Egypt. J. Plant Breed. 12(2): 143-155- (2008)

HETEROSIS AND COMBINING ABILITY IN DIALELL CROSSES AMONG SIX GENOTYPES OF CANOLA

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ABSTRACT

Six parental varieties and 15 F_1 hybrids were evaluated and tested to the mean performances of heterosis (versus mid-parents and better-parent) and combining abilities (general combining ability G C A and specific combining ability S C A) far No. of days to first flower, No of days to50% and 100% flowering, plant height, No. ofbranches, 1000-seed weight, seed yield/plant, seed yield/plot and seed oil percentage traits.

The analysis of variance revealed that, the mean squares of genotypes, parents' crosses and parent vs. crosses were significant for most studied traits.

The results for mean performances displayed that, among parents, the parent P_1(NA3)gave the lowest beneficial values compared to the other parents for No of days to first, 50% and 100% flowering. The parent P_6 (NA1022) recorded the highest values for other studied traits. The mean performances indicated that, the crosses (P_3XP_6), (P_1XP_3) and (P_1XP_4) were the best for the studied traits.

The data demonstrated that: the amounts of heterosis vs. the mid and better parents were significant and desirable for all studied traits.

The variance due to G C A and S C A denoted that significance for all studied traits. The G C A effects manifested that, the parent P_1 (N A 3) was the best combiner for all studied traits except for 1000-seed weight and seed oil % ,respectively for which the parents P_3 (serw1) and P_6(NA1022) were the best combiners for 1000-seed weight and seed oil % respectively.

The estimates of S C A effects of the studied traits indicated desirable S C A values in(P3X P6) for No. of days to first flower and 50% flowering, the cross(P2 X P5) for No. of days to 100% flowering , the cross (P1 X P4) for No of branches, 1000-seed weight and seed yield/plant, the cross(P1xP5) for seed yield/plot and the cross (P3XP4) for seed oil percentage.

Key words: ***Canola, Brassica napus,*** **Heterosis,** ***Combining ability.***

INTRODUCTION

Canola (*Brassica napus* L.) is one of the most important oil crops in the world. Canola became a new oil crop in Egypt, which may reduce the gab between the local production and consumption of the edible oil However, growing this crop in Egypt is still facing many problems, among which is the competition with the major winter field crops and the availability of limited numbers of adapted varieties for the Egyptian agricultural conditions.

Combining ability studies are frequently used by plant breeders to evaluate newly developed cultivars for their parental usefulness and to asses the gene action involved in various characters. This study helps also in designing an efficient breeding plant for further genetic upgrading of the existing materials. The parents of the best potentiality to transmit their combining ability (G C A) effects whereas, combinations of highest specific combining ability effects (S C A) demonstrate exploitation of heterosis concept. General and specific combining ability effects and heterosis have been studied in canola by several investigators (Habetinek 1993, Krzymanski *et al* 1993 and 1994, Kudla 1993 and 1996, Wos *et al* 1997, Satwinder *et al* 1997, Tyagi *et al* 2000, Wael 2003, Mahmoud 2004 and Mohamed 2004)

The main objectives of this study were to detect the magnitude of both G C A and S C A as well as heterosis and heterobeltiosis for seed yield and some other characters.

MATERIALS AND METHODS

Six canola parental genotypes i.e N A3 (P_1) Australia, N A 12 (P_2) Australia, Serwl (P_3) Egypt, N A 1011 (P_4) Australia, Pactol (P_5) France and N A 1022 (P_6) Australia, were used in the present study. These parents were chosen to represent a wide range of variability in most of the economic characters.

This investigation was carried out at El- Gemmeiza Agriculture Research Station, Agricultural Research Center (A.R.C) during the two seasons 2004-2005 and 2005-2006.

In 2004-2005 season, the six canola parental genotypes were crossed in diallel combinations excluding reciprocals .In 2005-2006 season the parental genotypes along with F_1's (21 genotypes) were planted at El-Gemmeiza Agricultural Research Station A randomized complete block design with three replications was used. Each experimental plot consisted of four rows, 4 m long and 60cm. apart (plot area 9.6 m^2), plant spacing was 20cm. All recommended cultivation practices were applied. Data were collected on individual plant basis using a sample of ten guarded plants per plot. The traits studied were: flowering date first, 50% and100% flowering, plant height, number of branches/plant, 1000-seed weight, seed yield/plant, seed yield/plot and oil percentage was determined according to the standard Method of A.O .A.C. (1990) using Soxhlet apparatus and hexane as solvent. The data obtained were statistically analyzed on individual plant mean basis. Combining ability analysis and various effects were estimated according to Griffing (1956) Method 2 Model 1. Heterosis (%) as F1mid parent/mid parent and heterobeltiosis as F_1-higher parent/higher parent x100 were calculated. Significance of heterosis and heterobeltiosis x 100 were computed by Bhatt (1971).

