

Original Research Article

Comparative Performance of Various Cherry Tomato (*Solanum* spp.) Accessions and their Crosses for Various Quality Traits under Open-Field and Polyhouse Conditions

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ABSTRACT

The present investigation was carried out at the Experimental Farm, Division of Vegetable Science, SKUAST-K, Shalimar, India during *Kharif* season 2020. Fifty-seven treatments comprising of 45 F_1 's, 10 parents and 2 checks were evaluated for various quality traits in Augmented Block Design (ABD). Analysis of variance revealed significant differences among the parents (accessions) as well as their crosses for all the traits under both environments, in the individual as well as in pooled data analysis. The maximum lycopene content ($\text{mg } 100\text{g}^{-1}$) was recorded in the accession EC-520074 (7.94) and cross EC-914092 x EC-914097 (8.57) in E_1 ; accession EC-914092 (10.32) and cross EC-914115 x EC-520078 (10.72) in E_2 and accession EC-520078 (7.66) and cross EC-914092 x VRT-02 (9.95) in pooled data analysis indicating that these should be considered for further improvement in future breeding programmes in terms of lycopene content.

Keywords

Analysis, *Kharif*,
Parent, Check,
Quality

Introduction

Cherry tomato (*Solanum* spp., $2n=2x=24$), one of the important botanical variety of the cultivated tomato (*Solanum lycopersicum* L.) is a member of nightshade family 'Solanaceae', consisting of 96 genera (Akhtar *et al.*, 2013) and over 3000 species (Melomey *et al.*, 2019; Sharma *et al.*, 2019). It is one of the promising wild type of *Solanum* spp., and is also considered as a 'Protective Food' because of its special nutraceutical value and high level of antioxidants like β -carotene,

vitamin C, carotenoids, polyphenols, phenolics, ascorbate, free amino acids and flavonoids (Lenucci *et al.*, 2006; Kavitha *et al.*, 2014). It is a warm season crop generally characterized by high dry matter content and soluble solids levels than normal-sized fresh tomato cultivars; these differences are due to their higher content of sugars (fructose and glucose) and organic acids (citric and malic), which, in turn, are major factors in determining their greater sweetness, sourness, and overall flavor intensity (Causse *et al.*, 2003; Muttappanavar *et al.*, 2014). It is also

known as salad tomato as its fruits are consumed more as a fruit rather than as a vegetable (Islam *et al.*, 2012). Botanically, the fruit is a berry; a simple fleshy fruit resembling a cherry, very abundant, borne in short, branched clusters, globular, perfectly smooth, with no apparent sutures. The fruits which are edible, ripens to a distinctive red and yellow colour, however other colours like green and black also exist.

Cherry tomato is native to the Andean region encompassing Ecuador and Peru of South America and thereafter it spread around the world following the Spanish colonization of the Americas (Grandillo *et al.*, 2011). It was first found throughout tropical and subtropical America, later propagated in the tropics of Asia and Africa (Gharezi *et al.*, 2012; Venkadeswaran *et al.*, 2018) and is widely distributed in California, Korea, Germany, Mexico and Florida (Anonymous, 2009a).

Though it became popular as a cash crop in various Asian countries, but it is still new in India as well as in Kashmir, as such its area, production and productivity has not been documented till date. But in Himachal Pradesh, protected cultivation of cherry tomatoes has been gaining importance from previous 5-6 years, on account of favourable growing conditions inside the polyhouse. Again, it is relished and is very popular in Brazil partly due to its versatility and ease of combining with a wide variety of uses in salads, appetizers, snacks, sauces, and soups (Filgueira, 2013; Costa *et al.*, 2018).

Materials and Methods

The present investigation was carried out at Vegetable Experimental Farm, Division of Vegetable Science, SKUAST-Kashmir, Shalimar, India during *Kharif* season, 2020 under two environments namely open

environment (E₁) and protected environment (E₂). The altitude of the location is 1685 meters above mean sea level and situated at 34^o.14" North latitude and 74^o.86" East longitude. The climate is temperate characterized by mild summers and very cold winters. The mean minimum and maximum temperatures are recorded in the months of January and June respectively. The maximum rainfall is received during the months from March to April with an average around 1380.20 mm for the year 2019-2020.

