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HETEROSIS AND GENE ACTION STUDIES OF SOME YIELD AND YIELD COMPONENT TRAITS IN SQUASH

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ABSTRACT

Summer squash (Cucurbitapepo L.) is considered to be one of the most popular vegetable crops grown in Egypt. Thus, this study aimed to examin the gene action for some economical traits using a halfdiallel crosses includingsevenvarieties which generate for all 21 F_1hybrids . This study would determine nature of gene actionand estimateheterosis for all yield and yield component traits. The results revealed that the mean squares of genotypes and its components, are GCA, SCA were highly significant for all studied traits,Highly significant differences were also found among genotypes, parents and hybrids for most of yield and yield componentstraits.These results indicated a wide range of genetic variations among the parental varieties used in this investigation. Parent's vs crosses mean squares were highly significantindicated that the average ofheterosis was significant in all crosses for all yield traits. The mean squares ofparents, crosses and parent's vscrosses were highly significant.Both general and specific combining ability variances were found to be highly significant for most traits . The ratio of σ^2 GCA / σ^2 SCA was less than unity for all yield studied traits indicating the the importance of non-additive gene action in the production of squash hybrids.The two parents;Saja and Beyaz seemed to be the best combiners for fruit yield trait .

Keywords : Heterosis , gene action , correlation , squash .

INTRODUCTION

Summer squash is belonging to the genus Cucurbitacea which have a wide range of variability. It is an interesting crop plant for genetical studies. In Egypt, there are only two local varieties of squash namely, the Balady which is totally discarded for its prostrated growth habit and low yield, and Eskandarani which is characterized with high production, and it meets thesatisfaction of both producers and consumers . Therefore, knowledge about the mode of gene action of economical traits, which directly contributes towards yield in any crop like summer squash (Cucurbitapepo, L.), helps to formulate the genetic basis of breeding. When the additive genetic variance is the main component of the total genetic variation, a maximum progress would be expected through selection programs. On the other hand, the presence of a relatively high non-additive (including dominance) genetic variance indicate that the production of squash hybrids should be the ultimate improvement as a result of the direct relationship between non-additive gene action and hetrotic effects.Additive and non-additive genetic variance could be determined from the combining ability analysis. Therefore, the estimates of general and specific combining abilities are of great value in establishing the most proper breeding approach. AbdEl-Maksoud *et al.,* (2003) found that both GCA and SCA were highly significantfor all yield and yield component traits. In a diallel crosses system among seven inbred lines derived from Eskandarani cultivar, El-Sharkawy (2000) indicated that theparental inbreed line L_2 would be considered as a good general combiner for harvesting early yield. Mohanty (2000), on pumpkin demonstrated that the mean squares due to general (GCA) and specific combining ability (SCA) effects were significant for number of leaves plant^{-1} and number of male flowers plant^{-1}.Abd El-Hadi *et al.,* (2001);Sadek (2003) and Abd El-Hadi *et al.,* (2004)cleared that heritability in broad sense(h^2b%) were larger in magnitudes than that of the corresponding values in narrow sense(h^2n%)for all studied trait in squash.This study aimed to present further informations dealing with the nature of gene action and combining ability effects for some economical traits as well as estimation of genetic parameters of these traits in squash.

MATERIALS AND METHODS

A half diallel crosses was done using seven varieties of squash. These varieties were: :Eskandarani (P_1) , Coppi (P_2), Saja (P_3) , Beyaz (P_4) , ZucchinoGinyoveze (P_5) , Zucchinotondo di piacenza (P_6) andZucchinoromanesco (P_7). All 21 F_1s along with their sevenparents were evaluated in aRandomized Complete Blocks Design with three replications. Spacing of 1.0m between rows and 0.5m between plants were applied at the Experimental Station of Genetics Dept. faculty of agric. in Mansourauniversitythrough 2014 growing summer season. The recommended cultural practices were applied. The data were subjected toan analysis of variance according to the Randomized Complete Blocks Design (RCBD) as outlined bySnedecor andCochran(1989).

Data were recorded on ten randomly plants from each replication and mean values were used for statistical analysis. Combining ability analysis was carried out according to method two and model.1 of Griffing's (1956)as a randommodel, as well as , themathematical model for a single cross value (xij) was also given by Griffing (1956).

