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Pushpendra Singh
Department of Vegetable Science, Acharya
Narendra Deva University of Agriculture &
Technology (ANDUA&T), Kumarganj,
Ayodhya, Uttar Pradesh, India

Aastik Jha
Department of Vegetable Science, Acharya
Narendra Deva University of Agriculture &
Technology (ANDUA&T), Kumarganj,
Ayodhya, Uttar Pradesh, India

Ashish Kumar Singh
Department of Vegetable Science, Acharya
Narendra Deva University of Agriculture &
Technology (ANDUA&T), Kumarganj,
Ayodhya, Uttar Pradesh, India

CN Ram
Department of Vegetable Science, Acharya
Narendra Deva University of Agriculture &
Technology (ANDUA&T), Kumarganj,
Ayodhya, Uttar Pradesh, India

Anil Kumar
Department of Vegetable Science, Acharya
Narendra Deva University of Agriculture &
Technology (ANDUA&T), Kumarganj,
Ayodhya, Uttar Pradesh, India

Sanjeev Singh
Department of Vegetable Science, Acharya
Narendra Deva University of Agriculture &
Technology (ANDUA&T), Kumarganj,
Ayodhya, Uttar Pradesh, India

DK Upadhyaya
Department of Vegetable Science, Acharya
Narendra Deva University of Agriculture &
Technology (ANDUA&T), Kumarganj,
Ayodhya, Uttar Pradesh, India

Kartikey Saini
Department of Vegetable Science, Acharya
Narendra Deva University of Agriculture &
Technology (ANDUA&T), Kumarganj,
Ayodhya, Uttar Pradesh, India

Lokesh Yadav
Krishi Vigyan Kendra (KVK), Panti,
Ambedkar Nagar, Acharya Narendra Deva
University of Agriculture & Technology
(ANDUA&T), Ayodhya, Uttar Pradesh, India

Manoj Kumar Singh
Krishi Vigyan Kendra (KVK), Mankapur,
Gonda, Acharya Narendra Deva University of
Agriculture & Technology (ANDUA&T),
Ayodhya, Uttar Pradesh, India

Corresponding Author:

Aastik Jha
Department of Vegetable Science, Acharya
Narendra Deva University of Agriculture &
Technology (ANDUA&T), Kumarganj,
Ayodhya, Uttar Pradesh, India

Evaluation of genetic variability, heritability and genetic advance in forty genotypes of tomato (*Solanum lycopersicum* L.) for yield and yield contributing traits

Pushpendra Singh, Aastik Jha, Ashish Kumar Singh, CN Ram, Anil Kumar, Sanjeev Singh, DK Upadhyaya, Kartikey Saini, Lokesh Yadav and Manoj Kumar Singh

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Abstract

The Present Investigation involved Forty genotypes of tomato (*Solanum lycopersicum* L.) evaluated for genetic variability, heritability, and genetic advance in yield and yield-contributing traits. The trial was laid out in a Completely Randomized Block Design at the Main Experimental Station, Department of Vegetable Science, Acharya Narendra Deva University of Agriculture and Technology, Ayodhya, Uttar Pradesh, during the year 2024-25. The phenotypic coefficient of variation (PCV) values were slightly higher than the genotypic coefficient of variation (GCV) values for all characters, indicating some influence of environmental factors on trait expression. High magnitudes of phenotypic and genotypic coefficients of variation were observed for pericarp thickness, fruit yield per plant, number of locules, leaf width, yield per hectare, lycopene content, plant height, leaf length, average fruit weight, and ascorbic acid content. High heritability coupled with high genetic advance was exhibited for pericarp thickness, followed by fruit yield per plant, number of locules, leaf width, lycopene content, yield per hectare, plant height, leaf length, ascorbic acid, average fruit weight, fruit length, TSS, number of fruits per cluster, titratable acidity, number of fruits per plant, and fruit width, indicating the predominance of additive gene action and greater effectiveness of direct selection.