Fifty-seven treatments comprising of 45 F₁'s, 10 parents and 2 checks were evaluated for various quality traits in Augmented Block Design. The seeds of all accessions and their crosses were first sown in nursery and then transplanted to the main field at a spacing of 60 x 60 cm between rows and plants respectively.

Recommended package of practices were followed to raise a healthy crop. The observations were recorded on nine quality traits viz., dry matter content, total soluble solids, titratable acidity, ascorbic acid content, lycopene content, total sugars, reducing sugar, non-reducing sugar and juice to pulp ratio by selecting fresh red-ripe fruits from five random plants and the average was worked out.

Results and Discussion

In this study, all the cherry tomato accessions (parental genotypes) and their crosses showed wide range of variability for most of the quality traits (Table 1 to 3) under both environments, in the individual as well as data pooled over environments. The estimates of mean values revealed that no accession as well as cross was superior for all the traits under study. However, different accessions as well as crosses were found to reveal superiority for different traits.

Table.1 Mean performance of genotypes for quality traits in cherry tomato (*Solanum* spp.)

Genotypes	Dry matter content (%)			Total Soluble Solids (^o Brix)			Titratable acidity (%)		
	E ₁	E ₂	Pooled	E ₁	E ₂	Pooled	E ₁	E ₂	Pooled
Suncherry	12.82	5.37	9.12	10.10	10.70	10.00	0.26	0.12	0.21
Suncherry x WIR - 5032	5.42	8.59	10.12	9.90	8.40	10.40	0.15	0.32	0.14
Suncherry x EC – 520074	9.09	10.71	8.71	10.40	10.40	8.80	0.13	0.14	0.33
Suncherry x EC – 914115	11.14	9.90	7.55	10.40	10.80	9.15	0.14	0.11	0.20
Suncherry x EC – 165690	9.97	4.41	7.66	8.70	5.70	9.40	0.32	0.22	0.19
Suncherry x EC – 914092	7.44	5.80	12.41	8.90	6.00	10.30	0.33	0.18	0.32
Suncherry x EC – 520078	7.63	5.38	9.63	8.80	9.30	10.00	0.13	0.17	0.18
Suncherry x WIR – 3957	7.46	5.29	10.76	9.50	6.10	10.15	0.27	0.15	0.32
Suncherry x EC – 914097	6.19	2.88	10.96	9.20	8.70	10.15	0.17	0.11	0.29
Suncherry x VRT - 02	9.12	8.73	11.97	9.60	10.40	10.70	0.21	0.15	0.30
WIR - 5032	14.85	11.97	10.81	10.30	10.50	10.45	0.37	0.17	0.38
WIR – 5032 x EC – 520074	9.96	15.38	10.59	10.30	10.50	10.40	0.26	0.18	0.30
WIR – 5032 x EC – 914115	11.70	14.71	9.39	10.10	10.40	10.05	0.22	0.15	0.36
WIR – 5032 x EC – 165690	7.56	8.05	8.99	9.90	8.90	9.95	0.13	0.20	0.36
WIR – 5032 x EC – 914092	11.65	10.83	7.89	10.20	9.80	8.90	0.20	0.08	0.46
WIR – 5032 x EC – 520078	9.87	7.72	10.36	10.10	9.90	10.65	0.43	0.16	0.34
WIR – 5032 x WIR – 3957	8.87	1.94	10.68	9.90	8.20	10.95	0.34	0.18	0.26
WIR – 5032 x EC – 914097	13.04	9.35	8.80	10.40	10.60	10.05	0.23	0.19	0.37
WIR – 5032 x VRT - 02	13.38	6.72	8.51	10.70	10.10	9.60	0.29	0.11	0.35
EC- 520074	10.55	7.42	8.23	10.70	10.60	9.75	0.31	0.11	0.27
EC- 520074 x EC – 914115	11.90	8.31	7.64	10.50	8.10	8.95	0.31	0.26	0.43
EC- 520074 x EC – 165690	9.72	8.24	6.63	10.40	10.00	8.95	0.44	0.23	0.41
EC- 520074 x EC – 914092	10.70	10.27	8.12	10.70	10.30	9.15	0.25	0.23	0.29
EC- 520074 x EC – 520078	10.48	7.93	10.05	10.10	9.60	9.75	0.35	0.15	0.23