Heterosis estimates

Estimation of heterosis was determined according to Mather (1949) and Mather and Jinks (1982) while Heterosis was estimated over the mid parents (H_{MP}%) whileheterobeltiosisor heterosis over the better parent (H_{BP}%) was also obtained.

Correlation coefficient

The relationship among the important traits under this study were assessed statistically through simple correlation as reported by Gomez and Gomez (1983), using SPSS (Statistical Package for Social Sciences) version 10 for windows.

The Data were recorded for eight traits. These traits were,fruit firmness (F.F.gm/cm^2)**;** fruit length (F.L.cm)**;**fruit shape index (F.Sh.I)**;**fruit diameter (F.D.cm)**;** fruit weight (F.W.g)**;** number of fruits per plant (NO.F./P.)**;**first picking date (F.P.D) and yield of plant (Y.P.g)**.**

RESULTS AND DISCUSSION

Highly significant differences were found among genotypes, parents and crosses for most of yield traits and yield componentsexcept for,(F.F.)which was insignificant (Table 1-a).These results indicated a wide range of genetic variations among the parental varieties. Parent'svs crosses mean squares showed highly significant differences for F.P.D. ,F.W.g , No.F./P. and Y.P.g indicated that the average ofheterosis was significant in all crosses for thesetraits. The interaction ofparent'svs crosses were highly significant for most studied traits. Similar results were obtained by Al-Ballat (2008) and Al-Araby, (2010).

Both general and specific combining ability variances were found to be highly significant for most traits , except for, general combining ability of (F.F) and (F.D).(Table 1-b).These results indicated the importance of both additive and non-additive genetic variances in determining the inheritance of these traits.(Al-Ballat, 2008 and Al-Araby, 2010).

The ratio of σ^2 GCA / σ^2 SCA was less than unity for all the traits indicating the preponderance of non-additive genetic variance. This finding suggests the importance of non-additive gene action in the production ofsquash hybrid. Similar results were also obtained by Kumbharet al. (2005);Obiadalla-Ali (2006) and Al-Araby, (2010).

Table 1(a):- Analysis ofvariance and the mean squares of the seven parents and their 21 of F_1 hybrids for yield and yield component traits.

Source of variance	d.f	F.F.	F.L.cm	F.Sh.I	F.D.cm	F.P.D	F.W.g	No.F./P.	Y.P.g
Replications	2	15.77	0.49	0.06	0.09	2.08	400.57	10.30	11677127.87
Genotypes	27	1.61	17.51**	5.99**	1.74*	21.14**	761.08**	19.00**	35479582.9**
Parents	6	1.33	18.85**	8.87**	2.67*	13.86**	648.13**	8.85**	16569620.1**
Crosses	20	1.70	17.94**	5.38**	1.55	22.48**	806.84**	17.44**	33200853.1**
P Vs F_1	1	1.33	1.06	0.83	0.01	38.11**	523.73**	111.0**	194513957.1**
Error	54	1.51	0.28	0.03	0.02	3.35	159.51	5.15	8914731.18

***, **=Significant at 0.05 and 0.01 levels of probability, respectively.**

Table 1(b):- Analysis variance of thepiratialdiallel crosses for yield and yield component traits.

Source of variance	d.f	F.F.	F.L.cm	F.Sh.I	F.D.cm	F.P.D	F.W.g	No.F./P.	Y.P.g
G.C.A	6	0.73	9.83**	4.09**	1.47	13.81**	574.9**	5.70**	9666270.8**
S.C.A	14	0.48	4.70**	1.40	0.33	5.12**	161.9**	6.51**	12443743.8**
Error	40	0.27	0.09	0.01	0.01	1.12	53.17	1.72	2971577.06
GCA/ SCA		0.242	0.235	0.327	0.508	0.353	0.533	0.092	0.079