RESULTS AND DISCUSSION

The analysis of variance for No of days to flowering, plant height (cm), no of branches/plant, 1000- seed weigh, seed yield/plant, seed yield/plot and seed oil percentage is shown in Table (1) Significant differences among genotypes were detected in all traits except seed yield/plot .Meantime, significant mean squares due to crosses were detected for all traits except No of branches, seed yield/plot. Mean squares for parents *vs*. hybrids, as an indication to average heterosis, were highly significant for overall traits except 1000- seed weight. The partitioning of genetic variations in general (GCA) and specific (SCA) combining ability Table (2) showed that, both G C A and S C A variances were highly significant for all studied traits except seed oil percentage for G C A and seed yield/ plot for SCA. This indicated the importance of both additive and non-additive genetic variance in determining the performances of these characters.

Results also revealed that additive type of gene action was the most important part of the total genetic variability in No of days to 100% flowering, No of branches/plant,1000 seed weight, seed yield/plot and seed oil percentage. For such case, one would accept the hypothesis that the performance of single cross progeny can be adequately predicated on the basis of additive. The best performing progeny, therefore, may be produced by crossing the two parents which had the highest GCA effects. The mean performance of F_1's is presented in Table (3). Data indicated that P1 (NA3) surpassed other parents for beginning, 50% and 100% flowering. On the other hand, P5 (Pactol) recorded the latest one for this characters. Cross P3xP6 (Serw1xNA1022) was in the same trend with P1 (NA3) for flowering and out-yielded the other crosses. While, cross P3xP5 (Serw1xPactol) gave the lowest and latest values.

Results in Table (3) cleared that, there is significant variances among highest yield components. P6 (NA1022) gave the highest value in number of branches, seed yield/plant and seed yield per plot while, P_2 (NA12) gave the lowest value. P_3 (Serw1) gave the highest 1000-seed weight as well as P_5 (Pactol) gave the highest oil percentage. On the other hand, P_5 (Pactol) recorded the lowest values of all yield components, i.e. .number of branches, seed yield/plant, seed yield/plot and seed index Cross. P_1xP_4 (NA3xNA1011) surpassed other crosses for seed index and seed yield/plot. P_1xP_3 (NA3xSerw1) gave the highest values in number of branches and seed yield/plant. Both P_2xP_5 (NA12 x Pactol) and P_5xP_6 (Pactol x NA1011) crosses showed the tallest plants. Finally, P_4xP_5 (NA1011 x Pactol) cross gave the highest oil percentage. Cross P_2 x P_4 (NA12 x Pactol) gave the lowest value in number of branches and seed yield/ plant. Cross P_2xP_5 (NA12xPactol) gave the lowest seed yield/plot and seed index.

Table 1. Mean squares for the agronomic characters studied.

S.O.V.	D.F.	Mean squares								
		No of days to-first flower	No of dayes to-50% flower	No of dayes to-100% flower	Plant height (cm)	No of branches	1000-seed weight	Seed yield/plant (g)	Seed yield/plot (kg)	Seed oil percentage.
Rep	2	15.44	0.33	1.25	28.50	0.33	0.19	22.08	0.10	0.38
Genotypes	20	110.63**	53.15**	45.45**	1261.41**	1.50*	0.33**	517.44**	0.42	3.88**
Parents	5	103.25**	85.82**	57.65**	1768.89**	2.09**	0.42**	6.01**	0.601	4.74**
Crosses	14	50.13**	34.80**	42.27**	474.70**	1.04	0.32**	47.57**	0.29	2.59**
P. vs. Crosse Cs	1	983.12**	146.69**	28.93**	9737.99**	4.98**	0.18	338.80**	1.33**	17.65**
Error	40	6.34	2.05	5.02	76.911	0.383	0.06	8.57	0.18	0.35

*,** Significant at 0.05%and0.01% levels of probability respectively.