Keywords: Tomato, genetic variability, heritability, genetic advance, PCV, GCV, yield-contributing traits, additive gene action, genotypes

Introduction

Tomato (*Solanum lycopersicum* L.) $2n = 2X = 24$, belongs to the Solanaceae family. Tomato is also known as the wolf apple or vilayati apple. It originated in the Peru-Ecuador region of South America (Rick, 1969) [18]. Tomatoes are commonly considered a “protective food,” as they contain high amounts of several nutritive phytochemical compounds, especially carotenoids such as lycopene and β -carotene (provitamin A), flavonoids, phenolic acids, ascorbic acid, and minerals such as calcium, iron, and phosphorus (Kiran *et al.*, 2020) [11]. A hundred grams of edible tomato parts contains 0.9 g protein, 0.1 g fat, 0.7 g fiber, 3.5 g carbohydrates, 15–20 calories of energy, 500–1500 IU vitamin A, 0.1 mg thiamine, 0.02 mg riboflavin, 0.6 mg niacin, 20–25 mg vitamin C, 6–9 mg calcium, and 0.1–0.3 mg iron (Gangwar *et al.*, 2023) [5]. India ranks second after China in tomato production, with a total production of 20.59 million tonnes in an area of 8.10 lakh hectares in 2024–25. Among the states, Madhya Pradesh leads in production, accounting for nearly 13.12% of the national share (27 lakh tonnes), followed by Andhra Pradesh and Karnataka. Uttar Pradesh has also emerged as an important tomato-growing state, with a production of 1.024 million tonnes from 25.47 thousand hectares (Anonymous, 2024) [2]. Genetic variability, heritability and genetic advance analysis are crucial in tomato breeding, as they help determine the level of genetic diversity in tomato crops and select the best genotypes. Genetic variability is the key to crop improvement and the production of high-yield varieties. The greater the genetic variability, the greater the probability of producing recombinants. Studies on genetic variability help in the selection of diverse and desirable parents for further improvements. Heritability is the level of genetic determination of a trait, whereas genetic advance indicates the effectiveness of selection. High heritability, together with high genetic advance, is considered highly reliable for

genetic gain under selection (Rasheed *et al.*, 2023) ^[17].

Materials and Methods

The experiment was conducted at the Main Experimental Station, Department of Vegetable Science, Acharya Narendra Deva University of Agriculture and Technology, Ayodhya, Uttar Pradesh, during the Rabi Season of 2024-25. The Experimental Site coordinates were 26.54°N latitude and 81.84°E longitude, with an altitude of 93 m above mean sea level (AMSL). The site has a humid subtropical climate with an annual rainfall of approximately 1,200 mm. During the cropping season, the temperatures ranged from 4.0 to 39.6°C. The experiment was laid out in a completely randomized block design (C.R.B.D.) with three replications to evaluate 40 tomato genotypes along with one check variety, Kashi Aman (Table 1). Standard agronomic practices and recommended plant protection measures were implemented throughout the cropping period to ensure optimal plant growth. Observations were made on five randomly chosen plants for 20 qualitative and quantitative characters, including days to 50% flowering, days to first flower appearance, days to fruit set, days to first fruit harvest, plant height, leaf length, leaf width, fruit length, fruit width, number of locules, average fruit weight, number of fruits per cluster, number of fruits per plant, pericarp

thickness, total soluble solids, lycopene content, ascorbic acid content, titratable acidity, fruit yield per plant, and fruit yield per hectare. Analysis of variance was calculated by the procedure given by Panse and Sukhatme (1967) ^[13]. Phenotypic and genotypic coefficients of variation were estimated using the procedure given by Burton and Devane (1953) ^[4]. GCV and PCV values were categorized according to the scale proposed by Sivasubramanian and Menon (1973) ^[21]. Values ranging from 0–10% are considered low, values between 10 and 20% as medium, and values above 20% are classified as high. Heritability in the broad sense (h^2bs) was calculated using the formula given by Allard (1960) ^[1], while heritability values were classified as per Robinson *et al.* (1955) ^[8]. Values ranging from 0–30% are considered low, values between 30–60% are categorized as medium and the values estimated above 60% are considered as high. Genetic advance percent of mean (GA%) was estimated by the method suggested by Hanson *et al.* (1956) ^[7], whereas the Genetic advance percent of mean values ranging from 0–10% are considered low, values between 10–20% are categorized as medium and values above 20% are regarded as high, are classified as per the method of Johnson *et al.* (1955) ^[8].