***, **=Significant at 0.05 and 0.01 levels of probability, respectively.**

General combining ability effects (GCA):-

The genotypes presented in **Table 2**,Eskandarani (P_1) and Zucchino Ginyoveze (P_5)were found to be good general combiners for some of yield traits suchas (F.Sh.I) and (F.L). Similarly,Coppi (P_2) and Zucchinotondo di piacenza (P_6) were good general combinersfor (F.W.). On the other hand Saja (P_3) had good general combining ability for(F.Sh.I), (No.F./P.) , (F.P.D)and (Y.P.g), while the parent al varietyBeyaz (P_4) was agood combine for (F.F),(F.L),(F.Sh.I) and (F.D).In addition,Zucchino romanesco(P_7) was agood combiner for (F.L),(F.Sh.I)and(F.P.D) .Thus, these could be used as the best parents to improve yield and yield components traits. The performance of parents was an indication of their GCA effects for all the above traits, as reported earlier by Sharma and Pathania (2000); Kamooh (2002);Abd El-Maksoud *et al.* (2003); Obiadalla-Ali (2006) and Al-Araby (2010).

Table 2:-General combining ability effects (gi) of the seven parents for yield and yield component traits.

Genotype	F.F.	F.L.cm	F.Sh.I	F.D.cm	F.P.D	F.W.g	No.F./P.	Y.P.g
P_1	-0.008	0.674**	0.148**	-0.063**	0.381	3.391	-0.700	-710.22
P_2	-0.116	-0.759**	-0.701**	0.374**	1.788**	12.45**	-0.88**	-209.96
P_3	0.111	0.178	0.122**	-0.231**	-1.878**	-9.62**	1.502**	1817.99**
P_4	0.416*	0.751**	0.445**	-0.243**	0.455	0.310	-0.236	-93.190
P_5	-0.229	0.583**	0.448**	-0.274**	0.677**	-3.085	0.014	-786.265
P_6	-0.420*	-2.050**	-1.152**	0.744**	-0.138	5.64*	0.436	981.661
P_7	0.245	0.623**	0.690**	-0.307**	-1.286**	-9.08**	-0.128	-1000.005
L.S.Dat 5%	0.320	0.190	0.059	0.056	0.654	4.512	0.811	1066.575
L.S.Dat 1%	0.426	0.252	0.079	0.074	0.871	6.008	1.079	1420.398

***, **=Significant at 0.05 and 0.01 levels of probability, respectively.**

Specific combining ability effects (SCA):-

The estimated values of SCA effects for yield and yield component traits are presented in Table 3. The results revealed that out of 21 cross combinations, The F_1 hybrids (P_1x P_7), (P_2x P_7) ,(P_3x P_6) , (P_4x P_7) and (P_5x P_6) showed highly significant positive desirable SCA effects for (F.L) and (F.Sh.I). The F_1 hybrids (P_1 x P_3) and (P_5x P_7) gave highest values for (F.D) and (No.F./P.) . The F_1 hybrids (P_3xP_4)and(P_3x P_6)gave highest values for(Y.P.g). The hybrids (P_3x P_4), showed highly significant positive desirable SCA effects for (F.L), (F.Sh.I), (F.P.D),(F.W)and (No.F./P). (P_3x P_6) showed highly significant positive desirable of SCA effects for (F.F), (F.L),(F.Sh.I), (F.P.D) ,(F.W),(No.F/P)and (P_4x P_6) showed highly significant positive desirable of SCA effects forfor(F.F) and(F.D).In general the two F_1 hybrids P_5x P_7 and P_3x P_4 showed highly significant positive and desirable estimates of SCA for F.W.g. The same resultes were obtained for NO.F./P. in the four hybrid combinations P_3x P_6 ,P_5x P_7,P_4x P_5 and P_1x P_3.While, for Y.P.g trait the two hybrid combinationsP_3x P_4 and P_3x P_6 were the best cominrs for this trait.

It was found that these were three cross combinations which showed significant and positive values of SCA effects. These crosses was:(P_3 x P_4) ,

(P_3 x P_6) and(P_4 x P_6)According by these crosses showed good specific combinations for most of studied traits. In this respect, many authors obtained variable estimates for both GCA and SCA effects in squash among them,Ahmed *et al.* (2003), Sadek (2003), Abd El-Hadi *et al.* (2005), Obiadalla- Ali (2006), Al-Ballat (2008), Kumbhar *et al.* (2005) and Al-Araby (2010).