Contd...

Genotypes	Dry matter content (%)			Total Soluble Solids (⁰ Brix)			Titratable acidity (%)		
	E ₁	E ₂	Pooled	E ₁	E ₂	Pooled	E ₁	E ₂	Pooled
EC- 520074 x WIR – 3957	12.26	11.12	8.83	10.50	6.50	9.20	0.42	0.21	0.44
EC- 520074 x EC – 914097	6.51	4.51	6.15	9.60	7.60	9.95	0.29	0.20	0.39
EC- 520074 x VRT - 02	10.13	2.54	10.53	9.50	10.30	10.00	0.34	0.20	0.32
EC- 914115	7.85	5.16	8.00	10.40	9.80	9.05	0.37	0.28	0.39
EC- 914115 x EC – 165690	6.68	4.90	6.57	9.00	6.50	9.95	0.45	0.29	0.27
EC- 914115 x EC – 914092	9.09	3.64	9.65	8.80	5.60	9.40	0.46	0.19	0.23
EC- 914115 x EC – 520078	10.50	8.21	7.16	10.80	9.60	8.25	0.46	0.18	0.17
EC- 914115 x WIR – 3957	10.21	10.26	5.59	10.50	9.80	7.65	0.22	0.17	0.18
EC- 914115 x EC – 914097	11.45	5.21	4.09	11.00	9.90	7.40	0.29	0.15	0.13
EC- 914115 x VRT - 02	9.91	5.34	10.35	10.90	10.00	10.45	0.22	0.18	0.16
EC-165690	8.16	10.45	15.05	10.10	10.30	10.45	0.17	0.19	0.17
EC-165690 x EC- 914092	9.44	3.83	9.44	10.00	6.90	9.35	0.57	0.12	0.14
EC-165690 x EC- 520078	6.53	4.34	4.83	10.00	5.20	9.05	0.41	0.13	0.17
EC-165690 x WIR – 3957	10.48	4.21	8.04	9.20	5.60	10.35	0.29	0.25	0.15
EC-165690 x EC-914097	6.78	3.66	7.87	9.60	5.40	9.35	0.27	0.28	0.19
EC-165690 x VRT - 02	9.67	5.35	9.26	9.90	6.90	10.15	0.27	0.19	0.23
EC- 914092	9.68	5.99	9.53	9.30	5.70	8.05	0.46	0.40	0.18
EC-914092 x EC-520078	5.60	3.88	3.53	8.60	5.20	8.95	0.39	0.17	0.20
EC- 914092 x WIR – 3957	6.39	8.46	5.03	9.50	6.80	8.15	0.30	0.24	0.29
EC-914092 x EC-914097	6.86	3.80	5.93	8.40	5.80	7.60	0.52	0.20	0.19
EC-914092 x VRT - 02	9.31	7.73	7.74	9.10	7.30	9.85	0.29	0.12	0.16
EC- 520078	6.93	5.46	7.90	9.20	6.50	10.15	0.29	0.15	0.19
EC-520078 x WIR-3957	9.15	5.63	4.09	10.00	10.30	6.05	0.16	0.15	0.13
EC-520078 x EC-914097	10.94	11.60	3.94	9.50	10.20	5.50	0.30	0.16	0.27

Contd...

