



E-ISSN: 2278-4136  
P-ISSN: 2349-8234  
JPP 2018; 7(6): 1766-1769  
Received: 22-09-2018  
Accepted: 24-10-2018

**Anita Kerketta**  
Ph.D. Scholar, Department of  
Horticulture, Naini Agricultural  
Institute, SHUATS, Prayagraj,  
Uttar Pradesh, India

**Vijay Bahadur**  
Associate Professor and Head,  
Department of Horticulture,  
Naini Agricultural Institute,  
SHUATS, Prayagraj, Uttar  
Pradesh, India

**J Rajesh**  
M.Sc. (Ag.) Horticulture  
Vegetable Science Department of  
Horticulture, Naini Agricultural  
Institute, SHUATS, Prayagraj,  
Uttar Pradesh, India

**Correspondence**  
**Anita Kerketta**  
Ph.D. Scholar, Department of  
Horticulture, Naini Agricultural  
Institute, SHUATS, Prayagraj,  
Uttar Pradesh, India

## Performance of different tomato genotypes (*Solanum lycopersicum* L.) for growth, yield and quality traits under Allahabad condition

Anita Kerketta, Vijay Bahadur and J Rajesh

### Abstract

The investigation was carried out to study the performance of different tomato genotypes for growth, yield & quality traits under open conditions on Vegetable Research Farm, Department of Horticulture, Sam Higginbottom University of Agriculture Technology & Sciences, Allahabad during Rabi Season of 2015-16. Twenty diverse genotypes of tomato collected from different sources and all the genotype are grown with three replications in 4 m<sup>2</sup> plot, and the plant keeping 60 x 45 cm maintained between Row and Plant distance. They were evaluated for growth yield & quality attribute for all the traits. On the basis of overall findings of the present research study it was concluded that there is wide range of variation in tomato traits for all the characters studied. The genotypes Arka Abha (165.66cm) is highest the plant height, days to first flower open (29.15) and Flower/ cluster (9.66), lycopen (4.23mg/100gm), Shelf Life (5.66 Days) in Kashi Sharad. The highest fruit set/cluster (5.33), No of fruits/ plant (87.50), Fruit Index (1.43), TSS (7.61<sup>0</sup>Brix) in Pusa Cherry, and the average fruit weight (84.50gm), fruit yield/ plant (4kg) in Genotypes Kashi Aman. TLCV incidence % recorded minimum in the genotypes H-88-78-1 (10.55), Kashi Vishesh showed the minimum severity % of 13.88. The assessment of variation guides the breeder to select superior parents to initiate an effective and fruitful crossing programme to improve the genotypes.

**Keywords:** Growth, yield, quality and tomato, To LCV incidence, severity

### Introduction

Tomato (*Solanum lycopersicum* L. 2n=2x=24) is one of the most popular and widely grown vegetable in the world. It belongs to the family Solanaceae. It is world's largest vegetable crop after potato. Tomato has become an important vegetable of the world in view of the increasing demand for fresh consumption as well as processing industry. Leading tomato producing states in India are Andhra Pradesh (36%) followed by Karnataka (10%), Orissa (8%), West Bengal (6%), Bihar (6%), Gujrat (6%), Maharashtra (4%), Chhattisgarh (4%), Tamil Nadu (3%), Jharkhand (2%) and 15% shared by other states (NHB 2015) [6]. Tomato yellow leaf curl virus (TYLCV) and To LCV are synonyms. Tomato cultivars are under threat of gemini virus transmitted by white fly (*Bemisia tabaci*). TYLCV causes 90-95% yield losses in tomato world-over.

Systematic study and evaluation of germplasm is of great importance for current and future agronomic and genetic improvement of crop. Furthermore, if an improvement program is to be carried out, evaluation of germplasm is imperative, in order to understand the genetic background and breeding value of the available germplasm (Singh *et al.* 2002) [9]. Reshuffling the genes through recombination is the principle way of developing improved genotypes in breeding programs. The breeding strategy involves assembling or generating variable Germplasm with different source of resistance and selection of superior genotypes for using Hybridization. The objective of this preliminary study was to examine the growth, yield and quality traits of tomato genotypes in Allahabad.