Heterosis versus the mid – parent ($H_{M.P.}$ %):-

Data in Table 4 showed that most hybrids had highly significant values (desirable) for most studied traits.The hybrid P_5×P_7showed highly significant heterosis for (F.W.g). Fifteen F_1 hybrids showed positive highly significant values (desirable) for (No.F./P). For (F.P.D) only six hybridsshowed highly significant negative heterosis values (desirable). Also,for (Y.P.g) no hybrids appeared significant to show heterosis. The best F_1 hybrids were;(P_1×P_2)for F.F , F.Lcm , F.Sh.I andNo.F./P and hybrid (P_1×P_3)for F.F , F.L.cm , F.Sh.I , F.D and No.F./P ;while the hybrid (P_5×P_7) showed positive highly significant heterosisfor F.W.g. and NO.F./P. In general out of the 21 F_1 hybrid combination ten , eight , nine , one and ten F_1 hybrids, showed positive and desirable highly significant values for F.F. , F.L.cm , F.Sh.I. ,F.W.g and NO.F./P. , respectively.

Table 3:-Specific combining ability effects (sij)of 21 F_1hybridsfor yield and yield component traits.

Hybrids	F.F.	F.L.cm	F.Sh.I	F.D.cm	F.P.D	F.W./g	No.F./P.	Y.P.g
P_1×P_2	0.627	0.301	0.145	-0.122	0.093	-3.315	0.646	769.398
P_1×P_3	0.666	-0.71**	-0.511**	0.305**	-3.907	2.955	2.548**	2518.769
P_1×P_4	0.028	0.407	0.450**	-0.256**	0.093	0.299	1.120	1431.620
P_1×P_5	-0.89*	-0.084	-0.266**	0.119	2.204**	9.084	0.397	778.694
P_1×P_6	-0.420	-1.69**	-0.683**	0.147*	2.019*	-14.71*	-1.179	-2422.898
P_1×P_7	0.782	2.98**	1.658**	-0.508**	0.500	9.352	0.468	1515.102
P_2×P_3	0.268	-0.236	-0.019	-0.031	-0.315	6.016	1.944	2887.84*
P_2×P_4	-0.541	-0.207	-0.315**	0.111	-0.648	4.847	-1.151	-1312.639
P_2×P_5	-0.286	0.162	-0.088	-0.034	-1.537	-2.665	2.22*	3219.43*
P_2×P_6	-0.495	-1.67**	-0.484**	0.457**	-0.056	10.794	-0.973	107.843
P_2×P_7	0.757	1.08**	0.457**	-0.421**	-0.241	0.250	1.054	2063.176
P_3×P_4	0.159	0.67**	0.266**	-0.005	-1.648*	15.70**	2.614*	4480.39**
P_3×P_5	0.137	-0.208	-0.104	0.057	2.130*	2.164	0.625	889.472
P_3×P_6	1.145**	5.29**	2.423**	-0.992**	-3.389**	12.38*	4.829**	7089.88**
P_3×P_7	-0.570	-2.14**	-0.706**	-0.067	-3.574**	-35.97**	-2.194*	-5342.120**
P_4×P_5	-0.168	0.275	0.574**	-0.315**	-0.870	-11.24*	2.819**	2674.324*
P_4×P_6	1.006*	-2.49*	-1.306**	0.626**	1.278	-0.535	-2.393*	-2933.26*
P_4×P_7	0.541	0.73**	0.345**	-0.195**	-0.907	-4.079	-1.979	-2039.602
P_5×P_6	0.218	3.02**	1.424**	-0.888**	-2.611**	-0.687	-1.756	-2841.86*
P_5×P_7	-0.863*	-4.48**	-3.048**	1.727**	1.537	26.85**	2.921**	3362.472*
P_6×P_7	-0.473	-2.36**	-1.421**	0.445	1.685*	2.791	1.358	1553.880
L.S.Dat 5%	0.791	0.469	0.147	0.137	1.619	11.166	2.006	2639.639
L.S.Dat 1%	1.053	0.625	0.195	0.183	2.157	14.870	2.672	3515.306

***,**= Significant at 0.05 and 0.01 levels of probability, respectively.**

Table 4:-Estimates of heterosis relative to mid- parent($H_{M.P}$%) for yield and yield component traits.

