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Combining ability studies in cherry tomato for yield and yield attributing traits in open and protected conditions

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Abstract
Ten diverse lines of cherry tomato were crossed in half diallel fashion to study the combining ability effects for various quantitative traits. Analysis of variance revealed significant differences for all the traits under both environments. The magnitude of *sca* variance was higher than the corresponding *gca* variance for all the traits under study, indicating the prevalence of non-additive gene action for all the traits except for days to first flowering, days to first fruit set and days to first fruit maturity in E_1 and data pooled over environments. Based on GCA effects of parents, lines WIR-5032, EC-520074 and EC-914092 in E_1 and lines WIR-3957, WIR-5032 and Sun Cherry in E_2 were found to be good general combiners for most of the traits. The crosses WIR-5032 x WIR-3957, EC-914115 x VRT-02 and EC-520074 x EC-520078 in E_1 and EC-520078 x VRT-02, EC-914092 x VRT-02 and EC-165690 x WIR-3957 in E_2 were found to be the superior cross combinations on the basis of fruit yield plant^{-1}.

Keywords: Combining ability, cherry tomato, yield, gene action, SCA, GCA

Introduction
Cherry tomato, one of the most promising vegetable crop is grown throughout the world due to its commercial and dietary value, widespread adaptability, possibility of growing under different cultivation conditions, relatively short life cycle, good productivity, seed production ability and resistance to some pests and diseases. For these and other desirable features like relatively small genome size, lack of gene duplication, easy way of controlling pollination and hybridization, ability of asexual propagation by grafting and possibility to regenerate whole plant from different explants, it is used as a model plant for both basic and applied research programmes (Bai and Lindhout, 2007; Prema *et al*. 2011b; Venkadeswaran *et al*., 2018) [2, 9, 14]. Combining ability has a prime importance in plant breeding since it provides information for the selection of parents and also the regarding nature of gene action. The knowledge of genetic structure and mode of inheritance of different characters helps plant breeders to employ the suitable breeding methodology for their improvement (Kiani *et al*., 2007) [7]. In the present study, efforts were made to identify the suitable parental lines for the use in hybridization, to identify the superior cross combinations for commercial exploitation of heterosis and to gain information on the mode of inheritance of desirable traits.

Materials and Methods
The combining ability studies in cherry tomato were carried out at Vegetable Experimental Farm, Division of Vegetable Science, SKUAST-Kashmir, Shalimar, India during *Kharif* season, 2020 in two environments namely open environment (E_1) and protected environment (E_2) in Augmented Block Design at a spacing of 60 x 60 cm between rows and plants respectively. A total of 10 parental lines were crossed in diallel fashion (excluding reciprocals) during *Rabi* season, 2019. Recommended package of practices were followed to raise a healthy crop. The resultant 45 F_1's were then evaluated along with their ten parental lines and two standard checks (Local cherry tomato-1 (C_1) and Local cherry tomato-2 (C_2)) during *Kharif* season, 2020 for 16 quantitative traits viz., plant height, number of primary branches plant^{-1}, days to first flowering, days to first fruit set, days to first fruit maturity, number of clusters plant^{-1}, number of flowers cluster^{-1}, number of fruits cluster^{-1}, number of fruits plant^{-1}, number of locules fruit^{-1}, fruit length, fruit diameter, average fruit weight, pericarp thickness, fruit yield plant^{-1} and fruit yield hectare^{-1} by selecting five random plants and the average was worked out.

Results and Discussion

Analysis of variance for general combining ability (GCA), specific combining ability (SCA) and their interaction with environments (Table 1, 2) revealed significant differences for all the traits under both environments, in the individual as well as data pooled over environments. Mean squares due to GCA and SCA was significant for all the traits under consideration. Mean squares due to GCA x environment and SCA x environment also revealed significant differences for all the traits under study. The genetic component variance ratio of GCA and SCA was found less then unity for all the traits under consideration. Variances due to SCA $(\hat{\sigma}^2 s)$ were higher in magnitude than the corresponding GCA variances $(\hat{\sigma}^2 g)$ in the individual as well as data pooled over environments for all the traits under study. The estimates of additive variance $(\hat{\sigma}^2 A)$ and dominance variance $(\hat{\sigma}^2 D)$ revealed that the magnitude of dominance variance was higher than the additive variance in the individual as well as data pooled over environments for all the traits under consideration except for days to first flowering, days to first fruit set and days to first fruit maturity in E_1 and data pooled over environments, indicating the prevalence of non-additive type of gene action. The ratio of additive variance to dominance variance $(\hat{\sigma}^2 A/\hat{\sigma}^2 D)$ was found to be less than unity for all the traits except for days to first flowering, days to first fruit set and days to first fruit maturity in E_1 and data pooled over environments.

General Combining Ability

The estimates of *gca* effects provides a measure of general combining ability of each genotype, thus aids in selection of superior ones as parental lines for hybridization programmes. The estimates of general combining ability effects in respect of 10 parents for sixteen quantitative traits presented in Table-3 to 4, revealed that none of the parents possessed significant and desirable general combining ability for all the traits concomitantly. However, different parents were found to reveal desirable general combining ability for different traits.

Parents EC-520074, EC-914115 and WIR-5032 in E_1; parents EC-520074, Sun Cherry and EC-165690 in E_2 and parents EC-520074, Sun Cherry and EC-914115 in data pooled over environments manifested significant positive GCA effects in terms of plant height, parents VRT-02, WIR-3957 and EC-520078 in E_1; parents WIR-3957, EC-520078 and VRT-02 in E_2 and parents WIR-3957, VRT-02 and 520078 in data pooled over environments manifested significant positive GCA effects in terms of number of primary branches plant^{-1}.

Parents WIR-5032, Sun Cherry and EC-520074 in E_1 and data pooled over environments and parents WIR-5032, Sun Cherry and WIR-3957 in E_2 manifested significant negative GCA effects in terms of days to first flowering, parents WIR-5032, Sun Cherry and EC-520074 in E_1 and data pooled over environments and parents WIR-5032, Sun Cherry and WIR-3957 in E_2 manifested significant negative GCA effects in terms of days to first fruit set, parents WIR-5032, Sun Cherry and EC-520074 in E_1; parents WIR-5032, EC-914115 and Sun Cherry in E_2 and parents WIR-5032, Sun Cherry and EC-914115 in data pooled over environments and manifested significant negative GCA effects in terms of days to first fruit maturity.

Parents WIR-5032, EC-914115 and Sun Cherry in E_1; parents Sun Cherry, WIR-5032 and EC-165690 in E_2 and parents WIR-5032, Sun Cherry and EC-914115 in data pooled over environments manifested significant positive GCA effects in terms of number of clusters plant^{-1}, parents EC-520074, WIR-5032 and EC-914115 in E_1 and data pooled over environments and parents EC-914115, WIR-5032 and EC-520074 in E_2 manifested significant positive GCA effects in terms of number of flowers cluster^{-1}, parents EC-520074, EC-914115 and EC-914097 in E_1; parents EC-914115, EC-520074 and WIR-3957 in E_2 and parents EC-520074, EC-914115 and WIR-5032 in data pooled over environments manifested significant positive GCA effects in terms of number of fruits cluster^{-1}, parents WIR-5032, EC-914115 and EC-520074 in E_1 and data pooled over environments and parents WIR-5032, Sun Cherry and EC-914115 in E_2 manifested significant positive GCA effects in terms of number of fruits plant^{-1}, parents EC-914092, VRT-02 and EC-165690 in E_1 and data pooled over environments and parents EC-914097, EC-165690, WIR-3957 and VRT-02 in E_2 manifested significant positive GCA effects in terms of number of locules fruit^{-1}, parents EC-914092, EC-914097 and VRT-02 in E_1, E_2 and data pooled over environments manifested significant positive GCA effects in terms of fruit length, parents EC-914092, VRT-02 and EC-914097 in E_1 and parents EC-914092, EC-914097 and VRT-02 in E_2 and data pooled over environments manifested significant positive GCA effects in terms of fruit diameter, parents EC-914092, EC-914097 and EC-165690 in E_1 and data pooled over environments and parents EC-914097, EC-914092 and VRT-02 in E_2 manifested significant positive GCA effects in terms of average fruit weight, parents EC-165690, EC-914092, EC-914097 and WIR-3957 in E_1; parents EC-914092, EC-914097 and WIR-3957 in E_2 and parents EC-914092, EC-914097 and EC-165690 in data pooled over environments manifested significant positive GCA effects in terms of pericarp thickness.

Parents EC-914092, EC-914097 and EC-914115 in E_1; parents EC-914097, EC-914092 and EC-165690 in E_2 and parents EC-914092, EC-914097 and EC-165690 in data pooled over environments manifested significant positive GCA effects in terms of fruit yield plant^{-1}, parents EC-914092, EC-914097 and EC-914115 in E_1; parents EC-914097, EC-914092 and EC-165690 in E_2 and parents EC-914092, EC-914097 and EC-165690 in data pooled over environments manifested significant positive GCA effects in terms of fruit yield hectare^{-1} (Fig. 1).

Specific Combining Ability

The specific combining ability reveals the best cross combination among the genotypes which can be useful for developing hybrids with high vigour for the traits. The estimates of specific combining ability effects in respect of 45 F_1s for sixteen quantitative traits presented in Table 5 to 14, revealed that none of the crosses possessed significant and desirable specific combining ability for all the traits concomitantly. Different crosses were found to reveal desirable specific combining ability for different traits.

Crosses EC-165690 x EC-914092, EC-914115 x EC-914092 and Sun Cherry x VRT-02 in E_1; crosses EC-520074 x EC-914092, EC-914115 x VRT-02 and EC-165690 x EC-914097 in E_2 and data pooled over environments manifested

significant positive SCA effects in terms of plant height, crosses EC-165690 x VRT-02, WIR-5032 x EC-165690 and EC-914115 x EC-914097 in E_1; crosses Sun Cherry x EC-914115, Sun Cherry x EC-520074, Sun Cherry x WIR-5032, EC-520074 x EC-914097 and WIR-3957 x VRT-02 in E_2 and crosses EC-165690 x VRT-02, EC-520074 x EC-914097 and Sun Cherry x EC-914097 in data pooled over environments manifested significant positive SCA effects in terms of number of primary branches plant^{-1}.

Crosses Sun Cherry x VRT-02, Sun Cherry x WIR-3957 and EC-520078 x WIR-3957 in E_1; crosses EC-520078 x WIR-3957, EC-165690 x EC-914092 and EC-914115 x EC-914097 in E_2 and crosses Sun Cherry x VRT-02, EC-520078 x WIR-3957 and EC-520078 x EC-914097 in data pooled over environments manifested significant negative SCA effects in terms of days to first flowering, crosses Sun Cherry x VRT-02, Sun Cherry x WIR-3957 and WIR-5032 x EC-914092 in E_1; crosses EC-520078 x WIR-3957, EC-165690 x EC-914092 and EC-520074 x EC-914097 in E_2 and crosses EC-520078 x WIR-3957, Sun Cherry x VRT-02 and WIR-5032 x EC-914092 in data pooled over environments manifested significant negative SCA effects in terms of days to first fruit set, crosses Sun Cherry x VRT-02, Sun Cherry x WIR-3957, EC-520074 x EC-914092 and EC-520078 x WIR-3957 in E_1; crosses WIR-5032 x EC-914092, Sun Cherry x VRT-02 and EC-520078 x WIR-3957 in E_2 and crosses Sun Cherry x VRT-02, WIR-5032 x EC-914092 and EC-520078 x WIR-3957 in data pooled over environments manifested significant negative SCA effects in terms of days to first fruit maturity.