Table 2. Mean squares for general and specifc combining ability and the rat of G C A/S C A for agronomic characters of canola

S.O.V.	D.F	Mean squares								
		No of days to first flower	No. of days to 50% flowering	No. of days to 100% flowering	Plant height (cm)	No of branches	1000-seed weight	Seed yield/ plant	Seed yield/ plot	Seed oil %
G.C.A.	5	27.39**	27.74**	18.55**	380.93**	0.55*	0.28**	10.07	0.26*	3.30
S.C.A.	15	39.78**	14.37**	14.02**	433.65**	0.48*	0.08	19.64**	0.10	*0.63
Error	40	2.12	0.68	1.67	25.64	0.13	0.02	2.86	0.06	0.12
G.C.A./S.C.A.		0.69	1.93	1.32	0.88	1.14	2.55	0.52	2.70	5.27

*,** significant at 0.05and 0.01 levels of probability respectively.

Cross P_2xP_3 (NA12xSerwl) gave the shortest plants .as well as cross P_1xP2 (NA3xNA12) gave the lowest seed oil percentage.

Data in Table (4) and (5) showed that crosses (P_1xP_2), (P_1xP_3), (P_1xP_4), (P_1xP_6), (P_2xP_4) and (P_4xP_6) recorded height significant negative heterosis than others in flowering date. Crosses P3xP4 (Serw1xNa1011), P_3xP_5 (Serw1xPactol), P_4xP_6 (NA1011xNA1022) and P_5xP_6 (PctolxNA1022) recorded highly significant values in plant height, number of branches and seed index characters. Crosse (P_1xP_3), (P_1xP_4), (P_1xP_6), (P_2xP_3), (P_2xP_5) and (P_4xP_5) gave the highest values of heterosis in seed yield/plant and seed yield/ plot characters. Crosses (P_1xP_4), (P_1xP_5), (P_1xP_6), (P_2xP_3), (P_2xP_5) and (P_4xP_5) were the highest with respect to heterosis in oil percentage. These results are in harmony with those of Thakur and Sagal (1997), Tyagi *et al* (2000), Wael (2003) and Mohamed (2004).

Estimates of G C A effects for individual parental inbred lines in each trait are illustrated in Table (6). P_1(NA3), P_3(serw1) and P_6 (NA1022) showed significant negative GCA effect for flowering date indicating that these inbred lines could be considered as good combiners for developing early genotypes. However, P_1 (NA3) showed highly significant positive G C A effects for plant height, No. of branches, and seed yield/plant. While P_5 (Pactol) was a good combiner for seed oil percentage.

Specific combining ability effects of the 15 crosses for all studied trait are presented in Table (7). Crosses (P_1xP_5), (P_2xP_5), (P_3xP_4) and (P_3xP_6) showed negative significant specific combining ability effects for flowering date.

Crosses (P_1xP_5), (P_2xP_5), (P_3xP_4), (P_3xP_6) and (P_4xP_5) recorded negative significant values in plant height. Crosses (P1xP2), (P1xP5), (P_2xP_5), (P_3xP_4), (P_4xP_5) and (P_5xP_6) recorded highly significant values in seed index. Crosses (P_1xP_4), (P_2xP_3), (P_2xP_4) and (P_2xP_6) recorded highly significant values in number of branches. Crosses (P_1xP_3), (P_1xP_4), (P_2xP_3), (P_2xP_3), (P_2xP_5) and (P_4xP_6) recorded highly significant values in seed yield. Crosses (P_1xP_3), (P_1xP_4), (P_1xP_5) and (P_3xP_6) recorded highly significant values in oil percentage and gave high oil ashysude. In such hybrids; desirable transgressive segregates would be expected in the subsequent generations. Normally, SCA would not contribute directly to improvement of autogamous crop except where commercial exploitation of heterosis is possible. If the crosses that exhibited high SCA come through two parents with high G C A as well, favorable combination of genes could be achieved at the genetic phase equilibrium in later generation of selfing and fixed in new superior lines for the favorable characters which also are good general combiners.