Table 1: Genotypes list and their sources

Sr. No.	Name of Genotypes	Sources	Sr. No.	Name of Genotypes	Sources
1	NDT-1	ANDUA&T Ayodhya	22	NDT-22	ANDUA&T Ayodhya
2	NDT-2	ANDUA&T Ayodhya	23	NDT-23	ANDUA&T Ayodhya
3	NDT-3	ANDUA&T Ayodhya	24	NDT-24	ANDUA&T Ayodhya
4	NDT-4	ANDUA&T Ayodhya	25	NDT-25	ANDUA&T Ayodhya
5	NDT-5	ANDUA&T Ayodhya	26	NDT-26	ANDUA&T Ayodhya
6	NDT-6	ANDUA&T Ayodhya	27	NDT-27	ANDUA&T Ayodhya
7	NDT-7	ANDUA&T Ayodhya	28	NDT-28	ANDUA&T Ayodhya
8	NDT-8	ANDUA&T Ayodhya	29	NDT-29	ANDUA&T Ayodhya
9	NDT-9	ANDUA&T Ayodhya	30	NDT-30	ANDUA&T Ayodhya
10	NDT-10	ANDUA&T Ayodhya	31	NDT-31	ANDUA&T Ayodhya
11	NDT-11	ANDUA&T Ayodhya	32	NDT-32	ANDUA&T Ayodhya
12	NDT-12	ANDUA&T Ayodhya	33	NDT-33	ANDUA&T Ayodhya
13	NDT-13	ANDUA&T Ayodhya	34	NDT-34	ANDUA&T Ayodhya
14	NDT-14	ANDUA&T Ayodhya	35	NDT-35	ANDUA&T Ayodhya
15	NDT-15	ANDUA&T Ayodhya	36	NDT-36	ANDUA&T Ayodhya
16	NDT-16	ANDUA&T Ayodhya	37	NDT-37	ANDUA&T Ayodhya
17	NDT-17	ANDUA&T Ayodhya	38	NDT-38	ANDUA&T Ayodhya
18	NDT-18	ANDUA&T Ayodhya	39	NDT-39	ANDUA&T Ayodhya
19	NDT-19	ANDUA&T Ayodhya	40	Kashi Aman	ICAR- IIVR Varanasi
20	NDT-20	ANDUA&T Ayodhya			
21	NDT-21	ANDUA&T Ayodhya			

Result and Discussion
Analysis of Variance

The analysis of variance (Table -2) indicated that the mean square due to genotypes were highly significant for all the 20 traits studied namely days to 50% flowering, days to first flower appearance, days to fruit set, days to first fruit harvest, plant height, leaf length, leaf width, fruit length, fruit width, number of locules, average fruit weight, number of fruits per cluster, number of fruits per plant, pericarp thickness, total soluble solids, lycopene content, ascorbic acid content, titratable acidity, fruit yield per plant, and fruit yield per hectare, offering ample scope for improving fruit yield and its contributing traits in tomato. Similar results for the number of fruits per plant, fruit length, pericarp thickness, total soluble solids, ascorbic acid, number of locules and average fruit weight were reported by Gopal *et al.* (2023) ^[6], Khokar (2023) ^[10], Pathak *et al.* (2024) ^[14], Prajwalitha

et al. (2022) ^[15], Singh *et al.* (2021) ^[20] and Thakur *et al.* (2025) ^[23], for the fruit yield per plant was by Khokar (2023) ^[10], Prajwalitha *et al.* (2022) ^[15], Rasheed *et al.* (2023) ^[17], Suresh *et al.* (2024) ^[22] and Yeasmin *et al.* (2023) ^[24]. Significant variations in lycopene and titratable acidity were observed by Suresh *et al.* (2024) ^[22].