Crosses EC-914115 x VRT-02, Sun Cherry x WIR-3957 and WIR-5032 x EC-914092 in E_1; crosses WIR-3957 x VRT-02, EC-914115 x VRT-02 and EC-165690 x EC-914097 in E_2 and crosses EC-914115 x VRT-02, Sun Cherry x WIR-3957 and EC-914092 x VRT-02 in data pooled over environments manifested significant positive SCA effects in terms of number of clusters plant^{-1}, Crosses Sun Cherry x VRT-02, EC-520074 x WIR-3957 and EC-520078 x EC-914097 in E_1; crosses Sun Cherry x VRT-02, Sun Cherry x EC-520074 and EC-520074 x WIR-3957 in E_2 and crosses Sun Cherry x VRT-02, EC-520074 x WIR-3957 and WIR-5032 x VRT-02 in data pooled over environments manifested significant positive SCA effects in terms of number of flowers cluster^{-1}, crosses EC-914115 x EC-914097, Sun Cherry x VRT-02 and EC-520074 x WIR-3957 in E_1; crosses WIR-5032 x EC-914115, EC-520078 x WIR-3957 and Sun Cherry x VRT-02 in E_2 and crosses Sun Cherry x VRT-02, EC-520074 x WIR-3957 and WIR-5032 x VRT-02 in data pooled over environments manifested significant positive SCA effects in terms of number of fruits cluster^{-1}, crosses Sun Cherry x VRT-02, EC-914115 x VRT-02 and WIR-5032 x EC-914092 in E_1; crosses Sun Cherry x EC-520074, WIR-5032 x VRT-02 and WIR-5032 x EC-914092 in E_2 and crosses Sun Cherry x VRT-02, WIR-5032 x EC-914092 and EC-914115 x VRT-02 in data pooled over environments manifested significant positive SCA effects in terms of number of fruits plant^{-1}, crosses WIR-3957 x VRT-02, EC-914097 x VRT-02 and EC-914115 x WIR-3957 in E_1 and data pooled over environments and crosses EC-165690 x WIR-3957, EC-914115 x VRT-02 and EC-165690 x EC-520078 in E_2 manifested significant positive SCA effects in terms of number of locules fruit^{-1}, crosses WIR-3957 x EC-914097, EC-520074 x EC-914097 and Sun Cherry x VRT-02 in E_1; crosses WIR-3957 x EC-914097, EC-520074 x EC-914097, EC-520078 x VRT-02 and EC-165690 x WIR-3957 in E_2 and crosses WIR-3957 x EC-914097, EC-520078 x VRT-02 and EC-520074 x EC-914097 in data pooled over environments manifested significant positive SCA effects in terms of fruit length, crosses EC-520074 x EC-914097, EC-914115 x EC-914092 and WIR-5032 x WIR-3957 in E_1; crosses EC-520078 x VRT-02, EC-165690 x WIR-3957 and EC-520074 x EC-914097 in E_2 and data pooled over environments manifested significant positive SCA effects in terms of fruit diameter, crosses WIR-3957 x EC-914097, EC-914115 x EC-165690 and EC-520074 x EC-914097 in E_1; crosses EC-520078 x VRT-02, EC-165690 x WIR-3957 and WIR-3957 x EC-914097 in E_2 and data pooled over environments manifested significant positive SCA effects in terms of average fruit weight, crosses WIR-3957 x EC-914097, EC-914092 x EC-520078 and EC-520074 x EC-914097 in E_1; crosses Sun Cherry x WIR-5032, Sun Cherry x EC-165690 and EC-520078 x VRT-02 in E_2 and crosses WIR-3957 x EC-914097, EC-520078 x VRT-02 and EC-914092 x EC-520078 in data pooled over environments manifested significant positive SCA effects in terms of pericarp thickness.

Crosses WIR-5032 x WIR-3957, EC-914115 x VRT-02 and EC-520074 x EC-520078 in E_1; crosses EC-520078 x VRT-02, EC-914092 x VRT-02 and EC-165690 x WIR-3957 in E_2 and crosses EC-165690 x WIR-3957, EC-165690 x EC-914097 and EC-520074 x EC-914097 in data pooled over environments manifested significant positive SCA effects in terms of fruit yield plant^{-1}, crosses WIR-5032 x WIR-3957, EC-914115 x VRT-02 and EC-520074 x EC-520078 in E_1; crosses EC-520078 x VRT-02, EC-914092 x VRT-02 and EC-165690 x WIR-3957 in E_2 and crosses EC-165690 x WIR-3957, EC-165690 x EC-914097 and EC-520074 x EC-914097 in data pooled over environments manifested significant positive SCA effects in terms of fruit yield hectare^{-1} (Fig. 2).

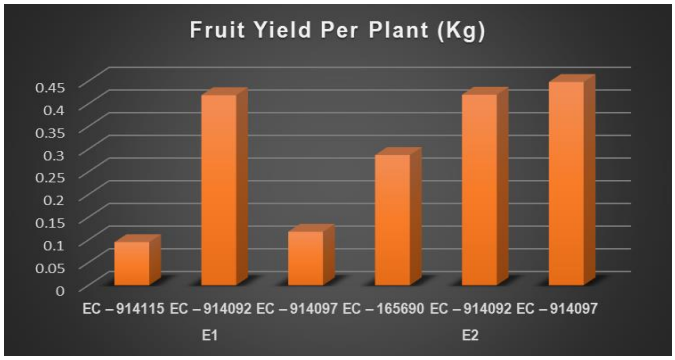

Fig 1: Best Parental Lines on the basis of Fruit Yield Plant^{-1}

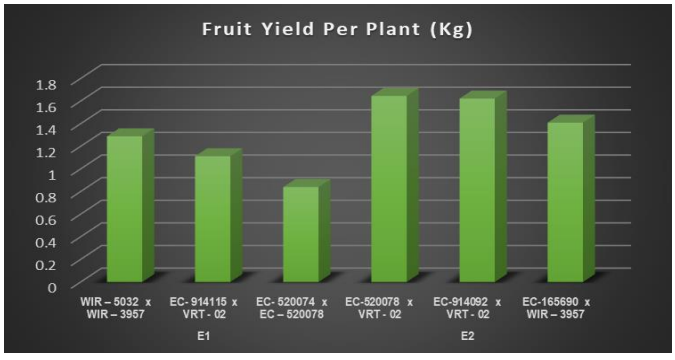

Fig 2: Superior cross combinations on the basis of fruit yield Plant^{-1}

Table 1: Analysis of variance for combining ability and estimates of components of variance for yield and yield attributing traits in cherry tomato

Source of Variation	d.f	Plant height (cm)			Number of primary branches plant^{-1}			Days to first flowering			Days to first fruit set		
		E_1	E_2	Pooled	E_1	E_2	Pooled	E_1	E_2	Pooled	E_1	E_2	Pooled
GCA	9	562.62**	16166.82**	9811.08**	0.18**	0.08**	0.20**	46.34**	44.67**	87.48**	43.11**	45.49**	85.44**
SCA	45	255.48**	6559.01**	3578.74**	0.09**	0.12**	0.13**	4.25**	10.75**	8.13**	4.29**	10.12**	8.71**
Environments	1	-	-	407336.00**	-	-	0.01**	-	-	1447.44**	-	-	6963.45**
GCA* Environments	9	-	-	6953.37**	-	-	0.05**	-	-	3.53**	-	-	3.16**
SCA* Environments	45	-	-	3242.60**	-	-	0.09**	-	-	6.86**	-	-	7.19**
Error (Individual)	108	0.000	0.000	-	0.000	0.000	-	0.000	0.000	-	0.000	0.000	-
Error (Pooled)	216	-	-	0.000	-	-	0.000	-	-	0.000	-	-	0.000
GCA/SCA Ratio	-	0.18	0.21	0.23	0.16	0.05	0.13	0.91	0.35	0.90	0.62	0.38	0.82
$\hat{\sigma}^2 g$	-	46.88	1347.23	408.80	0.01	0.01	0.01	3.86	3.72	3.65	3.59	3.79	3.56
$\hat{\sigma}^2 s$	-	255.48	6559.01	1789.37	0.09	0.12	0.06	4.25	10.75	4.07	5.79	10.12	4.36
$\hat{\sigma}^2 A$	-	93.77	2694.47	817.59	0.03	0.01	0.02	7.72	7.45	7.29	7.18	7.58	7.12
$\hat{\sigma}^2 D$	-	255.48	6559.01	1789.37	0.09	0.12	0.06	4.25	10.75	4.07	5.79	10.12	4.36
$\hat{\sigma}^2 A / \hat{\sigma}^2 D$	-	0.37	0.41	0.46	0.31	0.10	0.26	1.82	0.69	1.79	1.24	0.75	1.63

*, ** Significant at 5 and 1 per cent levels, respectively.

Table 2: Analysis of variance for combining ability and estimates of components of variance for yield and yield attributing traits in cherry tomato

Source of Variation	d.f	Days to first fruit maturity			Number of clusters plant^{-1}			Number of flowers cluster^{-1}			Number of fruits cluster^{-1}		
		E_1	E_2	Pooled	E_1	E_2	Pooled	E_1	E_2	Pooled	E_1	E_2	Pooled
GCA	9	47.82**	225.30**	228.38**	341.95**	10.04**	209.34**	3.74**	3.99**	5.97**	2.94**	4.16**	5.41**
SCA	45	4.29**	47.75**	32.70**	131.55**	7.93**	62.15**	0.76**	2.51**	2.27**	0.58**	2.00**	1.67**
Environments	1	-	-	899.27**	-	-	1682.22**	-	-	4.42**	-	-	10.24**
GCA* Environments	9	-	-	44.74**	-	-	142.65**	-	-	1.75**	-	-	1.69**
SCA* Environments	45	-	-	19.35**	-	-	77.33**	-	-	1.00**	-	-	0.91**
Error (Individual)	108	0.000	0.000	-	0.000	0.000	-	0.000	0.000	-	0.000	0.000	-
Error (Pooled)	216	-	-	0.000	-	-	0.000	-	-	0.000	-	-	0.000
GCA/SCA Ratio	-	0.93	0.39	0.58	0.22	0.11	0.28	0.41	0.13	0.22	0.42	0.17	0.27
$\hat{\sigma}^2 g$	-	3.98	18.78	9.52	28.50	0.84	8.72	0.31	0.33	0.25	0.25	0.35	0.23
$\hat{\sigma}^2 s$	-	4.29	47.75	16.35	131.55	7.93	31.07	0.76	2.51	1.14	0.58	2.00	0.84
$\hat{\sigma}^2 A$	-	7.97	37.55	19.03	56.99	1.67	17.44	0.62	0.66	0.50	0.49	0.69	0.45
$\hat{\sigma}^2 D$	-	4.29	47.75	16.35	131.55	7.93	31.07	0.76	2.51	1.14	0.58	2.00	0.84
$\hat{\sigma}^2 A / \hat{\sigma}^2 D$	-	1.86	0.79	1.16	0.43	0.21	0.56	0.83	0.26	0.44	0.84	0.35	0.54

*, ** Significant at 5 and 1 per cent levels, respectively.

