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HETEROSIS, NATURE OF GENE ACTION FOR SOME VEGETATIVE AND EARLINESS TRAITS IN WATERMELON, *(Citrullus lanatus, Thumb.)*

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ABSTRACT

Watermelon (*citrullus lanatus. Thunb.*) is an important vegetable crop grown in Egypt. Studying the genetic behavior of some economical traits is very important to produce local watermelon hybrids. A complete diallel cross mating design using five watermelon varities named as; Giza-1 (1), Giza- 21 (2), Charleston gray (3), Crimson sweet (4) and Dulzero (5) were performed. Different vegetative and earliness traits were studied. These traitswere :plant length in centimeter ,number of leaves per plant, number of branches per plant, fresh weight per plant in grams, dry weight per plant in grams, days to first male flower to first female flower. Different genetic parameter and heritability values as well as correlation among pairs of studied traits were evaluated

The caculated means of parental varieties and their hybrids showed that the average means of the F_1 hybrids, F_{1r} reciprocal hybrids and overall F1 hybrids significantly exceeded the mid-parents and some better parent (B.p)

The results indicated that the magnitudes of the non-additive genetic variances including dominance were larger than their corresponding estimates of additive genetic variances for all studied traits with few exceptions.The estimated values of heritability in broad sense were larger in magnitudes than their corresponding estimates of heritability in narrow sense for all studied traits.These findings cleard the importance of dominance variances and additive variances although dominance was larger .

The results illustrated that both phenotypic and genotypic correlation coefficients values were closed to each other with respect to most pairs of studied traits.

It could be also noticed positive genotypic (rg) and phenotypic (rph) correlation and highly significant between (P.L. cm) and (No.L./P.), (No.B./P.), (F.W./P. gs), (D.W./P. gs).

INTRODUCTION

Watermelon *(citrullus lanatus. Thunb)* is one of the most important economic vegetable crops grown in Egypt. The improvement and producing local watermelon hybrids may be achieved through successful breeding program. In this study, the diallel crosses mating design has been used to obtain estimation of genetic variance components, and the type of gene action for some important vegetative and earliness traits.

Kash and El-Diasty (1989) studied heterotic effect in some summer squash hybrids. They obtained heterosis values from the mid-parents. These values ranged from 18.17 to 41.96% for sex ratio and number of leaves per plant, respectively. They also showed that the estimated values versus the better parent ranged from 0.41 to 38.37 % for stem length and sex ratio, respectively. In cucumber, Awny (1992a) calculated the values of heterosis in the F_1 hybrids. They revealed high value of heterosis from the better parent

(10.56) and mid-parents (15.06) for number of branches per plant trait. Awny (1992b) stated that days to first male flower were significantly correlated with first female flowers in cucumber. Abd El-Hadi (1995) studied six inbred lines and 30 F1 hybrids among them (including F_1 reciprocal hybrids) in agoor. He recorded the presence of highly significant values of heterosis versus the mid-parents. These values were 17.57, 23.78 and 20.67 % for the number of leaves per plant for F_1 hybrid, F_1 reciprocal hybrids and all F_1 hybrids ($F_{1.1r}$), respectively. Abd El- Maksoud *et al* (2003) in squash showed that the average means of the F1 hybrids and the average over all F_1 hybrids ($F_{1.1r}$) exceeded their mid-parents (M.P) for all studied traits except sex ratio and days to first female flower. These traits showed desirable lower forward increasing female flower and earliness, respectively. Meanwhile, Gabr (2003) in squash estimated the amounts of heterosis over mid-parents for some vegetative traits. He recorded that values of heterosis ranged from 7.85 to 23.02 % for vein length and number of leaves per plant. For F_1 hybrids and F_1 reciprocal hybrids, the value ranged from 6.93 to 25.22 % for the same traits. In the same time, El-Gendy (2004) studied 12 F_1 hybrids of squash. They illustrated that the means of most studied traits of the F_1 hybrids significantly exceeded their mid-parents. They also investigated the presence of some promising F_1 hybrids which exceeded the better parent and showed desirable negative heterosis values against the better parent. The highest values of heterosis versus the (B.P) were 10.7 for date of first female flower

Abd El-Hafez *et al* (1997) and El-Mighawry (1998) claimed the importance of both additive and non additive gene variances in the inheritance of most studied traits.

