genetic variances it suggest the possibility of producing superior hybrids.

In this investigation, six varieties of eggplant were used. Three of them were used as female parents, while the others three varieties were used as male parents. Accordingly, nine F_1 hybrids were obtained between the male and female parents according to a factorial mating design. All genotypes, which included the six parental varieties and the nine F_1 hybrids were evaluated. The determination of variability between these genotypes became a necessity to investigate the nature of variability. Therefore, the analyses of variances were made over the locations and the results are presented in Table 3.

The results revealed that the mean squares of genotypes were high significant for all studied traits. Similarly, the mean squares of locations and genotypes X locations showed highly significance for all studied traits. Thus, the magnitudes of variability indicated the presence of important genetic variation among genotypes for all studied traits and demonstrated the different of environmental conditions in the two sites on genotypes.

To investigate heterosis against the mid-parents (M.P.) and the better parent (B.P.), the means of the parental varieties and their ranges as well as the means of F_1 hybrids were calculated for each location and the over all at the two locations and the results are presented in Table 4. Similarly, the values of heterosis versus the mid-parents and the better parent were determined and the results are shown in the same Table. The results revealed that the mean performances of the parental varieties and the F_1 hybrids showed variable values from one location to another. In addition, the means of the F_1 hybrids over the two locations showed different ranges. The recorded means of parents and F_1 hybrids showed the higher performances of the F_1 hybrids. The estimated values of heterosis from the mid-parents (M.P.) for all studied traits showed not only large estimates but also significant heterosis values. The obtained values of heterosis from the mid-parents (M.P.) as combined data were: 22.06, 29.15, 33.33, 13.59, 23.28, 15.46 and 72.1% for P.H. cm; No. B.P., No. L./P., W.F., gm, F.L. cm., F.D. cm. and A.Y/Pl traits respectively. At the same time, the results revealed that the calculated values of heterosis against the better parent (B.P.) were: 19.08, 20.27, 20.96, 5.54, 4.69, 7.64 and 26.92% for the above traits, respectively. Similar results were obtained by Singh *et al.* (1981), Swanat *et al.* (1992), El-Sharkawy *et al.* (1998) and Mandal and Dana (1992).

In general, the results indicated the possibility of obtaining hybrid vigor in eggplant for economical application by farmers in different location with emphasis on the choice of location. It this respect, the first location at Mansoura showed the highest performances for the means for all studied traits. Therefore, breeding programs could be executed in the segregating generations of the superior F_1 hybrids to recover new and improved lines. The validity of this breeding programs would depend upon the type of genetic variance controlling these genetic materials. The presence of large estimates of additive genetic variances (σ^2_A) would indicate that a selection program would be suitable. On the other hand, the high estimates of non-additive genetic variances including dominance (σ^2_D) would indicate the possibility of utilization of other programs such as producing F_1 hybrids.

Table 3: The mid-parents, ranges, heterosis values versus the mid-parents and the better parent calculated for two locations and from the combined data over locations for all studied traits.

Coneration		P.H.	No. B./P.	No. L./P.	W.F./gm	F.L.	F.D.	A.Y./P.	D.F.F.
M.P	M	71.4	7.82	48.6	114.60	11.71	6.92	0.882	72.4
	S	68.4	5.41	38.4	98.11	10.02	6.01	0.652	64.3
	C	69.8	6.62	43.5	106.36	10.87	6.47	0.767	68.35
Range	M	66.2 – 73.2	6.02 – 8.1	45.7 – 53.2	99.2 – 136.4	10.71 – 13.2	5.92 – 7.60	0.652 – 1.271	80.4 – 65.2
	S	63.1 – 69.9	4.2 – 6.7	32.3 – 42.7	67.4 – 106.1	9.8 – 12.4	4.18 – 6.27	0.492 – 0.817	73.2 – 60.4
	C	64.65 – 71.55	5.11 – 7.4	39.0 – 47.9	83.3 – 121.3	10.3 – 12.8	5.05 – 6.94	0.572 – 1.040	76.8 – 62.8
F_1	M	92.3	10.92	63.4	139.9	14.09	7.82	1.652	67.6
	S	78.1	6.88	52.6	111.2	12.70	7.12	0.981	64.2
	C	85.2	8.90	58.0	125.6	13.40	7.47	1.320	65.5
Range	M	80.6 – 94.7	9.11 – 12.02	56.4 – 72.3	130.2 – 164.7	11.2 – 14.2	6.22 – 7.92	1.37 – 1.972	74.8 – 63.4 6
	S	73.4 – 80.3	5.19 – 8.47	50.3 – 64.7	94.6 – 108.9	9.02 – 12.3	6.30 – 7.38	0.834 – 1.03	
	C	77.0 – 87.5	7.15 – 10.25	53.35 – 68.5	112.4 – 136.8	10.11 – 14.25	6.26 – 7.65	1.102 – 1.501	
H(M.P)	M	29.27**	39.64**	30.45**	22.08**	20.32**	13.01**	87.30**	-6.63
	S	14.52**	14.23**	36.80**	3.15	26.75**	18.47**	50.46**	
	C	22.06**	29.15**	33.33**	13.39**	23.28**	15.46**	72.10**	
E(B.P)	M	26.09**	34.81**	19.17**	2.57	6.74**	2.89	29.98**	2.90
	S	11.73**	2.69	23.19**	4.81	2.42	13.56**	20.07**	
	C	19.08**	20.27**	20.96**	3.54	4.69	7.64	26.92**	

