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Average Performance of Genotypes for Growth, Yield, and Quality Traits in Tomato (*Solanum lycopersicum* L.)

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ABSTRACT: During Kharif 2021, An experiment was conducted at P.G Research Farm, College of Horticulture, Venkataramannagudem, to examine the individual performance of 60 genotypes for yield characteristics. When it came to yield and yield-contributing traits, such as fruit yield per plant (5.17 kg) and number of fruits per plant (57.66), VRSL 87 was the best genotype. Plant height (137.80) and the number of primary branches per plant (11.88) were found to be significantly higher in the genotype VRSL 223 than in VRSL 66. On the other hand, VRSL 26 had a higher average fruit weight (118.01). Fruit diameter and length (8.50 and 8.40) were found to be superior to those of the genotype VRSL 107. When necessary multilocation trials are completed, the high yielding genotypes will be used as commercial varieties.

Keywords: Tomato, mean, per se performance.

INTRODUCTION

The tomato, or *Lycopersicon esculentum* Mill., is a widely grown vegetable that is considered important worldwide. The wild tomato first appeared in the Peru-Ecuador-Bolvia region of the Andes (South America) (Vavilov, 1951), and it has since spread throughout the world as one of the most popular vegetables due to its adaptability to a variety of growing environments. The tomato crop is highly versatile, can yield large amounts of food, and is used in both the fresh and processed food industries. It is one of the most nutritious vegetables, high in protein, fat, carbs, vitamin A, and vitamin C, among other vital minerals and food components. It finds application in both the fresh and processed food industries. It is scientifically legitimate to evaluate performance as a whole before releasing new varieties (Pidigam *et al.,* 2019; Saidaiah *et al.,* 2021; Rajashekar Reddy *et al.,* 2017). In light of the aforementioned, the current study was conducted to evaluate the tomato accessions' overall performance.

MATERIALS AND METHODS

The current investigation is made up of three experiments. All experimental materials were evaluated at the College of Horticulture in Venkataramannagudem, West Godavari District, Andhra Pradesh, from August 2021 to January 2023. The location is in Agro-climatic Zone-10, humid, East Coast Plain and Hills (Krishna-Godavari zone) with an average rainfall of 900 mm and is geographically located at 16° 63' 120" N latitude and 81° 27' 568" E longitude at 34 m (112 feet) above mean sea level. Summers are short and humid, and winters are mild. The experimental site's soil is a red sandy loam with good drainage and a moderate water holding capacity. The weather was favourable for crop growth and development at all stages of crop development of tomato. Sixty different tomato genotypes were evaluated for yield and yield attributing traits. The experiment was conducted from July 2021 to February 2021 in RBD and replicated FOR 3 times, with a total of 60 genotypes and a spacing of 60 cm 60 cm.

RESULTS AND DISCUSSION

The fruit length was recorded in VRSL 107 (7.46 cm), lower fruit length was observed in VRSL 114 (2.92 cm). Plant height varied from 141.28 to 76.30 cm general mean of 97.06cm. Higher plant height of 141.28 cm was recorded in VRSL 134, which was

VRSL 223 (137. 80 cm), while the lower fruit length was observed in VRSL 107 (76.30 cm) while the number of primary branches varied from 2.50 to 12.85 with general mean of 7.46. Among the genotypes, higher no of primary branches of 12.85 was recorded in VRSL 24, lower number of primary branches was observed in VRSL 177 (2.50). Among, higher average fruit weight of 57.66g was recorded in VRSL 87, which was followed by VRSL 44 (51.88g), the lower fruit weight was observed in VRSL 82 (13.66g). Among the genotypes, higher average fruit yield of 5.17 was recorded in VRSL 87, which was followed by VRSL 8 (4.88), while the lower fruit weight was observed in VRSL 177 (0.64). Similar results were earlier reported by Singh *et al*. (2015); Kumar and Gowda (2016); Maurya *et al*. (2020); Anuradha *et al*. (2020) for this trait in tomato.

Table 1: Mean values of tomato genotypes.