On the other hand, Khalaf Allah *et al* (2001) , in squash, illustrated that the estimates of specific combining ability (G.C.A) showed higher values than those of general combining ability (G.C.A) for most studied traits. They also noticed the importance of non-additive gene effects for inheritance of sex ratio, earliness and early yield traits. Sadek (2003) calculated the genetic parameters for earliness traits. He found that additive variances including dominance contributed in the inheritance of position of the first female flower, days to the first female flower and early yield as number and weight. She also added that the dominance genetic variances were larger than the corresponding values of additive genetic variances for those traits. Shamloul (2002) studied the heritability values in broad sense (h^2_b %) and narrow sense (h^2_n%) in sweet melon. He recoded that the highest value of (h^2_b %) was 97.55% for stem length and lowest value was 57.77% for number of branches per plant. On the other, hand ,Kosba *et al* (1993) in cantaloupe, reported that the magnitudes of genotypic correlations were very close to the corresponding values of phenotypic correlation. They also added that all the studied traits were positively correlated with each other in F_1 hybrids.

Abd El-Hadi and Abdein (2005) and Abd El-Hadi *et al* (2005) in squash found that most pairs of studied traits exhibited positive genotypic and phenotypic correlation coefficient such as vein length with number of leaves, fresh weight and dry weight per plant. In addition, number of first female flower was significantly correlated with date of first male flower

MATERIALS AND METHODS

1- The genetic materials:

The genetic materials used in this investigation included five different varieties of watermelon. All these varieties belong to the specie *Citrullus lanatus, thumb*. The seeds of all varieties were obtained from the vegetable research institute, agricultural research center, ministry of agriculture in Giza, Egypt. These varieties were: Giza-1, Giza-21, Charleston gray, Crimson sweet and Dulzera. These parental varieties varied with respect to the time of complete maturity and fruit characteristics.In the growing season of 2005 the five parental varieties were crossed among them to obtain 10 F_1 hybrids and 10 F_1 reciprocal hybrids (F_{1r}) through complete diallel crosses mating design.

2- Experimental design:

The genetic materials (25 genotypes) which included five parental varieties, 10 F_1 hybrids and 10 F_1 reciprocal hybrids were evaluated in the growing season of 2006. The experiment was carried out in a field trail experiment at El-Baramoun Research station, Mansoura, Dakhalia governorate. The experimental design was the randomized complete blocks design (R.C.B.D) with three replicates. Each plot was one ridge 10 m.length and 2 m width. The distance between hills was 1 m. long apart. Therefore, each ridge contained 10 hills. all cultural practices were made as recommended for watermelon.

Data were recorded on the following traits:

1- plant length in centimeters (P.L cm).
2- number of leaves per plant (N.L./P).
3- number of branches per plant (N.B,/P).
4- fresh weight per plant in grams (F.W./P).
5- dry weight of plant in grams (D.W./P).
6- date of first male flower (D ^{1st} F.M.F).
7- date of first female flower (D^{1st} F.F.F).

3- Statistical analysis

A- Analysis of variance

Analysis of variance were made to test the significance of differences among the five parental varieties. The differences between any two means were tested for significance using (L.S.D) at both 5% and 1% levels of probability as outlined by Steel and Torrie (1960).

$L.S.D._{(5\%)} = t_{0.05\,Edf} \times S^{-}d$, $L.S.D._{(1\%)} = t_{0.01\,Edf} \times S^{-}d$ and

$$S^{-}d = \sqrt{\frac{E.M.S}{K} \times \frac{n_1 + n_2}{n_1 n_2}}$$

Where:

Edf: is number of error degree of freedom
EMS: is error mean square
n1: is number of genotypes involved in the first mean
n2: is number of genotypes involved in the second mean

B- Estimation of heterosis:

Heterosis values were calculated at the deviation of F1, F1 reciprocal and all F1 hybrids from the mid and the better parents.