M: Mansoura
S: Sohag
C: Combined

Table 4: The results of the combined analysis of variances for factorial mating design over two locations for all studied traits.

S.V.	d.f	P.H. cm.	No. B/P.	No. L./P.	W.F./ gm.	F.L.	F.D.	A.Y./PL.
Locations	1	18.72**	37.18	52.21	201.4	43.7	46.18	149.21
Reps (L)	4	7.18	12.74	21.11	14.52	12.18	29.21	47.71
Pat. m	2	84.17 92.53 32.11	62.53 68.11 33.71	49.21 51.11 30.73	136.53 96.94 74.72	69.18 73.06 51.71	32.13 37.09 21.06	162.07 129.61 94.67
Mat. f	2	83.61 92.21 35.92	54.52 66.87 59.11	63.98 71.52 40.18	136.51 118.73 72.41	83.21 81.71 42.75	39.71 45.85 30.54	179.81 153.16 115.65
Pat. x Mat. (m x f)	4	67.18 71.22 24.71	43.11 52.04 44.98	51.12 39.07 25.01	118.07 98.19 52.07	56.71 61.92 40.19	38.19 42.13 32.07	153.73 117.92 92.87
P. x L.m	2	13.71 14.32 6.08	6.18 22.72 19.09	1.91 3.07 2.12	29.12 10.61 8.21	9.87 20.52 3.92	10.71 9.93 0.73	10.77 18.73 11.89
M. x L.F	2	16.16 25.27 6.21	4.18 16.23 13.14	6.77 8.17 4.50	28.15 14.10 9.55	7.39 21.19 3.05	4.9 7.21 1.93	17.07 24.92 14.58
P.M.L.	4	11.62 21.16 3.27	2.51 12.86 9.17	2.81 2.07 1.19	23.17 11.09 2.98	5.09 14.22 1.09	3.14 6.51 0.98	12.67 20.54 11.73
Error	32	1.02 0.72 0.18	0.998 0.781 0.315	1.167 1.008 0.910	4.235 2.642 0.997	1.924 2.711 0.914	3.02 0.651 0.423	1.392 1.712 0.542

To investigate the nature of gene action, the obtained F_1 hybrids were set according to factorial arrangement. The analyses of variance were made for the data obtained from each location and from the combined data over both locations. The results of the analysis of variances for all studied traits are cleared in Table 5.

The results illustrated that the magnitudes of the mean squares of paternal (σ^2_m), maternal (σ^2_f) and paternal X maternal (σ^2_{mf}) indicated the importance of both additive and non-additive genetic variances for all studied traits at each location and for the combined analyses over both locations. It could be noticed that the two locations were variable since the mean squares of locations were highly significant and of large magnitude than the other mean squares. This finding indicated that the F_1 hybrids did not perform equally well at both locations. Thus, specific hybrid would be assigned to specific location to achieve its highest yield.

In this respect, the design variance components of the factorial mating design could be translated into genetic variances in terms of additive (σ^2_A) and non-additive genetic variances including dominance (σ^2_D). The genetic variance components could be obtained from the male variance (σ^2_m) or/and female variance (σ^2_f) which estimate additive (σ^2_A). On the other hand, the male x femal variances (σ^2_{mf}) could estimate non-additive genetic variances including dominance.Thus, the values of σ^2_m, σ^2_f and σ^2_{mf} were obtained for each locations and over the two locations and the results are shown in Table 6.

Table 5: The variance of male (σ^2_m), female (σ^2_f) and male x femals (σ^2_{mf}) for two locations and the combined analyses for all studied traits.