Hybrids	F.F.	F.L.cm	F.Sh.I	F.D.cm	F.P.D	F.W.g	No.F./P.	Y.P.g
P_1×P_2	12.21**	3.01**	7.20**	-5.1**	5.37**	1.00	37.10**	46.24
P_1×P_3	18.05**	1.63**	0.60**	1.17**	16.67**	3.38	79.81**	74.22
P_1×P_4	6.19**	3.31**	13.60**	-9.7**	2.76*	1.66	28.67**	32.18
P_1×P_5	-14.76**	-0.68	-8.60**	6.2**	-4.61**	11.34	45.83**	51.49
P_1×P_6	0.34	-9.96**	-15.47**	0.37	-4.03**	-7.43	-2.25	-10.05
P_1×P_7	13.07**	12.78**	20.61**	-10.6**	-3.55**	7.19	22.73**	31.99
P_2×P_3	10.99**	2.01**	6.84**	-5.5**	4.26**	7.48	72.30**	89.62
P_2×P_4	-2.59**	-3.19**	-9.17**	2.36**	1.36	6.54	0.51	12.57
P_2×P_5	-8.47**	-1.96**	-11.74**	3.31**	0.00	4.93	72.32**	97.21
P_2×P_6	-2.39**	-14.04**	-21.70**	8.04**	-2.72**	10.93	-0.73	19.76
P_2×P_7	11.28**	-0.63	-5.77**	-5.2**	-4.90**	2.76	29.50**	47.99
P_3×P_4	11.33**	7.48**	13.11**	-5.6**	12.03**	13.15	61.39**	79.11
P_3×P_5	1.62*	0.82*	-2.86**	1.23**	0.00	6.97	66.10**	73.58
P_3×P_6	26.98**	46.46**	90.26**	-27.3**	13.49**	11.28	74.98**	87.34
P_3×P_7	-0.98	-15.18**	-18.85**	-0.16	11.48**	-27.81**	9.09**	-19.85
P_4×P_5	-4.56**	-1.20**	3.53**	-5.12**	1.40	-3.02	59.58**	59.52
P_4×P_6	20.59**	-18.42**	-35.52**	13.19**	-2.72*	2.17	-20.71**	-17.75
P_4×P_7	10.27**	-2.56**	-5.31**	1.41**	-0.73	-2.22	-13.91**	-11.42
P_5×P_6	0.00	19.02**	25.34**	-18.91**	5.15**	5.47	0.24	-6.59
P_5×P_7	-15.52**	-32.50**	-62.23**	77.9**	-6.21**	25.29**	62.97**	68.66
P_6×P_7	-2.49**	-22.54**	-45.62**	16.05**	-4.90**	3.62	16.68**	16.57
L.S.D.at 5%	1.268	0.752	0.235	0.220	2.597	17.905	3.217	4232.840
L.S.D.at 1%	1.689	1.002	0.313	0.293	3.458	23.845	4.284	5637.031

***,**= Significant at 0.05 and 0.01 levels of probability, respectively.**

Heterosis versus the better parents ($H_{B.P}$.%):-

Data presented in Table 5 showed heterosis percentage of 21 F_1 hybrids relative to better parent for yield and yield component traits. Most hybrids showed positive highly significant values (desirable) for(F.F.cm), (No.F./P) , (F.L.cm), (F.Sh.I), and (F.W.g). While, for (F.F.)only eleven F_1 hybrids gave positive significant and highly significant heterosis values (desirable) versus better parent.While, for (F.L),(F.Sh.I),(F,W,g),(No.F./P.) and (F.P.D) which were seven , eight , three and 18 F_1 hybrids , respectively.On the other hand , nine F_1 hybrids showed nigative and highly significant values (desirable) for each of F.D.cm and F.P.D. These results agreed with the results obtained byAbd El-Hadi *et al.,* (2001) ; Obiadalla-Ali (2006) ; Al-Ballat (2008) ; Yadav *et al.,* (2008) ; Anita and Ram (2009);Al-Araby(2010)andEl-Khatib (2013).