Coefficient of Variation

The phenotypic coefficient of variation (PCV) values were slightly higher than the genotypic coefficient of variation (GCV) values for all characters, indicating the influence of environmental factors on trait expression. The narrow differences between GCV and PCV for most traits indicated that environmental influence was relatively low and that genetic factors predominantly controlled these traits. High magnitudes of phenotypic and genotypic coefficients of variation were observed

for pericarp thickness, fruit yield per plant, number of locules, leaf width, yield per hectare, lycopene content, plant height, leaf length, average fruit weight, and ascorbic acid content (Table 3). Similar result for pericarp thickness, number of locules, plant height and average fruit weight reported by Gopal *et al.* (2023)^[6], Yeasmin *et al.* (2023)^[24], Shaikh *et al.* (2021)^[19], while fruit yield per plant and yield per hectare also reported by Gopal *et al.* (2023)^[6], Yeasmin *et al.* (2023)^[24] and Prajwalitha *et al.* (2022)^[15] and for lycopene reported by Thakur *et al.* (2025)^[23] and Shaikh *et al.* (2021)^[19], while ascorbic acid reported by Thakur *et al.* (2025)^[23].

Moderate variation of phenotypic and genotypic coefficients were recorded for fruit length, total soluble solids content, number of fruits per cluster, titratable acidity, number of fruits per plant, and fruit width. Similar results for fruit length and fruit width reported

by Yeasmin *et al.* (2023)^[24] and Prajwalitha *et al.* (2022)^[15], while total soluble solids by Shaikh *et al.* (2021)^[19] and Pathak *et al.* (2024), whereas number of fruits per cluster by Thakur *et al.* (2025)^[23] and Pathak *et al.* (2024)^[14], number of fruits per plant by Gopal *et al.* (2023)^[6] and titratable acidity by Kherwa *et al.* (2020)^[9].

Low phenotypic and genotypic values were observed for days to first fruit harvest, days to fruit set, days to 50% flowering, and days to first flower appearance. Similar results for days to first fruit harvest, days to fruit set, days to 50% flowering and days to first flower appearance reported by Prajwalitha *et al.* (2022)^[15], while days to first flower appearance by Shaikh *et al.* (2021)^[19] and Thakur *et al.* (2025)^[23], whereas days to 50% flowering by Gopal *et al.* (2023)^[6] and Pathak *et al.* (2024)^[14].

Table 2: Analysis of variance for twenty characters in tomato.

S. No	Characters	Replication (df = 2)	Genotypes (df = 39)	Error (df = 78)
1	Days 50% flowering	3.40	30.77**	3.36
2	Days to first flower appearance	2.26	25.62**	1.68
3	Days to fruit set	5.50	27.20**	4.83
4	Days to first fruit harvest	1.05	38.54**	17.70
5	Plant height (cm)	89.43	657.17**	13.73
6	Leaf length (cm)	14.72	60.37**	1.33
7	Leaf width (cm)	2.13	42.01**	0.22
8	Fruit length (cm)	0.007	2.393**	0.079
9	Fruit width (cm)	0.030	0.881**	0.050
10	Number of locules	0.059	1.922**	0.067
11	Average fruit weight (g)	35.91	610.64**	14.10
12	Numbers of fruit per cluster	7.42	1.86**	0.13
13	Number of fruits per plant	9.35	23.71**	1.32
14	Pericarp thickness (mm)	0.012	5.857**	0.009
15	TSS (°Brix)	0.038	2.793**	0.011
16	Lycopene (mg/100 g)	0.130	3.339**	0.010
17	Ascorbic acid (mg/100 g)	0.73	26.60**	0.06
18	Titratable acidity (%)	0.0001	0.0125**	0.0003
19	Fruit yield per plant (kg)	0.070	0.480**	0.015
20	Yield (q/ha)	334.99	7083.50**	297.69

Table 3: Range, mean, GCV (%), PCV (%), heritability and GA% for twenty characters of Tomato.