σ^2_f		P.H. cm.	No. B/P.	No. L./P.	W.F./ gm.	F.L.	F.D.	A.Y./PL.
σ^2_m	M	0.828	-0.236	-0.036	0.695	0.427	0.757	0.569
	S	1.286	0.345	0.613	-0.043	0.269	-0.470	0.750
	C	0.255	-1.0177	0.261	0.968	0.483	-0.598	0.096
σ^2_f	M	0.661	0.541	0.494	0.748	1.344	-0.018	1.204
	S	0.938	0.637	1.464	0.974	0.712	0.168	1.714
	C	0.455	0.564	1.159	0.765	0.033	-0.137	1.107
$\sigma^2_{m x f}$	M	9.26	6.76	8.05	15.82	8.60	5.84	23.51
	S	8.34	6.53	6.17	14.52	7.95	5.94	16.23
	C	3.57	5.97	3.97	8.18	6.52	5.18	13.52
σ^2_{mL}	M	0.232	0.408	-0.100	0.661	0.531	0.841	-0.211
	S	-0.760	1.096	0.111	-0.053	0.700	0.380	-0201
	C	0.312	1.102	0.103	0.581	0.314	-0.028	0.018
σ^2_{fL}	M	0.504	0.186	0.440	0.553	0.256	0.204	0.489
	S	0.457	0.374	0.678	0.334	0.774	0.078	0.487
	C	0.327	0.441	0.368	0.730	0.217	0.106	0.317
σ^2_{mfL}	M	3.53	0.504	0.548	6.31	1.063	0.04	3.76
	S	6.81	4.03	0.354	2.82	4.07	1.95	6.28
	C	1.03	2.95	0.092	0.66	0.059	0.186	3.73

M: Mansoura **S: Sohag** **C: Combined**

Table 6: The estimated values of additive (σ^2_A), non-addition (σ^2_D) genetic variances and heritabilities for all studied traits.

		P.H. cm.	No. B/P.	No. L./P.	W.F./ gm.	F.L.	F.D.	A.Y./PL.
σ^2_A	M	1.489	0.305	0.438	1.443	1.771	-0.775	1.773
	S	2.224	0.982	2.077	0.931	0.981	-0.302	2.464
	C	0.714	-0.613	1.420	1.733	0.116	-0.735	1.203
σ^2_D	M	9.26	6.76	8.05	15.82	8.60	5.84	23.51
	S	8.34	6.53	6.17	14.52	7.95	5.94	16.23
	C	3.57	5.97	3.97	8.18	6.52	5.18	13.52
σ^2_{fL}	M	96.93	95.50	95.62	92.41	94.19	83.42	98.20
	S	97.78	96.65	96.08	94.61	90.76	96.29	97.04
	C	82.75	79.74	90.24	88.23	91.71	91.65	86.91
σ^2_n	M	13.43	4.12	4.93	7.72	16.08	-	6.89
	S	20.58	12.64	24.19	5.71	9.97	-	12.79
	C	13.80	-	23.77	15.42	1.16	-	7.11

M: Mansoura **S: Sohag** **C: Combined**

The results revealed that the magnitudes of femal variances (σ^2_f) were larger than those of male variances (σ^2_m) for all studied traits. This finding indicated the importance of maternal effect in this genetic materials. The results also indicated that the values of male x female variances (σ^2_{mf}) were, always larger than (σ^2_m) and (σ^2_f) for all studied traits. These findings indicated that the non-additive genetic variances including dominance played a major role in the inheritance of the studied traits. It could be also noticed that the values of (σ^2_{fL}) were larger than the values of (σ^2_{mf}). At the same time, the obtained values of (σ^2_{mfL}) were larger than those of (σ^2_{fL}) and (σ^2_{mf}) for all studied traits. These results explained the importance of (σ^2_D) for the inheritance of all studied traits.

The obtained values of (σ^2_m, σ^2_f and σ^2_{mf}) could be translated to additive genetic variances (σ^2_A) and non-additive genetic variance including dominance (σ^2_D). The values of (σ^2_A) and (σ^2_D) in addition to the values of heritability in broad and narrow senses were determined and the results are shown in Table 7. The results indicated that the magnitudes of non-additive (σ^2_D) genetic variances were larger than their corresponding additive values of genetic variances (σ^2_A) for all studied traits. These results were expected and explain the obtained values of heterosis, which described earlier. These results indicated that (σ^2_D) played a major role for the inheritance of the studied traits. On the other hand, the obtained values of (σ^2_A) for all studied traits could not be neglected. These results were in agreement with the results obtained by Narandra and Ram (1981), Sidhu *et al.* (1981) and Rai *et al.* (1998).