### Materials and Method

The material for the study comprised of 20 genotypes of tomato, were collected from IIVR (Indian Institute of Vegetable Research), Varanasi (Table -1). The cultivars were raised in field experiment in randomized block design with three replications in the Vegetable Research Farm, Department of Horticulture, SHUATS, Prayagraj (Allahabad) during October 2015 to April 2016. About four week old seedlings were transplanted at a distance of 60 x45 cm between plants in 4m<sup>2</sup> plots. Besides, the good agricultural practices and plant protection measures were applied time to time as recommended for commercial tomato production. Five plants from each plot were randomly tagged and observations recorded on Plant height,

days to first flowering, days to 50% flowering, flower cluster, flower cluster/ plant, fruit set/ cluster, fruits/ plant, Average fruit weight, fruit yield/ plant, Locules/ fruit/ pericarp thickness, fruit shape index, TSS, Ascorbic acid, Acidity, Lycopene, shelf life, TLCV Incidence, TLCV Severity. The data collected on different parameters during the course of investigation were subjected to statistical analysis as per

method of analysis of variance (Panse and Sukhatme 1957) [8]. The significance and non-significance of the treatment effect were judged with the help of 'F' variance ratio test. Calculated 'F' value (variance ratio) was compared with the table value of 'F' at 5% level of significance. If calculated value exceeded the table value, the effect was considered to be significant.

**Table 1:** List of different Genotypes.

S. No.	Name of Genotypes	Source	S. No.	Name of Genotypes	Source
1	Kashi Sharad	IIVR,VARANASI	11	Azad T-6	IIVR,VARANASI
2	Kashi Hemant	IIVR,VARANASI	12	Ageta-32	IIVR,VARANASI
3	Kashi Aman	IIVR,VARANASI	13	EC-501574	IIVR,VARANASI
4	Arka Abha	IIVR,VARANASI	14	Kashi Vishesh	IIVR,VARANASI
5	Arka Vikash	IIVR,VARANASI	15	Pusa Cherry	IIVR,VARANASI
6	Angoorlata	IIVR,VARANASI	16	Pant T-5	IIVR,VARANASI
7	H-88-78-1	IIVR,VARANASI	17	Pant T-7	IIVR,VARANASI
8	H-88-78-5	IIVR,VARANASI	18	Hissar Lalit	IIVR,VARANASI
9	Punjab Chhuhara	IIVR,VARANASI	19	S-22	IIVR,VARANASI
10	Azad T-5	IIVR,VARANASI	20	Pusa Ruby	IIVR,VARANASI

### Results and Discussion

In order to evaluate the listed genotypes the mean of twenty genotypes including check for twenty Characters. Wide range of variation in mean performance of genotypes was observed for all characters under study (Table 2). The mean performance was highly significant for all characters, suggesting that there is ample scope for selection in different traits for the improvements of tomato.

The range for plant height varied from maximum (165.66) Arka Abha to minimum EC-501574 (77.66). The first flower open days after transplanting, the genotypes is that (29.15) Arka Abha and the longest time is taken by the genotypes (40.55) Kashi Vishesh. The early 50 % flower opening is observed in (38.33) S-22 and the delay is found in the genotypes Azad T-6 (42.66). The mean performance of genotypes indicated that maximum flower/ cluster (9.66) Kashi Sharad and minimum in Kashi Vishesh (5.46). The maximum number of flower cluster/ plant was observed in the genotypes H-88-78-1 (20.27) and minimum in Hisar Lalit (8.95). The highest no. of fruit set/ cluster (5.33) Pusa Cheery and minimum in S-22 (2.58). The highest no. of fruits/ plant was recorded in Pusa Cherry (87.03) and minimum in Pusa Ruby (29.66). The maximum average fruit weight was found in (84.50) Kashi Aman and minimum in (23.20) Pusa Cherry. The Highest fruit yield/ plant in (4.0kg) was observed in Kashi Aman and lowest found in the genotypes Pusa Ruby (1.31kg). The range of no. of locules/ fruit started from highest (7.13) Pant T-7 and minimum in Pusa Cherry (2.26). The maximum pericarp thickness was found in (4.71)

Punjab Chhuhara and minimum in (1.55) Pusa Cherry. The Fruit shape index was found in (1.43) Pusa Cherry and minimum in (0.36) H-88-78-5. The highest Total soluble solids in Pusa Cherry (7.61) and the minimum was recorded in the genotypes Hisar Lalit the value is that the (3.08). The observation of ascorbic acid recorded maximum in Angoorlata (19.78) and minimum in (11.13) Arka Vikas. The acidity recorded maximum in Azad T-5 (1.13) and minimum in H-88-78-5 (0.277). The highest lycopene found in (4.23) Kashi Sharad and lowest in (1.78) Punjab chhuhara. The long day shelf life was observed in (5.66) Kashi Sharad and minimum in (2) H-88-78-1, EC-501574 and S-22. These findings were in accordance with the result obtained by Narolia *et al.* 2012 [5], Jogi *et al.* 2008 [2] and Joshi & Kohli 2005 in tomato.