Table 3: Analysis of variance for combining ability and estimates of components of variance for yield and yield attributing traits in cherry tomato.

Source of Variation	d.f	Number of fruits plant^{-1}			Number of locules fruit^{-1}			Fruit length (cm)			Fruit diameter (cm)		
		E_1	E_2	Pooled	E_1	E_2	Pooled	E_1	E_2	Pooled	E_1	E_2	Pooled
GCA	9	7426.95**	184.23**	4779.64**	0.58**	0.017**	0.36**	0.37**	1.51**	1.62**	0.51**	1.61**	1.90**
SCA	45	1752.71**	93.44**	948.12**	0.28**	0.020**	0.15**	0.15**	0.35**	0.43**	0.14**	0.29**	0.37**
Environments	1	-	-	147641.74**	-	-	2.52**	-	-	1.75**	-	-	2.13**
GCA* Environments	9	-	-	2831.54**	-	-	0.24**	-	-	0.26**	-	-	0.22**
SCA* Environments	45	-	-	898.02**	-	-	0.15**	-	-	0.06**	-	-	0.05**
Error (Individual)	108	0.000	0.000	-	0.004	0.004	-	0.000	0.000	-	0.000	0.000	-
Error (Pooled)	216	-	-	0.000	-	-	0.004	-	-	0.000	-	-	0.000
GCA/SCA Ratio	-	0.35	0.16	0.42	0.17	0.070	0.19	0.21	0.36	0.31	0.31	0.47	0.43
$\hat{\sigma}^2 g$	-	618.91	15.35	199.15	0.05	0.001	0.01	0.03	0.13	0.07	0.04	0.13	0.08
$\hat{\sigma}^2 s$	-	1752.71	93.44	474.06	0.28	0.016	0.08	0.15	0.35	0.21	0.14	0.29	0.19
$\hat{\sigma}^2 A$	-	1237.82	30.70	398.30	0.10	0.002	0.03	0.06	0.25	0.13	0.08	0.27	0.16
$\hat{\sigma}^2 D$	-	1752.71	93.44	474.06	0.28	0.016	0.08	0.15	0.35	0.21	0.14	0.29	0.19
$\hat{\sigma}^2 A / \hat{\sigma}^2 D$	-	0.71	0.33	0.84	0.34	0.141	0.39	0.42	0.73	0.63	0.61	0.93	0.85

*, ** Significant at 5 and 1 per cent levels, respectively.

Table 4: Analysis of variance for combining ability and estimates of components of variance for yield and yield attributing traits in cherry tomato

Source of Variation	d.f	Average fruit weight (g)			Pericarp thickness (mm)			Fruit yield plant^{-1} (Kg)			Fruit yield hectare^{-1} (q)		
		E_1	E_2	Pooled	E_1	E_2	Pooled	E_1	E_2	Pooled	E_1	E_2	Pooled
GCA	9	480.05**	3574.66**	3269.06**	1.03**	5.85**	5.37**	0.44**	1.73**	1.42**	4839.76**	133668.20**	122266.86**
SCA	45	162.75**	773.80**	732.74**	0.57**	1.11**	1.23**	0.46**	0.69**	0.72**	51379.02**	53253.47**	65892.43**
Environments	1	-	-	11707.27**	-	-	19.62**	-	-	14.85**	-	-	2953435.66**
GCA* Environments	9	-	-	785.65**	-	-	1.51**	-	-	0.75**	-	-	59799.08**
SCA* Environments	45	-	-	203.80**	-	-	0.44**	-	-	0.43**	-	-	38740.06**
Error (Individual)	108	0.000	0.002	-	0.000	0.000	-	0.001	0.000	-	84.59	10.27	-
Error (Pooled)	216	-	-	0.001	-	-	0.000	-	-	0.000	-	-	47.43
GCA/SCA Ratio	-	0.250	0.390	0.370	0.150	0.440	0.36	0.08	0.21	0.16	0.08	0.21	0.15
$\hat{\sigma}^2 g$	-	40.00	297.89	136.21	0.09	0.49	0.22	0.04	0.14	0.06	4026.10	11138.16	5092.48
$\hat{\sigma}^2 s$	-	162.75	773.79	366.37	0.57	1.11	0.62	0.46	0.69	0.36	51294.43	53243.20	32922.50
$\hat{\sigma}^2 A$	-	80.01	595.78	272.42	0.17	0.97	0.45	0.07	0.29	0.12	8052.20	22276.32	10184.95
$\hat{\sigma}^2 D$	-	162.75	773.79	366.37	0.57	1.11	0.62	0.46	0.69	0.36	51294.43	53243.20	32922.50
$\hat{\sigma}^2 A / \hat{\sigma}^2 D$	-	0.49	0.77	0.74	0.30	0.88	0.73	0.16	0.42	0.33	0.16	0.42	0.31

*, ** Significant at 5 and 1 per cent levels, respectively.

Table 5: General combining ability (GCA) effects for yield and yield attributing traits in cherry tomato.

Parents	Plant height (cm)			Number of primary branches plant^{-1}			Days to first flowering			Days to first fruit set		
	E_1	E_2	Pooled	E_1	E_2	Pooled	E_1	E_2	Pooled	E_1	E_2	Pooled
Suncherry	-5.820 **	60.452 **	27.269 **	0.013 **	-0.047 **	-0.034 **	-1.560 **	-1.780 **	-1.670 **	-1.860 **	-1.983 **	-1.922 **
WIR - 5032	3.863 **	-2.032 **	1.002 **	0.013 **	0.003	0.016	-4.743 **	-4.397 **	-4.570 **	-4.360 **	-4.383 **	-4.372 **
EC – 520074	12.163 **	62.230 **	37.350 **	-0.187 **	-0.063 **	-0.25 **	-0.677 **	0.437 **	-0.120 **	-0.860 **	0.433 **	-0.213 **
EC – 914115	9.980 **	-3.556 **	3.274 **	-0.170 **	-0.013 **	-0.183 **	0.023 **	0.253 **	0.138 **	0.190 **	0.550 **	0.370 **
EC – 165690	1.630 **	3.048 **	2.392 **	-0.053 **	-0.013 **	-0.066 **	0.790 **	0.487 **	0.638 **	0.707 **	0.433 **	0.570 **
EC – 914092	-5.670 **	-11.938 **	-8.942 **	0.063 **	0.003	0.066	1.640 **	1.137 **	1.388 **	1.523 **	1.117 **	1.320 **
EC – 520078	-4.037 **	-5.588 **	-4.751 **	0.080 **	0.053 **	0.133 **	0.490 **	0.853 **	0.672 **	0.740 **	0.833 **	0.787 **
WIR – 3957	-1.903 **	-18.542 **	-10.161 **	0.113 **	0.170 **	0.283 **	0.973 **	-0.580 **	0.197 **	0.807 **	-0.583 **	0.112 **
EC – 914097	-2.037 **	-25.908 **	-13.911 **	-0.070 **	-0.130 **	-0.2 **	1.240 **	0.870 **	1.055 **	1.223 **	0.900 **	1.062 **
VRT - 02	-8.170 **	-58.166 **	-33.523 **	0.197 **	0.037 **	0.234 **	1.823 **	2.720 **	2.272 **	1.890 **	2.683 **	2.287 **
S.E ± (g_i)	0.00006	0.00250	0.00023	0.07500	0.07500	0.00000	0.07500	0.00010	0.00000	0.00017	0.07500	0.00000
S.E ± (g_i - g_j)	0.00009	0.00372	0.00035	0.07500	0.07500	0.00000	0.07500	0.00015	0.00000	0.00025	0.07500	0.00000
C.D at 5%	0.00020	0.00842	0.00068	0.16966	0.16966	0.00000	0.16966	0.00035	0.00000	0.00057	0.16966	0.00000

*, ** Significant at 5 and 1 per cent levels, respectively.

Table 6: General combining ability (GCA) effects for yield and yield attributing traits in cherry tomato

Parents	Days to first fruit maturity			Number of clusters plant^{-1}			Number of flowers cluster^{-1}			Number of fruits cluster^{-1}		
	E_1	E_2	Pooled	E_1	E_2	Pooled	E_1	E_2	Pooled	E_1	E_2	Pooled
Suncherry	-1.600 **	-2.530 **	-4.130 **	0.772 **	1.795 **	2.567 **	0.247 **	-0.370 **	-0.123 **	-0.037 **	-0.577 **	-0.307 **
WIR - 5032	-4.783 **	-8.247 **	-13.030 **	14.021 **	1.040 **	15.061 **	0.663 **	0.480 **	1.143 **	0.430 **	0.340 **	0.385 **
EC – 520074	-0.717 **	-1.380 **	-2.097 **	-0.930 **	-0.319 **	-1.249 **	0.863 **	0.430 **	1.293 **	0.847 **	0.573 **	0.710 **
EC – 914115	-0.017 **	-3.847 **	-3.864 **	1.846 **	-0.061 **	1.785 **	0.513 **	0.613 **	1.126 **	0.663 **	0.690 **	0.677 **
EC – 165690	0.833 **	2.087 **	2.920 **	-4.362 **	0.070 **	-4.292 **	-0.153 **	-0.870 **	-1.023 **	-0.070 **	-0.877 **	-0.473 **
EC – 914092	1.767 **	5.420 **	7.187 **	-2.997 **	-0.151 **	-3.148 **	-0.720 **	-0.837 **	-0.117 **	-0.487 **	-0.793 **	-0.640 **
EC – 520078	0.483 **	-1.380 **	-0.897 **	-0.422 **	-0.205 **	-0.629 **	-0.570 **	0.530 **	-0.040 **	-0.420 **	0.307 **	-0.057 **
WIR – 3957	0.967 **	1.170 **	2.137 **	-2.234 **	-0.341 **	-2.575 **	-0.087 **	0.197 **	0.110 **	-0.503 **	0.390 **	-0.057 **
EC – 914097	1.200 **	5.570 **	6.770 **	-4.524 **	-1.709 **	-6.233 **	-0.120 **	0.280 **	0.160 **	0.013 **	0.307 **	0.160 **
VRT - 02	1.867 **	3.137 **	5.004 **	-1.169 **	-0.118 **	-1.287**	-0.637 **	-0.453 **	-1.090 **	-0.437 **	-0.360 **	-0.398 **
S.E ± (g_i)	0.07500	0.00076	0.07500	0.00059	0.00039	0.00000	0.07500	0.07500	0.00000	0.07500	0.07500	0.00000
S.E ± (g_i - g_j)	0.07500	0.00113	0.07500	0.00088	0.00058	0.00000	0.07500	0.07500	0.00000	0.07500	0.07500	0.00000
C.D at 5%	0.16966	0.00256	0.16966	0.00199	0.00131	0.00000	0.16966	0.16966	0.00000	0.16966	0.16966	0.00000

*, ** Significant at 5 and 1 per cent levels, respectively.

