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Per se Performance of Hybrids and Parents for various Growth and Yield characteristics in Tomato (*Solanum lycopersicon* L.)

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ABSTRACT: An experiment was conducted in Kharif 2021 at P.G. Research Farm, College of Horticulture, Venkataramannagudem, to examine the yield characteristics of parents and hybrids as a whole. When it came to yield and yield-contributing traits, such as fruit yield/plant (5.59) and number of fruits/plant (67.45), VRSL 24 × VRSL 87 was the best genotype. The genotype VRSL 66 × VRSL 104 exhibited a significant advantage in plant height (111.89) and the highest number of primary branches per plant (11.96) compared to VRSL 18 × VRSL 104, which had a higher average fruit weight (88.71). In terms of fruit diameter and length, the genotype VRSL 18 × VRSL 44 was found to be superior (5.67 and5.70). The high yielding hybrids be utilized as commercial varieties after necessary multilocation trials.

Keywords: Tomato, mean, hybrids, per se performance.

INTRODUCTION

Tomato scientifically known as *Lycopersicon esculentum* Mill., are a popular vegetable that are valued globally. Due to its adaptability to a wide range of growing conditions, the wild tomato first emerged in the Peru-Ecuador-Bolvia region of the Andes (South America) (Vavilov, 1951). Since then, it has become one of the most popular vegetables worldwide. The tomato crop is used in the fresh and processed food industries, is very adaptable, and produces copious amounts of food. It is one of the healthiest vegetables, rich in essential minerals and other food ingredients as well as protein, fat, carbohydrates, and vitamins A and C. It is used in both the processed and fresh food sectors. Evaluation of performance followed by release of varieties is scientifically valid (Pidigam *et al.,* 2019; Saidaiah *et al.,* 2021; Rajasekhar Reddy *et al.,* 2017). Keeping the above in view, the present investigation was carried out to assess the per se performance of the parents and hybrids.

MATERIALS AND METHODS

The present investigation consists of three experiments. All the experimental material were evaluated during the period from June 2022 to January 2023 at College of Horticulture, Venkataramannagudem, West Godavari District, Andhra Pradesh. The location falls under Agro-climatic Zone-10, humid, East Coast Plain and Hills with an average rainfall of 900 mm and is geographically situated at 16° 63′ 120″ N latitude and 81° 27′ 568″ E longitude at an altitude of 34 m (112 feet) above mean sea level. The site experiences short humid summers and mild winters. The soil of the experimental site is sandy loam with better drainage and moderate water holding capacity. At all the stages of crop growth, the weather was congenial for growth and development of tomato. Sixty diverse genotypes of tomato were evaluated for various yield and yield attributing traits. The experiment was conducted during the period from July 2021 to February 2021 and was in RBD and replicated thrice, no. of genotypes 7, 21F_1s and 2 checks with Spacing 60 cm × 60 cm.

RESULTS AND DISCUSSION

Fruit length maximum recorded in VRSL 18 × VRSL 44 (5.67), the lower fruit length was observed in VRSL 8 × VRSL 66 (3.89 cm). Plant height varied from 89.33 to 111.89 cm with general mean of 97.10cm. Among the genotypes, higher plant height VRSL 66 × VRSL

104 cm was recorded 111.89 which was VRSL 24 × VRSL 87 (89.33cm), while the no of primary branches varied from 9.21 to 11.90 with a general mean of 10.91. Among, higher number of primary branches of 11.90 was recorded in VRSL 8 × VRSL 18, while the lower no of primary branches was observed in VRSL 44 × VRSL 66 (9.21). Among the genotypes, higher average fruit weight of 88.71 was recorded in VRSL 24 × VRSL 66, while the lower fruit weight was observed in VRSL 8 × VRSL 104 (68.21g). Among, higher fruit yield of 5.59 was recorded in VRSL 24 × VRSL 87, which was followed by VRSL 8 × VRSL 87 (5.30), while the lower fruit weight was observed in VRSL 8 × VRSL 104 (2.03). Similar results were earlier reported by Singh *et al*. (2015); Kumar and Gowda (2016); Maurya *et al*. (2020); Anuradha *et al*. (2020); Kumari *et al*. (2020) for this trait in tomato.

Table 1: Mean values of parents, hybrids and two commercial checks.

