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## Mean performance of tomato (*Solanum lycopersicum* L.) genotypes for yield, yield parameters and quality traits

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### Abstract

The experiment will be carried out at the Horticulture Research Farm, Department of Horticulture, Naini Agricultural Institute, Sam Higginbottom University of Agriculture, Technology and Sciences, Allahabad. The experiment will be conducted in Randomized block design having 26 (genotypes) in three replications. The genotypes TOINDVAR-3 (4.91) recorded highest mean performance for fruit yield per plant (kg). While lowest fruit yield per plant (kg) was observed for TOINDVAR-5 (1.88).

**Keywords:** Tomato, mean performance, genotypes and yield

### Introduction

Tomato (*Solanum lycopersicum* L.) is one of the most important solanaceae vegetable crop having diploid chromosome number  $2n=2x=24$ . It is herbaceous, annual to perennial, prostrate and sexually propagated crop plant with bisexual flowers. There are four to eight flowers in each compound inflorescence. The total sown area under Rabi Tomato is 260.4 thousand ha. so far in the different States. The major area sown are 38.8 thousand ha in Chhattisgarh, followed by Madhya Pradesh (37.0 thousand ha), Haryana (14 thousand ha), Uttar Pradesh (12.8 thousand ha), Tamil Nadu (12.7 thousand ha), Rajasthan (12.5 Thousand ha), Karnataka (9.5 thousand ha), Himachal Pradesh (1.3 thousand ha.). (State Departments of Horticulture & Agriculture, 2017-2018) The genetic variance of any quantitative trait is composed of additive variance (heritable) and non-additive variance and include dominance and epistasis (non-allelic interaction) therefore, it essential to partition the estimated phenotypic variability into its heritable and non-heritable components with suitable parameters such as genetic variance, phenotypic variance, genotypic coefficient of variation, phenotypic coefficient of variation, genetic advance, and heritability. Taisa *et al.* (2011) [8].

### Materials and Methods

The present investigation entitled Mean Performance of Tomato (*Solanum lycopersicum* L.) Genotypes for Yield, Yield Parameters and Quality Traits was conducted in randomized block design with 20 genotypes of tomato in three replications. The objectives were to assess the relative performance, estimation of genetic parameters. The characters studied were yield and yield attributing characters. The experiment was laid out at Vegetable Research Farm, Department of Horticulture, Naini Agricultural Institute SHUATS Allahabad. India in randomized block design (RBD) with three replications. The mean data of each character was subjected to statistical analysis for variance and tests the significance of each character as per the procedure of Panse and Sukhatme (1967). Genotypic and phenotypic correlation coefficients were calculated by standard procedures (Johnson *et al.*, 1955; Hanson *et al.*, 1956) [3, 1]. Heritability ( $h^2$  broad sense) and Genetic advance method by Robinson *et al.* (1949) Genetic advance as percentage over mean method by Johnson *et al.* (1955) [3].

### Results and Discussion

The results of mean performance for different tomato genotypes are presented in (Table 1). The highest plant height of genotype Arka Abha (167.10) Followed by H-88-78-5 (165.89), Angoorlata (161.8) and H-88-78-1(152.20) while lowest plant height was observed for EC 501574 (80.33). Similar observations in tomato were also reported by Mohammed *et al.* (2012) [4] and Narolia *et al.* (2012) [5].

The highest days to first flowering of genotype Kashi vishesh (37.93) Followed by TOINDVAR-5 (37.83), Pusa Cherry (37.13) And Arka Vikesh (36.53). While lowest days to first flowering was observed for Azad T-5 (31.40).

The highest Days to 50% flowering of genotype kashi vishesh (43.67) Followed by TOINDVAR-4 (43.00), TOINDVAR-3 (42.67) and Pusa Cherry (42.67). While lowest days to 50% flowering was observed for S-22 (37.67).

The highest Flower per cluster of genotype Azad T-5 (10.47) Followed by TOINDVAR-3(10.23), AGETA-32(10.13) And Pusa cherry (10.10). While lowest Flower per cluster was observed for Kashi Hemmant (5.80).