Table 7: Phenotypic (r_{ph}) and (r_g) correlation among pairs of studied traits.

	P.H. cm.	No. B/P.	No. L./P.	W.F./ gm.	F.L.	F.D.	A.Y./PL.
P.H.		0.52**	0.64**	0.58**	0.41*	0.39	0.78**
		0.62**	0.71**	0.60**	0.48*	0.42*	0.83**
No. B./P.			0.90**	0.51**	0.38	0.41*	0.89**
			0.96**	0.69**	0.46*	0.49*	0.94**
No. L./P.				0.68**	0.51*	0.54**	0.91**
				0.74*	0.59**	0.62**	0.97**
W.F.					0.68**	0.52**	0.74**
					0.74**	0.59**	0.83**
F.L.						0.31	0.78**
						0.34*	0.82**
F.D.							0.72**
							0.80**
A.Y./P.							

Concerning heritability values, the results indicated that the magnitudes of heritability in broad sense were larger than their corresponding heritability values in narrow sense for all studied traits at both locations. Similar results were noticed for heritability values estimated from the combined analysis. The calculated values of heritability in broad sense were 82.75, 79.74, 90.24, 88.23, 91.71, 91.65 and 86.91% for P.H., No. B./P., No. L/P., W.F./gm., F.L., F.D. and A.Y./P., respectively. At the same time, No. L./P. trait showed the highest value of heritability in broad sense (23.77%). This finding indicated the importance of non-additive genetic variances including dominance for all studied traits. However, additive variances were also important for many studied traits. Similar results were obtained by many authors among them Mehratra and Dixit (1977), Shah *et al.* (1991), Rai *et al.* (1998) and Sharma *et al.* (2000).

The results revealed that most pairs of studied traits were positively correlated genotypically and phenotypically. The results also indicated that A.Y./P. trait was positively and significantly correlated with all studied traits. At the same time, W.F. trait was positively correlated with P.H., No. B./P. and No. L./P. The largat r_{ph} and r_g was observed for A.Y./P. with No. L./P. Similar results were obtained by Singh *et al.* (1981), Charussrj *et al.* (1986), Vadivel and Bapu (1990) and Mohanty (1999).

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تأثير الظروف البيئية المختلفة على توارث بعض الصفات الاقتصادية الهامة فى الباذنجان ·

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فى هذه الدراسة تم استخدام ستة أصناف من الباذنجان وذلك للحصول على تسعة هجن جيل أول وذلك بالتهجين بين هذه الأصناف الستة وذلك طبقاً للنظام العاملى باستخدام ثلاثة أصناف كآباء هجن كل منها مع ثلاثة أمهات ·

- هذه المادة الوراثية يمكن استخدامها للحصول على القياسات الوراثية المختلفة، وكذلك دراسة قوة الهجين · وعلى هذا تم زراعة الأباء الستة والهجن التسعة فى منطقتين مختلفتين هما: مزرعة محطة بحوث البساتين بالبرامون (المنصورة – دقهلية) ومزرعة كلية الزراعة (سوهاج) جامعة جنوب الوادى ·
- أظهرت النتائج وجود تباين بين التراكيب الوراثية المختلفة فى الموقعين – وإن لم يثبت أن أحد الأباء أو الهجن كان متفوقا فى المنطقتين ·
- أظهرت النتائج المتحصل عليها أن قيمة قوة الهجين للصفات التى درست كانت ٢٢ر٠٦، ٢٩ر١٥، ٣٣ر٣٣، ١٣ر٥٩، ٢٣ر٢٨، ١٥ر٤٦ و ٧٢ر١٠% لصفات طول النبات، عدد الأفرع/نبات، عدد الأوراق/نبات، وزن الثمرة، طول الثمرة، قطر الثمرة ومحصول النبات الكلى على الترتيب ·

وقد أظهرت النتائج أيضا أن أعلى قيم قوة الهجين قياسا من أفضل الأباء كانت ٢٦ر٩٢% لصفة المحصول الكلى/نبات ·

- أظهرت النتائج أيضا أهمية كل من التباين الغير تجمعى والذى يشمل التباين السيادى والتباين التجمعى وإن كان قيم التباين الغير تجميعى هى الأعلى ·
- أظهرت النتائج كذلك أن قيم معامل التوريث فى المدى الواسع المتحصل عليها أعلى من مثيلتها فى المدى الضيق لكل الصفات المدروسة ·

وتوضح النتائج إمكانية إنتاج هجن عالية الإنتاج لزيادة الإنتاج فى الباذنجان ·