Table 7: General combining ability (GCA) effects for yield and yield attributing traits in cherry tomato.

Parents	Number of fruits plant^{-1}			Number of locules fruit^{-1}			Fruit length (cm)			Fruit diameter (cm)		
	E_1	E_2	Pooled	E_1	E_2	Pooled	E_1	E_2	Pooled	E_1	E_2	Pooled
Suncherry	-1.937 **	3.883 **	1.946 **	-0.153 **	-0.043 *	-0.098 **	-0.101 **	-0.161 **	-0.131 **	-0.147 **	-0.122 **	-0.135 **
WIR - 5032	65.564 **	7.050 **	72.614 **	-0.270 **	-0.043 *	-0.157 **	-0.383 **	-0.584 **	-0.483 **	-0.411 **	-0.627 **	-0.519 **
EC – 520074	7.298 **	2.150 **	9.448 **	-0.153 **	-0.043 *	-0.098 **	-0.086 **	-0.462 **	-0.274 **	-0.142 **	-0.467 **	-0.304 **
EC – 914115	9.093 **	2.783 **	11.876 **	-0.153 **	-0.010	-0.082 **	-0.053 **	-0.268 **	-0.161 **	-0.051 **	-0.254 **	-0.152 **
EC – 165690	-19.448 **	-3.733 **	-23.181 **	0.197 **	0.040 *	0.118 **	0.059 **	0.277 **	0.168 **	0.084 **	0.251 **	0.168 **
EC – 914092	-12.019 **	-3.800 **	-15.819 **	0.347 **	-0.010	0.168 **	0.227 **	0.419 **	0.323 **	0.314 **	0.481 **	0.398 **
EC – 520078	-8.679 **	-0.067 **	-8.746 **	-0.203 **	-0.010	-0.107 **	-0.004	0.128 **	0.062 **	-0.031	0.087 **	0.028 **
WIR – 3957	-12.028 **	-0.467 **	-12.495 **	0.163 **	0.040 *	0.102 **	0.016	0.004	0.010 **	0.043 *	-0.001	0.021 **
EC – 914097	-14.808 **	-4.900 **	-19.708 **	-0.020	0.057 **	0.018	0.187 **	0.324 **	0.256 **	0.149 **	0.373 **	0.261 **
VRT - 02	-13.036 **	-2.900 **	-15.936 **	0.247 **	0.023	0.135 **	0.137 **	0.322 **	0.230 **	0.191 **	0.279 **	0.235 **
S.E ± (g_i)	0.00123	0.07500	0.00000	0.01686	0.01731	0.01208	0.07500	0.07500	0.00000	0.07500	0.07500	0.00000
S.E ± (g_i - g_j)	0.00184	0.07500	0.00000	0.02513	0.02581	0.01801	0.07500	0.07500	0.00000	0.07500	0.07500	0.00000
C.D at 5%	0.00416	0.16966	0.00000	0.05685	0.05838	0.03550	0.16966	0.16966	0.00000	0.16966	0.16966	0.00000

*, ** Significant at 5 and 1 per cent levels, respectively.

Table 8: General combining ability (GCA) effects for yield and yield attributing traits in cherry tomato.

Parents	Average fruit weight (g)			Pericarp thickness (mm)			Fruit yield plant^{-1} (Kg)			Fruit yield hectare^{-1} (q)		
	E_1	E_2	Pooled	E_1	E_2	Pooled	E_1	E_2	Pooled	E_1	E_2	Pooled
Suncherry	-3.040 **	-11.373 **	-7.207 **	0.034 **	0.237 **	0.135 **	-0.137 **	-0.215 **	-0.176 **	-45.873 **	-59.818 **	-52.845 **
WIR - 5032	-12.585 **	-26.339 **	-19.461 **	-0.619 **	-0.997 **	-0.808 **	-0.003	-0.621 **	-0.312 **	-0.978	-172.677 **	-86.827 **
EC – 520074	-4.514 **	-20.785 **	-12.649 **	-0.158 **	-1.131 **	-0.644 **	-0.088 **	-0.518 **	-0.303 **	-29.102 **	-143.786 **	-86.444 **
EC – 914115	-3.309 **	-13.960 **	-8.635 **	-0.118 **	-0.578 **	-0.348 **	0.095 **	-0.218 **	-0.061 **	31.566 **	-60.391 **	-14.412 **
EC – 165690	4.815 **	14.453 **	9.635 **	0.382 **	0.380 **	0.381 **	0.089 **	0.287 **	0.188 **	29.522 **	79.836 **	54.679 **
EC – 914092	9.342 **	18.732 **	14.037 **	0.302 **	0.822 **	0.562 **	0.419 **	0.420 **	0.419 **	139.646 **	116.596 **	128.121 **
EC – 520078	-0.238 **	1.179 **	0.470 **	-0.138 **	0.092 **	-0.023 **	-0.073 **	0.190 **	0.058 **	-24.405 **	52.828 **	14.211 **
WIR – 3957	0.080 **	2.210 **	1.145 **	0.042 **	-0.138 **	-0.048 **	-0.227 **	-0.009 **	-0.118 **	-75.642 **	-2.538 **	-39.090 **
EC – 914097	6.447 **	21.197 **	13.822 **	0.302 **	0.727 **	0.515 **	0.118 **	0.448 **	0.283 **	39.372 **	124.370 **	81.871 **
VRT - 02	3.002 **	14.687 **	8.844 **	-0.031 **	0.587 **	0.278 **	-0.192 **	0.236 **	0.022 **	-64.107 **	65.580 **	0.737
S.E ± (g_i)	0.00021	0.01337	0.00668	0.07500	0.07500	0.00000	0.00752	0.00311	0.00407	2.51874	0.87778	1.33365
S.E ± (g_i - g_j)	0.00032	0.01994	0.00995	0.07500	0.07500	0.00000	0.01121	0.00463	0.00606	3.75471	1.30852	1.98809
C.D at 5%	0.00072	0.04510	0.01962	0.16966	0.16966	0.00000	0.02535	0.01048	0.01195	8.49369	2.96006	3.91852

*, ** Significant at 5 and 1 per cent levels, respectively.

Table 9: Specific combining ability (SCA) effects for yield and yield attributing traits in cherry tomato.

Crosses	Plant height (cm)			Number of primary branches plant^{-1}			Days to first flowering		
	E_1	E_2	Pooled	E_1	E_2	Pooled	E_1	E_2	Pooled
Suncherry x WIR - 5032	-24.502 **	-15.749 **	-20.098 **	0.042 **	0.502 **	0.272 **	3.456 **	5.053 **	4.255 **
Suncherry x EC – 520074	7.999 **	-165.354 **	-78.717 **	-0.158 **	-0.432 **	-0.295 **	1.189 **	-0.380 **	0.405 **
Suncherry x EC – 914115	1.782 **	31.495 **	16.691 **	-0.374 **	0.518 **	0.072 **	0.889 **	1.803 **	1.346 **
Suncherry x EC – 165690	-28.268 **	-11.682 **	-20.015 **	-0.491 **	-0.482 **	-0.487 **	0.523 **	2.170 **	1.346 **
Suncherry x EC – 914092	-22.568 **	49.023 **	12.280 **	0.192 **	0.102 **	0.147 **	-0.527 **	0.120 **	-0.204 **
Suncherry x EC – 520078	25.398 **	-21.336 **	2.084 **	-0.624 **	-0.348 **	-0.486 **	2.423 **	2.603 **	2.513 **
Suncherry x WIR – 3957	1.665 **	0.761 **	1.265 **	0.142 **	-0.065 **	0.039 **	-4.861 **	2.236 **	-1.312 **
Suncherry x EC – 914097	-18.602 **	53.848 **	17.675 **	0.126 **	0.435 **	0.281 **	-1.927 **	1.786 **	-0.070 **
Suncherry x VRT - 02	25.932 **	-8.382 **	9.244 **	0.259 **	-0.532 **	-0.137 **	-6.911 **	-3.064 **	-4.987 **
WIR – 5032 x EC – 520074	-2.885 **	-35.813 **	-18.422 **	-0.158 **	0.518 **	0.180 **	-0.827 **	7.036 **	3.105 **
WIR – 5032 x EC – 914115	-19.702 **	-52.324 **	-36.094 **	-0.374 **	0.068 **	-0.153 **	-0.727 **	-1.780 **	-1.254 **
WIR – 5032 x EC – 165690	10.248 **	-74.168 **	-32.033 **	0.509 **	-0.532 **	-0.012 **	-0.094 **	-3.614 **	-1.854 **
WIR – 5032 x EC – 914092	13.548 **	1.777 **	7.782 **	-0.208 **	-0.348 **	-0.278 **	-2.544 **	-2.064 **	-2.304 **
WIR – 5032 x EC – 520078	-11.285 **	80.771 **	34.662 **	-0.424 **	-0.198 **	-0.311 **	0.206 **	-3.380 **	-1.587 **
WIR – 5032 x WIR – 3957	23.982 **	11.432 **	17.626 **	0.142 **	0.285 **	0.214 **	0.123 **	2.653 **	1.388 **
WIR – 5032 x EC – 914097	-4.885 **	-45.212 **	-25.129 **	-0.074 **	-0.615 **	-0.345 **	-0.544 **	2.403 **	0.930 **
WIR – 5032 x VRT - 02	20.648 **	115.062 **	68.191 **	0.059 **	0.218 **	0.139 **	0.073 **	3.553 **	1.813 **
EC- 520074 x EC – 914115	1.799 **	-86.106 **	-42.301 **	-0.174 **	-0.065 **	-0.120 **	0.806 **	-2.214 **	-0.704 **
EC- 520074 x EC – 165690	5.948 **	84.073 **	44.871 **	0.109 **	0.135 **	0.122 **	1.239 **	-1.447 **	-0.104 **
EC- 520074 x EC – 914092	-4.952 **	166.115 **	80.634 **	-0.008 **	-0.082 **	-0.045 **	-2.811 **	-2.097 **	-2.454 **
EC- 520074 x EC – 520078	-13.785 **	-129.794 **	-71.937 **	0.176 **	0.268 **	0.222 **	-0.061 **	4.386 **	2.163 **
EC- 520074 x WIR – 3957	7.682 **	-4.063 **	1.661 **	-0.058 **	-0.448 **	-0.253 **	-0.344 **	-2.180 **	-1.262 **
EC- 520074 x EC – 914097	2.615 **	-33.274 **	-15.477 **	0.126 **	0.452 **	0.289 **	-0.011 **	-4.230 **	-2.120 **
EC- 520074 x VRT - 02	-2.452 **	-40.640 **	-21.277 **	0.059 **	0.085 **	0.072 **	0.206 **	0.720 **	0.463 **
EC- 914115 x EC – 165690	-12.068 **	-69.594 **	-40.879 **	0.092 **	0.085 **	0.089 **	0.339 **	-1.064 **	-0.362 **
EC- 914115 x EC – 914092	29.832 **	-42.418 **	-6.149 **	-0.224 **	-0.332 **	-0.278 **	0.489 **	0.486 **	0.488 **