Genotypes	Dry matter content (%)			Total Soluble Solids (⁰ Brix)			Titratable acidity (%)		
	E ₁	E ₂	Pooled	E ₁	E ₂	Pooled	E ₁	E ₂	Pooled
EC-520078 x VRT - 02	6.32	6.72	5.67	8.30	8.10	6.30	0.37	0.14	0.30
WIR- 3957	11.33	6.19	6.17	10.10	10.20	6.00	0.50	0.25	0.21
WIR-3957 x EC - 914097	5.39	2.91	5.77	9.60	4.90	6.55	0.21	0.17	0.16
WIR-3957 x VRT - 02	6.90	5.98	5.55	10.30	6.50	8.40	0.57	0.33	0.15
EC- 914097	12.43	4.72	9.16	10.10	10.20	9.15	0.35	0.22	0.15
EC-914097 x VRT - 02	8.62	3.83	4.55	9.90	5.50	7.55	0.28	0.20	0.21
VRT - 02	7.07	2.24	5.35	8.80	5.10	8.35	0.43	0.24	0.28
Check 1	8.93	7.38	3.04	9.30	8.20	5.30	0.35	0.25	0.22
Check 2	7.77	3.62	5.50	9.20	8.60	8.40	0.41	0.28	0.27
Mean	9.22	6.75	7.99	9.80	8.33	9.07	0.31	0.19	0.25
C.V %	0.00	0.00	21.84	0.00	0.00	10.95	0.00	0.00	27.19
S.E.m ±	0.00	0.00	0.71	0.00	0.00	0.41	0.00	0.00	0.03
C.D at 5%	0.00	0.00	1.98	0.00	0.00	1.13	0.00	0.00	0.08
Range Lowest	5.39	1.94	3.04	8.30	4.90	5.30	0.13	0.08	0.13
Range Highest	14.85	15.38	15.05	11.00	10.80	10.95	0.57	0.40	0.46

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

Table.2 Mean performance of genotypes for quality traits in cherry tomato (*Solanum* spp.)

Genotypes	Ascorbic acid content (mg100g ⁻¹)			Lycopene content (mg100g ⁻¹)			Total sugars (%)		
	E ₁	E ₂	Pooled	E ₁	E ₂	Pooled	E ₁	E ₂	Pooled
Suncherry	23.75	35.00	28.75	3.16	4.07	3.44	4.30	5.73	4.33
Suncherry x WIR - 5032	33.75	42.00	25.63	3.71	8.79	5.65	4.35	4.07	3.77
Suncherry x EC – 520074	27.50	39.20	44.38	6.24	7.10	4.71	3.22	5.73	5.22
Suncherry x EC – 914115	23.75	46.20	24.38	5.06	6.49	4.33	4.32	5.73	4.68
Suncherry x EC – 165690	58.75	43.40	66.88	4.27	3.85	4.33	5.73	4.06	5.35
Suncherry x EC – 914092	30.00	42.00	33.13	5.15	8.88	5.50	4.71	5.33	4.90
Suncherry x EC – 520078	25.00	56.00	38.13	4.14	6.11	4.23	4.71	5.25	4.50
Suncherry x WIR – 3957	23.75	42.00	22.50	4.52	5.99	2.72	4.64	5.73	4.40
Suncherry x EC – 914097	63.75	44.80	31.88	4.48	7.30	6.70	5.87	5.73	3.73
Suncherry x VRT - 02	70.00	36.96	48.13	4.18	5.70	5.24	4.82	5.71	3.55
WIR - 5032	25.00	51.80	51.88	6.16	6.22	4.78	4.74	5.71	1.09
WIR – 5032 x EC – 520074	41.25	44.80	49.38	4.84	4.15	4.50	5.06	5.73	4.23
WIR – 5032 x EC – 914115	40.00	43.40	22.50	3.60	5.65	5.42	4.87	1.05	3.10
WIR – 5032 x EC – 165690	36.25	29.40	37.50	4.86	3.53	5.80	4.13	3.82	3.31
WIR – 5032 x EC – 914092	18.75	35.00	22.50	3.09	5.74	4.82	4.35	1.19	2.71
WIR – 5032 x EC – 520078	26.25	36.40	58.13	2.35	6.79	2.90	4.45	5.73	3.74
WIR – 5032 x WIR – 3957	41.25	28.00	36.25	8.51	5.58	4.73	5.68	5.64	3.85
WIR – 5032 x EC – 914097	22.50	46.20	29.38	4.89	5.94	3.42	1.78	3.41	2.01
WIR – 5032 x VRT - 02	47.50	63.00	31.88	2.53	7.31	5.08	5.31	5.73	1.63
EC- 520074	48.75	57.40	26.88	7.94	7.25	3.38	1.78	5.55	1.49
EC- 520074 x EC – 914115	67.50	42.00	21.25	4.81	5.41	3.43	1.04	5.72	3.36
EC- 520074 x EC – 165690	36.25	43.40	21.25	4.74	7.46	5.63	1.14	5.71	4.87
EC- 520074 x EC – 914092	50.00	51.80	38.13	5.98	6.73	4.25	3.08	5.72	3.80
EC- 520074 x EC – 520078	48.75	53.20	18.13	3.01	2.86	2.81	5.37	3.16	3.19