Nevertheless, if crosses showing high SCA involve only one good combiner, such combinations would be expressed through out desirable

Table 4. Heterosis as percentage of mid-parent (M.P.) and better – parent (B.P.) in the F_1 crosses for agronomic characters of canola

Characters / F_1 Crosses	No of dayes to first flower		No of days to 50% flowering		No of days to 100% flowering		Plant height (cm)	
	M.P.	B.P.	M.P.	B.P.	M.P.	B.P.	M.P.	B.P.
P_1xP_2	-11.66**	-17.87**	-0.55	-4.62**	-2.41	-6.93**	13.27*	3.73
P_1xP_3	-1.60	4.65-**	-2.07*	-4.76**	-1.42	-2.46**	3.38	-0.68
P_1xP_4	-1.20	-3.90*	3.51**	-1.06	5.13**	3.84*	6.89	4.49
P_1xP_5	-10.90**	-18.27**	-6.19**	-13.69**	-7.09**	-12.64**	38.99**	19.99*
P_1xP_6	-6.75**	-10.30**	-0.37	-3.63**	2.13	1.05**	11.82	7.22
P_2xP_3	-9.09**	-12.81**	0.72	-0.70	2.04	-.99**	-1.60	-13.09
P_2xP_4	-7.26**	-11.38**	-3.19**	-3.53**	-2.21	-4.95**	5.48	-5.36
P_2xP_5	-19.08**	-20.33**	-10.20**	-14.00**	-10.06**	-11.50**	29.43**	3.42
P_2xP_6	-8.65**	-12.45**	0.18	-0.70	2.38	-0.66**	9.47	4.36
P_3xP_4	11.28-**	-11.62**	-7.55**	-9.19**	-4.03**	-4.19**	30.53**	28.36**
P_3xP_5	-8.02**	-13.09**	-3.10**	-8.47**	-1.67	-6.06**	39.35**	24.06**
P_3xP_6	-21.92**	-22.52**	-10.38**	-10.33**	-7.02**	-7.23**	12.84*	4.12
P_4xP_5	-11.35**	-16.55**	-4.75**	-8.47**	-0.16	-4.47**	48.98**	30.58**
P_4xP_6	-7.34**	-8.39**	-1.61	-2.83**	2.97	2.80**	14.28*	7.22
P_5xP_6	-10.86**	-15.16**	-7.72**	-12.38*	-1.00	-5.43**	38.71**	12.00

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

Table 5. Heterosis as percentage of mid-parent (M.P.) and better – parent (B.P.) in the F_1 crosses for agronomic characters of canola

Characters / F_1 crosses	No of braches		1000 seed weight		Seed yeild/plant		Seed yield/plot		Seed oil percentage	
	M.P.	B.P.	M.P.	B.P.	M.P.	B.P.	M.P.	B.P.	M.P.	B.P.
P_1xP_2	3.70**	-12.57**	-2.07**	-4.72**	9.33**	6.99**	9.96**	4.18**	1.76**	0.82
P_1xP_3	31.03**	18.76**	5.10**	0.00	30.41**	24.48**	14.77**	11.17**	1.49**	0.43
P_1xP_4	20.00**	12.57**	19.35**	16.40**	29.93**	28.07**	21.63**	21.11**	3.32**	1.98**
P_1xP_5	11.11**	-6.19**	-2.98**	-8.76**	16.12**	12.38**	29.89**	12.56**	2.67**	1.51**
P_1xP_6	-9.09**	-11.66	-9.24**	-6.29**	3.32	1.63	-1.86**	-6.36**	4.03**	1.42**
P_2xP_3	33.33**	23.09**	3.42**	-4.04**	8.63**	7.30**	15.76**	13.09**	3.38**	2.36**
P_2xP_4	4.00**	-7.08**	12.47**	12.29**	3.26	1.47	-4.26**	-4.44**	1.27**	0.91
P_2xP_5	54.54**	54.46**	2.17**	-1.42**	22.98**	21.60**	9.77**	-0.31	4.32**	0.96
P_2xP_6	14.28**	-5.83**	6.80**	0.84**	5.13*	1.23	7.33**	-2.54**	2.73**	1.07*
P_3xP_4	18.52**	14.37**	-1.31**	-8.50**	2.98	2.45	9.18**	5.55**	4.30**	2.28**
P_3xP_5	16.66**	7.62**	2.22**	-8.79**	9.85**	7.30**	18.93**	5.45**	0.22	-0.07
P_3xP_6	6.66**	-5.83**	-1.06**	-3.03**	23.11**	20.00**	4.78**	-7.12**	2.66**	1.98**
P_4xP_5	12.00**	0.00	6.26**	2.36**	9.16**	7.15**	18.33**	2.22**	4.14**	1.15**
P_4xP_6	-16.13**	-23.49**	-4.42**	-9.32**	6.39**	3.19	21.11**	-4.32**	2.96**	1.65**
P_5xP_6	21.43**	0.00	4.77**	4.22**	9.05**	3.89	-1.12**	-17.55**	2.35**	0.67
LSD at 5%	0.88	1.02	0.34	0.38	4.18	4.83	0.67	0.674	0.81	0.97
LSD at 1%	1.18	1.36	0.45	0.52	5.59	6.46	0.80	0.934	1.13	1.03