Heritability:-

Concerning heritability(Table 6)the results revealed that the estimated values of heritability in broad sense ($h^2{}_b$ %)were high for all studied traits. Similar results were obtained by Sadek (2003) and Al-Ballat (2008).On the other hand forheritability in narrow sense (F.L),(F.Sh.I) , (F.D) , (No.F./P), (F.W), (F.P.D)and (Y.P.g) showed low estimates (h^2n%) suggesting that a major part of the total phenotypic variance was due to dominance genetic variance and environmental effects. These findings indicated that selection for these traits should be done in the later generations to get used of transgressive segregation. These results agreed with those obtained byEl-Gendy (1999) and Obiadalla-Ali (2006).

Table 5:-Estimates of heterosis relative to better- parent ($H_{B.P}$%) for yield and yield compenet traits.

Hybrids	F.F.	F.L.cm	F.Sh.I	F.D.cm	F.P.D	F.W.g	No.F./P.	Y.P.g
P_1×P_2	12.31**	-3.29**	-7.13**	4.16**	4.20**	5.00	34.68**	41.38
P_1×P_3	15.90**	-3.79**	-3.26**	-0.53**	-11.89**	-5.44	95.29**	85.23
P_1×P_4	11.41**	6.69**	26.59**	-15.7**	1.40	-0.63	50.59**	50.43
P_1×P_5	-9.70**	2.61**	10.00**	-6.64**	6.29**	2.93	43.91**	34.80
P_1×P_6	-5.88**	-23.56**	-36.90**	21.15**	4.20**	-7.02	27.62**	18.16
P_1×P_7	19.27**	21.79**	60.39**	-24.1**	-1.40	-0.85	42.92**	40.87
P_2×P_3	13.19**	1.11*	-4.20**	5.68**	-4.08**	23.67*	57.05**	73.39
P_2×P_4	-6.87**	-11.72**	-27.51**	21.7**	-1.34	13.48	-13.58**	-2.54
P_2×P_5	-13.25**	-10.64**	-32.89**	33.1**	0.00	19.16	71.53**	116.69
P_2×P_6	-8.52**	-22.84**	-34.50**	17.9**	-6.37**	7.31	32.54**	64.24
P_2×P_7	17.26**	15.36**	53.86**	-24.9**	-8.92**	-8.15	53.95**	63.92
P_3×P_4	19.11**	17.83**	31.82**	-10.5**	-9.52**	21.72	72.98**	91.01
P_3×P_5	-5.42**	-7.35**	-19.56**	15.19**	0.00	5.73	83.04**	112.19
P_3×P_6	21.21**	30.43**	45.93**	-10.5**	-14.29**	23.32*	107.75**	128.97
P_3×P_7	6.53**	-2.53**	13.52**	-14.0**	-17.01**	-26.92**	16.38**	-19.56
P_4×P_5	-5.42**	-1.24**	-3.03**	1.75**	-1.38	3.03	89.66**	110.31
P_4×P_6	8.38**	-32.49**	-54.83**	48.8**	-1.34	5.04	-12.71**	-6.44
P_4×P_7	10.84**	1.76**	11.29**	-8.47**	-8.05**	-7.59	-14.29**	-16.34
P_5×P_6	-10.84**	-1.54**	-15.37**	16.2**	-6.21**	15.40	33.06**	44.18
P_5×P_7	-15.86**	-29.53**	-58.84**	71.0**	0.00	25.36*	92.70**	107.05
P_6×P_7	-12.75**	-37.97**	-64.74**	75.5**	5.15**	13.30	29.07**	41.87
L.S.D.at 5%	1.465	0.868	0.272	0.254	2.998	20.675	3.715	4887.663
L.S.D.at 1%	1.951	1.157	0.362	0.339	3.993	27.534	4.947	6509.082

***,**= Significant at 0.05 and 0.01 levels of probability, respectively.**

Table 6:-The relative magnitudes of different gene action and heritability for yield and yield component traits.