The disease incidence are minimum in the genotypes Kashi Vishesh (13.88%) followed by H-88-78-5 (16.66) and (22.22) are classified as resistance to TLCV disease. However, genotypes Azeta-32 (58.33) was found moderately susceptible to TLCV disease. Similarly, the minimum disease severity was in genotypes H-88-78-1 (10.55), H-88-78-5 (11.10) and Azad T-5 (12.77) maximum disease severity was observed that Pant T-7 (27.22). Similar finding were also reported by Kalloo and Banerjee (2000) [4] and Kumar *et al.* 2017 [1]. Hence, these genotypes Kashi vishesh, H-88-78-1 and Kashi Aman showed resistance to TLCV and could be utilized as parents in further hybridization programme. To increase in production and productivity of tomato, varieties must be early, high yielder and resistance to TLCV.

**Table 2:** Mean Performance of tomato genotypes for different characters.

Genotypes	Plant Height (cm)	Days to First Flowering	Days to 50% Flowering	Flowers/Cluster	Flower Clusters/plant	Fruit Set/Cluster	Fruits/Plant	Average Fruit Weight (g)	Fruit Yield/Plant (kg)	Locules/Fruit	Pericarp Thickness (mm)	Fruit Shape Index	TSS (°Brix)	Ascorbic Acid (mg/100g)	Acidity (%)	Lycopene (mg/100g)	Shelf Life (Days)	TLCV Incidence (%)	TLCV Severity (%)
Kashi Sharad	134.67	40.07	41.67	9.67	12.70	4.00	50.33	74.67	3.49	2.50	4.34	1.23	4.25	17.91	1.00	4.23	5.67	36.11	25.55
Kashi Hemant	95.53	37.80	40.33	5.33	17.58	3.02	52.08	77.67	3.65	5.70	4.03	1.00	4.06	15.97	0.78	3.05	3.00	44.44	16.11
Kashi Aman	87.20	32.38	41.33	6.00	12.91	3.83	48.08	84.50	4.06	3.40	4.36	0.90	3.25	15.37	0.37	3.30	3.67	22.22	22.77
Arka Abha	165.67	29.15	41.00	9.00	15.38	4.33	65.67	56.02	3.69	2.43	3.12	0.80	5.20	16.83	0.50	3.18	2.67	36.11	17.22
Arka Vikash	110.67	36.60	38.67	9.33	16.62	3.33	54.33	53.80	2.92	2.37	4.38	0.73	4.33	11.13	0.59	3.42	2.33	38.89	18.33
Angoorlata	162.00	32.17	39.67	9.00	19.05	3.33	63.00	35.60	1.96	3.63	3.62	1.17	4.52	19.78	0.83	3.47	3.00	33.33	16.11
H-88-78-1	143.27	35.27	41.33	6.67	20.27	3.83	75.00	32.53	2.10	3.40	4.55	0.63	4.13	14.10	0.48	3.25	2.00	16.66	10.55
H-88-78-5	158.60	34.70	40.33	8.67	15.72	4.00	60.50	51.80	2.71	2.60	3.38	0.37	4.24	13.50	0.28	3.03	2.33	22.22	11.11
Punjab Chhuhara	82.00	31.88	39.67	8.00	11.24	4.17	46.80	44.44	1.75	2.63	4.72	1.47	5.16	15.68	0.85	1.78	3.67	50.00	18.33
Azad t-5	156.07	29.55	41.00	9.75	15.10	2.67	38.30	62.68	2.40	2.50	3.75	0.90	4.51	15.05	1.13	2.07	3.33	41.66	12.77
Azad t-6	151.00	34.97	42.67	7.00	10.44	3.65	37.28	58.73	2.19	2.40	3.53	1.00	4.31	16.09	0.65	2.62	3.00	41.66	25.00
AGETA-32	125.00	34.13	39.00	9.33	12.22	3.33	40.27	59.67	2.13	6.43	4.42	0.73	4.09	12.92	0.53	2.15	2.33	58.33	22.77
EC-501574	77.67	37.07	40.00	7.27	11.92	3.83	45.55	64.80	2.71	2.23	3.69	0.83	4.62	14.08	0.70	3.13	2.00	50.00	19.44
Kashi Vishesh	84.93	40.55	42.00	5.47	13.75	3.20	39.48	83.27	3.29	3.57	3.89	0.73	3.82	16.15	0.65	2.50	3.33	13.88	13.89
Pusa Cherry	97.67	36.33	41.33	9.60	16.29	5.33	87.03	23.20	1.99	2.27	1.55	1.43	7.61	12.61	0.49	2.95	2.33	52.77	18.88
Pant t-5	103.80	32.47	37.67	8.33	13.23	3.08	40.77	60.29	2.45	5.87	3.51	1.40	3.61	12.96	0.38	3.92	3.00	38.89	27.22
Pant t-7	82.07	37.07	41.33	8.80	12.59	3.25	39.93	64.10	2.57	7.13	3.26	1.00	3.46	14.25	0.73	3.63	2.67	30.55	20.55
Hissar Lalit	105.67	34.67	38.67	7.20	8.96	4.13	35.75	72.50	2.59	6.17	3.39	0.83	3.81	13.21	0.59	3.40	2.33	33.33	18.88
S-22	99.20	32.13	38.33	6.60	13.09	2.58	33.43	68.70	2.29	4.77	3.57	0.97	3.08	13.37	0.79	3.13	2.00	27.77	22.77
Pusa Ruby	91.40	35.40	39.00	5.87	10.63	2.92	29.27	50.17	1.32	2.80	3.49	1.00	3.74	16.54	0.48	2.98	2.67	47.22	24.44
Mean	115.70	34.72	40.25	7.84	13.98	3.59	49.14	58.96	2.61	3.74	3.73	0.96	4.29	14.87	0.64	3.06	2.87	36.80	19.14
C.V.	6.17	10.08	2.95	15.50	12.58	17.86	9.95	11.98	12.84	10.70	9.26	13.35	7.20	8.50	32.31	12.00	14.33	28.89	19.37
S.E.	4.12	2.02	0.68	0.70	1.02	0.37	2.82	4.08	0.19	0.23	0.20	0.07	0.18	0.73	0.12	0.21	0.24	6.14	2.14
C.D. 5%	11.80	5.78	1.96	2.01	2.91	1.06	8.09	11.67	0.55	0.66	0.57	0.21	0.51	2.09	0.34	0.61	0.68	17.58	6.13