1- **Heterosis versus the mid parents:**

$$H(F_1, M.P)\% = \frac{(\overline{F_1} - MP)}{M.P} \times 100.$$

$$H(F_{1r}, M.P)\% = \frac{(\overline{F_{1r}} - MP)}{M.P} \times 100.$$

$$H(F_{1.1r}, M.P)\% = \frac{(\overline{F_{1.1r}} - MP)}{M.P} \times 100.$$

2- **Heterosis against the better parent:**

$$H(F_1, B.P)\% = \frac{(\overline{F_1} - BP)}{B.P} \times 100.$$

$$H(F_{1r}, B.P)\% = \frac{(\overline{F_{1r}} - B.P)}{B.P} \times 100.$$

$$H(F_{1.1r}, B.P)\% = \frac{(\overline{F_{1.1r}} - B.P)}{B.P} \times 100.$$

C- Diallel cross analysis:

In this investigation five parental varieties were crossed according to complete diallel crosses mating design to produce 10 F_1 hybrids and 10 F_1reciprocal hybrids to determine general (GCA) and specific (SCA) combining abilities. The variances of reciprocal effects were also obtained. The procedures of the analysis of variances were made according to Griffing's method-1 (1956) and outlined by Singh and Chaudharry (1985). Therefore, the form of the combining abilities variances and the exceptions of the mean squares are shown in Table 1.

D- Estimates of heritability:

The estimates of heritability were determined according to the following equation:

a = heritability in broad sense ($h^2_{b.}$) =
$$\frac{\sigma^2 A + \sigma^2 D}{\sigma^2 A + \sigma^2 D + \sigma^2 r + \sigma^2 e/k}$$

b = heritability in narrow sense ($h^2_{n.}$) =
$$\frac{\delta^2 A}{\delta^2 A + \delta^2 D + \delta^2 r + \delta^2 e/k}$$

Table 1: The form of analysis of combining abilities and The exceptions of the mean squares

S.V	D.F	Ms	E.M.S
GCA	n-1	Mg	$\sigma^2e+2(n-1)2/n.\ \sigma^2s+2n\ \sigma^2g$
SCA	n(n-1)/2	Ms	$\sigma^2e+2(n^2-n+1)/n^2.\ \sigma^2s$
Reci.	n(n-1)/2	Mr	$\sigma^2e+2\ \sigma^2r$
Error	(r-1)(9-1)	Me	σ^2e

Where:

n : is number of parents

σ^2g: is the variance of general combining ability

σ^2s: is the variance of specific combining ability

σ^2r: is the variance of reciprocal effects

σ^2e: is the error of variance

Mg, Ms, Mr amd Me: are the mean square of GCA, SCA, RE and error, respectively.

Genotypic and phenotypic correlation among pairs of studied traits were calculated according to Steel and Torrie (1960) and as outlined by Singh and Chaudhary (1985) as shown in Table 2.

The genotypic (rg) and phenotypic (rph) correlations for any pair of traits could be calculated according to the following equations:

$$\text{Genotypic correlation (rg)} = \frac{\delta g_1 g_2}{\sqrt{\delta^2 g_1 - \delta^2 g_2}}$$

$$\text{Phenotypic correlation (rph)} = \frac{\delta ph_1 ph_2}{\sqrt{\delta^2 ph_1 \,.\, \delta^2 ph_2}}$$

Where:

$\delta g_1 g_2$: is the genotypic covariance between any two traits

$\delta ph_1 ph_2$: is the phenotypic covariance between any two traits

$\delta^2 g_1$ and $\delta^2 g_2$: are the genotypic variance of the first and second trait, respectively.