Geneaction and heritability %	F.F.	F.L.cm	F.Sh.I	F.D.cm	F.P.D	No.F./P.	F.W./g	Y.P.g
ó²A	0.05	1.08	0.45	0.16	1.41	0.44	57.97	743854.87
ó²D	0.21	4.60	1.39	0.32	4.00	4.80	108.7	9472166.8
ó²E	0.27	0.09	0.01	0.01	1.12	1.72	53.17	2971577.06
h^2n%	9.43	18.7	24.4	32.9	21.5	6.35	26.3	56.4
h^2b%	49.2	98.4	99.4	97.9	82.8	75.2	75.8	77.4

Phenotypic correlation:-

As shown in Table 7,apositive and significant correlation coefficients were obtained for(F.F. gm/cm^2)with each of (F.L.cm), and (F.Sh.I), On the other handF.D.(cm) gave negative and highly significant correlation with (F.L.cm) and (F.Sh.I).(F.W./g) gavepositive and significant orhighly significant with (F.D.cm) and (F.P.D). Also the (Y.P.g) showedpositive and highly significant correlationwith (No.F./P.) and (F.W./g), while (F.L) gave positive and highly significant with (F.Sh.I), for (F.D) gave positive and significant with (F.P.D) and (F.W.g).

Table 7:-Estimates of phenotypic correlation coefficients among each pair of yield and yield component traits.

Traits	F.F.	F.L.cm	F.Sh.I	F.D.cm	F.P.D	No.F./P.	F.W.g	Y.P.g
F.F.	0.000							
F.L.cm	0.439*	0.000						
F.Sh.I	0.452*	0.967**	0.000					
F.D.cm	-0.412	-0.905**	-0.959**	0.000				
F.P.D	-0.387	-0.308	-0.368	0.430*	0.000			
No.F./P.	0.167	0.259	0.209	-0.195	-0.442*	0.000		
F.W.g	-0.142	-0.109	-0.296	0.481*	0.541**	0.046	0.000	
Y.P.g	0.107	0.185	0.067	0.018	-0.195	0.920**	0.430*	0.000

***,**= Significant at 0.05 and 0.01 levels of probability, respectively.**

In conclusion, The results of this study provide varibalegenetic information that wouldassist in the breeding efforts to develop new cultivar have high yield.The obtained results also revealed that the mean squares of genotypes and its components, GCA, SCA were highly significant for all studied traits, indicating that additive and non-additive genetic variance contributed to the inheritance of all studied traits. The parental lineBeyaz seemed to be the best combiner for fruit yield $^{-1}$. The crosses (Saja x Beyaz and Saja x Zucchinotondo di piacenza)were promising hybrid because they showed high SCA variances which in turn would show high heterosis.

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دراسة الفعل الجيني وقوه الهجين لبعض صفات المحصول ومكوناته في قرع الكوسه

أشرف حسين عبدالهادي[1] ، خليفه عبدالمقصود زايد[1] و محمد طاهر صلاح الدين عبيد الله البريفكانى[2]
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تمدراسة طبيعة الفعل الجيني لبعض الصفات الاقتصادية في قرع الكوسة من خلال استخدام التهجين النصف دوري بين سبعة من الاصناف المحلية والمستوردة حيث نتج 21 هجيناً بالاضافة الى الآباء السبع ،ولقد تم تقييم كل التراكيب في المزرعة البحثية الخاصة بقسم الوراثة – كلية الزراعة جامعة المنصورة . وتم تسجيل البيانات للتراكيب الوراثية المنزرعة في تجربة قطاعات كاملة العشوائية في ثلاث مكررات وذلك على صفات المحصول ومكوناته.

أشارت النتائج المتحصل عليها إلى أن متوسط المربعات للتراكيب الوراثية ومكوناتها ان تباين القدرة العامة على التآلف والقدرة الخاصة على التآلف كانت عالية المعنوية لكل الصفات المدروسة، مما يشير إلي أن كل من الفعل الجيني الإضافي و الفعل الجيني السيادي يلعب دوراً مهماً في توريث هذه الصفات.أوضحت النتائج أن الصنف سجا والصنف زياتا كانا أحسن الأصناف المدروسة من حيث القدرة العامة على التآلف لصفات المحصول والصلابة كما أوضحت النتائج أن الهجن المحتوية على الآباء سابقة الذكر كانت هجنمبشرة وذلك لأنها اظهرت قيماً عالية المعنوية لتأثيرات القدرة الخاصة على التآلف.