### Conclusion

On the basis of overall findings of the present research study it was concluded that there is wide range of variation in tomato genotypes for all the characters studied. Kashi Aman was superior from the other genotypes in term of fruit yield/plant in (4.0kg) and genotypes Kashi Vishesh and H-88-78-5 are resistance to TLCV. Hence, these genotypes can be utilized as parents in the hybridization.

### Acknowledgement

The Authors express their thanks to Director, IIVR, Varanasi for providing genotypes.

### References

1. Akask Kumar, Rajnees Srivastava, Vijay Bahadur, Netra Pal, Prasad VM. Genetic divergence for horticultural traits and To LCV resistance in tomato (*Solanum lycopersicum*L.). Vegetable science. 2017; 44(1):42-46.
2. Jogi P, Shukla N, Mehta N, Sahu M. Genetic divergence for fruit traits in tomato (*Lycopersicum esculentum* Mill.). Orissa Journal of Horticulture. 2008; 36(2):149-151.
3. Joshi A, Kohli UK. Genetic divergence for qualitative and quantitative traits in tomato (*Lycopersicum esculentum* Mill.). Indian Journal of Agricultural Sciences. 2003; 73(2):110-113.
4. Kalloo G, Banerjee MK. H-24: Moderately leaf curl resistance var. of tomato (*Lycopersicum esculentum* Mill.). Vegetable Science, 2000, 117-120.
5. Narolia RK, Reddy RVSK, Padma M. Correlation and path coefficient analysis of growth, yield and quality of tomato (*Lycopersicum esculentum* Mill.). Indian Journal of Tropical Biodiversity. 2012; 20(1): 65-69.
6. NHB. Indian Horticulture Database, Gurgaon, 2015, 178-185.
7. Om Prakash Meena, Vijay Bahadur. Assessment of genetic variability, heritability and genetic advance among tomato (*Solanum lycopersicum* L.) germplasm. The Bioscan. 2014; 9(4):1619-1623.
8. Panse VG, Sukhatme. Statistical Method for Agricultural Workers. Indian Council of Agricultural Research Publication, New Delhi, 1957, 1-359 (ed.16).
9. Singh JK, Singh JP, Jain SK, Joshi A. Studies on genetic variability and its importance in tomato. Progressive Horticulture. 2002; 34(1):77-79.
10. Singh H, Cheema DS. Studies on genetic variability and heritability for quality traits of tomato (*lycopersicon esculentum* Mill.). Under heat stress conditions. J Applied Hort. 2005; 7(1):55-57.
11. Tasisa J, Belew D, Bantte K, Gebreselassie W. Variability, heritability and genetic advance in tomato (*lycopersicon esculentum* Mill.) genotypes in West Shoa, Ethiopia. American-Eurasian J Agric. Environ. Sci. 2011; 11(1):87-94.
12. Vavilov NI. The origin variation immunity and breeding of cultivated plant. Soil Science. 1951; 72:482.
13. Meena OP, Bahadur V. Assessment of genetic variability, heritability and genetic advance among tomato (*lycopersicon esculentum* Mill.) germplasm. The Bioscan. 2014; 9(2):1619-1623.