*,** Singnificant at 0.05 and 0.01 levels of probability, respectively.

Table 6. General combining ability effects of the parents used in the diallel crosses for different agronomic characters.

Characters / Genotypes	No of dayes to first flower	No of dayes to 50% flowering	No of dayes to 100% flowering	Plant height (cm)	No of beranches	1000-seed weight	Seed yeild/ plant	Seed yield/plot	oil %
P_1	1.82-**	-2.17**	-1.68**	-2.74	0.33**	0.0014	1.75**	0.21*	-0.81**
P_2	1.81**	0.75*	1.49**	9.93**	-0.29*	-0.0497	-1.22*	-0.13	-0.41**
P_3	-1.36**	-1.58**	-1.64**	-7.66**	0.08	0.24**	0.66	0.03	-0.06
P_4	-0.24	1.042**	0.15*	-1.17	-0.12	0.00	-0.75	0.09	-0.12
P_5	2.72**	2.79**	1.94**	-5.11**	-0.25*	-0.26**	-0.78	-0.29**	0.10
P_6	-1.11*	-0.83**	-0.26	6.75**	0.25*	0.06	0.35	0.09	-036**
L.S.D.(gi)at5%	0.95	0.54	0.84	3.30	0.23	0.09	1.10	0.16	0.22
L.S.D.(gi)at1%	1.27	0.72	1.13	4.42	0.31	0.09	1.47	0.21	0.23
L.S.D gi-gi)at5%	1.47	0.84	1.31	5.12	0.36	0.14	1.70	0.25	0.34
L.S.D(gi-gi)at1%	1.96	1.12	1.75	5.25	0.48	1.12	2.28	0.33	0.46

*,** significant at 0.05 and 0.01 levels of probability, respectively .

Table 7 .Specific combining ability effects of the crosses produced, for different agronomic characters

Characters / Genotypes	N0 of days to first flower	No of days to 50% flowering	No of days to 100% flowering	Plant height (cm)	No. of branches	1000-seed weight	Seed yield/ plant	Seed yield/ plot	Oil %
P_1xP_2	-5.02**	-0.06	-1.34*	12.61**	-0.37	-0.20	-0.47	0.04	-0.05
P_1xP_3	3.15*	-0.39	-0.22	-7.47	0.91**	0.20	6.85**	0.13	-0.08
P_1xP_4	2.02	3.65**	4.32**	-6.29	0.79*	0.67**	7.80**	0.45*	0.46
P_1xP_5	-3.93**	-3.101**	-4.80**	19.85**	0.08-	-0.18	1.33	0.49**	0.33
P_1xP_6	-0.77	0.86	1.74	4.104	-0.58*	-0.39**	-2.83	-0.22	0.84**
P_2xP_3	-0.81	3.02**	3.94**	-21.51**	0.54	0.04	-0.08	0.29	0.69*
P_2xP_4	-0.60	-1.60**	-1.84*	-5.19	0.25	0.29**	-1.03	-0.32	-0.39
P_2xP_5	-9.56**	-6.35**	-7.30**	14.39**	1.20**	0.03-	5.96**	0.01	1.03**
P_2xP_6	-0.08	2.27**	2.90**	4.21	0.37	0.26**	-0.03	0.25	0.29
$P3xP_4$	-4.43**	-4.60**	-3.38**	25.28**	0.37	0.21-	-2.51	0.06	0.96**
$P3xP_5$	0.61	1.65**	1.48*	17.11**	-0.16	0.04	-0.51	0.21	-0.65*
P_3xP_6	-11.89**	-6.39**	-5.97**	4.02	0.00	-0.02	6.12**	-0.08	0.34
P_4xP_5	-3.85**	-0.97	1.36*	26.06**	0.04	0.08	0.41	0.26	0.83**
P_4xP_6	0.68	0.65	1.90*	2.53	0.79-*	-0.28**	0.35	-0.04	0.25
P_5xP_6	-1.64	-3.10**	0.77	19.24**	0.66*	0.22	0.67	-0.17	0.13
L.S.D.(sig)at5%	2.60	1.48	0.84	9.07	0.64	0.24	3.03	0.44	0.61
L.S.D(sig)at1%	3.48	1.52	2.37	9.31	0.85	0.25	4.05	0.45	0.82
L.S.D(sig-sik)at5%	3.88	2.21	3.46	13.53	0.95	0.37	4.52	0.65	0.91
L.S.D.(sig-sik)at1%	3.98	2.26	3.55	13.89	1.27	0.37	6.05	0.67	1.22