The highest flower cluster per plant of genotype EC-501574 (13.40) Followed by Kashi Aman (13.11), Arka Vikash (13.01) And TOINDVAR-2 (13.00). While lowest flower cluster per plant was observed for Pusa Cherry (13.40).

The highest fruit set per cluster of genotype Pusa cherry (6.83) Followed by H-88-78-5(6.60), AGETA-32 (6.23) And Kashi Sharad (6.00). While lowest fruit set per cluster was observed for Kashi hemant (3.97).

The highest fruit weight of genotype TOINDVAR-6 (77.47) Followed by TOINDVAR-3 (74.77), S-22(73.40) And TOINDVAR-1 (73.23). While lowest fruit weight was observed for Punjab Chhuhara (36.60).

The highest fruit per plant of genotype Arka Vikash (74.37) Followed by Azad T-5 (73.90), Pant T-7 (73.20) and H-88-78-5 (71.47). While lowest fruit per plant was observed for Kashi hemant (43.23). Similar observations in tomato were also reported by Singh *et al.* 2006 [7]; Hayadar *et al.* 2007 [2].

The highest fruit yield per plant of genotype TOINDVAR-3 (4.91) Followed by TOINDVAR-1 (4.60), Kashi Aman (4.25) And Pant T-7 (3.97). While lowest fruit yield per plant was observed for TOINDVAR-5 (1.88).

The highest fruit shapes index of genotype TOINDVAR-3 (1.50) Followed by Punjab Chhuhara (1.47), Pant T-5 (1.47) And Pusa Cherry (1.32). While lowest fruit shapes index was observed for H-88-78-5 (0.33).

The highest TSS of genotype Pusa cherry (6.45) Followed by Azad T-5 (5.61), TOINDVAR-3 (5.53) And Arka Abha (5.36). While lowest TSS was observed for S-22 (3.49).

The highest Ascorbic acid (vit c) of genotype Arka Abha (16.33) Followed by Azad T-6 (15.56), Pant-T-7(15.53) And Kashi Sharad (15.47). While lowest Ascorbic acid (vit c) was observed for AGETA-32 (11.67).

The highest acidity of genotype Arka Abha (1.19) Followed by Azad T-6 (1.11), TOINDVAR-3 (1.11) And Hissar Lalit (1.10). While lowest acidity was observed for Kashi Vishesh (0.44).