Characters	Range		Mean	Genotypic Coefficient Variance (%)	Phenotypic Coefficient Variance (%)	Heritability (%)	GA% mean
	Minimum	Maximum					
Days 50% flowering	35.33	47	43.1	7.01	8.2	73.13	12.36
Days to first flower appearance	28.33	38.33	34.11	8.28	9.11	82.56	15.5
Days to fruit set	34.99	45.57	41.16	6.78	8.28	67.05	11.44
Days to first fruit harvest	76.29	89.57	83.11	3.17	5.97	28.18	3.47
Plant height (cm)	41.96	96.8	69.72	21.01	21.67	93.98	41.95
Leaf length (cm)	13.08	29.56	21.32	20.81	21.5	93.68	41.5
Leaf width (cm)	9.28	23.01	15.78	23.66	23.84	98.47	48.36
Fruit length (cm)	3.72	7.59	4.98	17.9	18.01	98.89	36.68
Fruit width (cm)	3.40	5.73	4.82	10.91	11.86	84.59	20.66
Number of locules	2.0	4.33	2.99	26.29	27.67	90.24	51.44
Average fruit weight (g)	40.33	86.67	70.68	19.95	20.65	93.38	39.72
Numbers of fruit per cluster	3.11	5.71	4.5	16.88	18.69	81.61	31.42
Number of fruits per plant	13.34	23.33	17.82	15.33	16.63	84.98	29.11
Pericarp thickness (mm)	2.30	6.21	4.64	30.12	30.19	99.53	61.9
TSS (°Brix)	4.0	7.33	5.57	17.27	17.38	98.78	35.37
Lycopene (mg/100gram)	2.49	6.38	4.8	21.94	22.05	99.06	44.99
Ascorbic acid (mg/100gram)	10.09	19.92	14.97	19.87	19.94	99.30	40.79
Titratable acidity (%)	0.32	0.55	0.41	15.5	15.98	94.09	30.97
Fruit yield per plant (kg)	0.71	2.04	1.33	29.52	30.95	90.96	57.99
Yield (q/ha)	127.6	280.2	209.9	22.66	24.1	88.37	43.88

fibers, sugars and vitamins (Muchomba *et al.*, 2023 & Nair *et al.*, 2012). It serves as

Heritability (Hbs) and Genetic advance (%)

The heritability estimates for the 20 traits varied significantly, indicating differences in the degree of genetic control among the characters studied. High heritability was recorded for pericarp thickness, ascorbic acid, lycopene, fruit length, TSS, leaf width, titratable acidity, plant height, leaf length, average fruit weight, number of locules, fruit yield per plant and yield per hectare, indicating that these traits are predominantly governed by genetic factors with minimal environmental influence. Similar results of high heritability for these traits were reported by Anuradha *et al.* (2020) [3], Kherwa *et al.* (2020) [9], Prajwalitha *et al.* (2022) [15], Gopal *et al.* (2023) [6], Mitra *et al.* (2023) [12], Suresh *et al.* (2024) [22], Rajanikant *et al.* (2025) [16] and Thakur *et al.* (2025) [23].

High heritability was also observed for fruit width, number of fruits per plant, days to first flower appearance, number of fruits per cluster, days to 50% flowering and days to fruit set. Similar results for these traits were reported by Singh *et al.* (2021) [20], Prajwalitha *et al.* (2022) [15], Yeasmin *et al.* (2023) [24], Pathak *et al.* (2024) [14] and Suresh *et al.* (2024) [22], whereas days to first fruit harvest exhibited low heritability, similar was reported by Prajwalitha *et al.* (2022) [15].

Genetic advance (GA) as percent of the mean for 20 traits studied, was highest for pericarp thickness, followed by fruit yield

per plant, number of locules, leaf width, lycopene content, yield per hectare, plant height, leaf length, ascorbic acid, average fruit weight, fruit length, TSS, number of fruits per cluster, titratable acidity, number of fruits per plant, and fruit width. These traits exhibited high genetic advance coupled with high heritability, suggesting the predominance of additive gene action and greater effectiveness of direct selection.

Similar results for high genetic advance in pericarp thickness, fruit yield per plant, number of locules, lycopene content, yield per hectare, plant height, ascorbic acid, average fruit weight, fruit length, TSS, number of fruits per cluster were reported by Anuradha *et al.* (2020) [3], Kherwa *et al.* (2020) [9], Yeasmin *et al.* (2023) [24], Mitra *et al.* (2023) [12] and Rajanikant *et al.* (2025) [16], while high genetic advance for number of fruits per plant, fruit width and titratable acidity as reported by Prajwalitha *et al.* (2022) [15].

Moderate genetic advance as percent of mean was recorded for days to first flower appearance, days to 50% flowering and days to fruit set. Similar results for the days to first flower appearance were reported by Prajwalitha *et al.* (2022) [15] and Anuradha *et al.* (2020) [3], while for days to 50% flowering were reported by Mitra *et al.* (2023) [12], Gopal *et al.* (2023) [6], Pathak *et al.* (2024) [14] and Singh *et al.* (2021) [20].