*,** significant at 0.05 and 0.01, levels of probability, respectively.

transgressive segregations providing that additive genetic system present in the good combiner and 'complementary values of genes of specific effect present in the crosses .they may act in the same direction to reduce undesirable gene combination and maximize favorable combination in question. Therefore the crosses NA3 (P_1) x Serwl (P_3), NA3 (P_1) x NA1011 (P_4) and NA12 (P_2) x Pactol (P_5) may be of prime importance in any improvement program.

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قوة الهجين والقدرة على الائتلاف فى الهجن ا لتبادلية بين ستة تراكيب وراثية من الكانولا

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أقيمت تجربتان حقليتان بمحطة البحوث الزراعية بالجميزة خلال موسمى الزراعة ٢٠٠٥/٢٠٠٤و ٢٠٠٦/٢٠٠٥ لدراسة قوة الهجين وتوريث بعض الصفات الاقتصادية والقدرة العامة والخاصة على الائتلاف والنسبة المئوية للزيت فى بعض التراكيب الوراثية للكانولا وهى مستورد٣، مستورد ١٢، سرو١، مستورد ١٠١١، مستورد ١٠٢٢ وتم عمل كل التهجينات الممكنة بين الآباء جميعها خلال الموسم الأول للزراعة وذلك في اتجاه واحد فقط وفى الموسم الثاني تم تقيم الآباء وهجنها الخمسة عشر(الجيل الاول) فى تجربة حقلية في تصميم قطاعات كاملة العشوائية وسجلت بيانات : تاريخ خروج أول زهرة – عدد الأيام حتى تزهير٥٠% من نباتات القطعة التجريبية – عدد الأيام حتى اكتمال تزهير نباتات القطعة التجريبية – ارتفاع النبات– عدد الأفرع الثمرية – محصول النبات – محصول القطعة التجريبية – وزن١٠٠٠بذرة – النسبة المئوية للزيت.

اظهرت النتائج اختلافات معنوية بين الآباء والهجن الناتجة من هذه الآباء في جميع الصفات تحت الدراسة مما يشير الى وجود اختلافات وراثية لهذه الهجن الناتجة والآباء مما يتيح وجود تباينات وراثية كبيرة للصفات المدروسة.

أظهرت الهجن اختلافات عالية المعنوية لمعظم الصفات مما يشير الى امكانية الانتخاب بين هذة التراكيب الوراثية لتحسين الصفات لهذا المحصول كان تباين القدرة العامة والخاصة على الائتلاف عالى المعنوية لمعظم الصفات تحت الدراسة ماعدا وزن١٠٠٠ بذرة ومحصول القطعة التجريبية للقدرة الخاصة على الائتلاف.

أظهرت النسبة بين كلا من القدرة العامة والخاصة على الائتلاف ان الجزء الاكبر من التباين الوراثى يرجع الى التباين المضيف لكل الصفات ماعدا صفات بداية التزهير وارتفاع النبات ومحصول القطعة التجريبية.

وأشارت أيضا أن استخدام التهجين في برامج التربية لتحسين صفات وإنتاجية الكانولا وخاصة التهجين بين السلالات المحلية المتأقلمة مع الظروف المصرية والسلالات المستوردة التي تحمل صفات مرغوبة مثل التبكير في النضج والمحصول العالي، يتيح للمربى الجمع بين صفتي التبكير وجودة المحصول وكميته.