EC- 914115 x EC – 520078	8.598 **	-12.191 **	-1.852 **	-0.241 **	0.018 **	-0.112 **	-2.761 **	4.970 **	1.105 **
EC- 914115 x WIR – 3957	-5.135 **	-5.334 **	-5.290 **	-0.074 **	-0.098 **	-0.086 **	0.156 **	-2.597 **	-1.220 **
EC- 914115 x EC – 914097	-1.602 **	14.222 **	6.254 **	0.309 **	-0.198 **	0.056 **	-0.111 **	-4.247 **	-2.179 **
EC- 914115 x VRT - 02	11.732 **	140.970 **	76.711 **	0.242 **	0.235 **	0.239 **	-2.494 **	2.303 **	-0.095 **
EC-165690 x EC- 914092	41.782 **	42.417 **	42.252 **	-0.141 **	0.268 **	0.064 **	0.723 **	-4.947 **	-2.112 **
EC-165690 x EC- 520078	6.748 **	-125.476 **	-59.411 **	0.042 **	0.418 **	0.230 **	0.273 **	1.136 **	0.705 **
EC-165690 x WIR – 3957	-13.385 **	3.302 **	-5.089 **	-0.191 **	-0.298 **	-0.245 **	1.989 **	1.970 **	1.980 **
EC-165690 x EC-914097	21.349 **	117.348 **	69.300 **	-0.208 **	0.402 **	0.097 **	-0.477 **	-0.480 **	-0.479 **
EC-165690 x VRT - 02	-19.718 **	-2.795 **	-10.887 **	0.726 **	0.235 **	0.481 **	-0.861 **	-2.330 **	-1.595 **
EC-914092 x EC-520078	-15.552 **	-34.290 **	-24.777 **	0.126 **	0.202 **	0.164 **	1.623 **	1.486 **	1.555 **
EC- 914092 x WIR – 3957	-10.485 **	-149.353 **	-79.775 **	-0.108 **	-0.115 **	-0.112 **	0.939 **	1.520 **	1.230 **
EC-914092 x EC-914097	6.448 **	-35.306 **	-14.285 **	-0.124 **	-0.015 **	-0.070 **	0.273 **	4.670 **	2.471 **
EC-914092 x VRT - 02	-19.418 **	33.528 **	6.415 **	-0.191 **	-0.182 **	-0.187 **	1.289 **	-0.380 **	0.455 **
EC-520078 x WIR-3957	4.482 **	5.841 **	5.105 **	0.076 **	0.435 **	0.256 **	-2.911 **	-6.397 **	-4.654 **
EC-520078 x EC-914097	2.015 **	-11.176 **	-4.636 **	0.059 **	0.135 **	0.097 **	-2.377 **	-4.047 **	-3.212 **
EC-520078 x VRT - 02	-1.852 **	-116.078 **	-58.604 **	-0.608 **	-0.432 **	-0.520 **	2.839 **	-1.097 **	0.871 **
WIR-3957 x EC -914097	-2.718 **	-43.942 **	-23.386 **	0.026 **	0.418 **	0.222 **	0.339 **	0.986 **	0.663 **
WIR-3957 x VRT - 02	11.615 **	70.612 **	41.474 **	-0.041 **	0.452 **	0.206 **	2.556 **	1.336 **	1.946 **
EC-914097 x VRT - 02	-4.652 **	-34.798 **	-19.364 **	-0.258 **	-0.448 **	-0.353 **	0.289 **	0.886 **	0.588 **
S.E ± (S_{ij})	0.00020	0.00840	0.00070	0.07500	0.07500	0.00000	0.07500	0.00035	0.00000
S.E ± ($S_{ij} – S_{ik}$)	0.00030	0.01235	0.00115	0.07500	0.07500	0.00000	0.07500	0.00051	0.00000
C.D at 5%	0.00060	0.02488	0.00227	0.15115	0.15115	0.00000	0.15115	0.00103	0.00000

*, ** Significant at 5 and 1 per cent levels, respectively.

Table 10: Specific combining ability (SCA) effects for yield and yield attributing traits in cherry tomato.

Crosses	Days to first fruit set			Days to first fruit maturity			Number of clusters plant^{-1}		
	E_1	E_2	Pooled	E_1	E_2	Pooled	E_1	E_2	Pooled
Suncherry x WIR - 5032	3.082 **	5.221 **	4.152 **	3.492 **	7.017 **	5.255 **	-17.950 **	-1.278 **	-9.614 **
Suncherry x EC – 520074	1.382 **	0.005 **	0.693 **	1.226 **	-4.650 **	-1.712 **	3.741 **	2.140 **	2.941 **
Suncherry x EC – 914115	1.132 **	1.888 **	1.510 **	0.926 **	9.617 **	5.272 **	-15.325 **	2.553 **	-6.386 **
Suncherry x EC – 165690	0.615 **	2.405 **	1.510 **	0.476 **	4.883 **	2.680 **	-6.167 **	-0.299 **	-3.233 **
Suncherry x EC – 914092	-0.202 **	0.321 **	0.060 **	-0.658 **	1.550 **	0.446 **	5.978 **	-2.727 **	1.626 **
Suncherry x EC – 520078	2.182 **	2.805 **	2.493 **	2.426 **	8.950 **	5.688 **	-12.036 **	-0.313 **	-6.175 **
Suncherry x WIR – 3957	-5.685 **	2.421 **	-1.632 **	-4.858 **	4.000 **	-0.429 **	0.965 **	3.713 **	2.339 **
Suncherry x EC – 914097	-1.902 **	-1.462 **	-1.682 **	-1.891 **	-0.800 **	-1.346 **	-5.085 **	2.940 **	-1.073 **
Suncherry x VRT - 02	-6.968 **	-2.845 **	-4.907 **	-6.958 **	-13.167 **	-10.063 **	23.420 **	-4.061 **	9.680 **
WIR – 5032 x EC – 520074	-1.318 **	7.005 **	2.843 **	-0.791 **	8.067 **	3.638 **	0.232 **	-3.524 **	-1.646 **
WIR – 5032 x EC – 914115	1.032 **	-2.112 **	-0.540 **	-0.691 **	-5.267 **	-2.979 **	3.656 **	-4.771 **	-0.558 **
WIR – 5032 x EC – 165690	-0.685 **	-3.595 **	-2.140 **	-0.141 **	-6.000 **	-3.071 **	14.844 **	1.607 **	8.226 **
WIR – 5032 x EC – 914092	-5.102 **	-2.079 **	-3.590 **	-2.674 **	-13.333 **	-8.004 **	17.899 **	2.099 **	9.999 **
WIR – 5032 x EC – 520078	2.282 **	-3.395 **	-0.557 **	0.209 **	-3.333 **	-1.562 **	-13.686 **	-1.087 **	-7.387 **
WIR – 5032 x WIR – 3957	-0.385 **	2.621 **	1.118 **	0.126 **	5.317 **	2.722 **	9.766 **	2.059 **	5.913 **
WIR – 5032 x EC – 914097	-1.202 **	2.338 **	0.568 **	-0.508 **	11.917 **	5.705 **	-2.704 **	0.396 **	-1.154 **
WIR – 5032 x VRT - 02	3.132 **	3.555 **	3.343 **	0.026 **	-1.850 **	-0.912 **	-0.619 **	0.585 **	-0.017 **
EC- 520074 x EC – 914115	0.532 **	-2.529 **	-0.998 **	0.842 **	1.667 **	1.255 **	-0.363 **	0.737 **	0.187 **
EC- 520074 x EC – 165690	1.215 **	-1.412 **	-0.098 **	1.192 **	-2.867 **	-0.838 **	-4.816 **	1.345 **	-1.736 **
EC- 520074 x EC – 914092	-2.802 **	-2.095 **	-2.448 **	-2.941 **	-8.200 **	-5.571 **	6.499 **	-0.713 **	2.893 **
EC- 520074 x EC – 520078	-0.418 **	4.388 **	1.985 **	-0.058 **	6.600 **	3.271 **	8.965 **	-5.699 **	1.633 **
EC- 520074 x WIR – 3957	0.715 **	-2.195 **	-0.740 **	-0.341 **	-5.150 **	-2.746 **	8.777 **	-2.783 **	2.997 **
EC- 520074 x EC – 914097	-0.102 **	-4.279 **	-2.190 **	0.026 **	-5.150 **	-2.562 **	-5.913 **	1.814 **	-2.050 **
EC- 520074 x VRT - 02	0.032 **	0.738 **	0.385 **	0.159 **	0.483 **	0.321 **	-4.848 **	2.814 **	-1.017 **
EC- 914115 x EC – 165690	-0.035 **	-1.329 **	-0.682 **	0.292 **	6.600 **	3.446 **	-10.841 **	2.338 **	-4.252 **
EC- 914115 x EC – 914092	0.148 **	0.188 **	0.168 **	0.359 **	2.667 **	1.513 **	9.814 **	0.169 **	4.992 **
EC- 914115 x EC – 520078	-3.468 **	4.671 **	0.602 **	-2.758 **	0.467 **	-1.146 **	10.649 **	-0.666 **	4.992 **
EC- 914115 x WIR – 3957	-0.135 **	-2.912 **	-1.523 **	0.159 **	-4.283 **	-2.062 **	-5.529 **	-1.681 **	-3.605 **
EC- 914115 x EC – 914097	1.648 **	-0.795 **	0.427 **	-0.074 **	-6.083 **	-3.079 **	5.711 **	-0.283 **	2.714 **
EC- 914115 x VRT - 02	-3.018 **	1.821 **	-0.598 **	-2.541 **	-4.850 **	-3.696 **	36.446 **	-0.994 **	17.726 **
EC-165690 x EC- 914092	1.832 **	-4.895 **	-1.532 **	0.509 **	2.533 **	1.521 **	-1.739 **	0.038 **	-0.851 **
EC-165690 x EC- 520078	-0.185 **	1.188 **	0.502 **	0.192 **	10.333 **	5.263 **	4.957 **	-0.398 **	2.280 **
EC-165690 x WIR – 3957	2.148 **	2.005 **	2.077 **	1.909 **	10.583 **	6.246 **	-1.361 **	-0.632 **	-0.997 **
EC-165690 x EC-914097	0.132 **	-0.479 **	-0.173 **	-0.524 **	1.783 **	0.630 **	6.269 **	1.735 **	4.002 **
EC-165690 x VRT - 02	-1.135 **	-2.262 **	-1.698 **	0.009 **	-0.783 **	-0.387 **	-3.516 **	-4.246 **	-3.881 **
EC-914092 x EC-520078	1.798 **	1.505 **	1.652 **	1.859 **	4.400 **	3.130 **	-4.658 **	2.494 **	-1.082 **
EC- 914092 x WIR – 3957	2.532 **	1.521 **	2.027 **	1.176 **	0.050 **	0.613 **	-14.646 **	-0.131 **	-7.389 **
EC-914092 x EC-914097	0.115 **	4.638 **	2.377 **	0.142 **	3.050 **	1.596 **	-9.026 **	0.097 **	-4.465 **
EC-914092 x VRT - 02	1.248 **	-0.345 **	0.452 **	1.076 **	5.283 **	3.180 **	-4.791 **	3.536 **	-0.628 **

EC-520078 x WIR-3957	-3.885 **	-6.395 **	-5.140 **	-2.941 **	-11.550 **	-7.246 **	1.699 **	-1.766 **	-0.034 **
EC-520078 x EC-914097	-2.902 **	-4.079 **	-3.490 **	-2.374 **	-9.950 **	-6.162 **	14.999 **	-3.979 **	5.510 **
EC-520078 x VRT - 02	2.232 **	-1.062 **	0.585 **	2.759 **	2.883 **	2.821 **	-12.326 **	-3.060 **	-7.693 **
WIR-3957 x EC -914097	0.232 **	1.138 **	0.685 **	0.342 **	4.700 **	2.521 **	-7.049 **	-3.323 **	-5.186 **
WIR-3957 x VRT - 02	2.365 **	1.355 **	1.860 **	2.476 **	3.333 **	2.905 **	-10.464 **	5.906 **	-2.279 **
EC-914097 x VRT - 02	-0.052 **	0.871 **	0.410 **	0.242 **	3.133 **	1.688 **	-9.264 **	0.474 **	-4.395 **
S.E ± (S_{ij})	0.00057	0.07500	0.00000	0.07500	0.00255	0.07500	0.00198	0.00131	0.00000
S.E ± ($S_{ij} - S_{ik}$)	0.00084	0.07500	0.00000	0.07500	0.00375	0.07500	0.00292	0.00193	0.00000
C.D at 5%	0.00169	0.15115	0.00000	0.15115	0.00756	0.15115	0.00588	0.00388	0.00000

*, ** Significant at 5 and 1 per cent levels, respectively.