$\delta^2 ph_1$ and $\delta^2 ph_2$: are the phenotypic variance of the first and second trait, respectively.

The significance of the (rg) and (rph) was tested by using the "t" test at 5 and 1% levels of significance as described by Cochran and Cox (1957)

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

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

Table 2: The form of the analysis of variance, covariance and the expectations of the mean squares and mean products.

S.V	d.f	M.S	Analysis of variance	M.P	Analysis of variance
Replications	(k-1)				
Genotypes	(g-1)	M_2	$\delta^2e - k\delta^2g$	MP_2	$\delta e_1e_2 + k\delta g_1g_2$
Error	(k-1)(g-1)	M_1	δ^2e	MP_1	δe_1e_2

Where: K: is number of replications.
g: is number of genotypes.
$\delta^2g = (M_2 - M_1)/k.$
$\delta g_1g_2 = (MP_2 - MP_1)/k$
$\delta^2Ph = (\delta^2g + \delta^2e)/k$

RESULTS AND DISCUSSION

The mean performances of genotypes

The calculated means of the five parental varieties, F_1 hybrids and F_1 reciprocal hybrids are presented in Table 3. The results illustrated that there was no specific parent was superior or the best for all studied vegetative and earliness traits. It was also noticed that the parental variety Charleston gray (P_3) showed the highest mean for P.L. cm, No.L./P, No.B./P., F.W./P. and D.W./P. while, the highest parent for D[1]st F.M.F and D[1]st F.F.F was the parental variety Dulzera (P_5). On the other hand, the parental variety Giza-1 (P_1) was the lowest parent for P.L. cm, No.L./P., No.B./L., F.W./P. and D.W./P. gs.

Regarding F_1 hybrids and their reciprocal hybrids, the results revealed that most of the F_1 hybrids means exceeded their parents, which were involved in the hybridization. It could be also noticed that the highest F_1 hybrids for P.L. cm trait was ($P_1 \times P_3$) with the mean of 152.33 for the same trait. The mean performance of F_1 hybrids and their reciprocal range from 111.33 cm ($P_4 \times P_1$) to 170 cm ($P_1 \times P_3$);139.33 ($P_4 \times P_2$) to 170.33 ($P_1 \times P_3$); 2.67 ($P_5 \times P_2$), ($P_2 \times P_5$) to 4.33 ($P_1 \times P_3$). ($P_2 \times P_3$), ($P_2 \times P_4$), ($P_2 \times P_5$); 500.67 gs ($P_4 \times P_1$) to 900.67 gs ($P_1 \times P_3$);90.009 gs ($P_2 \times P_1$) to 140.33 gs ($P_1 \times P_3$), 40.33 gs ($P_1 \times P_4$), to 48.33 ($P_3 \times P_1$), 45.00 ($P_2 \times P_5$) to 54.33 ($P_3 \times P_1$) for .P.L. cm, No.L./P., No.B./P., F.W./P. gs, D.W./P. gs, D.[1st].F.M.F and D.[1st].F.F.F. Generally, the means of F_1 hybrids were larger than of those of F_1 reciprocal hybrids for all studied traits with few exceptions

Table 3: The mean performances of five parental varieties, F_1 hybrids and F_{1r} hybrids for vegetative and earliness traits.