Sr. No.	Treatment	Plant height (cm)	No. of primary branchesper plant	Fruit length (cm)	Fruit diameter (cm)	Average fruit weight (g)	Number of fruits/ plant	Fruit yield/plant (kg)
T1	VRSL 8	92.78	11.82	5.23	5.20	96.66	50.50	4.88
T2	VRSL 18	99.16	9.32	5.80	5.70	81.33	51.66	4.20
T3	VRGL 22	92.00	8.75	4.12	3.35	53.92	32.75	1.76
T4	VRSL 24	94.42	12.85	5.60	5.60	84.33	53.33	4.49
T5	VRGL 26	115.30	7.10	4.58	7.46	118.01	31.10	3.67
T6	VRSL 28	114.51	11.30	5.36	5.10	64.00	38.66	2.47
T7	VRSL 30	87.10	5.75	3.35	4.14	38.31	44.93	1.72
T8	VRSL 38	92.26	9.70	5.46	5.43	63.33	44.33	2.80
T9	VRSL 39	95.70	5.50	5.56	5.60	67.66	43.00	2.90
T10	VRSL 40	107.82	11.11	4.70	4.56	59.00	36.66	2.16
T11	VRSL 41	87.80	3.50	5.46	5.50	66.00	25.00	1.65
T12	VRSL 42	107.82	12.15	4.46	4.46	58.00	33.00	1.91
T13	VRSL 43	90.50	2.83	6.36	6.26	72.66	42.33	3.07
T14	VRSL 44	96.50	10.50	4.73	4.80	87.66	51.88	4.54
T15	VRSL 45	113.10	6.50	5.30	5.43	64.00	51.66	3.30
T16	VRSL 46	93.40	6.60	4.27	4.63	33.95	38.31	1.30
T17	VRSL 52	100.60	7.65	3.58	4.00	43.20	44.56	1.92
T18	VRSL 56	99.50	9.95	4.15	4.64	98.28	39.69	3.90
T19	VRSL 63	89.50	6.83	3.93	4.55	73.43	42.33	3.10
T20	VRSL 66	114.20	11.88	3.50	4.56	86.73	47.92	4.15
T21	VRSL 72	98.40	10.43	6.14	5.00	75.57	49.66	3.75
T22	VRSL78	89.30	2.50	4.73	4.65	96.69	15.00	1.45
T23	VRSL 81	102.60	4.50	6.30	6.40	72.00	15.00	1.08
T24	VRSL 82	105.70	6.50	6.20	6.23	69.00	13.66	0.94
T25	VRSL 86	85.30	5.50	5.63	5.66	69.33	34.33	2.38
T26	VRSL 87	85.99	11.30	5.38	5.93	89.80	57.66	5.17
T27	VRSL 88	100.50	8.10	3.72	4.21	66.48	40.45	2.68
T28	VRSL 90	87.20	7.50	4.69	5.09	52.11	13.66	0.71
T29	VRSL 92	85.00	6.50	4.56	4.56	55.00	42.33	2.32
T30	VRSL 94	91.10	6.50	4.81	4.82	77.67	34.33	2.66
T31	VRSL 104	97.47	10.19	5.43	5.43	84.33	55.00	4.63
T32	VRSL 105	76.90	5.50	3.60	3.80	51.66	43.66	2.25
T33	VRSL 106	100.33	9.80	4.23	4.30	52.33	46.00	2.40
T34	VRSL 107	76.30	5.50	8.50	8.40	66.33	46.66	3.09
T35	VRSL 109	86.50	6.83	4.76	4.80	63.00	41.66	2.62
T36	VRSL 113	94.90	1.83	4.00	5.17	56.67	41.33	2.34
T37	VRSL 114	87.20	2.83	2.97	2.92	42.59	55.33	2.35
T38	VRSL118	89.90	8.45	3.92	4.58	57.26	43.66	2.49
T39	VRSL 122	89.40	8.45	3.66	3.81	64.09	39.56	2.53
T40	VRSL 128	95.60	7.05	4.90	3.40	36.55	45.98	1.68
T41	VRSL 133	87.70	8.90	4.48	4.55	44.46	36.90	1.64
T42	VRSL 134	141.28	8.30	4.43	4.43	54.33	36.90	1.64
T_{43}	VRSL145	93.30	8.20	2.79	3.04	44.36	55.00	2.98
T_{44}	VRSL154	94.00	9.50	3.46	4.72	64.21	46.66	2.06
T_{45}	VRSL160	95.00	7.70	4.32	3.63	55.21	49.90	3.20
T_{46}	VRSL174	88.60	8.60	5.04	4.57	44.93	39.67	2.19
T_{47}	VRSL175	90.20	3.83	5.24	4.71	69.74	33.43	1.50
T_{48}	VRSL176	88.30	3.83	6.27	6.21	114.36	40.33	2.81
T_{49}	VRSL177	105.70	2.50	3.82	3.56	25.62	43.00	3.19
T_{50}	VRSL178	89.70	3.50	5.30	4.57	37.45	25.00	0.64
T_{51}	VRSL180	122.30	8.60	3.70	3.53	54.00	42.33	1.58
T_{52}	VRSL183	105.70	4.83	3.53	3.59	73.54	57.66	3.11

T_{53}	VRSL185	86.10	4.50	4.33	4.36	58.00	18.00	1.32
T_{54}	VRSL187	84.50	7.95	3.85	4.08	32.75	41.33	2.39
T_{55}	VRSL192	89.20	6.50	4.66	4.70	47.66	47.26	1.54
T_{56}	VRSL206	110.67	9.45	4.34	4.30	55.12	65.33	3.11
T_{57}	VRSL209	87.10	6.40	3.68	4.25	38.10	41.45	2.28
T_{58}	VRSL210	122.33	9.00	4.46	3.90	39.55	44.36	1.69
T_{59}	VRSL223	137.80	6.95	5.65	4.73	64.20	42.56	1.68
T_{60}	VRSL244	94.70	5.50	3.70	3.80	50.33	41.56	4.57
	Mean	97.06	7.36	4.670	4.75	62.29	40.54	2.70
	StdError	0.38	0.39	0.38	0.39	0.073	0.20	0.09
	CD@5%	1.08*	0.118**	1.08*	0.118**	0.204*	0.57*	0.27**

CONCLUSION AND FUTURE SCOPE

After multilocation, multisession studies, five superior genotypes for fruit yield, namely VRSL 87, VRSL 8, VRSL 24, VRSL 44, and VRSL 104, may be used as parents. As a result, the identified superior genotypes should be used in subsequent improvement studies using various breeding strategies.

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Conflict of Interest. None.

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