Table 11: Specific combining ability (SCA) effects for yield and yield attributing traits in cherry tomato

Crosses	Number of flowers cluster^{-1}			Number of fruits cluster^{-1}			Number of fruits plant^{-1}		
	E_1	E_2	Pooled	E_1	E_2	Pooled	E_1	E_2	Pooled
Suncherry x WIR - 5032	-0.186 **	-1.114 **	-0.650 **	-0.397 **	-0.665 **	-0.531 **	-72.651 **	-10.861 **	-41.756 **
Suncherry x EC – 520074	0.414 **	2.936 **	1.675 **	0.586 **	1.902 **	1.244 **	24.486 **	27.439 **	25.963 **
Suncherry x EC – 914115	0.964 **	-0.447 **	0.259 **	0.970 **	-1.615 **	-0.323 **	-46.709 **	-1.994 **	-24.352 **
Suncherry x EC – 165690	0.030 **	-0.964 **	-0.467 **	-0.097 **	-0.448 **	-0.273 **	-15.239 **	-6.077 **	-10.658 **
Suncherry x EC – 914092	-0.203 **	-0.797 **	-0.500 **	-0.880 **	0.268 **	-0.306 **	0.932 **	-11.011 **	-5.040 **
Suncherry x EC – 520078	-0.753 **	-1.764 **	-1.259 **	0.053 **	-0.832 **	-0.389 **	-36.868 **	-6.344 **	-21.606 **
Suncherry x WIR – 3957	-1.236 **	-1.430 **	-1.333 **	-0.464 **	-2.315 **	-1.389 **	-6.719 **	1.456 **	-2.632 **
Suncherry x EC – 914097	-0.803 **	-1.514 **	-1.159 **	-0.780 **	-0.832 **	-0.806 **	-24.079 **	4.489 **	-9.795 **
Suncherry x VRT - 02	2.114 **	3.220 **	2.667 **	1.670 **	2.435 **	2.052 **	102.749 **	0.689 **	51.719 **
WIR – 5032 x EC – 520074	0.997 **	-2.714 **	-0.859 **	0.720 **	-1.815 **	-0.548 **	36.585 **	-24.127 **	6.229 **
WIR – 5032 x EC – 914115	0.547 **	1.303 **	0.925 **	0.103 **	2.868 **	1.486 **	28.260 **	-9.161 **	9.550 **
WIR – 5032 x EC – 165690	0.014 **	-0.614 **	-0.300 **	-0.364 **	-0.365 **	-0.364 **	43.860 **	0.156 **	22.008 **
WIR – 5032 x EC – 914092	0.980 **	0.553 **	0.767 **	1.053 **	0.352 **	0.702 **	86.701 **	11.223 **	48.962 **
WIR – 5032 x EC – 520078	0.230 **	0.186 **	0.208 **	0.386 **	-0.148 **	0.119 **	-53.709 **	-0.911 **	-27.310 **
WIR – 5032 x WIR – 3957	-0.253 **	-0.680 **	-0.467 **	-0.130 **	-0.632 **	-0.381 **	5.640 **	6.889 **	6.265 **
WIR – 5032 x EC – 914097	-0.420 **	-1.764 **	-1.092 **	-0.447 **	-1.548 **	-0.998 **	-25.309 **	-6.077 **	-15.693 **
WIR – 5032 x VRT - 02	0.497 **	3.170 **	1.834 **	0.803 **	2.318 **	1.561 **	1.848 **	17.723 **	9.786 **
EC- 520074 x EC – 914115	-1.653 **	-2.847 **	-2.250 **	-1.514 **	-1.965 **	-1.739 **	-16.944 **	-9.061 **	-13.003 **
EC- 520074 x EC – 165690	0.214 **	0.636 **	0.425 **	0.220 **	0.402 **	0.311 **	-21.204 **	8.256 **	-6.474 **
EC- 520074 x EC – 914092	0.180 **	0.403 **	0.292 **	0.436 **	0.518 **	0.477 **	20.968 **	-0.277 **	10.346 **
EC- 520074 x EC – 520078	-0.170 **	0.836 **	0.333 **	-0.630 **	0.218 **	-0.206 **	26.158 **	-19.211 **	3.474 **
EC- 520074 x WIR – 3957	1.547 **	2.570 **	2.059 **	1.453 **	2.135 **	1.794 **	54.646 **	-1.211 **	26.718 **
EC- 520074 x EC – 914097	-0.420 **	-0.914 **	-0.667 **	-0.064 **	-0.782 **	-0.423 **	-30.713 **	4.223 **	-13.245 **
EC- 520074 x VRT - 02	-1.103 **	-1.980 **	-1.542 **	-0.614 **	-1.315 **	-0.964 **	-25.545 **	-0.377 **	-12.961 **
EC- 914115 x EC – 165690	0.164 **	-0.347 **	-0.092 **	0.003 **	-0.515 **	-0.256 **	-34.999 **	4.823 **	-15.088 **
EC- 914115 x EC – 914092	0.330 **	0.220 **	0.275 **	-0.380 **	0.602 **	0.111 **	30.973 **	3.689 **	17.331 **
EC- 914115 x EC – 520078	-0.020 **	0.653 **	0.317 **	0.153 **	0.302 **	0.227 **	47.033 **	2.156 **	24.595 **
EC- 914115 x WIR – 3957	0.097 **	0.386 **	0.242 **	-0.164 **	0.218 **	0.027 **	-16.419 **	-3.444 **	-9.932 **
EC- 914115 x EC – 914097	0.930 **	-0.097 **	0.417 **	1.720 **	0.502 **	1.111 **	42.492 **	0.589 **	21.541 **
EC- 914115 x VRT - 02	0.047 **	0.836 **	0.442 **	0.170 **	0.568 **	0.369 **	94.990 **	2.189 **	48.590 **
EC-165690 x EC- 914092	0.597 **	0.103 **	0.350 **	-0.047 **	-0.232 **	-0.139 **	-7.617 **	-2.594 **	-5.106 **
EC-165690 x EC- 520078	-1.553 **	-0.264 **	-0.909 **	-0.914 **	-0.132 **	-0.523 **	4.503 **	-0.127 **	2.188 **
EC-165690 x WIR – 3957	-0.636 **	-0.530 **	-0.583 **	-0.230 **	-0.615 **	-0.423 **	-7.609 **	-3.327 **	-5.468 **
EC-165690 x EC-914097	-0.603 **	-1.014 **	-0.809 **	-0.547 **	-0.132 **	-0.339 **	15.702 **	4.106 **	9.904 **
EC-165690 x VRT - 02	-1.086 **	0.720 **	-0.183 **	-1.097 **	0.735 **	-0.181 **	-15.140 **	-9.894 **	-12.517 **
EC-914092 x EC-520078	-0.786 **	-0.697 **	-0.742 **	-0.497 **	-0.615 **	-0.556 **	-25.255 **	5.339 **	-9.958 **
EC- 914092 x WIR – 3957	-0.870 **	-1.564 **	-1.217 **	-1.014 **	-0.698 **	-0.856 **	-45.037 **	-6.061 **	-25.549 **
EC-914092 x EC-914097	0.764 **	-0.447 **	0.159 **	0.670 **	-0.615 **	0.027 **	-6.196 **	-2.227 **	-4.212 **
EC-914092 x VRT - 02	-0.920 **	0.086 **	-0.417 **	-0.080 **	-0.548 **	-0.314 **	-23.499 **	10.573 **	-6.463 **
EC-520078 x WIR-3957	0.980 **	1.670 **	1.325 **	0.320 **	2.802 **	1.561 **	11.023 **	6.406 **	8.715 **
EC-520078 x EC-914097	1.214 **	0.986 **	1.100 **	0.403 **	1.285 **	0.844 **	60.934 **	-12.561 **	24.187 **
EC-520078 x VRT - 02	0.730 **	0.920 **	0.825 **	0.253 **	1.352 **	0.802 **	-32.369 **	-2.761 **	-17.565 **
WIR-3957 x EC -914097	0.330 **	0.320 **	0.325 **	-0.314 **	0.202 **	-0.056 **	-26.248 **	-10.161 **	-18.205 **
WIR-3957 x VRT - 02	-0.153 **	-2.347 **	-1.250 **	-0.264 **	-2.132 **	-1.198 **	-34.420 **	6.239 **	-14.091 **
EC-914097 x VRT - 02	0.280 **	-2.030 **	-0.875 **	0.220 **	-2.648 **	-1.214 **	-28.309 **	-8.127 **	-18.218 **
S.E ± (S_{ij})	0.07500	0.07500	0.00000	0.07500	0.07500	0.00000	0.00415	0.07500	0.00000
S.E ± ($S_{ij} - S_{ik}$)	0.07500	0.07500	0.00000	0.07500	0.07500	0.00000	0.00609	0.07500	0.00000
C.D at 5%	0.15115	0.15115	0.00000	0.15115	0.15115	0.00000	0.01228	0.15115	0.00000

*, ** Significant at 5 and 1 per cent levels, respectively

Table 12: Specific combining ability (SCA) effects for yield and yield attributing traits in cherry tomato