Genotype	P.L (cm)	No. L./P	No.B./P	F.W./P (gms)	D.W/P (gms)	D.1st F.M.F	D.1st.F.F.F
1	110.67	132. 00	2.067	511.67	85.00	48.33	52.00
2	123.00	142.33	3.33	610.00	100.67	51.00	58.67
3	156.67	155.33	4. 00	759.33	126.33	51.67	55.33
4	119.67	140.67	3.00	560.00	95.33	43.00	48.33
5	148.33	148.33	3.67	680.00	118.00	41.67	46.67
1x2	135.67	150.67	3.67	630.67	110.00	43.67	49.33
1x3	170.00	170.33	4.33	900.67	140.33	45.00	50.67
1x4	125.33	152.67	3.33	550.00	100.00	40.33	46.00
1x5	145.33	159.33	4.00	695.00	115.33	42.00	47.33
2x3	155.00	166.00	4.33	760.67	121.00	43.33	50.67
2x4	130.33	148.00	4.33	610.67	105.33	41.67	46.67
2x5	152.33	156.00	2.67	700.67	120.33	40.67	45.00
3x4	168.33	162.33	4.33	800.33	135.00	42.33	49.67
3x5	160.33	157.00	4.00	780.67	129.33	42.67	48.67
4x5	139.67	143 .00	4.00	650.00	119.33	43.67	46.67
2x1	120.67	143.33	3.33	600.33	90.00	45.67	51.00
3x1	150.33	161.33	3.67	800.33	130.67	48.33	54.33
4x1	111.33	144.00	3.67	500.67	96.00	40.67	46.00
5x1	151.33	147.00	3.33	650.00	105.00	41.33	48.67
3x2	133.00	157.67	4.00	690.33	112.33	42.67	50.00
4x2	120.67	139.33	4 .00	580.33	113.33	41.67	49.33
5x2	146.00	159.00	2.67	610.67	103.00	41.00	46.33
4x3	152.33	152.33	4.00	710.33	120.00	44.33	51.67
5x3	143.00	146.00	3.33	700.67	116.67	43.67	49.67
5x4	140.00	141.67	3.00	690.33	100.67	40.67	45.33
L.S.D 5%	5.1	5.23	1.25	105.88	5.44	2.67	4.2
L.S.D 1%	6.81	7.00	1.68	141.66	7.28	3.57	5.62

The mid-parents (M.P),ranges ,the means of F_1 hybrids, F_{1r} hybrids and over all $F_{1,1r}$ hybrids in addition to heterosis values versus the mid-parents and the better parent were obtained and the results are cleared in Table 4. The results illustrated that the amounts of hetreosis relative to the mid-parents were positive and showed highly significant for most studied traits with respect to theF_1, F_{1r} andall $F_{1,1r}$ hybrids.

The values of heterosis ranged from 4.00 % (F_{1r}) to 12.58 % (F_1); 3.80 % (F_{1r}) to 8.91 % (F_1); 4.98 % (F_{1r}) to 16.95 % (F_1) , 3.52 % (F_{1r}) to 13.83 % (F_1); -15.13 % (F_{1r}) to -9.76 % (F_1) and -7.92 % (F_1) to -5.68 % (F_{1r}) for P.L. cm, N.L./P., No.B./P., F.W./P. gs, D.W./P. gs, D.1st F.M.F., D.1st F.F.F., respectively. On the other hand, the values of heterosis versus the better parent ranged from -12.22 % (F_{1r}) to -4.79 % (F_1); -3.95 % (F_{1r}) to 0.77 % (F_1); -12.50 % (F_{1r}) to -2.53 % (F_1); -49.08 % ($F_{1,1r}$) to -6.77 (F_1); -13.90 % (F_{1r}) to -5.33 % (F_1); -4.01 % (F_{1r}) to 2.07 (F_1) and 3.00 (F_1) to 5.49 % (F_{1r}) for the same traits, respectively. Many investigators obtained similar results among them, Kosba and El-Diasty (1993), Awny (1992a), AbdEl-Hadi (1995),), Abd El-Maksoud *et al* (2003) and AbdEl-Hadi and El-Gendy (2004).

Table 4: The means and the ranges of the parental varieties, F_1 hybrids, F_{1r} reciprocal hybrids and overall $F_{1,1r}$ hybrids and heterosis values versus the mid-parents and better parent for all studied vegetative and earliness traits.