Contd...

Genotypes	Ascorbic acid content (mg100g ⁻¹)			Lycopene content (mg100g ⁻¹)			Total sugars (%)		
	E ₁	E ₂	Pooled	E ₁	E ₂	Pooled	E ₁	E ₂	Pooled
EC- 520074 x WIR – 3957	21.25	39.20	20.63	7.09	5.34	5.05	1.58	5.57	4.92
EC- 520074 x EC – 914097	23.75	36.40	17.50	3.75	5.61	5.68	4.61	5.73	1.19
EC- 520074 x VRT - 02	17.50	39.20	25.00	5.66	5.19	4.71	2.10	5.71	3.90
EC- 914115	57.50	42.00	21.88	5.94	6.20	3.02	4.52	5.73	1.80
EC- 914115 x EC – 165690	18.75	51.80	28.75	3.64	9.62	4.71	2.26	5.73	4.58
EC- 914115 x EC – 914092	26.25	43.40	40.60	5.99	6.68	7.95	3.16	5.73	4.90
EC- 914115 x EC – 520078	58.75	37.80	44.80	2.64	10.72	5.17	4.69	5.73	4.90
EC- 914115 x WIR – 3957	57.50	35.00	49.00	3.15	9.23	7.50	2.79	5.57	5.29
EC- 914115 x EC – 914097	58.75	29.40	43.40	5.98	10.66	6.65	2.34	5.71	5.73
EC- 914115 x VRT - 02	13.75	43.40	44.38	3.48	6.22	5.96	5.36	5.73	5.71
EC-165690	26.25	40.60	44.10	3.23	9.10	4.90	2.35	5.73	3.39
EC-165690 x EC- 914092	32.50	42.00	32.20	3.61	5.30	4.64	1.67	5.41	2.51
EC-165690 x EC- 520078	36.25	37.80	32.20	3.93	8.07	6.19	1.59	5.73	5.69
EC-165690 x WIR – 3957	27.50	37.80	54.60	6.22	4.60	6.63	1.66	5.53	4.57
EC-165690 x EC-914097	20.00	43.40	49.70	4.23	2.89	6.33	1.61	5.39	5.64
EC-165690 x VRT - 02	33.75	29.40	47.60	2.53	3.57	7.10	1.36	5.74	5.72
EC- 914092	27.50	43.40	46.20	3.23	10.32	4.10	5.73	5.71	4.37
EC-914092 x EC-520078	15.00	49.00	37.80	3.63	5.14	5.40	0.98	5.54	5.72
EC- 914092 x WIR – 3957	20.00	28.00	46.90	2.69	4.91	7.91	4.44	5.74	5.73
EC-914092 x EC-914097	22.50	44.80	40.60	8.57	4.30	8.70	5.30	5.74	5.73
EC-914092 x VRT - 02	50.00	33.60	32.20	3.65	2.98	9.95	1.87	5.47	5.64
EC- 520078	26.25	37.80	42.00	4.84	3.75	7.66	5.73	5.74	5.73
EC-520078 x WIR-3957	18.75	35.00	39.90	1.20	4.62	6.69	2.13	4.37	5.57
EC-520078 x EC-914097	17.50	39.20	40.60	4.42	6.03	3.75	4.24	1.23	5.46

Contd...