Crosses	Number of locules fruit^{-1}			Fruit length (cm)			Fruit diameter (cm)		
	E_1	E_2	Pooled	E_1	E_2	Pooled	E_1	E_2	Pooled
Suncherry x WIR - 5032	0.129 *	0.039	0.084 *	0.224 **	0.510 **	0.367 **	0.215 **	0.460 **	0.338 **
Suncherry x EC – 520074	0.012	0.039	0.026	-0.212 **	0.017 **	-0.098 **	-0.133 **	-0.031 **	-0.082 **
Suncherry x EC – 914115	0.012	0.006	0.009	-0.446 **	-0.306 **	-0.376 **	-0.345 **	-0.353 **	-0.349 **
Suncherry x EC – 165690	-0.138 *	-0.044	-0.091 *	0.403 **	0.669 **	0.536 **	0.200 **	0.462 **	0.331 **
Suncherry x EC – 914092	-0.488 **	0.006	-0.241 **	0.214 **	-0.124 **	0.045 **	0.170 **	-0.198 **	-0.014 **
Suncherry x EC – 520078	0.062	0.006	0.034	0.366 **	0.227 **	0.296 **	0.415 **	-0.024 **	0.196 **
Suncherry x WIR – 3957	0.095	-0.044	0.026	0.146 **	0.251 **	0.199 **	0.142 **	0.373 **	0.258 **
Suncherry x EC – 914097	0.279 **	-0.061	0.109 **	0.154 **	-0.519 **	-0.181 **	0.155 **	0.220 **	0.188 **
Suncherry x VRT - 02	0.012	-0.027	-0.008	-0.296 **	-0.657 **	-0.477 **	-0.446 **	-0.637 **	-0.542 **
WIR – 5032 x EC – 520074	0.129 *	0.039	0.084 *	-0.091 **	-0.230 **	-0.160 **	-0.110 **	-0.286 **	-0.198 **
WIR – 5032 x EC – 914115	0.129 *	0.006	0.067	0.296 **	-0.103 **	0.097 **	0.199 **	-0.118 **	0.040 **
WIR – 5032 x EC – 165690	-0.221 **	-0.044	-0.133 **	-0.036 **	-0.218 **	-0.127 **	-0.096 **	-0.233 **	-0.165 **
WIR – 5032 x EC – 914092	-0.371 **	0.006	-0.183 **	-0.104 **	-0.300 **	-0.202 **	-0.126 **	-0.283 **	-0.205 **
WIR – 5032 x EC – 520078	0.179 **	0.006	0.092 *	0.128 **	0.740 **	0.434 **	0.199 **	0.641 **	0.420 **
WIR – 5032 x WIR – 3957	-0.188 **	-0.044	-0.116 **	0.408 **	0.165 **	0.286 **	0.525 **	0.148 **	0.337 **
WIR – 5032 x EC – 914097	-0.005	-0.061	-0.033	-0.504 **	-0.665 **	-0.585 **	-0.461 **	-0.715 **	-0.588 **
WIR – 5032 x VRT - 02	-0.271 **	-0.027	-0.149 **	-0.494 **	-0.724 **	-0.609 **	-0.503 **	-0.482 **	-0.492 **
EC- 520074 x EC – 914115	0.412 **	0.006	0.209 **	-0.041 **	0.185 **	0.072 **	0.030 **	0.171 **	0.101 **
EC- 520074 x EC – 165690	-0.338 **	-0.044	-0.191 **	-0.172 **	-0.120 **	-0.146 **	-0.225 **	-0.164 **	-0.194 **
EC- 520074 x EC – 914092	0.512 **	0.006	0.259 **	-0.281 **	-0.373 **	-0.327 **	-0.355 **	0.106 **	-0.124 **
EC- 520074 x EC – 520078	0.062	0.006	0.034	0.051 **	0.148 **	0.100 **	0.070 **	0.170 **	0.120 **
EC- 520074 x WIR – 3957	-0.305 **	-0.044	-0.174 **	-0.249 **	-0.008 **	-0.128 **	-0.283 **	-0.093 **	-0.188 **
EC- 520074 x EC – 914097	-0.121 *	-0.061	-0.091 *	0.619 **	0.872 **	0.746 **	0.590 **	0.644 **	0.617 **
EC- 520074 x VRT - 02	-0.388 **	-0.027	-0.208 **	0.229 **	-0.506 **	-0.138 **	0.289 **	-0.463 **	-0.087 **
EC- 914115 x EC – 165690	-0.338 **	-0.077	-0.208 **	0.574 **	0.386 **	0.480 **	0.584 **	0.453 **	0.518 **
EC- 914115 x EC – 914092	-0.488 **	-0.027	-0.258 **	0.206 **	0.444 **	0.325 **	0.094 **	0.043 **	0.068 **
EC- 914115 x EC – 520078	0.062	-0.027	0.017	-0.142 **	-0.205 **	-0.174 **	-0.121 **	-0.293 **	-0.207 **
EC- 914115 x WIR – 3957	0.695 **	-0.077	0.309 **	-0.342 **	-0.161 **	-0.252 **	-0.295 **	-0.155 **	-0.225 **
EC- 914115 x EC – 914097	-0.121 *	-0.094	-0.108 **	-0.374 **	-0.821 **	-0.598 **	-0.381 **	-0.348 **	-0.365 **
EC- 914115 x VRT - 02	-0.388 **	0.339 **	-0.024	-0.184 **	-0.480 **	-0.332 **	-0.323 **	-0.515 **	-0.419 **
EC-165690 x EC- 914092	0.162 **	-0.077	0.042	-0.266 **	0.159 **	-0.053 **	-0.041 **	0.278 **	0.118 **
EC-165690 x EC- 520078	0.112	0.323 **	0.217 **	0.106 **	0.030 **	0.068 **	0.204 **	0.072 **	0.138 **
EC-165690 x WIR – 3957	-0.255 **	0.473 **	0.109 **	0.526 **	0.894 **	0.710 **	0.470 **	0.880 **	0.675 **
EC-165690 x EC-914097	-0.471 **	-0.144 *	-0.308 **	0.134 **	0.624 **	0.379 **	0.144 **	0.477 **	0.310 **
EC-165690 x VRT - 02	0.462 **	-0.111	0.176 **	-0.236 **	-0.145 **	-0.190 **	0.062 **	0.000 **	0.031 **
EC-914092 x EC-520078	-0.038	-0.027	-0.033	0.458 **	0.267 **	0.362 **	0.274 **	0.262 **	0.268 **
EC- 914092 x WIR – 3957	0.195 **	-0.077	0.059	0.158 **	0.091 **	0.125 **	0.100 **	0.130 **	0.115 **
EC-914092 x EC-914097	-0.621 **	0.306 **	-0.158 **	0.286 **	0.371 **	0.329 **	0.354 **	0.357 **	0.355 **
EC-914092 x VRT - 02	-0.888 **	-0.061	-0.474 **	-0.204 **	0.393 **	0.095 **	-0.408 **	0.110 **	-0.149 **
EC-520078 x WIR-3957	-0.255 **	-0.077	-0.166 **	-0.671 **	-1.018 **	-0.844 **	-0.655 **	-1.006 **	-0.830 **
EC-520078 x EC-914097	-0.071	-0.094	-0.083 *	-0.842 **	-1.268 **	-1.055 **	-0.841 **	-1.359 **	-1.100 **
EC-520078 x VRT - 02	-0.338 **	-0.061	-0.199 **	0.408 **	1.164 **	0.786 **	0.417 **	1.384 **	0.901 **
WIR-3957 x EC -914097	-0.438 **	-0.144 *	-0.291 **	0.898 **	1.186 **	1.042 **	0.445 **	0.578 **	0.512 **
WIR-3957 x VRT - 02	1.695 **	0.289 **	0.992 **	-0.052 **	-0.072 **	-0.062 **	0.484 **	0.402 **	0.443 **
EC-914097 x VRT - 02	1.679 **	-0.127 *	0.776 **	0.176 **	0.088 **	0.132 **	0.317 **	0.178 **	0.248 **
S.E ± (S_{ij})	0.05670	0.05822	0.03643	0.07500	0.07500	0.00000	0.07500	0.07500	0.00000
S.E ± ($S_{ij} – S_{ik}$)	0.08335	0.08559	0.05973	0.07500	0.07500	0.00000	0.07500	0.07500	0.00000
C.D at 5%	0.16797	0.17249	0.11773	0.15115	0.15115	0.00000	0.15115	0.15115	0.00000

*, ** Significant at 5 and 1 per cent levels, respectively.

Table 13: Specific combining ability (SCA) effects for yield and yield attributing traits in cherry tomato

Crosses	Average fruit weight (g)			Pericarp thickness (mm)			Fruit yield plant^{-1} (Kg)		
	E_1	E_2	Pooled	E_1	E_2	Pooled	E_1	E_2	Pooled
Suncherry x WIR - 5032	8.918 **	18.649 **	13.783 **	0.141 **	1.646 **	0.893 **	-0.124 **	0.368 **	0.122 **
Suncherry x EC – 520074	-6.772 **	3.765 **	-1.505 **	-0.221 **	-0.061 **	-0.141 **	-0.240 **	0.428 **	0.094 **
Suncherry x EC – 914115	-10.567 **	-6.419 **	-8.491 **	-0.321 **	-0.413 **	-0.367 **	-1.326 **	-0.399 **	-0.862 **
Suncherry x EC – 165690	14.208 **	28.897 **	21.552 **	-0.081 **	1.369 **	0.644 **	0.521 **	0.656 **	0.588 **
Suncherry x EC – 914092	4.812 **	-8.491 **	-1.842 **	0.299 **	0.487 **	0.393 **	0.784 **	-0.549 **	0.117 **
Suncherry x EC – 520078	7.652 **	-4.468 **	1.591 **	0.239 **	0.597 **	0.418 **	-0.281 **	-0.374 **	-0.327 **
Suncherry x WIR – 3957	5.373 **	9.641 **	7.509 **	0.519 **	0.827 **	0.673 **	0.536 **	0.589 **	0.563 **
Suncherry x EC – 914097	7.947 **	-11.686 **	-1.870 **	1.239 **	0.022 **	0.630 **	0.084 **	-0.011	0.036 **
Suncherry x VRT - 02	-15.378 **	-26.496 **	-20.935 **	-0.388 **	-1.618 **	-1.003 **	0.312 **	-0.592 **	-0.140 **
WIR – 5032 x EC – 520074	-1.407 **	10.777 **	4.687 **	0.372 **	-0.796 **	-0.213 **	-0.327 **	0.025 *	-0.151 **