	P.L. (cm)	No.L./P.	No.B./P.	F.W./P. (gs)	D.W./P. (gs)	D.1st.F.M.F.	D.1st.F.F.F.
M.P	131	.143	3.33	624	105.1	47.1	52.2
Range	110-156	132-155	2.67-4.00	512-759	85.0-126.3	41.7-51.7	46.7-58.7
F_1	148	156	3.90	708	119.6	42.5	48.1
Range	125-170	143-170	2.67-4.33	551-901	100.0-140.3	40.3-45.0	45.0-50.7
F_{1r}	136	149	3.50	653	108.8	40.0	49.2
Range	111-152	139-161	2.67-4.00	501-800	90.0-130.7	40.7-48.3	45.3-54.3
$F_{1,1r}$	142	152	3.70	387	144.2	41.3	48.7
Range	111.3-170.0	139.3-170.3	2.67-4.33	501-901	90.0-140.3	40.3-48.3	45.0-45.3
H(F_1,MP)%	12.58**	8.91**	16.95**	13.42**	13.83**	-9.79**	-7.92**
H(F_{1r},MP)%	4.00*	3.80	4.98*	4.68*	3.52	-15.13**	-5.68*
H($F_{1,1r}$,MP)%	8.29**	6.36**	10.98**	-38.06**	8.68**	-12.46**	-6.80**
L.S.D 0.05	1.976	2.027	0.487	41.006	2.108	1.034	1.626
L.S.D 0.01	2.644	2.712	0.651	45.864	2.820	1.384	2.175
H(F_1,BP)%	-4.79*	0.77	-2.53	-6.77**	-5.33*	2.07	3.00
H(F_{1r},BP)%	-12.22**	-3.95	-12.50**	-13.95**	-13.90**	-4.01	5.49*
H($F_{1,1r}$,BP)%	-8.60**	-1.59	-7.50**	-49.08**	-9.62**	-0.97	4.25*
L.S.D 0.05	4.121	3.882	0.932	78.520	4.037	1.98	3.113
L.S.D 0.01	3.784	5.193	0.247	105.056	4.501	2.650	4.165

*:significant at 5% level of probability .
**:significant at 5% level of probability

Estimates of heritability:

Genetic parameters were determined and the heritability values in both broad and narrow senses were calculated for vegetative and earliness traits and the results are presented in Table 5

The magnitudes of genetic parameters indicated that the non additive genetic variances were larger than those of the additive genetic variances for all studied traits. The estimated values of broad and narrow sense heritabilities indicated that the heritability values of broad sense were larger in magnitudes than their corresponding narrow sense estimates for all studied traits. These results were expected due to the high magnitudes of dominance .The estimated values of heritability in broad sense ranged from 61.89 % for (D.W./P. gs) to 94.67 % for (No.B./P.). While, the estimated values of heritability in narrow sense ranged from 0.23 % for (D.W./P. gs) to 16.79 % for (No.L./P.). Similar results obtained by El-Mighawry (1998), KHalf Allah *et al* (2001), Shamloul (2002) and Sadek (2003).

Table 5: Estimates of additive, non-additive genetic variances, heritability in broad sense and narrow sense

Genetic parameters	P.L. (cm)	No. L./P.	No.B./P.	F.W./P. (gs)	D.W/P. (gs)	D.1st. F.M.F.	D.1st. F.F.F.
δ^2 A	52.0	17.3	0.28	2291	1.5	0.10	1.5
δ^2 D	465.9	65.8	2.26	13703	252	14.57	16.20
δ^2 r	99.3	16.7	0.004	1101	252	0.32	0.23
h^2_b %	83.78	80.60	94.67	86.61	61.89	92.49	90.15
h^2_n %	8.38	16.79	10.55	12.41	0.23	0.65	7.47

Estimates of genotypic and phenotypic correlations:

The knowledge of degree and direction of association among different traits of watermelon is of great importance.Genotypic and phenotypic correlation coefficient provide a measure of this type of association between traits which may be used as a useful indicator in selection programs. The results are presented in Table 6

Table 6: Genotypic (above diagonal) and phenotypic (below diagonal) correlations for all pairs of vegetative and earliness traits.