Days to the first fruit harvest showed low genetic advance as percent of mean. Similar result were reported by Prajwalitha *et al.* (2022) [15] and Rajanikant *et al.* (2025) [16].

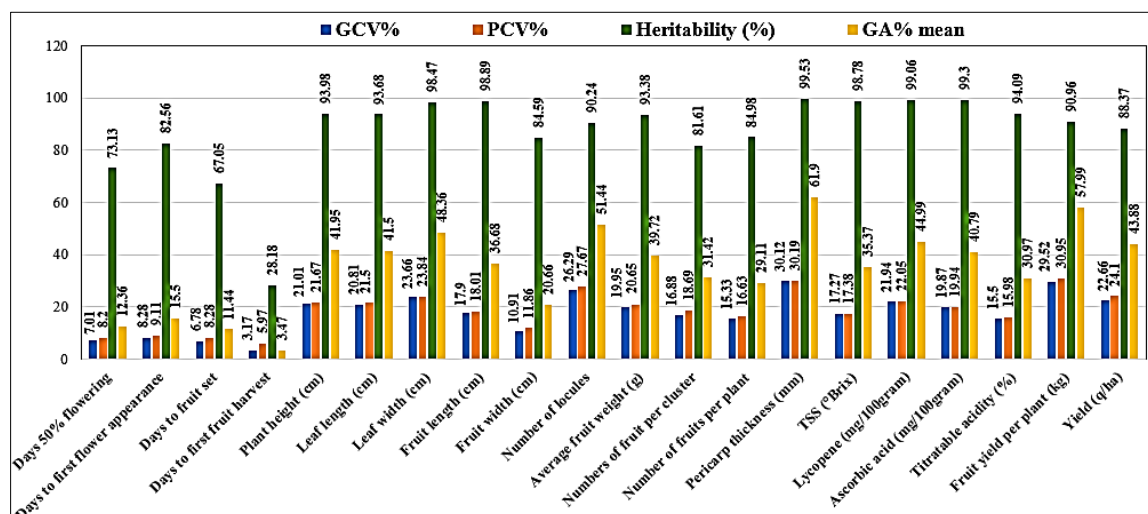


Fig 1: Graph of GCV%, PCV%, Heritability (%) and Genetic advance % of mean.

Conclusion

This investigation was undertaken to evaluate the genetic variability, heritability and genetic advance among 40 tomato genotypes. Analysis of variance showed highly significant differences for all the characters among the genotypes, indicating the presence of a considerable degree of genetic variability. Phenotypic coefficient of variation was higher than Genotypic coefficient of variation for all characters, indicating the influence of the environment on character expression. Both PCV and GCV high for traits pericarp thickness, plant height, ascorbic acid, fruit yield per plant, fruit yield per hectare, number of locules and leaf width, indicating the presence of high genetic variability. Furthermore, high heritability, coupled with high genetic advance for traits pericarp thickness, plant height, ascorbic acid, fruit yield per plant, fruit yield per hectare, number of locules, and leaf width, indicates the predominance of additive gene action and suggests that direct selection would be effective for their improvement.

References

- Allard RW. Relationship between genetic diversity and performance consistency in different environments. *Crop Sci.* 1960;1:127–132.
- Anonymous. Horticultural Statistics at a Glance. New Delhi: Ministry of Agriculture and Farmers Welfare, Government of India; 2024. Available from: <https://agriwelfare.gov.in/en/StatHortEst>
- Anuradha B, Saidaiyah P, Reddy RK, Harikishan S, Geetha A. Genetic variability, heritability, and genetic advance for yield and yield attributes in tomato (*Solanum lycopersicum* L.). *Int J Curr Microbiol Appl Sci.* 2020;9(11):2385–2391.
- Burton GW, DeVane EH. Estimating heritability in tall fescue (*Festuca arundinacea* L.) from replicated clonal material. *Agron J.* 1953;45:478–481.
- Gangwar LK, Sengar R, Kumar V, Prakash S, Mohit, Singh B, *et al.* Estimation of genetic divergence in tomato (*Solanum lycopersicum* L.). *Progressive Agriculture.* 2023;23(2):244–