WIR – 5032 x EC – 914115	3.978 **	4.156 **	4.068 **	0.332 **	-0.339 **	-0.003 **	0.723 **	-0.179 **	0.272 **
WIR – 5032 x EC – 165690	-5.187 **	-16.157 **	-10.673 **	-0.128 **	-0.437 **	-0.282 **	0.369 **	-0.378 **	-0.004
WIR – 5032 x EC – 914092	-9.893 **	-21.366 **	-15.628 **	-0.068 **	-0.819 **	-0.443 **	0.623 **	-0.397 **	0.113 **
WIR – 5032 x EC – 520078	5.157 **	21.737 **	13.445 **	0.432 **	0.811 **	0.622 **	-0.052 *	0.696 **	0.322 **
WIR – 5032 x WIR – 3957	6.098 **	0.386 **	3.240 **	0.152 **	0.061 **	0.107 **	1.289 **	0.259 **	0.774 **
WIR – 5032 x EC – 914097	-12.398 **	-32.341 **	-22.371 **	-0.948 **	-1.304 **	-1.126 **	-1.120 **	-0.909 **	-1.014 **
WIR – 5032 x VRT - 02	-9.933 **	-24.311 **	-17.122 **	-0.634 **	-0.984 **	-0.809 **	-0.756 **	-0.493 **	-0.625 **
EC- 520074 x EC – 914115	0.897 **	8.192 **	4.544 **	-0.049 **	0.714 **	0.333 **	-0.132 **	-0.042 **	-0.087 **
EC- 520074 x EC – 165690	-8.267 **	-14.242 **	-11.256 **	-0.689 **	-0.244 **	-0.467 **	-0.796 **	-0.144 **	-0.470 **
EC- 520074 x EC – 914092	-12.474 **	-20.740 **	-16.609 **	-0.549 **	-0.706 **	-0.627 **	-0.226 **	-0.529 **	-0.378 **
EC- 520074 x EC – 520078	0.706 **	1.433 **	1.070 **	-0.149 **	0.564 **	0.208 **	0.840 **	-0.530 **	0.155 **
EC- 520074 x WIR – 3957	-9.512 **	-8.818 **	-9.167 **	-0.529 **	0.274 **	-0.127 **	0.127 **	-0.204 **	-0.039 **
EC- 520074 x EC – 914097	20.311 **	30.365 **	25.339 **	1.411 **	0.129 **	0.770 **	0.714 **	1.305 **	1.010 **
EC- 520074 x VRT - 02	13.156 **	-22.285 **	-4.563 **	0.864 **	-0.491 **	0.187 **	0.712 **	-0.506 **	0.103 **
EC- 914115 x EC – 165690	25.338 **	21.654 **	23.496 **	1.271 **	0.864 **	1.067 **	0.438 **	1.032 **	0.735 **
EC- 914115 x EC – 914092	-6.849 **	8.616 **	0.883 **	-0.089 **	0.702 **	0.306 **	0.621 **	0.520 **	0.571 **
EC- 914115 x EC – 520078	-5.739 **	-12.322 **	-9.029 **	0.371 **	-0.568 **	-0.099 **	0.414 **	-0.554 **	-0.070 **
EC- 914115 x WIR – 3957	-6.037 **	-11.163 **	-8.601 **	-0.289 **	-0.258 **	-0.274 **	-0.513 **	-0.391 **	-0.452 **
EC- 914115 x EC – 914097	-13.164 **	-31.329 **	-22.247 **	-0.149 **	-1.203 **	-0.676 **	-0.048	-0.892 **	-0.470 **
EC- 914115 x VRT - 02	-9.639 **	-24.479 **	-17.061 **	-0.416 **	-1.103 **	-0.760 **	1.113 **	-0.603 **	0.255 **
EC-165690 x EC- 914092	-3.923 **	17.142 **	6.611 **	-0.429 **	-0.296 **	-0.363 **	-0.439 **	0.115 **	-0.162 **
EC-165690 x EC- 520078	4.347 **	-7.745 **	-1.700 **	-0.609 **	-0.266 **	-0.438 **	0.517 **	-0.282 **	0.117 **
EC-165690 x WIR – 3957	14.348 **	59.254 **	36.799 **	1.151 **	1.144 **	1.147 **	0.680 **	1.410 **	1.045 **
EC-165690 x EC-914097	1.902 **	37.317 **	19.611 **	-0.149 **	0.579 **	0.215 **	0.808 **	1.226 **	1.017 **
EC-165690 x VRT - 02	-5.793 **	-11.843 **	-8.816 **	-0.636 **	0.839 **	0.101 **	-0.494 **	-0.811 **	-0.653 **
EC-914092 x EC-520078	17.420 **	24.837 **	21.129 **	1.511 **	0.932 **	1.221 **	0.227 **	1.095 **	0.661 **
EC- 914092 x WIR – 3957	2.682 **	4.706 **	3.696 **	-0.589 **	-0.678 **	-0.634 **	-1.150 **	-0.149 **	-0.649 **
EC-914092 x EC-914097	11.015 **	37.079 **	24.048 **	0.731 **	0.897 **	0.814 **	0.725 **	0.444 **	0.585 **
EC-914092 x VRT - 02	-12.730 **	21.449 **	4.360 **	0.044 **	-0.483 **	-0.220 **	-0.954 **	1.623 **	0.334 **
EC-520078 x WIR-3957	-17.608 **	-36.982 **	-27.295 **	-1.069 **	-1.948 **	-1.509 **	-0.887 **	-1.066 **	-0.977 **
EC-520078 x EC-914097	-24.355 **	-57.458 **	-40.904 **	-1.369 **	-2.873 **	-2.121 **	-0.920 **	-1.747 **	-1.333 **
EC-520078 x VRT - 02	17.640 **	66.492 **	42.065 **	1.264 **	1.307 **	1.285 **	0.184 **	1.646 **	0.915 **
WIR-3957 x EC -914097	27.377 **	39.081 **	33.231 **	1.591 **	1.097 **	1.344 **	0.597 **	0.083 **	0.340 **
WIR-3957 x VRT - 02	4.972 **	8.641 **	6.808 **	0.364 **	0.797 **	0.580 **	-0.312 **	0.928 **	0.308 **
EC-914097 x VRT - 02	12.985 **	11.144 **	12.063 **	-0.016 **	0.512 **	0.248 **	-0.031	-0.452 **	-0.241 **
S.E ± (S_{ij})	0.00072	0.04498	0.02013	0.07500	0.07500	0.00000	0.02528	0.01045	0.01226
S.E ± ($S_{ij} – S_{ik}$)	0.00106	0.06612	0.03302	0.07500	0.07500	0.00000	0.03716	0.01537	0.02011
C.D at 5%	0.00214	0.13326	0.06508	0.15115	0.15115	0.00000	0.07490	0.03097	0.03963

*, ** Significant at 5 and 1 per cent levels, respectively

Table 14: Specific combining ability (SCA) effects for yield and yield attributing traits in cherry tomato

Crosses	Fruit yield hectare^{-1} (q)		
	E_1	E_2	Pooled
Suncherry x WIR - 5032	-41.245 **	101.925 **	30.340 **
Suncherry x EC – 520074	-79.861 **	118.451 **	19.295 **
Suncherry x EC – 914115	-442.626 **	-110.455 **	-276.540 **
Suncherry x EC – 165690	174.495 **	182.158 **	178.327 **
Suncherry x EC – 914092	261.964 **	-152.688 **	54.638 **
Suncherry x EC – 520078	-93.725 **	-104.140 **	-98.932 **
Suncherry x WIR – 3957	177.379 **	163.552 **	170.466 **
Suncherry x EC – 914097	27.742 **	-3.082	12.330 **
Suncherry x VRT - 02	104.704 **	-164.732 **	-30.014 **
WIR – 5032 x EC – 520074	-110.239 **	6.510 *	-51.865 **
WIR – 5032 x EC – 914115	241.913 **	-49.236 **	96.339 **
WIR – 5032 x EC – 165690	122.473 **	-104.603 **	8.935 *
WIR – 5032 x EC – 914092	207.833 **	-109.892 **	48.970 **
WIR – 5032 x EC – 520078	-17.063	193.959 **	88.448 **
WIR – 5032 x WIR – 3957	429.281 **	71.821 **	250.551 **
WIR – 5032 x EC – 914097	-374.273 **	-252.377 **	-313.325 **
WIR – 5032 x VRT - 02	-251.974 **	-136.393 **	-194.184 **
EC- 520074 x EC – 914115	-44.350 **	-11.740 **	-28.045 **
EC- 520074 x EC – 165690	-265.036 **	-40.303 **	-152.670 **
EC- 520074 x EC – 914092	-74.883 **	-147.573 **	-111.228 **
EC- 520074 x EC – 520078	279.988 **	-146.855 **	66.566 **
EC- 520074 x WIR – 3957	42.079 **	-57.063 **	7.492
EC- 520074 x EC – 914097	237.941 **	363.093 **	300.517 **

EC- 520074 x VRT - 02	237.259 **	-140.344 **	48.458 **
EC- 914115 x EC – 165690	145.203 **	286.641 **	215.922 **
EC- 914115 x EC – 914092	207.759 **	143.662 **	175.710 **
EC- 914115 x EC – 520078	137.543 **	-154.167 **	-8.312
EC- 914115 x WIR – 3957	-170.479 **	-108.535 **	-139.507 **
EC- 914115 x EC – 914097	-15.504	-247.593 **	-131.548 **
EC- 914115 x VRT - 02	371.362 **	-167.432 **	101.965 **
EC-165690 x EC- 914092	-146.337 **	31.275 **	-57.531 **
EC-165690 x EC- 520078	171.654 **	-77.907 **	46.873 **
EC-165690 x WIR – 3957	227.581 **	392.148 **	309.865 **
EC-165690 x EC-914097	269.790 **	341.124 **	305.457 **
EC-165690 x VRT - 02	-165.381 **	-225.476 **	-195.429 **
EC-914092 x EC-520078	75.650 **	304.583 **	190.117 **
EC- 914092 x WIR – 3957	-383.656 **	-40.962 **	-212.309 **
EC-914092 x EC-914097	241.416 **	123.274 **	182.345 **
EC-914092 x VRT - 02	-318.972 **	451.071 **	66.050 **
EC-520078 x WIR-3957	-295.498 **	-296.844 **	-296.171 **
EC-520078 x EC-914097	-306.176 **	-486.278 **	-396.227 **
EC-520078 x VRT - 02	61.239 **	457.379 **	259.309 **
WIR-3957 x EC -914097	199.281 **	23.014 **	111.148 **
WIR-3957 x VRT - 02	-103.613 **	258.045 **	77.216 **
EC-914097 x VRT - 02	-9.865	-126.313 **	-68.089 **
S.E ± (S_{ij})	8.47178	2.95242	4.02112
S.E ± ($S_{ij} – S_{ik}$)	12.45298	4.33987	6.59376
C.D at 5%	25.09754	8.74625	12.99626

*, ** Significant at 5 and 1 per cent levels, respectively.

Conclusion

General Combining Ability: From this study, it is concluded that parents WIR-5032, EC-520074, EC-914092 and Sun Cherry in E_1; parents WIR-3957, WIR-5032, Sun Cherry and EC-914097 in E_2 and parents EC-914115, WIR-5032, EC-520074 and EC-914092 in pooled data analysis were found to exhibit significant and desirable GCA effects for most of the traits. Hence, these parents could be selected for use in future crop improvement programmes and direct selection for higher values of yield plant^{-1} can be made in the advanced generations of their heterotic crosses.

Specific Combining Ability

From this study, it is concluded that crosses Sun Cherry x VRT-02, EC-914115 x VRT-02, EC-520074 x EC-914097 and WIR-5032 x WIR-3957 in E_1; EC-520078 x VRT-02, EC-165690 x WIR-3957, EC-520074 x VRT-02 and WIR-3957 x VRT-02 in E_2 and Sun Cherry x VRT-02, WIR-5032 x VRT-02, EC-520074 x EC-914097 and EC-914115 x VRT-02 in pooled data analysis were found to exhibit significant and desirable SCA effects for most of the traits. Hence, these crosses could be selected for exploitation of I am indebted to Dr. Khursheed Hussain and all my committee members for their guidance, technical support and provision of facilities during the whole experimental programme.

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Conflict of Interest

The authors have not declared any conflict of interest.

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