Traits	P.L. (cm)	No.L./P.	No.B./P.	F.W./P. (gs)	D.W/P. (gs)	D.1st.F.M.F.	D.1st.F.F.F.
P.L (cm)		0.87**	0.70**	0.98**	0.88**	-0.04	-0.45*
No.L./P	0.80**		0.86**	0.88**	0.77**	-0.09	-0.001
No.B./P	0.41*	0.64*		0.80**	0.68**	-0.04	0.12
F.W./P (gs)	0.99*	0.77**	0.75		0.99**	0.21	0.26
D.W./P (gs)	0.95**	0.73**	0.63	0.91**		0.05	0.15
D.1st .F.M.F	-0.04	-0.08	0.002	0.15	0.06		0.94**
D.1st.F.F.F	-0.27	0.3	0.16	0.22	0.14	0.89**	

*:significant at 5% level of probability.
**:significant at 5% level of probability.

The results revealed positive genotypic (rg) and phenotypic (rph) correlations and highly significant plant length (P.L. cm) with No.L./P., No.B./P., F.W./P. gs and D.W./P. gs. Also, No.L./P. with No.B./P., F.W./P. gs and D.W./P. gs and No.B./P. with F.W./P. gs and D.W./P. gs., F.W./P. gs with D.W./P. gs., D. 1st. F.M.F. with D. 1st. F.F.F.

The highest values of genotypic correlation was obtained for (P.L. cm X F.W./P. gs), (F.W./P. gs X D.W./P. gs) was 0.98, 0.99, respectively. While the highest values of phenotypic correlation was obtained for (P.L. cm X F.W./P. gs),(P.L. cm X F.W./P. gs) was 0.99, 95.00, respectively.

Similar results were obtained by Kosba *et al* (1993), Awny (1992b) and Abdein (2005).

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قوة الهجين وطبيعة فعل الجين لبعض الصفات الخضرية وصفات التبكير في النضج في البطيخ

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يعتبر البطيخ من محاصيل الخضر الهامة في مصر ولذلك فان دراسه السلوك الوراثي لبعض الصفات الاقتصاديه الهامه له اهميه كبرى لانتاج هجن محليه تتميز بانتاجيه عاليه ولتحقيق هذا الغرض استخدم في هذا البحث خمسة أصناف من البطيخ تم التهجين بينهم بنظام التهجين الدورى الكامل وهذه الأصناف هي جيزه -١، جيزه -٢١ ، شارلستون جراي ، كرمسون سويت ، ديلازورا.وتم دراسه العديد من الصفات الخضريه وصفات التبكير وكانت الصفات المدروسة هي طول الساق-عدد الأفرع لكل نبات - عدد الأوراق لكل نبات-الوزن الخضرى لكل نبات بالجرام – الوزن الجاف لكل نبات بالجرام - عدد الأيام لظهور الأزهار المنكرة - عدد الأيام لظهور الأزهار المؤنثة-وتحت دراسه القياسات الوراثيه المختلفه ومعامل التوريث وكذلك طبيعه الارتباط بين الصفات المختلفه .

أوضحت النتائج أن متوسطات هجين الجيل الأول وهجين الجيل الأول العكسي ذات معنوية عالية وتعدت متوسط الآباءوبعض افضل الاباء وان لم يكن هناك هجينا معينا فاق متوسط كل الاباء لكل الصفات. ولذا كانت هناك قيما متوسطة وعالية لقوة الهجين لكثير من الصفات •

أوضحت النتائج أن التباين الغير تجميعي والذى يشمل السياده أكبر من التباين التجميعي لكل الصفات المدروسة.و عليه فان

القيم المقدرة لمعامل التوريث اوضحت أن معامل التوريث في المدى الواسع أكبر من معامل التوريث في المدى الضيق.

واظهرت النتائج كذلك قيما معنويه للارتباط الوراثي والمظهري بين غالبيه ازواج الصفات التي درست مثل وجود ارتباط بين طول الساق وكل من عدد الاوراق لكل نبات وعدد الفروع لكل نبات والوزن الطازج والجاف لكل نبات .