Genotypes	Ascorbic acid content (mg100g ⁻¹)			Lycopene content (mg100g ⁻¹)			Total sugars (%)		
	E ₁	E ₂	Pooled	E ₁	E ₂	Pooled	E ₁	E ₂	Pooled
EC-520078 x VRT - 02	20.00	42.00	36.40	6.83	4.07	6.95	4.11	5.73	5.73
WIR- 3957	21.25	37.80	38.50	3.27	8.16	5.03	5.73	5.74	5.64
WIR-3957 x EC - 914097	17.50	42.00	39.20	6.42	8.90	3.64	1.30	5.73	5.61
WIR-3957 x VRT - 02	17.50	50.40	36.40	4.93	9.59	4.19	1.08	5.41	5.06
EC- 914097	27.50	35.00	40.60	6.18	4.47	5.05	4.31	5.73	3.48
EC-914097 x VRT - 02	22.50	33.60	39.90	3.24	8.41	8.53	3.49	5.73	5.74
VRT - 02	22.50	39.20	42.70	3.31	6.50	7.03	1.26	5.72	5.57
Check 1	21.25	44.80	36.40	2.73	5.10	7.46	2.33	5.73	5.73
Check 2	22.50	35.00	39.90	5.34	7.69	6.40	3.43	5.19	5.46
Mean	32.46	41.27	36.86	4.52	6.30	5.41	3.52	5.22	4.37
C.V %	0.00	0.09	20.02	0.00	0.03	24.89	0.00	0.00	22.84
S.E.m ±	0.00	0.02	3.01	0.00	0.00	0.55	0.00	0.00	0.41
C.D at 5%	0.00	0.04	8.39	0.00	0.00	1.53	0.00	0.00	1.13
Range Lowest	13.75	28.00	17.50	1.20	2.86	2.72	0.98	1.05	1.09
Range Highest	70.00	63.00	66.88	8.57	10.72	9.95	5.87	5.74	5.74

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

Table.3 Mean performance of genotypes for quality traits in cherry tomato (*Solanum* spp.)