**Table 1:** Mean performance of different genotypes for growth, yield and quality traits in tomato.

S. No	Character	Plant Height (cm) At 120 DAT	Days to First Flowering	Days to 50% Flowering	Flowers Per Cluster	Flowers Cluster Per Plant	Fruit Set Per Cluster	Fruit Weight (g)	Fruits Per Plant	Fruit Yield Per Plant (kg)	Fruit Shape Index	TSS (°Brix)	Ascorbic Acid (vit C) Mg/100g	Acidity
1	KashiSharad	131.00	35.07	41.00	9.60	11.40	6.00	51.35	67.40	3.48	0.97	4.51	15.47	0.81
2	KashiHemant	90.33	34.93	40.33	5.80	11.13	3.97	64.25	43.23	2.78	0.77	4.09	12.43	0.73
3	KashiAman	81.60	36.27	41.00	6.67	13.11	4.67	70.60	59.42	4.25	1.05	3.95	15.04	0.70
4	ArkaAbha	167.10	34.00	40.33	8.97	10.19	5.23	57.23	45.77	2.66	0.89	5.36	16.33	1.19
5	ArkaVikash	105.33	36.53	41.00	9.83	13.01	5.80	45.60	74.37	3.36	0.78	4.51	13.13	0.75
6	Angoorlata	161.83	33.53	41.00	7.07	10.75	4.87	47.07	61.07	2.19	1.01	4.53	14.43	0.60
7	H-88-78-1	152.20	34.07	40.00	7.47	10.68	4.33	58.40	45.70	2.49	0.62	4.12	13.43	0.73
8	H-88-78-5	165.87	32.93	40.33	9.53	10.67	6.60	40.64	71.47	2.80	0.33	4.47	13.71	0.51
9	Punjab Chhuhara	82.33	32.87	39.00	7.10	10.53	4.63	36.60	50.36	2.01	1.47	4.61	14.53	0.59
10	Azad T-5	149.40	31.40	40.00	10.47	12.78	5.67	47.72	73.90	3.38	0.97	5.61	14.93	0.61
11	Azad T-6	141.67	34.53	40.67	7.17	11.90	4.30	54.57	50.91	2.73	0.98	3.96	15.56	1.11
12	AGETA-32	131.00	33.20	41.00	10.13	11.13	6.23	54.37	69.57	3.89	0.55	3.81	11.67	1.04
13	EC-501574	80.33	36.13	41.00	8.07	13.40	5.00	60.87	56.44	3.41	0.84	4.68	15.09	0.53
14	KashiVishesh	86.40	37.93	43.67	5.97	11.63	4.10	71.07	46.16	3.22	0.49	3.55	15.41	0.44
15	Pusa Cherry	101.67	37.13	42.67	10.10	9.40	6.83	41.93	64.21	2.76	1.32	6.45	12.43	0.82
16	Pant T-5	97.00	33.93	38.33	9.00	9.93	5.90	57.80	58.27	3.28	1.47	3.79	13.79	0.85
17	Pant T-7	81.97	36.20	41.33	7.80	12.33	5.93	55.83	73.20	3.97	0.78	4.21	15.53	0.77
18	HissarLalit	105.33	32.20	38.00	6.73	11.57	4.50	70.03	51.73	3.68	0.81	4.16	14.36	1.10
19	S-22	90.73	32.47	37.67	7.00	10.40	4.43	73.40	46.47	3.48	0.80	3.49	13.69	0.89
20	Pusa Ruby	95.40	33.53	40.00	6.13	11.69	4.13	54.94	49.64	3.41	0.83	3.82	13.30	0.64
21	TOINDVAR-1	104.30	34.10	39.67	8.17	12.30	4.17	73.23	54.70	4.60	0.58	4.73	12.77	0.56
22	TOINDVAR-2	119.77	35.43	41.67	8.30	13.00	5.00	65.97	46.57	3.57	0.71	4.96	13.68	0.66
23	TOINDVAR-3	111.97	36.37	42.67	10.23	9.40	5.73	74.77	55.27	4.91	1.50	5.53	15.47	1.11
24	TOINDVAR-4	122.07	33.37	43.00	8.27	9.57	4.60	62.27	63.37	3.30	0.64	4.80	14.43	0.67
25	TOINDVAR-5	119.30	37.83	40.00	7.33	11.17	5.17	57.87	57.50	1.88	0.64	5.19	13.47	0.69
26	TOINDVAR-6	125.80	35.63	39.00	7.73	10.30	5.80	77.47	62.77	3.09	0.53	4.56	12.33	0.80
	Mean	115.45	34.68	40.55	8.10	11.28	5.14	58.69	57.67	3.25	0.86	4.52	14.09	0.76
	C.V.	7.05	6.01	3.10	21.98	9.39	14.68	13.20	16.19	16.64	12.60	17.23	8.54	25.27
	S.E.	4.70	1.20	0.73	1.03	0.61	0.44	4.47	5.39	0.31	0.06	0.45	0.69	0.11
	C.D. 5%	13.34	3.42	2.06	2.92	1.74	1.24	12.70	15.31	0.89	0.18	1.28	1.97	0.32
Range	Range Lowest	80.33	31.40	37.67	5.80	9.40	3.97	36.60	43.23	1.88	0.33	3.49	11.67	0.44
	Range Highest	167.10	37.93	43.67	10.47	13.40	6.83	77.47	74.37	4.91	1.50	6.45	16.33	1.19

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