Sr. No.	Treatment	Plant height (cm)	No. of primary branches/plant	Fruit length (cm)	Fruit diameter (cm)	Average fruit weight (g)	Number of fruits/ plant	Fruit yield/plant (kg)
T1	VRSL8 × VRSL18	94.11	11.90	5.45	5.32	87.23	52.65	4.59
T2	VRSL8 × VRSL24	91.78	10.34	5.19	4.90	70.49	47.47	3.34
T3	VRSL8 × VRSL44	94.56	11.45	4.91	4.92	69.22	31.45	2.17
T4	VRSL8 × VRSL66	106.45	11.23	3.89	4.92	76.10	49.24	3.74
T5	VRSL8 × VRSL87	91.34	10.56	5.12	5.32	86.77	61.66	5.30
T6	VRSL8 × VRSL104	100.56	11.32	4.21	4.71	68.21	29.86	2.03
T7	VRSL18 × VRSL24	91.89	10.78	4.96	4.91	69.31	37.87	2.62
T8	VRSL18 × VRSL44	97.23	10.37	5.67	5.70	79.75	54.33	4.33
T9	VRSL18 × VRSL66	96.23	11.67	5.32	5.32	80.17	54.85	4.39
T10	VRSL18 × VRSL 87	91.67	11.53	5.28	5.67	86.01	61.11	4.91
T11	VRSL18 × VRSL104	104.34	11.96	3.90	4.89	76.10	48.78	3.71
T12	VRSL24 × VRSL44	94.33	10.67	5.47	5.48	83.10	50.99	4.23
T13	VRSL24 × VRSL66	94.34	10.78	5.19	5.32	88.71	52.13	4.62
T14	VRSL24 × VRSL 87	89.33	11.58	4.89	5.10	82.98	67.45	5.59
T15	VRSL24 × VRSL104	110.35	11.01	3.92	4.78	78.04	43.25	3.37
T16	VRSL44 × VRSL66	98.50	9.21	5.66	5.12	78.78	52.43	4.13
T17	VRSL44 × VRSL87	98.43	9.86	4.98	5.03	72.44	32.87	2.38
T18	VRSL44 × VRSL104	107.37	9.89	3.98	4.91	72.99	45.37	3.31
T19	VRSL66 × VRSL87	97.11	10.31	4.94	5.21	72.09	30.65	2.26
T20	VRSL66 × VRSL104	111.89	10.65	3.90	4.98	76.11	46.78	3.56
T21	VRSL87 × VRSL 104	92.19	10.78	5.26	5.43	80.63	61.01	4.88
T22	VRSL8	92.78	11.82	5.23	5.20	93.76	50.50	4.73
T23	VRSL18	99.16	9.32	5.80	5.70	78.89	51.66	4.07
T24	VRSL24	94.42	12.85	5.60	5.60	81.95	55.33	4.53
T25	VRSL44	96.50	10.50	4.73	4.80	65.63	18.00	1.18
T26	VRSL66	114.20	11.88	3.50	4.56	71.52	43.92	3.14
T27	VRSL87	85.99	11.30	5.38	5.93	81.29	57.66	4.68
T28	VRSL104	97.47	10.19	5.43	5.43	81.80	55.00	4.49
T29	Arka Samrat (Resistant)	91.99	13.30	4.89	4.93	76.44	61.66	4.71
T30	Arka Vikas (susceptible)	86.56	8.32	4.31	4.78	69.18	28.86	1.99
T31	Mean	**97.10**	**10.91**	**4.89**	**5.16**	**77.85**	**47.67**	**3.88**
T32	StdError	0.14	0.01	0.14	0.01	0.03	0.19	0.08
T33	CD@5%	0.42	0.03	0.42	0.03	0.10	0.53	0.24

CONCLUSION AND FUTURE SCOPE

Considering the mean performance, four superior hybrids for fruit yield viz., The identified promising crosses (VRSL 24 × VRSL 87, VRSL 8 × VRSL 87, VRSL 18 × VRSL 87 and VRSL 87 × VRSL 104) could be further evaluated in comparison with commercial hybrids in multilocational trails to confirm their potentiality and to know their stability over different agroclimatic situations. Therefore, using the identified superior cross in additional improvement studies using different breeding strategies is recommended.

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Conflict of Interest. None.

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