Genotypes	Reducing sugar (%)			Non-reducing sugar (%)			Juice to pulp ratio		
	E ₁	E ₂	Pooled	E ₁	E ₂	Pooled	E ₁	E ₂	Pooled
Suncherry	3.52	4.73	3.72	0.78	1.00	0.61	2.74	2.64	2.34
Suncherry x WIR - 5032	3.91	3.07	3.10	0.44	1.00	0.67	1.93	1.67	1.64
Suncherry x EC – 520074	2.72	4.73	4.25	0.50	1.00	0.97	1.76	2.18	1.61
Suncherry x EC – 914115	3.47	4.75	4.01	0.84	0.97	0.66	1.51	1.90	2.55
Suncherry x EC – 165690	4.79	3.32	4.54	0.93	0.74	0.81	1.22	1.89	2.88
Suncherry x EC – 914092	3.70	4.33	4.28	1.01	1.00	0.62	2.00	1.72	3.72
Suncherry x EC – 520078	3.98	4.28	3.97	0.72	0.97	0.54	2.12	1.99	2.27
Suncherry x WIR – 3957	4.04	4.76	3.74	0.60	0.97	0.67	2.97	1.58	2.88
Suncherry x EC – 914097	4.88	4.74	2.99	0.99	0.99	0.75	3.81	1.57	2.77
Suncherry x VRT - 02	4.19	5.03	3.07	0.63	0.68	0.49	1.94	2.05	2.11
WIR - 5032	4.49	5.68	0.92	0.25	0.03	0.17	3.19	2.26	2.30
WIR – 5032 x EC – 520074	4.06	4.79	3.56	0.99	0.94	0.68	4.24	1.73	3.28
WIR – 5032 x EC – 914115	4.26	0.89	2.49	0.62	0.16	0.62	2.59	2.48	2.85
WIR – 5032 x EC – 165690	3.68	3.18	2.69	0.45	0.64	0.63	1.94	2.31	3.08
WIR – 5032 x EC – 914092	4.00	0.75	2.26	0.35	0.44	0.46	3.70	2.36	2.35
WIR – 5032 x EC – 520078	3.47	4.81	3.13	0.99	0.92	0.62	2.05	1.65	2.31
WIR – 5032 x WIR – 3957	4.86	4.64	3.17	0.83	1.00	0.69	3.48	1.74	3.07
WIR – 5032 x EC – 914097	1.12	2.51	1.02	0.66	0.91	0.99	2.05	1.87	2.35
WIR – 5032 x VRT - 02	4.60	4.73	1.16	0.72	1.00	0.47	2.08	2.45	2.02
EC- 520074	1.53	4.61	1.05	0.25	0.94	0.44	2.14	1.75	2.63
EC- 520074 x EC – 914115	0.91	4.80	2.75	0.13	0.92	0.61	3.13	2.17	2.48
EC- 520074 x EC – 165690	0.93	4.71	4.31	0.21	1.00	0.57	1.46	1.58	3.30
EC- 520074 x EC – 914092	2.26	4.73	3.17	0.82	0.99	0.64	4.62	2.19	2.01
EC- 520074 x EC – 520078	4.85	2.72	2.81	0.53	0.44	0.38	1.93	1.56	2.21

Contd...

Genotypes	Reducing sugar (%)			Non-reducing sugar (%)			Juice to pulp ratio		
	E ₁	E ₂	Pooled	E ₁	E ₂	Pooled	E ₁	E ₂	Pooled
EC- 520074 x WIR – 3957	1.28	4.63	4.01	0.30	0.44	0.91	3.13	1.56	3.13
EC- 520074 x EC – 914097	3.69	4.73	0.96	0.93	0.94	0.23	2.56	1.62	1.87
EC- 520074 x VRT - 02	1.84	4.74	3.14	0.27	1.00	0.77	2.67	1.66	1.88
EC- 914115	3.53	4.73	1.50	0.99	0.97	0.30	3.48	1.81	2.57
EC- 914115 x EC – 165690	1.91	4.73	3.68	0.35	1.00	0.90	2.06	1.37	2.67
EC- 914115 x EC – 914092	2.60	4.73	3.90	0.56	1.00	1.00	2.63	1.76	1.93
EC- 914115 x EC – 520078	4.02	4.73	4.04	0.68	1.00	0.86	2.09	1.68	1.90
EC- 914115 x WIR – 3957	2.23	4.63	4.31	0.56	1.00	0.99	2.52	1.74	1.86
EC- 914115 x EC – 914097	1.84	4.79	4.75	0.50	0.94	0.98	4.00	1.64	1.58
EC- 914115 x VRT - 02	4.49	4.73	5.36	0.87	0.91	0.35	2.14	1.76	2.16
EC-165690	1.36	4.76	2.84	0.99	1.00	0.55	2.41	1.58	2.11
EC-165690 x EC- 914092	0.68	4.45	1.97	0.99	0.97	0.54	2.29	1.91	2.34
EC-165690 x EC- 520078	1.34	4.73	4.73	0.25	0.97	0.96	1.91	1.91	1.70
EC-165690 x WIR – 3957	0.97	4.54	3.62	0.69	1.00	0.96	2.13	1.62	2.16
EC-165690 x EC-914097	0.96	4.38	4.71	0.65	0.99	0.93	2.48	1.54	1.96
EC-165690 x VRT - 02	1.13	4.73	4.72	0.23	1.00	1.00	2.78	1.69	1.89
EC- 914092	4.74	4.72	3.68	0.99	1.00	0.69	1.76	2.12	1.59
EC-914092 x EC-520078	0.75	4.56	4.74	0.23	0.99	0.98	3.19	1.25	1.74
EC- 914092 x WIR – 3957	4.13	4.74	4.73	0.31	0.97	1.00	2.70	1.52	1.57
EC-914092 x EC-914097	4.48	4.74	4.73	0.82	1.00	1.00	3.90	1.70	1.71
EC-914092 x VRT - 02	1.59	4.72	4.71	0.28	1.00	0.93	1.57	1.62	1.70
EC- 520078	4.74	4.74	4.75	0.99	0.75	0.98	2.45	1.60	1.75
EC-520078 x WIR-3957	1.70	3.49	4.59	0.43	1.00	0.98	2.32	1.63	1.77
EC-520078 x EC-914097	3.92	0.90	4.46	0.32	0.88	1.00	2.09	1.99	1.62