- 248.
6. Gopal K, Singh AK, Singh BK, Pal AK, Yadav N. Variability studies in diverse genotypes of tomato (*Solanum lycopersicum* L.) under Varanasi conditions. *Int J Plant Soil Sci.* 2023;35(19):915–922.
7. Hanson CH, Robinson HF, Comstock RE. Biometrical studies of yield in segregating populations of Korean lespezeza. *Agron J.* 1956;48(6):268–272.
8. Johnson HW, Robinson HF, Comstock RE. Estimates of genetic and environmental variability in soybeans. *Agron J.* 1955;47(7):314–318.
9. Kherwa RS, Solankey SS, Shivran BC, Kumari R, Kumari M. Genetic variability, heritability and genetic advance in tomato (*Solanum lycopersicon* L.). *Chem Sci Rev Lett.* 2020;9(34):398–402.
10. Khokhar SK. Genetic variability and character association analysis for quantitative and qualitative traits in tomato (*Solanum lycopersicum* L.) hybrids under protected environment. *Plant Arch.* 2023;23(2):501–508.
11. Kiran TP, Srinivasa V, Devaraju BM, Dushyanth M, Ganapathi M, Akshay A. Assessment of genetic diversity in tomato (*Solanum lycopersicum*) under protected condition. *Int J Curr Microbiol Appl Sci.* 2020;9(10):937–942.
12. Mitra DS, Kumar S, Yadav S, Verma S, Yadav L. Assessment of genetic variability, heritability and genetic advance among different characters in tomato [*Solanum lycopersicum* (Mill.) Wettst.]. *Int J Environ Clim Change.* 2023;13(11):2742–2750.
13. Panse VG, Sukhatme PV. Statistical Methods for Agricultural Workers. 4th ed. New Delhi: Indian Council of Agricultural Research; 2000. p. 381.
14. Pathak RK, Meghna SS, Kumar S, Kumar S, Narayan A, Chaudhary S. Genetic variability, heritability and genetic advance in tomato (*Solanum lycopersicum* L.). *Int J Adv Biochem Res.* 2024;8(8):184–187.
15. Prajwalitha K, Kerketta A, Akanksha. Genetic variability, heritability and genetic advance studies for different traits of tomato genotypes and hybrids. *Environ Ecol.* 2022;40(4):2568–2572.
16. Rajanikant, Singh AK, Raghuvanshi A, Maury G, Mishra NS. Assessment of genetic variability for yield and quality traits in tomato (*Solanum lycopersicum* L.). *J Sci Res Rep.* 2025;31(7):899–906.
17. Rasheed A, Ilyas M, Khan TN, Mahmood A, Riaz U, Chattha MB, *et al.* Study of genetic variability, heritability, and genetic advance for yield-related traits in tomato (*Solanum lycopersicon* Mill.). *Front Genet.* 2023;13:1030309.
18. Rick CM, Dempsey WH. Position of the stigma in relation to fruit setting of the tomato. *Bot Gaz.* 1969;130(3):180–186.
19. Shaik M, Ashok P, Babu RK, Sasikala. Studies on genetic variability in tomato (*Solanum lycopersicum* L.) for growth, yield, and quality traits. *Pharma Innov J.* 2021;10(10):1741–1743.
20. Singh H, Yadav GC, Maurya HK, Singh RP. Study on genetic variability in tomato (*Solanum lycopersicum* L.). *Pharma Innov J.* 2021;10(7):1422–1425.
21. Sivasubramanian V, Menon MP. Path analysis for yield and yield components of rice. *Madras Agric J.* 1973;60:1217–1221.
22. Suresh G, Evoor S, Faakruddin B, Jawadagi R, Vasudeva KR, Basavarajappa MP, *et al.* Exploring genetic variability in tomato for yield and quality traits. *Int J Res Agron.* 2024;7(12):321–325.
23. Thakur V, Sharma P, Sharma A, Kumar P, Gupta A. Genetic variability studies in tomato (*Solanum lycopersicum* L.) from pomato grafts. *Vegetos.* 2025;38(1):364–372.
24. Yeasmin S, Dukpa PD, Jatav V, Dwary S. Genetic variability, heritability, and genetic advance for yield and yield contributing traits in tomato (*Solanum lycopersicum* L.). *Int J Adv Biochem Res.* 2023;7(2):207–211.