Contd...

Genotypes	Reducing sugar (%)			Non-reducing sugar (%)			Juice to pulp ratio		
	E ₁	E ₂	Pooled	E ₁	E ₂	Pooled	E ₁	E ₂	Pooled
EC-520078 x VRT - 02	3.28	4.73	4.73	0.83	1.00	1.00	3.52	1.89	1.69
WIR- 3957	4.74	4.73	4.65	0.99	1.00	0.99	2.73	1.74	1.61
WIR-3957 x EC - 914097	1.07	4.76	4.73	0.23	0.97	0.87	1.72	1.81	1.61
WIR-3957 x VRT - 02	0.84	4.43	4.12	0.23	0.98	0.94	2.02	1.68	1.81
EC- 914097	3.66	4.73	2.82	0.65	1.00	0.67	1.69	1.91	2.16
EC-914097 x VRT - 02	2.61	4.73	4.75	0.88	1.00	0.99	2.07	1.57	1.78
VRT - 02	1.12	4.78	4.58	0.14	0.94	0.99	2.67	1.34	1.80
Check 1	1.87	4.73	4.76	0.46	1.00	0.97	2.47	1.75	1.46
Check 2	2.63	4.18	4.46	0.79	1.00	1.00	2.70	1.79	1.77
Mean	2.91	4.32	3.62	0.61	0.90	0.75	2.52	1.82	2.17
C.V %	0.00	0.00	24.26	0.00	0.00	25.00	0.00	0.00	20.15
S.E.m ±	0.00	0.00	0.36	0.00	0.00	0.08	0.00	0.00	0.18
C.D at 5%	0.00	0.00	1.00	0.00	0.00	0.21	0.00	0.00	0.50
Range Lowest	0.68	0.75	0.92	0.13	0.03	0.17	1.22	1.25	1.46
Range Highest	4.88	5.68	5.36	1.01	1.00	1.00	4.62	2.64	3.72

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

Based on the overall performance of various cherry tomato accessions (parental genotypes) and their crosses, the accession EC-520074 (7.94) and cross EC-914092 x EC-914097 (8.57) in E₁; accession EC-914092 (10.32) and cross EC-914115 x EC-520078 (10.72) in E₂ and accession EC-520078 (7.66) and cross EC-914092 x VRT-02 (9.95) in pooled data analysis were found to be best with respect to lycopene content (mg 100g⁻¹) indicating that these should be considered for further improvement in future breeding programmes.

Similar findings with respect to mean performance has also been reported by Renuka *et al.*, (2014), Chaudhari *et al.*, (2018), Omprasad *et al.*, (2018), Panchbhaiya *et al.*, (2018), Venkadeswaran *et al.*, (2018), Kannaujia *et al.*, (2019) and Tsagaye *et al.*, (2020).

From this study, it is concluded that all the cherry tomato accessions (parental genotypes) and their crosses can be effectively distinguished by its various quality traits. In future, further studies need to be carried over locations or years to facilitate further utilization in breeding programmes.

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